PALEONTOLOGICAL RESOURCES ASSESSMENT REPORT

MHS 98 PROJECT

City of Murrieta
Riverside County, California

For Submittal to:

Planning Department
City of Murrieta
1 Town Square/24601 Jefferson Avenue
Murrieta, CA 92562

Prepared for:

MHS 98, LLC
31938 Temecula Parkway, Suite A369
Temecula, CA 92592

Prepared by:

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Michael Hogan, Principal Investigator

March 11, 2019

CRM TECH Contract #3440P
Approximately 11 acres
USGS Murrieta, Calif., 7.5' (1:24,000) Quadrangle
A portion of the Rancho Temecula land grant, T7S R3W, San Bernardino Baseline and Meridian

EXECUTIVE SUMMARY

Between January and March 2019, at the request of MHS 98, LLC, CRM TECH performed a paleontological resource assessment on approximately 11 acres of vacant land in the City of Murrieta, Riverside County, California. The subject property of the study consists of Assessor's Parcel Numbers (APN) 913-210-005 to -007, -010 to -013, -033 to -035, and a portion of APN 913-210-032. It is to the southwest of the intersection of Winchester Road (State Route 79) and Murrieta Hot Springs Road, in a portion of the Rancho Temecula land grant lying within T7S R3W, San Bernardino Baseline and Meridian.

The study is part of the environmental review process for the proposed construction of a 234-unit multi-family housing complex on the property. The City of Murrieta, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.). The purpose of the study is to provide the City with the necessary information and analysis to determine whether the proposed project would adversely affect any significant, nonrenewable paleontological resources, as required by CEQA, and to design a paleontological mitigation program, if necessary.

In order to identify any paleontological resource localities that may exist in or near the project area and to assess the possibility for such resources to be encountered during the project, CRM TECH initiated records searches at the appropriate repositories, conducted a literature review, and carried out a systematic field survey of the project area. The results of these research procedures indicate that the proposed project's potential to impact paleontological resources appears to be high, especially for vertebrate fossils in the older Pauba Formation deposits that are present below but near the ground surface within the project area.

Based on these findings, CRM TECH recommends that a paleontological resource impact mitigation program be developed and implemented during the project to prevent impacts on significant, nonrenewable paleontological resources or reduce them to a level less than significant. As the primary component of the mitigation program, all earth-moving operations associated with the project should be monitored for any evidence of buried fossil remains. Under this condition, the proposed project may be cleared to proceed in compliance with CEQA provisions on paleontological resources.

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INTRODUCTION

Between January and March 2019, at the request of MHS 98, LLC, CRM TECH performed a paleontological resource assessment on approximately 11 acres of vacant land in the City of Murrieta, Riverside County, California (Figure 1). The subject property of the study consists of Assessor's Parcel Numbers (APN) 913-210-005 to -007, -010 to -013, -033 to -035, and a portion of APN 913-210-032. It is to the southwest of the intersection of Winchester Road (State Route 79) and Murrieta Hot Springs Road, in a portion of the Rancho Temecula land grant lying within T7S R3W, San Bernardino Baseline and Meridian (Figures 2, 3).

The study is part of the environmental review process for the proposed construction of a 234-unit multi-family housing complex on the property. The City of Murrieta, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.). The purpose of the study is to provide the City with the necessary information and analysis to determine whether the proposed project would adversely affect any significant, nonrenewable paleontological resources, as required by CEQA, and to design a paleontological mitigation program, if necessary.

In order to identify any paleontological resource localities that may exist in or near the project area and to assess the possibility for such resources to be encountered during the project, CRM TECH initiated records searches at the appropriate repositories, conducted a literature review, and carried out a systematic field survey of the project area. The following report is a complete account of the methods, results, and final conclusion of this study. Personnel who participated in the study are named in the appropriate sections below, and their qualifications are provided in Appendix 1.

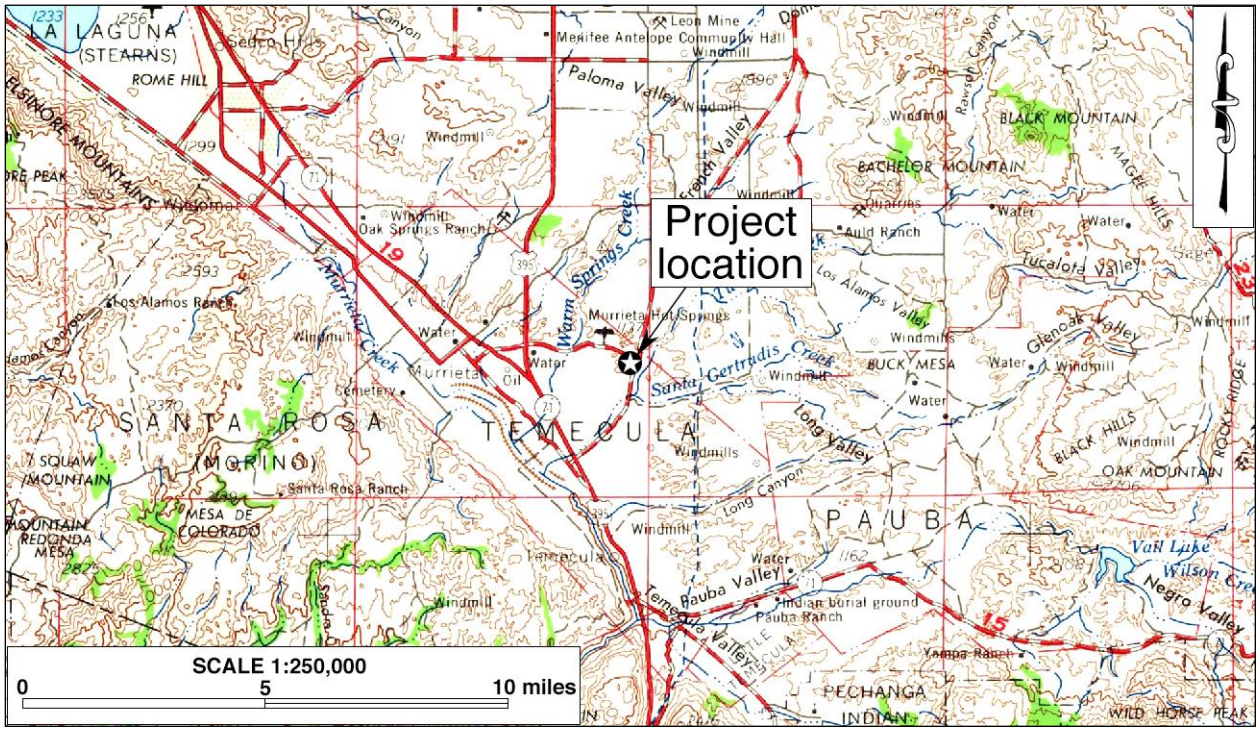

Figure 1. Project vicinity. (Based on USGS Santa Ana. Calif., 30'x60' quadrangle, 1979 edition)

