

APPENDIX 5



CRM TECH
 1016 E. Cooley Drive, Suite A/B
 Colton, CA 92324

MEMORANDUM

Date: November 3, 2025; updated December 22, 2025
From: Bai “Tom” Tang, Principal, CRM TECH
To: Kaitlyn Dodson-Hamilton, Vice-President, Tom Dodson and Associates
Subject: Paleontological Resources Sensitivity Assessment: Mission Springs Water District (MSWD) Septic to Sewer Update Project, in and near the City of Desert Hot Springs, Riverside County, California

Dear Ms. Dodson-Hamilton:

At your request, CRM TECH has completed a paleontological resource sensitivity assessment on the area of potential effects (APE) for the proposed Mission Springs Water District (MSWD) Septic to Sewer Update Project in and near the City of Desert Hot Springs, Riverside County, California (Figs. 1-9). As a part of the MSWD Groundwater Quality Protection Program, the project proposes the installation of approximately 142,000 linear feet (26.9 miles) of 8-inch sewer main pipelines and an estimated total of 2,500 4- to 6-inch service laterals along the routes, as well as the abatement of more than 2,000 on-site septic tanks. This study is a part of the environmental review process for the project, as required by the lead public agency, namely the MSWD, pursuant to the California Environmental Quality Act (CEQA). The project may involve federal funding administered by the U.S. Army Corps of Engineers (USACE), which would mandate compliance with the National Environmental Policy Act (NEPA) as well.

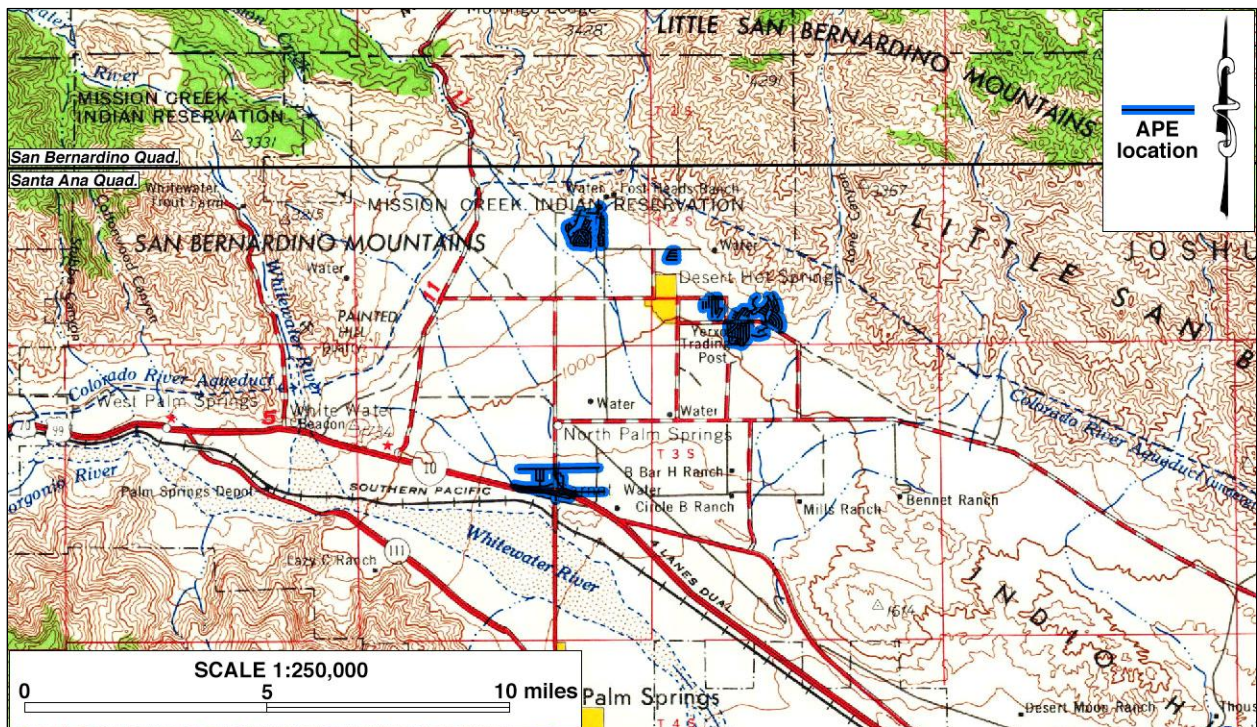


Figure 1. Project vicinity. Based on USGS San Bernardino and Santa Ana, Calif., 120’x60’ quadrangles.

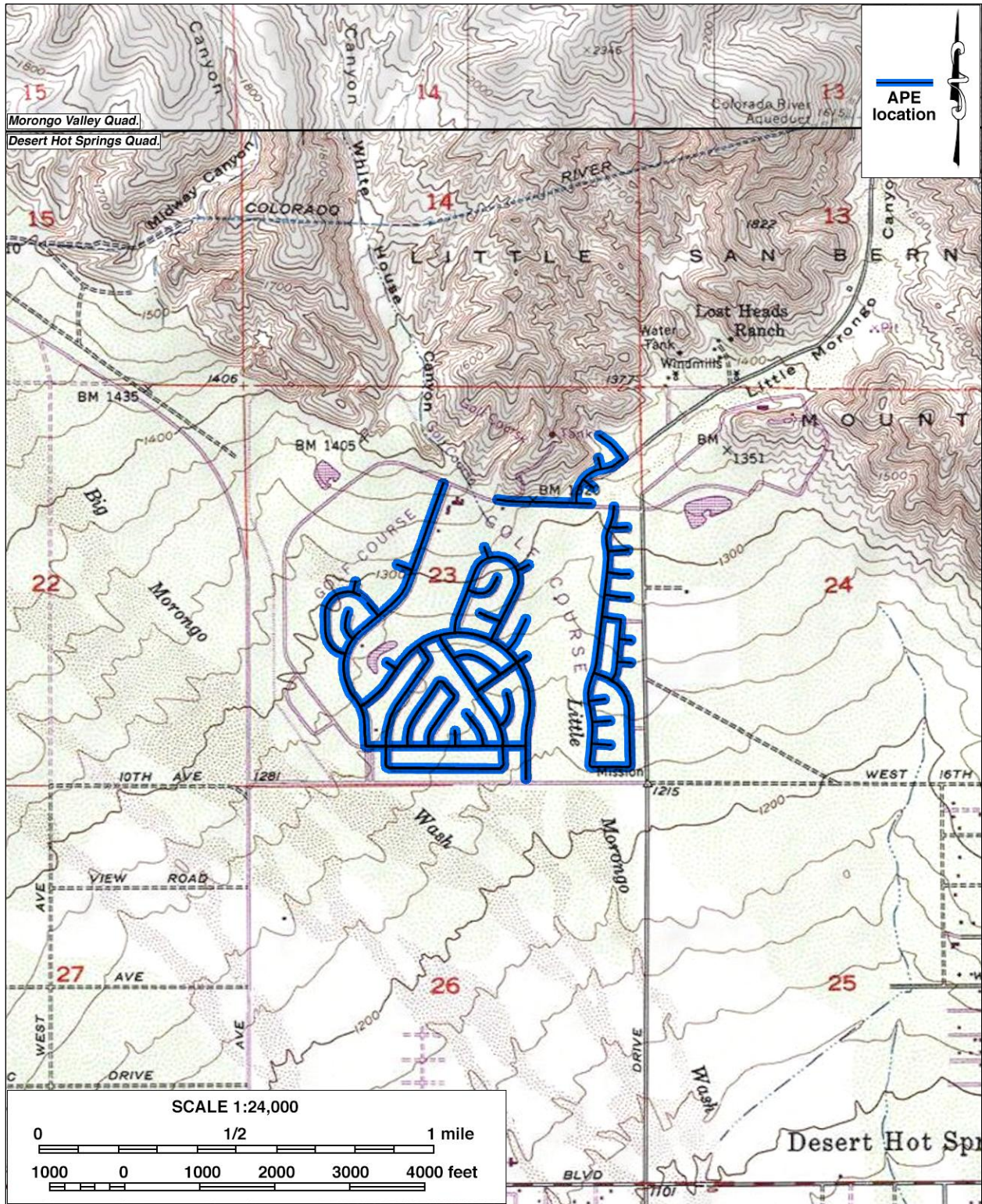


Figure 2. Location and configuration of the APE (Area A). Based on USGS Desert Hot Springs and Morongo Valley, Calif., 7.5' quadrangles.

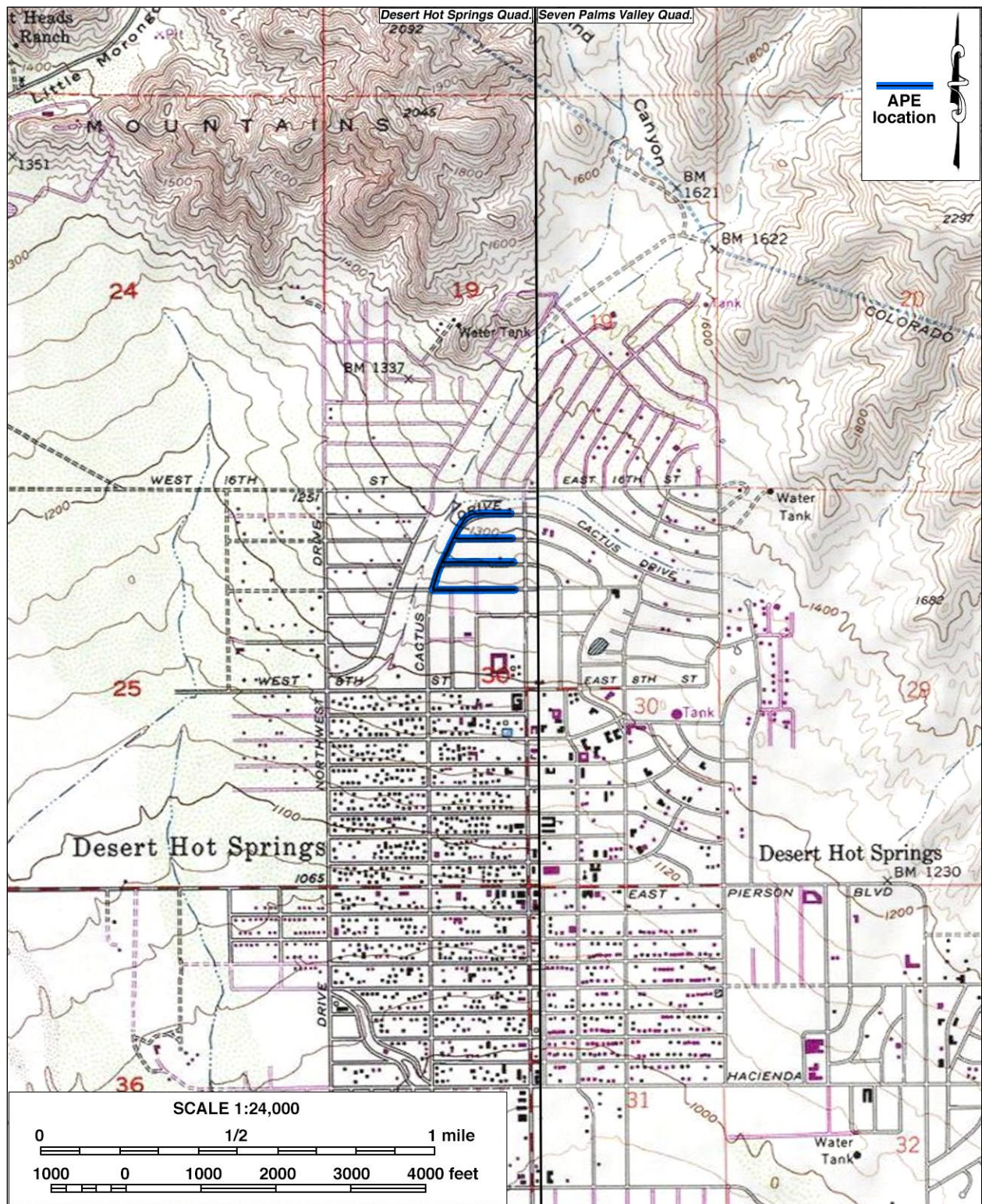


Figure 3. Location and configuration of the APE (Area D-3). Based on USGS Desert Hot Springs and Seven Palms Valley, Calif., 7.5' quadrangles.

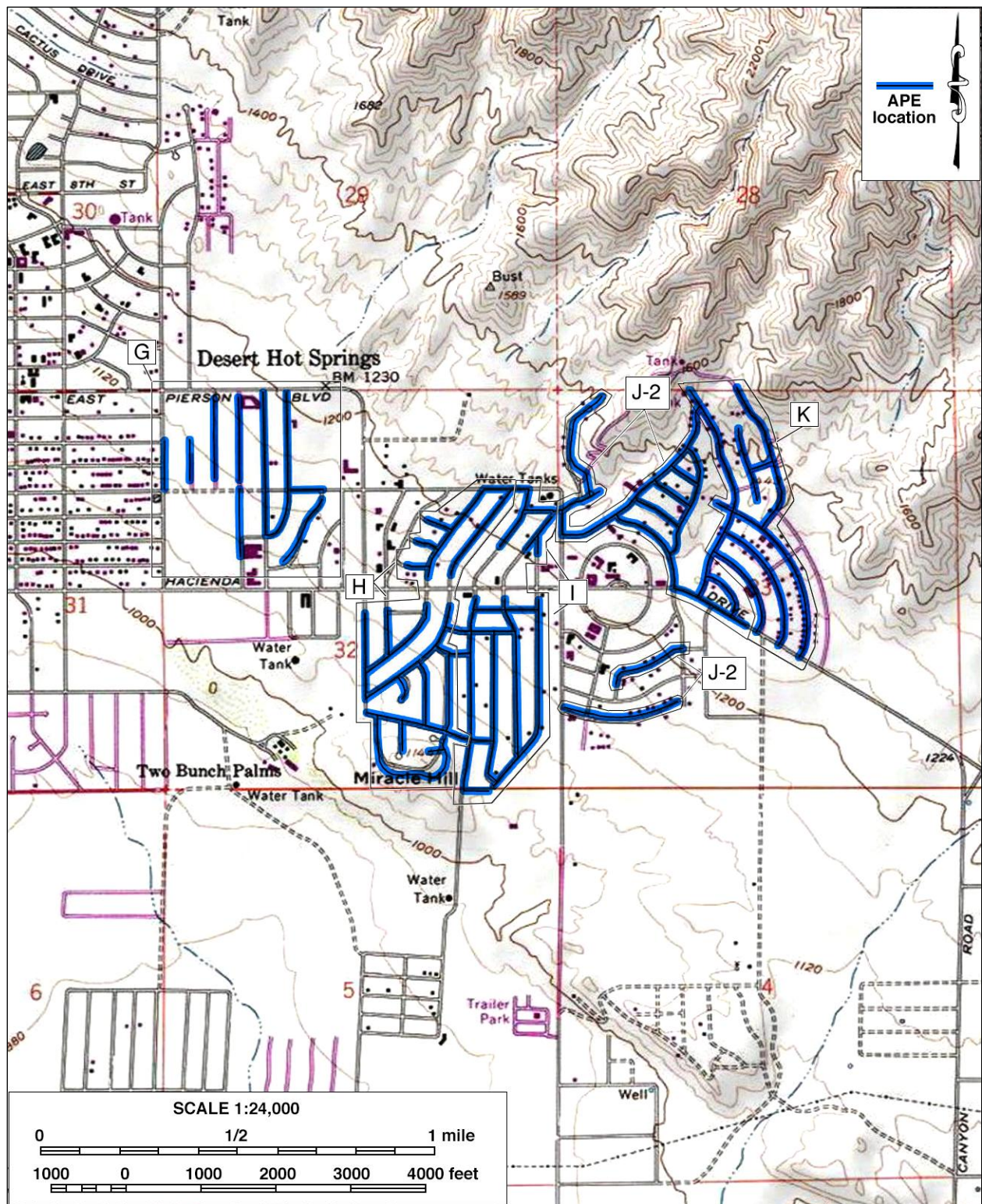


Figure 4. Location and configuration of the APE (Areas G, H, I, J-2 and K). Based on USGS Seven Palms Valley, Calif., 7.5' quadrangle.

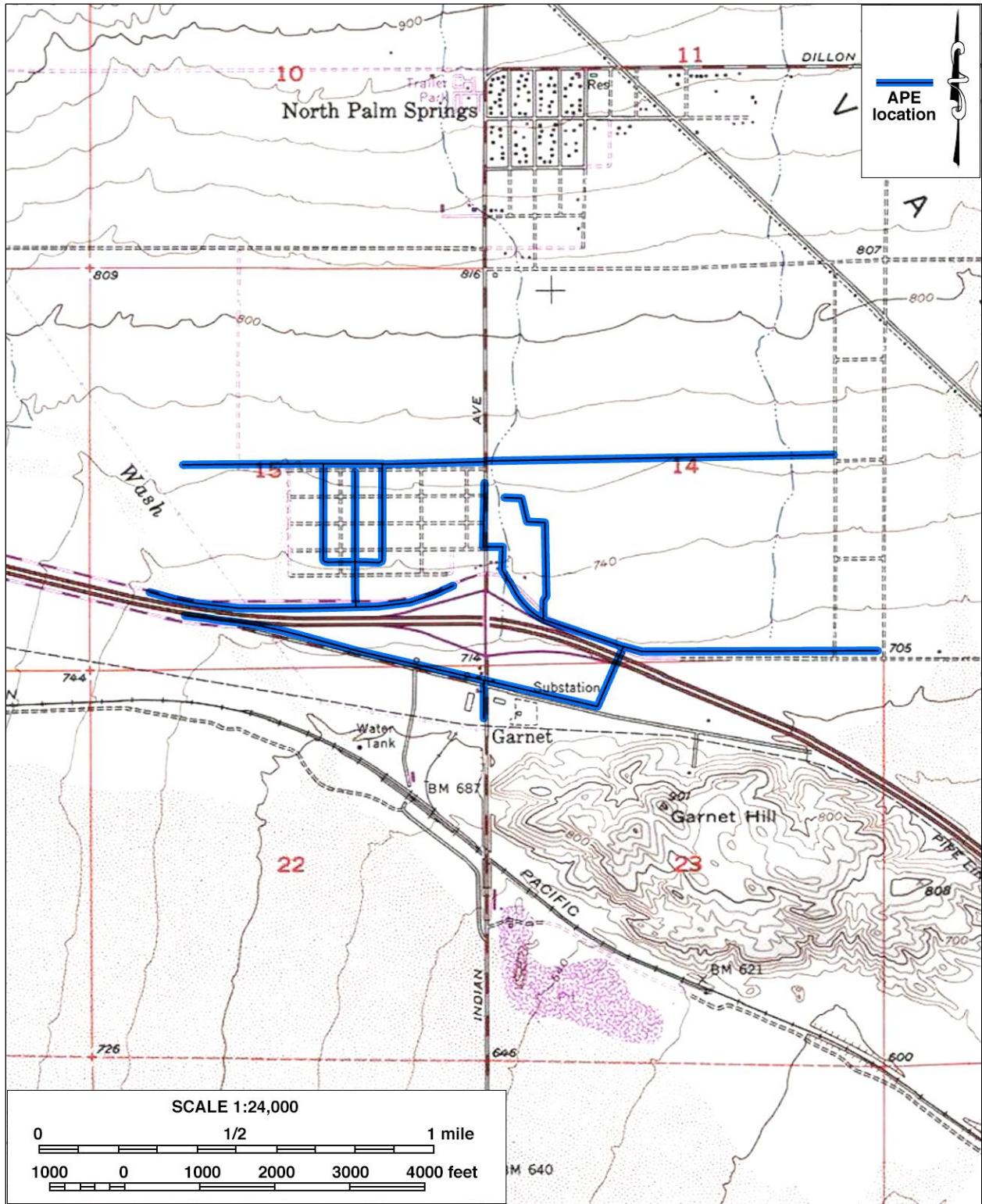


Figure 5. Location and configuration of the APE (I-10 Corridor). Based on USGS Desert Hot Springs, Calif., 7.5' quadrangle.



Figure 6. Satellite image of the APE (Area A).

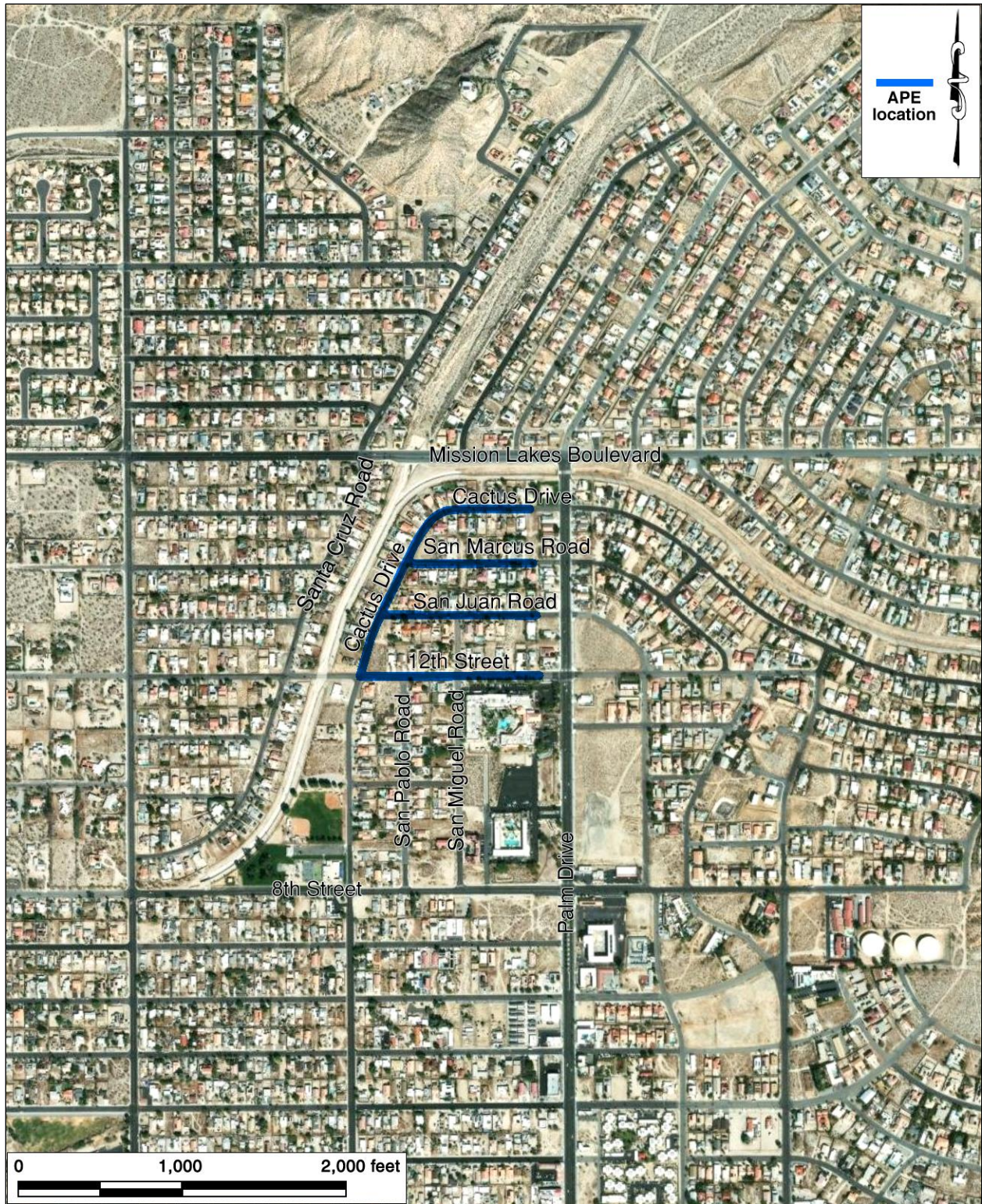


Figure 7. Satellite image of the APE (Area D-3).

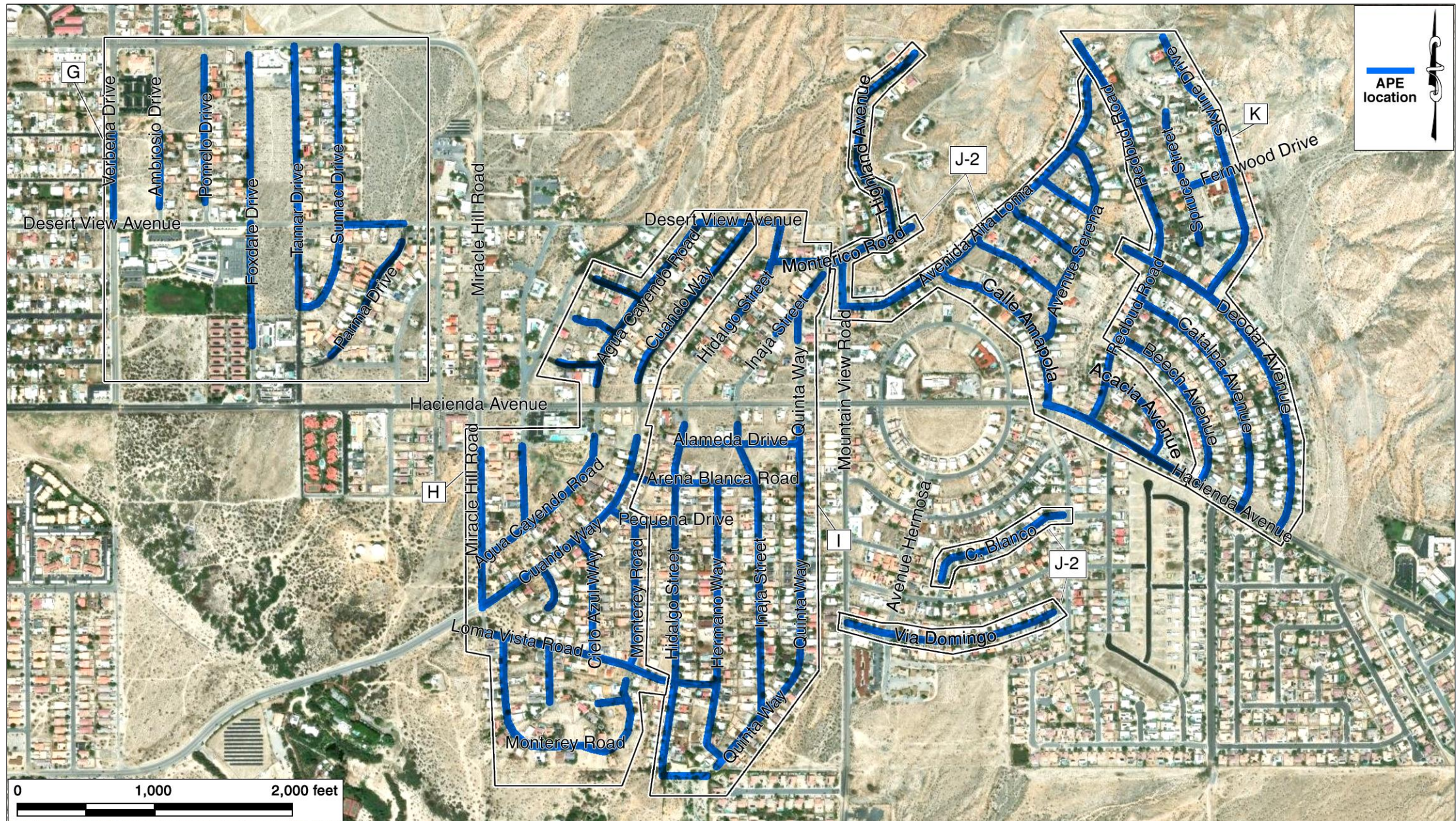


Figure 8. Satellite image of the APE (Areas G, H, I, J-2 and K).

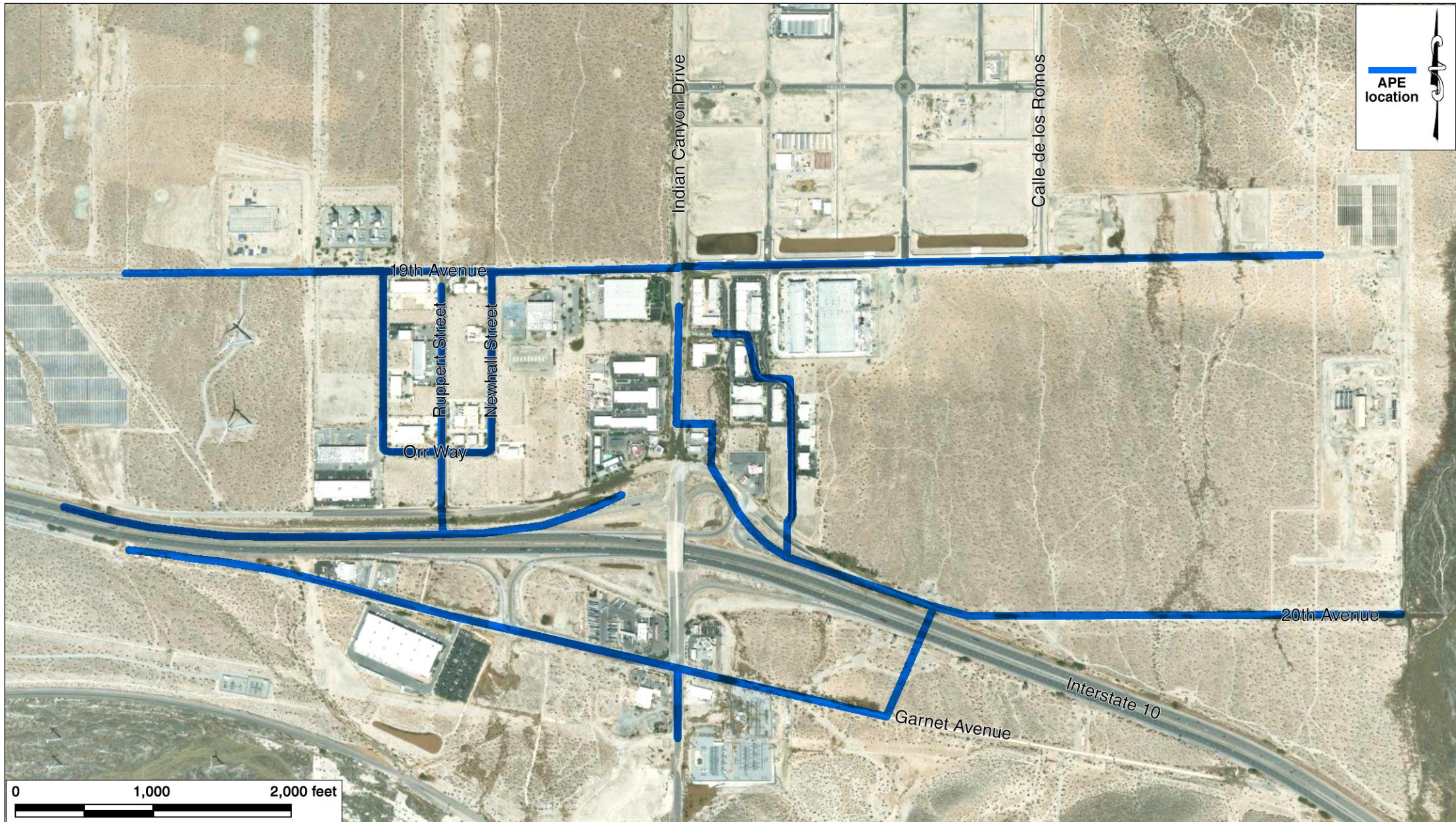


Figure 9. Satellite image of the APE (I-10 Corridor).

The APE is delineated to encompass the maximum extent of ground disturbance required for the implementation of the project. The horizontal extent of the APE includes the proposed 26.9 linear miles of sewer main pipeline alignments within roadways and existing rights-of-way as well as the sites of the 2,500 service laterals and the septic tanks. In general, the portion of the APE for future laterals and septic tank abatement coincides with the portions of the individual parcels lying immediately adjacent to the sewer main pipeline alignments, between the public rights-of-way and the buildings. The vertical extent of the APE, representing the maximum depth of excavation required for pipeline installation, is estimated to range from seven to ten feet below surface for the sewer mains and from four to six feet for the service laterals but may reach up to 15 feet in some areas due to the natural terrain or to cross under existing drainage channels.

The APE comprises eight designated areas at four separate locations along the northern, eastern, and southern edge of the City of Desert Hot Springs, both inside and outside the city limits. Area A is located in the residential neighborhood around the golf courses of the Mission Lakes Country Club, just outside the northern boundary of the city (Figs. 2, 6). Areas D-3 is located in a residential neighborhood to the south of Mission Lakes Boulevard between Palm Drive and Santa Cruze Road, in the northeastern portion of the city (Figs. 3, 7). Areas G, H, I, J-2, and K are clustered in a residential neighborhood on both sides of Hacienda Avenue and between Verbena Drive and Deodar Avenue, in the easternmost portion of the city (Figs. 4, 8). The final area, known as I-10 Corridor, lies across the southwestern boundary of the city and on both sides of Indian Canyon Drive between 19th Avenue and the Union Pacific Railroad (Figs. 5, 9). The various components of the APE are scattered among Section 23 of T2S R4E, Sections 30, 32, and 33 of T2S R5E, and Sections 14, 15, 22, and 23 of T3S R4E, San Bernardino Baseline and Meridian, as depicted in the United States Geological Survey (USGS) Desert Hot Springs and Seven Palms Valley, California, 7.5' quadrangles (Figs. 2-5).

The purpose of the study is to assist the MSWD and the USACE in identifying any paleontological localities that may be affected by the proposed project and assessing the potential for such localities to be encountered during construction. To accomplish this objective, CRM TECH initiated a records search at the appropriate repository, conducted a literature review, and carried out a systematic field survey of the APE. This memorandum represents a summary of the methods and findings of these research procedures and the final conclusion of the study.

Records Search

The records search service for this study was provided by the Western Science Center (WSC) in Hemet, California. The records search found no fossil localities within the APE or within a one-mile radius (McDonald 2025; see Appendix 1). The WSC notes:

The corridor occupied by the project area is surrounded by mountains with non-fossiliferous Precambrian metamorphic rocks. However, the geologic units underlying the project areas themselves are mapped as alluvial deposits from the Quaternary (Pleistocene-Holocene)... Quaternary alluvial units are considered to be fossiliferous and highly paleontologically sensitive. (McDonald 2025)

Essentially, the WSC considers the area to be high in paleontological sensitivity, stating that “any fossil specimens recovered from the project would be scientifically significant” (McDonald 2025).

Therefore, the WSC recommends that a paleontological resource mitigation program be implemented, including monitoring, to salvage and curate fossil remains potentially present within the APE.

Literature Review

In conjunction with the records search, CRM TECH report writer Elizabeth Beckner pursued a literature review on the APE and vicinity under the direction of principal paleontologist Ron Schmidting (see App. 2 for qualifications). Sources consulted during the review include primarily topographic, geologic, and soil maps of the Desert Hot Springs area, published geologic literature pertaining to the project location, and other materials in the CRM TECH library, including unpublished reports generated by other similar surveys in the vicinity.

Dibblee (2004) identifies the surface sediments in Area A, Area D-3, and I-10 Corridor as *Qa* (Holocene alluvial sand and gravel of valley areas), *Qg* (Holocene alluvial sand and gravelly sand of stream channel washes), and a small portion as *gn* (Precambrian to Mesozoic gneissic and mafic igneous rocks). Areas G, H, I, J-2, and K are identified by Dibblee (2008) as *Qa* (Holocene alluvial sand and gravel of major creeks and stream washes), with *Qfg* (Pleistocene fanglomerate) in a small portion of Area I and *gn* (possibly Precambrian gneissic rock that is part of a metasedimentary complex) in a small portion of Area K.

Lancaster et al. (2012) identify most of the soils in Area A as *Qyf* (young alluvial fan deposits), with the rest of the area featuring *Qw* (alluvial wash deposits) and a very small amount of *pKm* (Cretaceous and pre-Cretaceous metamorphic formations; Fig. 10). The young alluvial fan deposits, *Qyf*, date to the Holocene to Late Pleistocene and is described as “unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon” (*ibid.*). *Qw* dates to the late Holocene and is described as “unconsolidated sandy and gravelly sediment deposited in recently active channels of streams and rivers,” while *pKm* is Mesozoic in age or older and is of “sedimentary and volcanic origin” (*ibid.*).

The surface soils in Area D-3 are identified as *Qyf* and *Qw*, while the soils in Area G are identified primarily as *Qyf*, with portions consisting of *Qw* (Fig. 10). In Areas H and I, the soils also consist of *Qyf* and *Qw*, with the northern portion of the areas having some *Qof* (old alluvial fan deposits; Fig. 10). *Qof* dates to the late to middle Pleistocene and is described as “slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand and silt deposits issued from a confined valley or canyon” (Lancaster et al. 2012). The soils in Areas J-2 are identified as *Qyf*, *Qof*, and a small portion as *pKm*, while Area K is identified as *Qyf*, *Qw*, and *pKm* (Fig. 10). The soils in I-10 Corridor are identified as *Qyf*, *Qe* (eolian and dune deposits), and *Qya* (young alluvial valley deposits; Fig. 10). The eolian and dune deposits, *Qe*, date to the late Holocene and are described as “unconsolidated, generally well-sorted wind-blown sand,” while *Qya* dates to the Holocene to Late Pleistocene and is described as “unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers” (*ibid.*).

Field Inspection

On June 18, 2025, CRM TECH paleontological surveyor Melissa Portilla (see App. 2 for qualifications) carried out the field survey of Areas A, G, H, I, K, and I-10 Corridor of the APE. On

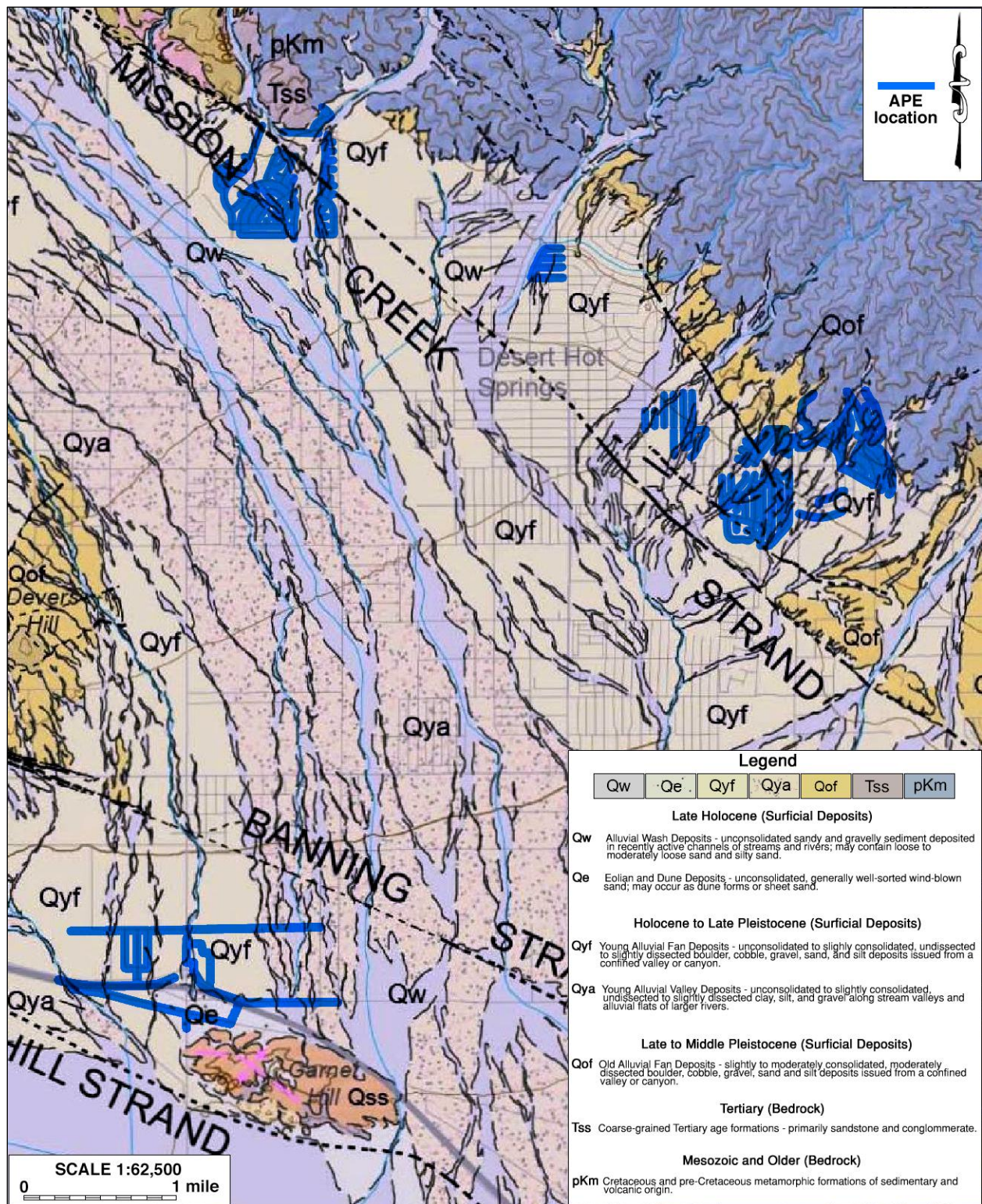


Figure 10. Surface sediments in and around the APE. (Source: Lancaster et al. 2012)

On July 7, 2025, Areas D-3 and J-2 were surveyed by CRM TECH field director Daniel Ballester (see App. 2 for qualifications). In Areas A, D-3, G, H, I, J-2, K, and the portions of I-10 Corridor along paved roads, the survey was conducted at a reconnaissance level by driving slowly along each roadway included in the APE and visually inspecting the public rights-of-way and the portions of the parcels along the routes lying immediately adjacent to the rights-of-way.

For the portions of the APE in I-10 Corridor that are unpaved or are inaccessible by vehicle, the survey team conducted an intensive-level pedestrian survey by walking along the linear path of the APE and visually inspecting the adjacent land. In this way, the ground surface in the entire APE was systematically and carefully examined to determine the soil types, verify the geological formations, and to look for any indications of paleontological remains. Visibility of the native ground surface was essentially 0% in the paved areas but was mostly excellent (90-100%) in unpaved areas where vegetation was sparse. A portion of the APE within I-10 Corridor on 20th Avenue, north of the I-10 freeway, is covered by dense brush within the drainage, which reduced ground visibility to less than 15%.

Areas A, D-3, G, H, I, J-2, and K are predominantly residential neighborhoods with some commercial establishments, while I-10 Corridor consists of commercial and industrial properties and vacant land. Much of the ground surface in the APE is paved or covered by landscaping, with little vestige of the native ground surface visible. In addition, two small portions of the APE in I-10 Corridor had restricted access, where the survey team was unable to enter due to active road construction east of Indian Canyon Drive on 20th Avenue and east of Calle de los Romos on 19th Avenue. Both of these areas, however, are located within and adjacent to paved roadbeds. In light of the extent of past ground disturbances in the vicinity, the visibility level and restricted access were not considered a major hindrance to the survey effort.

The field survey of the APE encountered no surface evidence of any paleontological resources. Surface soils observed in the unpaved portions of I-10 Corridor were alluvial silty sand deposits, and no other geological formations or any indications of fossil remains were noted. As noted above, the ground surface in most of the APE has been extensively disturbed by past construction activities associated with the existing roadways, underground utility lines, and adjacent developments, leaving little vestige of the native landscape. As a result, it does not represent an accurate reflection of the paleontological sensitivity of the native soils in the vicinity.

Conclusion and Recommendations

In summary of the research results presented above, no paleontological localities were previously found within or in the immediate vicinity of the APE, and no surface manifestation of any fossil remains were observed during the field survey. However, the prevailing sediments at the APE location have been identified as Pleistocene-age alluvium, which generally has a high potential to contain significant, nonrenewable fossil remains beyond the extensively disturbed surface soils.

Based on the sensitivity assessment outlined above, CRM TECH recommends to the MSWD and the USACE a conclusion that the proposed project may impact paleontological resources that are potentially present in the relatively undisturbed subsurface sediments. Therefore, CRM TECH further recommends that a mitigation plan be prepared for the project by a qualified paleontologist.

As the primary component of the mitigation plan, paleontological monitoring should be required during the project, as outlined in detail below:

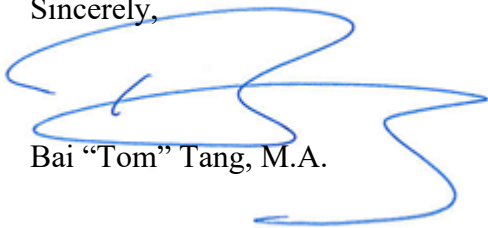
- All earth-moving operations reaching beyond the disturbed surface soils, generally five to six feet in depth within the existing roadbed, should be monitored by a qualified paleontological monitor. The monitor should be prepared to quickly salvage fossils as they are unearthed to avoid construction delays and should collect samples of sediments that are likely to contain fossil remains of small vertebrates or invertebrates. 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 MSWD and the USACE, would signify completion of the statutory compliance process regarding paleontological resources.

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

Thank you for this opportunity to be of service. If you have any questions or need further information regarding the findings of this study, please do not hesitate to contact me at (909) 824-6400 or ttang@crmtech.us.

Thank you for this opportunity to be of service.

Sincerely,



Bai "Tom" Tang, M.A.

References Cited

- Dibblee, Thomas W., Jr.
2004 Geologic Map of the Desert Hot Springs Quadrangle, Riverside County, California. Dibblee Geology Center Map #DF-121. Dibblee Geological Foundation, Santa Barbara, California.
- 2008 Geologic Map of the Thousand Palms and Lost Horse Mountain Quadrangles, Riverside County, California. Dibblee Geology Center Map #DF-327. Dibblee Geological Foundation, Santa Barbara, California.
- Lancaster, Jeremy T., Cheryl A. Hayhurst, and Trinda L. Bedrossian
2012 Preliminary Geologic Map of Quaternary Surficial Deposits in Southern California, Palm Springs 30'x60' Quadrangle. In Trinda L. Bedrossian, Peter Roffers, Cheryl A. Hayhurst, Jeremy

T. Lancaster, and William R. Short: *Geologic Compilation of Quaternary Surficial Deposits in Southern California*; Plate 24. California Geological Survey Special Report 217. Sacramento, California.

McDonald, Andrew

2025 Letter of findings, paleontological resources records search for the proposed project.

Records review letter report prepared by the Western Science Center, Hemet, California. (See Appendix 1)

APPENDIX 1

RECORDS SEARCH RESULTS



July 9, 2025

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

Dear Nina Gallardo,

This letter presents the results of a record search conducted for the Proposed Mission Springs Water District (MSWD): Groundwater Quality Protection Program Assessment District 18 USACE Phasing Summary Project (CRM TECH No. 4271P) in Riverside County, California.

The corridor occupied by the project areas is surrounded by mountains with non-fossiliferous Precambrian metamorphic rocks. However, the geologic units underlying the project areas themselves are mapped as alluvial deposits dating from the Quaternary (Pleistocene-Holocene) (Dibblee & Minch 2004, *Geologic map of the Desert Hot Springs quadrangle, Riverside County, California*; Dibblee & Minch 2008, *Geologic map of the Thousand Palms & Lost Horse Mountain 15 minute quadrangles, Riverside County, California*). Quaternary alluvial units are considered to be fossiliferous and highly paleontologically sensitive. Although the Western Science Center does not have any fossil localities within the project areas or one-mile radii, Quaternary alluvial units throughout Southern California have produced large quantities of fossils, such as the extensive collection from Diamond Valley Lake housed at Western Science Center.

Any fossil specimens recovered from the project would be scientifically significant. Excavation activity associated with the development of the project area would impact the paleontologically sensitive Quaternary 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 from the study area.

If you have any questions, or would like further information, please feel free to contact me at amcdonald@westerncentermuseum.org

Sincerely,







A handwritten signature in black ink that reads 'Andrew McDonald'.

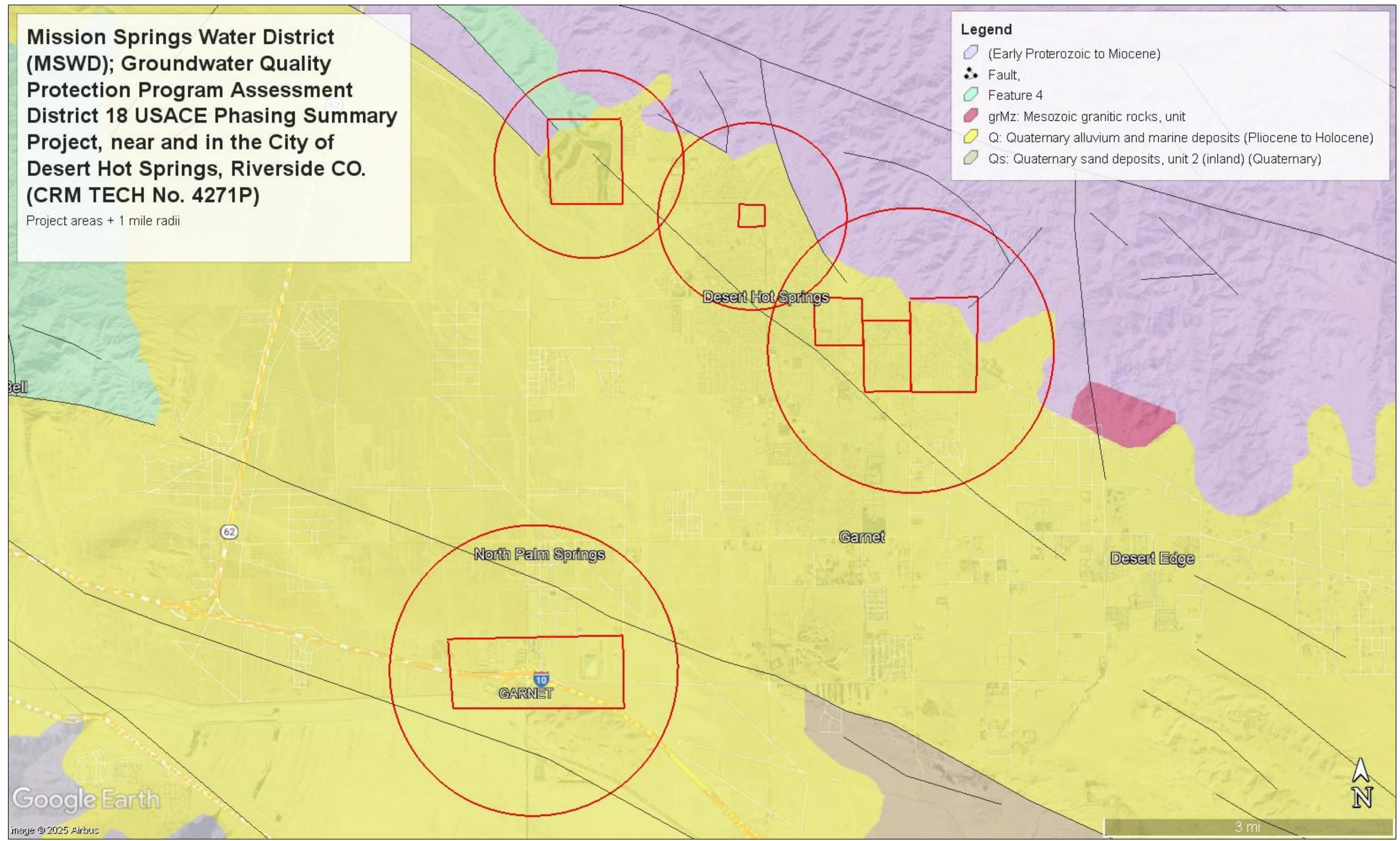
Andrew McDonald, PhD
Curator

Mission Springs Water District (MSWD); Groundwater Quality Protection Program Assessment District 18 USACE Phasing Summary Project, near and in the City of Desert Hot Springs, Riverside CO. (CRM TECH No. 4271P)

Project areas + 1 mile radii

Legend

-  (Early Proterozoic to Miocene)
-  Fault,
-  Feature 4
-  grMz: Mesozoic granitic rocks, unit
-  Q: Quaternary alluvium and marine deposits (Pliocene to Holocene)
-  Qs: Quaternary sand deposits, unit 2 (inland) (Quaternary)



**APPENDIX 2
PERSONNEL QUALIFICATIONS**

**PRINCIPAL PALEONTOLOGIST
Ron Schmidting, M.S.**

Education

1995 M.S., Geology, University of California, Los Angeles.
1991 Pasadena City College, Pasadena, California.
1985 B.A., Archaeology, Paleontology, Ancient Folklore, and Art History, University of Southern Mississippi, Hattiesburg.

Professional Experience:

2020- Principal Paleontologist, CRM TECH, Colton, California.
2014- Instructor of Earth Science, History of Life, Ecology, and Evolutionary Biology, Columbia College Hollywood, Reseda, California.
2013, 2015 Volunteer, excavation of a camarasaur and a diplodocid in southern Utah, Natural History Museum of Los Angeles County, California.
1993-2014 Consultant, Getty Conservation Institute, Brentwood, California.

- Geological Consultant on the Renaissance Bronze Project, characterizing constituents of bronze core material;
- Paleontological Consultant for Antiquities/Conservation, identifying the foraminifera and mineral constituents of a limestone torso of Aphrodite;
- Scientific Consultant on the Brentwood Site Building Project, testing building materials for their suitability in the museum galleries.

1999-2001 Archaeological and Paleontological Monitor, Michael Brandman Associates, Irvine, California.
1997 Department of Archaeology, University of California, Los Angeles.
1994 Scientific Illustrator and Teaching Assistant, Department of Earth and Space Sciences and Department of Biological Sciences, University of California, Los Angeles.

Memberships

AAPS (Association of Applied Paleontological Sciences), USA; CSEOL (Center for the Study of Evolution and the Origin of Life), Department of Earth Sciences, University of California, Los Angeles.

Publications and Reports

Author, co-author, and contributor on numerous paleontological publications and paleontological resource management reports.

REPORT WRITER
Elizabeth L. Beckner, Ph.D.

Education

2024 Ph.D., Anthropology, University of California, Riverside.
2017 M.A., Anthropology, University of California, Riverside.
2016 B.A., Anthropology, University of California, Riverside.
2014 A.A., Anthropology, Chaffey College, Rancho Cucamonga, California.

Professional Experience

2025- Project Archaeologist, CRM TECH, Colton, California.
2025- Lecturer, California State University, San Bernardino.
2019- Adjunct Instructor, Chaffey College, Rancho Cucamonga, California.
2019 Archaeologist, Dudek, Pasadena, California
2017-2019 Teaching Assistant, University of California, Riverside.
2018 Archaeologist, Proyecto Sacbé Cobá-Yaxuna (Sacbé Cobá-Yaxuna Project), Cobá, Quintana Roo, Mexico.
2016-2017 Field Assistant, Proyecto de Interacción Política del Centro de Yucatán (Political Interaction Project of Central Yucatan), Yaxuna, Yucatan, Mexico.
2015-2017 Information Officer, Eastern Information Center, Riverside, California.

PALEONTOLOGICAL SURVEYOR
Melissa A. Portilla, B.A.

Education

2023 A.A. (*cum laude*), Anthropology, Fullerton College.
2019 B.A., Ancient History: Classics, University of Hawaii, Manoa.

- Cross-trained in paleontological field procedures and identifications by CRM TECH Principal Geologist/Paleontologist Ron Schmidting.

Professional Experience

2023- Project Archaeologist/Paleontologist, CRM TECH, Colton, California.
2023-2024 Project Archaeologist/Paleontologist, Psomas, Pasadena, California.
2020 Collections Assistant, Museum of Us, San Diego, California.

PROJECT PALEONTOLOGIST/FIELD DIRECTOR
Daniel Ballester, M.S.

Education

- 2013 M.S., Geographic Information System (GIS), University of Redlands, California.
1998 B.A., Anthropology, California State University, San Bernardino.
1997 Archaeological Field School, University of Las Vegas and University of California, Riverside.
1994 University of Puerto Rico, Rio Piedras, Puerto Rico.
- 2021 “An Introduction to Geoarchaeology: How Understanding Basic Soils, Sediments, and Landforms can make you a Better Archaeologist.” SAA Online Seminar.
2007 Certificate in Geographic Information Systems (GIS), California State University, San Bernardino.
- Cross-trained in paleontological field procedures and identifications by CRM TECH Principal Geologist/Paleontologists Harry M. Quinn and Ron Schmidtling.

Professional Experience

- 2002- Field Director/GIS Specialist, CRM TECH, Riverside/Colton, California.
2011-2012 GIS Specialist for Caltrans District 8 Project, Garcia and Associates, San Anselmo, California.
2009-2010 Field Crew Chief, Garcia and Associates, San Anselmo, California.
2009-2010 Field Crew, ECorp, Redlands.
1999-2002 Project Paleontologist/Archaeologist, CRM TECH, Riverside, California.
1998-1999 Field Crew, K.E.A. Environmental, San Diego, California.
1998 Field Crew, A.S.M. Affiliates, Encinitas, California.
1998 Field Crew, Archaeological Research Unit, University of California, Riverside.

Paleontological and Cultural Resources Management Reports

Co-author and contributor to numerous paleontological and cultural resources management reports since 2002.