AIRPORT BOULEVARD BRIDGE REPLACEMENT PROJECT

PALEONTOLOGICAL MEMORANDUM

FOR THE

AIRPORT BOULEVARD BRIDGE REPLACEMENT PROJECT
Community of Thermal, Riverside County, California
08-RIV-County of Riverside

Federal Project Number: BRLS-5956(231)

Prepared by:
Cogstone Resource Management
425 W. La Cadena, Suites 11 and 12
Riverside, CA 92501

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SUMMARY OF FINDINGS

This report assesses the potential for impacting fossil resources for the proposed Airport Boulevard Bridge Replacement Project (project) located in unincorporated Riverside County, California. The County of Riverside (County) in cooperation with the California Department of Transportation (Caltrans) and the City of Coachella (City) propose to replace the existing Airport Boulevard Bridge over the Whitewater River (State Br. No. 56C-0020). The County is the lead agency for the project under the California Environmental Quality Act (CEQA) and Caltrans is the lead agency under the National Environmental Policy Act (NEPA). The purpose of the proposed project is to update the existing facility to meet seismic, scour, flood, and design standards.

Ground disturbing activities would range in depth up to 20 feet below the current surface, while piles would extend to 60 feet deep.

- Roadway cuts – 5 feet deep.
- Bridge abutments will be roughly 20 feet deep.
- The bridge footing excavation/driven piles will be approximately 60 feet deep.

The project is mapped as Holocene (<11,700 years ago) alluvial sand and gravel of Whitewater River, and Holocene alluvial sand and clay of valley areas/clay of playa lakes. Artificial fill was noted within the project area during the survey.

Paleontologist Santiago Hernandez of Cogstone performed a paleontological field survey of the project area on April 14, 2022. All undeveloped and potentially native ground surface areas within the ground disturbance portion of the project area were examined when it was safe to do so; known areas of fill were not examined. When such were present, existing ground disturbances (e.g., cutbanks, ditches, animal burrows, etc.) were visually inspected. Observable native sediments consisted of slightly to moderately sorted, brown to gray silts with some area containing sands and larger cobble sized clasts, consistent with geologic mapping. No fossil resources were observed during the survey.

In assessing the sediments potential to produce fossils, artificial fill is assigned no potential. Locally, Pleistocene fossils typically begin appearing about eight to ten feet deep in the valleys, although rarely fossils occur at shallower depths. Shallower sediments in the valleys usually do not contain the remains of extinct animals, although Holocene (less than 11,700 years old) remains may be present. Project sediments fit all three points for low potential sediments as per Caltrans paleontological sensitivity rankings. Low potential includes all sediments that 1) are potentially fossiliferous but that have not yielded significant fossils in the past; 2) have not yet yielded fossils but possess a potential for containing fossil remains; or 3) contain common and/or

widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock are well understood.

Project sediments do not fit any points for high potential sediments as per Caltrans paleontological sensitivity rankings. High potential includes all sediments that have: 1) abundant vertebrate fossils; 2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; 3) areas that may contain datable organic remains older than Recent, including Neotoma (sp.) middens; 4) areas that may contain unique new vertebrate deposits, traces, and/or trackways; 5) rock units which, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils including, but not limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils; or 6) fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive.

Typically, geological units less than 11,700 years old (Holocene) are given a low sensitivity as they are too young to contain the remains of extinct animals. A study of Lake Cahuilla beds in La Quinta produced radiometric ages of charcoal between 5,890 + 60 and 1,080 + 80 years old from depths of 10.5 feet and 3.3 feet respectively. No fossils of extinct animals were recovered from the 7,050 pounds of sediment.

Because of these factors, the Holocene sediments of the project are assigned a low potential for scientifically significant fossils. No Paleontological Mitigation Plan is required. If unanticipated discoveries are made all work must halt within 60 feet until a qualified paleontologist can evaluate the find per Caltrans Specification 14-7.03. Work may resume immediately outside of the 60-foot radius.

INTRODUCTION

PURPOSE OF STUDY

This report presents the results of a paleontological identification and evaluation study for the Airport Boulevard Bridge Replacement Project (project; Figures 1, 2) located in unincorporated Riverside County, California. The County of Riverside (County) in cooperation with the California Department of Transportation (Caltrans) and the City of Coachella (City) propose to replace the existing Airport Boulevard Bridge over the Whitewater River (State Br. No. 56C-0020). The County is the lead agency for the project under the California Environmental Quality Act (CEQA) and Caltrans is the lead agency for the National Environmental Policy Act (NEPA).

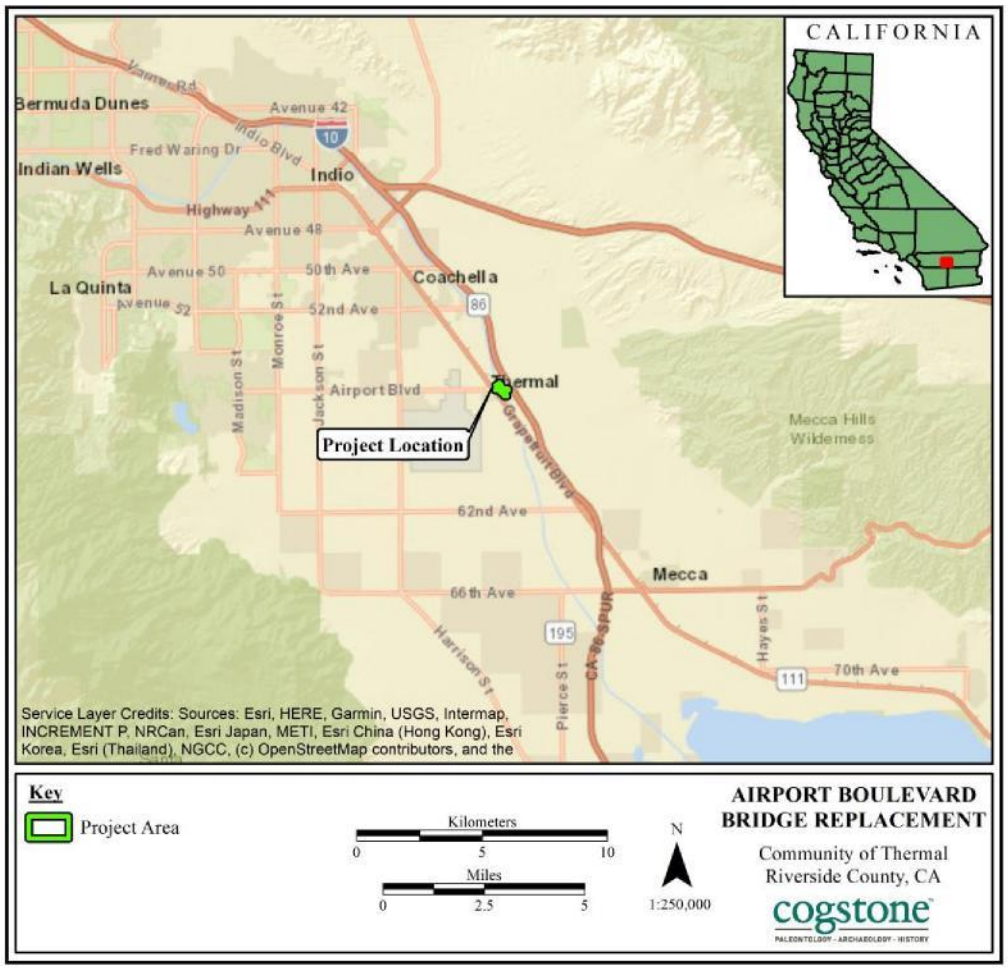

Figure 1. Project Vicinity Map

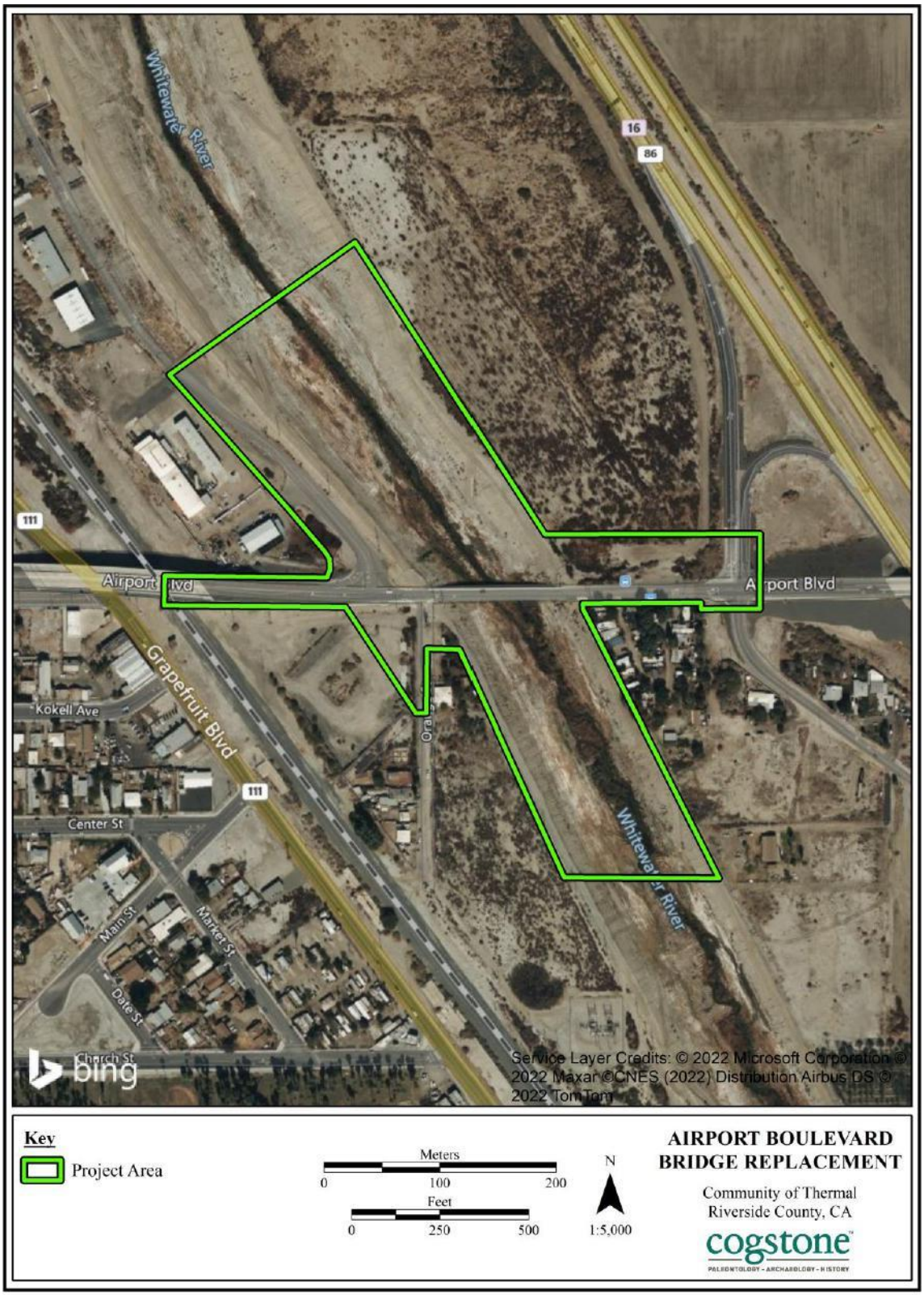

Figure 2. Project Study Area Map

PURPOSE AND NEED

The purpose of the proposed project is to update the existing facility to meet seismic, scour, flood, and design standards.

The need for the project is outlined below:

- The existing bridge has reached its useful design life. The bridge has inadequate shoulder width, lane width and is found to be structurally inadequate to meet the basic required strength and resistance.
- The existing Airport Boulevard Bridge over Whitewater River needs to be replaced with a new bridge that will meet the current seismic, service load design standards, and provide an adequate facility for emergency response and general access across the Whitewater River.

PROJECT DESCRIPTION

The County of Riverside (County) in cooperation with the California Department of Transportation (Caltrans) and the City of Coachella (City) propose to replace the existing Airport Boulevard Bridge over the Whitewater River (State Br. No. 56C-0020). The Airport Boulevard Bridge is located in the community of Thermal, in the County of Riverside, California.

The proposed bridge work is consistent with the 2012-2035 Regional Transportation Plan (RTP) as published by the Southern California Association of Governments (SCAG). The project is anticipated to utilize federal funds through the federal Highway Bridge Program (HBP), as such it requires compliance with the National Environmental Policy Act (NEPA). Caltrans is the lead agency under NEPA and the County is the lead agency under CEQA. The City is a responsible agency under CEQA as the bridge is partially owned by the City as it is partially within City limits and City sphere of influence.

The existing Airport Boulevard Bridge is a two-lane road approximately 366 feet long and 34 feet wide with thirteen spans over the Whitewater River. This road along with the bridge is classified as a “collector street” by the County of Riverside. The bridge was originally built in 1951 and sustained damage in the 1969 flood. Partial reconstruction of the bridge occurred in 1970, when the bents were retrofitted by placing in-fill walls between the bent columns and pile cap with additional steel piles driven at the two ends of the in-filled wall bents. In 2017 the bridge was rehabilitated to include a 5-foot sidewalk on the south side. Furthermore, this bridge also has scour issues that have exposed a portion of the existing steel-encased piles and is now classified as a “Scour Critical Bridge” as of September 2019, based on Caltrans’ inspection in August 2019.

The bridge is listed in the Federal Eligible Bridge List (EBL) with a Sufficiency Rating (SR) of 60 according to the Bridge Inspection Report prepared by Caltrans Structure Maintenance and Investigations (SM&I). Since the bridge has an SR lower than 80, the bridge is eligible for major rehabilitation in accordance with the Highway Bridge Program (HBP) guidelines.

Additionally, the Federal Emergency Management Agency (FEMA) Flood Plain Report indicated significant inundation for the Airport Boulevard Bridge in a 100 year flood event. The Coachella Valley Water District (CVWD) has proposed improvements of the channel at the bridge location, including lowering of the riverbed by five feet and installing concreting lining from bank to bank underneath the existing bridge. The purpose of the CVWD project is to restore channel flow conditions to convey the 100-year flood, provide requisite freeboard and to remove the existing threat of flooding during a 100-year storm event to the parcels within the area of benefit. This project is currently underway; to counter the impact of lowering the channel, four of the bents/support required temporary retrofit, strengthening of these bents/support is also a part of this project.

It has been determined that a seismic structural retrofit would cost approximately $1 million more than replacement of the bridge, and with the significant hydraulic constraint cited above, the County proposes to replace Airport Boulevard Bridge with a new concrete structure. This project proposes to replace the existing two-lane Airport Boulevard Bridge over Whitewater River with a new, wider, two-lane bridge and reconstruct the connecting approach roadways to meet current Caltrans seismic design codes. The new bridge would have foundations placed below the potential scour plane. The project would raise the bridge profile by approximately 2-3 feet in order to maintain a minimum freeboard from the flood water. The reprofiling would extend into approximately 850 feet of approach roadway to the west that will also be reconstructed.

The project may also include minor retaining walls and offsite improvements in order to maintain access to the existing mobile home community on the south side of Airport Boulevard. Roadway improvements also include transition pavement to the existing grade separation structure to the west and improvement of the intersection at Orange Street and Airport Boulevard. The project will also provide sidewalk improvements on the south side of the new bridge as well as accommodate future connectivity to the Coachella Valley Link Trail, which is anticipated to connect to Airport Boulevard along the unnamed local road in the northwestern quadrant of the project.

Depending on the project design, utility relocation may be required. Coordination with the following utilities to determine actions that may need to be taken once project design is established include: Coachella Valley Water District, Imperial Irrigation, Kinder Morgan Energy

Partners, Level 3 Communications/CenturyLink, MCI (Verizon Business), So Cal Gas (Distribution - Palm Desert division), and Utiliquest for Frontier.

The new bridge will be constructed in two stages. Stage 1 is to construct the north half of the bridge along the north edge of the existing structure, while the traffic on Airport Boulevard would remain on the existing bridge in each direction, unless necessary to reduce traffic control to one-way traffic to temporarily accommodate construction vehicles. Once Stage 1 is constructed, two lanes of traffic will be shifted to the newly constructed bridge while the existing bridge is demolished in Stage 2. Upon completion of demolition, the remaining south half of the proposed bridge will be constructed and completed once joined to the north half of the bridge with a closure pour.

Sliver takes for right of way acquisition would be required, and the commercial land in the northeast quadrant adjacent to the project area would potentially be considered as a staging area.

PROJECT STUDY AREA

The project is mapped within sections 15 and 22 of Township 6 South, Range 8 East of the Indio 7.5-minute United States Geological Survey topographic map within the San Bernardino Base Meridian (Figure 3). The project area spans approximately 25.96 acres along Airport Boulevard.

Ground disturbing activities would range in depth up to 20 feet below the current surface, while piles would extend to 60 feet deep.

- Roadway cuts - 5 feet deep.
- Bridge abutments will be roughly 20 feet deep.
- The bridge footing excavation/driven piles will be approximately 60 feet deep.

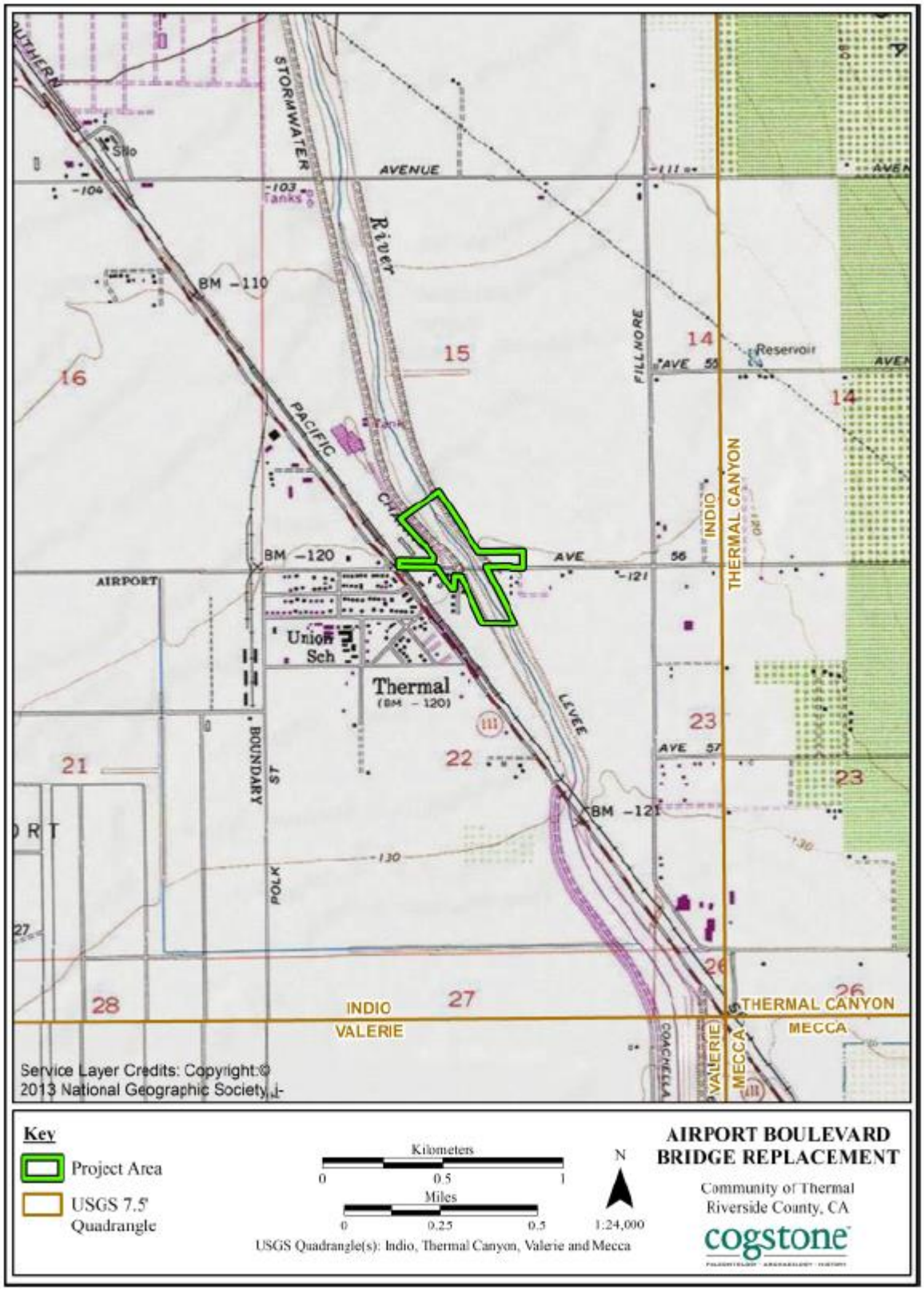

Figure 3. Project Topographic Map

PROJECT PERSONNEL

Cogstone Resource Management Inc. (Cogstone) conducted the paleontological resources studies. A brief resume of the principal investigator is appended (Appendix A). Additional qualifications of key Cogstone staff are available at http://www.cogstone.com/key-staff/.

- Kim Scott served as the Principal Paleontologist for the project and co-authored this report. Ms. Scott has an M.S. in Biology with an emphasis in paleontology from California State University (CSU), San Bernardino, a B.S. in Geology with an emphasis in paleontology from the University of California, Los Angeles (UCLA), and over 25 years of experience in California paleontology and geology.
- Kelly Vreeland co-authored this report. Ms. Vreeland has an M.S. and a B.S. in Geology, with an emphasis in paleontology, from CSU Fullerton, as well as 11 years of experience in California paleontology and geology.
- Eric Scott served as the task manager and reviewed this report for quality control. Mr. Scott has an M.A. in Anthropology, with an emphasis in biological paleoanthropology from UCLA, and more than 38 years of professional experience in California paleontology.
- Logan Freeberg prepared the geographic information system (GIS) maps used throughout this report. Mr. Freeberg has a B.A. in Anthropology from the University of California (UC), Santa Barbara and a certificate in GIS from CSU Fullerton, as well as 18 years of experience in California archaeology.
- Santiago Hernandez performed the pedestrian field survey. Mr. Hernandez has a B.S. in Geology and B.A. in Biology, with an emphasis on ecology, evolution, and biodiversity, from UC Davis. Mr. Hernandez has 1.5 years of experience in California paleontology and geology.
- Debbie Webster provided technical editing. Ms. Webster has more than 21 years of experience in technical writing.

REGULATORY ENVIRONMENT

FEDERAL LAWS AND REGULATIONS

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA; 42 USC 4321-4347) mandates the protection of cultural resources within its general policy for environmental protection. It requires the preservation of important historic, cultural, and natural aspects of our national heritage, and the maintenance, wherever possible, of an environment that supports diversity and a variety of individual choice. Regulations promulgated by the Advisory Council on Historic Preservation provide for the coordination of NEPA and National Historic Preservation Act (NHPA)

compliance, under 36 CFR Part 800.14(a). Regulations for implementing the procedural provisions of NEPA are available at 40 CFR Part 1500-1508.

If the presence of a significant environmental, cultural, or paleontological resource is identified during the scoping process, Federal agencies and their agents must take the resource into consideration when evaluating project effects when a project is proposed for development on Federal land, or land under Federal jurisdiction. The level of consideration depends upon the Federal agency involved.

FEDERAL-AID HIGHWAY ACT OF 1935 (20 USC 78)

Section 305 of the Federal Aid Highway Act of 1956 (20 USC 78, 78a) gives the FHWA authority to use Federal funds to salvage archaeological and paleontological sites affected by highway projects. The Archaeological and Paleontological Statute (23 USC 305) amends the Antiquities Act of 1906. Specifically, it states:

> Funds authorized to be appropriated to carry out this title to the extent approved as necessary, by the highway department of any State, may be used for archaeological and paleontological salvage in that state in compliance with the Act entitled "An Act for the preservation of American Antiquities," approved June 8, 1906 (PL 59-209; 16 USC 431-433), and State laws where applicable.

This statute allows funding for mitigation of paleontological resources recovered pursuant to Federal aid highway projects, provided that "excavated objects and information are to be used for public purposes without private gain to any individual or organization" (FR 46(19): 9570.

STATE LAWS AND REGULATIONS

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA states that: It is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required are intended to assist public agencies in systematically identifying both the significant effects of proposed project and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.

CEQA declares that it is state policy to: "take all action necessary to provide the people of this state with...historic environmental qualities." It further states that public or private projects financed or approved by the state are subject to environmental review by the state. All such projects, unless entitled to an exemption, may proceed only after this requirement has been satisfied. CEQA requires detailed studies that analyze the environmental effects of a proposed project. In the event that a project is determined to have a potential significant environmental

effect, the act requires that alternative plans and mitigation measures be considered. CEQA includes paleontological, archaeological, and historic resources as integral features of the environment.

If paleontological resources are identified during the project scoping studies, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the resource.

PUBLIC RESOURCES CODE

In addition to CEQA, a number of other sections of the Public Resources Codes (PRC) provide additional regulations that govern the treatment of paleontological, historical, and archaeological resources.

PRC Section 30244 requires reasonable mitigation for impacts on paleontological resources that occur as a result of development on public lands.

PRC Sections 4307–4309 affords protection to geologic features and "paleontological materials" but grants the director of the state park system authority to issue permits for specific activities that may result in damage to such resources, if the activities are for state park purposes and in the interest of the state park system.

Section 5097.5: No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands (lands under state, county, city, district or public authority jurisdiction, or the jurisdiction of a public corporation), except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

CALIFORNIA PENAL CODE

California Penal Code section 622: Establishes as a misdemeanor the willful injury, disfiguration, defacement, or destruction of any object or thing of archaeological or historical interest or value, whether situated on private or public lands.

CALIFORNIA ADMINISTRATIVE CODE, TITLE 14, SECTION 4307

This section states that "No person shall remove, injure, deface or destroy any object of paleontological, archeological or historical interest or value."

COUNTY LAWS AND REGULATIONS

There are several policies covering paleontological resources within the County's *General Plan, Multipurpose Open Space (OS) Element* (County of Riverside, 2015:OS-51):

- **OS 19.6:** Whenever existing information indicates that a site proposed for development has high paleontological sensitivity as shown on Figure OS-8, paleontological resource impact mitigation program (PRIMP) shall be filed with the Riverside County Geologist prior to site grading. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.