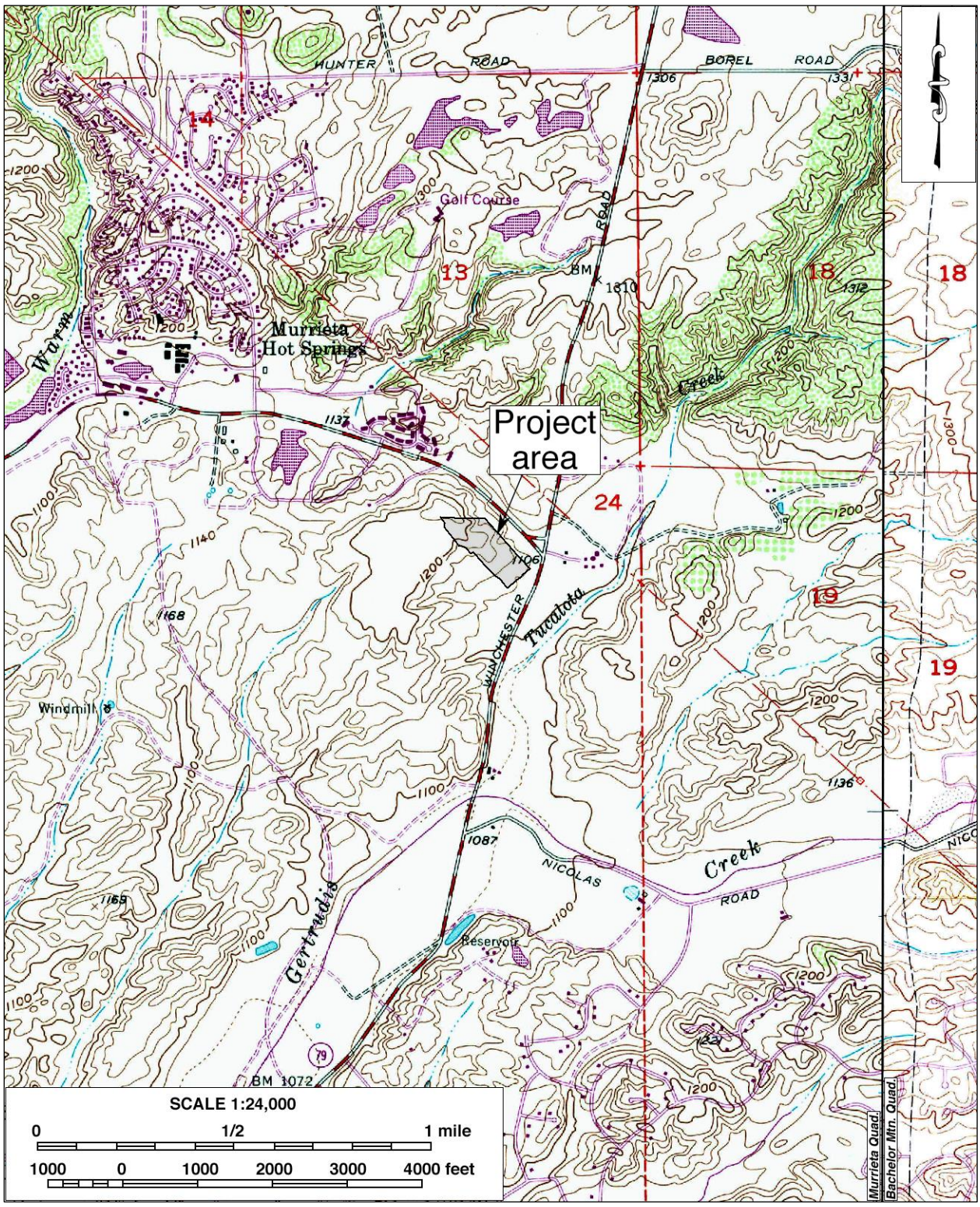

Figure 2. Project location. (Based on USGS Bachelor Mountain and Murrieta, Calif., 7.5' quadrangles, 1978/1979 edition)

Figure 3. Aerial view of the project area.

PALEONTOLOGICAL RESOURCES

DEFINITION

Paleontological resources represent the remains of prehistoric life, exclusive of any human remains, and include the localities where fossils were collected as well as the sedimentary rock formations in which they were found. The defining character of fossils or fossil deposits is their geologic age, which is typically regarded as older than approximately 12,000 years, the generally accepted temporal boundary marking the end of the last late Pleistocene (circa 2.6 million to 12,000 years B.P.) glaciation and the beginning of the current Holocene epoch (circa 12,000 years B.P. to the present).

Common fossil remains include marine shells; the bones and teeth of fish, amphibians, reptiles, and mammals; leaf assemblages; and petrified wood. Fossil traces, another type of paleontological resource, include internal and external molds (impressions) and casts created by these organisms. These items can serve as important guides to the age of the rocks and sediments in which they are contained, and may prove useful in determining the temporal relationships between rock deposits from one area and those from another as well as the timing of geologic events. They can also provide information regarding evolutionary relationships, development trends, and environmental conditions.

Fossil resources generally occur only in areas of sedimentary rock (e.g., sandstone, siltstone, mudstone, claystone, or shale). Because of the infrequency of fossil preservation, fossils, particularly vertebrate fossils, are considered nonrenewable paleontological resources. Occasionally fossils may be exposed at the surface through the process of natural erosion or because of human disturbances; however, they generally lay buried beneath the surficial soils. Thus, the absence of fossils on the surface does not preclude the possibility of their being present within subsurface deposits, while the presence of fossils at the surface is often a good indication that more remains may be found in the subsurface.

SIGNIFICANCE CRITERIA

According to guidelines proposed by Eric Scott and Kathleen Springer (2003) of the San Bernardino County Museum, paleontological resources can be considered to be of significant scientific interest if they meet one or more of the following criteria:

1. The fossils provide information on the evolutionary relationships and developmental trends exhibited 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 the interactions between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; and/or
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.

PALEONTOLOGICAL SENSITIVITY

The fossil record is unpredictable, and the preservation of organic remains is rare, requiring a particular sequence of events involving physical and biological factors. Skeletal tissue with a high percentage of mineral matter is the most readily preserved within the fossil record; soft tissues not intimately connected with the skeletal parts, however, are the least likely to be preserved (Raup and Stanley 1978). For this reason, the fossil record contains a biased selection not only of the types of organisms preserved but also of certain parts of the organisms themselves. As a consequence, paleontologists are unable to know with certainty, the quantity of fossils or the quality of their preservation that might be present within any given geologic unit.

Sedimentary units that are paleontologically sensitive are those geologic units (mappable rock formations) with a high potential to contain significant nonrenewable paleontological resources. More specifically, these are geologic units within which vertebrate fossils or significant invertebrate fossils have been determined by previous studies to be present or are likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontological resources anywhere within their geographical extent as well as sedimentary rock units temporally or lithologically amenable to the preservation of fossils.

A geologic formation is defined as a stratigraphic unit identified by its lithic characteristics (e.g., grain size, texture, color, and mineral content) and stratigraphic position. There is a direct relationship between fossils and the geologic formations within which they are enclosed and, with sufficient knowledge of the geology and stratigraphy of a particular area, it is possible for paleontologists to reasonably determine the formation's potential to contain significant nonrenewable vertebrate, invertebrate, marine, or plant fossil remains.

The paleontological sensitivity for a geologic formation is determined by the potential for that formation to produce significant nonrenewable fossils. This determination is based on what fossil resources the particular geologic formation has produced in the past at other nearby locations. Determinations of paleontologic sensitivity must consider not only the potential for yielding vertebrate fossils but also the potential of yielding a few significant fossils that may provide new and significant taxonomic, phylogenetic, and/or stratigraphic data.

The Society of Vertebrate Paleontology issued a set of standard guidelines intended to assist paleontologists to assess and mitigate any adverse effects/impacts to nonrenewable paleontological resources. The guidelines defined four categories of paleontological sensitivity for geologic units that might be impacted by a proposed project, as listed below (Society of Vertebrate Paleontology 2010:1-2):

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

SETTING

The project area is situated among a group of rolling hills separating the Menifee-Palomar Valley to the north from the Temecula Valley to the south, which are two of the many tectonically controlled valleys within the valley-and-ridge systems in the Perris Block (English 1926; Woodford et al. 1971:3421). These structurally depressed troughs are filled with nonmarine sediments of upper Pliocene through Recent age, and the ridges are composed of plutonic igneous rocks, metasedimentary rocks, and late-stage intrusive dikes (Mann 1955:Plate 1; Kennedy 1977:5).

English (1926) defined the Perris Block as a region between the San Jacinto and Elsinore-Chino fault zones, bounded on the north by the Cucamonga (San Gabriel) Fault and on the south by a vaguely delineated boundary near the southern end of the Temecula Valley. This structural block has been active since Pliocene time (Woodford et al. 1971:3421). The project location, however, lies away from the flanks of any of the ridge systems. The valleys in this area, trending nearly east-west, are likely to be more erosional than tectonic in origin. The area surrounding the project location is known to contain underlying geologic units of the Pauba Formation, consisting of very old sandstone deposits dating to the Pleistocene period (Kennedy and Morton 2003; Radford 2019).

The project area lies on the northern edge of a densely populated residential neighborhood and abuts several commercial properties along Winchester Road to the east (Figure 3). On the north side, the project area is bound by a chain-link fence that separates the property from a smaller development, and to the southwest it partially adjoins an existing apartment complex. To the northeast and the northwest are other parcels of undeveloped land.

Elevations within the project area range approximately from 1,129 to 1,170 feet above mean sea level. The terrain is characterized by an undulating surface with flatter sections around the perimeter and several low-lying hills in the interior (Figure 4). Vegetation consists of dense clusters of wild rosemary and sparse low-lying patches of grasses and dandy-lions rooted in topsoil consisting of moist, coarse-grained, sandy-clay loam, brown in color. Disturbances on the property are abundant and frequent. Man-made features observed during the survey include several makeshift dumpsites, drinking "hang-outs," vehicle tire tracks, a concrete curb running east/west for approximately 25 feet, and an off-road bike race track in the middle portion of the project area.

METHODS AND PROCEDURES

RECORDS SEARCHES

The records search service for this study was provided by the Natural History Museum of Los Angeles County (NHMLAC) in Los Angeles and the Western Science Center (WSC) in Hemet. These institutions maintain files of regional paleontological localities as well as supporting maps and documents. The records search results were used to identify known previously performed paleontological resource assessments as well as known paleontological localities within a one-mile radius of the project area.

Figure 4. Overview of the current natural setting of the project area. (Photograph taken on February 19; view to the northwest)

LITERATURE REVIEW

In conjunction with the records searches, CRM TECH paleontologist Harry M. Quinn pursued a literature review on the project area and vicinity. Sources consulted during the review include primarily topographic, geologic, and soil maps of the Murrieta area; the Riverside County GIS database on paleontological sensitivity, published geologic literature pertaining to the project location, and other materials in the CRM TECH library, including unpublished reports produced during similar surveys in the vicinity.

FIELD SURVEY

On October 19, 2018, CRM TECH paleontological surveyor Salvadore Boites carried out the field survey of the project area. The survey was completed by walking a series of parallel southeast-northwest transects at 15-meter (approximately 50-foot) intervals. In this way, the entire project area was systematically examined for any indications of paleontological remains and to verify the geological formations and soil types. Surface visibility varied from 30 to 90 percent, depending on vegetation density, at the time of the survey.

RESULTS AND FINDINGS

RECORDS SEARCHES

The Natural History Museum of Los Angeles County and the Western Science Center found no known paleontological localities within the boundaries of the project area but reported fossil localities in the vicinity from sediment lithologies similar to those that may be found in the project area (McLeod 2019; Radford 2019; see App. 2). According to both institutions, the project area lies upon late-Pleistocene Pauba Formation sandstone deposits (*ibid.*). The NHMLAC identified two

fossil localities from the Pauba Formation to the southwest of the project area, both of which produced fossil specimens of horse, *Equus* (McLeod 2019). The WSC reports that two concentrations of fossil localities have been identified within one mile of the project area (Radford 2019). Therefore, the subsurface sediments in the project area are considered to be of high paleontological sensitivity (*ibid*.).

LITERATURE REVIEW

The surface geology in the project area was mapped by Kennedy and Morton (2003a) as consisting entirely of *Qpfs* (Figure 5). Described as an "informal member" of the Pleistocene-aged Pauba Formation, *Qpfs* is composed of brown sandstone containing sparse conglomerate beds of cobbles and boulders. Dibblee (2008) mapped the surface sediments in the project area as *Qoa*, or Pleistocene-aged, gray, older alluvial gravel and sand.

Riverside County paleontological sensitivity maps classifies the project location as High Sensitivity A (RCIT n.d.). "High sensitivity includes not only the potential for yielding abundant vertebrate fossils, but also for production of a few significant fossils that may provide new and significant data" (County of Riverside 2015:4.9-11). High Sensitivity A, specifically, is based on formations or deposits that are known to contain, or have the appropriate age and conditions to contain, significant paleontological resources (*ibid.*).

FIELD SURVEY

The field survey encountered no surface manifestation of any fossilized faunal or floral remains. It was noted during the survey that recent rainfalls had eroded enough surface sediments to carve out a four-foot-deep gully, revealing the presence of Pauba Formation sediments at the depth of approximately three feet below the original ground surface.

SUMMARY

According to the research results presented above, the sediments in the project area consist of Pleistocene-aged alluvial fan deposits on the immediate surface and Pleistocene-aged Pauba Formation sandstone deposits roughly three feet below the surface. McLeod (2019) reports the discovery of fossil specimens of *Equus* to the southwest of the project location from Pauba Formation deposits, and Radford (2019) reports two clusters of fossil localities within one mile of the project area. The County of Riverside (RCIT n.d.) assigned the project location a High Sensitivity A designation. Based on these assessments, the surface soils and in particular the undisturbed subsurface deposits, including the Pauba Formation, appear to have a high potential for containing significant, nonrenewable fossil resources.

CONCLUSION AND RECOMMENDATIONS

CEQA guidelines (Title 14 CCR App. G, Sec. V(c)) require that public agencies in the State of California determine whether a proposed project would "directly or indirectly destroy a unique paleontological resource" during the environmental review process. The present study, conducted in

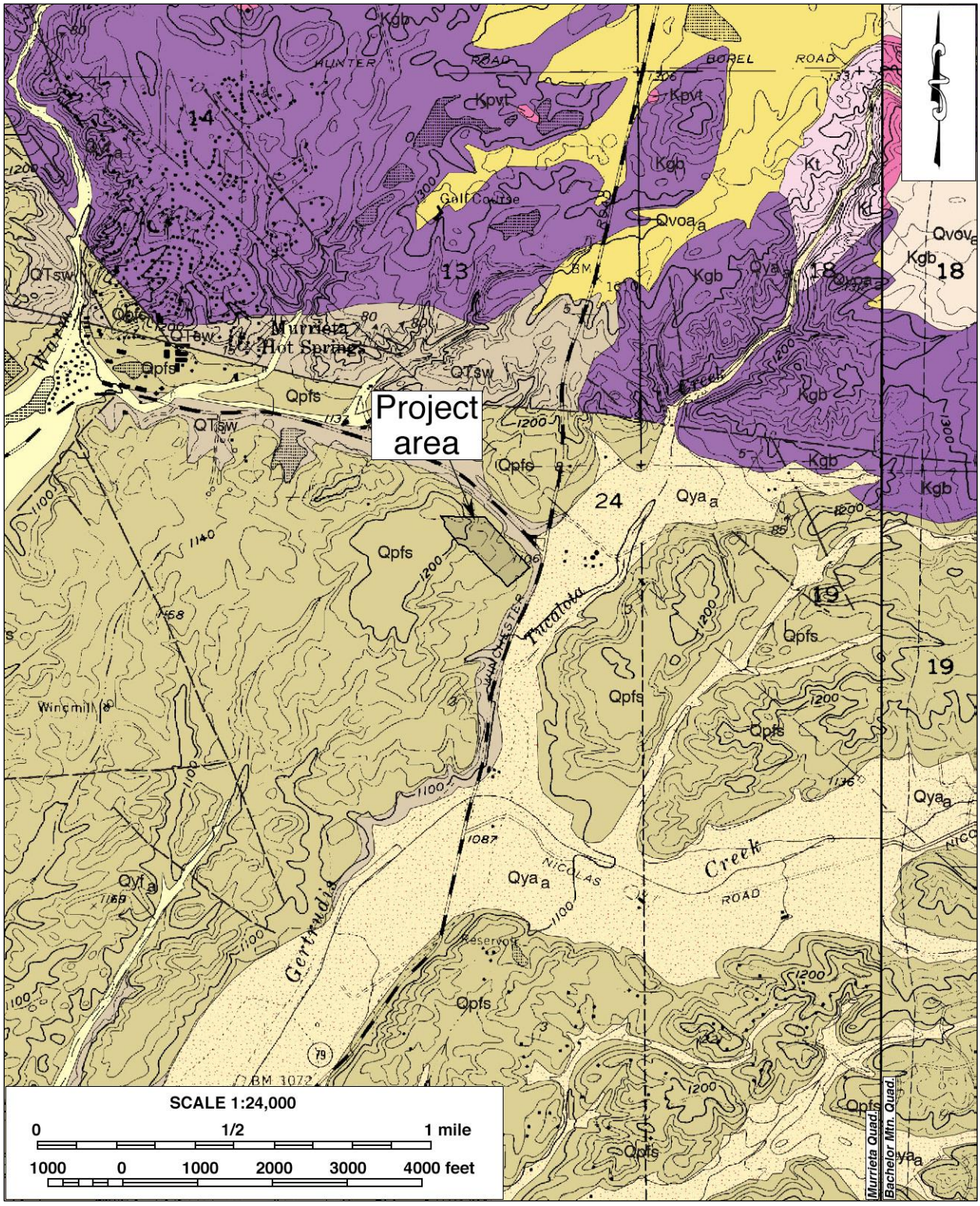

Figure 5. Geologic map of the project vicinity. (Based on Kennedy and Morton 2003a; 2003b)

compliance with this provision, is designed to identify any significant, non-renewable paleontological resources that may exist within or adjacent to the project area, and to assess the possibility for such resources to be encountered in future excavation and construction activities.

Based on the study results presented above, the proposed project's potential to impact significant paleontological resources appears to be high throughout the project area, especially for significant vertebrate fossils in the older Pauba Formation deposits that are present below but near the ground surface within the project area. Therefore, CRM TECH recommends that a paleontological resource impact mitigation program be developed and implemented during the project to prevent impacts on significant, nonrenewable paleontological resources or reduce them to a level less than significant. The mitigation program should be developed in accordance with the provisions of CEQA (Scott and Springer 2003) as well as the proposed guidelines of the Society of Vertebrate Paleontology (2010), and should include but not be limited to the following components:

- All earth-moving operations within the project area should be monitored by a qualified paleontological monitor. The monitor should be prepared to quickly salvage fossils as they are unearthed to avoid construction delays and should collect samples of sediments that are likely to contain fossil remains of small vertebrates or in vertebrates. However, the monitor must have the power to temporarily halt or divert grading equipment to allow for the removal of abundant or large specimens.
- Collected samples of sediment should be processed to recover small fossils, and all recovered specimens should be identified and curated at a repository with permanent retrievable storage.
- A report of findings, including an itemized inventory of recovered specimens, should be prepared upon completion of the procedures outlined above. The report should include a discussion of the significance of the paleontological findings, if any. The report and the inventory, when submitted to the City of Murrieta, would signify completion of the program to mitigate potential impacts on paleontological resources.

Under this condition, the proposed project may be cleared to proceed in compliance with CEQA provisions on paleontological resources.

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APPENDIX 1

PERSONNEL QUALIFICATIONS

PROJECT GEOLOGIST/PALEONTOLOGIST
Harry M. Quinn, M.S., California Professional Geologist #3477

Education

1968 M.S., Geology, University of Southern California, Los Angeles, California.
1964 B.S, Geology, Long Beach State College, Long Beach.
1962 A.A., Los Angeles Harbor College, Wilmington, California.

- Graduate work oriented toward invertebrate paleontology; M.S. thesis completed as a stratigraphic paleontology project on the Precambrian and Lower Cambrian rocks of Eastern California.

Professional Experience

2000- Project Paleontologist, CRM TECH, Riverside/Colton, California.
1998- Project Archaeologist, CRM TECH, Riverside/Colton, California.
1992-1998 Independent Geological/Geoarchaeological/Environmental Consultant, Pinyon Pines, California.
1994-1996 Environmental Geologist, E.C E.S., Inc, Redlands, California.
1988-1992 Project Geologist/Director of Environmental Services, STE, San Bernardino, California.
1987-1988 Senior Geologist, Jirsa Environmental Services, Norco, California.
1986 Consulting Petroleum Geologist, LOCO Exploration, Inc. Aurora, Colorado.
1978-1986 Senior Exploration Geologist, Tenneco Oil E & P, Englewood, Colorado.
1965-1978 Exploration and Development Geologist, Texaco, Inc., Los Angeles, California.

Previous Work Experience in Paleontology

1969-1973 Attended Texaco company-wide seminars designed to acquaint all paleontological laboratories with the capability of one another and the procedures of mutual assistance in solving correlation and paleo-environmental reconstruction problems.
1967-1968 Attended Texaco seminars on Carboniferous coral zonation techniques and Carboniferous smaller foraminifera zonation techniques for Alaska and Nevada.
1966-1972, 1974, 1975 Conducted stratigraphic section measuring and field paleontological identification in Alaska for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic and Mesozoic rocks and some Tertiary rocks, including both megafossil and microfossil identification, as well as fossil plant identification.
1965 Conducted stratigraphic section measuring and field paleontological identification in Nevada for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic rocks and some Mesozoic and Tertiary rocks. The Tertiary work included identification of ostracods from the Humboldt and Sheep Pass Formations and vertebrate and plant remains from Miocene alluvial sediments.

Memberships

Society of Vertebrate Paleontology; American Association of Petroleum Geologists; Association of Environmental Professionals; Rocky Mountain Association of Geologists, Pacific Section; Society of Economic Paleontologists and Mineralogists; San Bernardino County Museum.

Publications in Geology

Five publications in Geology concerning an oil field study, a ground water and earthquake study, a report on the geology of the Santa Rosa Mountain area, and papers on vertebrate and invertebrate Holocene Lake Cahuilla faunas.

REPORT WRITER
Ben Kerridge, M.A.

Education

2014	Archaeological Field School, Institute for Field Research, Kephallenia, Greece.
2010	M.A., Anthropology, California State University, Fullerton.
2009	Project Management Training, Project Management Institute/CH2M HILL, Santa Ana, California.
2004	B.A., Anthropology, California State University, Fullerton.

Professional Experience

2015-	Project Archaeologist/Report Writer, CRM TECH, Colton, California.
2015	Teaching Assistant, Institute for Field Research, Kephallenia, Greece.
2009-2014	Publications Delivery Manager, CH2M HILL, Santa Ana, California.
2010-	Naturalist, Newport Bay Conservancy, Newport Beach, California.
2006-2009	Technical Publishing Specialist, CH2M HILL, Santa Ana, California.
2002-2006	English Composition/College Preparation Tutor, various locations, California.

PALEONTOLOGICAL SURVEYOR
Salvadore Boites, M.A.

Education

2013	M.A., Applied Anthropology, California State University, Long Beach.
2003	B.A., Anthropology/Sociology, University of California, Riverside.
1996-1998	Archaeological Field School, Fullerton Community College, Fullerton, California.

- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.

Professional Experience

2014-	Project Archaeologist/Paleontological Surveyor, CRM TECH, Colton, California.
2010-2011	Adjunct Instructor, Anthropology, Everest College, Anaheim, California.
2003-2008	Project Archaeologist, CRM TECH, Riverside/Colton, California.
2001-2002	Teaching Assistant, Moreno Elementary School, Moreno Valley, California.
1999-2003	Research Assistant, Anthropology Department, University of California, Riverside.

Research Interests

Cultural Resource Management, Applied Archaeology/Anthropology, Indigenous Cultural Identity, Poly-culturalism.

APPENDIX 2

RECORDS SEARCH RESULTS

WESTERN SCIENCE CENTER

January 31, 2019

CRM Tech
Nina Gallardo
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Dear Ms. Gallardo,

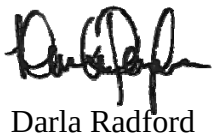
This letter presents the results of a record search conducted for the MHS Project (CRM TECH no. 3440P) in the city of Murrieta, Riverside County, California. The project site is located south of Delhaven Street and Date Street, north of Rising Hill Drive, and west of Highway 79, Township 7 South, Range 3 West on the Murrieta USGS 7.5 minute quadrangle.

The geologic units underlying this project are mapped entirely as very old sandstone deposits of the Pauba Formation dating to the Pleistocene period (Kennedy & Morton, 1993). Pauba Formation Sandstone units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area, but does have multiple localities within a one mile radius of the project. Nearby localities associated with the Harveston II Project resulted in dozens of fossil localities and hundreds of Pleistocene fossil specimens. Based off of general location information, the Principe Collection (a salvage collection from Murrieta, CA) also appears to have numerous localities that fall within the one mile radius of the project area as well.

Any fossils recovered from the MHS Project area would be scientifically significant. Excavation activity associated with development of the project area would impact the paleontologically sensitive Pleistocene units and it is the recommendation of the Western Science Center that a paleontological resource mitigation program be put in place to monitor, salvage, and curate any recovered fossils associated with the current study area.

If you have any questions, or would like further information about the Harveston II Project or Principe Collection, please feel free to contact me at dradford@westerncentermuseum.org

Sincerely,



Darla Radford
Collections Manager

MHS Project - CRM Tech # 3440P

Project location, one mile radius, geologic mapping, and WSC fossil localities.

Legend

- Delhaven Project
- One Mile Radius
- Principe Collection Localities
- Qpfs: Pauba Formation Sandstone, Very Old Surficial (Pleistocene)
- WSC Locality 30

Principe Old School House

Principe 6

MHS Project

WSC Locality 30

Principe Four Seasons

N

3000 ft

Google Earth

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

tel 213.763.DINO
www.nhm.org

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
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12 February 2019

CRM Tech
1016 East Cooley Drive, Suite B
Colton, CA 92324

Attn: Nina Gallardo, Project Archaeologist / Native American liaison

re: Paleontological resources for the proposed MHS 98 Project, CRM TECH No. 3440P, in the City of Murrieta, Riverside County, project area

Dear Nina:

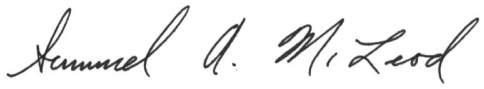
I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed MHS 98 Project, CRM TECH No. 3440P, in the City of Murrieta, Riverside County, project area as outlined on the portion of the Murrieta USGS topographic quadrangle map that you sent to me via e-mail on 29 January 2019. We do not have any vertebrate fossil localities that lie directly within the proposed project area, but we do have localities somewhat nearby from sedimentary deposits similar to those that occur in the proposed project area, either at the surface or at depth.

In the entire proposed project area there are exposures of the late Pleistocene Pauba Formation. Our closest fossil vertebrate localities from the Pauba Formation are LACM 5891 and 5892, south-southwest of the proposed project area, along Margarita Road south of Winchester Road and Santa Gertrudis Creek, that produced specimens of fossil horse, *Equus*. Directly west of localities LACM 5891-5892, east of the Temecula Valley Freeway (I-15) and north of Winchester Road [Banana Avenue], our Pauba Formation locality LACM 5447 produced further specimens of fossil horse, *Equus*. Northwest of locality LACM 5447, west of the Temecula Valley Freeway (I-15) and south of Date Street, we have another Pauba Formation locality, LACM 7941, that produced fossil specimens of undetermined elephant, Proboscidea, and fossil horse, *Equus*.

Any excavations in the Pauba Formation exposed throughout the proposed project area may well encounter significant vertebrate fossil remains. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Sediment samples should also be collected from the older deposits in the proposed project area and processed to determine their small fossil potential. 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,



Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice