Paleontologic Survey and **Assessment for the Diamond Specific Plan Project, Riverside County, California**

Prepared for

JIC-CP Diamond Development

7777 Center Avenue, Suite 300

Huntington Beach, CA 92647

Prepared by

McKeehan Environmental Consultants

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INTRODUCTION

The following report is submitted in response to a request by JIC-CP Diamond Development to conduct a paleontological survey of the subject property in accordance with the requirements of the City of Lake Elsinore and Riverside County. These services entailed records and literature searches, a pedestrian field survey, and a follow-up assessment. This report documents the results of the study.

LOCATION AND DESCRIPTION

The property is an 87.2-acre parcel of land located in the San Jacinto Drainage in the City of Lake Elsinore, Riverside County (Figure 1).

The channelized San Jacinto River is adjacent on the west and the distance to Lake Elsinore varies from 300 to 1,300 meters (900 to 4,000 feet)

The project site is located along both sides of Diamond Drive between Lakeshore/Mission Trail and Malaga Road, with a small portion on the south side of Malaga at the southwest corner of Malaga Road and Diamond Drive. The undeveloped portion of the project site is approximately 61 acres.

Portions of the project site were previously plowed. There is non-native ruderal vegetation on the site. The northern portion of the site is occupied by a retail business and parking lot; the southern portion is occupied by a baseball park. Elevations range from a low of approximately 1260 feet above mean sea level (amsl) along its eastern boundary to a high of about 1,280 feet above sea level in its northern half.

Figure 1. Location Map

METHODS

A records and literature search (McLeod 2009) was conducted at the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County (abbreviated LACM). The project area was field inspected for surficial paleontological resources by Mark A. Roeder, Riverside County recognized paleontologist, with Judy McKeehan on January 14 and again on May 8, 2009, to observe the geomorphology after obtaining the records search results.

Recently, portions of the property may have been disced and the ground visibility was excellent in those areas. Other portions of the property were covered by ruderal vegetation, ranging from sparse to somewhat dense.

RESULTS

The subject property is underlain by Late Pleistocene rock units that range in age from Late Pleistocene (more than 10,000 years) to Holocene (less than 10,000 years) as listed in Table 1. These units consist of fan deposits from the nearby Selco Hills, fluvial deposits from the San Jacinto River, and lake deposits of Lake Elsinore (Engel 1959; Morton and Weber 1991, 2003; McLeod 2009).

Geology

Table 1. Geologic Time and Formations in the Study Area

PERIOD	EPOCH	AGE (millions of years	FORMATIONS (Present on Property if Described)
QUATERNARY	Holocene	0.011	Ql-Quaternary very young lacustrine deposits (late Holocene) Qw-Quaternary very young wash deposits (late Holocene)
	Pleistocene	1.8	Qyf $_{a}$-Quaternary young alluvial-fan deposits Unit 1 valley deposits (late Pleistocene-early Holocene) Qyv $_{a}$ -young alluvial-valley deposits (late Pleistocene and Holocene)
TER	Pliocene	5.0	
	Miocene	22.5	
	Oligocene	37.5	

T I A R Y	Eocene	53.5	
	Paleocene	65.0	

Below is a detailed description of the geologic units located on the property from Morton and Weber 2003 (Figure 2).

Quaternary young alluvial-valley deposits (Qyv [a])

Although not present at the surface, these deposits which are to the east and consist of fluvial fan deposits derived from the nearby Sedco Hills (Morton and Weber 1991, 2003; McLeod 2009) may be at depth on the property. According to McLeod 2009, "The fan deposits typically do not contain fossils at least in the uppermost layers". These deposits consist of unconsolidated sand, silt, and clay-bearing alluvium and are young (late Pleistocene-Holocene) in age. The records search indicated that there were no known fossil occurrences within this rock unit (McLeod 2009).

Quaternary young alluvial-fan deposits (Qyf[a])

This young fanglomerate (Engel 1959; Morton and Weber 1991, 2003; McLeod 2009) composed of pebbles, gravel, cobbles, and boulders deposited from erosion of the Sedco Hills to the east and is present over most of the property. This rock unit occurs as benches and fan slope accumulations at the mouths of canyons along both sides of the Elsinore trough (Engel 1959) and in most areas is around 10 feet thick, but can exceed 60 feet. At the surface, this rock unit is very coarse and usually does not contain significant fossils (McLeod 2009).

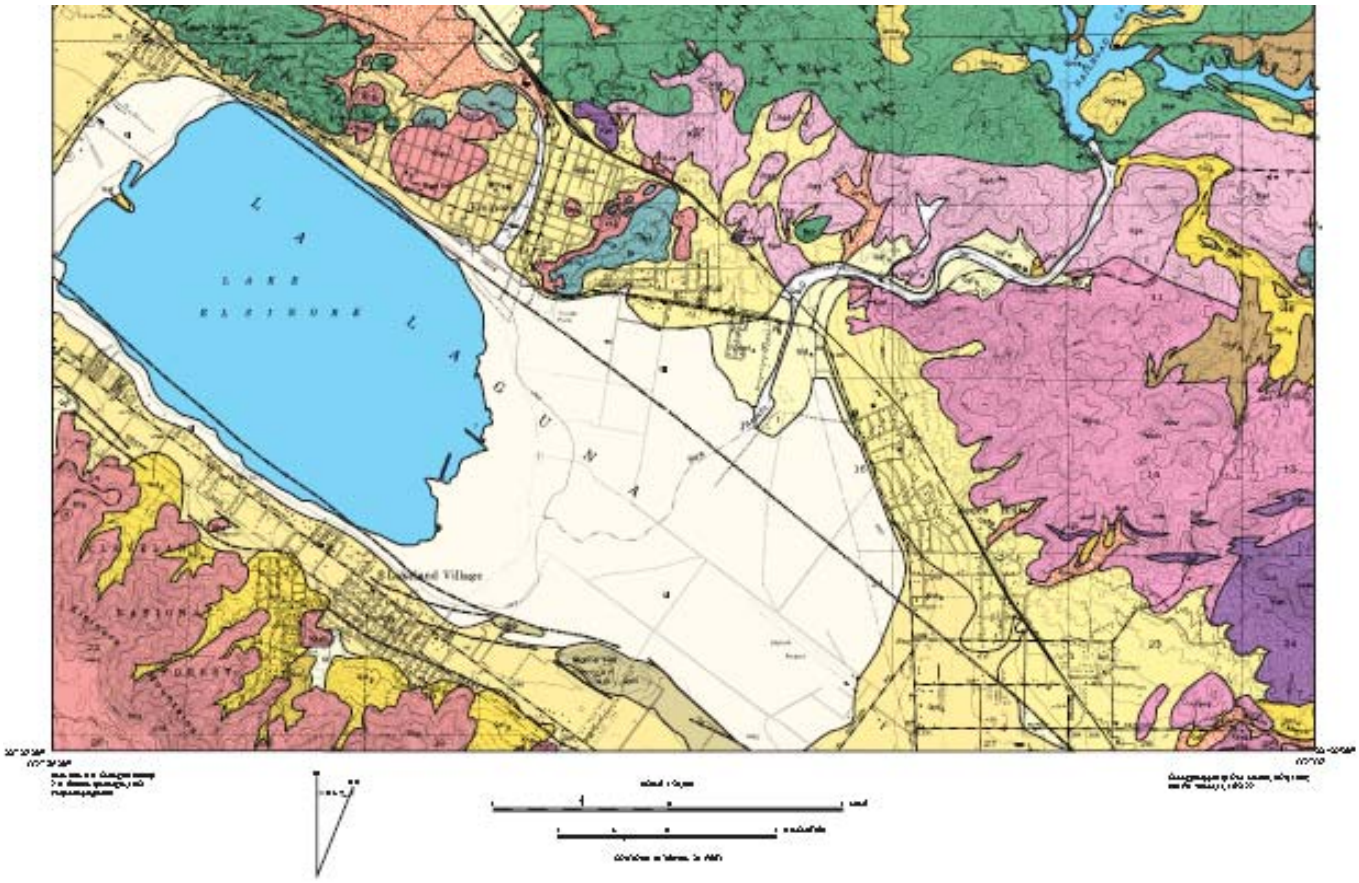
Quaternary very young wash deposits (Qw)

On the project area, these deposits consist of mostly of silt and sand, with minor amounts of gravel (Engel 1959: Morton and Weber 1991, 2003) and are at the surface very young (late Holocene. On the parcel, this rock unit is present along the western boundary in the San Jacinto River drainage. Based on water well drill logs, these fluvial sediments reach a thickness of 160 feet (Engel 1959) at the northwest end of Lake Elsinore. On the parcel, there were exposures at the west end of the depression north of the current stadium. Very young looking laminated gray sands to silty sands were exposed in a 5 foot section along small drainage. Northeast of the property in the vicinity of the Railroad Canyon

Reservoir, there is a vertebrate fossil locality LACM that yielded a specimen of a fossil horse, *Equus*, from similar sediments (McLeod 2009).

Quaternary lake deposits (Ql)

Exposed in the extreme southern and western portions of the property, the lake deposits of Lake Elsinore consisted of gray clayey, silty, and fine-grained lacustrine (lake) deposits (Morton and Weber 1991, 2003). These deposits are very young (late Holocene but increase in age with depth. Elsewhere in southern California, late Pleistocene lake deposits have yielded the fossil remains of large extinct Ice-Age animals, such as saber tooth cats, sloths, bison, camels, dire wolves, mastodons, and mammoths (Jefferson 1991). McLeod (2009) stated that "Our closest vertebrate fossil locality from these deposits is LACM 6059, immediately west of the proposed project area between the current Lake Elsinore margin and the San Jacinto River drainage that produced a specimen of the fossil camel *Camelops hesternus*.



PRELIMINARY GEOLOGIC MAP OF THE ELSINORE 7.5' QUADRANGLE, RIVERSIDE COUNTY, CALIFORNIA

Ql Ql-Quaternary very young lacustrine deposits (late Holocene)

Qw Qw-Quaternary very young wash deposits (late Holocene)

Qyf Qyf $_a$-Quaternary young alluvial-fan deposits Unit 1 valley deposits (late Pleistocene-early Holocene)

Qyv Qyv $_a$ -young alluvial-valley deposits (late Pleistocene and Holocene)

Figure 2. Geologic Map of Surficial Rock Units Present on the Subject Property (Morton and Weber, 2003)

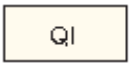
Paleontologic Sensitivity

According to McLeod, 2009, all of the geologic units on the property are considered to be highly sensitive for paleontologic resources.

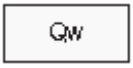
The County of Riverside Geographic Information System (2009)-Paleontological Sensitivity rates the upper portion of the property as high potential/sensitivity and the lower portion of the property from the depression north of the stadium and the parcel to the south and southeast as low potential. The low potential rating includes Quaternary very young wash deposits of the San Jacinto River (Qw) in the depression north of the stadium and to the south, the Quaternary very young lacustrine deposits (Ql) at southern end of the property, and Quaternary young alluvial-fan (Qyf) deposits in triangular shaped parcel immediately east of the stadium.

The paleontological sensitivity rating of the geological rock units within the study area is listed below.

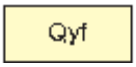
Highly Sensitive Paleontological Rock Units Present on the Subject Property



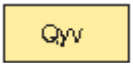
Ql-Quaternary very young lacustrine deposits (late Holocene)



Qw-Quaternary very young wash deposits (late Holocene)



Qyf $_{a}$-Quaternary young alluvial-fan deposits Unit 1 valley deposits (Late Pleistocene-early Holocene)



Qyv $_{a}$ -young alluvial-valley deposits (late Pleistocene and Holocene)

DISCUSSION

Direct impacts on unknown paleontological resources within the project boundaries may result from future construction activities. Those impacts may be

beneficial in terms of fossil discovery and salvage or they may be adverse, creating inadvertent destruction. On the positive side, increased construction activities in the past in Riverside County have led to the discovery of significant paleontological resources.

According to McLeod (2009), “even shallow excavations in the younger alluvial deposits in the proposed project area may well encounter significant vertebrate fossils. 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”

There is a high probability of the occurrence of scientifically important fossil remains in all rock units especially in excavation that are below 5 feet in depth. Fossils remains may be uncovered during earthmoving operations in conjunction with construction activities.

RECOMMENDATIONS

The mitigation program described below is consistent with Society of Vertebrate Paleontology (Scott and Springer 2003) guidelines and will reduce adverse construction-related impacts on paleontologic resources to the level of non-significance. The following measures constitute the mitigation program:

- During any earth-moving activity associated with development, excavations requiring moving large volumes earth will be monitored according to the following specific schedule provided below, which is based on the paleontological sensitivity of the rock unit underlying the area of effect:

- If any scientifically important large fossil remains are uncovered during earth-moving activities the field technician will divert earth-moving equipment away from the site until he or she has examined the remains. If the remains are evaluated to be important, the field technician will remove them. If warranted, a sample of rock will be collected for processing. The technician will be equipped to allow for the rapid removal of fossil remains and/or matrix and thus reduce the potential for any construction delays.

- If scientifically important fossil remains are observed and if safety restrictions permit, the construction contractor will allow the field

technician to safely evaluate the scientific importance if the discovery. At the field technician's discretion, the grading contractor may assist in the removal of the fossil remains and rock to reduce any delay in construction

- Depending upon the paleontologic importance of the rock unit, the rock will be examined periodically for microfossils by wet or dry screening. If important fossil remains are found as a result of screening, samples of sufficient size to generate a representation of the organisms preserved will be collected and processed, if warranted, onsite or at a convenient location.

- A qualified paleontologist will make collections of exposed fossils from the lithologic units of high paleontologic importance. All vertebrate and representative samples of mega invertebrate and plant fossils will be collected. Productive sites will be excavated and approximately 2,000 pound (lb.) rock samples will be collected to process for micro-vertebrate fossil remains. The Society of Vertebrate Paleontology (SVP) recommends a standard sample of 6,000 pounds (SVP, 1995) be collected for micro vertebrate sites; however, it is here recommended that such a large volume only be required in very unique situations, such as, where no fossils have ever been reported and the results would greatly alter scientific interpretations of the area, or the site is so rich, that the diversity of known taxa would be greatly enhanced by processing a larger volume

- Fossils recovered from the field or by processing will be prepared, identified, and along with the accompanying field notes, maps, and photographs accessioned into the collections of a designated, accredited museum such as Natural History Museum of Los Angeles County, San Bernardino County Museum, or San Diego Natural History Museum.

Adherence to these mitigation measures will ensure that all adverse impacts on the paleontologic resources encountered during construction will be reduced to below a significant level and that all observed remains will be recovered.

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