- **OS 19.**7**:** Whenever existing information indicates that a site proposed for development has low paleontological sensitivity as shown on Figure OS-8, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the Riverside County Geologist shall be notified and a paleontologist shall be retained by the project proponent. The paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.

- **OS 19.8:** Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity as shown on Figure OS-8, a report shall be filed with the Riverside County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources prior to approval of that department.

- **OS 19.9:** Whenever paleontological resources are found, the County Geologist shall direct them to a facility within Riverside

BACKGROUND

GEOLOGICAL SETTING

The project area is in the Coachella Valley at the northern end of the Salton Trough. Surrounded by mountains on all but the southeastern side, the Salton Trough is an extensional basin that parallels the San Andreas Fault Zone through the Coachella Valley from the Desert Hot Springs area to the Pacific Ocean south of the Gulf of California. The San Andreas Fault Zone lies near the center of the trough while the Pacific Plate is along the west side and the North American Plate is along the east. The northwesterly motion of the Pacific Plate relative to the North American Plate has formed this extensional basin and continues to cause the Salton Trough to widen and sink from the stretching of the continental crust. The San Andreas Fault Zone continues south through the Gulf of California which is also widening and sinking.

The Salton Trough has been periodically flooded by the Colorado River from ~6,000 years ago to ~470 years ago. Named Lake Cahuilla, this large lake formed after the Colorado River Delta blocked access of the marine waters of the Sea of Cortez about 11,700 years ago in Imperial County and northern Sonora, Mexico. Flood waters of the Colorado River could then accumulate, forming a large freshwater lake. The high-water line of this lake is visible in some of the rock outcrops along the western side of the Salton Sea. The Salton Sea is the salt rich remnant of a man-made freshwater lake which lies in the same basin as Lake Cahuilla. Each time Lake Cahuilla filled, it brought with it an entire ecosystem that included freshwater fish, mussels, waterfowl, and marsh plants. Ethnographic accounts taken from Cahuilla Native Americans from the mid-nineteenth century have been used to estimate A.D. 1600 as the latest date for the last time the Lake Cahuilla formed. Holocene fossil shell and vertebrates are commonly found throughout the ancient lakebed.

STRATIGRAPHY

The project is mapped as Holocene (<11,700 years ago) alluvial sand and gravel of Whitewater River, and Holocene alluvial sand and clay of valley areas/clay of playa lakes (Dibblee and Minch 2008). Not mapped by Dibblee and Minch (2008) but noted within the project area during the pedestrian survey, are various amounts of modern artificial fill.

Figure 4. Project Geology Map

Alluvial sand and gravel of Whitewater River

Unconsolidated, fluvial sands and gravels occur in the recently active channels of the Whitewater River (Bedrossian et al. 2012; Lancaster et al. 2012; Dibblee and Minch 2008). Older fluvial deposits interfinger with lake and dune sediments (Bedrossian et al. 2012; Lancaster et al. 2012), while modern sediments are deposited in the man-made Whitewater River Channel (Dibblee and Minch 2008).

Alluvial sand and clay of valley areas/clay of playa lakes

Alluvial valley sediments in the area were laid down when Lake Cahuilla was dry or very shallow. These interfinger with the light grey, alkaline clays and micaceous silt of the Lake Cahuilla beds.

Artificial fill

Artificial fill was noted during the pedestrian survey. These man-made deposits frequently utilize local sediments and can appear very similar to native deposits.

RECORDS SEARCH

A record search of the project was obtained from the Western Science Center (Stoneburg 2022; Appendix B). Additional records from the University of California Museum of Paleontology database (UCMP 2022), the PaleoBiology Database (PBDB 2022), print sources (Jefferson 1991a, 1991b; Whistler et al. 1995), and previous record searches from the Natural History Museum of Los Angeles County (NHMLA; McLeod 2013, 2015), the San Diego Natural History Museum (SDNHM; Randall 2008), and the San Bernardino County Museum (SBCM; Scott 2004a, 2004b, 2006) were also reviewed for fossil records near to the project.

Holocene Sediments

McLeod (2013, 2015) and Whistler et al. (1995) report Holocene fossil localities from the Lake Cahuilla beds in La Quinta, about 8 miles northwest of the project (Table 1). Paleontological mitigation sampling for a project in the Lake Cahuilla beds consisted of two pre-construction test trenches excavated to 13 feet deep. Approximately 7,050 pounds of sediments were processed from between depths of 3 and 13 feet. Relatively small samples were collected for micropaleontological and invertebrate analysis, while large samples were collected from where vertebrate fossils were present. Lithologies of the 13 feet deep trenches consisted of alternating fluvial and lacustrine sediments. While a charcoal sample from approximately 10.5 feet deep in the lowest fluvial unit dated to 5,890 ± 60 years before present (ybp), a sample from approximately 7.5 feet deep in the middle fluvial unit dated 2,500 ± 50 ybp, and a sample from approximately 4 feet deep in the upper fluvial unit dated 1,080 ± 80 ybp (Whistler et al. 1995).

Freshwater mollusk shells were abundant on the surface and throughout almost every stratigraphic interval (Whistler et al. 1995). The upper fluvial unit had one horizon that was more than 50 percent composed of small snail shells. Most vertebrate fossils were recovered from fluvial, rather than lacustrine, strata. Overall, diverse freshwater diatoms, land plant pollen, sponges, ostracods, mollusks, fish, and small terrestrial vertebrates were recovered from this paleontological sampling program (Whistler et al. 1995:114; Appendix B, page 1, paragraph 3). In the La Quinta samples, the middle lacustrine unit contained mostly pollen, while the middle fluvial unit had sparse small land animals (Table 1). The upper lacustrine units had fish, mollusks, ostracods, sponges, diatoms, and land plant pollen. The upper fluvial unit had virtually no pollen or diatoms but abundant small invertebrate and vertebrates.

McLeod (2013, 2015) additionally reports the recovery of a jaw of a bighorn sheep (*Ovis canadensis*) from the La Quinta area (NHMLA 6256).

Table 1. Fossils from the Lake Cahuilla beds in La Quinta

Group	Taxon	Common Name	MLU (DPW 2467)	MFU (DPW 2468)	ULU1 (DPW 2469)	ULU2 (DPW 2470)	UFU (DPW 2471)
rabbits	*Sylvilagus* sp.	cottontail rabbit					x
squirrels	*Ammospermophilus leucurus*	antelope ground squirrel		x			x
mice and rats	*Perognathus longimembris*	pocket mouse		x			x
	Dipodomys sp.	kangaroo rat					x
	Neotoma lepida	desert wood rat					x
	Peromyscus sp.	white-footed mouse					x
bird	unlisted	songbirds					x
iguanid lizards	*Phrynosoma platyrhinos*	desert horned lizard					x
	Sceloporus magister	desert spiny lizard					x
	Uma inornata	fringe-toed lizard		x			x
	Urosaurus graciosus	long-tailed brush lizard					x
constricting snakes	*Chionactis occipitalis*	western shovel-nosed					x
	Hypsiglena torquata	night snake					x
	Pituophis melanoleucus	gopher snake				x	x
	Sonora semiannulata	western ground snake					x
rattlesnakes	*Crotalus cerastes*	sidewinder					x
	Crotalus sp.	large rattlesnake					x
fishes	*Cyprinodon maculartus*	desert pupfish					x
	Gila elegans	bonytail		x		x	x
	Xyrauchen texanus	razorback sucker					x
ostracods	*Cypridopsis vidua*	ostracod			x	x	
	Cyprinotus torosa	ostracod			x		
	Limnorythere cerioruberosa	ostracod			x	x	
clams	*Anodonta californiensis*	California floater			x	x	x
	Pisidium casertanum	ubiquitous pea clam			x	x	x
snails	*Amnicola longinqua*	dusky snail			x	x	x
	Ferrissia walker	cloche ancylid					x
	Flumnicola sp.	pebble snail					x

Group	Taxon	Common Name	MLU (DPW 2467)	MFU (DPW 2468)	ULU1 (DPW 2469)	ULU2 (DPW 2470)	UFU (DPW 2471)
snails	*Gyraulus parvus*	ash gyro			x	x	x
	Helisoma trivolvis	rams horn			x	x	x
	Physella ampullacea	paper physa			x	x	x
	Physella humerosa	corkscrew physa			x	x	x
	Tryonia protea	desert tryonia			x	x	x
land plants	*Selaginella sinuites*	club-moss				x	
	Polypodiaceae	ferns				x	
	Pinus sp.	pine			x	x	
	Betulaoceae	alders, birches					
	Ceanothus sp.	mountain lilac					
	Chenopodiaceae	saltbushes	x			x	
	Onagraceae	evening primroses			x	x	
	Quercus sp.	oak		x			
	Compositae *(Ambrosia*-type*)*	ragweed			x		
	Compositae (*Helianthus*-type*)*	sunflower			x		

NOTES:
MLU = middle lacustrine unit (DPW 2467)
MFU = middle fluvial unit (DPW 2468 = LACM 6255; 2,500 ± 50 ybp)
ULU1 = upper lacustrine unit 1 (DPW 2469 = LACMIP 16830)
ULU2 = upper lacustrine unit 2 (DPW 2470 = LACM 6253, LACMIP 16830; 1,080 ± 80 ybp) UFU = upper fluvial unit (DPW 2470 = LACM 6252, LACMIP 16831; 1,080 ± 80 ybp)
From Whistler et al. 1995; McLeod 2013, 2015

SURVEY

METHODS

The survey stage is a crucial part of the project's environmental assessment phase. Its purpose is to confirm that field observations conform to the geological maps of the project area. Sediments are assessed for their potential to contain fossils. Additionally, if paleontological resources have previously been recorded from the region, the survey will verify the exact location of those resources, the condition or integrity of each resource, and the proximity of the resource to the project area.

Paleontologist Santiago Hernandez of Cogstone performed a paleontological field survey of the project area on April 14, 2022. All undeveloped and potentially native ground surface areas within the ground disturbance portion of the project area were examined when it was safe to do so. Known areas of fill were not examined. When such were present, existing ground disturbances (e.g., cutbanks, ditches, animal burrows, etc.) were visually inspected. Photographs of the project area, including ground surface visibility and items of interest, were taken with a digital camera.

RESULTS

Some of the project area was covered with artificial fill (Figure 5). Ground visibility varied from 0 to 70% with some areas covered with shrubs and concrete. Observable native sediments consisted of slightly to moderately sorted, brown to gray silts with some area containing sands and larger cobble sized clasts, consistent with geologic mapping by Dibblee and Minch (2008) (Figure 6). Artificial fill was present in some areas, primarily adjacent to the roadways within the project area. No fossils were observed during the survey.

Figure 5. Overview of southern end of the project area

Figure 6. Alluvial sand and clay of valley areas (left) and alluvial sand and gravel of Whitewater River (right)

PALEONTOLOGICAL SCIENTIFIC RELEVANCE CRITERIA

Only qualified, trained paleontologists with specific expertise in the type of fossils being evaluated can determine the scientific relevance of paleontological resources. Fossils are considered to be useful to science if one or more of the following criteria apply:

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

2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary

stratum, including data important in determining the depositional history of the region and the timing of geologic events therein.

3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas.
4. The fossils demonstrate unusual or spectacular circumstances in the history of life.
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations (Scott and Springer 2003; Scott et al. 2004).

Scientific relevance is assessed subsequent to recovery and identification of fossils, typically by the scientific institution receiving the fossils. Typically, all identifiable vertebrate fossils are to be curated in perpetuity at an accredited repository after excavations have finished.

Nonvertebrate fossils (plants, shells, trace fossils, etc.) may be collected as a representative sample when numerous fossils of the same species are present. Although initial identifications can be made in the field, final determination on fossil identifications and relevance to science must be made by the repository.

In the case of unidentifiable fossils, unless they can be used for radiometric dating, these typically do not meet the scientific relevance criteria listed above. In the case of isolated finds or single bones, while they may not initially appear to meet the scientific relevance criteria by themselves, they cannot immediately be discounted as not scientifically relevant. This is because the evaluation of evolutionary relationships, development of biological communities, interaction between paleobotanical and paleozoological biotas, or unusual or spectacular circumstances in the history of life (criteria 1, 3, and 4 above) require a large quantity of data to assess. The accumulation of information on localities of similar age with identifiable fossils recovered in a geographic area is necessary to build these data sets.

PALEONTOLOGICAL SENSITIVITY

Caltrans utilizes a tripartite scale to characterize paleontological sensitivity consisting of no potential, low potential, and high potential (Caltrans 2016; Table 2). Occurrences of fossil resources are closely tied to the geologic units (e.g., formations or members) that contain them. The probability for finding significant fossils in a project area can be broadly predicted from previous records of fossils recovered from the geologic units present in and/or adjacent to the study area.

Caltrans (2016) guidance for evaluating fossil deposits and sensitivity of resources states:

> "Regardless of the format used by a paleontologist to rank formations, the importance of any rock unit must be explicitly stated in terms of specific fossils known or suspected to be present (and if the latter, why such fossils are suspected) and why these fossils are of paleontological importance. Some land-managing agencies may require the use of specific guidelines to assess significance, whereas others may defer to the expertise of local paleontologists and provide little guidance. Because each situation may differ, it is important that there is a clear understanding between project staff (Caltrans or local), consultants, and personnel from other agencies, as to exactly what criteria will be used to assess the significance of rock units affected by a particular project.
>
> As a practical matter, no consideration is generally afforded to paleontological sites for which scientific importance cannot be demonstrated. If a paleontological resource assessment results in a determination that the site is insignificant or of low sensitivity, this conclusion should be documented in a Paleontological Evaluation Report (PER) and in the project's environmental document in order to demonstrate compliance with applicable statutory requirements.
>
> If a paleontological resource is determined to be significant, of high sensitivity, or of scientific importance, and the project impacts it, a mitigation program must be developed and implemented. Mitigation can be initiated prior to and/or during construction. The latter is more common for Caltrans projects. It should be pointed out that mitigating during construction poses a greater risk of construction delays. Mitigation is an eligible federal project cost, in accordance with 23 U.S.C. 305, only if acceptable significance documentation is submitted. Thus, coordination between Caltrans, Federal Highway Administration, and all jurisdictional agencies is critical to formally establishing the significance of a resource." [PER Instructions, Chapter 8, Vol. 1, Standard Environmental Reference (SER), https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/volume-1-guidance-for-compliance/ch-8-paleontology accessed June 2018].

Table 2. Caltrans Paleontology Sensitivity Scale

Caltrans Sensitivity	Description
High Potential	Rock units which, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils. These units include, but are not limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. These units may also include some volcanic and low-grade metamorphic rock units. Fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive. High sensitivity includes the potential for containing: 1) abundant vertebrate fossils; 2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; 3) areas that may contain datable organic remains older than Recent, including *Neotoma* (sp.) middens; or 4) areas that may contain unique new vertebrate deposits, traces, and/or trackways. Areas with a high potential for containing significant paleontological resources require monitoring and mitigation.
Low Potential	This category includes sedimentary rock units that: 1) are potentially fossiliferous, but have not yielded significant fossils in the past; 2) have not yet yielded fossils, but possess a potential for containing fossil remains; or 5) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock are well understood. Sedimentary rocks expected to contain vertebrate fossils are not placed in this category because vertebrates are generally rare and found in more localized stratum. Rock units designated as low potential generally do not require monitoring and mitigation. However, as excavation for construction gets underway it is possible that new and unanticipated paleontological resources might be encountered. If this occurs, a Construction Change Order (CCO) must be prepared in order to have a qualified Principal Paleontologist evaluate the resource. If the resource is determined to be significant, monitoring and mitigation is required.
No Potential	Rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks are classified as having no potential for containing significant paleontological resources. For projects encountering only these types of rock units, paleontological resources can generally be eliminated as a concern when the Preliminary Environmental Analysis Report (PEAR) is prepared and no further action taken.
Source: Caltrans 2016.	

CONCLUSIONS AND RECOMMENDATIONS

The project is mapped as Holocene alluvial sand and gravel of Whitewater River, and Holocene alluvial sand and clay of valley areas/clay of playa lakes. Not mapped but noted within the project area during the pedestrian survey, are various amounts of modern artificial fill.

Ground disturbing activities would range in depth up to 20 feet below the current surface, while piles would extend to 60 feet deep.

- Roadway cuts - 5 feet deep.
- Bridge abutments will be roughly 20 feet deep.
- The bridge footing excavation/driven piles will be approximately 60 feet deep.

In assessing the sediments potential to produce fossils, artificial fill is assigned no potential (Table 3). Locally, Pleistocene fossils typically begin appearing about eight to ten feet deep in the valleys, although rarely fossils occur at shallower depths. Shallower sediments in the valleys usually do not contain the remains of extinct animals, although Holocene (less than 11,700 years old) remains may be present. Project sediments fit all three points for low potential sediments as per Caltrans paleontological sensitivity rankings. Low potential includes all sediments that 1) are potentially fossiliferous, but have not yielded significant fossils in the past; 2) have not yet yielded fossils, but possess a potential for containing fossil remains; or 3) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock are well understood.

Table 3. Project Paleontology Sensitivity

Rock Units	Caltrans Sensitivity		
	high	low	no
artificial fill			X
alluvial sand and gravel of Whitewater River		X	
alluvial sand and clay of valley areas/clay of playa lakes		X	

All depths refer to the original grade of the area.

Project sediments do not fit any points for high potential sediments as per Caltrans paleontological sensitivity rankings. High potential includes all sediments that have: 1) abundant vertebrate fossils; 2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; 3) areas that may contain datable organic remains older than Recent, including Neotoma (sp.) middens; 4) areas that may contain unique new vertebrate deposits, traces, and/or trackways; 5) rock units which, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils including, but not

limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils; or 6) fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive.

Typically, geological units less than 11,700 years old (Holocene) are given a low sensitivity as they are too young to contain the remains of extinct animals. A study of Lake Cahuilla beds in La Quinta produced radiometric ages of charcoal between 5,890 + 60 and 1,080 + 80 years old from depths of 10.5 feet and 3.3 feet respectively. 7,050 pounds of sediment were washed from sediment up to 13 feet below the surface. No fossils of extinct animals were recovered from the Lake Cahuilla beds.

Because of these factors, the Holocene sediments of the project are assigned a low potential for scientifically significant fossils. No Paleontological Mitigation Plan is required. If unanticipated discoveries are made all work must halt within 60 feet until a qualified paleontologist can evaluate the find per Caltrans Specification 14-7.03. Work may resume immediately outside of the 60-foot radius.

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APPENDIX A. QUALIFICATIONS

cogstone
PALEONTOLOGY - ARCHAEOLOGY - HISTORY

KIM SCOTT
Principal Investigator for Paleontology

EDUCATION

2000 B.S., Geology with paleontology emphasis, University of California, Los Angeles
2013 M.S., Biology with a paleontology emphasis, California State University, San Bernardino

SUMMARY QUALIFICATIONS

Ms. Scott has more than 25 years of experience in California paleontology and geology. She is a qualified geologist and field paleontologist with extensive survey, monitoring and fossil salvage experience. In addition, she has special skills in fossil preparation (cleaning and stabilization) and preparation of stratigraphic sections and other documentation for fossil localities. Ms. Scott serves as company safety officer and is the author of the company safety and paleontology manuals.

SELECTED PROJECTS

Romoland Line A-3, Stage 2 and 3, Romoland, Riverside County Flood Control District. Project involved construction of an approximately 3,174 lineal feet of underground reinforced concrete box (12 feet wide by 6.5 feet high) and a sediment basin. Prepared a Paleontological Resources Impact Mitigation Program. Principal Paleontologist. Riverside County Flood Control and Water Conservation District. 2020

Mount Vernon Bridge Replacement, San Bernardino, San Bernardino, CA. Project involved replacing the Mount Vernon Bridge over the Burlington Northern Santa Fe rail yard. Prepared a Paleontological Mitigation Plan. Principal Paleontologist. Sub to Traylor - Granite Joint Venture. 2020

Central Freight Lines, LLC Distribution Center, City of Perris, Riverside County, CA. Project involved construction of a ~56,000 square foot cross dock for transferring shipments and 10,000 square foot main office. Prepared a Paleontological Resources Mitigation Plan. Principal Paleontologist. Sub to Divina Management Inc. 2018

Santa Ana River Trail Phase IV Reaches B and C, Redlands and Mentone, San Bernardino County Flood Control District. Project involved construction of a ~3.2-mile-long section of the Santa Ana River Trail on the southern bank of the Santa Ana River between Orange Street in the City of Redlands and Opal Avenue. Supervised the survey and prepared a Paleontological Resources Assessment. Principal Paleontologist. Sub to ECORP. 2018

Bloomington Affordable Housing Project-Phase III, Bloomington, San Bernardino County, CA. Project was to construct an affordable housing apartment complex and community amenities on Valley Boulevard. The Project utilized funding through the United States Department of Housing and Urban Development (HUD). Principal Paleontologist/Report Co-Author. Sub to Michael Baker International. 2018

Fire Station 172 Project, Rancho Cucamonga Fire Protection District, San Bernardino County, CA. The project involved relocation of the Fire Station from 9612 San Bernardino Road to 8870 San Bernardino Road. The station was to be expanded and would also include a San Bernardino County Sheriff's substation. Scott prepared the Paleontological Assessment. Sub to Placeworks. Principal Paleontologist/Report Author. 2018

Cactus Basin, City of Rialto, San Bernardino County Flood Control District. This project connected the City of Rialto Storm Drain Lines 'A' and 'B' with Cactus Basin 4. The Basin was also modified to approximately 43 feet deep. Conducted paleontological monitoring activities and prepared the Paleontological Monitoring Report. Principal Paleontologist/Report Author. Sub to ECORP. 2017-2018

cogstone
PALEONTOLOGY - ARCHAEOLOGY - HISTORY

KELLY VREELAND
Paleontologist

EDUCATION

2014 M.S., Geology, California State University, Fullerton
2010 B.S., Geology, California State University, Fullerton

SUMMARY OF QUALIFICATIONS

Ms. Vreeland is a Paleontologist with over 11 years of experience in field paleontology. Her field and laboratory experience includes fieldwork and research projects throughout California and Nevada, as well as conducting fieldwork and surficial geologic mapping in Montana. Ms. Vreeland has expertise in invertebrate paleontology and paleoecology. She is a member of the Geological Society of America, the Paleontological Society, the Society for Sedimentary Geology, and the Association for Women in Geoscience.

SELECTED EXPERIENCE

State Route 60 Truck Lanes Project, RCTC, Caltrans District 8, City of Banning, Riverside County, CA. RCTC in cooperation with Caltrans proposed to construct an eastbound truck-climbing lane and westbound truck-descending lane – along with inside and outside standard shoulders in both directions. The total length of the project is 4.51 miles. A combined Paleontological Identification Report and Paleontological Evaluation Report found a high likelihood for this project to impact paleontological resources. Mitigation measures included a Paleontological Mitigation Plan which included requiring a paleontological Worker Environmental Awareness Program training, signed repository agreement with the San Bernardino County Museum, monitoring by a principal paleontologist, and defined standard field and laboratory methods. Cogstone is providing paleontological monitoring. At the end of construction, Cogstone will prepare a Paleontological Monitoring Report. Caltrans is the lead agency under the National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA). Sub to ECORP. Supervisor. 2020-*ongoing*

University of California Natural Reserve System San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project, City of Irvine, Orange County, CA. Cogstone conducted a cultural and paleontological resources assessment to determine the potential impacts to cultural and paleontological resources for the proposed long-term water management improvements and habitat value of the Marsh Reserve. Services included pedestrian survey, records searches, Sacred Lands File search from the Native American Heritage Commission, background research, and reporting. Due to the proximity of the project to the San Diego Creek, the project required a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and Section 106 National Historic Preservation Act compliance. University of California acted as the lead CEQA agency and USACE acted as lead agency under the National Environmental Protection Act (NEPA). Sub to Moffat & Nichol. Paleontology Supervisor. 2020-2021

Los Angeles World Airports (LAWA) United Airlines East Maintenance Hangar and Ground Support Equipment Project, LAX, Los Angeles County, CA. Cogstone conducted cultural and paleontological monitoring during the proposed consolidation and modernization of existing facilities. The project intended to redevelop an approximately 35-acre site. Planned vertical impacts were up to 6 feet deep for footings, at least 10.5 feet for stormwater detention, and 50 to 70 feet deep for augering. Upon completion of monitoring, Cogstone prepared a Cultural and Paleontological Resources Monitoring Compliance Report. The City of Los Angeles acted as lead agency for the project. Sub to CDM Smith. Paleontology Supervisor. 2020-2021

Jack Ranch San Luis Obispo Agricultural Cluster Project, City of San Luis Obispo, San Luis Obispo County, CA. Cogstone prepared a cultural and paleontological assessment to propose effective mitigation of potential adverse impacts to paleontological resources resulting from a proposed subdivision of a 299-acre property into 13 residential lots as well as a Conditional Use Permit to allow for a Major Agricultural Cluster project. Cogstone provided archaeological and paleontological monitoring and submitted a Cultural and Paleontological Resources Monitoring Compliance Report upon completion. Sub to Kirk Consulting. Paleontology Supervisor. 2020-2021

APPENDIX B. PALEONTOLOGY RECORDS SEARCH

WESTERN SCIENCE CENTER

April 4th, 2022

Cogstone Resource Management
Logan Freeberg
1518 W. Taft Ave
Orange, CA 92865

Dear Mr. Freeburg,

This letter presents the results of a record search conducted for Airport Blvd Bridge Replacement Project located in Riverside County, California. The project site is located directly on Airport Blvd between State Route 111 and State Route 86 in the Township 6 South, Range 8 East, Sections 15 and 22 on the *Indio and Thermal Canyon, CA* USGS 7.5 minute quadrangle.

The geologic units underlying this project are mapped entirely as alluvial silt, sand and gravel deposits dating from the Holocene period (Dibblee and Minch 2008). 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. However, if development requires any substantial depth of disturbance, the likelihood of reaching Pleistocene alluvial sediments would increase. 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, 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,

Brittney Elizabeth Stoneburg
Collections Technician

2345 Searl Parkway ♦ Hemet, CA 92543 ♦ phone 951.791.0033 ♦ fax 951.791.0032 ♦ WesternScienceCenter.org