APPENDIX F

PALEONTOLOGICAL ASSESSMENT

PALEONTOLOGICAL ASSESSMENT FOR THE JEFFERSON AVENUE PROJECT

CITY OF MURRIETA
RIVERSIDE COUNTY, CALIFORNIA

APN 910-410-011

Prepared for:

LMC
95 Enterprise, Suite 200
Aliso Viejo, California 92656

Submitted to:

City of Murrieta
Planning Department
1 Town Square
Murrieta, California 92562

Prepared by:

Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

March 14, 2022

Paleontological Database Information

Author:	Todd A. Wirths, M.S., Senior Paleontologist, California Professional Geologist No. 7588
Consulting Firm:	Brian F. Smith and Associates, Inc. 14010 Poway Road, Suite A Poway, California 92064 (858) 679-8218
Report Date:	March 14, 2022
Report Title:	Paleontological Assessment for the Jefferson Avenue Project, City of Murrieta, Riverside County, California (APN 910-410-011)
Prepared for:	LMC 95 Enterprise, Suite 200 Aliso Viejo, California 92656
Submitted to:	City of Murrieta Planning Department 1 Town Square Murrieta, California 92562
Prepared by:	Brian F. Smith and Associates, Inc. 14010 Poway Road, Suite A Poway, California 92064
USGS Quadrangle:	Unsectioned Township 7 South, Range 3 West (projected) of the *Murrieta, California* (7.5-minute) Quadrangle.
Study Area:	Approximately 18 acres
Key Words*:*	Paleontological assessment; Pleistocene Pauba Formation; Plio-Pleistocene unnamed sandstone and conglomerate unit of Wildomar; mammalian fossil bones; high sensitivity; full-time monitoring; City of Murrieta.

Table of Contents

Section **Page**

I. INTRODUCTION AND LOCATION....1
II. REGULATORY SETTING....1
State of California....1
City of Murrieta....4
III. GEOLOGY....5
IV. PALEONTOLOGICAL RESOURCES....8
Definition....8
Fossil Locality Search....8
Project Survey....8
V. PALEONTOLOGICAL SENSITIVITY....9
Overview....9
Professional Standards....9
VI. CONCLUSION AND RECOMMENDATIONS....10
Paleontological MMRP....10
VII. CERTIFICATION....12
VIII. REFERENCES....13

Appendices

Appendix A – Qualifications of Key Personnel

List of Figures

Figure **Page**

Figure 1 General Location Map....2
Figure 2 Project Location Map....3
Figure 3A Geologic Map....6
Figure 3B Geologic Map Key....7

I. INTRODUCTION AND LOCATION

A paleontological resource assessment has been completed for the Jefferson Avenue Project, located east of the intersection of Jefferson Avenue and Murrieta Hot Springs Road, in the city of Murrieta, Riverside County, California (Figures 1 and 2). The project consists of one parcel (Assessor's Parcel Number 910-410-011) totaling approximately 18 acres. On the U.S. Geological Survey 7.5-minute, 1:24,000-scale *Murrieta, California* topographic quadrangle map, the project is located in unsectioned Township 7 South, Range 3 West (projected), of the San Bernardino Baseline and Meridian. The project includes the construction of a mixed-use apartment complex with tuck-under garages, surface parking, and a club/lease building.

As the lead agency, the City of Murrieta has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources. The paleontological assessment of the project included a review of paleontological literature and fossil locality records in the area; a review of the underlying geology; and recommendations to mitigate impacts to potential paleontological resources, if necessary.

II. REGULATORY SETTING

The California Environmental Quality Act (CEQA), which is patterned after the National Environmental Policy Act, is the overriding environmental regulation that sets the requirement for protecting California's paleontological resources. CEQA mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15063 of the CCR provides a process by which a lead agency may review a project's potential impact to the environment, whether the impacts are significant, and provide recommendations, if necessary.

