

**PALEONTOLOGICAL RESOURCES
ASSESSMENT**

**WILDOMAR 11-ACRE PROJECT
CITY OF WILDOMAR, COUNTY OF RIVERSIDE, CALIFORNIA**

LSA

March 2016

**PALEONTOLOGICAL RESOURCES
ASSESSMENT**

**WILDOMAR 11-ACRE PROJECT
CITY OF WILDOMAR, COUNTY OF RIVERSIDE, CALIFORNIA**

Submitted to:

Emad Bolous
c/o Tom Mungari, Nova Homes, Inc.
Mari Mina, LLC
4030 Birch Street, Suite 100
Newport Beach, California 92660

Prepared by:

Sarah Rieboldt, Ph.D.,
and Brooks Smith
LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614
(949) 553-0666

Project No. MMI1501

LSA

March 2016

EXECUTIVE SUMMARY

LSA was retained by Mari Mina, LLC to prepare a paleontological resources assessment for the proposed Wildomar 11-Acre Project (project) in the City of Wildomar in the County of Riverside, California. The project involves the construction of 77 single-family homes, as well as a centrally located, shared recreation area with a clubhouse, playground, and pool. This assessment included a locality search at the Natural History Museum of Los Angeles County, an examination of geologic maps and paleontological literature, and a field survey.

No significant paleontological resources were identified directly within the project area during the locality search or the field survey. The results of the locality search and literature review indicate that the majority of the project area is underlain by the sandstone member of the Pleistocene Pauba Formation, which has high paleontological sensitivity. The northeastern corner of the project area contains monzogranite to granodiorite of the Cretaceous Paloma Valley Ring Complex, which has no paleontological sensitivity. Because excavation during the course of the project will reach paleontologically sensitive deposits, there is a potential for the project to impact paleontological resources. In order to mitigate potential adverse impacts to nonrenewable paleontological resources, as required by State regulations, LSA recommends the following procedures:

- A paleontologist shall be hired to develop a Paleontological Resource Impact Mitigation Program (PRIMP) for this project. The PRIMP shall include the methods that will be used to protect paleontological resources that may exist within the project area, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.
- Excavation and grading activities in deposits with a high paleontological sensitivity rating (sandstone member of the Pauba Formation) shall be monitored by a paleontological monitor following a PRIMP. No paleontological monitoring is required for excavation in rocks with no paleontological sensitivity (monzogranite to granodiorite of the Paloma Valley Ring Complex).
- If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find in order to assess its significance.
- Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of an accredited scientific institution.
- At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.
- In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and a paleontologist should be contacted to assess the find for significance. If determined to be significant, the fossil shall be collected from the field.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
INTRODUCTION.....	1
REGULATORY SETTING	3
STATE REGULATIONS.....	3
METHODS.....	4
LITERATURE REVIEW.....	4
LOCALITY SEARCH	4
FIELD SURVEY.....	4
RESULTS.....	5
LITERATURE REVIEW.....	5
Pauba Formation, Sandstone Member.....	5
Paloma Valley Ring Complex, Monzogranite to Granodiorite	7
LOCALITY SEARCH	7
FIELD SURVEY.....	7
RECOMMENDATIONS	8
REFERENCES.....	9

