Los Angeles County
Metropolitan Transportation Authority

West Santa Ana Branch Transit Corridor

Final Paleontological Resource Impacts Analysis Report

Metro®

WEST SANTA ANA BRANCH TRANSIT CORRIDOR PROJECT

Final Paleontological Resource Impacts Analysis Report

Prepared for:

Metro

Los Angeles County
Metropolitan Transportation Authority

Prepared by:

WSP USA, Inc.
515 South Figueroa Street
Suite 1400
Los Angeles, California 90071

rincon

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AUTHOR(S)

Jessica DeBusk, Rincon Consultants, Inc.

Heather L. Clifford, Rincon Consultants, Inc.

Jorge Mendieta, Rincon Consultants, Inc.

Rachel Perzel, Rincon Consultants, Inc.

Shannon Carmack, Rincon Consultants, Inc.

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AA	Alternatives Analysis
APE	Area of Potential Effects
bgs	below ground surface
BRT	bus rapid transit
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CGS	California Geological Society
CHSRA	California High-Speed Rail Authority
EIR	environmental impact report
EIS	environmental impact statement
FTA	Federal Transit Administration
GCCOG	Gateway Cities Council of Governments
I	interstate
LAUS	Los Angeles Union Station
LPA	locally preferred alternative
LRT	light rail transit
LRTP	Long Range Transportation Plan
Metro	Los Angeles County Metropolitan Transportation Authority
MRDC	Metro Rail Design Criteria
MSF	maintenance and storage facility
NEPA	National Environmental Policy Act
NHMLAC	Natural History Museum of Los Angeles County
NPS	National Park Service
OCTA	Orange County Transportation Authority
OLDA	Orangeline Development Authority
PEROW/WSAB	Pacific Electric Right-of-Way/West Santa Ana Branch
ROD	record of decision
ROW	right-of-way
SCAG	Southern California Association of Governments
SVP	Society of Vertebrate Paleontology

Acronym	Definition
TPSS	traction power substation
TRS	technical refinement study
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
WSAB	West Santa Ana Branch

1 INTRODUCTION

1.1 Study Background

The West Santa Ana Branch (WSAB) Transit Corridor (Project) is a proposed light rail transit (LRT) line. In January 2022, the Los Angeles County Metropolitan Transportation Authority (Metro) Board of Directors identified the Locally Preferred Alternative (LPA), which will extend approximately 14.5 miles from the northern terminus in the City of Los Angeles/Florence-Firestone community of Los Angeles (LA) County to the southern terminus in the City of Artesia, traversing densely populated, low-income, and heavily transit-dependent communities. The Project will provide reliable, fixed-guideway transit service that will increase mobility and connectivity for historically underserved, transit-dependent, and environmental justice communities; reduce travel times on local and regional transportation networks; and accommodate substantial future employment and population growth.

1.2 Alternatives Evaluation, Screening, and Selection Process

A wide range of potential alternatives have been considered and screened through the alternatives analysis processes. In March 2010, the Southern California Association of Governments (SCAG) initiated the Pacific Electric Right-of-Way (PEROW)/WSAB Alternatives Analysis (AA) Study (SCAG 2013) in coordination with the relevant cities, the Orangeline Development Authority (renamed to Eco-Rapid Transit, which has since been dissolved), the Gateway Cities Council of Governments, Metro, the Orange County Transportation Authority, and the owners of the right-of-way (ROW)—Union Pacific Railroad (UPRR), BNSF Railway, and the Ports of Los Angeles and Long Beach. The AA Study evaluated a wide variety of transit connections and modes for a broader 34-mile corridor from Union Station in downtown Los Angeles to the City of Santa Ana in Orange County. In February 2013, SCAG completed the PEROW/WSAB Corridor Alternatives Analysis Report[1] and recommended two LRT alternatives for further study: West Bank 3 and the East Bank.

Following completion of the AA, Metro completed the *West Santa Ana Branch Transit Corridor Project Technical Refinement Study* (Metro 2015) in 2015 focusing on the design and feasibility of five key issue areas along the 19-mile portion of the WSAB Transit Corridor within LA County:

- Access to Union Station in downtown Los Angeles
- Northern Section options
- Huntington Park Alignment and Stations
- New C (Green) Line Station
- Southern Terminus at Pioneer Station in Artesia

In September 2016, Metro initiated the WSAB Transit Corridor Environmental Study (Environmental Study) with the goal of environmentally clearing the Project under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

[1] Initial concepts evaluated in the SCAG report included transit connections and modes for the 34-mile corridor from Union Station in downtown Los Angeles to the City of Santa Ana. Modes included low-speed magnetic levitation (maglev) heavy rail, light rail, and bus rapid transit.

Metro issued a Notice of Preparation (NOP) on May 25, 2017, with a revised NOP issued on June 14, 2017, extending the comment period to 60 days. In June 2017, Metro held public scoping meetings in the Cities of Bellflower, Los Angeles, South Gate, and Huntington Park. Metro provided project updates and information to stakeholders with the intent to receive comments and questions through a comment period that ended in August 2017. A total of 1,122 comments were received during the public scoping period from May through August 2017. The comments focused on concerns regarding the Northern Alignment options, with specific concerns related to potential impacts to Alameda Street with an aerial alignment. Given potential visual and construction issues raised through public scoping, additional Northern Alignment concepts were evaluated.

In February 2018, the Metro Board of Directors approved further study of the alignment in the Northern Section due to community input during the 2017 scoping meetings. A second alternatives screening process was initiated to evaluate the original four Northern Alignment options and four new Northern Alignment concepts. The *Final Northern Alignment Alternatives and Concepts Updated Screening Report* was completed in May 2018 (Metro 2018). The alternatives were further refined and, based on the findings of the second screening analysis and the input gathered from the public outreach meetings, the Metro Board of Directors approved Alternatives E and G for further evaluation.

On July 11, 2018, Metro issued a revised and recirculated CEQA NOP, thereby initiating a scoping comment period. The purpose of the revised NOP was to inform the public of the Metro Board's decision to carry forward Alternatives E and G into the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). During the scoping period, one agency and three public scoping meetings were held in the Cities of Los Angeles, Cudahy, and Bellflower. The meetings provided project updates and information to stakeholders with the intent to receive comments and questions to support the environmental process. The comment period for scoping ended on August 24, 2018; more than 250 comments were received.

Following the July 2018 scoping period, a number of project refinements were made to address comments received, including additional grade separations, removing certain stations with low ridership, and removing the Bloomfield extension option. The Metro Board adopted these project refinements at its November 2018 meeting.

1.3 Draft Environmental Impact Statement/Environmental Impact Report

The Draft EIS/EIR and corresponding technical studies included evaluation of a No Build Alternative, four Build Alternatives, two station design options, and two site options for a maintenance and storage facility (MSF):

- Alternative 1: Los Angeles Union Station to Pioneer Station
  - Design Option 1: Los Angeles Union Station – Metropolitan Water District
  - Design Option 2: Addition of Little Tokyo Station
- Alternative 2: 7th St/Metro Center to Pioneer Station
- Alternative 3: Slauson/A Line (Blue) to Pioneer Station
- Alternative 4: I-105/C Line (Green) to Pioneer Station

- Paramount MSF site option
- Bellflower MSF site option

Figure 1-1 illustrates the Build Alternatives evaluated in the Draft EIS/EIR.

Figure 1-1. Draft EIS/EIR Build Alternatives

Source: Metro 2020

The Draft EIS/EIR was released for public review and comment in July 2021 for 45 days, which was then extended to a 60-day public review period through September 28, 2021, to provide additional time for the public to respond. Notices of the Draft EIS/EIR release were done in accordance with CEQA and NEPA regulations and included two rounds of notices to announce details of the release of the Draft EIS/EIR, as well as to provide information on the public hearings and comment methods. The Notice of Availability was distributed to 261 agencies via USB drives, which included an electronic copy of the Draft EIS/EIR.

During the 60-day public review period, Metro hosted four virtual public hearings, four virtual community information sessions, and over 19 pop-up booths for in-person engagement at locations throughout the project corridor. In addition, Metro held approximately 20 briefings to key stakeholders, elected officials, corridor cities, and other agencies. In total, approximately 450 submissions were received during the public review and comment period. In January 2022, the Metro Board of Directors identified Alternative 3 as the LPA. The LPA extends from a northern terminus at the Slauson/A Line Station located in the City of Los Angeles/Florence-Firestone unincorporated area of LA County to a southern terminus at the Pioneer Station located in Artesia for a total of 14.5 miles. With identification of the LPA, the Metro Board also identified the MSF site option located in the City of Bellflower as a component of the LPA.

1.4 Report Purpose and Structure

This section examines the affected environment, impacts, and mitigation related to paleontological resources. The report is organized into the following sections:

- Section 2 – Project Description
- Section 3 – Regulatory Framework
- Section 4 – Affected Environment/Existing Conditions
- Section 5 – Environmental Impact/Environmental Consequences
- Section 6 – California Environmental Quality Act
- Section 7 – Construction Impacts
- Section 8 – Project Measures and Mitigation Measures
- Section 9 – References

1.5 General Background

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 physical remains, tracks, or traces of once living organisms preserved in rocks or sediment. Fossils are commonly found in sedimentary rocks. Although rare, fossils can also be preserved in volcanic rocks and low-grade metamorphic rocks under certain conditions (Society of Vertebrate Paleontology [SVP], 2010).

Paleontologists normally distinguish invertebrate from vertebrate fossil localities (as opposed to the archaeological term “site”) as each typically requires a different research approach. Invertebrate localities, especially when they comprise microscopic species like diatoms, foraminifera, and radiolarians, but also when they include larger shelly marine fauna (e.g., clams), can require extensive bulk sediment sampling and processing. Also, invertebrate fossils normally occur in marine lithologies, can be widespread and abundant, and are often well-preserved. They tend to contain fewer separate hard parts subject to loss or destruction

after death. In contrast, vertebrate fossils can be marine or nonmarine in origin, comprise large and/or small taxa (e.g., whales to rodents) that are locally distributed, numerically scarce (i.e., few individuals), and be poorly-preserved. They tend to contain hundreds of separate hard parts (skeletal elements) that are easily lost or destroyed after death.

1.6 Methodology

The Affected Area for the purposes of evaluating potential impacts to paleontological resources includes the ground surface and subsurface within the alignment and stations, MSF, traction power substation (TPSS) sites, and parking facilities where ground disturbance associated with the LPA will occur. This Affected Area corresponds to the area where potential effects/impacts may occur as a result of the LPA.

To assess whether the LPA has the potential to disturb significant fossil resources at the subsurface, geologic maps of the Affected Area for paleontological resources were examined and existing literature pertaining to the geology, paleontology, and stratigraphy of the area was reviewed. Geologic units are considered to be "sensitive" for paleontological resources if they are known to contain significant fossils anywhere in their extent. Therefore, a search of pertinent local and regional museum repositories for paleontological localities within and nearby the Affected Area for paleontological resources was necessary to determine whether fossil localities have been previously discovered within a particular rock unit. A formal paleontological collections records search was conducted at the Natural History Museum of Los Angeles County (NHMLAC) on May 1, 2017. Due to design refinements, a supplemental record search of roughly the northern 3.8 miles of the Project was conducted on August 29, 2018. (Refer to Appendix A for the Paleontology Records Search Results; please note that searches were conducted prior to the identification of the Project's LPA and therefore include a geographic area larger than that which is ultimately applicable to the LPA.)

The SVP broadly defines significant paleontological resources as follows:

> *Fossils and fossiliferous deposits consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years) (SVP 2010, 11).*

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, rare, diagnostically important, or are common but have the potential to provide valuable scientific information for evaluating evolutionary patterns and geologic processes. New or unique specimens can provide new insights into evolutionary history; however, additional specimens of even well represented lineages can be equally important for studying evolutionary pattern and process, evolutionary rates and paleophylogeography. Even unidentifiable material can provide useful data for dating geologic units if radiocarbon dating is possible. As such, common fossils (especially vertebrates) may be scientifically important, and therefore considered highly significant.

Absent specific agency guidelines, most professional paleontologists in California adhere to guidelines set forth by SVP (2010)) in "Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources". These guidelines establish detailed protocols for the assessment of the paleontological resource potential (i.e., "sensitivity") of a project area and outline measures to follow in order to mitigate adverse

impacts to known or unknown fossil resources during project development. Using baseline information gathered during a paleontological resource assessment, the paleontological resource potential of the geologic unit(s) (or members thereof) underlying a project area can be assigned to a high, undetermined, low, or no paleontological sensitivity category, as defined by SVP (2010). This criterion is based on rock units within which vertebrate or significant invertebrate fossils have been determined by previous studies to be present or likely to be present. While these standards were specifically written to protect vertebrate paleontological resources, all fields of paleontology have adopted these guidelines.

The paleontological sensitivity of the Affected Area for paleontological resources was evaluated according to the following SVP (SVP 2010) categories:

I. **High Potential (sensitivity)** –*Rock units from which significant vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered are considered to have a high potential for containing significant non-renewable fossiliferous resources. These units include but are not limited to, sedimentary formations and some volcanic formations which contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas which contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas which may contain new vertebrate deposits, traces, or trackways are also classified as significant.*

II. **Low Potential (sensitivity)** – *Sedimentary rock units that are potentially fossiliferous but have not yielded fossils in the past or contain common and/or widespread invertebrate fossils of well documented and understood taphonomic, phylogenetic species and habitat ecology. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils prior to the start of construction. Generally, these units will be poorly represented by specimens in institutional collections and will not require protection or salvage operations. However, as excavation for construction gets underway it is possible that significant and unanticipated paleontological resources might be encountered and require a change of classification from Low to High Potential and, thus, require monitoring and mitigation if the resources are found to be significant.*

III. **Undetermined Potential (sensitivity)** –*Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.*

IV. **No Potential** – *Rock units of metamorphic or igneous origin are commonly classified as having no potential for containing significant paleontological resources*

Existing federal regulations (i.e., Paleontological Resources Protection Act [PRPA]) provide protections for paleontological resources on federal lands, but do not establish standards by which the potential for adverse effects should be evaluated. The Bureau of Land Management (BLM) has developed guidelines for assessing paleontological sensitivity, and these

guidelines are generally consistent with the standards and guidelines established by the SVP (SVP 2010). To satisfy NEPA requirements, the potential for adverse effects to paleontological resources are analyzed in accordance with SVP guidelines for assessing paleontological sensitivity of geologic units, and the following threshold for evaluating effects under NEPA: Destruction, damage or loss of scientifically important paleontological resources and associated stratigraphic and paleontological data as a result of ground disturbance from project activity could be considered a direct adverse effect under NEPA.

