8 May 2019

Ms. Emily Hoyt
ICF
49 Discovery, Suite 250
Irvine, CA 92618

RE: Paleontological Records Search – Gilman Springs Median and Shoulder Widening Project

Dear Ms. Hoyt:

This letter report presents the results of a paleontological records search conducted for the Gilman Springs Median and Shoulder Widening Project (Project), located to the east of the City of Moreno Valley in an unincorporated area of Riverside County, California. The Project site consists of an approximately 4.5 mile long segment of Gilman Springs Road located west of State Route 79 and south of Alessandro Boulevard.

A review of published geological maps covering the Project site and surrounding area was conducted to determine the specific geologic units underlying the Project site. Each geologic unit was subsequently assigned a paleontological resource potential following Riverside County and Society of Vertebrate Paleontology (SVP) guidelines (SVP, 2010). In addition, a search of the paleontological collection records housed at the San Diego Natural History Museum (SDNHM) was conducted in order to determine if any documented fossil collection localities occur at the Project site or within the immediate surrounding area.

Geologic Units Underlying the Project Site

Published geological reports (e.g., Morton and Miller, 2006) covering the Project area indicate that the proposed Project has the potential to impact late Pleistocene- to Holocene-age alluvial fan deposits, late Pleistocene- to Holocene-age landslide deposits, the Pliocene- to Pleistocene-age San Timoteo Beds, the Miocene- to early Pliocene-age Mount Eden Formation, and Cretaceous-age intrusive igneous rocks (Figure 1). These geologic units and their paleontological potential are summarized in detail below. The SDNHM does not have any documented fossil collection localities within a 1-mile radius of the Project site.

Quaternary alluvial fan deposits – The Project site is reported to be primarily underlain at the surface by late Holocene-age alluvial fan deposits (Qf) and slightly older late Pleistocene- to Holocene-age alluvial fan deposits (Qyf). From a paleontological standpoint, Holocene-age (less than 11,000 years old) sedimentary deposits are typically considered to be too young to contain fossils, while Pleistocene-age (2.5 million to 11,000 years old) deposits are known to often contain fossils. SDNHM paleontological collection records do not document the occurrence of any known fossil localities from Holocene- or Pleistocene-age alluvial deposits within a 1-mile radius of the Project site. However, elsewhere in the lowlands of western Riverside County, Pleistocene-age alluvial deposits have produced important fossilized remains of terrestrial vertebrates, particularly of large-bodied mammals, including ground sloth, mammoth, mastodon, camel, bison, dire wolf, sabertoothed cat, American lion, and giant short-faced bear (e.g., Anderson et al., 2002; Jefferson, 1991a,b; Springer et al., 2009, 2010). Old

alluvial-fan deposits underling the Project site are considered to be unlikely to contain significant fossils in the uppermost layers, but may contain fossils at an unknown depth. As a general rule, a threshold of approximately 5–10 feet below surface grade is used to determine whether excavations are likely to impact paleontological resources in Pleistocene alluvial deposits. These deposits are therefore assigned a high paleontological potential B according to Riverside County guidelines, based on the possible presence of paleontological resources at an uncertain depth below existing surface grade.

Quaternary landslide deposits – Certain portions of the Project alignment located west of Jack Rabbit Trail are underlain by late Pleistocene- to Holocene-age landslide deposits (Qyls). Generally, landslide deposits range from poorly sorted, loosely consolidated, matrix supported, cobble to boulder conglomerates with chaotically oriented blocks/clasts to large, relatively intact slumped blocks of sedimentary strata. The SDNHM does not have any fossil localities from landslide deposits within a 1-mile radius of the Project site. Typically, landslide deposits are considered to have low paleontological potential because the stratigraphic context of any entrained fossil remains is lost, making them of limited scientific value. However, deep-seated landslides containing large slumped blocks with intact, recognizable stratigraphy have the potential to produce significant paleontological resources. Because the stratigraphy remains relatively intact, discovered fossils may retain their gross stratigraphic context and are thus still significant. The landslides underlying the Project site appear to be derived from the San Timoteo Beds, and therefore may contain fossils, and should be individually evaluated to determine whether the landslides are chaotic (low paleontological potential) or contain intact stratigraphy (high paleontological potential A).