FIGURES

Figure 1: Project Location and Vicinity	2
Figure 2: Geology Map	6

APPENDIX

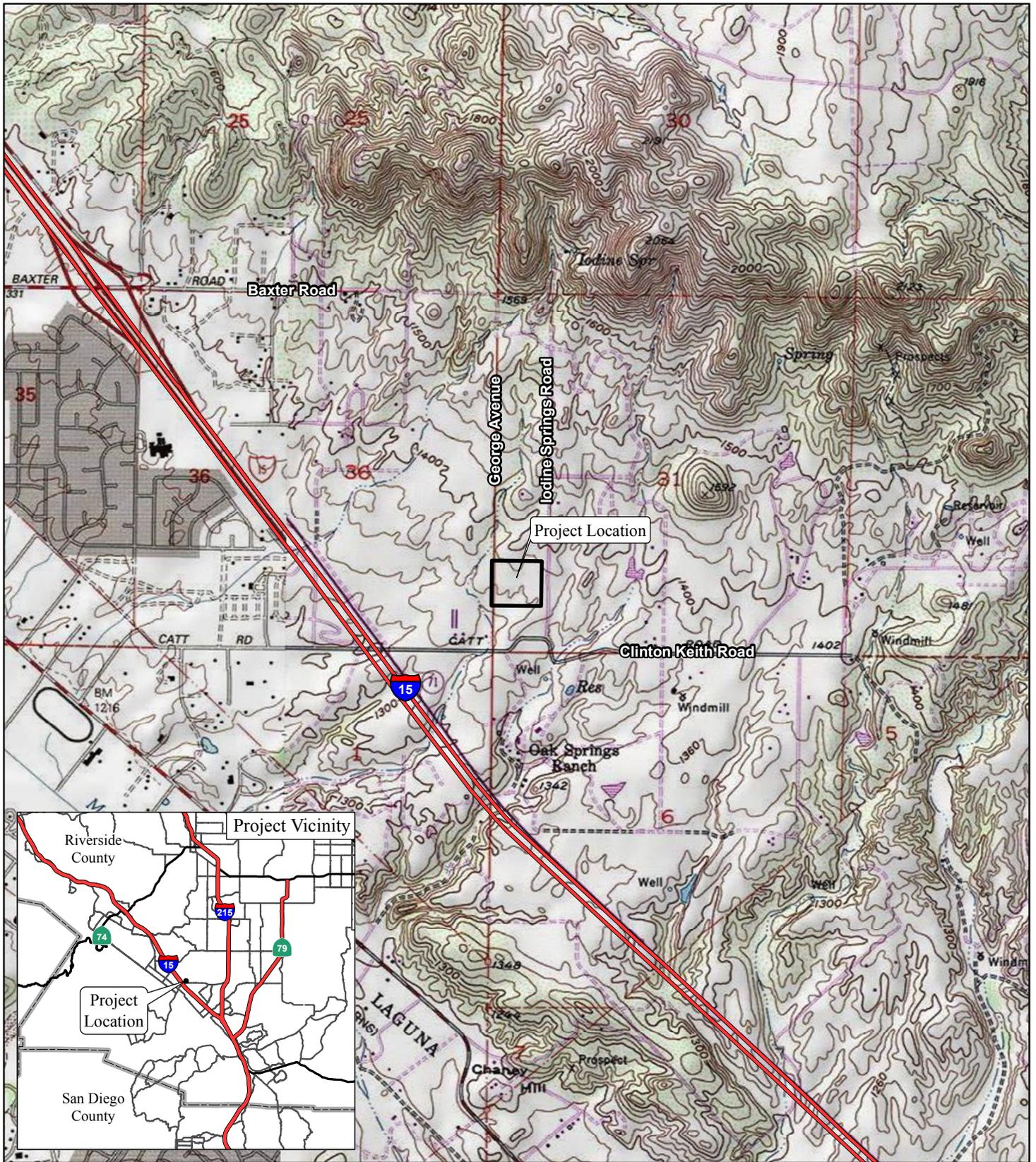
A: FOSSIL LOCALITY SEARCH RESULTS FROM THE NATURAL HISTORY MUSEUM OF
LOS ANGELES COUNTY

INTRODUCTION

LSA was retained by Mari Mina, LLC to prepare a paleontological resources assessment for the proposed Wildomar 11-Acre Project (project) in the City of Wildomar in the County of Riverside, California. The project involves the construction of 77 single-family homes, as well as a centrally located, shared recreation area with a clubhouse, playground, and pool. Current project plans indicate that development of the project will involve removal of any existing brush and debris at the surface of the project area; excavation to a depth of 13 feet within the project area to reach competent material; installation of wet and dry utilities; construction of the new homes, clubhouse, playground, and pool area; and landscaping.

The project area is located on approximately 11 acres north of Clinton Keith Road between George Avenue to the west and Iodine Springs Road to the east. It is depicted on the United States Geological Survey (USGS) *Murrieta, California* 7.5-minute topographic quadrangle map in Township 6 South, Range 3 West, Section 31, San Bernardino Baseline and Meridian (USGS, 1979; Figure 1).