To satisfy CEQA requirements, paleontological resource impacts are analyzed in accordance with Appendix G of the *CEQA Guidelines,* which states that impacts are considered significant if the LPA will directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Impacts will be significant if construction activities result in the destruction, damage, or loss of scientifically important paleontological resources and associated stratigraphic and paleontological data. The activities may include grading, excavation, or other activities that disturb substantial quantities of the subsurface geologic units with a high paleontological sensitivity.

2 PROJECT DESCRIPTION

This section describes the No Build Alternative and the LPA studied in the WSAB Transit Corridor Final EIS/EIR, including station locations, and the MSF. The LPA was developed through a comprehensive alternatives analysis process and meets the purpose and need of the Project.

The No Build Alternative and LPA are generally defined as follows:

- **No Build Alternative:** Reflects the transportation network in the 2042 horizon year without the LPA. The No Build Alternative includes the existing transportation network along with planned transportation improvements that have been committed to and identified in the constrained *Metro 2009 Long Range Transportation Plan* (2009 LRTP) (Metro 2009) and SCAG's *2016-2040* RTP/SCS (SCAG 2016), as well as additional projects funded by Measure M that would be completed by 2042.
- **LPA:** The LPA consists of a 14.5-mile LRT line that will extend from the northern terminus in the City of Los Angeles/Florence-Firestone community of LA County to a southern terminus in the City of Artesia.

Figure 2-1 illustrates the LPA. The northern terminus of the LPA will be located just south of the intersection of Long Beach Avenue and Slauson Avenue, connecting to the current Slauson/A Line Station. South of Slauson Avenue, the LPA will follow the UPRR-owned La Habra Branch[2] ROW east along Randolph Street. At the Ports-owned San Pedro Subdivision ROW, the LPA will turn southeast to follow the San Pedro Subdivision ROW and then transition to the PEROW south of the I-105 freeway. The LPA will then follow the Metro-owned PEROW to the southern terminus at the Pioneer Station in Artesia. Figure 2-2 depicts the alignment sections that will require freight track relocation. The LPA will be grade separated where warranted, as indicated on Figure 2-1.

[2] The La Habra Branch may also be referred to as the La Habra Subdivision. La Habra Branch is used within this document.

Figure 2-1. Locally Preferred Alternative Alignment by Grade

Source: WSP and TAHA 2023

Figure 2-2. Existing Rail Right-of-Way Ownership

Source: WSP and TAHA 2023

2.1 No Build Alternative

For the NEPA evaluation, the No Build Alternative is evaluated in the context of the existing transportation facilities in the project corridor (the corridor extends approximately 2 miles from each side of the four alternatives evaluated in the Draft EIS/EIR) and other capital transportation improvements and/or transit and highway operational enhancements that are reasonably foreseeable. Because the No Build Alternative provides the background transportation network against which the LPA's impacts are identified and evaluated, the No Build Alternative does not include the Project.

The No Build Alternative reflects the transportation network in 2042 and includes the existing transportation network along with planned transportation improvements that have been committed to and identified in the constrained Metro 2009 LRTP and the SCAG 2016 RTP/SCS, as well as additional projects funded by Measure M, a sales tax initiative approved by voters in November 2016. The No Build Alternative includes Measure M projects that are scheduled to be completed by 2042.

The required environmental baseline socioeconomic growth projections, including the reasonably foreseeable transportation network in 2042, were established in July 2017 when the preparation of the Draft EIS/EIR began. The SCAG 2016-2040 RTP/SCS was the adopted current regional growth forecast at the time the Draft EIS/EIR baseline was established. Specifically, the baseline year 2017 and future year 2042 population, housing, and employment are derived from the Transportation Analysis Zone-level estimates from the SCAG 2016-2040 RTP/SCS.

Table 2.1 lists the existing transportation network and planned improvements included as part of the No Build Alternative based on the Metro 2009 LRTP and SCAG 2016 RTP/SCS.

Table 2.1. No Build Alternative – Existing Transportation Network and Planned Improvements

Project	To / From	Location Relative to Study Area
Rail (Existing)		
Metro Rail System (LRT and Heavy Rail Transit)	Various locations	Within Study Area
Metrolink (Southern California Regional Rail Authority) System	Various locations	Within Study Area
Rail (Under Construction/Planned)[1]		
Metro Westside D Line Extension	Wilshire/Western to Westwood/VA Hospital	Outside Study Area
Metro C Line Extension[2] to Torrance	96th Street Station to Torrance	Outside Study Area
Metro C Line Extension	Norwalk to Expo/Crenshaw	Outside Study Area
Metro East-West Line/Regional Connector/Eastside Phase 2	Santa Monica to Lambert Road Santa Monica to Peck Road	Within Study Area
Metro North-South Line/Regional Connector/Foothill Extension to Claremont Phase 2B	Long Beach to Claremont	Within Study Area
Metro Sepulveda Transit Corridor	Metro G Line to Metro E Line	Outside Study Area

Project	To / From	Location Relative to Study Area
Metro East San Fernando Valley Transit Corridor	Sylmar to Metro G Line	Outside Study Area
Los Angeles World Airport Automated People Mover	96th Street Station to LAX Terminals	Outside Study Area
Metrolink Capital Improvement Projects	Various projects	Within Study Area
California High-Speed Rail	Burbank to LA LA to Anaheim	Within Study Area
Link US[3]	LAUS	Within Study Area
Bus (Existing)		
Metro Bus System (including BRT, Express, and local)	Various locations	Within Study Area
Municipality Bus System[4]	Various locations	Within Study Area
Bus (Under Construction/Planned)		
Metro G Line (BRT)	Del Mar (Pasadena) to Chatsworth Del Mar (Pasadena) to Canoga Canoga to Chatsworth	Outside Study Area
Vermont Transit Corridor (BRT)	120th Street to Sunset Boulevard	Outside Study Area
North San Fernando Valley BRT	Chatsworth to North Hollywood	Outside Study Area
North Hollywood to Pasadena	North Hollywood to Pasadena	Outside Study Area
Highway (Existing)		
Highway System	Various locations	Within Study Area
Highway (Under Construction/Planned)		
High Desert Multi-Purpose Corridor	SR-14 to SR-18	Outside Study Area
I-5 North Capacity Enhancements	SR-14 to Lake Hughes Road	Outside Study Area
SR-71 Gap Closure	I-10 to Rio Rancho Road	Outside Study Area
Sepulveda Pass Express Lane	I-10 to US-101	Outside Study Area
SR-57/SR-60 Interchange Improvements	SR-57/SR-60	Outside Study Area
I-710 South Corridor Project (Phases 1 and 2)	Ports of Long Beach and LA to SR-60	Within Study Area
I-105 Express Lane	I-405 to I-605	Within Study Area
I-5 Corridor Improvements	I-605 to I-710	Outside Study Area

Source: Metro 2018, WSP 2019
Notes: [1] Where extensions are proposed for existing Metro rail lines, the origin/destination is defined for the operating scheme of the entire rail line following completion of the proposed extensions and not just the extension itself.
[2] The Metro C Line extension to Torrance includes new construction from Redondo Beach to Torrance; however, the line will operate from Torrance to 96th Street.
[3] Link US rail walk times included only.
[4] The municipality bus network system is based on service patterns for Bellflower Bus, Cerritos on Wheels, Cudahy Area Rapid Transit, Get Around Town Express, Huntington Park Express, La Campana, Long Beach Transit, Los Angeles Department of Transportation, Norwalk Transit System, and the Orange County Transportation Authority.
BRT = bus rapid transit; LA = Los Angeles; LAUS = Los Angeles Union Station; LAX = Los Angeles International Airport; LRT = light rail transit; SR = State Route; VA = Veterans Affairs

2.2 Locally Preferred Alternative

2.2.1 Refinements to the Locally Preferred Alternative

The LPA evaluated in this report is Alternative 3 from the Draft EIS/EIR with refinements to address stakeholder coordination and comments on the Draft EIS/EIR. Refinements to the LPA include the following:

- Shift the Slauson/A Line aerial station platform south and add a second set of vertical circulation and pedestrian circulation elements between the Slauson/A Line Station and the existing A Line Station. Additionally, a set of stairs was added between the A Line station and street level.
- Swap the location of the freight and LRT tracks within the La Habra Branch ROW compared to the Draft EIS/EIR design. Freight tracks will be located on the north side of the ROW and LRT tracks on the south side to accommodate potential freight connectivity to an existing industrial track on the north side of the ROW.
- Open or close at-grade crossings and implement left-turn restrictions over the LRT tracks in the City of Huntington Park:
  - Open crossings previously proposed for closure at Albany Street and Rugby Boulevard
  - Close crossings previously proposed to remain open at Malabar Street and Arbutus Avenue
  - Implement left-turn restrictions at Santa Fe Avenue, Pacific Boulevard, Miles Avenue, and State Street
- Modify roadway design at the southeast corner of Florence Avenue and California Avenue to avoid partial acquisition of infrastructure related to a water well.
- Redesign a freight spur track connection north of Rayo Avenue on the west side of the freight tracks to avoid impacts to a spur track.
- Close the private at-grade crossing at Miller Way. The private business will be displaced by the Project.
- Extend the LRT viaduct north of Imperial Highway to avoid impacts to a spur track and full acquisition of a property.
- Reconfigure the I-105/C Line Station parking facility by removing dedicated transit parking on the west side of the freight tracks and expanding the parking facility on the east side of the freight tracks to the north; also add a new driveway entrance to the parking facility at Century Boulevard.
- Eliminate demolition and reconstruction of the Arthur Avenue and Façade Avenue bridges; modify Façade Avenue to an emergency exit only from the I-105/C Line infill station (rather than a station entrance and exit).
- Modify the replacement freight bridge at I-105 to a four-span structure, consistent with the current bridge, rather than the previously proposed two-span structure.
- Replace the proposed pedestrian undercrossing with a pedestrian bridge at Paramount High School that will span the entire rail ROW.
- Realign the MSF site entrance on Somerset Boulevard to align with Bayou Avenue to allow for a signalized pedestrian crossing of Somerset Boulevard.
- Add protected left turn and a traffic signal on Clark Avenue at Los Angeles Street to accommodate dedicated turning movements to the community.

- Modify alignment of the LRT tracks and soundwall at the Bellflower Mobile Home Park to minimize parking loss and provide replacement parking elsewhere on the property to maintain the existing number of parking spaces.
- Redesign retaining walls on the southeast side of the 183rd Street/Gridley Road crossing from retained fill to columns.
- Incorporate the Artesia Historic District Recreation Trails as an existing, rather than future, condition in the Final EIS/EIR plan set.
- Add a design option that will close 186th Street but keep 187th Street open to traffic in the City of Artesia, and turn Corby Avenue into a cul-de-sac with an access driveway for the existing business.
- Modify the entrance to the Pioneer Station parking structure to align with Solana Place and shift structure north to provide alley egress resulting in an additional level on the Pioneer parking structure to maintain the number of parking spaces identified in the Draft EIS/EIR.
- Extend the median located north of the LRT tracks at the Pioneer Boulevard grade crossing to prohibit left turns from a shopping center driveway along the east side.
- Incorporate Mitigation Measures NOI-4 (Crossing Signal Bell Shrouds) and NOI-5 (Gate-Down-Bell-Stop Variance), recommended in the Draft EIS/EIR to further reduce noise at grade crossings, as Project Measure NOI PM-1 and NOI PM-2 in the Final EIS/EIR to be implemented as part of the LPA.
- Add Project Measure VA PM-8 (Residential Screening for Aerial Structures), which requires privacy screening along portions of the aerial structure adjacent to the rear of residential properties in the Cities of Paramount, Bellflower, and Cerritos if the soundwall in those locations will not be sufficiently tall to provide similar privacy screening.
- Add Project Measures BIO PM-1 (Invasive Plant Species Best Management Practices) and BIO PM-2 (Prohibition of Invasive Plant Species in Landscape Plans) to provide options to minimize the spread of invasive species during construction and prohibit the inclusion of invasive species in landscape plans; add Project Measure BIO PM-3 (LA Metro Tree Policy) to require adherence to LA Metro Tree Policy, adopted by Metro in October 2022.
- Add Project Measure CR PM-1 (Secretary of the Interior Standards Design Review), which requires review and approval of the design of the new LRT bridge and C Line station that will be constructed within the Century Freeway-Transitway Historic District and extension of the Union Pacific LA River Rail Bridge's existing concrete piers by a professional who meets the Secretary of the Interior's Professional Qualification Standards in architectural history, history, or architecture.

Refinements also included the following modifications to construction laydown/staging areas:

- Relocate the construction laydown area near State Street and Randolph Street to east of State Street in the railroad ROW.
- Relocate the laydown area at the southeast corner of Imperial Highway and Garfield Place to north of Imperial Highway within the San Pedro Subdivision ROW.
- Locate a construction laydown/staging area on the east side of the ROW between Rayo Avenue and Southern Avenue.

Additionally, refinements included changes to traction power substations (TPSS) site locations:

- Relocate TPSS Site 14 from the northwest corner of Randolph Street and State Street to the east within railroad ROW.
- Eliminate optional TPSS Sites 16E and 12E in the City of Huntington Park.
- Add Optional TPSS Site 7E within the reconfigured parking facility east of the tracks at the I-105/C Line Station parking facility.
- Relocate the proposed TPSS Site 2 from the northwest side of the intersection of 183rd Street/Gridley Road to the southeast side.

2.2.2 Alignment Configuration

This section summarizes the LPA alignment. The general characteristics of the LPA are summarized in Table 2.2. Figure 2-3 illustrates the freeway crossings along the alignment. Additionally, the LPA will require relocation of existing freight rail tracks within the ROW to maintain existing operations where freight tracks will be in a shared corridor with the LRT tracks. Figure 2-2 depicts the alignment sections that will require freight track relocation.

Table 2.2. Summary of LPA Components

Component	Quantity
Alignment length	14.5 miles
Length of at-grade and aerial	12.1 miles at-grade; 2.4 miles aerial[1]
Station configurations	9 along WSAB alignment, 1 at-grade infill station along C Line 3 aerial; 6 at-grade
Parking facilities	5 total: 4 surface lots and 1 parking structure (approximately 2,800 spaces)
At-grade crossings	30
Elevated street crossings	15
Freight crossings	6
Freeway crossings	4 (1 aerial/overcrossing at I-105; 3 freeway undercrossings[2] at I-710, I-605, SR 91)
Freight realignment	8.7 miles
River crossings	3 (Rio Hondo, LA River and San Gabriel)
TPSS facilities	17
Maintenance and Storage Facility site	1 (City of Bellflower)

Source: WSP 2023
Notes: [1] Alignment configuration measurements count retained fill embankments as at-grade.
[2] The light rail tracks crossing beneath freeway structures.
LA = Los Angeles; TPSS = traction power substation; WSAB = West Santa Ana Branch

Figure 2-3. Freeway Crossings

Source: WSP 2023

The total alignment length of the LPA will be approximately 14.5 miles, consisting of approximately 12.1 miles of at-grade and 2.4 miles of aerial alignment. The LPA will include nine new LRT stations along the WSAB alignment, of which six will be at-grade and three will be aerial. Additionally, the Project will add one new infill station along the C Line at I-105 to allow transfers between the WSAB alignment and the C Line. Five of the stations will include parking facilities, providing a total of approximately 2,800 dedicated transit parking spaces. Four of the parking facilities will be surface lots and the fifth will be a parking structure. The alignment will include 30 at-grade crossings, 4 freeway crossings (3 freeway undercrossings and 1 aerial freeway crossing), 3 river crossings, 15 aerial road crossings, and 6 freight crossings. The following further describes the LPA along the alignment.

Northern terminus (City of Los Angeles/Florence-Firestone community of LA County): The northern terminus of the LPA will begin at the Slauson/A Line Station, which will serve as a transfer point to the Metro A Line. Transfers between the Slauson/A Line Station and the existing Metro A Line will be accommodated via two pedestrian bridges between the two station platforms. The pedestrian bridges will be located at the southern and northern ends of the platforms and will be accessed by stairs, escalators, and/or elevators. Stairs, escalators, and/or elevators will also connect with the street level on the north side of the station, while stairs will connect with the street level on the south side of the station. An additional set of stairs will be added to the existing A Line Station providing access to street level. Tail tracks[3] accommodating layover storage for a three-car train will extend approximately 1,000 feet north from the station.

La Habra Branch ROW[4] (City of Huntington Park): South of the Slauson/A Line Station, the alignment will turn east along the existing UPRR owned La Habra Branch ROW in the median of Randolph Street. The alignment will be on the south side of the La Habra Branch ROW, and the freight tracks will be realigned but remain in the northern portion of the ROW. The alignment will transition to an at-grade configuration west of Alameda Street and will proceed east along the Randolph Street median. Wilmington Avenue, Regent Street, and Malabar Street will be closed to traffic crossing the ROW, altering the intersection design to a right-in, right-out configuration. The Pacific/Randolph Station will be located just east of Pacific Boulevard. From the Pacific/Randolph Station, the alignment will continue east at-grade. Arbutus Avenue and Rita Avenue will be closed to traffic crossing the ROW, altering the intersection design to a right-in, right-out configuration.

San Pedro Subdivision ROW (Cities of Huntington Park, Bell, Cudahy, South Gate, Downey, and Paramount): At the San Pedro Subdivision ROW, the alignment will transition to an aerial configuration and turn south to cross over Randolph Street and the freight tracks, returning to an at-grade configuration north of Gage Avenue. The alignment will be located on the east side of the existing San Pedro Subdivision ROW freight tracks, and the existing track(s) will be relocated to the west side of the ROW. The alignment will continue at-grade within the San Pedro Subdivision ROW to the at-grade Florence/Salt Lake Station south of Florence Avenue.

[3] Tail tracks are additional tracks that extend beyond the end of the mainline tracks and can be used for temporarily parking, storing, or reversing the direction of trains. While the tracks are designed to allow for layover if needed, trains will not sit at the end of the line.

[4] The La Habra Branch may also be referred to as the La Habra Subdivision. La Habra Branch is used within this document.

The alignment will continue southeast from the at-grade Florence/Salt Lake Station within the San Pedro Subdivision ROW, crossing Otis Avenue, Santa Ana Street, and Ardine Street at-grade. The alignment will be located on the east side of the existing San Pedro Subdivision freight tracks, and the existing tracks will be relocated to the west side of the ROW. South of Ardine Street, the alignment will transition to an aerial structure to cross over the existing UPRR tracks and Atlantic Avenue. The Firestone Station will be located on an aerial structure between Atlantic Avenue and Firestone Boulevard. The Firestone Station will include a dedicated transit parking facility providing approximately 600 parking spaces with a vehicle underpass under the freight tracks to access the parking facility.

The alignment will then cross over Firestone Boulevard and transition back to an at-grade configuration prior to crossing Rayo Avenue at-grade. The alignment will continue south along the San Pedro Subdivision ROW, crossing Southern Avenue at-grade and continuing at-grade until it transitions to an aerial configuration to cross over the LA River. The LRT bridge will be constructed next to the existing freight bridge. South of the LA River, the alignment will transition to an at-grade configuration, then passing under the I-710 freeway through a new box tunnel structure. The alignment will then return to an aerial structure to cross over the Rio Hondo Channel. South of the Rio Hondo Channel, the alignment will transition to an aerial structure to cross over a realigned spur track, Imperial Highway and Garfield Avenue. South of Garfield Avenue, the alignment will transition to an at-grade configuration and serve the Gardendale Station north of Gardendale Street.

From the Gardendale Station, the alignment will continue south in an at-grade configuration, crossing Gardendale Street and Main Street to serve the I-105/C Line Station, which will be located at-grade north of Century Boulevard. The I-105/C Line Station will include a dedicated transit parking facility providing approximately 340 to 360 parking spaces, depending on the location of the TPSS. The alignment will continue at-grade, crossing Century Boulevard, then will cross over the I-105 freeway in an aerial configuration within the existing San Pedro Subdivision ROW bridge footprint. A new Metro C Line Station will be constructed in the median of the I-105 freeway. The I-105/C Line Station will be connected to the new infill C Line Station in the middle of the freeway via a pedestrian walkway on the new LRT bridge. Vertical pedestrian access will be provided from the LRT bridge to the new C Line Station platform via stairs, escalators, and/or elevators. Emergency egress from the C Line Station will also be provided at Façade Avenue via stairs and elevators. To accommodate construction of the new station platform, the existing Metro C Line tracks will be widened and, as part of the I-105 Express Lanes Project, the I-105 lanes will be reconfigured.

PEROW (Cities of Paramount, Bellflower, Cerritos, and Artesia): South of the I-105 freeway, the alignment will continue at-grade within the San Pedro Subdivision ROW. In order to maintain freight operations and allow for freight train crossings, the alignment will transition to an aerial configuration as it turns southeast and enter the PEROW. The existing freight track will cross beneath the aerial alignment and align on the north side of the PEROW east of the San Pedro Subdivision ROW. The Paramount/Rosecrans Station will be located in an aerial configuration west of Paramount Boulevard and north of Rosecrans Avenue. The existing freight track will be relocated to the northeast side of the alignment adjacent to the viaduct structure. The Paramount/Rosecrans Station will include a dedicated transit parking facility providing approximately 490 parking spaces located south of the alignment between Los Angeles Department of Water and Power property and Rosecrans Avenue.

The alignment will continue southeast in an aerial configuration over the Paramount Boulevard/Rosecrans Avenue intersection and descend to an at-grade configuration. The alignment will return to an aerial configuration to cross over Downey Avenue descending back to an at-grade configuration north of Somerset Boulevard. The existing Paramount High School pedestrian bridge will be reconstructed over the LPA and freight tracks to maintain the connection between Paramount High School and the athletics fields. One of the adjacent freight storage tracks at the World Energy facility will be relocated to accommodate the new LRT tracks and maintain storage capacity. There are no active freight tracks south of the World Energy facility (Somerset Boulevard).

The alignment will cross Somerset Boulevard at-grade. South of Somerset Boulevard, the at-grade alignment will parallel the existing Bellflower Bike Trail that is currently aligned on the south side of the PEROW. The alignment will continue at-grade crossing Lakewood Boulevard, Clark Avenue, and Alondra Boulevard. The at-grade Bellflower Station will be located west of Bellflower Boulevard. The Bellflower Station will include a dedicated transit parking facility providing approximately 260 parking spaces.

East of Bellflower Boulevard, the Bellflower Bike Trail will be realigned to the south side of the PEROW to accommodate an existing historic building located near the southeast corner of Bellflower Boulevard and the PEROW. The realigned bike trail will then match the existing bike trail east of the historic building near Bellflower Boulevard. The LRT alignment will continue southeast within the PEROW and transition to an aerial configuration near Cornuta Avenue, crossing over Flower Street and Woodruff Avenue. The alignment will return to an at-grade configuration south of Woodruff Avenue. South of Woodruff Avenue, the Bellflower Bike Trail will be realigned along the north side of the PEROW. Continuing southeast, the LRT alignment will cross under the SR-91 freeway in an existing undercrossing. The alignment will cross over the San Gabriel River on a new bridge, replacing the existing abandoned freight bridge. South of the San Gabriel River, the alignment will transition back to an at-grade configuration before crossing Artesia Boulevard at-grade.

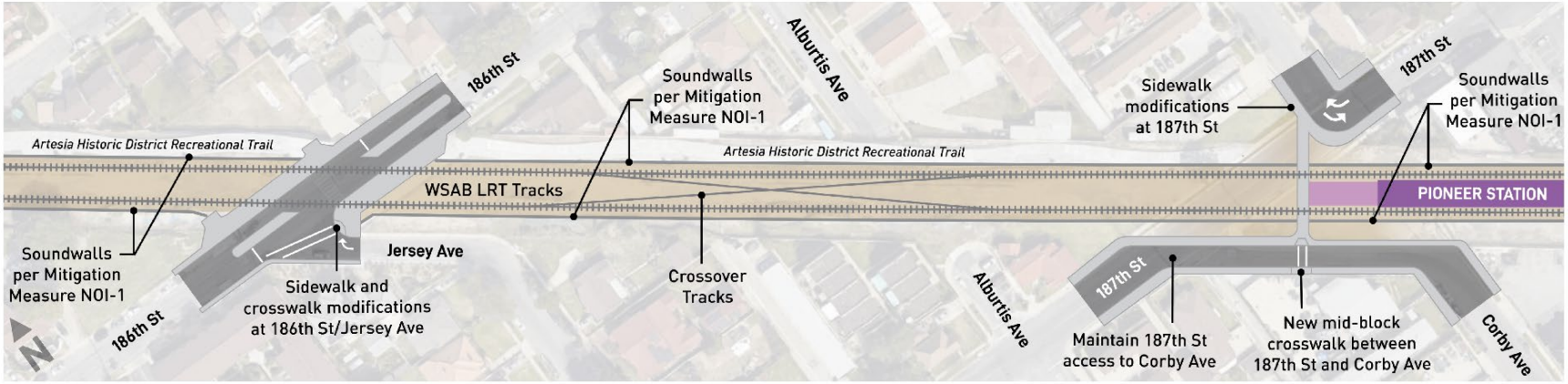
East of Artesia Boulevard, the alignment will cross beneath the I-605 freeway in an existing underpass. Southeast of the underpass, the alignment will continue at-grade, crossing Studebaker Road. North of Gridley Road, the alignment will transition to an aerial configuration to cross over 183rd Street and Gridley Road. The alignment will return to an at-grade configuration and cross 186th Street and 187th Street at-grade. The alignment will then pass through the Pioneer Station on the north side of Pioneer Boulevard at-grade. The Pioneer Station will include a dedicated transit parking facility providing approximately 1,100 parking spaces. Tail tracks accommodating layover storage for a three-car train will extend approximately 1,000 feet south from the station, crossing Pioneer Boulevard and terminating north of South Street.

2.2.3 Design Option – Close 186th Street

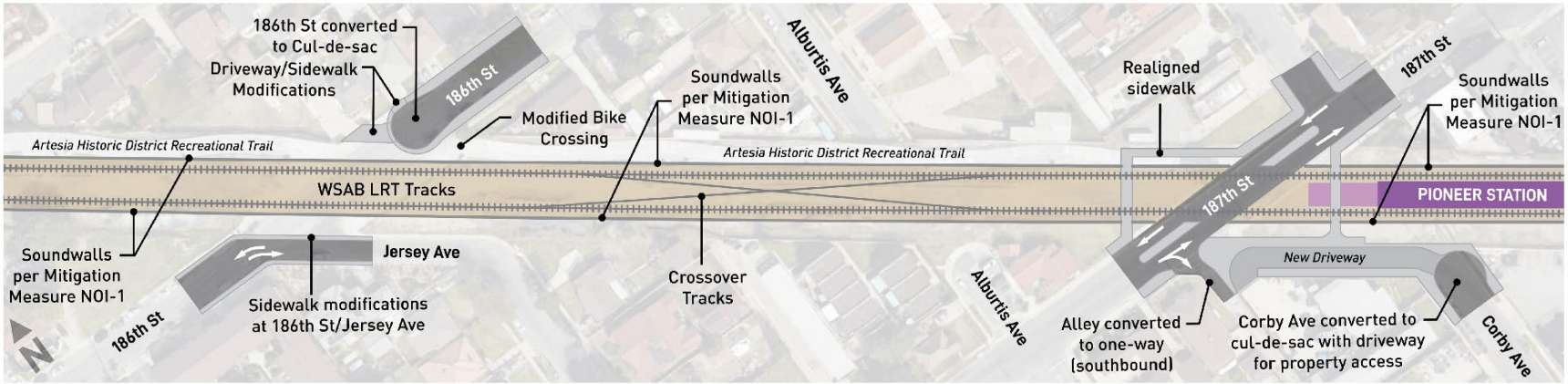
The LPA includes one design option:

- **Design Option:** Close 186th Street – The design option would close 186th Street but keep 187th Street open to traffic in the City of Artesia. Corby Avenue would become a cul-de-sac with an access driveway for the existing business (Figure 2-4).

Figure 2-4. Locally Preferred Alternative and Design Option: Close 186th Street



Locally Preferred Alternative



Design Option 1: Close 186th Street

Source: Prepared on behalf of Metro in 2023

2.2.4 Maintenance and Storage Facility

Generally, each LRT project requires an MSF facility to provide daily servicing and cleaning, inspection and repairs, and storage of light rail vehicles (LRVs). Activities may take place in the MSF throughout the day and night depending upon train schedules, workload, and the maintenance requirements.

In January 2022, the Metro Board identified the Bellflower MSF as the WSAB Project's MSF site. The MSF site is located in the City of Bellflower and is bounded by a mobile home community and industrial facilities to the west, Somerset Boulevard and apartment complexes to the north, residential homes to the east, and the PEROW and Bellflower Bike Trail to the south. Access to the site will be via a signalized driveway at Somerset Boulevard and Bayou Avenue (Figure 2-5). In total, the MSF site is approximately 21 acres and could accommodate up to 80 LRVs to serve the Project's operations plan.

The MSF will have storage tracks, each with sufficient length to store three-car train sets and a maintenance-of-way vehicle storage. The facility will include a main shop building with administrative offices, a cleaning platform, a TPSS, employee parking, a vehicle wash facility, a paint and body shop, and other facilities as needed. The east and west yard leads (i.e., the tracks leading from the mainline to the facility) will have sufficient length for a three-car train set.

Figure 2-5. Maintenance and Storage Facility Site

Source: WSP and TAHA 2023

3 REGULATORY FRAMEWORK

3.1 Federal

Federal protection for scientifically significant paleontological resources applies to projects if any construction or other related project impacts occur on federally owned or managed lands, involve the crossing of state lines, or are federally funded. The following federal protections may apply to paleontological resources in the Affected Area for paleontological resources.

The National Environmental Policy Act (NEPA) of 1969, as amended (Public Law [P.L.] 91-190, 42 USC 4321- 4347, January 1, 1970, as amended by P.L. 94-52, July 3, 1975; P.L. 94-83, August 9, 1975; and P.L. 97-258 Section 4(b), September 13, 1982), recognizes the continuing responsibility of the federal government to "preserve important historic, cultural, and natural aspects of our national heritage" (Section 101 [42 USC Section 4321], No. 382).

Paleontological Resources Preservation Act, enacted as a result of the passage of the Omnibus Public Lands Management Act of 2009, P.L. 111-011, Title VI, Subtitle D, Paleontological Resources Preservation. Sets forth regulations and provisions pertaining to paleontological resources on all federally administered lands.

3.2 State

The protection of paleontological resources in California is addressed through the regulatory compliance of CEQA.

3.2.1 California Environmental Quality Act

Paleontological resources are considered nonrenewable scientific resources and are protected under CEQA, which states, in part, that a project will "normally" have a significant effect on the environment if it, among other things, will disrupt or adversely affect a paleontological site except as part of a scientific study. Specifically, in Appendix G of the CEQA Guidelines, the "Environmental Checklist Form," the question is posed: "Will the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature." In order to determine the uniqueness of a given paleontological resource, it must first be identified or recovered (i.e., salvaged). Therefore, mitigation of adverse impacts to paleontological resources is mandated by CEQA.

3.2.2 California Public Resources Code

Public Resources Code Section 5097.5 states that a person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands. It further states under Code 30244 that any development that would adversely impact paleontological resources shall require reasonable mitigation. These regulations apply to projects located on land owned by or under the jurisdiction of the state or any city, county, district, or other public agency.

3.3 Local

3.3.1 County of Los Angeles

Paleontological resources are addressed under the Conservation and Natural Resource Element of the Los Angeles County 2035 General Plan (2012, 157), which set forth the following policies:

- Policy C/NR 14.1: Mitigate impacts from new development on or adjacent to historic, cultural, and paleontological resources to the greatest extent feasible.
- Policy C/NR 14.2: Support an inter-jurisdictional collaborative system that protects and enhances the County's historic, cultural, and paleontological resources.
- Policy C/NR 14.5: Promote public awareness of the County's historic, cultural, and paleontological resources.
- Policy C/NR 14.6: Ensure proper notification and recovery processes are carried out for development on historic, cultural, and paleontological resources.

3.3.2 City of Los Angeles

The City of Los Angeles General Plan (2001), Conservation Element: Chapter II Resource Conservation and Management, Section 3 outlines an objective and policy for the protection of paleontological resources:

- Objective: protect the city's archaeological and paleontological resources for historical, cultural, research and /or educational purposes.
- Policy: continue to identify and protect significant archaeological and paleontological sites and/or resources known to exist or that are identified during land development, demolition, or property modification activities.

3.3.3 City of Vernon

The City of Vernon does not have specific requirements pertaining to paleontological resources.

3.3.4 City of Huntington Park

The City of Huntington Park does not have specific requirements pertaining to paleontological resources.

3.3.5 City of Bell

The City of Bell previously found that "no paleontological resources have been found in the City and the surrounding area. Thus, the City has a low sensitivity for paleontological resources and the potential for the discovery of paleontological resources is unlikely" (City of Bell General Plan 2010).

3.3.6 City of Cudahy

The City of Cudahy General Plan (2010), in Section 5: Conservation Element (subsection 5.6.6), does not contain any specific goals or policies with respect to paleontological resources. As stated:

> "With the City fully urban, discovery of paleontological resources is unlikely. Records of known sites do not indicate the presence of resources in the City or the surrounding area. The Los Angeles County Museum of Natural History has indicated that the entire City of Cudahy has a low potential and sensitivity for paleontological resources."

3.3.7 City of South Gate

The City of South Gate does not have any ordinances or policies relating to paleontological resources.

3.3.8 City of Downey

The City of Downey does not have any ordinances or policies relating to paleontological resources.

3.3.9 City of Paramount

The City of Paramount does not have any ordinances or policies relating to paleontological resources.

3.3.10 City of Bellflower

The City of Bellflower does not have any ordinances or policies relating to paleontological resources.

3.3.11 City of Artesia

The City of Artesia does not have any ordinances or policies relating to paleontological resources.

4 AFFECTED ENVIRONMENT/EXISTING CONDITIONS

4.1 Geologic Setting

The Affected Area for paleontological resources for the LPA lies in the northwestern portion of the Peninsular Ranges geomorphic province, one of 11 major provinces in the state (California Geological Survey [CGS] 2002). The Peninsular Ranges province is characterized by its northwest trending valleys and faults that branch from the San Andreas fault zone (CGS 2002). The Peninsular Ranges consist of rocks from the Paleozoic to late Cenozoic, including a large Jurassic to Cretaceous batholith that intrudes an older Triassic metasedimentary sequence (Kennedy et al. 2007). The batholith is predominately composed of tonalite, gabbro, and granodiorite, and granite plutonic igneous rock (Todd et al. 2003). The Affected Area for paleontological resources is located on the wedge-shaped central block of the Los Angeles Basin where Cretaceous to Holocene sedimentary rocks unconformably overlie crystalline basement rocks (Roffers and Bedrossian 2010; Saucedo et al. 2007, 2016; Yerkes et al. 1965). The Los Angeles Basin is a structural basin that contains sediments that range in thickness from just a few feet to as much as 31,000 feet in some places (Yerkes et al. 1965). Throughout the basin, Quaternary sediments are mapped at the surface (Roffers and Bedrossian 2010; Saucedo et al. 2007, 2016).

The Affected Area for paleontological resources includes one (1) geologic unit mapped at the surface: Quaternary younger alluvium, unit 2 (Qya_2) (Campbell et al. 2014; Saucedo et al. 2016) (refer to Appendix B for the geologic units and paleontological sensitivity of the Affected Area for paleontological resources; please note that searches were conducted in support of the Draft EIS/EIR, prior to the identification of the LPA and, therefore, include a geographic area larger than that which is ultimately applicable to the LPA). This alluvial unit is composed of Holocene sediments at the surface. In the subsurface, the Holocene alluvial deposits overlie older late Pleistocene sediments at a depth as shallow as 5 feet below ground surface (bgs) (McLeod 2017 2018).

4.2 Paleontological Record Search Results

The paleontological records search results indicate the NHMLAC does not have any fossil localities that lie directly within the Affected Area for paleontological resources, but they do have vertebrate localities nearby from the same sedimentary deposits that occur in the subsurface below the Affected Area for paleontological resources (McLeod 2017, 2018). Thirteen previously recorded vertebrate fossil localities have been identified within Quaternary older alluvium near the Affected Area for paleontological resources. Most of the localities were identified in areas mapped at the ground surface as Quaternary younger (Holocene) alluvium, where age of the Quaternary sediments increases with depth. Depth of discovery within these localities varies between 5 feet to over 40 feet. At least one locality (LACM 3347) was recorded at less than 2 feet below ground surface (bgs) in Quaternary older alluvium mapped at ground surface. Combined, these localities have yielded several specimens of mammoth, ground sloth, saber-toothed cat, dire wolf, horse, camel, deer, antelope, rabbit, rodent, reptile, salamander, turkey, shark, and bony fish. The results of the record search are presented in Table 4.1.

Table 4.1. Previously Discovered Paleontological Resources in the Vicinity of the Affected Area for Paleontological Resources for the LPA

LACM Locality Number(s) and Approximate Location	Geologic Formation	Epoch (geologic age)	Discovery Depth	Taxa
LACM 1225; N of Century Boulevard and I-110	Quaternary older alluvium	Pleistocene	15-20 feet	*Mammuthus*
LACM 7701-7702; near Atlantic Avenue and I-710	Quaternary older alluvium	Pleistocene	11-34 feet	*Sylvilagus* (rabbit); *Microtus* (vole); *Reithrodontomys* (harvest mouse); *Thomomys* (pocket gopher); *Colubridae* (snake); *Lacertelia* (lizard); *Batrachoseps* (salamander); *Gasterosteus aculeatus* (threespine stickleback)
LACM 1295, 1344, 3266, 3365, 4206; around I-110 in the vicinity of Athens	Quaternary older alluvium	Pleistocene	ca. 15 feet	*Mammuthus; Paramylodon* (ground sloth); *Canis dirus* (dire wolf); *Equus; Cervus* (deer); *Capromeryx* (pronghorn antelope); *Bison* (bison); *Sylvilagus*; *Sciuridae* (squirrel); *Microtus*; *Thomomys*; *Parapavo* (turkey); *Mancalla* (puffin); *Clemmys*
LACM 6802; near Bixby Road between Atlantic Avenue and Orange Avenue	Quaternary older alluvium	Pleistocene	16 feet	undetermined vertebrates
LACM 1021; near the intersection of Spring Street and Cherry Avenue south of I-405	Quaternary older alluvium	Pleistocene	unknown	*Aves and Mammuthus*
LACM 3347; in La Mirada north of Leffingwell Road east of La Mirada Boulevard	Quaternary older alluvium	Pleistocene	2 feet bgs, where Pleistocene alluvium is mapped at surface	*Equus*
LACM 3382; W of I-710, E of Wilmington Avenue and N of Artesia Boulevard	Quaternary older alluvium	Pleistocene	5 feet	*Mammuthus*

LACM Locality Number(s) and Approximate Location	Geologic Formation	Epoch (geologic age)	Discovery Depth	Taxa
LACM 3660; NW side of Long Beach Airport along Cover Street between Pixie Avenue and Paramount Boulevard	Quaternary older alluvium	Pleistocene	19 feet	*Mammuthus*

Source: McLeod (2017, 2018)

4.3 Paleontological Sensitivity Assessment

NHMLAC fossil collections records for the Affected Area for paleontological resources accord with the scientific record of abundant and diverse vertebrate fauna previously identified within similar Pleistocene sediments in southern California (Agenbroad 2003; Bell et al. 2004; Brattstrom and Sturn 1959; Koch et al. 2004; Jefferson 1985, 1991; Maguire and Holroyd 2016; Merriam 1911; Reynolds et al. 1991; Savage et al. 1954; Scott and Cox 2008; Springer et al. 2009; Steadman 1980; Tomiya et al. 2011; Wilkerson et al. 2011; Winters 1954). Based on depth of previous fossil discoveries in the area (McLeod 2017, 2018), the Quaternary younger (Holocene) alluvium mapped at the surface of the Affected Area for paleontological resources is underlain by older Quaternary (Pleistocene) fossil-bearing alluvium at depths as shallow as 5 feet bgs. The entire Affected Area for paleontological resources is thus considered to have high paleontological sensitivity at depths at or below 5 feet (refer Appendix B for a figure showing paleontological sensitivity of the Affected Area for paleontological resources).

5 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES

Direct effects result from activities related to construction and occur at the same time and place as the surface-disturbing action. The potential for direct effects on scientifically significant surface and subsurface fossils in fossiliferous sedimentary deposits is controlled by two factors. These include: (1) the depth and lateral extent of disturbance of fossiliferous bedrock and/or surficial sediments; and (2) the depth and lateral extent of occurrence of fossiliferous bedrock and/or surficial sediments beneath the surface. Ground disturbance has the potential to adversely affect an unknown quantity of fossils that may occur on or underneath the surface in areas containing paleontologically sensitive geologic units. Without mitigation, these fossils, as well as the paleontological data they could provide, if not properly salvaged and documented, could be adversely affected (destroyed), rendering them permanently unavailable for future scientific research.

Indirect effects occur later in time or further away in distance than direct effects but are still reasonably foreseeable. They typically include effects that result from the normal ongoing operation and maintenance of facilities and infrastructure constructed under a project. An example of an indirect adverse effect on paleontological resources would be the construction of a new road that increases public access to a previously inaccessible area and results in unauthorized fossil collecting and vandalism.

This section discusses the potential effects to paleontological resources that may occur from operation of the LPA. The underlying geologic unit and paleontological sensitivity of the Affected Area for paleontological resources are consistent across geographic sections for paleontological resources; therefore, the analysis and recommendations presented below apply to the entire Affected Area for paleontological resources.

5.1 No Build Alternative

Under the No Build Alternative, the LPA would not be constructed. The existing transportation network would remain and planned transportation improvements that have been committed to and identified in the constrained 2009 LRTP and SCAG's RTP/SCS, as well as additional projects funded by Measure M that would be completed by 2042 would be implemented. Under the No Build Alternative, no new ground disturbance would result from the operation of the LPA because the LPA would not be implemented, and the environmental setting would remain in current conditions (with the addition of currently planned and funded projects). Any construction projects under the No Build Alternative that disturb paleontological sensitive strata have the potential to adversely impact paleontological resources unless mitigation measures are employed. The specific nature of the effects to each committed project would be dependent on the lithology, age, and location of the underlying strata, as well as the depth and extent of native sediment disturbance.

5.2 Locally Preferred Alternative

Under NEPA, direct and indirect adverse effects to paleontological resources due to ongoing maintenance and operations of the LPA will be negligible because there will be minimal, if any, ground disturbance during operation of the LPA. As a result, there will be no adverse effects to paleontological resources during operation of the LPA.

5.3 Design Option: Close 186th Street

Similar to the LPA without the design option, no ground disturbing activities are proposed during operation of the LPA with the design option. Therefore, there would be no adverse effects to paleontological resources.

5.4 Maintenance and Storage Facility

No ground disturbing activities are proposed at the MSF site during the operation phase of the LPA. Therefore, there will be no adverse effects to paleontological resources resulting from the operation of the MSF site.

5.5 U.S. Army Corps of Engineers Facilities

No ground disturbing activities are proposed at U.S. Army Corps of Engineers (USACE) facilities during the operation phase of the LPA. Therefore, there will be no adverse effects to paleontological resources within USACE facilities resulting from the operation of the LPA.

5.6 California Department of Transportation Facilities

No ground disturbing activities are proposed at Caltrans facilities during the operation phase of the LPA. Therefore, there will be no adverse effects to paleontological resources within Caltrans facilities resulting from the operation of the LPA.

6 CALIFORNIA ENVIRONMENTAL QUALITY ACT DETERMINATION

To satisfy CEQA requirements, paleontological resource impacts were analyzed in accordance with Appendix G of the CEQA Guidelines. Appendix G states that impacts would be significant if operation of the LPA would result in any activities that could directly disturb or destroy paleontological resources. Impacts would be significant if project activities result in the destruction, damage, or loss of scientifically important paleontological resources and associated stratigraphic and paleontological data. The activities may include grading, excavation, or other activities that disturb substantial quantities of the subsurface geologic units with a high paleontological sensitivity. Indirect disturbances or destruction of paleontological resources may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility.

6.1 Threshold PALEO-1: Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

6.1.1 No Project Alternative

Under the No Project Alternative, the LPA would not be constructed, and the environmental setting would remain in current conditions. Therefore, no impacts to paleontological resources would result.

6.1.1.1 Mitigation Measures

No impacts to paleontological resources are expected as a result of the No Project Alternative and no mitigation measures are required.

6.1.1.2 Impacts Remaining After Mitigation

No impacts would occur.

6.1.2 Locally Preferred Alternative

Direct impacts to paleontological resources due to ongoing maintenance and operation of the LPA are considered to be negligible because there will be minimal, if any, ground disturbance during its operation. As such, the LPA will not result in impacts to paleontological resources.

6.1.2.1 Mitigation Measures

No impacts to paleontological resources are expected as a result of the LPA and no mitigation measures are required.

6.1.2.2 Impacts Remaining After Mitigation

No impacts will occur.

6.1.3 Design Option: Close 186th Street

No ground disturbing activities are proposed for the design option during the operation phase of the LPA; as a result, there would be no impacts to paleontological resources during operation of the design option.

6.1.4 Maintenance and Storage Facility

No ground disturbing activities are proposed at the MSF during the operation phase of the LPA; as a result, there will not be impacts to paleontological resources during operation of the MSF site.

7 CONSTRUCTION IMPACTS

7.1 Construction Activities

Construction activities associated with the WSAB Project are detailed in the *West Santa Ana Branch Transit Corridor Project Final Construction Methods Report* (Metro 2024).

7.2 Construction Methodology

This section discusses the potential effects/impacts to paleontological resources that may occur from construction of the LPA.

Existing federal regulations (i.e., PRPA) provide protections for paleontological resources on federal lands, but do not establish standards by which the potential for adverse effects should be evaluated. The BLM has developed guidelines for assessing paleontological sensitivity, and these guidelines are generally consistent with the standards and guidelines established by the SVP 2010). To satisfy NEPA requirements, the potential for adverse effects to paleontological resource are analyzed in accordance with SVP guidelines for assessing paleontological sensitivity of geologic units, and the following threshold for evaluating effects under NEPA. Destruction, damage, or loss of scientifically important paleontological resources and associated stratigraphic and paleontological data as a result of ground disturbance from project activity could be considered a direct adverse effect under NEPA. Because effects to paleontological resources could occur as a result of ground disturbing activities, the measures recommended in PR-1 below have been designed to avoid direct adverse effects to paleontological resources under NEPA.

To satisfy CEQA requirements, Paleontological resource impacts are analyzed in accordance with Appendix G of the CEQA Guidelines and considered significant if the LPA has the potential to result in any activities that could directly disturb or destroy paleontological resources. Impacts would be significant if construction activities result in the destruction, damage, or loss of scientifically important paleontological resources and associated stratigraphic and paleontological data. The activities may include grading, excavation, or other activities that disturb substantial quantities of the subsurface geologic units with a high paleontological sensitivity. Indirect disturbances or destruction of paleontological resources may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility.

7.3 Construction Effects

7.3.1 No Build Alternative

Under the No Build Alternative, the LPA would not be constructed. However, the existing transportation network would remain and planned transportation improvements that have been committed to and identified in the constrained 2009 LRTP and SCAG's RTP/SCS, as well as additional projects funded by Measure M that would be completed by 2042 would be implemented.

The No Build Alternative is intended to compare the effects of the Build Alternatives versus implementing only currently planned and funded projects, which includes the existing

network and future improvements to the rail, bus, and freeway network within and around the Affected Area for paleontological resources. Effects to paleontological resources are directly related to the extent and type of ground disturbance of a given project. Any construction project under the LRTP that disturbs paleontological sensitive strata has the potential to adversely affect paleontological resources unless mitigation actions are employed. The specific nature of the effects to each committed project under the LRTP would be dependent on the lithology, age, and location of the underlying strata, as well as the depth and extent of native sediment disturbance. Each project would undergo environmental clearance and mitigation measures would be identified as applicable.

7.3.2 Locally Preferred Alternative

As a consequence of the paleontological sensitivity of the Affected Area for paleontological resources, the potential to discover paleontological resources during ground-disturbing activities associated with construction of the LPA is high in areas that extend below 5 feet bgs. In general, the potential for a given construction activity associated with the LPA to result in adverse effects to paleontological resources is directly proportional to the amount and location of ground disturbance associated with the activity.

The types of effects to paleontological resources could include:

- Disturbance, damage, or destruction of a significant fossil
- Destruction of a unique geologic feature associated with a paleontological site
- Disturbance or destruction of a paleontological site, which results in the loss of scientific context of fossil remains

The types of LPA-related disturbances and associated effects during construction of the LPA will include:

- Grading, excavation, and trenching could create an adverse effect to paleontological resources. If construction of the LPA results in the disturbance or destruction of paleontological resources, an adverse effect for the purposes of NEPA will occur. Mitigation Measure PR-1, described in Section 8, will be implemented to mitigate these potential adverse effects to paleontological resources.
- Ground disturbance related to construction of the LPA that does not exceed 5-feet bgs will have a low or negligible potential to affect paleontological resources; therefore, no adverse effects are anticipated, and mitigation is not required.
- Staging areas and temporary access roads will be limited to surface-disturbing activities; therefore, no adverse effects are anticipated.
- Removal of existing structures will occur within previously disturbed sediments; therefore, no adverse effects are anticipated.
- Non-construction personnel will not be allowed to gain access to any newly unearthed previously buried paleontological resources and unlawful collecting of fossils will not occur; therefore, no indirect effects are anticipated.

7.3.3 Design Option: Close 186th Street

Impacts for construction of the LPA with the design option are substantially similar to those for construction of the LPA without the design option. The types of ground disturbances and associated effects during construction of the design option would include:

- Grading, excavation, and trenching could create an adverse effect to paleontological resources. If construction of the design option results in the disturbance or destruction of paleontological resources, an adverse effect for the purposes of NEPA would occur. Mitigation Measure PR-1, described in Section 8.2.2, would be implemented to mitigate these potential adverse effects to paleontological resources.
- Ground disturbance related to construction of the design option that does not exceed 5-feet bgs would have a low or negligible potential to effect paleontological resources; therefore, no adverse effects are anticipated, and mitigation is not required.
- Staging areas and temporary access roads would be limited to surface-disturbing activities; therefore, no adverse effects are anticipated.
- Removal of existing materials would occur within previously disturbed sediments; therefore, no adverse effects are anticipated.
- Non-construction personnel would not be allowed to gain access to any newly unearthed, previously buried paleontological resources, and unlawful collecting of fossils would not occur; therefore, no adverse indirect effects are anticipated.

7.3.4 Maintenance and Storage Facility

The types of LPA-related disturbances and associated effects during construction of the MSF site will include:

- Grading, excavation, and trenching could create an adverse effect to paleontological resources. If construction of the MSF site results in the disturbance or destruction of paleontological resources, an adverse effect for the purposes of NEPA will occur. Mitigation Measure PR-1, described in Section 8, will be implemented to mitigate these potential adverse effects to paleontological resources.
- Ground disturbance related to construction of the MSF site that does not exceed 5-feet bgs will have a low or negligible potential to effect paleontological resources; therefore, no adverse effects are anticipated, and mitigation is not required.
- Staging areas and temporary access roads will be limited to surface-disturbing activities; therefore, no adverse effects are anticipated.
- Removal of existing structures will occur within previously disturbed sediments; therefore, no adverse effects are anticipated.
- Non-construction personnel will not be allowed to gain access to any newly unearthed, previously buried paleontological resources and unlawful collecting of fossils will not occur; therefore, no adverse indirect impacts are anticipated.

7.3.5 U.S. Army Corps of Engineers Facilities

The types of ground disturbances and associated effects during construction of the LPA at USACE facilities will include:

- Grading, excavation, and trenching could create an adverse effect to paleontological resources. If construction of the LPA at USACE facilities results in the disturbance or destruction of paleontological resources, an adverse effect for the purposes of NEPA

will occur. Mitigation Measure PR-1, described in Section 8.2.2, will be implemented to mitigate these potential adverse effects to paleontological resources.

- Ground disturbance related to construction of the LPA that does not exceed 5-feet bgs within USACE facilities will have a low or negligible potential to effect paleontological resources; therefore, no adverse effects are anticipated, and mitigation is not required.
- Staging areas and temporary access roads will be limited to surface-disturbing activities within USACE facilities; therefore, no adverse effects are anticipated.
- Removal of existing materials or structures within USACE facilities will occur within previously disturbed sediments; therefore, no adverse effects are anticipated.
- Non-construction personnel will not be allowed to gain access to any newly unearthed, previously buried paleontological resources within USACE facilities, and unlawful collecting of fossils within USACE facilities will not occur; therefore, no adverse indirect effects are anticipated.

7.4 California Department of Transportation Facilities

The types of ground disturbances and associated effects during construction of the LPA at Caltrans facilities will include:

- Grading, excavation, and trenching could create an adverse effect to paleontological resources. If construction of the LPA within Caltrans facilities results in the disturbance or destruction of paleontological resources, an adverse effect for the purposes of NEPA will occur. Mitigation Measure PR-1, described in Section 8.2.2, will be implemented to mitigate these potential adverse effects to paleontological resources.
- Ground disturbance related to construction of the LPA that does not exceed 5-feet bgs within Caltrans facilities will have a low or negligible potential to effect paleontological resources; therefore, no adverse effects are anticipated, and mitigation is not required.
- Staging areas and temporary access roads will be limited to surface-disturbing activities within Caltrans facilities; therefore, no adverse effects are anticipated.
- Removal of existing materials or structures within Caltrans facilities will occur within previously disturbed sediments; therefore, no adverse effects are anticipated.
- Non-construction personnel will not be allowed to gain access to any newly unearthed, previously buried paleontological resources within Caltrans facilities, and unlawful collecting of fossils within Caltrans facilities will not occur; therefore, no adverse indirect effects are anticipated.

7.5 California Environmental Quality Act Determination

To satisfy CEQA requirements, paleontological resource impacts were also analyzed in accordance with Appendix G of the *CEQA Guidelines*.

7.5.1 Threshold PALEO-CON-1: Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

7.5.1.1 No Project Alternative

Under the No Project Alternative, no new ground disturbance would occur because the Project would not be constructed, and the environmental setting would remain in current conditions. As such, there would be no impacts to paleontological resources.

Mitigation Measures

No mitigation measures are required.

Impacts Remaining After Mitigation

No impacts would occur.

7.5.1.2 Locally Preferred Alternative

Potential impacts to paleontological resources in the Affected Area for paleontological resources during ground-disturbing activities associated with construction of the LPA is high. Impacts to paleontological resources associated with construction of the LPA will be greatest for activities such as grading, excavation, and trenching that require a high degree of sediment displacement. These activities will directly impact and disturb the geologic strata at depth and have a high potential to impact buried paleontological resources where disturbance will extend below 5 feet bgs. Staging areas or access roads will be examples of activities that will be limited to surface-disturbing activities; therefore, the potential to significantly impact paleontological resources as the result of these ancillary activities is low or is not anticipated. Removal of existing structures is not anticipated to result in significant impacts because ground disturbance will occur within previously disturbed sediments. Indirect impacts of the LPA are not anticipated because non-construction personnel will not be allowed to gain access to any newly unearthed, previously buried paleontological resources and unlawful collecting of fossils will not occur.

Mitigation Measures

Implementation of Mitigation Measure PR-1 is required.

Impacts Remaining After Mitigation

Impacts will be less than significant with mitigation. Mitigation Measure PR-1 (a) through (d) will effectively mitigate the LPA's significant impacts to paleontological resources through the recovery, identification, and curation of previously unrecovered fossils.

7.5.1.3 Design Option: Close 186th Street

Impacts for construction of the LPA with the design option are substantially similar to those for construction of the LPA without the design option. Potential impacts to paleontological resources in the Affected Area for paleontological resources during ground-disturbing activities associated with construction of the design option is high and would be greatest for

activities such as grading, excavation, and trenching that require a high degree of sediment displacement. These activities would directly impact and disturb the geologic strata at depth and have a high potential to impact buried paleontological resources where disturbance would extend below 5 feet bgs. Indirect impacts are not anticipated because non-construction personnel would not be allowed to gain access to any newly unearthed, previously buried paleontological resources, and unlawful collecting of fossils would not occur.

Mitigation Measures

Implementation of Mitigation Measure PR-1 is required.

Impacts Remaining After Mitigation

Impacts would be less than significant with mitigation. Mitigation Measure PR-1 (a) through (d) will effectively mitigate the design option's significant impacts to paleontological resources through the recovery, identification, and curation of previously unrecovered fossils.

7.5.1.4 Maintenance and Storage Facility

Potential impacts to paleontological resources in the Affected Area for paleontological resources during ground-disturbing activities associated with construction at the MSF site is high and will be greatest for activities such as grading, excavation, and trenching that require a high degree of sediment displacement. These activities will directly impact and disturb the geologic strata at depth and have a high potential to impact buried paleontological resources where disturbance will extend below 5 feet bgs. Staging areas or access roads will be examples of activities that will be limited to surface-disturbing activities; therefore, the potential to significantly impact paleontological resources as the result of these ancillary activities is low or is not anticipated. Removal of existing structures is not anticipated to result in significant impacts because ground disturbance will occur within previously disturbed sediments. Indirect impacts of the LPA are not anticipated because non-construction personnel will not be allowed to gain access to any newly unearthed, previously buried paleontological resources and unlawful collecting of fossils will not occur.

Mitigation Measures

Implementation of Mitigation Measure PR-1 is required.

Impacts Remaining After Mitigation

Impacts will be less than significant with mitigation. Mitigation Measure PR-1 (a) through (d) will effectively mitigate the LPA's significant impacts to paleontological resources through the recovery, identification, and curation of previously unrecovered fossils.

8 PROJECT MEASURES AND MITIGATION MEASURES

8.1 Project Measures

There are no project measures related to paleontological resources.

8.2 Mitigation Measures

8.2.1 Operation

Operation of the LPA, including the MSF and the design option (if selected), will not result in impacts to paleontological resources; as such, mitigation is not required.

8.2.2 Construction

Based on the effect/impact analysis described in Section 7, construction of the LPA and MSF will have a high potential to result in adverse effects/significant impacts to paleontological resources during grading, excavation, and trenching activities that extend below 5 feet bgs. Narrow-diameter auguring (less than 3 feet) and pile driving are exempt from monitoring. These adverse effects/impacts will be reduced with implementation of Mitigation Measure PR-1 (a) through (d): PR-1a (Paleontological Resources Mitigation and Monitoring Program), Mitigation Measure PR-1b (Paleontological Worker Environmental Awareness Program), Mitigation Measure PR-1c (Construction Monitoring), and Mitigation Measure PR-1d (Preparation and Curation of Recovered Fossils).

Mitigation Measure PR-1 (a through d), as presented below, will effectively reduce the adverse effects/significant impacts associated with construction of the LPA to these resources through the recovery, identification, and curation of previously unrecovered fossils. These measures would also apply for construction of the LPA with the design option, if selected.

PR-1(a) **Paleontological Resources Mitigation and Monitoring Program.** Prior to the commencement of ground-disturbing activities for the Locally Preferred Alternative (LPA), Metro will retain a qualified professional paleontologist to prepare and implement a Paleontological Resources Mitigation and Monitoring Program (PRMMP) for the LPA. The qualified paleontologist (principal paleontologist) must have at least a Master's degree or equivalent work experience in paleontology, will have experience with local paleontology, and will be familiar with paleontological procedures and techniques. The PRMMP shall describe mitigation requirements to be consistent with the Society of Vertebrate Paleontology (SVP) standards for paleontological resources mitigation (SVP 2010). The PRMMP will include at a minimum the following:

1) Geologic setting, including paleontological sensitivity of the LPA site
2) Description of the LPA, outlining the type and extent of ground disturbance
3) Specifications for what ground-disturbing activity requires paleontological monitoring
4) Paleontological monitoring procedures:
   a. qualifications of paleontological monitors
   b. timing and duration of monitoring
   c. required data collection procedures

   d. daily monitoring log content
5) Communication protocols to be followed in the event that an unanticipated fossil discovery is made during development of the LPA
6) Construction diversion and resource recovery protocols:
   a. authority for ceasing construction
   b. aerial extent of avoidance (construction exclusion) for any discovery
   c. timing to evaluate and recover the fossil
7) Fossil collection and preparation standards (field and museum)
8) Curation standards including appropriate institutions, curation agreements, and deadlines for materials to be accessioned
9) Post-recovery reporting requirements

PR-1(b) **Paleontological Worker Environmental Awareness Program.** Prior to the start of construction, the qualified paleontologist or his or her designee will conduct training for construction personnel regarding the appearance of fossils and the procedures for notifying paleontological staff should fossils be discovered by construction staff. The Paleontological Worker Environmental Awareness Program will be fulfilled at the time of a pre-construction meeting. In the event of a fossil discovery by construction personnel, all ground-disturbing activities within 50 feet of the find will be halted, a 50-foot exclusion zone around the find will be established, and the qualified paleontologist and/or designee will be contacted to evaluate the find before re-starting work in the exclusion zone. If the qualified paleontologist determines that the fossil(s) is (are) scientifically significant, the qualified paleontologist will complete the conditions outlined in Mitigation Measure PR-1(c) and PR-1(d) to mitigate impacts to significant fossil resources.

PR-1(c) **Construction Monitoring.** Ground-disturbing construction activities (including grading, excavation, and trenching) that have the potential to impact previously undisturbed (i.e., native) sediments or geologic units of high paleontological sensitivity below 5 feet below ground surface will be monitored on a full-time basis by a qualified paleontological monitor during initial ground disturbance. Monitoring pursuant to the Paleontological Mitigation and Monitoring Program will be supervised by the qualified paleontologist and will be conducted by a monitor who meets or exceeds the Society of Vertebrate Paleontology (2010) requirements for a qualified paleontological monitor, including at least a Bachelor's degree in geology, paleontology, or related field, and experience with collection and salvage of paleontological resources. If geological evidence indicates that sediments are younger alluvium or previously disturbed sediments and have a low potential to yield paleontological resources, or if older sediments are determined not to be fossiliferous based on results of monitoring at this location, the qualified paleontologist may determine that full-time monitoring is no longer warranted and may recommend reducing monitoring to periodic spot-checking or cease entirely. Monitoring will be reinstated if any new or unforeseen deeper ground disturbances are required and reduction or suspension will need to be reconsidered by the qualified paleontologist. Ground-disturbing activity that reaches a depth of less than 5 feet below ground surface will not require paleontological monitoring.

In the event that a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected. Typically, fossils can be safely recorded and, if significant, potentially collected quickly by a single paleontologist without disrupting construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) may require more extensive excavation and longer recovery periods. In such a case, the monitor, under the supervision of the principal paleontologist, will have the authority to temporarily direct, divert, or halt construction activity so that the fossil(s) can be removed in a safe and timely manner.

PR-1(d) **Preparation and Curation of Recovered Fossils.** Once recovered, significant fossils will be identified to the lowest possible taxonomic level, prepared to a curation-ready condition, and curated at a scientific institution with a permanent paleontological collection (such as the Natural History Museum of Los Angeles County) along with all pertinent field notes, photos, data, and maps. Fossils of undetermined significance at the time of collection may also warrant curation at the discretion of the qualified paleontologist. The cost of curation is assessed by the repository and will be the responsibility of Metro.

At the conclusion of all required monitoring, laboratory work, and museum curation, the qualified paleontologist will prepare a final report describing the results of the paleontological mitigation monitoring efforts associated with the Locally Preferred Alternative. The report will include a summary of the field and laboratory methods, an overview of the project geology and paleontology, a list of taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, and recommendations. If the monitoring efforts produced fossils, then a copy of the report will also be submitted to the designated museum repository and to Metro.

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APPENDIX A. PALEONTOLOGY RECORDS SEARCH RESULTS

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

1 May 2017

Rincon Consultants, Inc.
449 15th Street, Suite 303
Oakland, CA 94612

Attn: Kyle Brudvik, Paleontologist / Geoarchaeologist / Archaeologist

re: Paleontological resources for the proposed West Santa Ana Branch Transit Corridor Project, Rincon Project #16-02417, from Los Angeles to Artesia, Los Angeles County, project area

Dear Kyle:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed West Santa Ana Branch Transit Corridor Project, Rincon Project #16-02417, from Los Angeles to Artesia, Los Angeles County, project area as outlined on the portions of the Los Angeles, South Gate, Whittier, and Los Alamitos USGS topographic quadrangle maps that you sent to me via e-mail on 20 April 2017. We do not have any vertebrate fossil localities that lie directly within the proposed project area boundaries, but we do have localities nearby from the same sedimentary deposits that occur subsurface in the proposed project area.

Surface deposits in the entire proposed project area consist of younger Quaternary Alluvium, derived as alluvial fan deposits from the Los Angeles River that currently flows east of the northern and western portions of the proposed project area and from Los Angeles River, Rio Hondo and the San Gabriel River that flow through the southeastern portion of the proposed project area. These younger Quaternary deposits usually do not contain significant fossil vertebrates in the uppermost layers, but the underlying older Quaternary deposits found at varying depths may well contain significant vertebrate fossils.

Our closest vertebrate fossil locality to the northern portion of the proposed project area from the older Quaternary deposits beneath the younger Quaternary Alluvium is LACM 2032, north-northeast of the of the northern terminus of the proposed project area at Union Station near the intersection of Mission Road and Daly Street around the Golden State Freeway (I-5), that produced fossil specimens of pond turtle, *Clemmys mamorata*, ground sloth, *Paramylodon harlani*, mastodon, *Mammut americanum*, mammoth, *Mammuthus imperator*, horse, *Equus*, and camel, *Camelops*, at a depth of 20-35 feet below the surface. The pond turtle specimens from locality LACM 2032 were figured in the scientific literature by B.H. Brattstrom and A. Sturn (1959. A new species of fossil turtle from the Pliocene of Oregon, with notes on other fossil *Clemmys* from western North America. Bulletin of the Southern California Academy of Sciences, 58(2):65-71). At our locality LACM 1023, just north of locality LACM 2032 near the intersection of Workman Street and Alhambra Avenue, excavations for a storm drain recovered fossil specimens of turkey, *Meleagris californicus,* sabre-toothed cat, *Smilodon fatalis*, horse, *Equus*, and deer, *Odocoileus*, at unstated depth. A specimen of the turkey, *Meleagris*, from this locality was published in the scientific literatus by D. W. Steadman (1980. A Review of the Osteology and Paleontology of Turkeys (Aves: Meleagridinae). Contributions in Science, Natural History Museum of Los Angeles County, 330:131-207). West of the northern portion of the proposed project area, near the intersection of Hill Street and 12th Street, our older Quaternary locality LACM 1755 produced a fossil specimen of horse, *Equus*, at a depth of 43 feet below the street.

Our closest vertebrate fossil localities to the central portion of the proposed project area from these Quaternary deposits are LACM 7701-7702, northeast of the central portion of the proposed project area north of the Los Angeles River and east of the Long Beach Freeway (I-710) near the intersection of Atlantic Avenue and the Long Beach Freeway (I-710) just outside the boundaries of the City of Commerce. Localities LACM 7701-7702 produced fossil specimens of threespine stickleback, *Gasterosteus aculeatus*, salamander, *Batrachoseps*, lizard, Lacertilia, snake, Colubridae, rabbit, *Sylvilagus*, pocket mouse, *Microtus*, harvest mouse, *Reithrodontomys*, and pocket gopher, *Thomomys*, at depths of 11 to 34 feet below grade.

Further south, west of the south-central portion of the proposed project area, we have an older Quaternary locality LACM 1225, in excavations for the Harbor Freeway (I-110) just north of Century Boulevard, that produced fossil specimens of mammoth, *Mammuthus*, at a depth of 15-20 feet below the surface, including one specimen figured in the scientific literature by A. Koch et al. (2004. Santa Monica Mountains National Recreation Area Paleontological Survey. National Park Service Geological Resources Division Technical Report, 04/01:1-27).

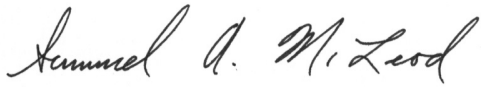
A little further south around the Harbor Freeway (I-110) in the vicinity of Athens, west of the south-central portion of the proposed project area, we have a set of vertebrate fossil localities from older Quaternary deposits including LACM 1295, 1344, 3266, 3365, and 4206. These localities produced a typical late Pleistocene fauna including fossil specimens of pond turtle, *Clemmys*, puffin, *Mancalla*, turkey, *Parapavo*, ground sloth, *Paramylodon*, mammoth, *Mammuthus*, dire wolf, *Canis dirus*, rabbit, *Sylvilagus*, squirrel, Sciuridae, deermouse, *Microtus*, pocket gopher, *Thomomys*, horse, *Equus*, deer, *Cervus*, pronghorn antelope, *Capromeryx*, and bison, *Bison*, at depths as shallow as fifteen feet below the surface.

West of the southeastern portion of the proposed project area, on the northern flank of the Dominguez Hills west of the Long Beach Freeway(I-710), east of Wilmington Avenue and north of Artesia Boulevard, our older Quaternary locality LACM 3382 produced a specimen of fossil mammoth, *Mammuthus*, at a depth of only five feet below the surface. Southwest of the southern terminus of the proposed project area, on the northwest side of the Long Beach Airport along Cover Street between Pixie Avenue and Paramount Boulevard, Our older Quaternary locality LACM 3660, produced a specimen of fossil mammoth, *Mammuthus*, at a depth of 19 feet below the surface.

Shallow excavations in the younger Quaternary Alluvium exposed throughout the proposed project areas are unlikely to uncover significant vertebrate fossils. Deeper excavations that extend down into older Quaternary deposits, however, possibly as shallow as five feet in depth, may well encounter significant fossil vertebrate remains. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,



Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

29 August 2018

Rincon Consultants, Inc.
87 North Raymond Avenue, Suite 911
Pasadena, CA 91103

Attn: Heather Clifford, Associate Paleontologist / Geologist

re: Paleontological resources for the proposed LA Metro Santa Ana Line (revised northern alignments) Project, Rincon Project # 16-02417, in the Cities of Los Angeles, Artesia, and Cerritos, Los Angeles County, project area

Dear Heather:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed LA Metro Santa Ana Line (revised northern alignments) Project, Rincon Project # 16-02417,in the Cities of Los Angeles, Artesia, and Cerritos, Los Angeles County, project area as outlined on the portions of the Hollywood, Los Angeles, and Los Alamitos USGS topographic quadrangle maps that you sent to me via e-mail on 15 August 2018. We have no vertebrate fossil localities that lie directly within the boundaries of the proposed project area, but we do have localities nearby from sedimentary deposits similar to those that may occur at depth in the proposed project area.

The entire proposed project area has surface deposits composed of younger Quaternary Alluvium, derived as fluvial deposits from the floodplain of the Los Angeles River that currently flows in a concrete channel just to the east for the Alternative E, Alternative G, and northern portion of the WSAB Corridor, and from the San Gabriel River and Coyote Creek for the southern portion of the WSAB Corridor and the Optional Bloomfield Extension. These younger Quaternary deposits usually do not contain significant fossil vertebrate remains, at least in the uppermost layers, but the underlying older Quaternary deposits found at varying depths may well contain significant vertebrate fossils.

Our closest vertebrate fossil locality from the older Quaternary deposits is LACM 2032, just north of due east of the of the northern terminus of the Alternative E proposed project area route near the intersection of Mission Road and Daly Street around the Golden State Freeway (I-5), that produced fossil specimens of pond turtle, *Clemmys mamorata*, ground sloth, *Paramylodon harlani*, mastodon, *Mammut americanum*, mammoth, *Mammuthus imperator*, horse, *Equus*, and camel, *Camelops*, at a depth of 20-35 feet below the surface. The pond turtle specimens from locality LACM 2032 were figured in the scientific literature by B.H. Brattstrom and A. Sturn (1959. A new species of fossil turtle from the Pliocene of Oregon, with notes on other fossil *Clemmys* from western North America. Bulletin of the Southern California Academy of Sciences, 58(2):65-71). At our locality LACM 1023, just north of locality LACM 2032 near the intersection of Workman Street and Alhambra Avenue, excavations for a storm drain recovered fossil specimens of turkey, *Meleagris californicus,* sabre-toothed cat, *Smilodon fatalis*, horse, *Equus*, and deer, *Odocoileus*, at unstated depth. A specimen of the turkey, *Meleagris*, from this locality was published in the scientific literatus by D. W. Steadman (1980. A Review of the Osteology and Paleontology of Turkeys (Aves: Meleagridinae). Contributions in Science, Natural History Museum of Los Angeles County, 330:131-207).

Our next closest vertebrate fossil locality from older Quaternary deposits beneath the younger Quaternary Alluvium is LACM 1755, due south of the western terminus of the Alternative G proposed project area route near the intersection of Hill Street and 12th Street, that produced a fossil specimen of horse, *Equus*, at a depth of 43 feet below the street.

Just north and west of the northwestern extensions of the Alternative G proposed project area route, just north of 6th Street and just west of Broadway, there are exposures of the marine Pliocene Fernando Formation and just to the north of those deposits there are exposures of the marine late Miocene Yorba Member of the Puente Formation (also referred to as an Unnamed Shale in this area), and these two rock units may occur at depth in the proposed project area.

We have a series of vertebrate fossil localities from the Fernando Formation nearby including LACM 7730, between the northern portion of the Alternative E proposed project area route and the northern-most extension of the Alternative G proposed project area route near the intersection of Main Street and 2nd Street; LACM 4726, just southwest of the northern-most extension of the Alternative G proposed project area route near the corner of 4th and Hill Streets; LACM 6971, further to the west of locality LACM 4726 west of Pershing Square near the corner of 6th and Flower Streets; and LACM 3868, almost due north of the western-most extension of the Alternative G proposed project area route north of 6th Street between Lucas Avenue and South Bixel Street. These nearby Fernando Formation localities have produced a composite fauna including fossil specimens of stingray, *Dasyatis*, eagle ray, *Myliobatis*, skate, *Raja*, chimaerid, Chimaeriformes, bull shark, *Carcharhinus leucas*, dusky shark, *Carcharhinus obscurus*, hammerhead shark, *Sphyrna*, sixgill shark, Hexanchiformes, bonito shark, *Isurus oxyrinchus*, salmon shark, *Lamna ditropis*, white sharks, *Carcharodon sulcidens* and *Carcharodon carcharias*, herring, Clupeidae, hake, *Merluccius*, sheepshead, *Semicossyphus*, mackerel, *Scomber*, bird, Aves, rorqual baleen whale, Balaenopteridae, and toothed whale, Odontoceti.

Our Puente Formation locality LACM 5961 occurs just north-northeast of the northern-most extension of the Alternative G proposed project area route just north of the intersection of Hill Street and 1st Street. Locality LACM 5961, discovered during excavation for the Metrorail station at unknown depth, produced a specimen of the fossil bristlemouth fish, *Cyclothone*. Our next closest vertebrate fossil locality from the Puente Formation is LACM 7990, northeast of the northern-most extension of the Alternative G proposed project area and west of the northern portion of the Alternative E proposed project area route north of Temple Street between Broadway and Spring Street, that produced fossil fish including slickheads, Alepocephalidae, argentinas, Argentinidae, deep sea smelts, Bathylagidae, viperfish, *Chauliodus*, herring, Clupeidae, cod, Gadiformes, bristlemouths, Gonostomidae, mackerel, Scombridae, and dragonfish, Stomiatidae.

Our closest older Quaternary localities to the northern portion of the WSAB Corridor proposed project area route are LACM 7701-7702, to the east-southeast in the City of Commerce near the intersection of Atlantic Avenue and the Long Beach Freeway (I-710) that produced fossil specimens of threespine stickleback, *Gasterosteus aculeatus*, salamander, *Batrachoseps*, lizard, Lacertilia, snake, Colubridae, rabbit, *Sylvilagus*, pocket mouse, *Microtus*, harvest mouse, *Reithrodontomys*, and pocket gopher, *Thomomys*, at depths of 11 to 34 feet below grade. To the west-southwest, near the intersection of 46th Street and Western Avenue, our older Quaternary locality LACM 7758 produced fossil specimens of three-spine stickleback, *Gasterosteus aculeatus*, meadow vole, *Microtus*, deer mouse, *Peromyscus*, pocket gopher, *Thomomys*, and pocket mouse, *Perognathus*, at a depth of 16 feet below the surface.

Our closest older Quaternary locality to the southern portion of the WSAB Corridor proposed project area route and to the Optional Bloomfield Extension proposed project area route is LACM 3660, to the southwest of this portion of the the proposed project area on the northwest side of the Long Beach Airport along Cover Street between Pixie Avenue and Paramount Boulevard, that produced a specimen of fossil mammoth, *Mammuthus*, at a depth of 19 feet below the surface. Further to the southwest of this portion of the proposed project area we have locality LACM 6802, near Bixby Road between Atlantic Avenue and Orange Avenue, that produced fossil specimens of undetermined vertebrates at a depth of 16 feet below the surface. South-southwest of the this portion of the proposed project area near the intersection of Spring Street and Cherry Avenue south of the San Diego Freeway (I-405), we have locality LACM 1021 that produced fossil specimens of bird, Aves, and mammoth, *Mammuthus*, at unknown depth. Our closest vertebrate fossil locality from the older Quaternary deposits to the north is LACM 3347, situated northeast of this portion of the proposed project area in La Mirada north of Leffingwell Road east of La Mirada Boulevard, that produced a fossil specimen of horse, *Equus*, at a depth of only two feet below the surface.

Very shallow excavations in the younger Quaternary Alluvium exposed throughout the proposed project area are unlikely to uncover significant vertebrate fossils. Deeper excavations that extend down into older sedimentary deposits, however, may well encounter significant fossil vertebrate remains. Any substantial excavations in the proposed project area, therefore, should

be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

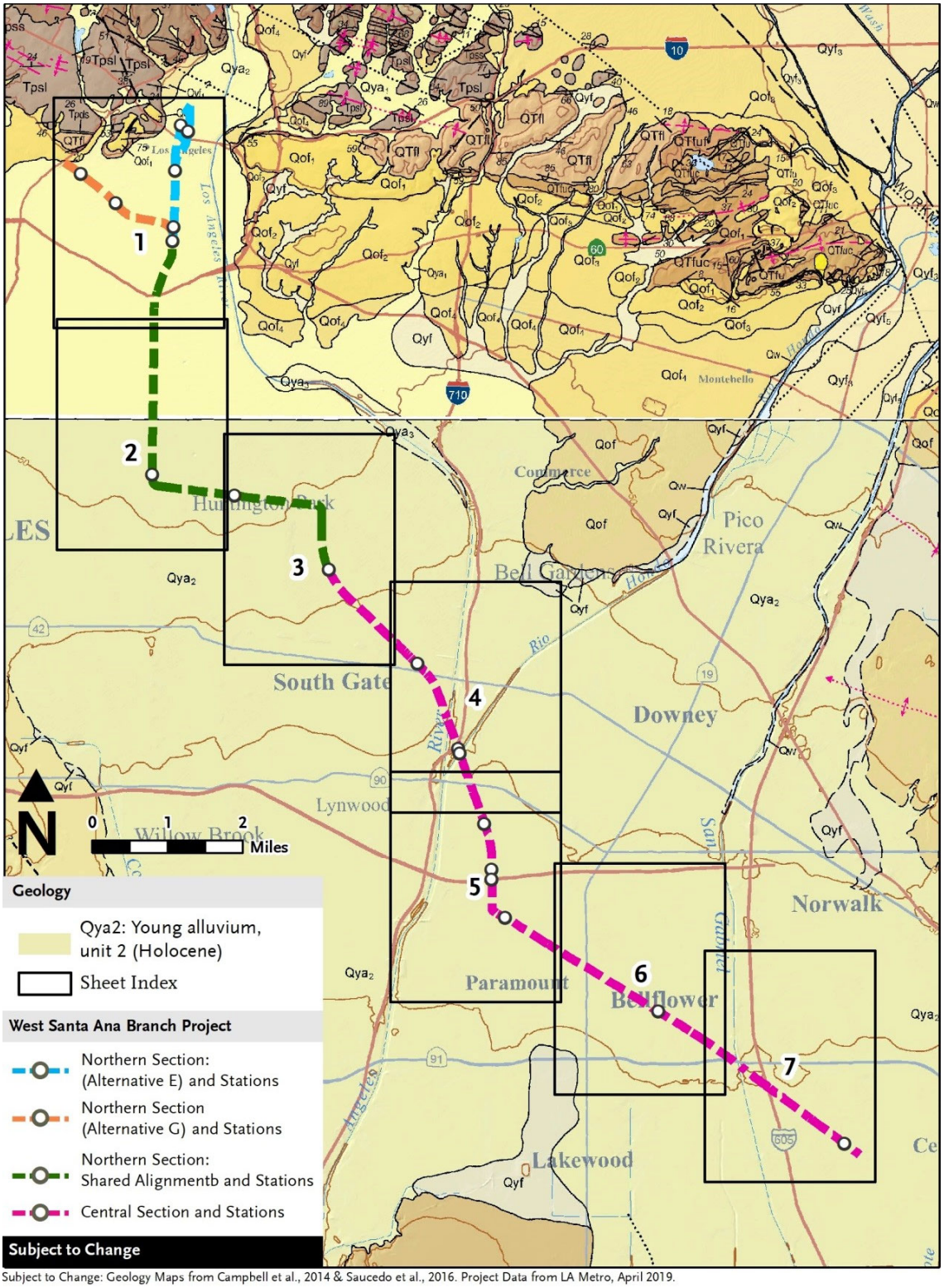
Sincerely,

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

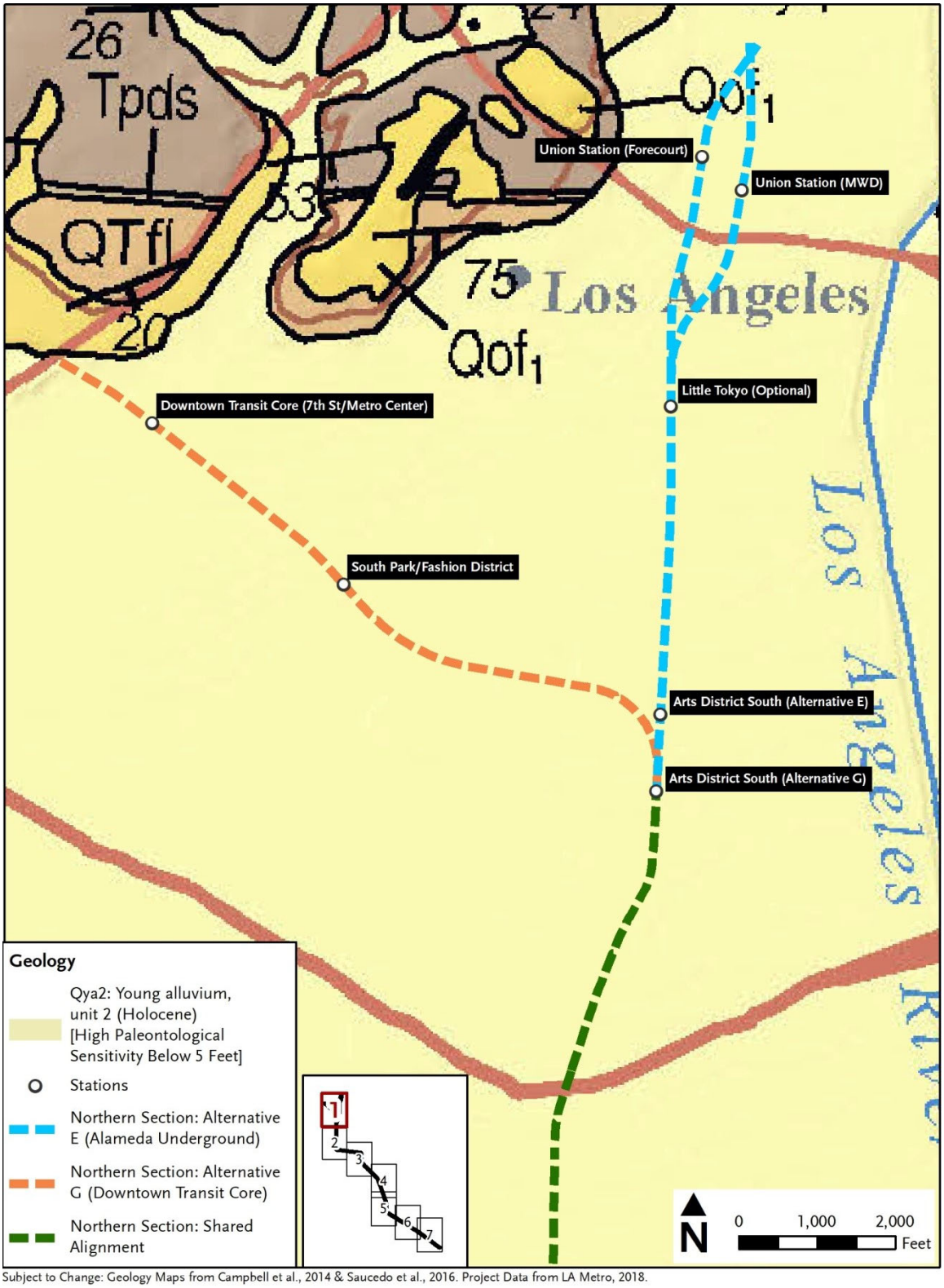
APPENDIX B. PALEONTOLOGY MAPS

Figure B-1. Geologic Units and Paleontological Sensitivity in the Affected Area



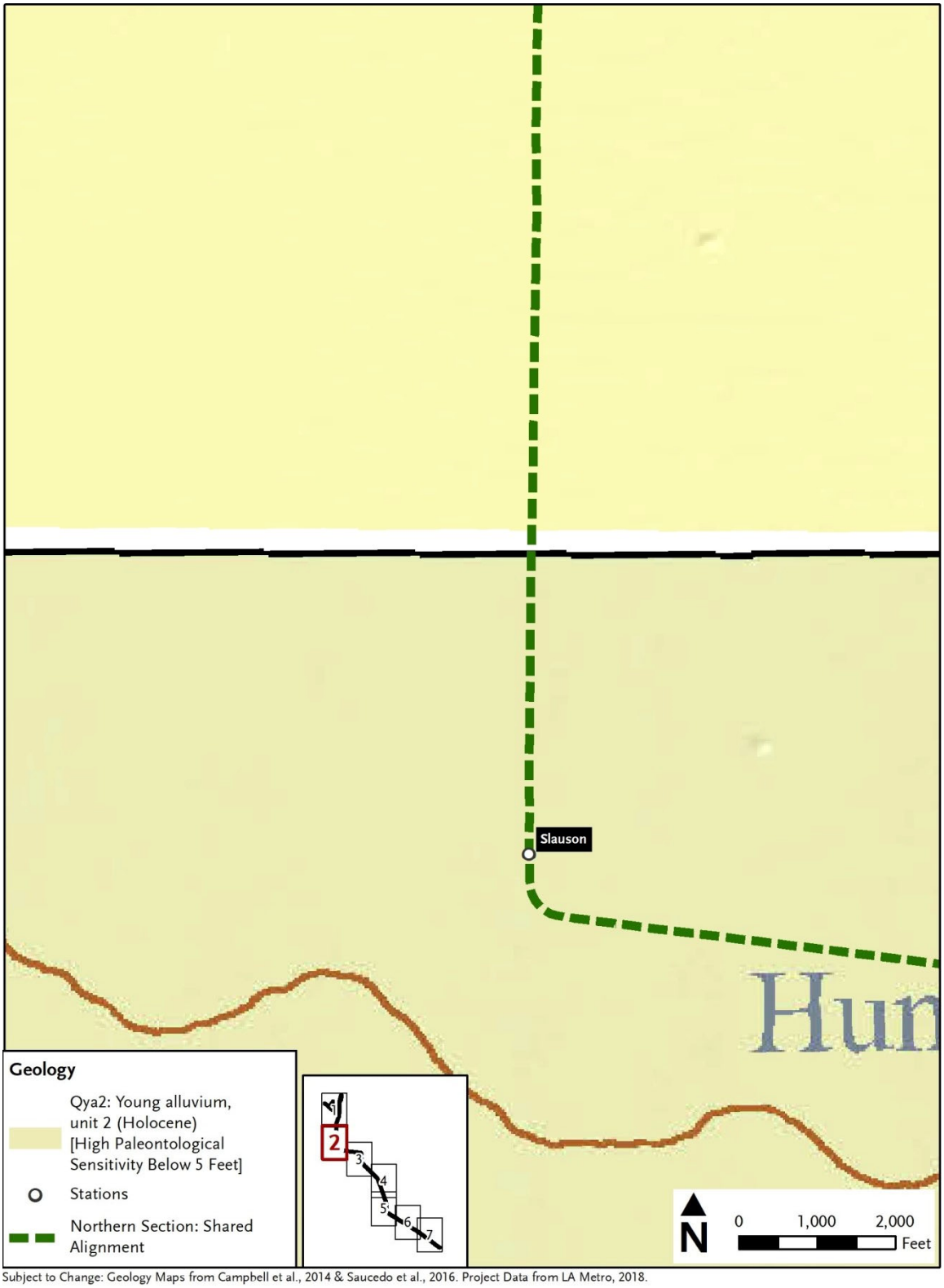
Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, April 2019.

Figure B-2. Geologic Units and Paleontological Sensitivity in the Affected Area, Sheet 1



Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, 2018.

Figure B-3. Geologic Units and Paleontological Sensitivity in the Affected Area, Sheet 2

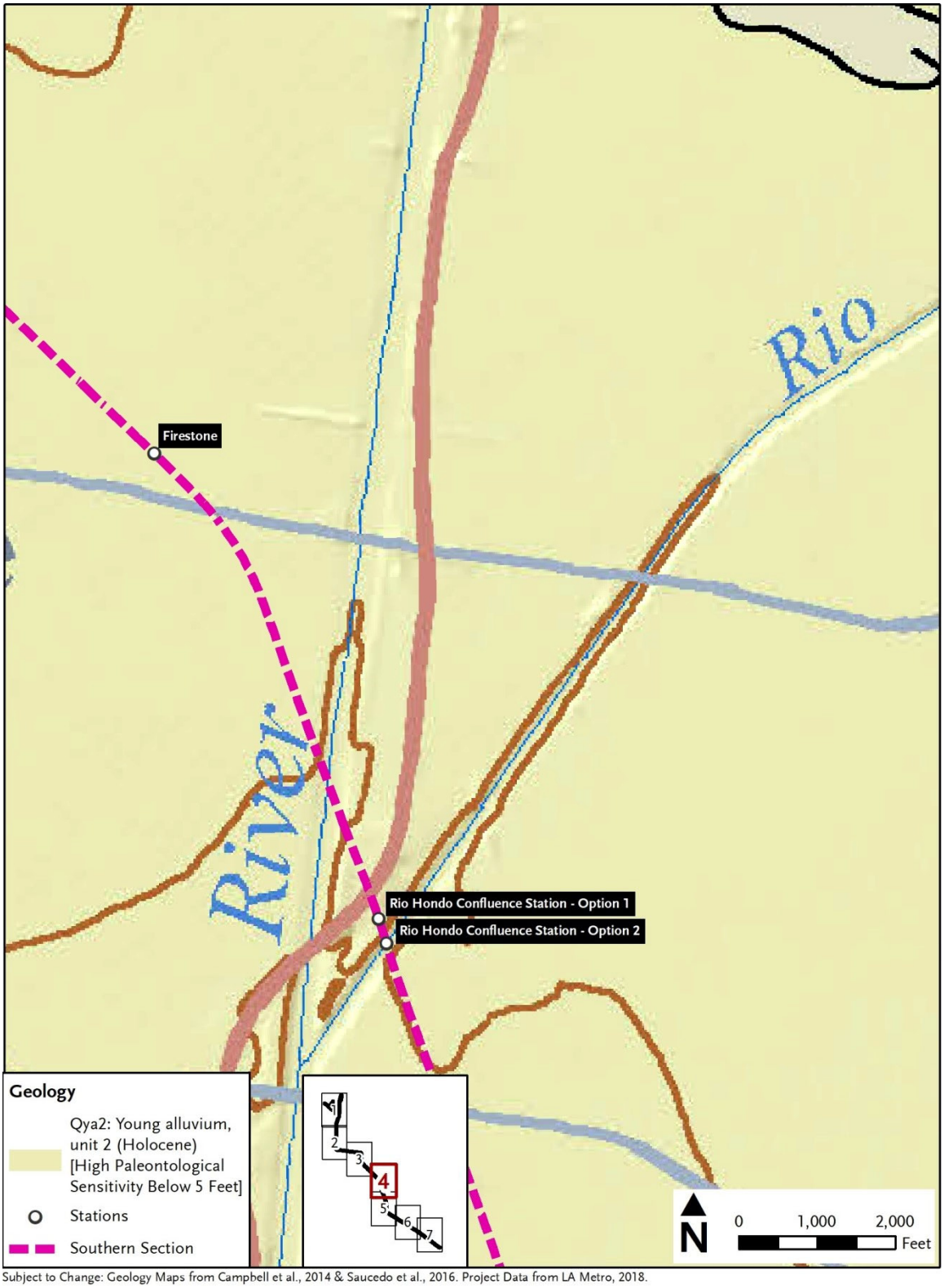


Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, 2018.

Figure B-4. Geologic Units and Paleontological Sensitivity in the Affected Area, Sheet 3

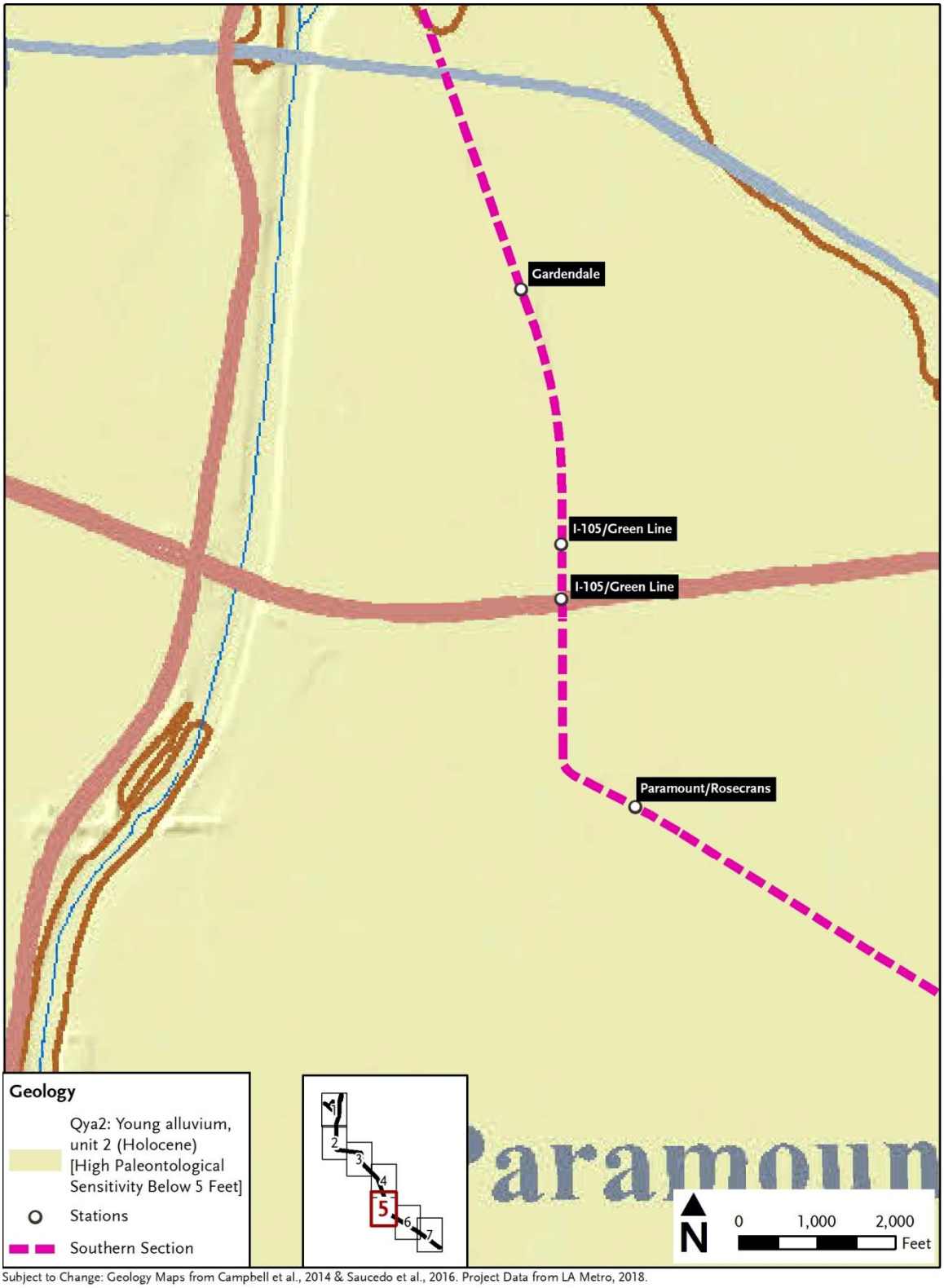
Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, 2018.

Figure B-5. Geologic Units and Paleontological Sensitivity in the Affected Area, Sheet 4



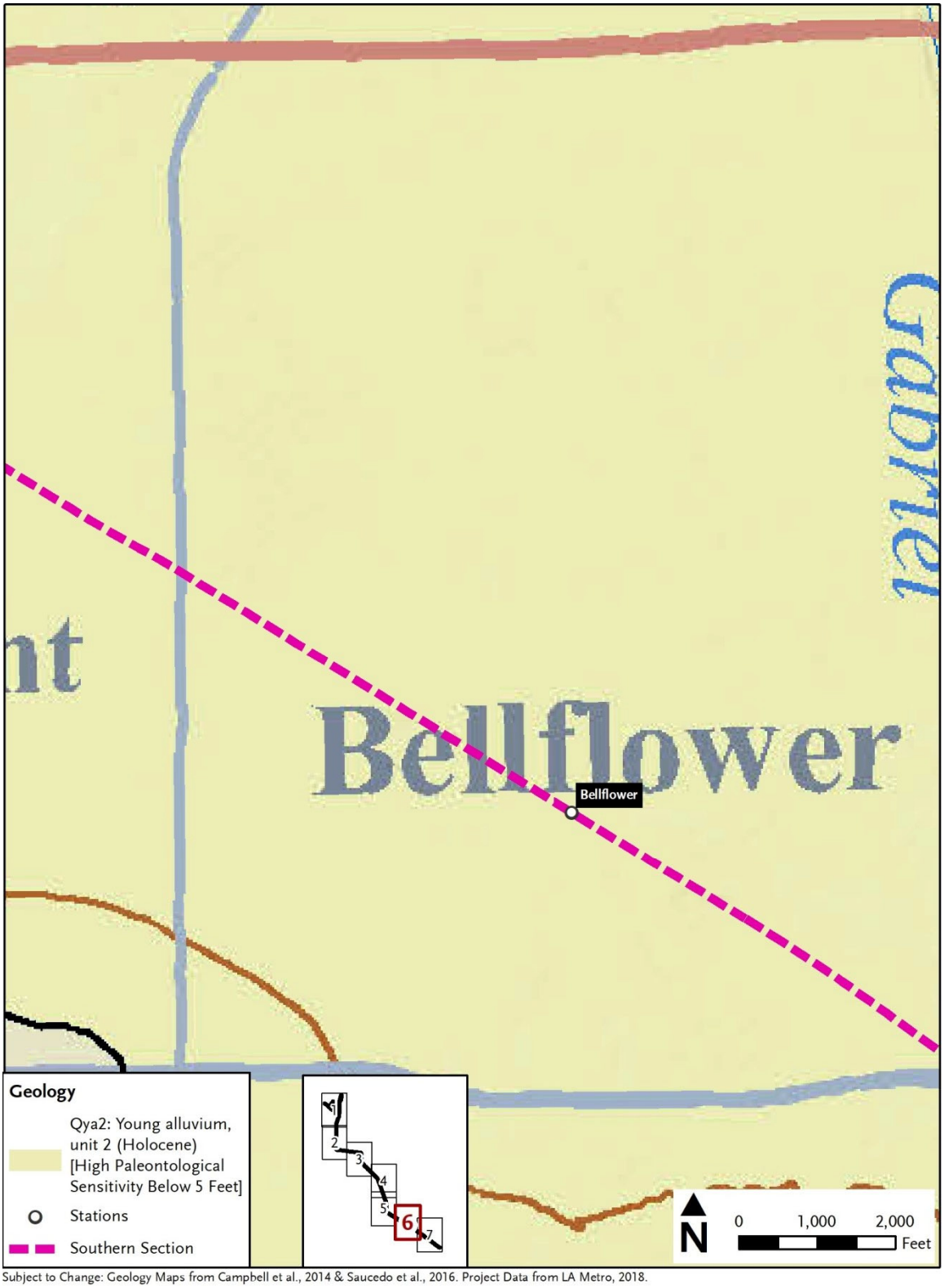
Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, 2018.

Figure B-6. Geologic Units and Paleontological Sensitivity in the Affected Area, Sheet 5



Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, 2018.

Figure B-7. Geologic Units and Paleontological Sensitivity in the Affected Area, Sheet 6



Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, 2018.

Figure B-8. Geologic Units and Paleontological Sensitivity in the Affected Area, Sheet 7

Subject to Change: Geology Maps from Campbell et al., 2014 & Saucedo et al., 2016. Project Data from LA Metro, 2018.