San Timoteo Beds – Short segments of the Project alignment located just north of Bridge Street are underlain by distal floodplain deposits of the lower sandstone member of the late Pliocene- to early Pleistocene-age (approximately 4.3 million to 780,000 years old) San Timoteo Beds (Tstl). The SDNHM does not have any fossil localities from the San Timoteo Beds within a 1-mile radius of the Project site. However, abundant scientifically important Blancan-age vertebrate fossils (e.g., the pocket gopher *Thomomys*, the cotton rat *Sigmodon minor*, the packrat *Neotoma fossilis*, the pygmy mouse *Baiomys*, the deer mouse *Peromyscus hagermanensis*, the gopher *Reynoldsomys timoteoensis*, the heteromyid rodent *Prodipodomys idahoensis*, the vole *Mimomys*, the porcupine *Erethizon*, and the horse "*Plesippus*" *idahoensis*) and Irvingtonian-age vertebrate fossils (e.g., the canid *Canis edwardii*, the vole *Microtus*, the muskrat *Ondatra idahoensis*, the bog lemming *Mictomys kansasensis*, the porcupine *Erethizon cascoensis*, the horses "*Plesippus*" *fracescana* and *Equus bautistensis*, the tapir *Tapirus merriami*, the deer *Odocoileus cascaensis*, the ground sloth *Megalonyx*, and the mammoth *Mammuthus*) have been recovered from this formation in the San Timoteo Badlands to the north of the Project site (Albright, 1999). The San Timoteo Beds are, therefore, assigned a high paleontological potential A.

Mount Eden Formation – Short segments along the southern half of the Project alignment are underlain by fluvial and lacustrine deposits of the Miocene- to early Pliocene-age (approximately 6 to 4.3 million years old) Mount Eden Formation (Tmea). The SDNHM does not have any recorded fossil localities from the Mount Eden Formation within a 1-mile radius of the Project site. However, scientifically important late Hemphillian-age vertebrate fossils have been recovered from the Mount Eden Formation at localities on the north side of Mt. Eden (e.g., the rodent *Repomys gustelyi*, rhinoceros *Teleoceras*, the camelid *Megacamelus merriami*, the horse *Dinohippus osborni*, the bear *Agriotherium*

gregoryi, and the dromomerycid artiodactyl *Pediomeryx hemphillensis*) (Albright, 1999). Accordingly, the Mount Eden Formation is assigned a high paleontological potential A.

Cretaceous intrusive igneous rocks – Cretaceous intrusive igneous rocks comprise part of the northern end of the Peninsular Ranges Batholith, and include the unit mapped as tonalite near mouth of Laborde Canyon (Klt). These rocks occur along a small portion of the Project alignment located south of Bridge Street. The SDNHM does not have any fossil localities from intrusive igneous rocks within a 1-mile radius of the Project site. Plutonic igneous rocks do not preserve fossils because they crystallize at extremely high temperatures and pressures several miles below the earth's surface, so these rocks are assigned a low paleontological potential.

Summary and Recommendations

In summary, the San Timoteo Beds and Mount Eden Formation are considered to have a high paleontological potential for yielding scientifically significant fossils at all depths (high potential A), and earthwork at any depths within these deposits has the potential to impact paleontological resources. In addition, landslides derived from the San Timoteo Beds may also contain paleontological resources, but should be individually evaluated prior to assignment of a paleontological potential rating. Large slumped blocks containing intact stratigraphy are assigned a high potential A, while small-scale and/or chaotic landslides are assigned a low potential. Quaternary alluvial fan deposits are considered to be unlikely to contain significant fossils in the uppermost (i.e., Holocene-age) horizons (low potential), but may contain fossils in older Pleistocene-age deposits that potentially occur at an unknown depth in the subsurface (high potential B). As a general rule, a transition zone of approximately 5–10 feet below surface grade is used to define where excavations may likely begin to impact paleontological resources. Finally, Cretaceous intrusive igneous rocks do not contain paleontological resources (low potential).

Implementation of a complete paleontological resource mitigation program is recommended during ground-disturbing activities that will impact the San Timoteo Beds and Mount Eden Formation, landslides containing large slumped blocks of intact strata of the San Timoteo Beds, and Quaternary alluvial fan deposits at depths of 5–10 feet below surface grade.

If you have any questions concerning these findings please feel free to contact me at 619-255-0321 or kmccomas@sdnhm.org.

Sincerely,

Katie McComas, M.S.
Paleontological Report Writer & GIS Specialist
San Diego Natural History Museum

Enc: Figure 1a,b: Project map

Literature Cited

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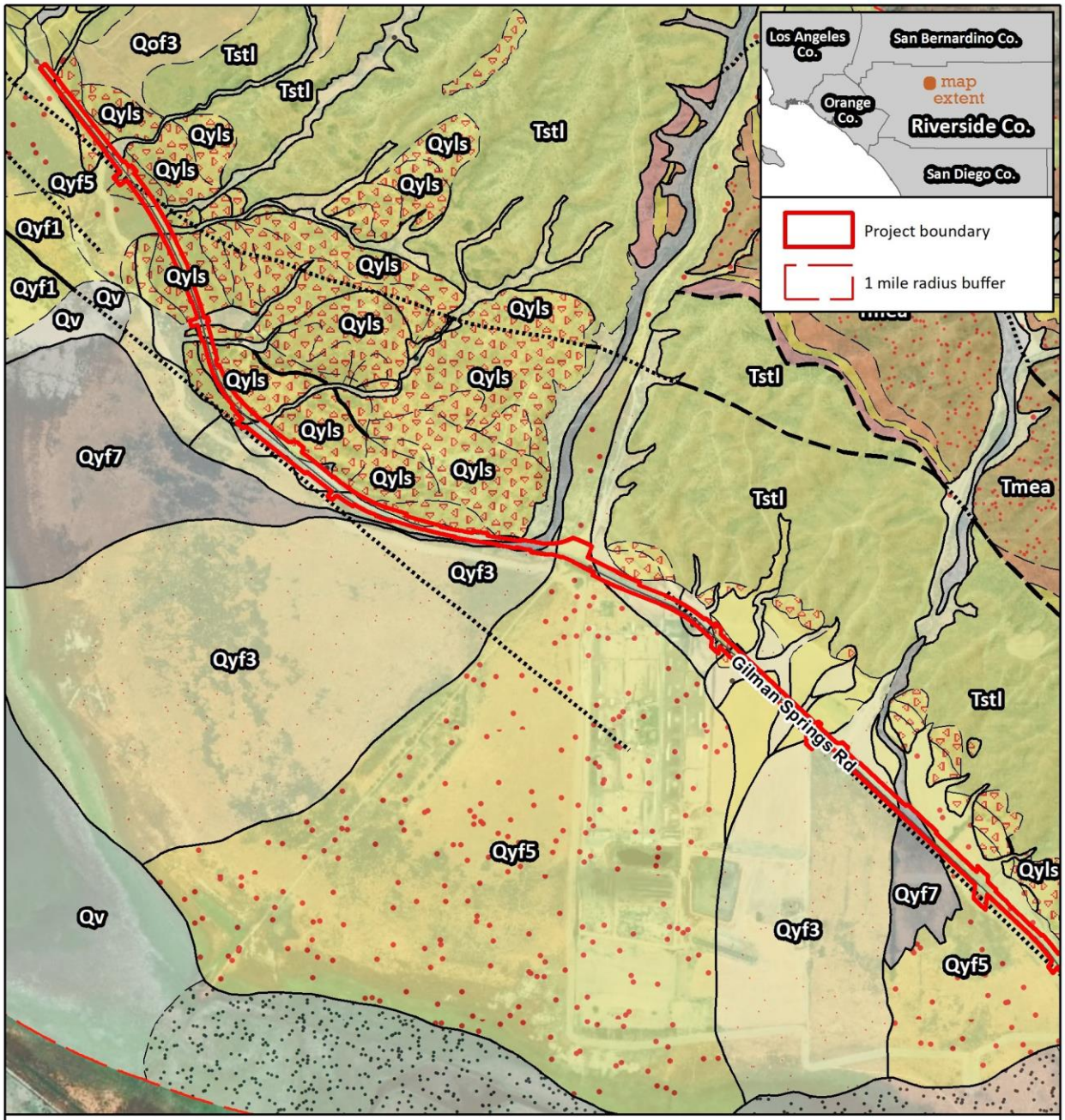
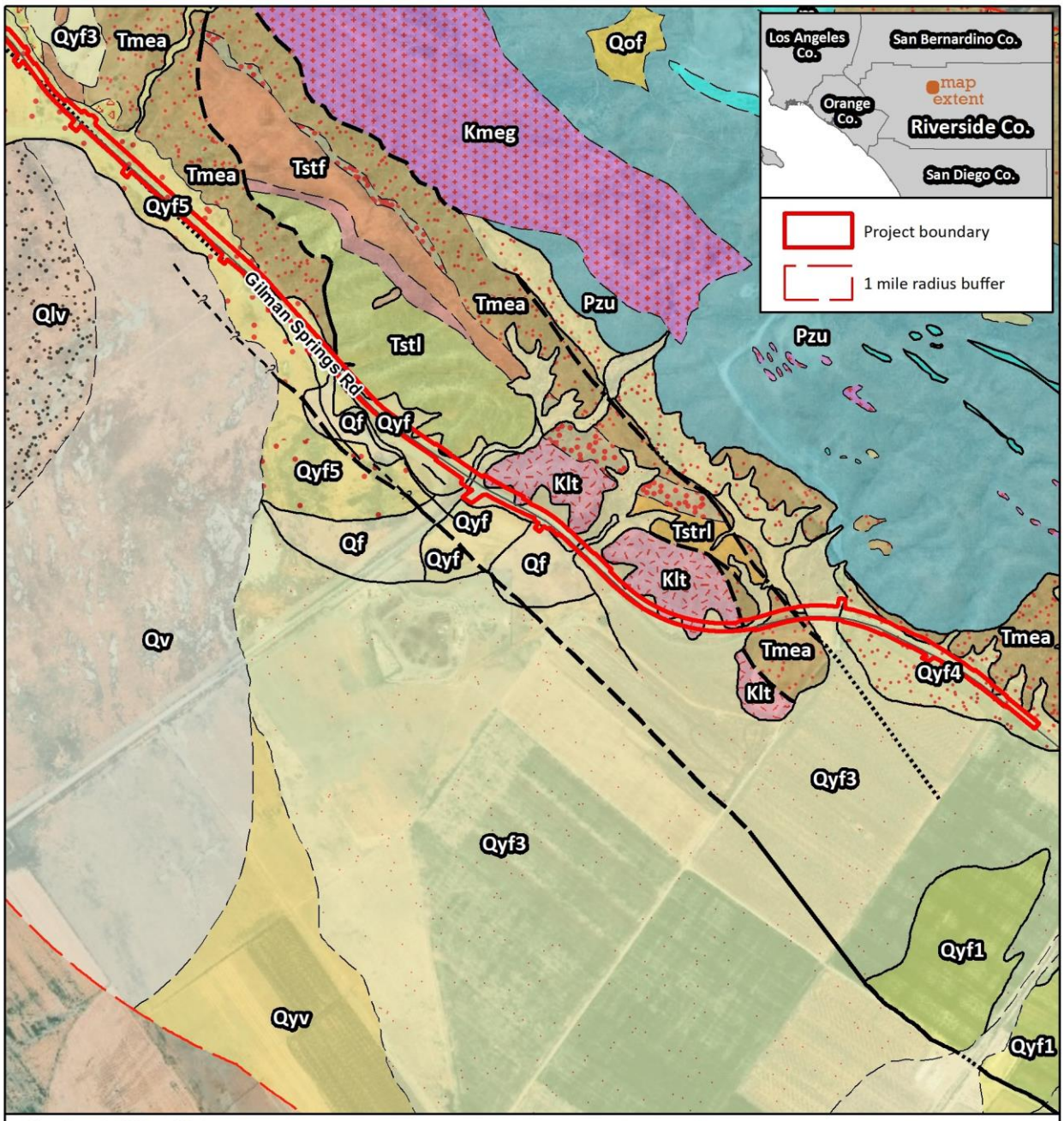

Qof3
Tstl
Qyls
Qyf5
Qyf1
Qv
Qyf7
Qyf3
Tmea
Gilman Springs Rd
Qf
Qf1
Unit 1
young landslide deposits
(late Pleistocene to Holocene)
Qyf
young alluvial fan deposits
(late Pleistocene to Holocene)
Qyf7
Unit 7
Qyf5
Unit 5
Qyf4
Unit 4
Qyf3
Unit 3
Qyf1
Unit 1
Klt
tonalite near mouth of Laborde Canyon
(Cretaceous)
Los Angeles Co.
San Bernardino Co.
Orange Co.
Riverside Co.
San Diego Co.
map extent
Project boundary
1 mile radius buffer
Geologic Map Units
very young alluvial fan deposits
(late Holocene)
San Timoteo Beds,
lower sandstone member (Pliocene)
Mount Eden Formation
(Miocene to early Pliocene)
Sources: Geology as published by Morton & Miller, 2006; USA Major Roads, World Imagery, Terrain Hillshade, Esri et al., 2019
PaleoServices
FIGURE
1a
Project Map
Gilman Springs Median & Shoulder Widening
Riverside County, California
0
0.34
scale in miles
N



Geologic Map Units

Sources: Geology as published by Morton & Miller, 2006; USA Major Roads, World Imagery, Terrain Hillshade, Esri et al., 2019

- Qf — very young alluvial fan deposits (late Holocene)
- Qf1 — Unit 1
- Qyls — young landslide deposits (late Pleistocene to Holocene)
- Qyf — young alluvial fan deposits (late Pleistocene to Holocene)
- Qyf7 — Unit 7
- Qyf5 — Unit 5
- Qyf4 — Unit 4
- Qyf3 — Unit 3
- Qyf1 — Unit 1
- Tstl — San Timoteo Beds, lower sandstone member (Pliocene)
- Tmea — Mount Eden Formation (Miocene to early Pliocene)
- Klt — tonalite near mouth of Laborde Canyon (Cretaceous)

PaleoServices

FIGURE 1b

Project Map
Gilman Springs Median & Shoulder Widening
Riverside County, California

0 0.34 N
scale in miles