In CEQA's Environmental Checklist Form, one of the questions to answer is, "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law by which protects nonrenewable resources including fossils, which is paraphrased below:

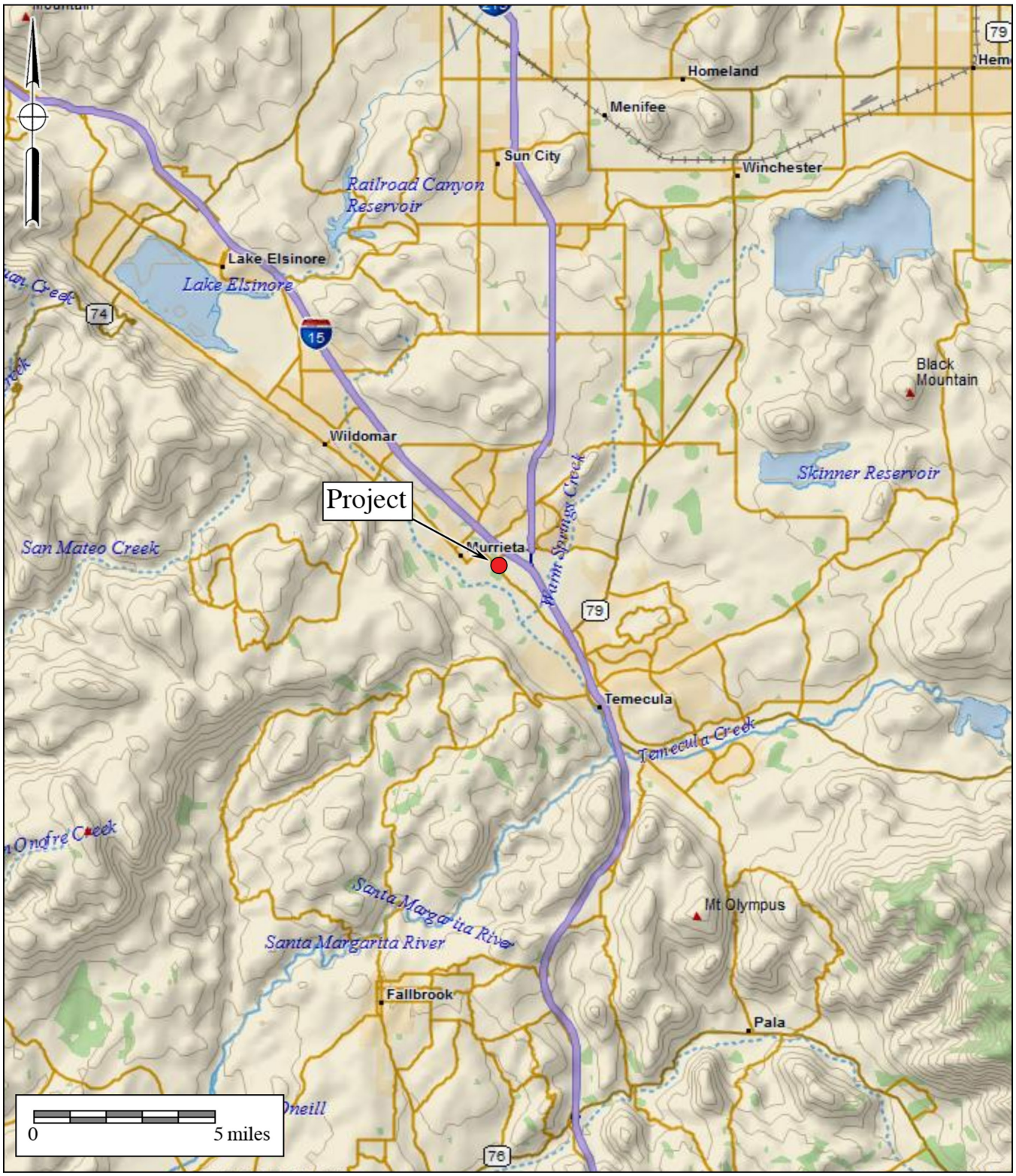


Figure 1

General Location Map

The Jefferson Avenue Project

DeLorme (1:250,000)

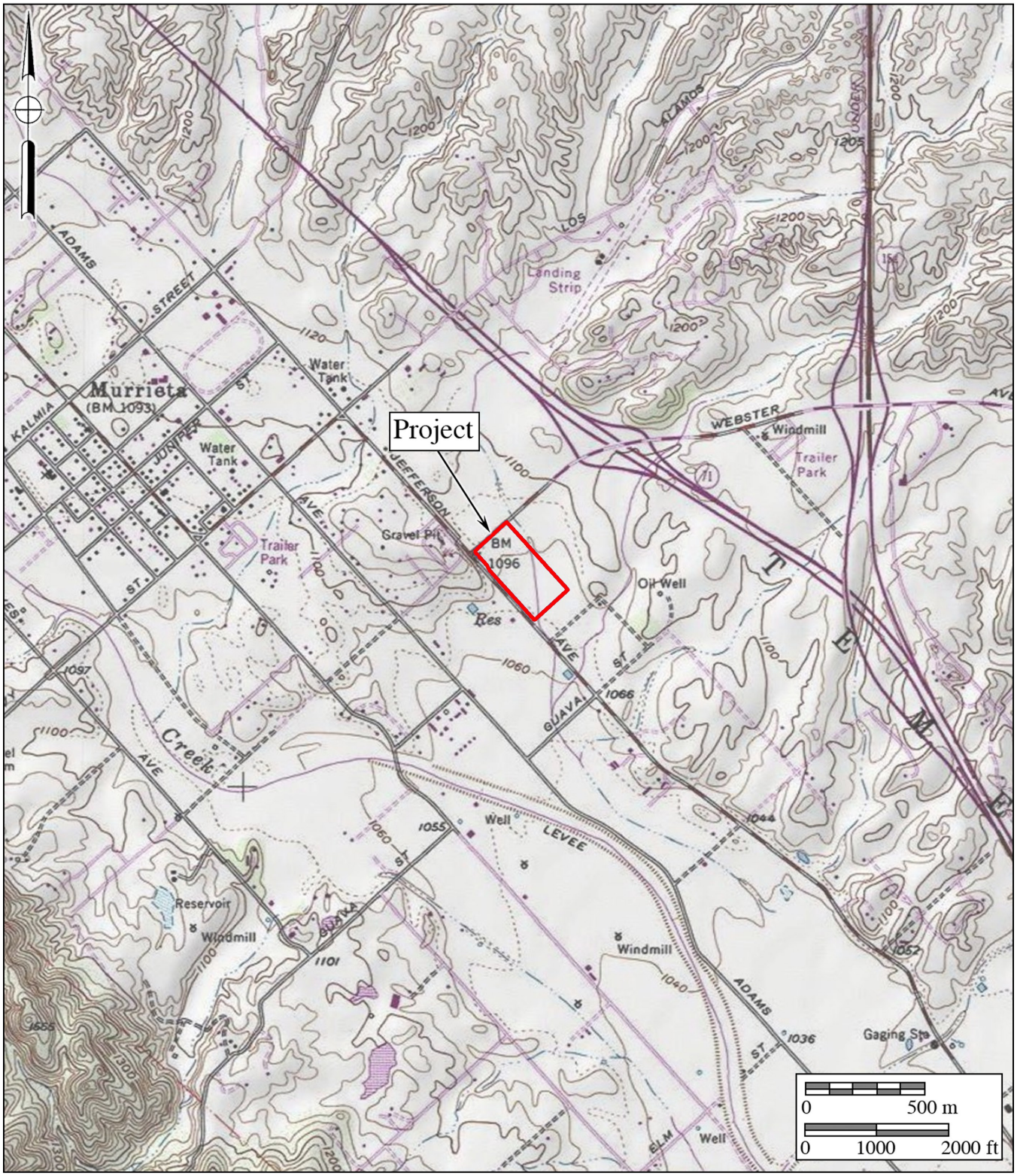


Figure 2

Project Location Map

The Jefferson Avenue Project

USGS *Murrieta* Quadrangle (7.5-minute series)

a) A person shall not 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, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.
b) 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.
c) A violation of this section is a misdemeanor.

City of Murrieta

In Chapter 8 of the Conservation Element of the City's General Plan, goals and policies concerning paleontological resources are outlined in general terms (City of Murrieta 2011a). The goals and policies are repeated in Section 5.9 of the City's Environmental Impact Report (EIR) (City of Murrieta 2011b). Within Section 5.9 of the EIR, potential impacts to paleontological resources are identified and evaluated. Mitigation measure CR-2 provides mitigation procedures in the event of an inadvertent discovery of paleontological resources. By adhering to the General Plan's Conservation Element Goal CSV-7, its associated policies, and mitigation measures CR-1 and CR-2, potential impacts to paleontological resources would be reduced to a level below significant, according to the EIR (City of Murrieta 2011b). Mitigation measures CR-1 and CR-2 are stated below:

CR-1 Future development projects shall continue to be evaluated for cultural resources by the City of Murrieta through review by the Eastern Information Center (EIC) and notification of and consultation with the local tribes for new entitlement projects. The projects shall be evaluated for compliance with the California Environmental Quality Act (CEQA) and where feasible, avoidance of cultural resources. If, following review by the EIC and/or tribal consultation, it is determined that there is a potential for impacts to cultural resources, further cultural resources analysis by a qualified professional(s), as defined in Mitigation Measure CR-2, may be required by the City.

CR-2 In the event that cultural resources (archaeological, historical, paleontological) are inadvertently unearthed during excavation and grading activities of any future development project, the contractor shall cease all earth-disturbing activities within a 100-foot radius of the area of

> discovery. If not already retained due to conditions present pursuant to Mitigation Measure CR-1, the project proponent shall retain a qualified professional (*i.e.,* archaeologist, historian, architect, paleontologist, Native American Tribal monitor), subject to approval by the City of Murrieta to evaluate the significance of the find and appropriate course of action (refer to Mitigation Measures CR-1 and CR-3 [note: CR-3 addresses human remains and is therefore not applicable to this report]). If avoidance of the resources is not feasible, salvage operation requirements pursuant to Section 15064.5 of the CEQA Guidelines shall be followed. After the find has been appropriately avoided or mitigated, work in the area may resume. (City of Murrieta 2011b)

III. GEOLOGY

Regionally, the project is situated within the northern part of Temecula Valley, which occupies the northwest-southeast-oriented Elsinore fault zone. The Elsinore fault zone divides the Perris Block, on the northeast side, from the Santa Ana Block on the southwest side of the fault zone (Morton and Miller 2006). Near the project, the northwest-southeast trending Wildomar fault is mapped alongside southbound Jefferson Avenue (Figure 3A). As shown on Figures 3A and 3B (after Kennedy and Morton 2003), the west side of the project is underlain by the fossiliferous sandstone member of the Pleistocene Pauba Formation (area colored pale olive and labeled "Qpfs"). This geologic unit is characterized as brown, indurated, cross-bedded sandstone containing sparse beds of conglomerate (Kennedy and Morton 2003). Across the Wildomar fault and Jefferson Avenue, the fossiliferous sandstone member of the Pleistocene to Pliocene-aged "unnamed sandstone and conglomerate of the Wildomar area" is mapped (area colored brownish gray and labeled "QTsw"), described as friable, pale yellowish-green, medium-grained, caliche-rich sandstone. Together, these formations span a time interval ranging from about 3.5 million to perhaps 120,000 years ago (Pajak et al. 1996). The east half of the project consists of an unnamed drainage lined with Holocene and latest Pleistocene-aged young alluvial channel deposits, composed of unconsolidated sand and silt (colored yellow with red dots and labeled "Qya_a") (Kennedy and Morton 2003). The young alluvial channel deposits likely constitute a veneer of sediments covering the Pauba Formation.

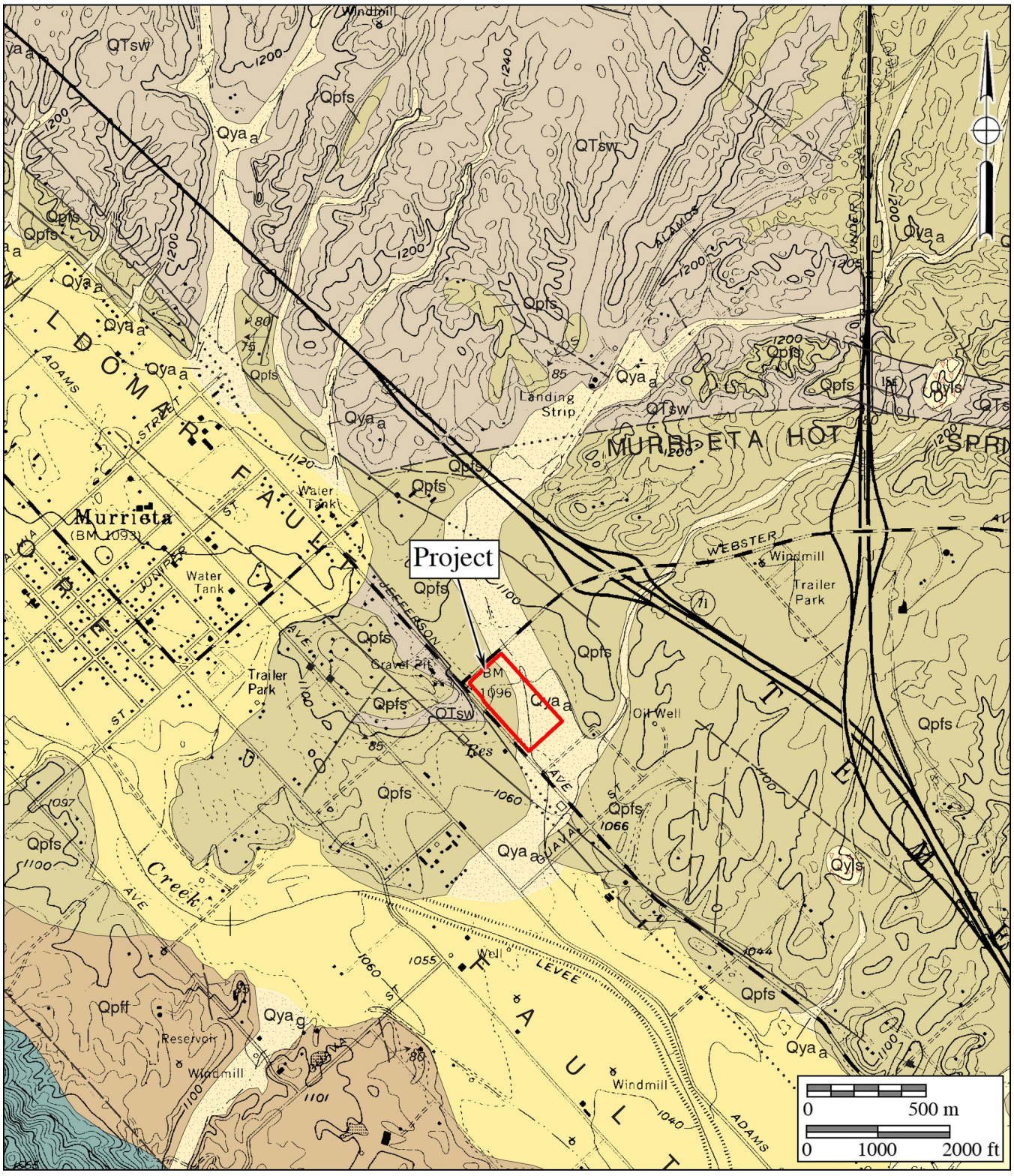


Figure 3A

Geologic Map

The Jefferson Avenue Project

Geology after Kennedy and Morton (2003)

DESCRIPTION OF MAP UNITS

Holocene and late Pleistocene

Qya **Young alluvial channel deposits**

Qyv **Young alluvial valley deposits**

Qyls **Young landslide**

Pleistocene

Qpfs **Sandstone member, Pauba Formation**

Qpff **Fanglomerate Member, Pauba Formation**

Pleistocene and late Pliocene

QTsw **Sandstone unit, sandstone, and conglomerate of the Wildomar area**

Cretaceous

Kpvg **Monzogranite to granodiorite**

Mesozoic

Mzu **Metasedimentary rocks, undifferentiated**

Figure 3B
Geologic Key
The Jefferson Avenue Project

Geology after Kennedy and Morton (2003)

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology 2010) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a nonrenewable resource under state and local guidelines (Section II of this report).

Fossil Locality Search

A paleontological literature review and collections and records search was performed for the project with collection and locality records searches using reports obtained for prior nearby projects from the Division of Geological Sciences at the San Bernardino County Museum (SBCM), the Los Angeles County Museum of Natural History (LACM), the Western Science Center (WSC), and finally with data from published and unpublished paleontological literature. The records search indicated that the LACM and the WSC have no known fossil localities within the project boundaries or near the project. However, published SBCM localities reveal several fossil localities yielded by the unnamed sandstone of the Wildomar area within one mile of the project (Scott and Cox 1993; Pajak et al. 1996). Between the project and California Oaks Road to the north, eight localities are known. These localities include the fossil bones of rodents, rabbits, giant ground sloths, peccaries, pronghorn antelope, horses, tapirs, saber tooth cats, mammoths, and short-faced bears. Just over one mile away to the west along Evening Shade Place, between Jefferson and Adams avenues, the fossil bones of horses, a camel, a three-foot long tusk of a mammoth, the antler of a deer, and other unidentified mammal bones, were recovered from the Pauba Formation, from elevations ranging from 1157 to 1176 feet (Stewart et al. 2003). More unpublished SBCM Pauba Formation localities are known approximately two to three miles north of the project, and include the bones of horses and small vertebrates (SBCM localities 5.6.325 – 5.6.336).

Project Survey

On November 23, 2021, BFSA staff, under the supervision of Principal Investigator Todd A. Wirths, conducted an intuitive review of the property to determine if any paleontological resources were visible. The field methodology employed for the project included walking evenly spaced survey transects set approximately 10 meters apart while visually inspecting the ground surface. All potentially sensitive areas where paleontological resources might be located were closely inspected. The property can be characterized as completely disturbed by clearing and disking, road improvements on the west and north, and partial channelization of the drainage that

passes through the property. Aside from vegetation in the existing drainage, no native vegetation was visible on the subject property. No bedrock outcrops were exposed that might indicate the presence of fossils. No paleontological resources, or evidence of paleontological resources, were observed during the survey.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that might have become fossilized over time. The "unnamed sandstone and conglomerate of the Wildomar area" and the Pauba Formation, as discussed in Section IV, have a proven paleontological record (Reynolds and Reynolds 1990a, 1990b; Reynolds et al. 1990; Scott and Cox 1993; Pajak et al. 1996; Hohman et al. 2020). In the greater Wildomar, Murrieta, and Temecula areas, these formations have produced abundant suites of fossil terrestrial mammals, including various reptiles and amphibians, shrews, various rodents, rabbits, giant ground sloths, bats, coyotes, skunks, weasels, short-faced bear, pronghorn antelopes, peccaries, tapirs, horses, camels, mammoths, bighorn sheep, deer, and llama, and therefore have a high paleontological resource sensitivity.

Holocene alluvium is generally considered to be geologically too young to contain significant nonrenewable paleontological resources (*i.e.,* fossils) and is thus typically assigned a low paleontological sensitivity. Pleistocene (older than 11,700 years old) alluvial and alluvial fan deposits in the Inland Empire and western Riverside County, however, are known to yield important terrestrial vertebrate fossils, such as extinct mammoths, mastodons, giant ground sloths, extinct species of horse, bison, and camel, saber-toothed cats, and others (Jefferson 1991). These Pleistocene sediments are thus accorded a high paleontological resource sensitivity.

Professional Standards

The Society of Vertebrate Paleontology (2010) has drafted guidelines that include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as listed below:

- *High Potential:* Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- *Undetermined Potential:* Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment, and that further study is needed to determine the potential of the rock unit.

- *Low Potential:* Rock units that are poorly represented by fossil specimens in institutional collections or based upon a general scientific consensus that only preserve fossils in rare circumstances.
- *No Potential:* Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

Using these criteria, based on the ages of the geologic formations at the project, the fossil record formations, and several fossil localities within one mile of the project, the Pauba Formation, and the "unnamed sandstone and conglomerate of the Wildomar area" (if it is present at the project at depth), can be considered to have a high potential to yield significant paleontological resources. The veneer of Holocene to late Pleistocene alluvium mapped across the eastern half of the project may be considered to have an undetermined potential; young (Holocene) surface deposits will have a low potential, while older and deeper (Pleistocene) deposits of the unit may have an undetermined paleontological resource potential.

VI. CONCLUSIONS AND RECOMMENDATIONS

Research has confirmed the existence of potentially fossiliferous Pleistocene Pauba Formation ("Qpfs") and possibly the Plio-Pleistocene "unnamed sandstone and conglomerate of the Wildomar area" ("QTsw") at the project. The occurrence of terrestrial vertebrate fossils at shallow depths from both formations is well documented. The "High" paleontological sensitivity rating assigned to these formations for yielding paleontological resources supports the recommendation that paleontological monitoring be implemented during mass grading and excavation activities in these deposits to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. Full-time monitoring of undisturbed Pauba Formation and the "unnamed sandstone and conglomerate of the Wildomar area," if it exists at depth at the project, is recommended starting at the surface. For the Holocene and latest Pleistocene-aged young alluvial channel deposits, full-time monitoring is suggested starting at a depth of five feet below the surface. A paleontological Mitigation Monitoring and Reporting Program (MMRP) is suggested below.

Paleontological MMRP

The following monitoring guidelines, outlined below, are based on the findings stated above. Paleontological monitoring may be reduced upon the observations and recommendations of the professional-level project paleontologist. The following MMRP, when implemented, would reduce potential impacts of paleontological resources to a level below significant:

1. Monitoring of mass grading and excavation activities in areas identified as likely to contain paleontological resources shall be performed by a qualified paleontologist or

paleontological monitor. Starting at the surface, monitoring will be conducted full-time in areas of grading or excavation in undisturbed Pauba Formation and "unnamed sandstone and conglomerate of the Wildomar area." Full-time monitoring of the Holocene and latest Pleistocene-aged young alluvial channel deposits is recommended starting at five feet deep.

2. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface, or, if present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources. The monitor shall notify the project paleontologist, who will then notify the concerned parties of the discovery.
3. Paleontological salvage during trenching and boring activities is typically from the generated spoils and does not delay the trenching or drilling activities. Fossils are collected and placed in cardboard flats or plastic buckets and identified by field number, collector, and date collected. Notes are taken on the map location and stratigraphy of the site, which is photographed before it is vacated and the fossils are removed to a safe place. On mass grading projects, discovered fossil sites are protected by flagging to prevent them from being overrun by earthmovers (scrapers) before salvage begins. Fossils are collected in a similar manner, with notes and photographs being taken before removing the fossils. Precise location of the site is determined with the use of handheld GPS units. If the site involves remains from a large terrestrial vertebrate, such as large bone(s) or a mammoth tusk, that is/are too large to be easily removed by a single monitor, a fossil recovery crew shall excavate around the find, encase the find within a plaster and burlap jacket, and remove it after the plaster is set. For large fossils, use of the contractor's construction equipment may be solicited to help remove the jacket to a safe location.
4. Isolated fossils are collected by hand, wrapped in paper, and placed in temporary collecting flats or five-gallon buckets. Notes are taken on the map location and stratigraphy of the site, which is photographed before it is vacated and the fossils are removed to a safe place.
5. Particularly small invertebrate fossils typically represent multiple specimens of a limited number of organisms, and a scientifically suitable sample can be obtained from one to several five-gallon buckets of fossiliferous sediment. If it is possible to dry screen the sediment in the field, a concentrated sample may consist of one or two buckets of material. For vertebrate fossils, the test is usually the observed presence of small pieces of bones within the sediments. If present, as many as 20 to 40 five-gallon buckets of sediment can be collected and returned to a separate facility to wet-

screen the sediment.

6. In accordance with the "Microfossil Salvage" section of the Society of Vertebrate Paleontology guidelines (2010:7), bulk sampling and screening of fine-grained sedimentary deposits (including carbonate-rich paleosols) must be performed if the deposits are identified to possess indications of producing fossil "microvertebrates" to test the feasibility of the deposit to yield fossil bones and teeth.
7. In the laboratory, individual fossils are cleaned of extraneous matrix, any breaks are repaired, and the specimen, if needed, is stabilized by soaking in an archivally approved acrylic hardener (*e.g.,* a solution of acetone and Paraloid B-72).
8. Recovered specimens are prepared to a point of identification and permanent preservation (not display), including screen-washing sediments to recover small invertebrates and vertebrates. Preparation of individual vertebrate fossils is often more time-consuming than for accumulations of invertebrate fossils.
9. Identification and curation of specimens into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (*e.g.,* the WSC) shall be conducted. The paleontological program should include a written repository agreement prior to the initiation of mitigation activities. Prior to curation, the lead agency (*e.g.,* the City of Murrieta) will be consulted on the repository/museum to receive the fossil material.
10. A final report of findings and significance will be prepared, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). The report, when submitted to, and accepted by, the appropriate lead agency, will signify satisfactory completion of the project program to mitigate impacts to any potential nonrenewable paleontological resources (*i.e.,* fossils) that might have been lost or otherwise adversely affected without such a program in place.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief, and have been compiled in accordance with CEQA criteria.

PROFESSIONAL GEOLOGIST
TODD A. WIRTHS
No. 7588
STATE OF CALIFORNIA

March 14, 2022

Todd A. Wirths
Senior Paleontologist
California Professional Geologist No. 7588

Date

VIII. REFERENCES

City of Murrieta. 2011a. Chapter 8, Conservation Element, Murrieta General Plan 2035. https://www.murrietaca.gov/DocumentCenter/View/4362/08---Conservation-Elementpdf.

City of Murrieta. 2011b. Section 5.9: Cultural Resources, Final Environmental Impact Report, Murrieta General Plan 2035, SCH NO. 2010111084. https://www.murrietaca.gov/DocumentCenter/View/754/05-09---Cultural-Resources-PDF.

Hohman, C.J., Scott, E., and Dooley, A.C. 2020. Shifting faunas and changing climate: new remains of middle to late Pleistocene *Equus* from southwestern Riverside County, California: Abstract, *in* The Society of Vertebrate Paleontology 80th Annual Meeting · Virtual 2020, Conference Program.

Jefferson, G.T. 1991. A catalogue of late Quaternary vertebrates from California: Part two, mammals. Natural History Museum of Los Angeles County, Technical Reports, no. 7: i-v + 1-129.

Kennedy, M.P., and Morton, D.M. 2003. Preliminary geologic map of the Murrieta 7.5' quadrangle, Riverside County, California: U. S. Geological Survey Open-File Report 03-189, version 1.0, scale 1:24,000.

Morton, D.M. and Miller, F.K. 2006. Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: U.S. Geological Survey Open-File Report 06-1217, scale 1:100,000.

Pajak, A.F., Scott, E., and Bell, C.J. 1996. A review of the biostratigraphy of Pliocene and Pleistocene sediments in the Elsinore Fault zone, Riverside County, California. PaleoBios, 17:2-4, pp. 28-49.

Reynolds, R.E., and Reynolds, R.L. 1990a. A new, late Blancan faunal assemblage from Murrieta, Riverside County, California, *in*, Reynolds, R., ed., Abstracts of Papers presented at the Mojave Desert Quaternary Research Center, Fourth Annual Symposium, San Bernardino County Museum, Redlands, California.

Reynolds, R.E., and Reynolds, R.L. 1990b. Irvingtonian? faunas from the Pauba Formation, Temecula, Riverside County, California. *In*, J. Reynolds, compiler, Abstracts of proceedings, 1990 Mojave Desert Quaternary Research Symposium, San Bernardino County Museum, Redlands, California. San Bernardino County Museum Association Quarterly, v. XXXVII, no. 2, p. 37.

Reynolds, R.E., Fay, L.P., and Reynolds, R.L. 1990. California Oaks Road: An early-late Irvingtonian Land Mammal Age fauna from Murrieta, Riverside County, California, *in*, Reynolds, R., ed., Abstracts of Papers presented at the Mojave Desert Quaternary

Research Center, Fourth Annual Symposium, San Bernardino County Museum, Redlands, California.

Scott, E., and Cox, S.M. 1993. *Arctodus simus* (Cope, 1879) from Riverside County, California. PaleoBios, 15:2, pp. 27-36.

Society of Vertebrate Paleontology. 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources; by the SVP Impact Mitigation Guidelines Revision Committee: http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_ Mitigation_Guidelines.aspx.

Stewart, J.D., Kennedy, G.L., and Shiller, G.I. 2003. Paleontological monitoring report, Murrieta 55 Project, city of Murrieta, Riverside County, California (Tentative Tract Map No. 29923[00-160]). Unpublished consulting report prepared for Keystone Communities, San Diego, California, by Brain F. Smith and Associates, Inc., Poway, California.

APPENDIX A

Qualifications of Key Personnel

Todd A. Wirths, MS, PG No. 7588

Senior Paleontologist

Brian F. Smith and Associates, Inc.
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: twirths@bfsa-ca.com

Education

Master of Science, Geological Sciences, San Diego State University, California **1995**

Bachelor of Arts, Earth Sciences, University of California, Santa Cruz **1992**

Professional Certifications

California Professional Geologist #7588, 2003
Riverside County Approved Paleontologist
San Diego County Qualified Paleontologist
Orange County Certified Paleontologist
OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board member, San Diego Geological Society
San Diego Association of Geologists; past President (2012) and Vice President (2011)
South Coast Geological Society
Southern California Paleontological Society

Experience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSA, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

Selected Recent Reports

2019 *Paleontological Assessment for the 10575 Foothill Boulevard Project, City of Rancho Cucamonga, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Assessment for the MorningStar Marguerite Project, Mission Viejo, Orange County, California.* Prepared for T&B Planning. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Monitoring Report for the Nimitz Crossing Project, City of San Diego.* Prepared for Voltaire 24, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California.* Prepared for JRT BP 1, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Oceanside Beachfront Resort Project, Oceanside, San California.* Prepared for S.D. Malkin Properties. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Nakase Project, Lake Forest, Orange County, San California.* Prepared for Glenn Lukos Associates, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, Banning, Riverside County*. Prepared for NP Banning Industrial, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Ortega Plaza Project, Lake Elsinore, Riverside County*. Prepared for Empire Design Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Record Search Update for the Green River Ranch III Project, Green River Ranch Specific Plan SP00-001, City of Corona, California*. Prepared for Western Realco. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Cypress/Slover Industrial Center Project, City of Fontana, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Imperial Landfill Expansion Project (Phase VI, Segment C-2), Imperial County, California*. Prepared for Republic Services, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Assessment for the Manitou Court Logistics Center Project, City of Jurupa Valley, Riverside County, California*. Prepared for Link Industrial. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Resource Impact Mitigation Program for the Del Oro (Tract 36852) Project, Menifee, Riverside County*. Prepared for D.R. Horton. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Assessment for the Alessandro Corporate Center Project (Planning Case PR-2020-000519), City of Riverside, Riverside County, California*. Prepared for OZI Alessandro, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Monitoring Report for the Boardwalk Project, La Jolla, City of San Diego*. Prepared for Project Management Advisors, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.