Technical Appendix D2

Paleontological Resources Assessment

Brian F. Smith and Associates, Inc.
Archaeology / Biology / History / Paleontology / Air Quality / Traffic / Acoustics

17 December 2013

Mr. David Ornelas
T&B Planning, Inc.
1419 University Avenue, Suite C
San Diego, California 92103

Subject: Paleontological Resource and Monitoring Assessment, Modular Logistics Center Project, City of Moreno Valley, Riverside County, California (APNs 312-250-030, -031, -032, -036, -037, and -038)

Dear Mr. Ornelas:

Site Location: A paleontological resource assessment has been completed for the Modular Logistics Center project, located in the city of Moreno Valley, west of the Perris Reservoir and comprising the northwestern part of Section 32, Township 3 South, Range 3 West, San Bernardino Base and Meridian (USGS 7.5-minute, Perris, California quadrangle), Riverside County, California (Attachments 1 and 2). The 50.68-acre property is comprised of six parcels (Assessor's Parcel Numbers [APNs] 312-250-030, -031, -032, -036, -037, and -038) and located on the east side of Perris Boulevard, south of the Perris Valley Storm Drain, between March Air Force Base and the Perris Reservoir.

Geology: Published geologic reports and maps of the project area include those of T. H. Rogers, 1965 (Santa Ana Sheet of the Geologic Map of California); D. M. Morton, 2004 (Preliminary digital geologic map of the Santa Ana 30' x 60' quadrangle); and D. M. Morton, 2003 (Preliminary geologic map of the Perris 7.5' quadrangle, Riverside County, California: U. S. Geological Survey Open-File Report 03-270, scale 1:24,000). The latter map is the most detailed, and shows surface exposures (Attachment 3) of two geologic formations in the area, lower Pleistocene (approximately 1.8 million to perhaps 200,000 to 300,000 year old) very old alluvial fan deposits ($Qvof_a$, in brown on Attachment 3), and Holocene and upper Pleistocene (10,000 to perhaps 100,000 year old) young alluvial valley deposits (Qyv_{sa}, in yellow on Attachment 3), which are present as a thin veneer over the older alluvial fan deposits in the eastern half of the project area.

Paleontological Sensitivity: A paleontological sensitivity map generated by the Riverside County Land Information System on December 17, 2013 (Attachment 4) ranks the entire project area as having a High Potential/Sensitivity (High B), which is "based on [the presence of] geologic formations or mappable rock units that contain fossilized body elements, and trace fossils such as

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tracks, nests and eggs. These fossils occur on or below the surface." The category "High B" indicates that fossils are likely to be encountered at or below four feet of depth, and may be impacted during excavation by construction activities. Alluvial sediments with a High Potential/Sensitivity (High B) to yield nonrenewable paleontological resources (*i.e.*, fossils) are shown in amber tint on Attachment 4.

Results: Based on a paleontological literature and collections and records search previously conducted by the Geological Sciences Division of the San Bernardino County Museum in Redlands, California for a nearby project site (E. G. Scott, 2005, attached), the Holocene alluvium is considered to be too recently deposited to have the potential to contain fossil resources, and is assigned a "low paleontological resource sensitivity." However, the older Pleistocene alluvial fan deposits have a high potential to contain significant nonrenewable paleontological resources (*i.e.*, fossils), and are assigned a "high paleontological resource sensitivity" by Scott (2005). Similar older Pleistocene sediments throughout the lowland (valley) areas of Riverside County and the Inland Empire have been reported to yield significant fossils of plants and extinct terrestrial mammals from the last Ice Age (see references in Scott, 2005), such as mammoths, mastodons, giant ground sloths, dire wolves, short-faced bears, saber-toothed cats, large and small horses, camels, and bison. The collections and records search report (Scott, 2005), however, did not identify any known fossil localities from within a one-mile radius of that project site, which includes the area of the Modular Logistics Center project site.

Recommendations: Because of the high paleontological sensitivity (High B) of the older alluvial fan deposits across the site and beneath the thin veneer of younger alluvium, paleontological monitoring of mass grading and excavation (utility trenching, etc.) activities in areas so mapped should be required in order to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. A mitigation program consistent with the provisions of the California Environmental Quality Act (CEQA), regulations currently implemented by the County of Riverside and the City of Moreno Valley, and proposed guidelines of the Society of Vertebrate Paleontology follow this letter.