This assessment was conducted pursuant to all applicable State regulations regarding paleontological resources, as well as guidelines established by the Society of Vertebrate Paleontology (SVP, 1995, 2010). According to these regulations and guidelines, if development of a project impacts significant paleontological resources, a plan must be developed to mitigate those impacts. This assessment documents the potential for encountering paleontological resources during development of this project and makes recommendations on how to mitigate impacts to those resources.



LSA

LEGEND

 Project Location

FIGURE 1



0 1000 2000
FEET

SOURCE: USGS 7.5' Quad - Murrieta (1979), CA

F:\MMI1501\GIS\ProjectLocation_USGS.mxd (3/1/2016)

Wildomar 11 Acre Project
Project Location and Vicinity

REGULATORY SETTING

State Regulations

Under State law, paleontological resources are protected by the California Environmental Quality Act (CEQA) and Public Resources Code (PRC) Section 5097.5.

The purpose of CEQA is to provide a Statewide policy of environmental protection. As part of this protection, State and local agencies are required to analyze, disclose, and, when feasible, mitigate the environmental impacts of, or find alternatives to, proposed projects. The *State CEQA Guidelines* (California Code of Regulations 15000 et seq.) provide regulations for the implementation of CEQA and include more specific direction on the process of documenting, analyzing, disclosing, and mitigating the environmental impacts of a project. To assist in this process, Appendix G of the *State CEQA Guidelines* provides a sample checklist form that may be used to identify and explain the degree of impact a project will have on a variety of environmental aspects, including paleontological resources (Section V[c]). As stated in Section 15002(b)(1–3) of the *State CEQA Guidelines*, CEQA applies to governmental action, including activities that are undertaken by, financed by, or require approval from a government agency.

The California PRC Section 5097.5 protects historic, archaeological, and paleontological resources on public lands in California and establishes criminal and civil penalties for violations. Specifically, this law states:

- “(a) 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, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.
- (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.”

METHODS

LITERATURE REVIEW

The literature review included an examination of geologic maps of the project area and a review of relevant geological and paleontological literature to determine which geologic units are present within the project area and whether fossils have been recovered from those geologic units elsewhere in the region. As geologic units may extend over large geographic areas and contain similar lithologies and fossils, the literature review includes areas well beyond the project area. The results of this literature review include an overview of the geology of the project areas and a discussion of the paleontological sensitivity (or potential) of the geologic units within the project area.

LOCALITY SEARCH

The purpose of a locality search is to establish the status and extent of previously recorded paleontological resources within and adjacent to the study area for a given project. In March 2016, a locality search was conducted through the Natural History Museum of Los Angeles County (LACM). This search identified any vertebrate localities in the LACM records that exist near the project area in the same or similar deposits. A copy of the locality search results from the LACM is attached in Appendix A.

FIELD SURVEY

On February 28, 2016, LSA Senior Cultural Resources Manager Riordan Goodwin conducted a pedestrian survey of the project area. Special attention was paid to any graded areas and to rodent burrows that offered a better view of the underlying sediment. The purpose of a field survey is to note the sediments in the project area, relocate any known paleontological localities, and identify any unrecorded paleontological resources exposed on the surface of a project area. In this way, impacts to existing, unrecorded paleontological material may be mitigated prior to the beginning of ground-disturbing activities and portions of the project area that are more likely to contain paleontological resources may be identified.

RESULTS

LITERATURE REVIEW

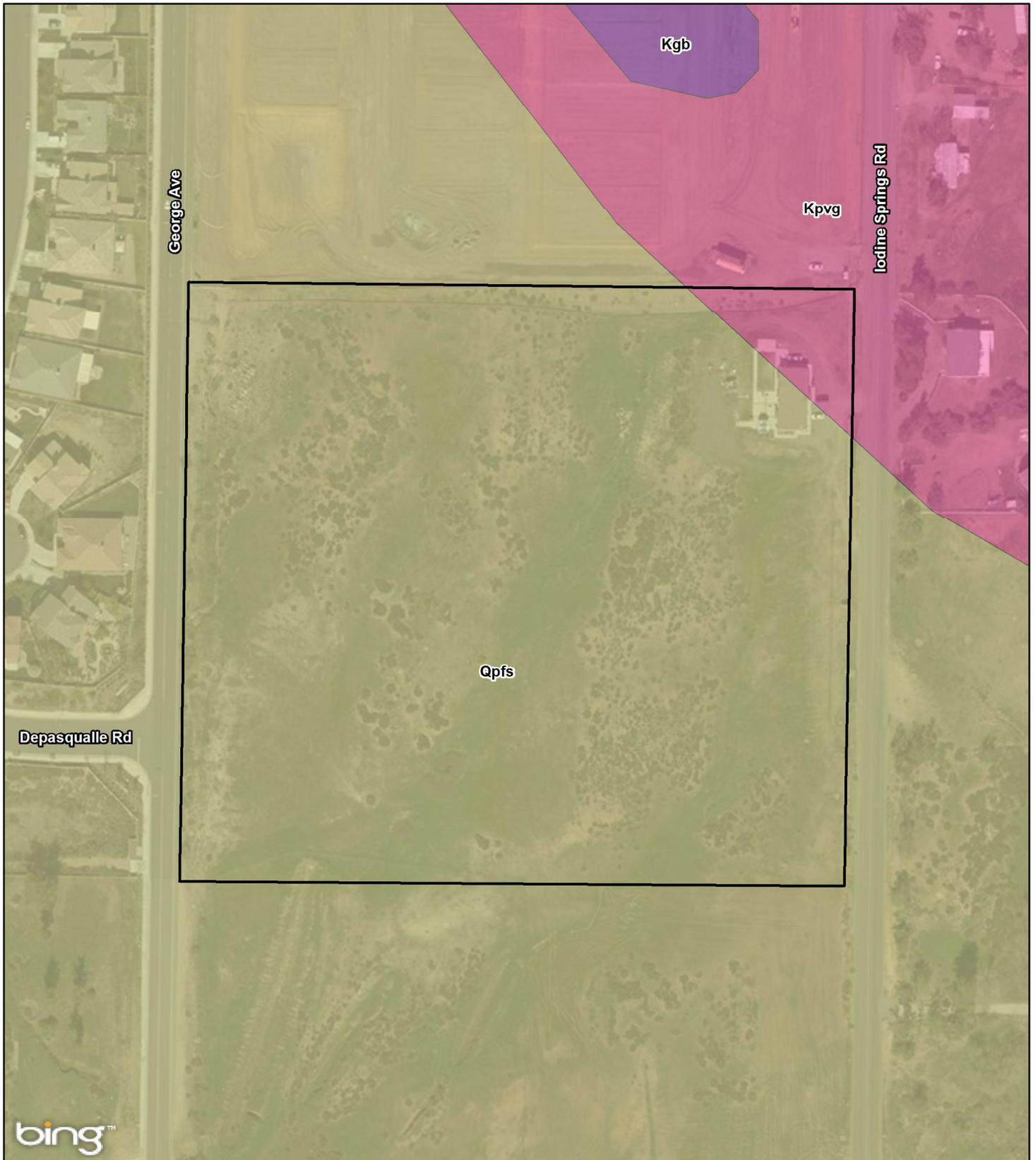
The project area is located at the northern end of the Peninsular Ranges Geomorphic Province, a 900-mile long northwest-southeast trending structural block that extends from the Transverse Ranges to the tip of Baja California and includes the Los Angeles Basin (California Geological Survey, 2002; Norris and Webb, 1976). The total width of this province is approximately 225 miles, extending from the Colorado Desert in the east, across the continental shelf to the Southern Channel Islands (Santa Barbara, San Nicolas, Santa Catalina, and San Clemente) in the west (Sharp, 1976). This province is characterized by a series of mountain ranges separated by northwest-trending valleys subparallel to faults branching from the San Andreas Fault (California Geological Survey, 2002). It contains extensive pre-Cretaceous (older than 145 million years ago [Ma]) igneous and metamorphic rocks covered by limited exposures of post-Cretaceous (younger than 66 Ma) sedimentary deposits (Norris and Webb, 1976). Within this province, the project is located on the Perris Block, a fault-bounded structural block that extends from the southern foot of the San Gabriel and San Bernardino Mountains southeast to the vicinity of Bachelor Mountain and Polly Butte (Morton and Miller, 2006; Kenney, 1999). It is bounded on the northeast by the San Jacinto Fault and on the southwest by the Elsinore Fault Zone (Morton and Miller, 2006).

Geologic mapping by Kennedy and Morton (2003) indicate that the majority of the project area is underlain by the sandstone member of the Pleistocene Pauba Formation, while the northeastern corner of the project area contains monzogranite to granodiorite of the Cretaceous Paloma Valley Ring Complex (Figure 2). Dates for the geologic periods and epochs referenced in this report are derived from the International Chronostratigraphic Chart published by the International Commission on Stratigraphy (ICS, 2015).

Pauba Formation, Sandstone Member

The Pleistocene Pauba Formation was deposited from approximately 120,000–600,000 years ago and consists of siltstone, sandstone, and conglomerate (Kennedy and Morton, 2003; Pajak et al., 1996). It contains two informal members: a fanglomerate member and a sandstone member (Kennedy and Morton, 2003). Within the project area, only the sandstone member is present. The informal sandstone member of the Pauba Formation consists of brown, moderately cemented, cross-bedded sandstone with infrequent cobble and boulder conglomerate beds (Kennedy and Morton, 2003).

The formation as a whole is known to produce scientifically important vertebrate fossils from the Irvingtonian North American Land Mammal Age. These fossils include ground sloth, camel, mammoth, mastodon, deer, horse, mice, shrew, and rabbit (Jefferson, 1991a, 1991b; Pajak et al., 1996). There is a potential to recover similar fossils in the deposits of the sandstone member of the Pauba Formation within the project area. Therefore, these deposits have high sensitivity for paleontological resources.



L S A

LEGEND

 Project Location

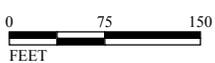
Geologic Unit

 Qpfs – Pauba Formation, sandstone member

 Kpvg – Paloma Valley Ring Complex, monzogranite to granodiorite

 Kgb – Gabbro

FIGURE 2



SOURCE: Bing Maps (2014)

F:\MM11501\GIS\Geology.mxd (3/1/2016)

Wildomar 11 Acre Project
Geology Map

Paloma Valley Ring Complex, Monzogranite to Granodiorite

The Cretaceous (66.0–145.0 Ma) monzogranite to granodiorite of the Paloma Valley Ring Complex consists of pale gray, massive, medium-grained biotite monzogranite with some hornblende-biotite granodiorite from an older ring dike (Kennedy and Morton, 2003). These rocks formed as magma intruded the surrounding rocks and cooled below the surface.

Because the igneous rocks of the Paloma Valley Ring Complex formed from magma below the surface, they will not contain fossils. Therefore, these rocks have no paleontological sensitivity.

LOCALITY SEARCH

According to the locality search conducted by the LACM (Appendix A), the museum does not have records of any fossil localities within the project area. Moreover, the museum notes that the Mesozoic igneous rocks in the northeastern portion of the project area will not contain recognizable fossils. However, the museum does have records of fossil localities nearby from the Pauba Formation, which covers most of the project area. The closest vertebrate fossil localities in deposits of this formation are LACM 5447, 5891–5892, and 7941, all of which are found southeast of the project area around Interstate 15 (I-15) and Winchester Road (State Route 79). These localities produced specimens of fossil horses (Equidae) and an undetermined elephant (Proboscidea). Further to the southeast of the project area, in Temecula between Long Valley Road and Santiago Road, locality LACM 5789 produced more specimens of fossil horse (*Equus*). Also to the southeast, south of Long Canyon, locality LACM 5904 yielded specimens of fossil rabbit (Leporidae) and fossil pocket gopher (*Thomomys*). Additional horse (*Equus*) material was recovered from locality LACM 5893, which is found in the hill between the Temecula and Pauba Valleys, east of I-15.

The LACM states that excavation within the igneous rocks in the northeastern part of the project area will not produce any fossils, but excavations in the Pauba Formation throughout the remainder of the project area have the potential to encounter scientifically significant paleontological resources. The museum suggests that any substantial excavations in this formation be monitored to quickly and professionally recover any fossils discovered without impeding project development.

FIELD SURVEY

No paleontological resources were observed during the field survey. Ground visibility was poor, with much of the surface obscured by vegetation. Most of the project area has been disturbed by grading and the site's previous use as an orchard. Piles of landscaping and construction debris were encountered throughout the project area. Where exposed, the surveyor noted that the native sediments in the northern part of the project area, although disturbed, are consistent with the sandstone member of the Pauba Formation as mapped by Kennedy and Morton (2003).

RECOMMENDATIONS

No significant paleontological resources were identified directly within the project area during the locality search or field survey. However, the project area contains deposits that have the potential to produce scientifically important paleontological resources. These deposits include the Pleistocene sandstone member of the Pauba Formation, which is mapped over the majority of the project area. Because excavation during the course of the project will reach these paleontologically sensitive deposits, there is a potential for the project to impact paleontological resources. In order to mitigate potential adverse impacts to nonrenewable paleontological resources, LSA recommends the following procedures:

- A paleontologist shall be hired to develop a Paleontological Resource Impact Mitigation Program (PRIMP) for this project. The PRIMP shall include the methods that will be used to protect paleontological resources that may exist within the project area, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.
- Excavation and grading activities in deposits with high paleontological sensitivity (sandstone member of the Pauba Formation) shall be monitored by a paleontological monitor following a PRIMP. No monitoring is required for excavations in rocks with no paleontological sensitivity (monzogranite to granodiorite of the Paloma Valley Ring Complex).
- If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find in order to assess its significance.
- Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a scientific institution.
- At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.
- In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and a paleontologist should be contacted to assess the find for significance. If determined to be significant, the fossil shall be collected from the field.

By following the above procedures, potential impacts to nonrenewable paleontological resources would be avoided.

REFERENCES

California Geological Survey

- 2002 *California Geomorphic Provinces*. California Geologic Survey Note 36. California Department of Conservation.

International Commission on Stratigraphy (ICS)

- 2015 *International Chronostratigraphic Chart*. Published by the International Commission on Stratigraphy. January 2015. <http://www.stratigraphy.org/index.php/ics-chart-timescale>.

Jefferson, George T.

- 1991a *A Catalogue of Late Quaternary Vertebrates from California: Part One: Non-marine Lower Vertebrate and Avian Taxa*. Natural History Museum of Los Angeles County Technical Reports No. 5, Los Angeles.
- 1991b *A Catalogue of Late Quaternary Vertebrates from California: Part Two: Mammals*. Natural History Museum of Los Angeles County Technical Reports No. 7, Los Angeles.

Kennedy, M.P., and D.M. Morton

- 2003 *Preliminary Geologic Map of the Murrieta 7.5-minute Quadrangle, Riverside County, California*. Version 1.0. Digital preparation by Rachel M. Alvarez and Greg Morton. Prepared by the United States Geological Survey (USGS) in cooperation with the California Geological Survey. USGS Open-File Report 03-189. Maps Scale 1:24,000.

Kenney, Miles D.

- 1999 *Emplacement, Offset History, and Recent Uplift of Basement within the San Andreas Fault System, Northeastern San Gabriel Mountains*. Unpublished Ph.D. Dissertation, University of Oregon. 279 pp.

Morton, Douglas M., and Fred K. Miller

- 2006 *Geologic Map of the San Bernardino and Santa Ana 30-minute by 60-minute quadrangles, California*. Digital preparation by Pamela M. Cosette and Kelly R. Bovard. Prepared by the United States Geological Survey (USGS) in cooperation with the California Geological Survey. USGS Open File Report 2006-1217. Map Scale 1:100,000.

Norris, R.M. and R.W. Webb

- 1976 *Geology of California*, John Wiley and Sons, Inc., Santa Barbara.

Pajak, Alois F., Jr., Eric Scott, and Christopher J. Bell

- 1996 *A Review of the Biostratigraphy of Pliocene and Pleistocene Sediments in the Elsinore Fault Zone, Riverside County, California*. *PaleoBios* 17(2-4):28-49.

Sharp, R.P.

1976 *Geology: Field Guide to Southern California*, Kendall/Hunt Publishing Company; Second edition, pp. 181.

Society of Vertebrate Paleontology

1995 *Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines*. Society of Vertebrate Paleontology News Bulletin, No. 163, January 1995, pp. 22–27.

2010 *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Society of Vertebrate Paleontology. Impact Mitigation Guidelines Revision Committee, pp. 1–11.

United States Geological Survey (USGS)

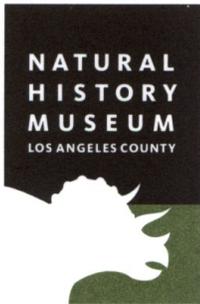
1979 *Murrieta, California 7.5-minute topographic quadrangle*. Published 1953. Photorevised 1979. United States Geological Survey, Denver, Colorado.

APPENDIX A

FOSSIL LOCALITY SEARCH RESULTS FROM THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

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

tel 213.763.DINO
www.nhm.org



Vertebrate Paleontology Section
Telephone: (213) 763-3325
Fax: (213) 746-7431
e-mail: smcleod@nhm.org

1 March 2016

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614

Attn: Sarah Rieboldt, Ph.D., Paleontologist

re: Paleontological Resources Records Check for the proposed Wildomar 11-Acre Project, LSA Project # MMI1501, in the City of Wildomar, Riverside County, project area

Dear Sarah:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed Wildomar 11-Acre Project, LSA Project # MMI1501, in the City of Wildomar, Riverside County, project area as outlined on the portion of the Murrieta USGS topographic quadrangle map that you sent to me via e-mail on 26 February 2016. We do not have any vertebrate fossil localities that lie directly within the proposed project boundaries, but we do have localities nearby from the same deposits that occur in the proposed project area.

According to geologic mapping, in the very northeastern portion of the proposed project area the bedrock is composed of Mesozoic intrusive igneous rocks that will not contain recognizable fossils. We have no vertebrate fossil localities from these types of rocks. Otherwise, the proposed project area has exposures of the terrestrial Plio-Pleistocene Pauba Formation. Our closest fossil vertebrate localities to the proposed project area from the Pauba Formation are LACM 5447, 5891-5892, and 7941. These localities all occur southeast of the proposed project area around the Temecula Valley Freeway (I-15) and Winchester Road (Route 79). Locality LACM 7941 is situated between Jefferson Road and the Temecula Valley Freeway (I-15). Locality LACM 5447 is situated along Ynez Road north of Winchester Road and Santa Gertrudis Creek. LACM 5891 and 5892 are situated along Margarita Road south of Winchester Road and Santa Gertrudis Creek. All these localities produced specimens of fossil horses, Equidae, and in addition locality LACM 7941 produced a fossil specimen of undetermined elephant, Proboscidea.

Further southeast of the proposed project area but still in the Pauba Formation we have several vertebrate fossil localities. Southeast of the proposed project area in Temecula east of the Temecula Valley Freeway (I-15), west of Ynez Road, between Long Valley Road and Santiago Road, locality LACM 5789 produced more specimens of fossil horse, *Equus*. Farther southeast, south of Long Canyon, locality LACM 5904 produced specimens of fossil rabbit, Leporidae and fossil pocket gopher, *Thomomys*. More fossil horse, *Equus*, material was recovered from the Pauba Formation locality LACM 5893, in the hills between the confluence of the Temecula and Pauba Valleys east of the Temecula Valley Freeway (I-15).

Excavations in the intrusive igneous rocks exposed in northeastern-most portion of the proposed project area will not encounter any recognizable fossils. Excavations in the exposures of the Pauba Formation in almost all of the proposed project area, however, may well encounter significant fossil vertebrate remains. Any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be closely monitored to quickly and professionally collect any fossils discovered without impeding development. Sediment samples should also be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

A handwritten signature in cursive script that reads "Samuel A. McLeod".

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice