RIVERSIDE COUNTY TRANSPORTATION COMMISSION

Riverside-Downtown
STATION IMPROVEMENTS

Appendix O. Paleontological Identification and Evaluation Report

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Paleontological Identification and Evaluation Report

November 2020

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
ADA	Americans with Disabilities Act
AREMA	American Railway Engineering and Maintenance-of-Way Association
BNSF	Burlington Northern Santa Fe
B.S.	Bachelor of Science
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CPUC	California Public Utilities Commission
FR	Federal Regulation
FRA	Federal Rail Administration
FTA	Federal Transit Authority
GIS	Geographic Information System
MP	Mile Post
M.S.	Master of Science
NEPA	National Environmental Policy Act
PBDB	Paleobiology Database
PER	Paleontological Evaluation Report
PIR	Paleontological Identification Report
PMP	Paleontological Mitigation Plan
PROJECT	Riverside-Downtown Station Improvements
PUB. L.	Public Law
QG	Holocene-age young alluvial gravel and sand of stream channels
QOA	Pleistocene-age older alluvial fan deposits
RCTC	Riverside County Transportation Commission
ROW	Right-of-Way
SCRRA	Southern California Regional Rail Authority

SR	State Route
SVP	Society of Vertebrate Paleontology
USC	United States Code
WSC	Western Science Center

1.0 EXECUTIVE SUMMARY

A combined Paleontological Identification Report (PIR) and Paleontological Evaluation Report (PER) was prepared. The purpose of this study is to identify and evaluate potential impacts to paleontological resources resulting from the Riverside-Downtown Station Improvements (Project), and to develop preliminary measures to avoid or reduce these impacts to below the level of significance pursuant to the California Environmental Quality Act (CEQA) and to avoid or reduce adverse effects under the National Environmental Policy Act (NEPA). This work was required by the Riverside County Transportation Commission (RCTC) and Federal Transit Authority (FTA) in order to fulfill their responsibilities as the lead agency under CEQA and NEPA, respectively. All work was conducted in compliance with applicable federal, state, and local regulations.

The Project consists of improvements to the Riverside-Downtown Station Mile Post (MP) 9.9 to MP 10.2 on the Burlington Northern Santa Fe (BNSF) San Bernardino Subdivision located just east of State Route (SR) 91 and a short distance from the SR 60 in the City and County of Riverside, California. Proposed improvements include construction of an additional passenger loading platform, the extension of the existing pedestrian overcrossing and additional elevator and associated tracks which would allow for two trains to service the station off the BNSF mainline. The paleontological study for the Project included an institutional records search and review of geologic maps, geotechnical bore logs, literature, and online databases. A paleontological survey was not conducted because a review of aerial photographs showed that the surface of the Project area is completely obscured by hardscaping, landscaping, roads, highways, buildings, and previously disturbed sediments.

The Project area is mapped as low paleontological sensitivity Holocene-age young alluvial gravel and sand of stream channels (Qg) and high sensitivity Pleistocene-age older alluvial fan deposits (Qoa). While not mapped at the surface, aerial photographs indicate that artificial fill is also present throughout the surface of the Project area. There are no documented paleontological localities within the boundaries of the Project area. However, fossils are known from Pleistocene-age deposits in the City of Riverside and elsewhere in Riverside County. Similar Pleistocene-age deposits are present within the Project area beneath the artificial fill and Holocene-age sediments starting at depths of 4.5 feet. Maximum depths of excavation are anticipated to be 10 feet deep for the elevator tower and retaining wall, but the grading across the majority of the site will be 3 to 5 feet deep. In addition, per site information provided by RCTC, previous remedial excavations have been completed over much of the site to depths up to 30 feet and significant amount of trenching also has taken place for the construction of a vapor extraction system that operated at the site in the past.

Project activities may encounter paleontological resources if native sensitive Pleistocene-age sediments are encountered during excavation. Excavations entirely within artificial fill or Holocene-age deposits will not encounter paleontological resources. Additionally, placement of imported fill to increase the elevation of the site will not encounter significant paleontological resources.

In the event of unanticipated paleontological resource discoveries during Project related activities, work in the immediate vicinity of the discovery should be halted until the unanticipated discovery can be evaluated by a qualified paleontologist.

2.0 INTRODUCTION

The purpose of this study is to identify and evaluate potential impacts to paleontological resources resulting from the Riverside Downtown Station Improvements Project, and to develop preliminary measures to avoid or reduce these impacts to below the level of significance pursuant to CEQA and no adverse effect under NEPA. This document was required by the RCTC and FTA in order to fulfill their responsibilities as the lead agency under CEQA and NEPA, respectively. All work was conducted in compliance with applicable federal, state, and local regulations.

2.1. Project Objectives

The purpose of the proposed Project is to expand capacity, improve operations and efficiency, connectivity, and the passenger experience at the Riverside-Downtown Station. The basic Project objectives supporting the purpose of the Project are listed below:

- Expand platform capacity to meet passenger train storage needs;
- Allow for train meets off the BNSF mainline and minimize impacts to BNSF operations;
- Improve train connectivity and passenger accessibility while minimizing impacts on improvement projects near the station that are already designed or in construction;
- Facilitate more efficient passenger flow and reduce dwell times;
- Enhance safety and access for station users; and
- Accommodate projected future demand.

2.2. Project Location and Description

RCTC and Metrolink propose to improve the Riverside-Downtown Station MP 9.9 to MP 10.2 on the BNSF San Bernardino Subdivision located just east of SR 91 and a short distance from the SR 60 in the City and County of Riverside, California.

Proposed improvements include construction of an additional passenger loading platform, the extension of the existing pedestrian overcrossing and additional elevator and associated tracks which would allow for two trains to service the station off the BNSF mainline. The proposed track would be required to connect and integrate into the existing station layover tracks on the east side to improve train meet times without impacting BNSF operations. The Project would also provide additional parking and improved vehicular traffic circulation on the east side of the station (see Figure 2-1, Project Location Map and Figure 2-2, Project Vicinity Map).

2.3. Alternatives Considered

2.3.1. No Project Alternative

Under the No Project Alternative, implementation of improvements at the Riverside-Downtown Station would not be constructed and the current configuration of the Riverside-Downtown Station would remain the same. Although there would be no project-related impacts to environmental resources, the No Project Alternative would not meet the Project Objectives or improve operations to accommodate the 91/Perris Valley Line and the Inland Empire Orange County Lines. Train capacity and storage would be limited to the existing platforms. The No Project Alternative does provide insight on future conditions with no improvements and serves as a baseline for comparison with the Build Alternative.

2.3.2. Build Alternative

RCTC and Metrolink propose improvements to the following elements of the Station: 1) Station Platform and Tracks; 2) Pedestrian Access; and 3) Parking, Circulation and Streetscape. The proposed improvements include building an additional passenger loading platform and tracks to the east side of existing station to improve Metrolink service and extending the existing pedestrian overpass to access the new proposed platform. The proposed track would also connect into the existing station layover tracks on the north end of the station as well as provide additional parking and improve traffic flow on the east side of the station. A summary of the proposed Build Alternative improvements is presented in Table 2-1.

Table 2-1. Summary of Proposed Build Alternative Improvements

Element	Description
Station Platform and Track Improvements	• Add new center platform (platform 3) • Add new tracks (station tracks 5 and 6) • Modification of railroad signal system
Pedestrian Access Improvements	• Extend pedestrian access to new platform 3 • Emergency egress would be provided at three locations
Parking, Circulation and Streetscape Improvements	• Relocate ADA parking • Modify Bus Drop-off Area • Add sidewalks and trees • Add up to 560 additional parking spaces

The proposed improvements would enhance Metrolink train connections without affecting BNSF services. The improvements would be designed in accordance

with the most recent applicable codes, Southern California Regional Rail Authority (SCRRA), BNSF, Americans with Disabilities Act (ADA), American Railway Engineering and Maintenance-of-Way Association (AREMA), Federal Rail Administration (FRA), and California Public Utilities Commission (CPUC), standards and guidelines.

Maximum depths of excavation are anticipated to be 10 feet deep for the elevator tower and retaining wall, but the grading across the majority of the site will be 3 to 5 feet deep.

Common Features of Build Alternative

Station Platform and Track Improvements

The Build Alternative, includes the following station platform and track improvements as part of the proposed Project:

- Add new center platform (Platform 3) that is approximately 680 feet in length and 30 feet in width with direct access from the new parking area to the east and access from the west using the at-grade crossings from Platform 2;
- Add new tracks (Station Tracks 5 and 6) and other track improvements; and
- Modification of the railroad signal system.

Platform 3 would be located between Station Tracks 5 and 6. Platform 3 would be able to service seven 85-foot passenger cars. The centerline to centerline spacing of the parallel tracks at the platform would be approximately 40 feet. Demolition of existing structures and other ancillary improvements would be required to facilitate construction of the station platform and track improvements.

Pedestrian Access Improvements

- The Build Alternative includes the following pedestrian access improvements as part of the proposed Project:
  - Extend the existing pedestrian overpass access.
  - Add pedestrian at-grade access from the proposed surface parking lot on the east side of proposed station improvements to Platforms 2 and 3 through an extension of the existing pedestrian at-grade crossing on the north end of the platforms and a new pedestrian at-grade rail crossing on the south end of the platforms. The pedestrian at-grade crossings would include safety enhancements such as proper channelization, automated gates and flashers.
- Emergency egress would be provided at three locations from Platform 3:
  - North end pedestrian at-grade crossing (existing at-grade crossing to be extended);
  - Pedestrian Access; and
  - South end pedestrian at-grade crossing (new).

Parking, Circulation and Streetscape

The Build Alternative includes the following parking, circulation and streetscape improvements as part of the proposed Project:

- Relocate ADA parking;
- Modify the bus drop-off area;
- Add sidewalks and trees; and
- Add up to 560 additional parking spaces (proposed surface parking lot) with access to the east side of the station via at-grade pedestrian crossings.

Design Options

As part of the Build Alternative, there is a design option related to a longer extension of the pedestrian overpass access from the new proposed platform to the new surface parking lot. Another design option is associated with the new surface parking lot and combining this new parking lot with the existing overflow parking lot on the east side of the station. This parking option includes traffic circulation improvements along Howard Avenue, 9th Street, 10th Street, and Commerce Street. A summary of the proposed design options is presented in Table 2-2**.**

Table 2-2. Summary of Proposed Build Alternative with Design Options Build + Design Option	**Description**
Pedestrian Overpass Access Improvements	
Pedestrian Overpass Access Design Option 1	Extend pedestrian overpass access to the new platform 3 and to the new surface parking lot
Parking, Circulation and Streetscape Improvements	
Parking Design Option 1A	New surface parking lot east of station. *Requires acquisition and demolition of existing structures and other ancillary structures and residential parcels on the corner of 12th Street and Howard Avenue to facilitate construction of the proposed improvements*
Parking Design Option 1B	Same as Parking Design Option 1A but avoids relocation impacts to residential parcels on the corner of 12th Street and Howard Avenue

Table 2-2. Summary of Proposed Build Alternative with Design Options Build + Design Option	Description
Parking Design Option 2A	New surface parking lot east of station combined with existing overflow parking lot with the extension of Howard Avenue through to 9th Street. *Requires acquisition and demolition of existing structures and other ancillary structures and residential parcels on the corner of 12th Street and Howard and requires acquisition of additional parcels directly east of the existing overflow parking lot*
Parking Design Option 2B	Same as Parking Design Option 2A but avoids relocation impacts to residential parcels on the corner of 12th Street and Howard Avenue
Parking Design Option 3A	Same as Parking Design Option 1A/2A but avoids impacts to additional parcels east of the existing overflow parking lot by routing Howard Avenue around the parcels.
Parking Design Option 3B	Same as Parking Design Option 1B/2B but avoids relocation impacts to additional parcels east of the existing overflow parking lot.

Pedestrian Overpass Access Improvements

Access from the existing station area would be provided by the proposed extension of the pedestrian overpass (see Figure 2-3, Build Alternative with Pedestrian Overpass Access Design Option 1). The Build Alternative with Pedestrian Overpass Access Design Option 1 includes a longer extension of the pedestrian overpass to Platform 3 and new surface parking lot (two spans, two towers/elevators).

The new pedestrian overpass elevator tower would be located 14 feet clear of both Track 5 and Track 6 on Platform 3. Access from the proposed surface parking lot would be provided by two 10-foot wide at-grade pedestrian crossings at the north and south end of Platform 3.

Parking, Circulation and Streetscape Improvements

All parking design options would require the acquisition of parcels directly east of the station and demolition of existing structures and other ancillary structures to facilitate construction of the proposed Build Alternative improvements:

- Parking Design Option 1A would require the acquisition of residential parcels on the corner of 12th Street and Howard Avenue. Parking Option 1B would avoid the residential properties.
- Parking Design Option 2A and 2B would have similar right-of-way (ROW) impacts as Options 1A and 1B but would require acquisition of additional parcels directly east of the existing overflow parking lot.
- Parking Design Option 3A and 3B would have similar ROW impacts as Options 2A and 2B but would avoid parcel acquisitions directly east of the overflow parking lot.
- Parking Design Option 1A/1B adds a new surface parking lot and maintains separation from the existing overflow parking lot on the eastside of the station (Figure 2-4, Building Alternative with Parking Design Option 1A and Figure 2-5, Build Alternative with Parking Design Option 1B).
    - Parking Design Option 1A – Add new surface parking lot and maintain separation from existing overflow parking lot on the east side of the station. Acquisition and demolition of residential parcels on the corner of 12th Street and Howard Avenue would be required. (see Figure 2-4, Build Alternative with Parking Design Option 1A).
    - Parking Design Option 1B – Add proposed surface parking lot and maintain separation from existing overflow parking lot on the east side of the station and avoid impacts to residential parcels at the corner of 12th Street and Howard Avenue (see Figure 2-5, Build Alternative with Parking Design Option 1B).
- Parking Design Options 2A/2B proposes a new surface parking lot directly east of the station combined with the existing overflow parking lot (see Figure 2-6, Build Alternative with Parking Design Option 2A and Figure 2-7, Build Alternative with Parking Design Option 2B).
    - Parking Design Option 2A – Combine proposed surface parking lot with existing overflow parking lot on the east side of the station which would require acquisition and demolition of residential parcels on the corner of 12th Street and Howard Avenue. This option would also include extending Howard Avenue through to 9th Street and would require additional acquisition of parcels directly east of the existing overflow parking lot as well as partial street vacations for 10th Street and Commerce Street (see Figure 2-6, Build Alternative with Parking Design Option 2A).
    - Parking Design Option 2B – Combine proposed surface parking lot with existing overflow parking lot on the east side of the station and avoid impacts to residential parcels at the corner of 12th Street and Howard

Avenue. This option would also include extending Howard Avenue through to 9th Street and would require additional acquisition of parcels directly east of the existing overflow parking lot as well as partial street vacations for 10th Street and Commerce Street (see Figure 2-7, Build Alternative with Parking Design Option 2B).

- Parking Design Options 3A and 3B propose a new surface parking lot directly east of the station combined with the existing overflow parking lot and extension of Howard Street through to 9th Street (see Figure 2-8, Build Alternative with Parking Design Option 3A and Figure 2-9, Build Alternative with Parking Design Option 3B).
  - Parking Design Option 3A – Combine proposed surface parking lot with existing overflow parking lot on the east side of the station which would require and demolition of residential parcels on the corner of 12th Street and Howard Avenue. This option would also include extending Howard Avenue through to 9th Street as well as partial street vacations for 10th Street and Commerce Street while avoiding additional acquisition of parcels directly east of the existing overflow parking lot (see Figure 2-8, Build Alternative with Parking Design Option 3A).
  - Parking Design Option 3B - Combine proposed surface parking lot with existing overflow parking lot on the east side of the station and avoid impacts to residential parcels at the corner of 12th Street and Howard Avenue. This option would also include extending Howard Avenue through to 9th Street as well as partial street vacations for 10th Street and Commerce Street while avoiding additional acquisition of parcels directly east of the existing overflow parking lot (see Figure 2-9, Build Alternative with Parking Design Option 3B).

2.4. Methods

The paleontological study for the Project included review of geologic maps, geotechnical bore logs, literature, online databases, and the results of a paleontological records search conducted by the Western Science Center (WSC). The geology underlying the Project area was reviewed, as well as any geologic units occurring within a one half-mile radius. The results of the reviews were used to complete a paleontological sensitivity analysis using the Society of Vertebrate Paleontology (SVP) sensitivity criteria and an impact analysis.

Courtney Richards, M.S. authored this report and Elisa Barrios, B.S. prepared the GIS maps (see Appendix A for qualifications).

Figure 2-1. Project Location Map

Source: Base layers from ESRI ArcGIS

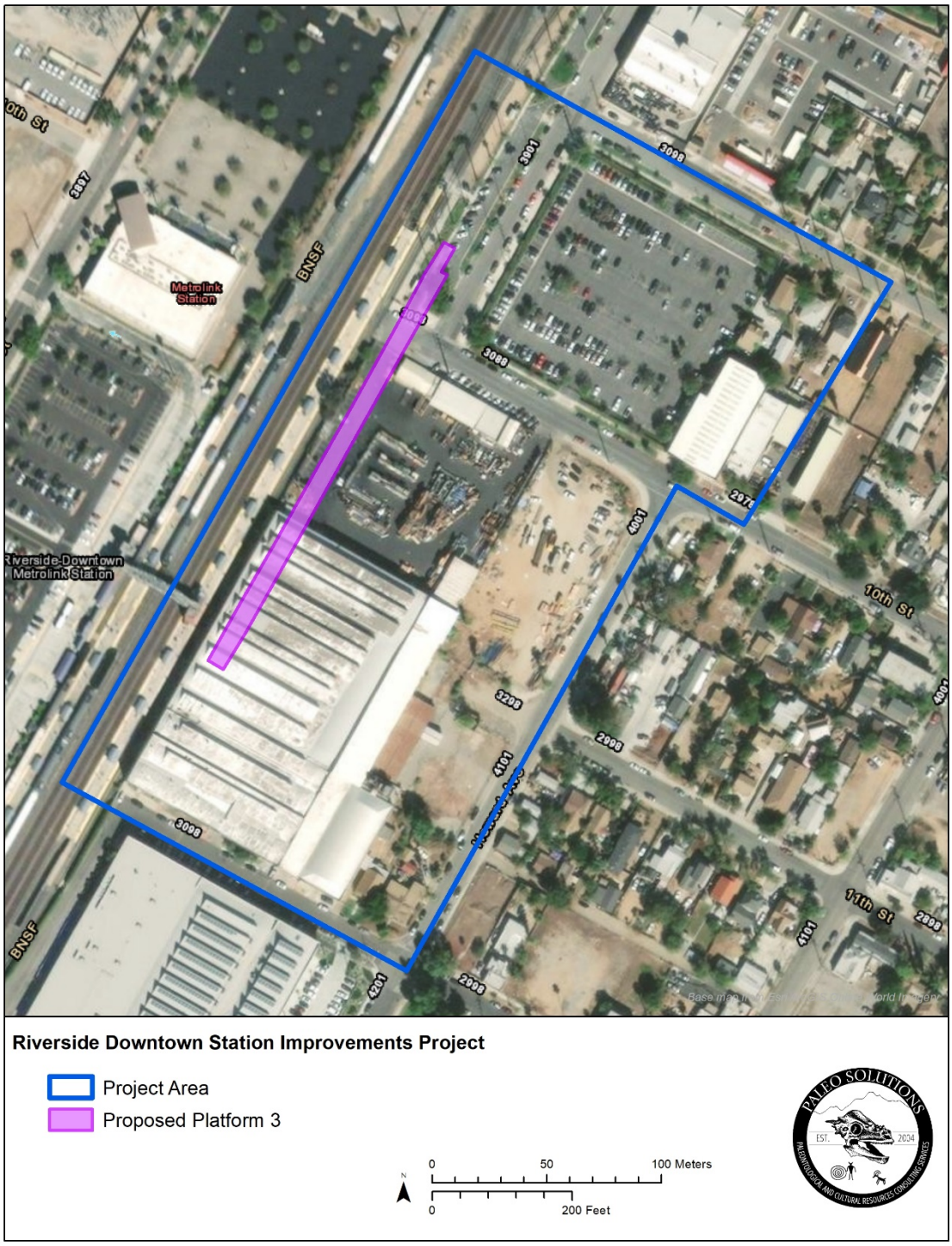

Figure 2-2. Project Vicinity Map

Source: Base layers from ESRI ArcGIS

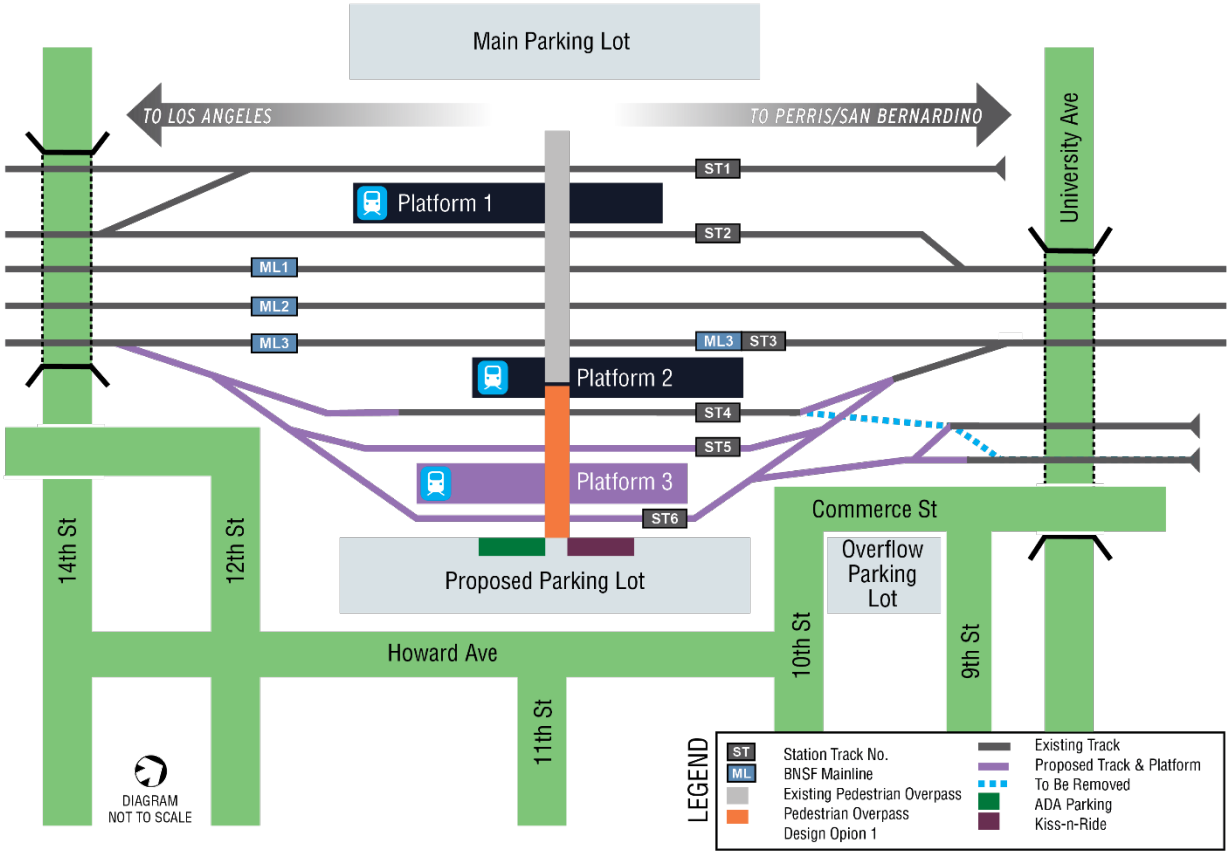

Figure 2-3. Build Alternative with Pedestrian Overpass Access Design Option 1

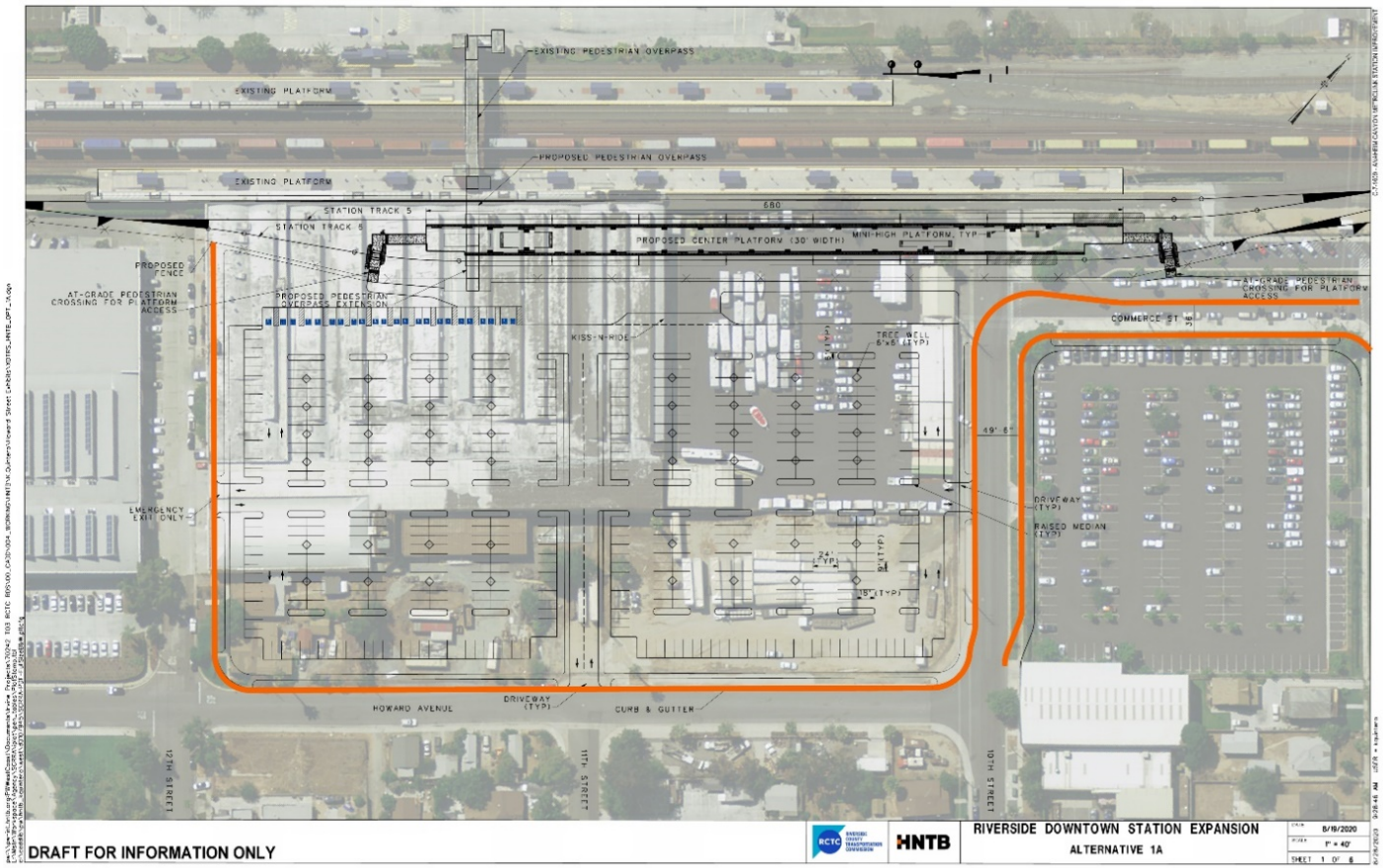

Figure 2-4. Build Alternative with Parking Design Option 1A

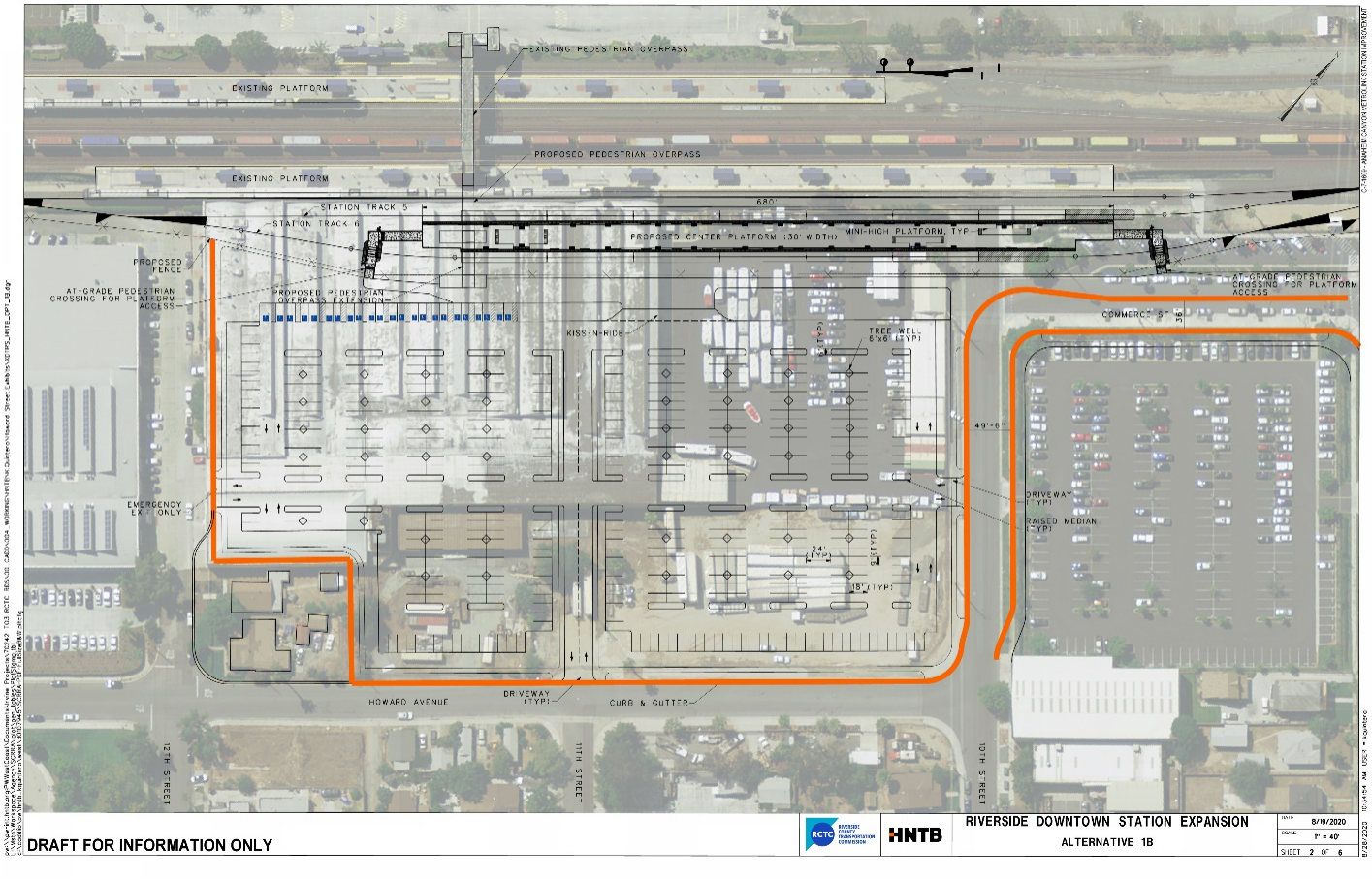

Figure 2-5. Build Alternative with Parking Design Option 1B

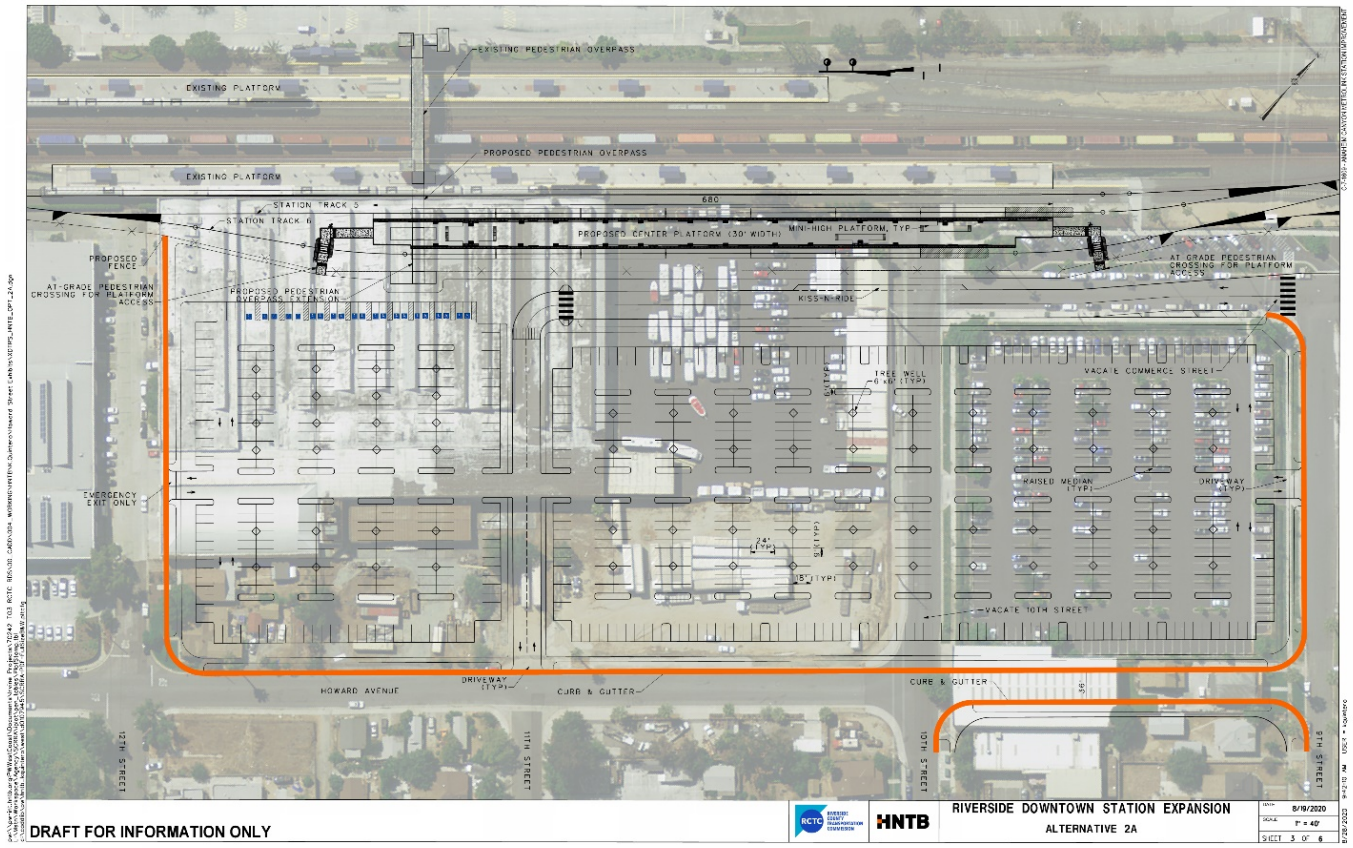

Figure 2-6. Build Alternative with Parking Design Option 2A

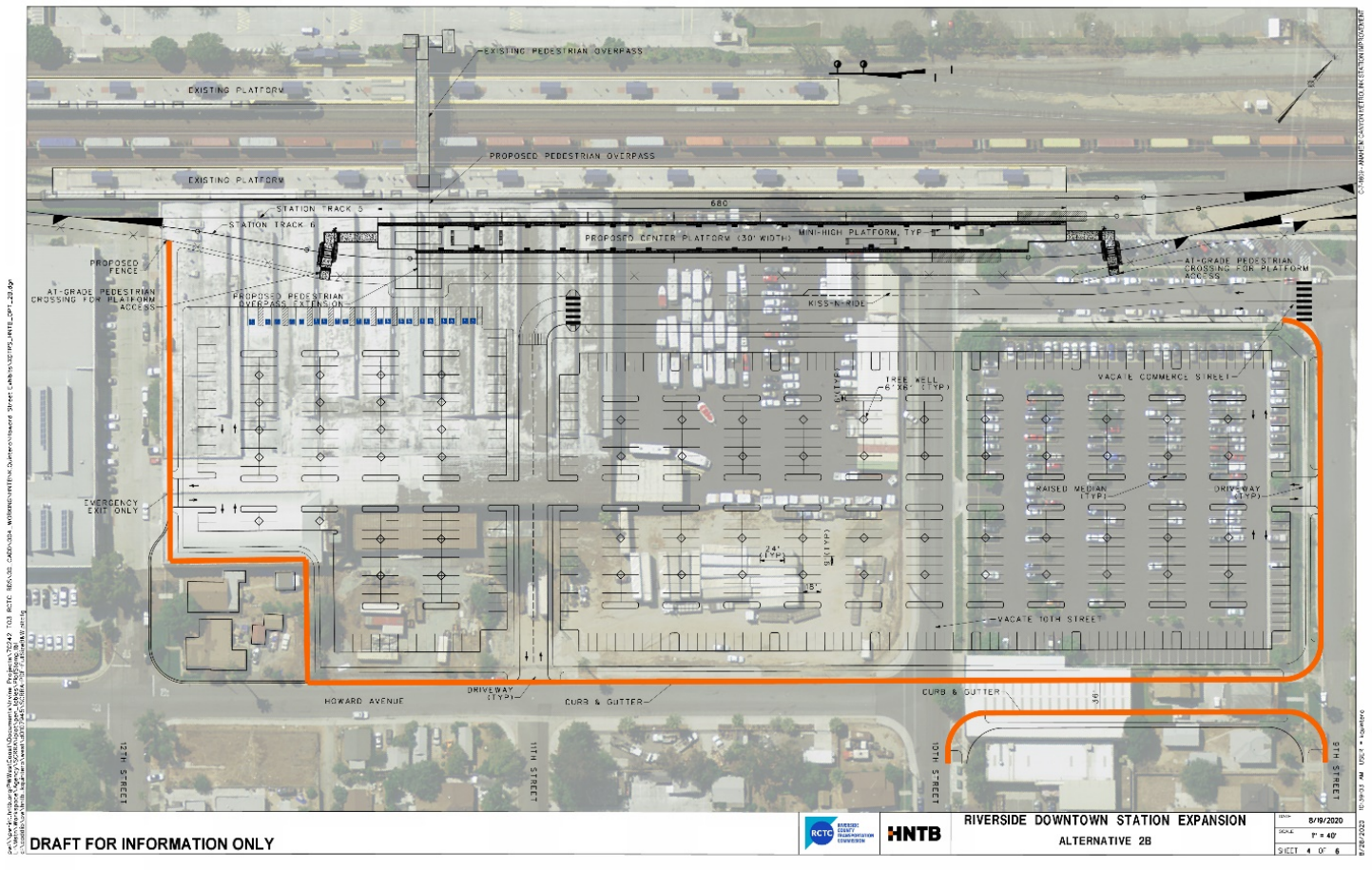

Figure 2-7. Build Alternative with Parking Design Option 2B

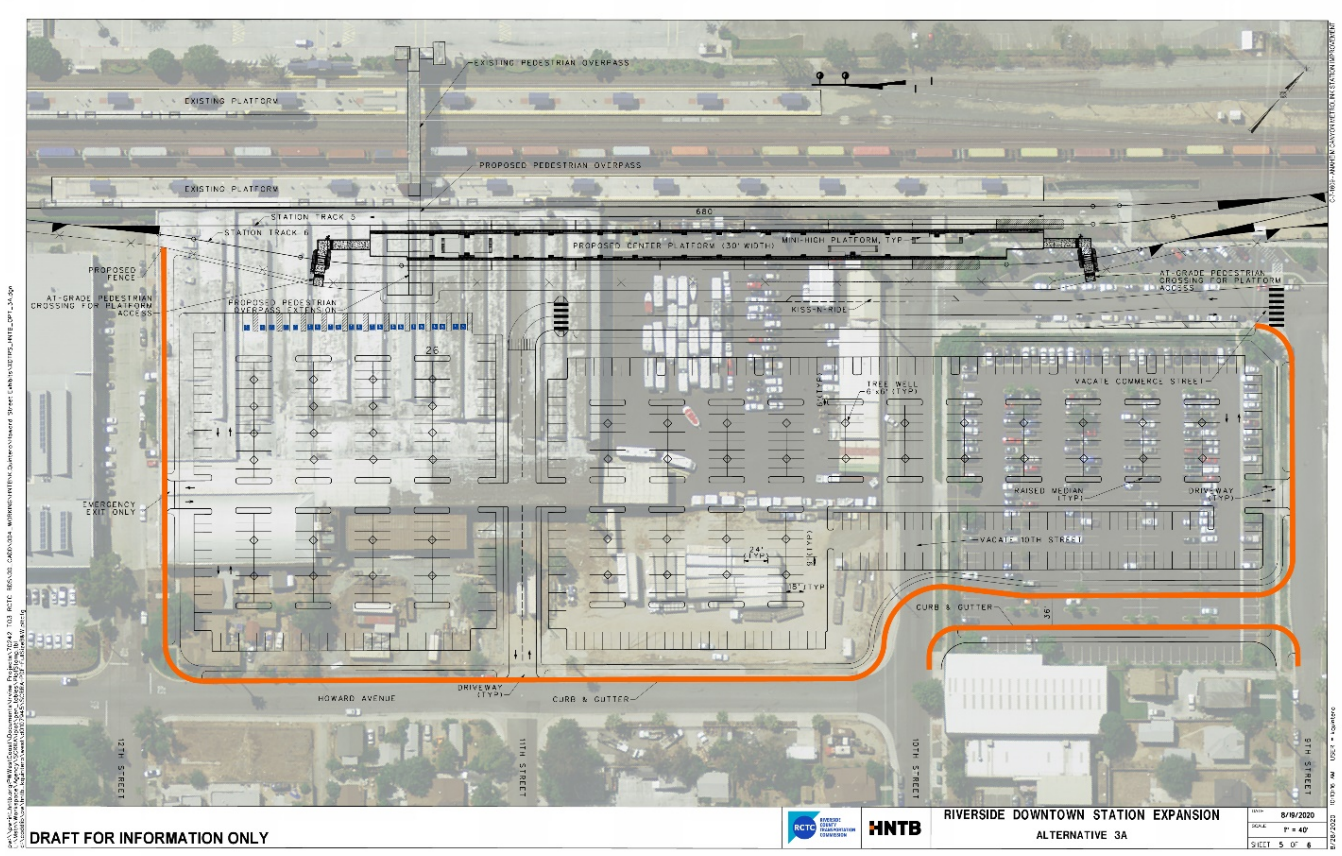

Figure 2-8. Build Alternative with Parking Design Option 3A

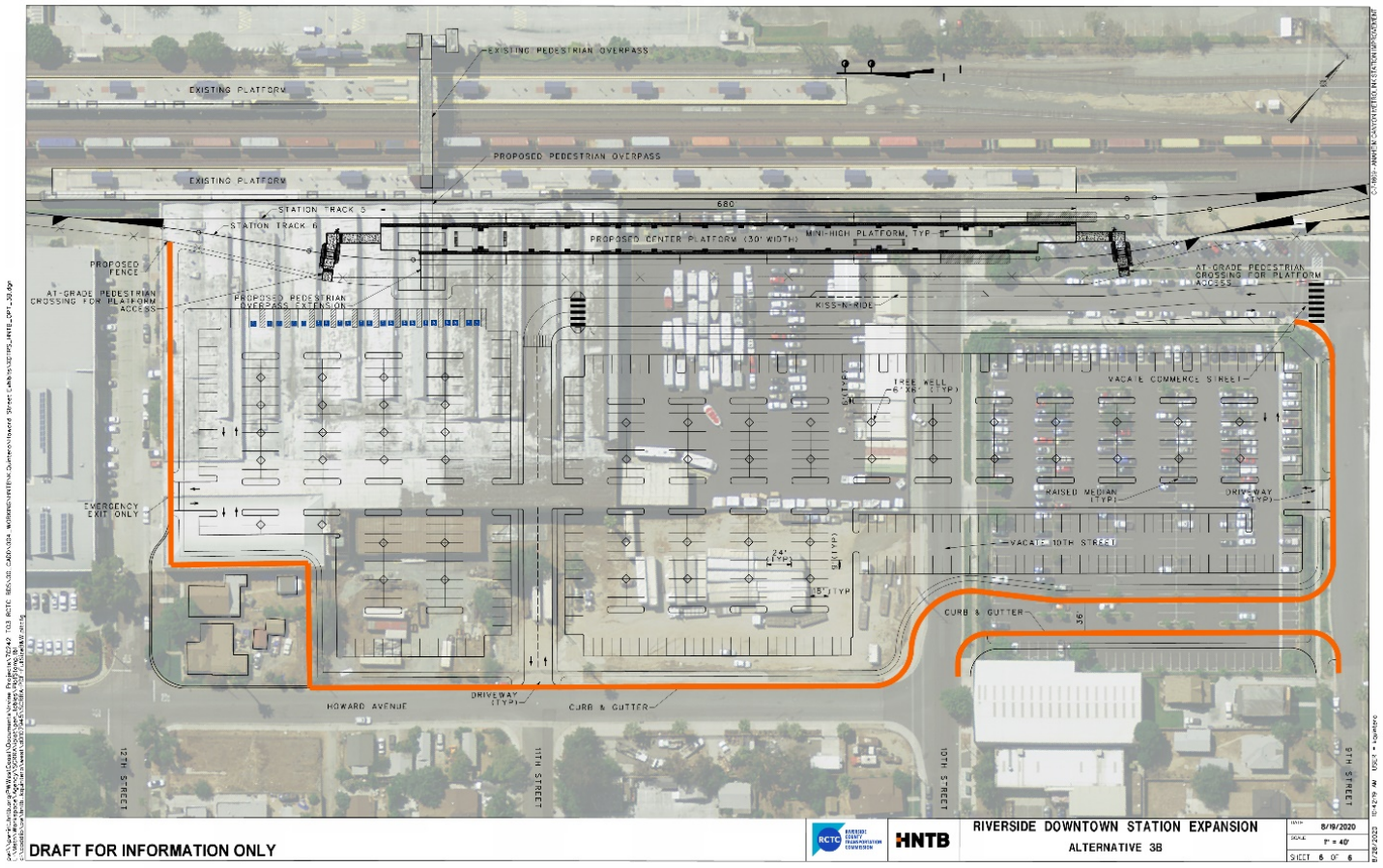

Figure 2-9. Build Alternative with Parking Design Option 3B

3.0 DEFINITION AND SIGNIFICANCE OF PALEONTOLOGICAL RESOURCES

As defined by Murphey and Daitch (2007): "Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. Paleontological resources include not only fossils themselves, but also the associated rocks or organic matter and the physical characteristics of the fossils' associated sedimentary matrix.

The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered non-renewable resources because the organisms they represent no longer exist. Thus, once destroyed, a fossil can never be replaced. Fossils are important scientific and educational resources because they are used to:

- Study the phylogenetic relationships amongst extinct organisms, as well as their relationships to modern groups;
- Elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including the biases inherent in the fossil record;
- Reconstruct ancient environments, climate change, and paleoecological relationships;
- Provide a measure of relative geologic dating that forms the basis for biochronology and biostratigraphy, and which is an independent and corroborating line of evidence for isotopic dating;
- Study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time;
- Study patterns and processes of evolution, extinction, and speciation; and
- Identify past and potential future human-caused effects to global environments and climates."

Fossils vary widely in their relative abundance and distribution and not all are regarded as significant. According to the SVP (2010):

> "A Significant Fossiliferous Deposit is a rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information."

Vertebrate fossils, whether preserved remains or track ways, are classified as significant by most state and federal agencies and professional groups (and are specifically protected under the California Public Resources Code). In some cases, fossils of plants or invertebrate animals are also considered significant and can provide important information about ancient local environments. Assessment of significance is also subject to the CEQA criterion that the resource constitutes a “unique paleontological resource or site.”

The full significance of fossil specimens or fossil assemblages cannot be accurately predicted before they are collected, and in many cases, before they are prepared in the laboratory and compared with previously collected fossils. Pre-construction assessment of significance associated with an area or formation must be made based on previous finds, characteristics of the sediments, and other methods that can be used to determine paleoenvironmental and taphonomic conditions.

4.0 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

This section of the report presents the applicable federal, state, and local regulatory requirements pertaining to paleontological resources that apply to this Project.

4.1. Federal Regulatory Setting

If any federal funding is used to wholly or partially finance a project, occurs on federal lands, involves a federal permit, and/or includes a perceived federal impact, federal laws and standards apply, and an evaluation of potential impacts on paleontological resources may be required. The management and preservation of paleontological resources on public and federal lands are prescribed under various laws, regulations, and guidelines.

4.1.1. The National Environmental Policy Act of 1969 (NEPA)

The National Environmental Policy Act of 1969, [NEPA] as amended (Public Law [Pub. L.] 91-190, 42 United States Code [USC] 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258 § 4(b), Sept. 13, 1982) recognizes the continuing responsibility of the Federal Government to "preserve important historic, cultural, and natural aspects of our national heritage . . ." (Sec. 101 [42 USC § 4321]) (#382). With the passage of the Paleontological Resources Preservation Act (2009), paleontological resources are considered to be a significant resource and it is therefore now standard practice to include paleontological resources in NEPA studies in all instances where there is a possible impact.

4.1.2. Antiquities Act of 1906

The Antiquities Act of 1906 (16 USC 431-433) states, in part:

> That any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court.

Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR 3]), the term "objects of antiquity" has been interpreted to include fossils by the National Park Service, the Bureau of Land Management, the Forest Service, and other federal agencies. Permits to collect fossils on lands administered by federal agencies are authorized under this Act.

However, due to the large gray areas left open to interpretation due to the imprecision of the wording, agencies are hesitant to interpret this act as governing paleontological resources.

4.2. State Regulatory Setting

4.2.1. California Environmental Quality Act (CEQA)

The procedures, types of activities, persons, and public agencies required to comply with CEQA are defined in the Guidelines for Implementation of CEQA (State CEQA Guidelines), as amended on March 18, 2010 (Title 14, Section 15000 et seq. of the California Code of Regulations [i.e., 14 CCR Section 15000 et seq.]) and further amended January 4, 2013 and December 28, 2018. One of the questions listed in the CEQA Environmental Checklist is: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (State CEQA Guidelines Appendix G, Section VII, Part f.).

4.2.2. State of California Public Resources Code

The State of California Public Resources Code (Chapter 1.7), Sections 5097 and 30244, includes additional state level requirements for the assessment and management of paleontological resources. These statutes require reasonable mitigation of adverse impacts to paleontological resources resulting from development on state lands, and define the excavation, destruction, or removal of paleontological "sites" or "features" from public lands without the express permission of the jurisdictional agency as a misdemeanor. As used in Section 5097, "state lands" refers to lands owned by, or under the jurisdiction of, the state or any state agency. "Public lands" is defined as lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

4.3. Local Regulatory Setting

4.3.1. Riverside County

The Riverside County General Plan requires consideration of paleontological resources under the Multipurpose Open Space Element of the general plan (County of Riverside, 2015). The Riverside County General Plan recommendations are based on the SVP guidelines (2010) for the mitigation of paleontological resources. Additionally, the Riverside County General Plan Multipurpose Open Space Element contains a figure of paleontological sensitivity, Figure OS-8. The Multipurpose Open Space Element of the general plan (County of Riverside, 2015) provides the following requirements for paleontological sensitive areas within the county:

OS 19.6. Whenever existing information indicates that a site proposed for development has high paleontological sensitivity as shown on Figure OS-8, a

paleontological resource impact mitigation program shall be filed with the County Geologist prior to site grading. The paleontological resource impact mitigation program shall specify the steps to be taken to mitigate impacts to paleontological resources.

OS 19.7. Whenever existing information indicates that a site proposed for development has low paleontological sensitivity as shown on Figure OS-8, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the County Geologist shall be notified and a paleontologist shall be retained by the project proponent. The paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.

OS 19.8. Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity as shown on Figure OS-8, a report shall be filed with the County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources prior to approval of that department.

OS 19.9. Whenever paleontological resources are found, the County Geologist shall direct them to a facility within Riverside County for their curation, including the WSC in the City of Hemet.

According to Figure OS-8, the Project area is located within an area mapped as High (High A) paleontological sensitivity (sensitive for fossil material at the surface) (see Appendix C).

4.3.2. City of Riverside

The Historic Preservation Element of the City of Riverside General Plan (2012) includes one policy regarding paleontological resources within the city:

HP-1.3. The City shall protect sites of archaeological and paleontological significance and ensure compliance with all applicable state and federal cultural resources protection and management laws in its planning and project review process.

5.0 BACKGROUND AND DESCRIPTION OF RESOURCE

The Project area is located within the Peninsular Ranges Geomorphic Province (Harden, 2004). A geomorphic province is a geographical area of distinct landscape character, with related geophysical features, including relief, landforms, orientations of valleys and mountains, type of vegetation, and other geomorphic attributes (Harden, 2004). Attributes of the Peninsular Ranges Geomorphic Province consist of northwest-southeast-trending, fault-bounded discrete blocks, with mountain ranges, broad intervening valleys, and low-lying coast plains (Yerkes et al., 1965; Norris and Webb, 1990). Within California, the province extends approximately 125 miles from the Transverse Ranges and the Los Angeles Basin south to the Mexican border, extending southward approximately 775 miles toward to the tip of Baja California, and it is bound on the east by the right-slip San Andreas Fault Zone, the Eastern Transverse Ranges, and the Colorado Desert (Norris and Webb, 1990; Hall, 2007). Most of the geomorphic province is located offshore and includes the Santa Catalina and San Clemente islands (Hall, 2007). Topographically on the mainland, the Peninsular Ranges are steeper on the eastern slopes, where they are truncated by normal faults like the Elsinore or San Jacinto faults, and are more gradual on their western slopes toward the Pacific Ocean, similar to the topography of the Sierra Nevada (Norris and Webb, 1990; Prothero, 2017). Within the province, the highest elevations are found in the eastern-most block, with San Jacinto Peak reaching approximately 10,805 feet in elevation and various summits of the Santa Rosa Mountains averaging 6,000 feet in elevation (Norris and Webb, 1990). Westward toward the coast, elevations are less dramatic.

The pre-Phanerozoic history of the Peninsular Ranges is not represented within the province, and few locations contain rocks older than the Mesozoic (Norris and Webb, 1990), and sparse Paleozoic strata within the Peninsular Ranges is in stark contrast to the Sierra Nevada, which contains thick sections of Paleozoic rocks. The oldest pre-batholithic rocks in the Peninsular Ranges are Paleozoic in age and consist of metamorphosed remnants of a stable carbonate platform (now marble and schist) on a passive continental margin that existed along western North America at that time (Harden, 2004). Moreover, late Paleozoic limestone is present near Riverside (Norris and Webb, 1990), further supporting the presence of a shallow marine environment prior to the Mesozoic. Most of the geologic history of the Peninsular Ranges is represented by Mesozoic-age plutonic rocks and Cenozoic-age uplift, erosion, and sedimentary deposition in basins (Sylvester and O'Black Gans, 2016).

During the Triassic and Jurassic, marine sedimentary rocks composed of sandstone and shale were deposited in turbidite sequences along a submarine fan (Harden, 2004). Throughout the Jurassic and Cretaceous, the continental margin became active as the Farallon Plate, which ferried old island arcs,

subducted beneath the North American Plate, creating a large pluton complex (i.e., batholith) beneath the surface that rose into the upper crust and intruded into Paleozoic and Mesozoic sedimentary and volcanic rocks (Harden, 2004; Sylvester and O'Black Gans, 2016). The large complex of batholiths resulted in the formation of the San Marcos Gabbro, Bonsall Tonalite, and Woodson Mountain Granodiorite among others in the Peninsular Ranges (Norris and Webb, 1990). Contact metamorphism from the plutons metamorphosed older sedimentary and volcanic rocks into marble, slate, schist, quartzite, gneiss, and metavolcanic rocks (Sylvester and O'Black Gans, 2016). The timing of the Peninsular Ranges Batholith is similar to that of the Sierra Nevada, ranging in age from 70 to 120 million years ago (Norris and Webb, 1990). The batholith complex originally formed south of the Mexican border but has since moved along the right-slip San Andreas Fault over the past 40 million years (Prothero, 2017). During the Late Cretaceous through the Paleogene, the Peninsular Ranges Batholith was uplifted and eroded into a broad plain, where fluvial systems transported sediments westward across the plain and onto the seafloor (Sylvester and O'Black Gans, 2016). Sedimentary rocks were deposited in a forearc basin by turbidity currents representing both deep and shallow marine and nonmarine environments, including the marine Williams, Ladd, and Rosario formations and the nonmarine Trabuco Formation, with extensive exposures in the western flank of the Santa Ana Mountains (Norris and Webb, 1990; Harden, 2004).

Throughout the Cenozoic, thick sections of sedimentary rocks were deposited in large basins, such as the Los Angeles, Imperial, and offshore basins, due to erosion (Norris and Webb, 1990). Most exposures of early Tertiary strata are restricted to the coastal margins, with a maximum thickness of approximately 4,500 feet in the Santa Ana Mountains (Norris and Webb, 1990). Most Cenozoic strata represent nonmarine depositional environments; however, approximately 600 feet of marine sediments are present near San Diego (Norris and Webb, 1990). Thick nonmarine deposits formed during the Oligocene, followed by a pause of sedimentation at the end of the Oligocene due to tectonic uplift (Norris and Webb, 1990). By the beginning of the Miocene, most of the Farallon Plate had been subducted beneath the North American Plate, and the Pacific Plate came into contact with the North American Plate (Sylvester and O'Black Gans, 2016). As the Pacific Plate slid northwest along the North American Plate, a section of forearc basin was rafted, rotated clockwise approximately 110 degrees, and carried north approximately 130 miles; while carried northward, the forearc basin was compressed and formed the Transverse Ranges located immediately north of the Peninsular Ranges (Sylvester and O'Black Gans, 2016). Additionally, movement along the San Jacinto Fault Zone, which bifurcates from the San Andreas Fault Zone in an area north of the Peninsular Ranges, occurred in the middle to late Tertiary through the Quaternary, with a right-slip and vertical

motion resulting in approximately 18 miles of lateral displacement (Norris and Webb, 1990). During this time, thick accumulations of nonmarine sediments filled basins, as well as coastal and offshore areas, in the northern Peninsular Ranges during the Pliocene, with up to 7,000-foot thick sections of siltstone, sandstone, and conglomerate in the Mount Eden and San Timoteo canyons (Norris and Webb, 1990). Despite widespread volcanism elsewhere in southern California during the late Tertiary, little volcanism occurred within the Peninsular Ranges during this time (Norris and Webb, 1990). Throughout the Quaternary, fluvial and lacustrine sediments continued to fill basins within the province, with restricted volcanic and marine terrace deposits along the coast (Norris and Webb, 1990).

The Project area is situated in the Perris Block, which is a fault-bounded block comprising part of the northern Peninsular Ranges. The block lies between the Los Angeles Basin and the San Jacinto Mountains and is bounded by the San Jacinto and Elsinore-Chino fault zones and the Cucamonga Fault (Woodford et al., 1971). During the Pliocene and Pleistocene, deep isostatic flow caused the Perris Block to oscillate vertically as the Los Angeles Basin sank and the San Jacinto Mountains rose (Woodford et al., 1971). The oscillations resulted in deposition of deep valley continental sediments as well as volcanic rocks, which were emplaced on top of the dominantly crystalline basement, and multiple erosional surfaces (Woodford et al., 1971).

5.1. Geologic Context

Geologic mapping by Dibblee and Minch (2003, 2004) indicates that the Project area is underlain by Holocene-age young alluvial gravel and sand of stream channels (Qg) and Pleistocene-age older alluvial fan deposits (Qoa). While not mapped at the surface, aerial photographs indicate that artificial fill is also present throughout the surface of the Project area. The distribution of geologic units, as mapped by Dibblee and Minch (2003, 2004), is provided in Figure 5-1, Project Geology Map.

5.1.1. Artificial Fill (Not Mapped) (Recent)

Artificial fill comprises recent deposits of previously disturbed sediments that are found in areas where ground disturbing activities such as surface grading has occurred. Color is highly variable, and sediments are mottled in appearance. Artificial fill is not mapped at the surface of the Project area (Dibblee and Minch, 2003, 2004; Figure 5-1, Project Geology Map); however, satellite photos indicate that the entire surface of the Project area is covered by infrastructure. A review of geotechnical bore logs recorded by Leighton in February 2020 identified artificial fill in only one location and it was not differentiated from the younger alluvial deposits. However, additional geotechnical bore logs recorded by DYA in January 1997 and compiled by Leighton (2020) indicate that the area west of 10th Street has a layer of artificial fill that is up to 7 feet thick. Artificial fill was not

recorded in the geotechnical bore logs to the east of 10th Street (Leighton, 2020). However, the full geotechnical report indicated that undocumented fill layers may extend up to 10 feet below ground surface in some areas, especially near the Prism Aerospace building (Leighton, 2020). Additionally, RCTC consultants drilled about 15-20 soil borings throughout the Project site for Phase II hazardous waste investigations and consistently encountered fill material from approximately 2 to 5 feet below ground surface.

5.1.2. Young Alluvial Gravel and Sand of Stream Channels (Qg) (Holocene)

Holocene-age young alluvial gravel and sand of stream channels (Qg) consist of sediments that were laid down by recent or modern fluvial processes (transported by water). Deposits are composed of unindurated, undissected gravel and sand (Dibblee and Minch, 2003, 2004). These sediments are mapped in the central portion of the Project area (Dibblee and Minch, 2003, 2004; Figure 5-1, Project Geology Map). A review of geotechnical bore logs recorded by Leighton in February 2020 indicates that young, Holocene-age deposits are present starting between 0 and 1 foot below the surface and extending to depths of 4.5 feet to the east of 10th Street and 14.5 feet at 12th Street. The full geotechnical report indicates that young alluvial soils were encountered in the western portion of the site, mainly between 10th Street and 13th Street, and that the deposits may extend up to 15 feet below ground surface. Additional geotechnical bore logs recorded by DYA in January 1997 and compiled by Leighton (2020) do not differentiate between the younger, Holocene-age deposits and older, Pleistocene-age deposits; however, they do indicate that native sediments are present beneath artificial fill deposits starting at depths of 7 feet to the west of 10th Street and between 0 and 4 inches to the east of 10th Street (Leighton, 2020).

5.1.3. Older Alluvial Fan Deposits (Qoa) (Pleistocene)

Older alluvial fan deposits (Qoa) were deposited during the Pleistocene (approximately 2.6 million years ago to 11,000 years ago). These sediments consist of tan to reddish-brown colored, weakly-indurated, dissected alluvial fan deposits composed primarily of sand with some gravel (Dibblee and Minch, 2003, 2004). Pleistocene-age older alluvial fan deposits (Qoa) are mapped at the surface of the majority of the Project area (Dibblee and Minch, 2003, 2004; Figure 5-1, Project Geology Map). A review of geotechnical bore logs recorded by Leighton in February 2020 indicates that these deposits are present starting at depths ranging from 4.5 feet deep to the east of 10th Street to 14.5 feet deep at 12th Street. Additional geotechnical bore logs recorded by DYA in January 1997 and compiled by Leighton (2020) do not differentiate between the younger, Holocene-age deposits and older, Pleistocene-age deposits; however, they do indicate that native sediments are present beneath artificial fill deposits starting at

depths of 7 feet to the west of 10th Street and between 0 and 4 inches to the east of 10th Street (Leighton, 2020).

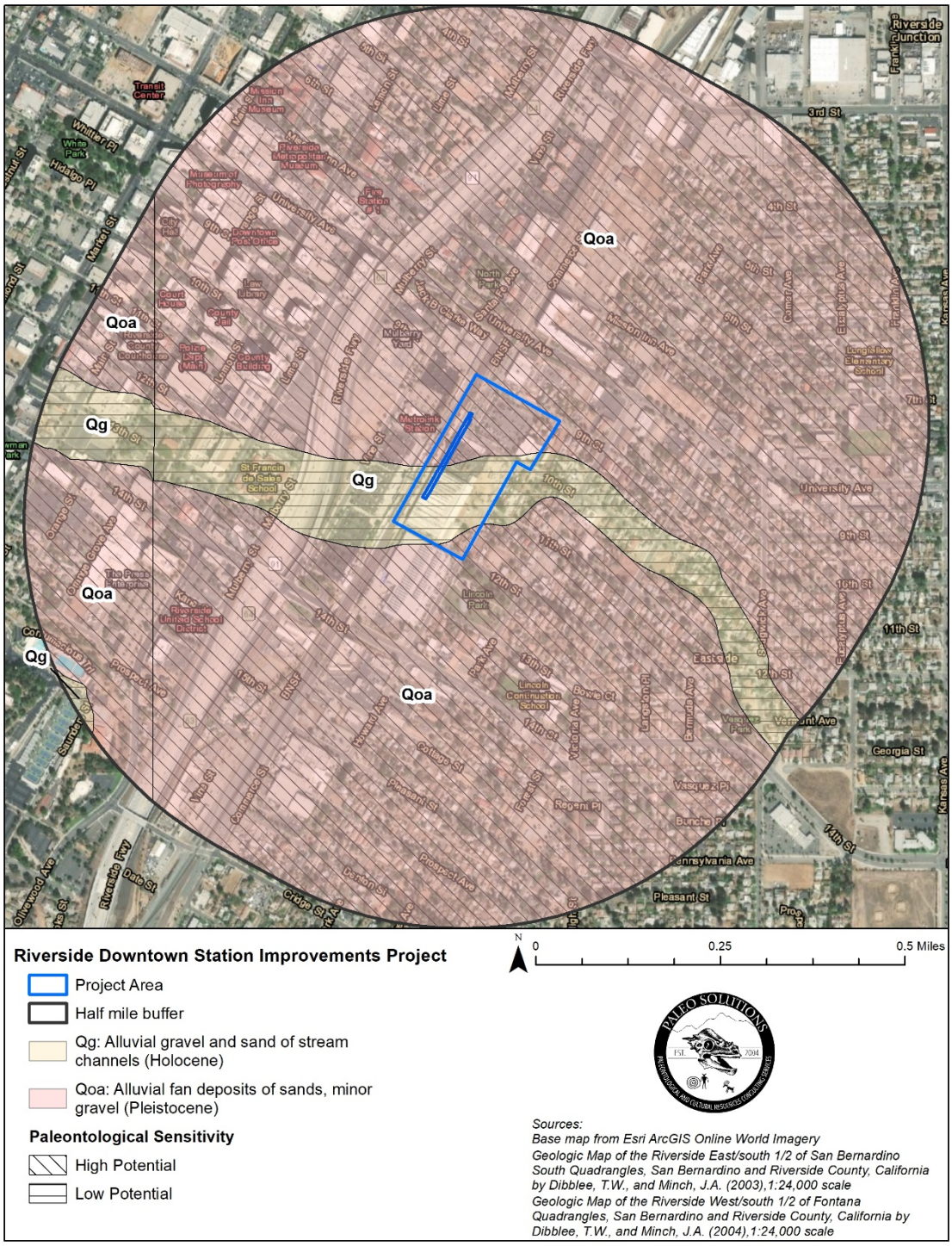

Figure 5-1. Project Geology Map

Source: Dibblee and Minch (2003, 2004)

5.2. Paleontological Resources

Paleontological searches of records maintained by the WSC were conducted. The museum responded on February 27, 2020 that they do not have any fossil localities recorded from within the Project area or a one-mile radius (Radford, 2020). However, the museum did state that they consider the Pleistocene-age older alluvial fan deposits within the Project area to be paleontologically sensitive.

Taxonomically diverse and locally abundant Pleistocene animals and plants have been collected from older alluvial deposits, such as the older alluvial fan deposits (Qoa), within the City of Riverside, Riverside County, and throughout southern California and include mammoth (*Mammuthus*), mastodon (*Mammut*), camel (Camelidae), horse (Equidae), bison (*Bison*), giant ground sloth (*Megatherium*), peccary (Tayassuidae), cheetah (*Acinonyx*), lion (*Panthera*), saber tooth cat (*Smilodon*), capybara (*Hydrochoerus*), dire wolf (*Canis dirus*), and numerous taxa of smaller mammals (Rodentia, Testudines) (Blake, 1991; Jahns, 1954; Jefferson, 1991; University of California Museum of Paleontology [UCMP], 2020; Paleobiology Database [PBDB], 2020; City of Riverside, 2012).

Due to their young age, Holocene-age deposits, such as the young alluvial gravel and sand of stream channels (Qg), typically do not contain significant vertebrate fossils, at least in the uppermost layers, but they may well contain significant vertebrate fossil remains at depth in older deposits.

Depending on the source of the artificial fill, there is potential for paleontological resources to be present. However, any fossil resources contained within these sediments will have been removed from their original deposition locations and, therefore, lack significant stratigraphic contextual data.

6.0 SENSITIVITY AND IMPACT ANALYSIS

6.1. Sensitivity Analysis

Based on the results records search and the geologic map, literature, and online database review, the paleontological sensitivity of the geologic units within the PSA were ranked using SVP sensitivity guidelines (SVP, 2010), and an impact analysis was performed.

6.1.1. SVP Sensitivity Criteria

In its "Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources," SVP (2010) recognizes four categories of paleontological potential for rock units: high, undetermined, low, and no potential:

High Potential

Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

Undetermined Potential

Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases

where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

Low Potential

Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e.g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

No Potential

Some rock units have no potential to contain significant paleontological resources, for instance high grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

6.1.2. Sensitivity Analysis Results

Fossils are generally unknown from Holocene-age alluvial deposits due to their young age. Both the Holocene-age deposits and artificial fill at the site may contain reworked paleontological material from older deposits but any discoveries would not meet significance criteria as the material would lack critical contextual information. Therefore, the Holocene-age young alluvial gravel and sand of stream channel deposits (Qg) and unmapped artificial fill both have low paleontological potential at the surface using the SVP (2010) sensitivity system. Pleistocene-age older alluvial fan deposits (Qoa) are considered to have a high potential for fossil resources using SVP (2010) guidelines since they have produced scientifically significant vertebrate fossils in the Project vicinity.

6.2. Impact Analysis

Impacts on paleontological resources can generally be classified as either direct, indirect or cumulative. Direct adverse impacts on surface or subsurface paleontological resources are the result of destruction by breakage and crushing as the result of surface disturbing actions including construction excavations. In areas that contain paleontologically sensitive geologic units, ground disturbance has the potential to adversely impact surface and subsurface paleontological resources of scientific importance. Without mitigation, these fossils and the paleontological data they could provide if properly recovered and documented, could be adversely impacted (damaged or destroyed), rendering them permanently unavailable to science and society.

Indirect impacts typically include those effects which result from the continuing implementation of management decisions and resulting activities, including normal ongoing operations of facilities constructed within a given project area. They also occur as the result of the construction of new roads and trails in areas that were previously less accessible. This increases public access and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting. Human activities that increase erosion also cause indirect impacts to surface and subsurface fossils as the result of exposure, transport, weathering, and reburial.

Cumulative impacts can result from incrementally minor but collectively significant actions taking place over a period of time. The incremental loss of paleontological resources over time as a result of construction-related surface disturbance or vandalism and unlawful collection would represent a significant cumulative adverse impact because it would result in the destruction of non-renewable paleontological resources and the associated irretrievable loss of scientific information.

There are no documented paleontological localities within the boundaries of the Project area, and the Holocene-age young alluvial gravel and stream channel deposits (Qg) and unmapped artificial fill at the surface have a low potential to contain significant fossils due to their young age and disturbed nature, respectively. However, fossils are recorded from Pleistocene-age alluvial deposits in the City of Riverside, Riverside County, and southern California (Blake, 1991; Jahns, 1954; Jefferson, 1991; UCMP, 2020; PBDB, 2020; City of Riverside, 2012). Similar Pleistocene-age sediments are mapped at the surface in the majority of the Project area and geotechnical reports indicate that they are present at depth (4.5 to 14.5 feet deep) beneath the Holocene-age alluvial deposits (Qg) and artificial fill. However, per site information provided by RCTC, previous remedial excavations have been completed over much of the site to depths up to 30 feet and significant amount of trenching also has taken place for the construction of a vapor extraction system that operated at the site in the past. Based on available excavation information, the Project will primarily involve shallow grading (3 to 5 feet deep) and would require ground disturbance to depths of 10 feet in a limited area for the elevator tower and retaining wall and has the potential to encounter native Pleistocene-age older alluvial fan deposits (Qoa) beneath unmapped artificial fill and the Holocene-age young alluvial gravel and stream channel deposits (Qg). Excavations into the Pleistocene-age older alluvial fan deposit (Qoa) may encounter paleontological resources. Excavations entirely within artificial fill or Holocene-age deposits will not encounter paleontological resources. Additionally, placement of imported fill to increase the elevation of the site will not encounter significant paleontological resources.

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7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the records search results and analysis of geologic maps, geotechnical bore logs, literature, and online databases, as well as the current Project description, construction activities for the Project may encounter paleontological resources during excavations that extend into native Pleistocene-age older alluvial fan deposits (Qoa) in the subsurface of the Project area. In the event of unanticipated paleontological resource discoveries during Project related activities, work in the immediate vicinity of the discovery should be halted until the unanticipated discovery can be evaluated by a qualified paleontologist.

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Appendix A. Qualifications

COURTNEY RICHARDS

Principal Paleontologist

PROFILE

Ms. Richards earned her Master of Science degree in Biological Sciences from Marshall University and a Bachelor of Science degree in Earth and Space Science from the University of Washington. Her experience includes broad research, field, and laboratory experience throughout California and across the western United States. She maintains a comprehensive understanding of the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), the Bureau of Land Management (BLM), best practices in mitigation paleontology, and other various federal, state, and local regulations governing paleontological resources. Ms. Richards has conducted paleontological fieldwork in Mesozoic, Eocene, and Oligocene rock units in Montana, Utah, and Wyoming; and Pliocene, Miocene, and Pleistocene surficial deposits throughout California; and Paleocene and Eocene Coalmont Formation, the Eocene and Oligocene White River Formation, and the Miocene North Park Formation in Colorado. Her previous professional experiences include appointments as the vertebrate paleontology collection assistant at the Burke Museum of Natural History and Culture and Paleontology Field Director at a cultural resources firm in southern California. At Paleo Solutions, Ms. Richards is responsible for the execution of paleontology projects in California, including technical report writing and project management, and regularly provides technical assistance on out-of-state projects.

EXPERIENCE & EDUCATION

Years of Experience
16 years

Education
M.S. Biological Sciences
Marshall University, 2011

B.S. Earth and Space Science
University of Washington, 2006

CERTIFICATIONS & TRAINING

- Qualified City and County of San Diego Paleontologist
- Qualified Riverside County Paleontologist
- Qualified Orange County Paleontologist
- Mine Safety & Health Administration: 24-hr New/Inexperienced Metal/Non-Metal Surface Miners Certification
- First Aid/CPR Certified

PRESENTATIONS

Modesto, S.P., Richards, C.D., Ide, O., and Sidor, C.A., 2019, The vertebrate fauna of the Upper Permian of Niger–X. The mandible of the captorhinid reptile Moradisaurus grandis: Journal of Vertebrate Paleontology, DOI: 10.1080/02724634.2018.1531877

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PROJECT EXPERIENCE

Palm Canyon Wash Levee
Riverside County Flood Control • Riverside County, CA

Principal Investigator. Ms. Richards was the primary author of a Paleontological Memo Report that presented the results of a paleontological literature search and geological and paleontological sensitivity mapping. The purpose of the study was to determine if paleontological resources are known or reasonably anticipated within the project area. The Palm Canyon Wash Levee project was located north of Cody Court, Along Palm Canyon Wash to Palm Canyon Drive. It continued farther east along along Palm Canyon Wash and ended west of South Gene Autry Trail (SR-111) and west of Tahquitz Creek in Palm Springs.

Paradise Valley Specific Plan
Glorious Land Company • Riverside County, CA

Senior Paleontologist. Ms. Richards co-authored a Paleontological Assessment Report for the construction of a resort community, which will include a variety of residential developments, recreational opportunities, commercial and industrial facilities, and associated infrastructures. Of the 5,411-acre project area, 2,151 acres are slated for development (planned development area), leaving the remaining 3,260 acres as open space. The report was prepared for the County of Riverside, Planning Department and the Bureau of Land Management Palm Springs-South Coast Field Office. The project surface is mapped as Quaternary alluvium; Pleistocene to Pliocene Ocotillo Formation, Pliocene Palm Springs Formation, Miocene to Pliocene Mecca Formation, and pre-Cenozoic plutonic, metamorphic, and granitic rocks.

Sentinel Power Plant
Southern California Edison • Riverside County, CA

Paleontologist. Ms. Richards oversaw paleontological and archaeological monitoring during construction of a 37-acre power plant site, 14-acre construction laydown area, 3,250 feet of transmission lines, and 2.5 miles of natural gas pipeline located north of Palm Springs.

West of Devers Transmission Line Upgrade Project
Southern California Edison • San Bernardino and Riverside Counties, CA

Principal Paleontologist. Ms. Richards was the primary author of the Paleontological Resource Mitigation and Monitoring Plan (PRMMP), which was designed to reduce project impacts on paleontological resources to below the level of significance pursuant to the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) for Southern California Edison's (SCE) planned project to upgrade the existing transmission lines between the Devers, El Casco, San Bernardino, and Vista Substations to increase the system transfer capacity from 1,600 megawatts to 4,800 megawatts. She coordinated and authored the completion of Notice to Proceed Requests (NTPRs) for the Material Yards, Transmission Lines, Colorado River Substation Distribution Line Extension, Telecommunication Lines, and Access Road Improvements that summarized the paleontological sensitivity of the area and the applicable paleontological mitigation requirements for each area, respectively. She is currently overseeing paleontological monitoring during the construction of the project.

French Valley Parkway/Interstate 15 Overcrossing and Interchange Improvements - Phase II
City of Temecula • Riverside County, CA

Principal Paleontologist. Ms. Richard was the primary author of a combined Paleontological Identification Report (PIR)/Paleontological Evaluation Report (PER) for the City of Temecula's proposed project to construct a two-12-foot lane northbound collector/distributor system along I-15 from the Winchester Road interchange to just north of the I-15/I-215 junction providing connectors to I-15 and I-25 within the cities of Temecula and Murrieta in Riverside County, CA. She oversaw the review of geologic maps, literature reviews, online database review, reviewed the initial PER and Paleontological Mitigation Plan from 2006 and a geotechnical report. The results of the review were used to complete a paleontological sensitivity and impact analysis using Caltrans' sensitivity criteria.

Kramer Junction Expressway Project
Caltrans, District 8 • Kramer, San Bernardino County, CA

Principal Paleontologist. Ms. Richards is overseeing paleontological monitoring during the widening of the roadway to accommodate 4 lanes of Expressway on State Route 58. The project involves the realignment of the roadway and will provide a grade separation for the railroad crossing. The purpose of the project is to accommodate increased volumes of oversized vehicles. The project will reduce traffic congestion, improve traffic safety, reduce accident rates, improve operational efficiency by separating slow-moving vehicles, improve the reliability of goods movement, reduce people/goods movement conflicts and extend the life of the pavement.

17350 Perris Blvd Moreno Valley
Alere Property Group, LLC • Moreno Valley, CA

Principal Investigator. Ms. Richards was the primary author of the Paleontological Monitoring Report and oversaw archeological and paleontological monitoring during construction excavations. The project involved the demolition and removal of existing buildings, grading, and preparation of the property for redevelopment, and construction and operation of one industrial warehouse building containing 1,109,378 square feet of building space with 256 loading bays.

Heacock Channel Improvement Project
March Air Reserve Base • Moreno Valley, CA

Senior Paleontologist. Ms. Richards co-authored a Paleontological Resources Assessment to determine the potential project-related effects on paleontological resources during construction activities for this project located on approximately 50 acres in the City of Moreno Valley. The March Air Reserve Base, March Joint Powers Authority (MJPA), and the City of Moreno Valley Park and Community Services Department are proposing to improve an existing undersized earthen based channel by construction a fully lined concrete flood control channel that will provide 100-year flood protection to residential, commercial, federal, public, and privately-owned properties.

Perris Valley Line Project
Riverside County Transportation Commission • Riverside County, CA

Senior Paleontologist. Ms. Richards performed oversight of paleontological monitoring for a 24-mile extension of the Metrolink 91 Line. She oversaw the construction of four new stations, upgrading of associated track and utility relocations to extend the Metrolink connection from Riverside through Moreno Valley to Perris. The Perris Valley Line will operate primarily on a track used as a freight rail line for more than 120 years.

Slover Avenue Distribution Center
Alere Property Group of Newport Beach • San Bernardino, CA

Principal Investigator. Ms. Richards was the primary author of the Paleontological Monitoring Report and oversaw paleontological and archaeological monitoring during construction excavations and the creation of an Archaeological Technical Report. The Slover Avenue Distribution Center consisted of the construction of one (1) high-cube distribution warehouse building that contains 671,324 square feet of total building area and included mass grading to install building pads and foundations.

West Valley Connector Bus Rapid Transit
San Bernardino County Transportation Authority • Los Angeles and San Bernardino Counties, CA

Principal Paleontologist. Ms. Richards prepared a combined Paleontological Identification and Evaluation Report (PIR/PER) that analyzed the potential impacts along the project with an objective to determine if paleontological resources are known or reasonably anticipated within the project site, to assess the potential for the proposed project to result in significant impacts/effects on paleontological resources, and recommend measures to reduce these impacts/effects to below the level of significance. The PIR/PER was prepared as part of the technical analysis required to support an Environmental Impact Report (EIR)/Environmental Assessment (EA). The San Bernardino County Transportation Authority, in cooperation with the cities of Pomona, Montclair, Ontario, Rancho Cucamonga, and Fontana, proposes the construction of the project, a 35-mile-long Bus Rapid Transit (BRT) project that will decrease travel times and improve the existing public transit system within the corridor.

ELISA BARRIOS

GIS Specialist

PROFILE

Ms. Barrios earned her bachelor's degree in Geology with emphasis on Environmental Geoscience and obtained a Geographic Information Systems Certificate from the California State Univerisy, Los Angeles in 2018. As Paleo Solutions GIS Specialist, Ms. Barrios creates maps in Esri Collector for archaeological and paleontological field work and reports, prepares and maintains file geodatabases in ArcGIS, creates and edits shapfiles in ArcGIS Desktop, and digitizes geology maps and archaeological data. In addition, Ms. Barrios gained valuable experience working as a CivicSpark Climate Fellow for the Southern California Association of Governments (SCAG). CivicSpark is a Governor's Initiative AmeriCorps program dedicated to building capacity for local public agencies to address community resilience issues through national service. Ms. Barrios participated in two initiatives and was responsible for GIS analysis, sustainability tracking, research, data management, community engagement, organizing working groups, focus groups, interviews, and outreach events for various projects. Finally, in 2019, Ms. Barrios presented and was a showcase finalist at SCAG's Annual Regional Conference and General Assembly. Her presentation demonstrated an Esri StoryMap detailing the regional impacts of a high intensity urban earthquake by analyzing historic data, using GIS tools, and researching various case studies.

EXPERIENCE & EDUCATION

Years of Experience
2 years

Education
B.S. Geology (Environmental Geoscience)
California State University, Los Angeles

Geographic Information Systems Certification
California State University, Los Angeles

PROJECT EXPERIENCE

Alere Brodiaea Logistics Center Project
Alere Property Group • Moreno Valley, Riverside County, CA

GIS Specialist. Ms. Barrios produced report maps that depict the project area and work areas. Paleo Solutions was retained to provide archaeological and paleontological monitoring services in potentially sensitive sediments for the Alere Brodiaea Logistics Center Project. The project proposed to develop a 261,807-square-foot warehouse with office spaces, auto parking, and landscaping on flatland.

West of Devers Transmission Line Upgrade Project
Southern California Edison • Riverside and San Bernardino Counties CA

GIS Specialist. Ms. Barrios is responsible for producing report maps depicting the project area and work locations. The West of Devers project is being constructed to upgrade the existing transmission lines between the Devers, El Casco, San Bernardino, and Vista Substations to increase the transfer capacity from 1,600 megawatts to 4,800 megawatts. The project will replace the existing 220-kV transmission lines and associated structures with higher-capacity 220-kV transmission lines and new 200kV structures, upgrade substation equipment, remove and relocated approximately 2-miles of existing 66kV subtransmission lines, remove and relocate approximately 4 miles of existing 12kV distribution lines, and install telecommunication lines and equipment for the protection, monitoring, and control of transmission lines and substation equipment.

Cross Bar Ranch
Bureau of Land Management (BLM) • City of Amarillo, TX

GIS Specialist. Ms. Barrios created paleontological field maps for the Cross Bar Ranch Paleontological Resource Inventory Project. The objective of the inventory is to establish baseline paleontological resource data in part to meet the BLM's responsibilities under the Paleontological Resources Preservation Act (PRPA), but also to obtain an inventory of the paleontological resources within the study area and an understanding of their scientific importance in order to make it possible to manage them effectively and in accordance with BLM policy and the PRPA. The results of the study will also be used to streamline NEPA associated with potential projects within the study area.

Southern California Edison On-Call Cultural Resources Services Contract
Southern California Edison • Fresno, Inyo, Kern, Los Angeles, Madera, Mono, Orange, Riverside, San Bernardino, Santa Barbara, Tulare, and Ventura Counties

GIS Specialist. Ms. Barrios produced report maps and developed the archaeological and GIS schema. SCE owns and operates a complex network of electrical transmission and distribution lines, substations, and maintenance facilities throughout their territory in southern and central California. SCE facilities are located on private, county, state-owned, and federally-managed lands. Maintenance of these facilities requires regular repairs and replacement of utility poles, towers, and other structures. Paleo Solutions, as a subcontractor to Cardno, is providing on-call cultural resources services for operations and maintenance activities located throughout SCE's territory. Services provided by Paleo Solutions have included desktop reviews, records searches, field surveys, construction monitoring, report preparation, and coordination with Native American groups for hundreds of tasks orders completed to date. Services for each task varies based on the project requirements.

230kV Substation Upgrades – Freezeout Drilling and Windstar Substation Survey
Summit Line Construction • Carbon County, WY

GIS Specialist. Ms. Barrios produced maps that depict the project area and work areas for the paleontological survey report. The Project will involve construction of additional bays, which will include the installation of 230-kilovolt (kV) and 34.5-kV low-profile transformers and associated switches and substation equipment, as well as rerouting an existing 34.5-kV distribution line and an existing 230-kV transmission line. Paleo Solutions provided pre-construction worker environmental awareness training focused on paleontological resources, a preconstruction field survey of the Latham and Windstar substation locations, and construction monitoring services during construction of the five Freezeout drilling locations.

Lockhee Martin Plant 10 Solar Facility
Tetra Tech, Inc. • Palmdale, Los Angeles County, CA

GIS Specialist. Ms. Barrios produced maps for field surveys and project vicinity maps and location maps that will be included in the technical report. The Project proposes to develop a solar facility on an approximately 160-acre parcel located in Palmdale, CA. Paleo Solutions provided paleontological and cultural resources technical studies that are requred in support of the Initial Study/Mitigated Negative Declaration and provide documentation that is in compliance with CEQA.

Link Union Station
Los Angeles Metropolitan Transportation Authority • Los Angeles, CA

GIS Specialist. Ms. Barrios is creating maps for field surveys and updating maps for the technical study report. The project proposes to transform Union Station from a "stub-ends track station" into a "run-through tracks station" with a new passenger concourse that would improve the efficiency of the station and accommodate future growth and transportation demands in the region. Paleo Solutions was retained to conduct a literature review and background research for the project area, GIS work for geological mapping and modeling, and begin existing settings within draft technical report. A museum records search at the Natural History Museum of Los Angeles County and an online review of collections records maintained by the University California Museum of Paleontology for potential paleontological resources localities within and in the vicinity of the project boundaries will be conducted.

Ten West Link Transmission Line Project
Bureau of Land Management • Maricopa County, AZ to Riverside County, CA

GIS Specialist. Ms. Barrios produced report maps that depict the location vicinity and updating geology data. The project proposes to construct, operate, maintain, and decommission a series-compensated, 500 kilovolt alternating current overhead transmission line with a 200-foot right-of-way, which spans approximately 114 miles from the Arizona Public Services Company (APS) Delaney Substation near the community of Tonopah, Maricopa County, Arizona to the Southern California Edison (SCE) Colorado River Substation near the City of Blythe, Riverside County, California. The purpose of the project is to transmit 3,200 megawatts between two substations and to provide connection capability for new energy projects in the region.

Division 20 Portal Widening/Turnback Facility
Los Angeles Metropolitan Transportation Authority • Los Angeles, Los Angeles County, CA

GIS Specialist. Ms. Barrios produced project vicinity and work area maps will be included in the technical report. Paleo Solutions was retained to complete an updated Paleontological and a Cultural Resources assessment, respectively, to include portions of a project area that were added after the initial assessment reports. Records searches, a pedestrian field survey, and AB 52 Native American consultation were conducted to contribute to the updated assessment reports. In addition, Paleo Solutions contributed paleontological and archaeological sections that were incorporated into the project's Environmental Impact Report. The project consists of the widening of the existing portal for the Division 20 Rail Yard north of the Arts District in downtown Los Angeles that will accommodate the increased service levels on the Metro Red and Purple Lines, develop a new turnback facility, increase train storage capacity, and reconfigure existing internal tracks and access roads, in turn improving service times at Union Station and throughout the Metro Red/Purple Line system.

Enchanted Hills Park Skate Spot Project
The City of Perris, Planning Department • Perris, CA

GIS Specialist. Ms. Barrios produced maps that depict the project area and work areas that were included in the paleontological technical study report. Paleo Solutions was contracted by Helix Environmental Planning, Inc. (Helix) to conduct an analysis of existing paleontological data, conduct a pedestrian paleontological survey of the Project site, and to provide recommendations for mitigation based on the geological and paleontological data. This work was required by the City of Perris (the City) to meet their requirements as the lead agency under CEQA. The Project consists of construction of a skate park within the existing Enchanted Hills Park located in the City of Perris.

Appendix B. Record Search Results

WESTERN SCIENCE CENTER

Paleo Solutions
Barbara Webster
911 S. Primrose Avenue, Unit N
Monrovia, CA 91016

February 27, 2020

Dear Mr. Stewart,

This letter presents the results of a record search conducted for the Riverside Downtown Station Improvements Project in the city of Riverside, Riverside County, California. The project site is located south of University Avenue, north of 14th Street, east of Commerce Street, and west of Park Avenue in Sections 23 and 26 of Township 2 South, Range 5 West, on Riverside East USGS 7.5 minute quadrangle.

The geologic units underlying the project area are mapped primarily as old alluvial fan deposits dating from the mid to late Pleistocene epoch with a segment of young axial channel dating to the late Pleistocene or Holocene running east-west through the center of the project area (Morton & Matti, 1996-1997). The Western Science Center does not have fossil localities within the project area or within the 1 mile radius of the project area, but we would consider this sediment to be paleontologically sensitive.

Given the geologic mapping of the project area there is an increased likelihood that paleontological resources could be found during project development, especially in any previously undisturbed sediments. Any fossil specimens recovered from Riverside Downtown Station Improvements Project would be scientifically significant. Excavation activity associated with the development of the project area would impact the paleontologically sensitive Pleistocene alluvial 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.

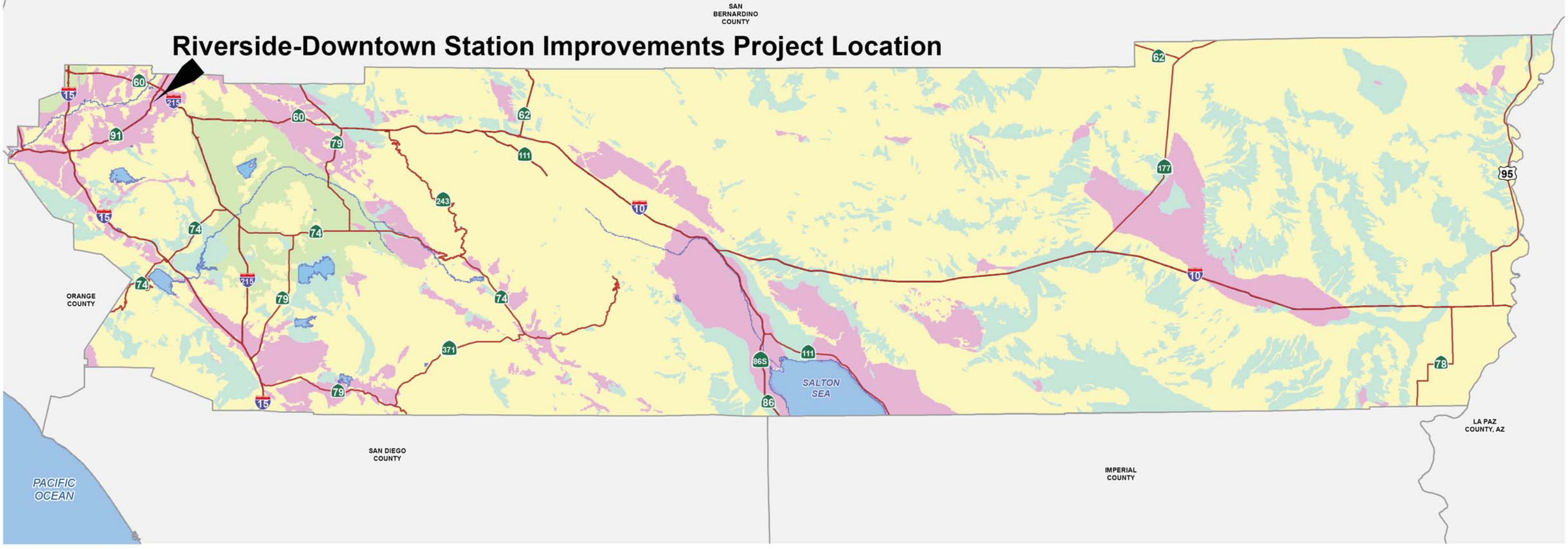
If you have any questions please feel free to contact me at dradford@westerncentermuseum.org

Sincerely,

Darla Radford
Collections Manager

Appendix C. Riverside County General Plan (2015) Figure OS-8 with Approximate Riverside-Downtown Station Improvements Project Location Identified

Riverside-Downtown Station Improvements Project Location



Data Source: LSA Associates (1999)

- High A (Ha)
- High B (Hb)
- Low
- Undetermined
- Highways
- Waterbodies

Figure OS-8

December 16, 2013

Miles

0 10 20

RIVERSIDE COUNTY PLANNING DEPARTMENT

PALEONTOLOGICAL SENSITIVITY