If you have any questions concerning this evaluation, please feel free to contact us at our Poway address. Thank you for the opportunity to provide paleontological services for this project.

Sincerely,

George L. Kennedy, Ph.D.
Senior Paleontologist

Attachments: Index maps, geologic map, paleo sensitivity map, SBCM records search report

Paleontological Mitigation Program

Modular Logistics Center Project

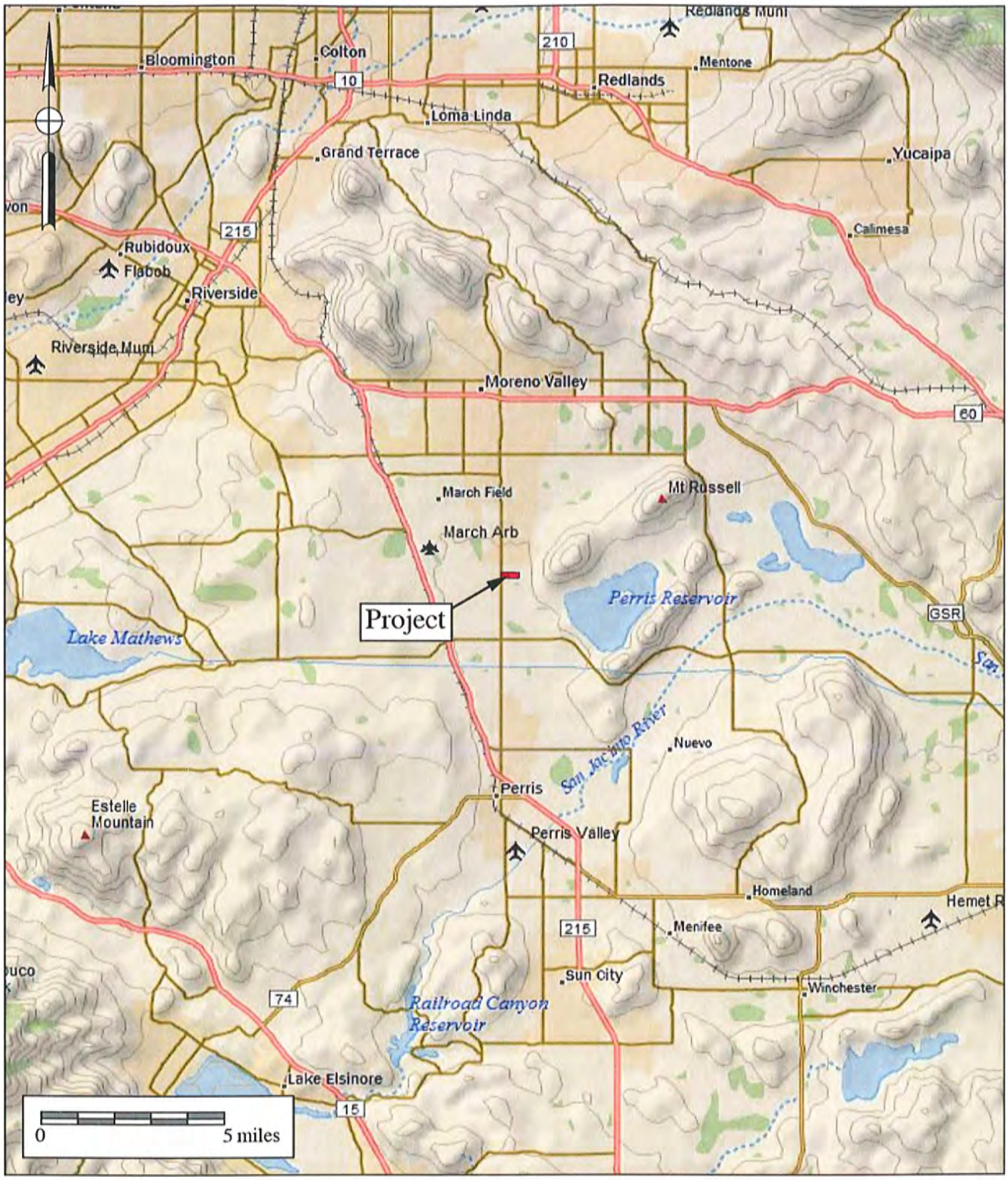
(APNs 312-250-030, -031, -032, -036, -037, and -038)

1. Monitoring of mass grading and excavation activities shall be conducted in areas identified as likely to contain paleontological resources by a qualified paleontologist or paleontological monitor. Monitoring will be conducted generally below five feet in depth in areas of grading or excavation in undisturbed, very old alluvial fan sediments ($Qvof_a$ on geologic map, Attachment 3), as well as where over excavation of the thin veneer of younger alluvial valley sediments (Qyv_{sa} on geologic map, Attachment 3) will encounter the older alluvial fan deposits in the subsurface. The qualified paleontological consultant may revise the monitoring protocol, including the depths at which monitoring should be initiated, if the initial grading cuts reveal a greater potential for fossils at depths less than five feet. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment to allow for the 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 or yield fossil resources.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including screen washing sediments to recover small invertebrates and vertebrates, if necessary. Preparation of individual vertebrate fossils is often more time-consuming than for accumulations of invertebrate fossils.

3. 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 Western Science Center Museum, 2345 Searl Parkway, Hemet, California 92543). The paleontological program should include a written repository agreement prior to the initiation of mitigation activities.

4. Preparation of a final monitoring and mitigation report of findings and significance, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location. The report, when submitted to the appropriate lead agency, will signify satisfactory completion of the project program to mitigate impacts to any paleontological resources.

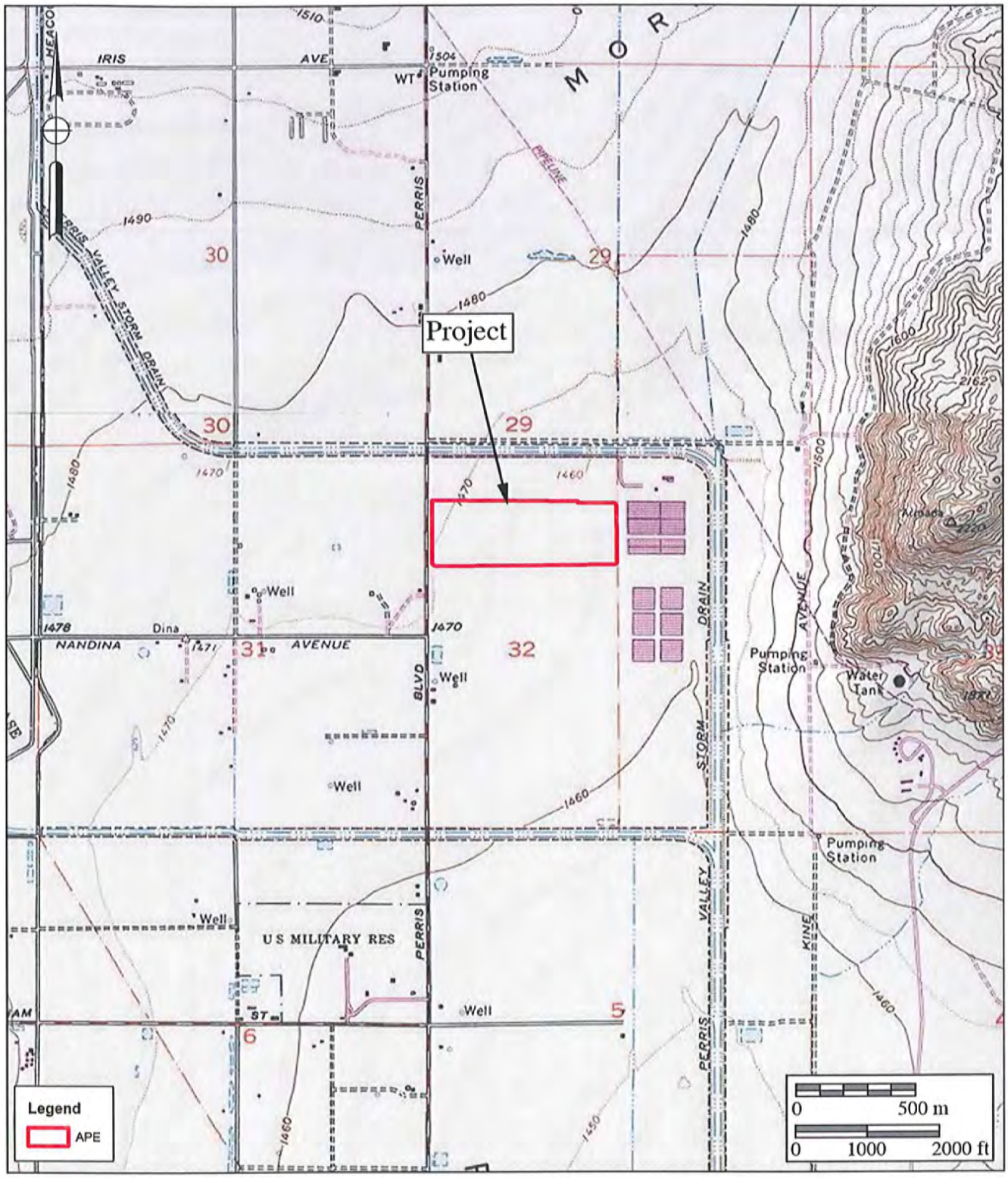


Attachment 1

General Location Map

The Modular Logistics Center Project

DelAmore (1:250,000 series)

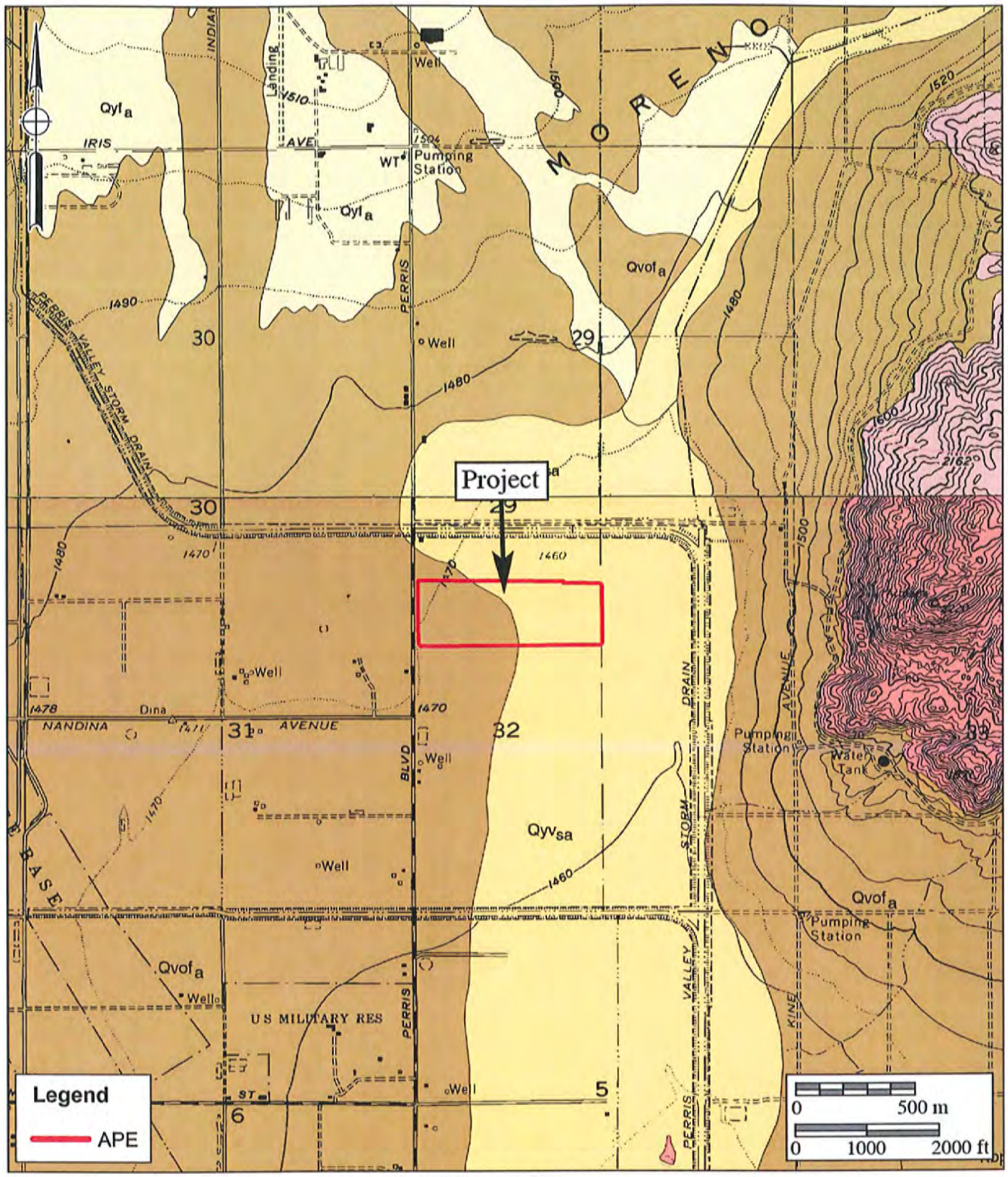


Attachment 2

Project Location Map

The Modular Logistics Center Project

USGS *Perris* Quadrangle (7.5-minute series)

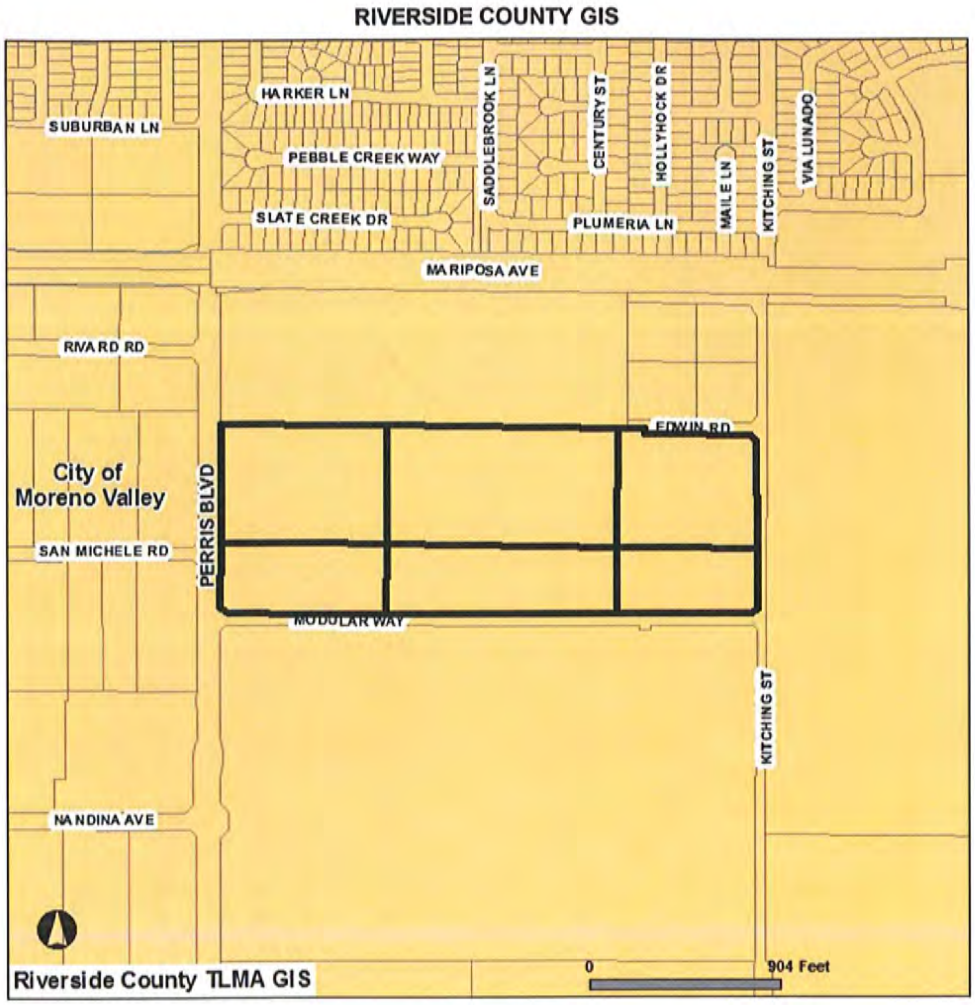


Attachment 3

Geologic Map

The Modular Logistics Center Project

Geology after Morton (2003) and Morton and Matti (2001)



Selected parcel(s):
312-250-030 312-250-031 312-250-032 312-250-036 312-250-037 312-250-038

PALEONTOLOGICAL SENSITIVITY

SELECTED PARCEL
PARCELS
INTERSTATES
HIGH POTENTIAL/SENSITIVITY (HIGH B)
HIGHWAYS
CITY

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Attachment 4

Paleontological Sensitivity Map

The Modular Logistics Center Project

SAN BERNARDINO COUNTY MUSEUM

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COUNTY OF SAN BERNARDINO
ECONOMIC DEVELOPMENT
AND PUBLIC SERVICES GROUP

ROBERT L. McKERNAN
Director

11 January 2005

Brian F. Smith & Associates
attn: George L. Kennedy, Ph.D.
14010 Poway Road, Suite "A"
Poway, CA 92064

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, STRATFORD RANCH PROJECT (BFSA # 04-175), PERRIS REGION, RIVERSIDE COUNTY, CALIFORNIA**

Dear Dr. Kennedy,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named property north of the City of Perris, Riverside County, California. The study area is located in the western portion of section 5, Township 4 South, Range 3 West, San Bernardino Base and Meridian, as seen on the Perris, California 7.5' United States Geological Survey topographic quadrangle map (1967 edition, photorevised 1973).

Previous geologic mapping (Rogers, 1965; Morton, 2004) indicates that the proposed study area is located primarily upon surface and subsurface early to middle Pleistocene alluvial fan deposits (= unit $\mathbf{Qvof_a}$), overlain in the eastern portion of the property by a thin veneer of Holocene alluvial valley deposits (= $\mathbf{Qyv_{sa}}$). The Holocene alluvium is too recently deposited to have potential to contain fossil resources, and so is assigned low paleontologic sensitivity. However, the older Pleistocene alluvial deposits have high potential to contain significant nonrenewable paleontologic resources, and so are assigned high paleontologic sensitivity. Similar older Pleistocene sediments throughout Riverside County and the Inland Empire have been reported to yield significant fossils of plants and extinct animals from the Ice Age (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999; Anderson and others, 2002). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, short-faced bears, sabre-toothed cats, large and small horses, large and small camels, and bison (Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999; Anderson and others, 2002).

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no previously-known paleontologic resource localities are recorded by the SBCM from within the study area, nor from within at least one mile in any direction.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation in conjunction with development may have high potential to adversely impact significant nonrenewable paleontologic resources present within the boundaries of the proposed Stratford Ranch development. A qualified vertebrate paleontologist must be retained to develop a program to mitigate impacts to such resources. This mitigation program should be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside and the proposed guidelines of the Society of Vertebrate Paleontology. This program should include, but not be limited to:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Based upon the results of this review, areas of concern include all previously-undisturbed sediments of fossiliferous Pleistocene older alluvium present within the boundaries of the property. Paleontologic monitors should be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially-fossiliferous units described herein are not present, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.

3. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g., SBCM). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established museum repository has been fully completed and documented.

4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontologic resources.

References

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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.

Morton, D.M., 2004. Preliminary digital geologic map of the Santa Ana 30' x 60' quadrangle, southern California, version 2.0. United States Geological Survey Open-File Report 99-172. Digital preparation by K.R. Bovard and R.M. Alvarez. Prepared by the Southern California Areal Mapping Project (SCAMP), in cooperation with the California Geological Survey

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Springer, K.B., E. Scott, J.C. Sagebiel and K.M. Scott, 1999. A late Pleistocene lake edge vertebrate assemblage from the Diamond Valley, Riverside County, California. Journal of Vertebrate Paleontology 19(3): 77-A.

Woodburne, M.O., 1991. The Cajon Valley, *in* Inland Southern California: the last 70 million years, M.O. Woodburne, S.F.B. Reynolds, and D.P. Whistler, eds. Redlands, San Bernardino County Museum Special Publication 38(3&4), p. 41-43.

Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum