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Abbreviations

The following acronyms, initialisms, and short forms are used in this report.

2030 RTP  
2030 San Diego Regional Transportation Plan: Pathways for the Future

2050 RTP  
2050 Regional Transportation Plan: Our Region, Our Future

ADA  
Americans with Disabilities Act

C&S  
communications and signaling

Caltrans  
California Department of Transportation

CEQA  
California Environmental Quality Act

DARs  
direct-access ramps

FTA  
Federal Transit Administration

HOV  
high-occupancy vehicle

I-  
Interstate

LOSSAN  
Los Angeles—San Diego—San Luis Obispo Rail Corridor Agency

LRV  
light rail vehicles

LRT  
light rail transit

MTDB  
Metropolitan Transit Development Board

MTS  
Metropolitan Transit System

myo  
million years old

NCTD  
North County Transit District

NEPA  
National Environmental Policy Act

NNLs  
National Natural Landmarks

OCS  
overhead catenary system

OTTC  
Old Town Transit Center

PE  
preliminary engineering

PRC  
Public Resources Code

PRMMP  
Paleontological Resources Monitoring and Mitigation Plan

SANDAG  
San Diego Association of Governments

SEIS/SEIR  
Supplemental Environmental Impact Statement and Subsequent Environmental Impact Report

SR  
State Route

SVP  
Society of Vertebrate Paleontology

TPSS  
traction power substation
<table>
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<td>University of California, San Diego</td>
</tr>
<tr>
<td>USC</td>
<td>United States Code</td>
</tr>
<tr>
<td>UTC</td>
<td>University Towne Centre</td>
</tr>
<tr>
<td>VA</td>
<td>Veterans Administration</td>
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PREFACE

Refined Build Alternative

The Mid-Coast Corridor Transit Project Draft Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report (SEIS/SEIR) and supporting technical reports were circulated for a 60-day public review and comment period between May 17, 2013 and July 17, 2013. The San Diego Association of Governments (SANDAG) Board of Directors approved the Refined Build Alternative for evaluation in the Final SEIS/SEIR on November 15, 2013, and amended the Refined Build Alternative on May 9, 2014, as documented in the *Mid-Coast Corridor Transit Project Final Refined Build Alternative Report* (SANDAG, 2014a). The Refined Build Alternative generally reflects the Build Alternative with the Veterans Administration (VA) Medical Center Station Option evaluated in the Draft SEIS/SEIR; however, it also includes some additional refinements.

Section 2.4 in Chapter 2.0 of the Final SEIS/SEIR provides a detailed description of the Refined Build Alternative. The process of developing the refinements is discussed in Section 2.3 of Chapter 2.0 of the Final SEIS/SEIR.

Validation of Technical Analysis

SANDAG evaluated whether the refinements incorporated into the Refined Build Alternative would change the impacts or mitigation described for the Build Alternative with the VA Medical Center Station Option in the Draft SEIS/SEIR. Specifically, SANDAG considered whether the following changes would materially affect the analysis and conclusions in this technical report:

- Changing the locations of the traction power substations
- Modifying the layout of the Clairemont Drive, Nobel Drive, and UCSD East Stations
- Adjusting the alignment near Voigt Drive
- Removing the straddle bents at the Interstate 5 crossing near Nobel Drive
- Modifying the location and configuration of several retaining walls
- Adding two segments of aerial structure north of La Jolla Colony in place of a retaining wall
- Adding one and removing four construction staging and laydown areas

SANDAG has determined that the refinements listed above would not affect the analysis and conclusions presented in this technical report. Specifically, the refinements do not change the location and extent of subsurface excavations in a manner that would change the impact conclusions for paleontological resources presented in this technical report for the Build Alternative with the VA Medical Center Station Option. In addition, the study area and underlying geologic units with high paleontological sensitivity remain unchanged. Therefore, the conclusions regarding direct, indirect, and cumulative impacts of the Refined Build Alternative do not differ from the Build Alternative with the VA Medical Center Station Option. As a result, the technical report prepared to support the Draft SEIS/SEIR was retained in its original form. The conclusions reached for the Build Alternative with the VA Medical Center Station Option reflected in this report are applicable to the Refined Build Alternative.
S.0 SUMMARY

This summary discusses purpose and scope, investigative constraints, summary of findings, and recommendations.

S.1 Purpose and Scope

The Mid-Coast Corridor Transit Project is approximately 11 miles in length and is located in the City of San Diego, San Diego County, California. The purpose of this project is to improve transit travel times and reliability while reducing the number of transfers, making transit a more attractive mode of travel.

This Paleontological Resources Survey Report was prepared to comply with current state environmental review policies, specifically the California Environmental Quality Act (CEQA) and the CEQA Guidelines, which require lead agencies to evaluate proposed projects for the potential to impact significant paleontological resources.

S.2 Investigation Constraints

Survey constraints consisted of limited ground visibility in most parts of the survey area due to urbanization or vegetation cover. However, all mapped geological units could be identified at, or adjacent to, the Paleontological Area of Effect (study area).

S.3 Summary of Findings

Five geologic units that have been assigned a high paleontologic sensitivity were identified in the study area (see Appendix A, Paleontology Sensitivity Maps). All of these geologic units contain previously recorded paleontological localities in their respective units. A total of 88 fossil localities are recorded within a quarter-mile radius of the study area; however, none of the previously recorded fossil localities occurs in the study area. The geologic units determined to have a high paleontological sensitivity within the study area are described below:

- The Bay Point Formation was identified along the project alignment from the Santa Fe Depot to the Balboa Avenue Station. In addition, during the field survey, a fossil shell hash layer was observed in the Bay Point Formation along the eastern side of the railroad tracks, west of the intersection of Morena Boulevard and McGraw Street. The presence of the fossil shell hash layer indicates that there are paleontological resources present at the surface within the study area that could be affected by the project. The presence of the fossil shell hash layer also indicates that sediments present within the study area are favorable for the preservation of fossils. Twenty-five fossil localities occur within the near shore marine Bay Point Formation and have produced fossils of various marine invertebrates (e.g., bryozoans, barnacles, shrimp, crabs, ostracods, snails, clams, oysters, pectens, chitons, and tusk shells).
- The Lindavista Formation was identified in the direct vicinity of the project alignment from the Executive Drive Station to the University Towne Centre (UTC) Transit Center. One fossil locality is in the marine Lindavista Formation. This locality produced fossils of marine invertebrates (e.g., clams).
The San Diego Formation was identified in the direct vicinity of the project alignment from the Middletown Station to the Washington Street Station and northeast of the Balboa Avenue Station. In total, 37 fossil localities were previously identified in this formation in the study area. These localities produced fossils of extremely diverse assemblages of marine organisms, in addition to rare remains of terrestrial mammals, fossil wood, and leaves.

The Scripps Formation was identified along the project alignment from the Clairemont Drive Station to the UTC Transit Center. Twelve fossil localities have been discovered in the near shore marine Scripps Formation in the vicinity of the project. These localities produced fossils of plants (e.g., almond trees, sycamore, willows, and horsetails), marine invertebrates (e.g., worms, bryozoans, crabs, snails, clams, tusk shells, and sea biscuits), and marine vertebrates (e.g., sharks and rays).

The Ardath Shale Formation was identified along the project alignment from the Clairemont Drive Station to the Executive Drive Station. Eleven fossil localities have been discovered in the deep marine Ardath Shale Formation in the vicinity of the project. These localities produced fossils of plants, marine invertebrates (e.g., foraminifers, bryozoans, crabs, shrimp, brachiopods, snails, clams, oysters, tusk shells, and sea biscuits), and marine vertebrates (e.g., sharks and fish).

Two fossil localities have been found in the undifferentiated Ardath Shale/Scripps Formation in the vicinity of the project. These localities produced fossils of plants (e.g., horsetails), marine invertebrates (e.g., crabs, snails, and clams), and marine vertebrates (e.g., fish).

The results of the background research and field survey indicate that the project has the potential to cause adverse impacts or significant impacts to significant paleontological resources and that these adverse impacts or significant impacts can be eliminated with the recommended measures set forth in this report.

S.4 Recommendations

Full-time paleontological monitoring is recommended during construction ground disturbances along the project alignment between the Santa Fe Depot and the Nobel Drive Station due to the presence of geologic units that have been determined to have a high paleontological sensitivity in and adjacent to the study area.

Part-time paleontological monitoring is recommended in the University of California, San Diego (UCSD) area from the Nobel Drive Station to the UTC Transit Center. In the event that any fossil discoveries are encountered during monitoring activities, a qualified paleontologist would evaluate their significance. In the event fossil remains are identified during ground disturbances, paleontological mitigation will allow for the salvage of potentially significant fossils and associated data of scientific importance that otherwise might be lost to earth-moving activities. If the find is determined to be significant, full-time monitoring in this area would be required for the duration of construction in the area. This conclusion is consistent with the UCSD 2004 Long Range Development Plan Final Environmental Impact Report (UCSD, 2004).
Paleontological monitoring is recommended only during the construction phase of the project. No mitigation measures are necessary during operation.

Implementation of the recommended mitigation measures during project construction will reduce potential adverse impacts to paleontological resources to a less than significant level.
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Chapter 1.0 – Introduction

1.0 INTRODUCTION

The Federal Transit Administration (FTA) and the San Diego Association of Governments (SANDAG) are preparing a Draft Supplemental Environmental Impact Statement and Subsequent Environmental Impact Report for the Mid-Coast Corridor Transit Project in San Diego, California. The project is approximately 11 miles in length and is located in the City of San Diego, County of San Diego, California (Figure 1-1 and Figure 1-2). The purpose of this project is to improve transit travel times and reliability while reducing the number of transfers, making transit a more attractive mode of travel. The FTA is serving as lead agency for the National Environmental Policy Act (NEPA) of 1969, and SANDAG is serving as lead agency for the California Environmental Quality Act (CEQA) of 1970.

This Paleontological Survey Report was prepared to comply with current state environmental review policies. CEQA and the CEQA Guidelines require lead agencies to evaluate proposed projects for the potential to cause impacts to significant paleontological resources.
Figure 1-1. Mid-Coast Corridor Transit Project Vicinity Map

Source: SANDAG, 2011
Figure 1-2. Mid-Coast Corridor Transit Project Location Map

Source: SANDAG, 2013
Figure 1-2. Mid-Coast Corridor Transit Project Location Map (continued)

Source: SANDAG, 2013
2.0 BACKGROUND

The Federal Transit Administration (FTA) and the San Diego Association of Governments (SANDAG) have prepared a Supplemental Environmental Impact Statement and Subsequent Environmental Impact Report (SEIS/SEIR) for the Mid-Coast Corridor Transit Project in San Diego, California. The SEIS/SEIR supplements the following environmental documents: the Mid-Coast Corridor Alternatives Analysis/Draft Environmental Impact Statement/Draft Environmental Impact Report (Metropolitan Transit Development Board [MTDB], 1995a); the Final Environmental Impact Report for the Mid-Coast Corridor (MTDB, 1995b); and the Mid-Coast Corridor Project Balboa Extension and Nobel Drive Coaster Station Final Environmental Impact Statement (MTDB, 2001). The FTA is serving as lead agency for the SEIS in accordance with the National Environmental Policy Act (NEPA) of 1969, and SANDAG is serving as lead agency for the SEIR in accordance with the California Environmental Quality Act (CEQA) of 1970.

The Draft SEIS/SEIR includes an analysis of the affected environment and potential impacts on the social, economic, cultural, and natural environment that would result from constructing and operating the alternatives under consideration within the Mid-Coast Corridor. The alternatives being considered and analyzed for potential impacts include a No-Build Alternative and a Build Alternative.

The Build Alternative is the Mid-Coast Corridor Transit Project, or project, as it is planned to operate in 2030. The project consists of extending the existing San Diego Trolley (Trolley) Blue Line from the Santa Fe Depot north to the Old Town Transit Center (OTTC), via the existing Trolley tracks, and then north along new tracks to the University Towne Centre (UTC) Transit Center in University City, with eight new stations at Tecolote Road, Clairemont Drive, Balboa Avenue, Nobel Drive, University of California, San Diego (UCSD) West Campus, UCSD East Campus, Executive Drive, and the UTC Transit Center.

The Build Alternative includes two options for consideration. One option provides an additional station at the Veterans Administration (VA) Medical Center and the other is a design option for the aerial alignment along Genesee Avenue in University City.

2.1 Purpose of the Report

This technical report describes the affected environment and evaluates the potential impacts of the Build and No-Build Alternatives. It also describes the regulatory framework and methodologies used for the impact analysis. The analysis evaluates short term, long term, and cumulative effects, both direct and indirect. If the project would result in adverse effects, this technical report identifies measures to reduce or eliminate the impacts, which are additionally carried forward and included in the Draft SEIS/SEIR.

2.1.1 Organization

This technical report contains the following chapters:

- Summary
- Introduction
2.1.2 Impact Evaluation

Projects can result in either beneficial or adverse impacts to the environment. CEQA requires an evaluation of the project impacts on paleontological resources. This report uses the Mid-Coast Corridor Transit Project Draft SEIS/SEIR Plan Set (SANDAG, 2013a) in describing the project. The analysis uses several different approaches to identify the potential impacts of the Mid-Coast Corridor Transit Project. Together, these approaches provide an accurate disclosure of the Mid-Coast Corridor Transit Project impacts in compliance with CEQA requirements.

2.1.2.1 National Environmental Policy Act

The American Antiquities Act, which provides the basis for consideration of paleontological resources under NEPA, only applies to paleontological resources found on federal land. Because none of the area within the right-of-way for the Mid-Coast Corridor Transit Project is federal land, paleontological resources are not evaluated under NEPA for the project.

2.1.2.2 California Environmental Quality Act

CEQA requires that determinations of significance be made for environmental impacts by measuring project impacts and comparing the project-related impacts to identified topic-specific significance thresholds. Impacts created by the Build Alternative are compared to existing conditions to determine direct and indirect short-term and long-term impacts with project implementation. Existing conditions generally refers to conditions in 2010 when the Notice of Preparation for CEQA was issued.

The No-Build Alternative serves as the CEQA “No Project” alternative in the Draft SEIS/SEIR. The No-Build Alternative represents what the Mid-Coast Corridor would be like in 2030 without the Mid-Coast Corridor Transit Project. The CEQA analysis of the No-Build Alternative focuses on which impacts would be different without the Mid-Coast Corridor Transit Project. One change that is evaluated under CEQA is the continuation and enhancement of bus Route 150.

For CEQA impacts assessment, the level of impact is expressed in terms of whether it is not significant, less than significant, or potentially significant. This determination is based on analysis comparing the impact to the thresholds of significance for each topic. Following identification of appropriate mitigation measures, potentially significant impacts
can then be further classified as either less than significant with mitigation incorporated or significant and unavoidable.

The CEQA cumulative analysis identifies the aggregate or total impact that results when the impacts of other actions are combined with the direct and indirect impacts of the Build Alternative. If a cumulatively significant condition is identified, CEQA requires the analysis to determine if the project’s contribution to the significant condition is “cumulatively considerable” and thus, significant.

2.2 Description of the Mid-Coast Corridor

The Mid-Coast Corridor is the area centering on Interstate (I-) 5 and extending from Downtown San Diego on the south to UCSD and University City on the north (Figure 2-1). Located entirely within the City of San Diego, the corridor is bounded by the Pacific Ocean on the west and by I-805 and State Route (SR) 163 on the east. The Mid-Coast Corridor is topographically diverse, with terrain ranging from coastal beaches and bays to inland areas containing steep hillsides and narrow canyons.

The Mid-Coast Corridor is characterized by dense urban centers and an abundance of regional activity centers and other major trip generators. Dense population and employment centers currently anchor both the northern and southern ends of the Mid-Coast Corridor. The UCSD campus, the Westfield UTC shopping center, and regional hospitals are clustered in the north part of the corridor and represent the second most dense land uses in the county. At the south end of the corridor is the region’s only identified Metropolitan Center—Downtown San Diego—with the region’s densest land uses and high-rise development.

Other major land uses within or immediately adjacent to the corridor (Figure 2-1) include:

- Regional hospitals: Scripps Green Hospital, Scripps Memorial Hospital La Jolla (Scripps Hospital), UCSD Thornton Hospital, VA Medical Center, UCSD Medical Center Hillcrest, and Scripps Mercy Hospital
- Major colleges and universities: UCSD, University of San Diego, San Diego Mesa College, and San Diego City College
- Regional shopping centers: Westfield UTC, Fashion Valley, and Westfield Horton Plaza
- Major parks and visitor attractions: Mission Bay Park, San Diego Zoo, SeaWorld San Diego, Old Town San Diego State Historic Park, Balboa Park, the Gaslamp Quarter, San Diego Convention Center, Petco Park, Rose Canyon Open Space Park, and Marian Bear Memorial Park
- San Diego International Airport

2.3 Alternatives under Consideration

This section describes the No-Build and Build Alternatives, and Build Alternative options that were selected for consideration in this report.
Figure 2-1. Mid-Coast Corridor

Source: SANDAG, 2012
Note: The Trolley lines shown represent the 2010 Trolley operating plan.
2.3.1 No-Build Alternative

This section describes the transportation improvements assumed in the No-Build Alternative within the Mid-Coast Corridor that are evaluated in this technical report and carried forward into the Draft SEIS/SEIR, as well as 2030 horizon year conditions resulting from projected development and changes in population and employment.

2.3.1.1 Highway and Transit Facility Improvements from the 2030 RTP

The No-Build Alternative is evaluated in the context of the existing transportation facilities and services in the Mid-Coast Corridor (as characterized in 2010) and other facilities and services identified in the Revenue Constrained Scenario of the 2030 San Diego Regional Transportation Plan: Pathways for the Future (2030 RTP) (SANDAG, 2007). Since the No-Build Alternative provides the background transportation network against which the Build Alternative’s impacts are identified and assessed, the No-Build Alternative excludes the Mid-Coast Corridor Transit Project but does include continued and enhanced bus service on Route 150. The No-Build Alternative that was originally developed for the Draft SEIS/SEIR, and presented during the CEQA and NEPA scoping processes, was derived from the 2030 RTP. In October 2011, the SANDAG Board of Directors adopted a new regional transportation plan that extended the planning horizon from 2030 to 2050, the 2050 Regional Transportation Plan: Our Region, Our Future (2050 RTP) (SANDAG, 2011). However, the 2030 RTP has been retained as the basis for the No-Build Alternative because, as discussed below, no substantive differences exist between the 2030 and 2050 RTPs that would alter the environmental analysis.

The 2050 RTP was reviewed to determine if it includes any additional funded projects planned for implementation in the Mid-Coast Corridor by 2030 and not included in the 2030 RTP. The only major new project in the Mid-Coast Corridor is the extension of the Trolley Blue Line from the UTC Transit Center to Mira Mesa via the Sorrento Mesa/Carroll Canyon area. This extension is not an alternative to the Mid-Coast Corridor Transit Project since it is dependent on the Mid-Coast Corridor Transit Project’s implementation. The Mira Mesa/Sorrento Mesa extension has not been considered in a corridor-level alternatives analysis. Future analysis under NEPA and CEQA also would be required. Thus, this extension is not included in either the No-Build Alternative or the Build Alternative.

The 2050 RTP also was reviewed to determine if it includes any Mid-Coast Corridor projects that are assumed in the No-Build Alternative that are not in the 2030 phase of the 2050 RTP. The only major project not in the 2030 phase of the 2050 RTP is the addition of high-occupancy vehicle (HOV) lanes in the segment of I-5 from I-8 to La Jolla Village Drive. The 2050 RTP defers the implementation of the HOV lanes in this segment until the decade ending in 2050. Because the 2050 RTP only defers implementation of the HOV lanes, but still includes them, they are assumed in the design and analysis of the Mid-Coast Corridor Transit Project under the No-Build and Build Alternatives. The other Mid-Coast Corridor projects in the 2050 RTP that are not in the 2030 RTP and that are scheduled for implementation by 2030 are minor projects (e.g., minor adjustments to bus routes, increased bus frequency) and are not expected to have any substantial bearing on the analysis of the Mid-Coast Corridor Transit Project.
Figure 2-2 shows the location of the major projects included in the Revenue Constrained Scenario of the 2030 RTP located within the Mid-Coast Corridor and assumed to exist in the No-Build Alternative. These include the following major improvements from the 2030 RTP:

- Double tracking of the Los Angeles—San Diego—San Luis Obispo Rail Corridor Agency (LOSSAN) tracks and other rail improvements, with an increase in frequency of COASTER service to every 20 minutes during peak periods and to every 60 minutes during off-peak periods in both directions.

- HOV lanes on I-5 from I-8 north to Oceanside, with direct access ramps (DARs) at various locations, of which the DARs at Voigt Drive would be located within the Mid-Coast Corridor. The HOV lanes would be restricted to vehicles with two or more occupants.

- Combination of HOV and Managed Lanes on I-805 from I-5 to South Bay, with DARs at Carroll Canyon Road and Nobel Drive.

- Trolley low-floor system improvements to the Trolley Blue and Orange Lines, including station platform, power, and signaling improvements to allow extension of the Trolley Green Line to the 12th and Imperial Avenue Transit Center and use of low-floor vehicles systemwide.

### 2.3.1.2 Transit System Improvements

The No-Build Alternative transit system within the Mid-Coast Corridor assumes services planned to be in operation in or by 2030. As with the existing transportation system, the No-Build Alternative transit system consists of Trolley services operated by the Metropolitan Transit System (MTS), Amtrak intercity passenger rail services, North County Transit District (NCTD)-operated COASTER commuter rail services, and MTS and NCTD bus transit services. MTS-operated bus services include local, express, limited express, and BRT services.

Under the No-Build Alternative, the 2030 Trolley operating plan would result in operation of the Trolley Blue Line from the San Ysidro Transit Center at the U.S.–Mexico International Border through Downtown San Diego to the Santa Fe Depot; the Trolley Green Line would operate north and east from the 12th and Imperial Avenue Transit Center through the OTTC and Mission Valley to Santee. The Trolley Orange Line would operate from Gillespie Field through Downtown San Diego to America Plaza.

Figure 2-3 shows the major MTS bus routes serving the Mid-Coast Corridor under the No-Build Alternative. Table 2-1 provides bus route information on fares and service frequency during both peak (i.e., 6:00 to 9:00 a.m. and 3:00 to 6:00 p.m.) and off-peak (i.e., 9:00 a.m. to 3:00 p.m.) periods. Service hours after 6:00 p.m. would be similar to existing operations.

In addition to existing transit services, the No-Build Alternative assumes improvements to existing bus transit and light rail transit (LRT) services operated by MTS. The following sections describe these improvements.
Figure 2-2. No-Build Alternative Transportation Improvements

Source: SANDAG, 2013
Figure 2-3. No-Build Alternative Major Bus Routes

Source: SANDAG, 2012
Table 2-1. No-Build Alternative Bus Operating Plan in 2030

<table>
<thead>
<tr>
<th>Route</th>
<th>Description</th>
<th>Frequency of Service (Peak: 6:00 to 9:00 a.m. / Off-Peak: 9:00 a.m. to 3:00 p.m.)</th>
<th>Fare</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>OTTC to Garnet and Bayard</td>
<td>15.0 / 15.0</td>
<td>$2.00</td>
</tr>
<tr>
<td>9</td>
<td>Garnet and Bayard to OTTC</td>
<td>15.0 / 15.0</td>
<td>$2.00</td>
</tr>
<tr>
<td>25</td>
<td>Clairemont Mesa to Fashion Valley Trolley Station</td>
<td>15.0 / 15.0</td>
<td>$2.00</td>
</tr>
<tr>
<td>27</td>
<td>Mission and Felspar to Clairemont Mesa</td>
<td>15.0 / 15.0</td>
<td>$2.00</td>
</tr>
<tr>
<td>30</td>
<td>UTC Transit Center to B and 9th Street</td>
<td>10.0 / 10.0</td>
<td>$2.25</td>
</tr>
<tr>
<td>31</td>
<td>Mira Mesa Transit Center to UTC Transit Center</td>
<td>15.0 / 15.0</td>
<td>$2.00</td>
</tr>
<tr>
<td>41</td>
<td>Fashion Valley Transit Center to UCSD West</td>
<td>10.0 / 10.0</td>
<td>$2.25</td>
</tr>
<tr>
<td>44</td>
<td>OTTC to Morena Blvd and Balboa Ave</td>
<td>7.5 / 7.5</td>
<td>$2.25</td>
</tr>
<tr>
<td>50</td>
<td>Park Blvd and Broadway to UTC Transit Center</td>
<td>15.0 / 15.0</td>
<td>$2.50</td>
</tr>
<tr>
<td>105</td>
<td>OTTC to UTC Transit Center</td>
<td>15.0 / 15.0</td>
<td>$2.25</td>
</tr>
<tr>
<td>120</td>
<td>Kearny Mesa Transit Center to 3rd and Market St</td>
<td>15.0 / 15.0</td>
<td>$2.25</td>
</tr>
<tr>
<td>150*</td>
<td>5th and Broadway to UTC Transit Center</td>
<td>15.0 / 30.0</td>
<td>$2.50</td>
</tr>
<tr>
<td>201/202</td>
<td>SuperLoop</td>
<td>7.5 / 7.5</td>
<td>$2.25**</td>
</tr>
<tr>
<td>276</td>
<td>UCSD Route—Voigt Drive Loop</td>
<td>15.0 / 15.0</td>
<td>**</td>
</tr>
<tr>
<td>284</td>
<td>UCSD Route—UCSD West to Scripps Institution of Oceanography</td>
<td>15.0 / 15.0</td>
<td>**</td>
</tr>
<tr>
<td>921</td>
<td>Mira Mesa Transit Center to UCSD West</td>
<td>15.0 / 15.0</td>
<td>$2.25</td>
</tr>
<tr>
<td>960</td>
<td>UTC Transit Center to Euclid Avenue Trolley Station</td>
<td>25.0 / No service</td>
<td>$2.50</td>
</tr>
</tbody>
</table>

Source: SANDAG, 2012
Notes: * Not included in 2030 RTP
** Free for UCSD students and faculty

OTTC = Old Town Transit Center; UCSD = University of California, San Diego; UTC = University Towne Centre

2.3.1.3 Bus Transit Service Improvements

The Mid-Coast Corridor Transit Project is excluded from the No-Build Alternative to represent corridor conditions without the project. Without the Mid-Coast Corridor Transit Project, more direct transit service would be needed to connect Downtown San Diego, the OTTC, and University City. To meet this need, continuing service on the existing Route 150, which provides bus transit services between Downtown San Diego, the OTTC, and University City, was added to the No-Build Alternative to replace the Mid-Coast Corridor Transit Project. Figure 2-4 shows the bus route and station locations for Route 150 under the No-Build Alternative.

Under the No-Build Alternative, the existing Route 150 would be modified to operate along Broadway in Downtown San Diego and along Pacific Highway from Downtown San Diego north to the OTTC. From the OTTC north, Route 150 would be modified to operate within the proposed I-5 HOV lanes north to Nobel Drive. This modification to Route 150 would improve travel times over the existing Route 150, which operates in the general-purpose lanes on I-5 north to Gilman Drive. Route 150 would operate at a frequency of 15 minutes during peak periods and 30 minutes during off-peak and midday periods. The service would be operated using articulated buses. Fares are assumed to be $2.50 for a one-way trip.
Figure 2-4. No-Build Alternative Bus Route 150

Source: SANDAG, 2012
2.3.1.4 Trolley Service Improvements

In addition to the bus service improvements, the No-Build Alternative assumes service frequency improvements to the existing Trolley system, as identified in the Revenue Constrained Scenario of the 2030 RTP and shown in Figure 2-5. Under the No-Build Alternative, the frequency of service on the Trolley Blue Line would increase from 15 to 7.5 minutes during off-peak periods. Thus, the Trolley Blue Line would operate 7.5-minute service all day, and the Trolley Orange and Green Lines would continue to operate at 15-minute service all day.

Table 2-2 presents a summary of the Trolley operating plans for existing conditions and for the No-Build Alternative. The operating plans identify the service frequency during peak (i.e., 6:00 to 9:00 a.m. and 3:00 to 6:00 p.m.) and off-peak (i.e., 9:00 a.m. to 3:00 p.m.) periods, vehicle type, and fares for the Trolley Green, Blue, and Orange Lines. Service after 6:00 p.m. would be similar to existing operations.

Table 2-2. No-Build Alternative Trolley Operating Plan

<table>
<thead>
<tr>
<th>Route</th>
<th>Peak Frequency (6:00 to 9:00 a.m.)</th>
<th>Off-Peak Frequency (9:00 a.m. to 3:00 p.m.)</th>
<th>Vehicle Type</th>
<th>Fare (each way)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 Operating Plan (Existing Conditions)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trolley Green Line Santee Town Center to OTTC</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line San Ysidro Transit Center to OTTC</td>
<td>7.5</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Orange Line Gillespie Field to 12th and Imperial Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>2030 Operating Plan (No-Build Alternative)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trolley Green Line Santee Town Center to 12th and Imperial Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line San Ysidro Transit Center to Santa Fe Depot</td>
<td>7.5</td>
<td>7.5</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Orange Line Gillespie Field to America Plaza</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
</tbody>
</table>

Source: SANDAG, 2012
Note: OTTC = Old Town Transit Center

2.3.1.5 Trolley Vehicle Fleet and Maintenance Facilities

Operation of the No-Build Alternative Trolley operating plan in 2030 would require a fleet of 142 light rail vehicles (LRVs) including reserve, spare, and special-service vehicles. This represents an increase of eight vehicles over the existing fleet of 134 LRVs.

The maintenance shops located at 1255 Imperial Avenue in San Diego provide service and maintenance to the LRV fleet. The facility has the capacity to store approximately 200 vehicles, or 66 additional vehicles. The maintenance facilities would not require expansion under the No-Build Alternative.
Figure 2-5. No-Build Alternative Trolley Operating Plan in 2030

Source: SANDAG, 2012
2.3.1.6 Regional Growth and Development

The No-Build Alternative assumes regional growth and development consistent with the 2030 RTP, which uses the *Series 11: 2030 Regional Growth Forecast Update* adopted by SANDAG. This forecast is used as a basis for land use and demographic information in the transportation and traffic modeling. The *Series 11: 2030 Regional Growth Forecast Update: Process and Model Documentation* (SANDAG, 2008) presents a basic description of the SANDAG forecast models used in the 2030 Regional Growth Forecast Update. The conditions created by the No-Build Alternative in 2030, as predicted by the Series 11 forecast (adjusted to exclude the Mid-Coast Corridor Transit Project), include the expected effects of development projects consistent with adopted land use plans.

2.3.2 Build Alternative

The Build Alternative consists of the Mid-Coast Corridor Transit Project. This section describes the project, including minor modifications to bus services to improve access to stations and eliminate duplication of service with the extension of the Trolley Blue Line.

The Mid-Coast Corridor Transit Project provides for the extension of the Trolley Blue Line from the Santa Fe Depot in Downtown San Diego to the UTC Transit Center in University City. With the extension of the Trolley Blue Line, construction of the project would provide for continuous service on the Trolley Blue Line from the San Ysidro Transit Center at the U.S.–Mexico International Border to University City.

Figure 2-6 shows the project alignment and station locations and the VA Medical Center Station Option and the Genesee Avenue Design Option. The project would use the existing Trolley tracks for approximately 3.5 miles, from the Santa Fe Depot to a point just north of the OTTC and south of the San Diego River. The Trolley Blue Line trains would share the tracks with the Trolley Green Line trains. North of this point, the project includes construction of 10.9 miles of new double track extending to the terminus at the UTC Transit Center in University City.

In addition to the new double-track extension, the project includes eight new stations, upgrades to existing systems facilities between the Santa Fe Depot and the OTTC, and the acquisition of new Trolley vehicles for the extended project operation. Stations would be located at Tecolote Road, Clairemont Drive, Balboa Avenue, Nobel Drive, UCSD West Campus, UCSD East Campus, Executive Drive, and the UTC Transit Center. The project also includes an option for an additional station at the VA Medical Center.

The following sections describe the project alignment, stations, vehicles, power system and signaling, operating plan, and schedule for implementation of the project.

2.3.2.1 Alignment

The project alignment would follow the LOSSAN tracks within the existing MTS and City of San Diego right-of-way from the Santa Fe Depot to approximately 3,500 feet south of the I-5/Gilman Drive/La Jolla Colony Drive interchange. The alignment would then leave the LOSSAN right-of-way, enter California Department of Transportation (Caltrans) right-of-way, and parallel the east side of the I-5 corridor north to the I-5/Gilman Drive/La Jolla Colony Drive interchange. North of the interchange, the alignment would parallel the I-5..
Figure 2-6. Mid-Coast Corridor Transit Project

Source: SANDAG, 2013
corridor, traveling partially within Caltrans right-of-way and partially on private property. At about 2,500 feet south of Nobel Drive, the alignment would transition to an aerial structure and cross over to the west side of I-5 south of Nobel Drive. From Nobel Drive, the alignment would continue north to the UCSD West Campus, then cross back over to the east side of I-5 along Voigt Drive and terminate on Genesee Avenue at the UTC Transit Center. The alignment’s total length from the south side of the San Diego River to the terminus at the UTC Transit Center is 10.9 miles.

Plan and profile drawings for the project alignment and Genesee Avenue Design Option are provided in the Mid-Coast Corridor Transit Project Draft SEIS/SEIR Plan Set (SANDAG, 2013a), referred to as Draft SEIS/SEIR plan set. Right-of-way plans showing existing and proposed rights-of-way and temporary construction easements for the project and Genesee Avenue Design Option alignment, stations, and supporting facilities also are contained in the Draft SEIS/SEIR plan set. The Mid-Coast Corridor Transit Project Property Acquisitions Technical Report (SANDAG, 2013b) identifies property acquisitions and structures to be demolished as part of the project. The Mid-Coast Corridor Transit Project Construction Impacts Technical Report (SANDAG, 2013c) describes the construction methods, activities, and durations.

Figure 2-7 presents a conceptual plan and profile drawing of the project alignment, stations, and supporting facilities. The alignment for the project with the Genesee Avenue Design Option is basically the same as for the project without the design option. The only difference is that the Genesee Avenue Design Option uses straddle bents rather than columns to support the aerial structure and stations, and has different locations of special trackwork on Genesee Avenue.

Alignment North of OTTC to UTC Transit Center

North of the OTTC, the project alignment would be located primarily at grade within the existing MTS right-of-way, north to the vicinity of Gilman Drive/La Jolla Colony Drive. This railroad corridor is used by the COASTER commuter rail, Amtrak intercity rail, and Burlington Northern and Santa Fe freight rail. The project alignment would be located east of the existing LOSSAN tracks, from the OTTC to south of SR 52, with at-grade stations at Tecolote Road, Clairemont Drive, and Balboa Avenue.

The project alignment would use bridges to cross the San Diego River, Tecolote Creek, and Rose Creek, and would be grade separated over Friars Road and Balboa Avenue. South of SR 52, the alignment would transition to an aerial structure and would cross the existing LOSSAN tracks, continuing at grade west of the existing LOSSAN tracks. To accommodate the alignment along the westerly right-of-way, the existing LOSSAN tracks would be relocated east but would still be located within the MTS right-of-way. Just south of Gilman Drive/La Jolla Colony Drive, the alignment would leave the MTS right-of-way and enter the I-5 right-of-way. Along the I-5 corridor, the project alignment would be designed so as not to preclude the future widening of I-5.

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1 A straddle bent refers to a type of structure used to avoid a situation where the column would cause an obstruction (such as a fly-over ramp where the column might land in the roadway below). The straddle bent, as its name implies, straddles the roadway or other obstruction. It consists of a beam supported by columns on the outside.
Upon entering the I-5 right-of-way north of SR 52, the project alignment would extend at grade along the east side of I-5, crossing under La Jolla Colony Drive in an approximately 200-foot-long cut-and-cover underpass. North of that underpass, the alignment would continue at grade along the east side of I-5, generally within or adjacent to the I-5 right-of-way, and transition to an aerial structure to cross to the west side of I-5, south of Nobel Drive. The aerial alignment would continue north along the west side of I-5 to an aerial station at La Jolla Village Square (Nobel Drive Station).

Continuing north from the Nobel Drive Station, the project alignment would remain on an aerial structure, travel for approximately 160 feet along the southeast corner of the shopping center on the north side of Nobel Drive, then enter the I-5 right-of-way and travel along the west side of I-5 within the I-5 right-of-way. It would return to grade just north of the I-5/La Jolla Village Drive interchange. North of this interchange, the alignment would run at-grade for approximately 460 feet along the west side of I-5 and the east side of the VA Medical Center. An optional at-grade station would be located at the VA Medical Center. The station would be within the I-5 right-of-way, with access provided from the VA Medical Center property.

South of Gilman Drive, the project alignment would transition back to an aerial structure and enter the UCSD West Campus, crossing Gilman Drive and the surface parking lot located north of Gilman Drive on the UCSD campus. The aerial alignment would then cross Pepper Canyon and continue to an aerial station on the UCSD West Campus.

North of the UCSD West Station, the project alignment would turn east on an aerial structure on the UCSD campus and cross to the north side of Voigt Drive. It would continue east on the UCSD campus, crossing over I-5 and the corner of the Scripps Hospital surface parking lot located on the east side of I-5 and the north side of Voigt Drive. Column supports would be required along the west side of Warren Field and along the parking lots on the north side of Voigt Drive, both on the UCSD West Campus and at Scripps Hospital. The alignment would be located north of the existing northerly curb line of Voigt Drive to allow for future widening of Voigt Drive, which is proposed as part of the Caltrans I-5 North Coast Corridor Project currently under environmental review. The I-5 North Coast Corridor Project proposes to construct HOV DARs that connect to the north side of Voigt Drive. Construction of the DARs is scheduled for completion by 2020. To provide the required vertical clearance between the LRT alignment and the future DARs at Voigt Drive, the project alignment crossing I-5 would be located at an elevation higher than Voigt Drive.

On the east side of I-5, the project alignment would continue on aerial structure and cross to the south side of Voigt Drive in the vicinity of the Scripps Hospital driveway entrance, located north of the UCSD baseball field. The aerial alignment would continue on UCSD property to Genesee Avenue, where it would enter the street right-of-way.
Figure 2-7. Conceptual Plan and Profile of Mid-Coast Corridor Transit Project

Source: SANDAG, 2013a
Figure 2-7. Conceptual Plan and Profile of Mid-Coast Corridor Transit Project (continued)

Source: SANDAG, 2013a
Caltrans is proposing to realign Voigt Drive to connect to Genesee Avenue and realign Campus Point Drive to connect to Voigt Drive. Voigt Drive is located on UCSD property. The Mid-Coast Corridor Transit Project’s columns would be placed so as not to preclude the realignment of Voigt Drive and Campus Point Drive. Localized widening of Voigt Drive would be required to minimize use of straddle bents to support the aerial structure along Voigt Drive within the UCSD East Campus.

The aerial alignment would cross the southbound lanes of Genesee Avenue just west of Regents Road and continue south on an aerial structure in the median of Genesee Avenue, following the existing alignment of Genesee Avenue to a station at Executive Drive and a terminal station at the UTC Transit Center. The project’s Genesee Avenue Design Option is located in the segment between Regents Road and the project’s terminus. This design option would use straddle bents rather than some center columns along Genesee Avenue to reduce right-of-way acquisition from adjacent properties.

Figure 2-9 presents a conceptual plan view of the project alignment and Genesee Avenue Design Option showing the location of the center columns and straddle bents under each design concept. The plan set contains cross sections and plans with more detailed information on the location of the columns and straddle bents, including structure dimensions.

**Project with Center Column Design on Genesee Avenue**

Under the project, the support columns generally would be located in the center of the Genesee Avenue median, as shown in the visual simulation in Figure 2-8. The project would require two straddle bents along Genesee Avenue, as shown in Figure 2-9.

The first straddle bent would be located west of Regents Road where the alignment would enter Genesee Avenue at an angle. The second one would be located on Genesee Avenue at the Executive Square intersection. The straddle bents would have support columns either in the median of Genesee Avenue, along the south side of Genesee Avenue, or in the median of Executive Square. The remaining support columns would be spaced at approximately 125 to 210 feet apart. Localized widening of Genesee Avenue would be required to accommodate the support columns with necessary clearances and to maintain the number of existing traffic lanes.
Figure 2-9. Genesee Avenue Design Concepts

Source: SANDAG, 2012
Project with Straddle Bent Design Option on Genesee Avenue
The Genesee Avenue Design Option, which is visually simulated in Figure 2-10, would use some straddle bents in place of median support columns on Genesee Avenue, thereby reducing the amount of right-of-way acquisitions required by the project. The use of straddle bents along Genesee Avenue is the only change provided by this design option.

The straddle bents would be located on each side of the right-of-way or in the median of Genesee Avenue to support cross beams that would span the roadway. Approximately 16 straddle bents would be required for this design option (Figure 2-9). The straddle bents would include one at Regents Road, four in the vicinity of Eastgate Mall, six in the vicinity of Executive Square and Executive Drive, and five in the vicinity of Esplanade Court/UTC Driveway and the UTC Transit Center. The guideway and stations would rest on the cross beams with the roadway underneath. Right-of-way acquisitions under this design option would be confined primarily to column locations along the right-of-way edge and where the columns cannot fit within the existing right-of-way. The straddle bents would be spaced at approximately the same distances as the project’s center columns without the design option, as shown in Figure 2-9.

2.3.2.2 Stations
The project includes eight new stations for passenger access, plus an optional station at the VA Medical Center. All new stations would be side-platform stations with 360-foot-long platforms designed to accommodate up to four-car trains. All platforms would be fully accessible and comply with the Americans with Disabilities Act (ADA).

Canopies would be provided at each station and would cover portions of the platforms and fare collection areas. Fare collection equipment, consisting of ticket/smart card vending machines and Compass Card validators, would be provided at each station. These amenities would be placed as appropriate on the platform where boarding occurs or at station entrances. Other station amenities would include benches, information kiosks, and security features according to SANDAG Design Criteria. Bicycle lockers would be provided at all stations except at the UTC Transit Center. Bicycle lockers at this station would be provided during the planned reconstruction of the bus transit center in the future, which is a separate project from the Mid-Coast Corridor Transit Project. Parking and bus transfer facilities would be provided at five stations, as described later in this section. Lighting would be provided at all station platforms and parking areas.
For the at-grade stations south of Balboa Avenue where the southbound platform would be adjacent to the LOSSAN tracks, a screen wall would be constructed at the back of the platforms to shield passengers from the wind induced by a fast-moving Amtrak or COASTER train. On aerial platforms, a 10-foot-high safety fence or screen would be provided at the back of both platforms.

The new project stations include both at-grade and aerial stations. The project segment along the MTS right-of-way between the San Diego River crossing and Gilman Drive would include three at-grade stations at Tecolote Road, Clairemont Drive, and Balboa Avenue. The site concept plans developed for these stations are described below. More detailed station site plans for each of the stations are provided in the *Mid-Coast Corridor Transit Project Draft SEIS/SEIR Plan Set* (SANDAG, 2013a).

- **Tecolote Road Station**—This at-grade station would be located south of the existing Tecolote Road overcrossing (Figure 2-11). Primary access to the station for northbound traffic would be provided via the existing signalized intersection at West Morena Boulevard and Vega Street. A driveway for right turns in and out would be provided on West Morena Boulevard for southbound traffic. A traction power substation (TPSS) would be located immediately north of the station driveway on West Morena Boulevard. The station site would include 280 surface parking spaces, with 180 spaces adjacent to the west side of West Morena Boulevard and another 100 spaces to the south of Vega Street. Short-term parking spaces would be provided for pick up and drop off of passengers (referred to as kiss-and-ride). Bus stops and turnouts for transferring passengers would be provided on both sides of West Morena Boulevard by widening the roadway and removing approximately 15 existing on-street parking spaces along the east side of West Morena Boulevard. In the vicinity of the bus stops, a fence would be provided in the median of West Morena Boulevard to prevent passengers from crossing at mid-block. Pedestrian ramps and stairs would be constructed on the east side of West Morena Boulevard for access to the north and south sides of Tecolote Road. Additionally, a new sidewalk would be constructed along the east side of West Morena Boulevard to Knoxville Street.

- **Clairemont Drive Station**—This at-grade station would be located south of the existing Clairemont Drive overcrossing adjacent to Morena Boulevard (Figure 2-12). The station platforms would be located along the west side of Morena Boulevard and a 150-space surface parking lot would be located across the street on the east side. The station parking lot would include a site for a TPSS. Access to the station parking lot would be provided via driveways on Ingulf Street and Clairemont Drive. Pedestrian access from Clairemont Drive to the station would be provided by new stairs and ADA-compliant access ramps located on both sides of Clairemont Drive. A new bus turnout would be provided on the south side of Clairemont Drive. New sidewalks would be constructed along the east side of Morena Boulevard from Ingulf Street to north of Clairemont Drive and along the west side of Morena Boulevard from the north side of the station platform to Gesner Street. Pedestrian crossings between the east and west sides of Morena Boulevard and the station parking lot would be provided by existing crosswalks at the signalized intersections at Morena Boulevard/Ingulf Street and Morena Boulevard/Gesner Street.
Figure 2-11. Site Concept for Tecolote Road Station

Source: SANDAG, 2013

Figure 2-12. Site Concept for Clairemont Drive Station

Source: SANDAG, 2013
Balboa Avenue Station—This at-grade station would be located in the southwest quadrant of the Balboa Avenue/Morena Boulevard interchange (Figure 2-13). The station site would include a surface parking lot with approximately 220 spaces, five bus bays, and short-term parking for pick up and drop off of passengers. An additional on-street bus turnout would be provided on the west side of Morena Boulevard. To provide for bus and vehicular access to the station, the existing on ramp from eastbound Balboa Avenue to southbound Morena Boulevard would be removed and traffic would be diverted to the loop ramp connecting eastbound Balboa Avenue to Morena Boulevard. The loop ramp would be widened and its intersection with Morena Boulevard would be signalized, allowing traffic to turn south on Morena Boulevard. The westerly leg of this intersection would serve as the entrance to the station for buses and as an entrance and exit for vehicular traffic. Buses would exit the station via a new signalized intersection constructed at the southern end of the station site. Pedestrian access to the station from Morena Boulevard would be provided via new sidewalks on both sides of Morena Boulevard within the station area. Access from Balboa Avenue would be via ramps and stairs on both sides of the street. A pedestrian bridge would be provided across Balboa Avenue for access to the station from the north side of Balboa Avenue.

Figure 2-13. Site Concept for Balboa Avenue Station

Source: SANDAG, 2013
The project segment along the I-5 corridor between Gilman Drive and the alignment crossing of I-5 at Voigt Drive would include an aerial station at Nobel Drive, an optional at-grade station at the VA Medical Center, and an aerial station on the UCSD West Campus. The UCSD West Station includes two different station concepts depending on whether the VA Medical Center Station is included in the project. The site concept plans developed for these stations are described below.

- **Nobel Drive Station**—This aerial station would be located within an existing parking area on the west side of I-5 and south of Nobel Drive at the La Jolla Village Square shopping center (Figure 2-14). The station would include a joint-use parking structure with 260 transit parking spaces as well as replacement parking for the surface parking spaces lost as a result of constructing the station and parking structure at the shopping center. Access to the station platform would be provided by stairs and elevators. No bus stops would be constructed at this station as part of the project. Nobel Drive currently has bus stops on both sides of the street in the vicinity of the station.

  ![Figure 2-14. Site Concept for Nobel Drive Station](source:SANDAG, 2013)

- **VA Medical Center Station**—This optional at-grade station would be located at the VA Medical Center on the west side of I-5 and north of La Jolla Village Drive (Figure 2-15). The horizontal and vertical track alignment has been designed so as not to preclude this optional station under the Build Alternative. The station would be at approximately the same elevation as the surface parking lot of the VA Medical Center. No new parking or bus stops would be provided at this station.
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Figure 2-15. Site Concept for Optional VA Medical Center Station

- Figure 2-15. Site Concept for Optional VA Medical Center Station

connection to the hospital would be provided by improvements to the pedestrian paths between the station and the main hospital entrance. A TPSS would be located in Caltrans right-of-way, south of the station.

- UCSD West Station—This aerial station would be located at the north end of Pepper Canyon and west of the UCSD student housing complex (Figure 2-16). The station would be located just east of the campus center and the Price Center. No parking would be provided at the station.

Because the alignment would have to clear the existing parking lot at the south end of the canyon and Lyman Drive at the north end of the canyon, this station would be constructed at an elevation higher than the elevation of the canyon rim. North of the station, two to three shuttle bus stops and a bus turnaround area would be provided for the UCSD shuttle bus service. The shuttle bus area would be located at grade below the north end of the elevated station platforms. Stairs and an elevator would provide access to the north end of the station platform.

Without the Optional VA Medical Center Station, access to the VA Medical Center would be provided by stairs and an elevator at the south end of the station platform (as shown in the top inset in Figure 2-16). These stairs and elevators would descend to the elevation of the westerly canyon rim. A walkway would be constructed to connect to the existing pedestrian walkways on the UCSD West Campus. With the
Figure 2-16. Site Concepts for UCSD West Station (Build Alternative and VA Medical Center Station Option)

Source: SANDAG, 2013
Optional VA Medical Center Station (shown in the bottom inset in Figure 2-16), only stairs for emergency use would be provided at the south end of the platform because access to the VA Medical Center would be provided by the additional station.

The project segment east of I-5, along Voigt Drive, would include an aerial station on the UCSD East Campus west of Campus Point Drive, serving both the UCSD East Campus and Scripps Hospital. The site concept plan for the UCSD East Station is described below.

- UCSD East Station—This aerial station would be located along the south side of Voigt Drive, west of Campus Point Drive and the Preuss School, near Scripps Hospital (Figure 2-17). Station access would be provided by stairs and elevators. A pedestrian bridge would be provided across Voigt Drive for access to the north side of Voigt Drive. New sidewalks would be constructed on both sides of Voigt Drive to connect with the western end of the station. No station parking or new bus stops would be provided. A TPSS would be located to the west of the station platforms.

**Figure 2-17. Site Concept for UCSD East Station**
East of I-5 along Genesee Avenue, the project would include aerial stations at Executive Drive and at the UTC Transit Center. The site concept plans for these two stations, both with and without the Genesee Avenue Design Option, are described below.

- **Executive Drive Station**—This aerial station would be located in the center of Genesee Avenue, south of Executive Drive, and would span Executive Square (Figure 2-18). Station construction would require removal of the existing pedestrian bridge crossing Genesee Avenue. Pedestrian grade-separated access across Genesee Avenue at this location would be provided through the aerial station platform at Executive Drive via ramps, elevators, and stairway facilities connecting to the existing pedestrian facilities to the west and east sides of Genesee Avenue. Shuttle bus pullouts and passenger drop-off and pick-up areas would be constructed on both sides of Genesee Avenue. No parking would be provided at the station. A TPSS would be located near the southern end of the station site. The station layout and features under the Genesee Avenue Design Option (as shown in the bottom inset in Figure 2-18) would generally be the same as those under the Build Alternative (as shown in the top inset in Figure 2-18). However, under the Genesee Avenue Design Option, there would be no conflict between the existing pedestrian bridge and the proposed LRT guideway allowing the existing pedestrian bridge to remain in place. Minor modifications to the pedestrian bridge would be required to provide pedestrian access to the aerial LRT station.

- **UTC Transit Center**—This aerial station would be located in the center of Genesee Avenue, south of Esplanade Court/UTC Driveway, with pedestrian bridges to the Westfield UTC shopping center on the east and the Costa Verde shopping center on the west (Figure 2-19). The station would provide 260 transit parking spaces in a joint-use parking facility at the Westfield UTC shopping center. Access to the station parking facility would be via the intersection of Genesee Avenue and Esplanade Court/UTC Driveway. The station also would include a connection to the new bus transit center, which would be built as part of the expansion of the Westfield UTC shopping center. The Westfield UTC shopping center expansion is scheduled for completion before revenue service begins on the Mid-Coast Corridor Transit Project. A TPSS would be located near the southern end of the station site. Construction of the Build Alternative would require the removal of the pedestrian bridge across Genesee Avenue located mid-block between La Jolla Village Drive and Esplanade Court/UTC Driveway. Pedestrian access across Genesee Avenue would be provided approximately 500 feet to the south of the existing bridge at the intersection of Genesee Avenue and Esplanade Court/UTC Driveway. Grade-separated pedestrian access across Genesee Avenue would also be accommodated through the aerial station platform at the UTC Transit Center to be located just south of Esplanade Court/UTC Driveway via ramps, elevators, and stairway facilities connecting the LRT station to the parkway area along the west side of Genesee Avenue and the UTC Transit Center to the east of the LRT station. The station layout and features under the Genesee Avenue Design Option (as shown in the bottom inset in Figure 2-19) would generally be the same as those under the Build Alternative (as shown in the top inset in Figure 2-19). If the Genesee Avenue Design Option is constructed, the pedestrian bridge would be retained as there would be no conflict between the existing bridge and proposed LRT guideway.
Figure 2-18. Site Concepts for Executive Drive Station, with and without Genesee Avenue Design Option

Source: SANDAG, 2013
Figure 2-19. Site Concepts for UTC Transit Center, with and without Genesee Avenue Design Option

Source: SANDAG, 2013
2.3.2.1 Trolley Vehicle Fleet and Maintenance Facilities

The Trolley Blue Line extension would require 36 new LRVs to cover peak-period service with spares in 2030. In the opening year of revenue service, 25 of the 36 new LRVs would be required. Fare collection would be the same as the existing proof-of-payment system currently in use on the Trolley. No fare collection equipment would be provided on the vehicle.

The MTS maintenance plan for LRVs, including those for the project, centralizes all functions at the existing maintenance facilities located at 1255 Imperial Avenue in Downtown San Diego. No expansion of existing maintenance facilities would be required for the project.

2.3.2.2 Power System and Signaling

The LRVs would receive electrical power from overhead contact wires. Catenary support poles, approximately 25 feet high, would be located at approximately 150- to 180-foot intervals. The catenary poles generally would be located in the center of the project alignment. In some locations, the poles would be located on both sides of the Trolley tracks. The overhead electrical power lines would be suspended above the Trolley tracks.

Electricity to power the LRVs would be provided by TPSSs. The TPSSs would be of similar size and design to the existing substations used on the Trolley Green Line. Typical TPSS dimensions would be a 40-foot by 15-foot unmanned equipment enclosure within a 45-foot by 75-foot fenced site. Figure 2-20 shows an example of an existing TPSS.

Figure 2-20. Existing Traction Power Substation at Mission Valley Center Station

![Existing Traction Power Substation at Mission Valley Center Station](source: SANDAG, 2012)

Operation of the project would require 18 TPSSs, including four upgraded substations on three existing sites between Santa Fe Depot and the OTTC and 14 new substations. The TPSS locations and layouts are shown in the *Mid-Coast Corridor Transit Project*.
Draft SEIS/SEIR Plan Set (SANDAG, 2013a). Figure 2-21 illustrates the layout of a typical TPSS.

**Figure 2-21. Traction Power Substation Layout**

The project includes improvements and upgrades to three existing TPSS locations between Santa Fe Depot and the OTTC on Olive Street, on Bean Street, and at the OTTC. The site at Olive Street may require two substations. The extension of Trolley Blue Line service proposed on existing tracks between Santa Fe Depot and the OTTC also would require a new substation within the existing MTS Wright Street Yard. The other 13 new substations would be located north of the OTTC. Table 2-3 identifies the location of the existing substations and the proposed substation upgrades between Santa Fe Depot and the OTTC, and the proposed new substations north of the OTTC.

Communications and signaling (C&S) buildings centralize train control and communications for Trolley operations at each station. Each facility is an enclosure located within the station site area, typically adjacent to a station platform. Positioning of a C&S building must be selected to provide clearances for maintaining and servicing equipment and to maintain sight lines for LRT operations. Upgrades to the existing C&S system between the Santa Fe Depot and the OTTC would be required as part of the project; however, this would not require additional C&S buildings.

Other proposed physical improvements to the Trolley system south of the OTTC and north of Santa Fe Depot would include upgrades to existing systems, including the signaling system and the overhead catenary system (OCS) to accommodate all-day 7.5-minute Trolley Blue Line service. These potential improvements would be located within the existing railroad and MTS right-of-way, as described below:
Table 2-3. Traction Power Substations Locations

<table>
<thead>
<tr>
<th>No.</th>
<th>Stationing</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>64+00 Olive St, upgrade to an existing substation located along the east side of the right-of-way and addition of a second substation within the same site</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>101+50 Bean St, in City of San Diego right-of-way, may require modification to existing cul-de-sac</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>133+00 Wright Street Yard, within existing MTS property</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>171+00 OTTC, upgrade to an existing substation located along the west side of the right-of-way</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>199+30 South of the San Diego River and north of I-8, in City of San Diego right-of-way</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>210+00 North of San Diego River, east of the tracks along Anna Ave</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>240+60 At Tecolote Rd Station, along the east side of the tracks and south of Tecolote Creek</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>312+00 At Clairemont Dr Station, along the east side of Morena Blvd, full acquisition from a shopping center</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>349+50 South of Baker St, in Caltrans right-of-way, along the west side of existing tracks</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>400+00 North of Balboa Ave and south of Jutland Dr, partial take from graded land east of MTS right-of-way</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>456+00 Just north of Jutland Dr, undeveloped parcel east of MTS right-of-way</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>550+50 Just south of La Jolla Colony Dr, in Caltrans right-of-way, along east side of tracks</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>600+50 Undeveloped parcel next to Charmant Dr and east of the alignment, just before the alignment crosses the freeway south of Nobel Dr</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>645+00 In Caltrans right-of-way along the west side of the alignment next to the VA Medical Center. Access would be from the parking lot at the VA Medical Center</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>694+00 Along the south side of Voigt Dr on the UCSD East Campus, next to the baseball field</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>752+50 Along the east side of Genesee Ave, just north of La Jolla Village Dr, partial acquisition of the landscape area in front of a high-rise office building</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>771+00 On Genesee Ave on partially acquired Westfield UTC shopping center property, near the south end of the UTC Transit Center platform</td>
<td></td>
</tr>
</tbody>
</table>

Source: SANDAG, 2013a
Notes: Caltrans = California Department of Transportation; MTS = Metropolitan Transit System; OTTC = Old Town Transit Center; UCSD = University of California, San Diego; UTC = University Towne Centre; VA = Veterans Administration

- LRT signaling system improvements would include additional track circuit relays at County Center/Little Italy, Middletown, and Washington Street Stations; upgrades to the block signaling system to accommodate the reduced headways between Santa Fe Depot and the OTTC; and adjustments to the crossing gate controllers to ensure an efficient gate operation also meeting requirements of the Manual on Uniform Traffic Control Devices (23 Code of Federal Regulations, Part 655, Subpart F).

- OCS improvements would include the addition of a double messenger wire instead of the existing single messenger wire.

- LOSSAN track improvements would provide for the relocation of an existing control point signal from the north side of Taylor Street to the south side of Taylor Street, just north of the existing station platform. The improvements would reduce railroad gate down time for northbound COASTER and Amtrak trains stopping at the OTTC.

2.3.2.3 Operating Plan

Operating plans were developed using ridership forecasts. These operating plans were then used to develop the capital and operating cost estimates and to provide the basis for the analysis of potential project impacts.
Table 2-4 presents the existing 2010 Trolley operating plan and the Trolley operating plans developed for the opening year and 2030 revenue service. The 2030 operating plan for the No-Build Alternative (also provided in Table 2-2) is included for comparative purposes.

Table 2-4. Trolley Operating Plans

<table>
<thead>
<tr>
<th>Route</th>
<th>Peak Frequency (6:00 to 9:00 a.m.)</th>
<th>Off-Peak Frequency (9:00 a.m. to 3:00 p.m.)</th>
<th>Vehicle Type</th>
<th>Fare (each way)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2010 Operating Plan (Existing Conditions)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trolley Green Line Santee Town Center to OTTC</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line San Ysidro Transit Center to OTTC</td>
<td>7.5</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Orange Line Gillespie Field to 12th and Imperial Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td><strong>2010 Operating Plan (Build Alternative)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trolley Green Line Santee Town Center to OTTC</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line San Ysidro Transit Center to UTC Transit Center</td>
<td>7.5</td>
<td>7.5</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Orange Line Gillespie Field to 12th and Imperial Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td><strong>Opening Year Operating Plan</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trolley Green Line Santee Town Center to 12th and Imperial Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line San Ysidro Transit Center to America Plaza</td>
<td>7.5</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line America Plaza to UTC Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Orange Line Gillespie Field to Santa Fe Depot</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td><strong>2030 Operating Plan (Build Alternative)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trolley Green Line Santee Town Center to 12th and Imperial Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line San Ysidro to UTC Transit Center</td>
<td>7.5</td>
<td>7.5</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Orange Line Gillespie Field to America Plaza</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td><strong>2030 Operating Plan (No-Build Alternative)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trolley Green Line Santee Town Center to 12th and Imperial Transit Center</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Blue Line San Ysidro Transit Center to Santa Fe Depot</td>
<td>7.5</td>
<td>7.5</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
<tr>
<td>Trolley Orange Line Gillespie Field to America Plaza</td>
<td>15.0</td>
<td>15.0</td>
<td>Trolley</td>
<td>$2.50</td>
</tr>
</tbody>
</table>

Source: SANDAG, 2012

Notes: *The Trolley Blue Line would operate as a continuous run from the San Ysidro Transit Center to the UTC Transit Center. During peak periods in the opening year, alternating trains would turn back at America Plaza, resulting in 15-minute headways north of America Plaza and 7.5-minute headways south of America Plaza.

OTTC = Old Town Transit Center; UTC = University Towne Centre
The 2010 operating plan (existing conditions) does not include the Build Alternative. Therefore, to evaluate project impacts compared to existing conditions, the Build Alternative was added into the 2010 operating plan to provide a basis for comparing project impacts to existing conditions.

At the startup of revenue operations, the project is expected to require 15-minute service during peak and off-peak periods. Figure 2-22 shows the operating plan for the opening year of service.

The proposed Trolley operating plan for the Build Alternative in 2030 presented in Table 2-4 includes the extension of the Trolley Blue Line to the UTC Transit Center. As shown in Figure 2-23, the Trolley Blue Line in 2030 would be operated as a single line with three-car trains from the existing San Ysidro Transit Center in the south to the UTC Transit Center in University City, with stops at all 29 intermediate stations. The Trolley Green and Orange Lines would operate the same as under the No-Build Alternative in 2030. Weekday Trolley Blue Line service in 2030 would operate every 7.5 minutes during peak periods (i.e., 6:00 to 9:00 a.m. and 3:00 to 6:00 p.m.) and during the off-peak midday period (i.e., 9:00 a.m. to 3:00 p.m.). The fare structure would be the same as previously described for the No-Build Alternative.

The Trolley operating plan in 2010 that includes the Build Alternative is the same as the 2010 operating plan except for extension of the Trolley Blue Line from the OTTC to the UTC Transit Center and an increase in service frequency to 7.5 minutes during the off-peak period. Thus, under the Build Alternative in 2010, the Trolley Blue Line would operate at 7.5-minute intervals during both peak and off-peak periods.

With extension of Trolley Blue Line service to the UTC Transit Center, the service provided by bus Route 150 operating between Downtown San Diego and University City would duplicate the new Trolley services and therefore would be eliminated with implementation of the project, consistent with the 2030 RTP. In addition to this modification, minor changes would be made to several bus routes to improve access to the new Trolley stations proposed under the Build Alternative. These modifications consist of rerouting of bus routes to connect to stations. The service frequency of the routes serving the stations would not change. Table 2-5 identifies routes serving the Trolley stations under the Build Alternative and shows which routes would be modified to serve the stations. No changes to other bus routes or the COASTER would be required.

2.3.2.4 Schedule

The project is currently in the Project Development phase of the New Starts process, which includes the completion of the NEPA and CEQA processes. Completion of the environmental review process is anticipated in mid-2014, following which SANDAG will seek FTA approval to advance the project to the Engineering phase pursuant to MAP-21. During the Engineering phase, SANDAG and FTA will negotiate a Full Funding Grant Agreement, which is anticipated in early 2015. Construction is assumed to begin in 2015, and revenue service is expected to start by the end of 2018.
Figure 2-22. Mid-Coast Corridor Transit Project Opening Year Trolley Operating Plan

Source: SANDAG, 2012
Figure 2-23. Mid-Coast Corridor Transit Project 2030 Trolley Operating Plan

Source: SANDAG, 2012
## Table 2-5. Build Alternative Bus Routes Serving Trolley Stations

<table>
<thead>
<tr>
<th>Route</th>
<th>Description</th>
<th>Frequency of Service</th>
<th>Build Alternative Stations Served</th>
<th>Modified under Build Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>OTTC to Garnet and Bayard</td>
<td>15 Off-Peak</td>
<td>OTTC, Balboa Ave</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Garnet and Bayard to OTTC</td>
<td>15 Off-Peak</td>
<td>OTTC, Balboa Ave</td>
<td>Yes</td>
</tr>
<tr>
<td>27</td>
<td>Mission and Felspar to Clairemont Mesa</td>
<td>15 Off-Peak</td>
<td>Balboa Ave</td>
<td>Yes</td>
</tr>
<tr>
<td>30</td>
<td>UTC Transit Center to B and 9th</td>
<td>10 Peak</td>
<td>Washington St, OTTC</td>
<td>No</td>
</tr>
<tr>
<td>31</td>
<td>Mira Mesa Transit Center to UTC Transit Center</td>
<td>15 Off-Peak</td>
<td>Executive Dr, UTC Transit Center</td>
<td>No</td>
</tr>
<tr>
<td>41</td>
<td>Fashion Valley Trolley Station to UCSD West</td>
<td>10 Off-Peak</td>
<td>UCSD West, Executive Dr, UTC Transit Center</td>
<td>No</td>
</tr>
<tr>
<td>44</td>
<td>OTTC to Morena and Balboa</td>
<td>7.5 Off-Peak</td>
<td>OTTC, Balboa Ave</td>
<td>No</td>
</tr>
<tr>
<td>50</td>
<td>Park and Broadway to UTC Transit Center</td>
<td>15 Off-Peak</td>
<td>Clairemont Dr, UTC Transit Center</td>
<td>No</td>
</tr>
<tr>
<td>105</td>
<td>OTTC to UTC Transit Center</td>
<td>15 Off-Peak</td>
<td>OTTC, Tecolote Rd, UTC Transit Center</td>
<td>No</td>
</tr>
<tr>
<td>150*</td>
<td>5th and Broadway to UTC Transit Center</td>
<td>*</td>
<td></td>
<td>Yes—Deleted</td>
</tr>
<tr>
<td>201</td>
<td>SuperLoop</td>
<td>7.5 Off-Peak</td>
<td>Nobel Dr, VA Medical Center, UCSD West, UCSD East, Executive Dr, UTC Transit Center</td>
<td>No</td>
</tr>
<tr>
<td>202</td>
<td>SuperLoop</td>
<td>7.5 Off-Peak</td>
<td>Nobel Dr, VA Medical Center, UCSD West, UCSD East, Executive Dr, UTC Transit Center</td>
<td>No</td>
</tr>
<tr>
<td>276</td>
<td>UCSD Route–Voigt Drive Loop</td>
<td>15 Off-Peak</td>
<td>VA Medical Center, UCSD West</td>
<td>Yes</td>
</tr>
<tr>
<td>284</td>
<td>UCSD Route–UCSD West to Scripps Institution of Oceanography</td>
<td>15 Off-Peak</td>
<td>UCSD West</td>
<td>Yes</td>
</tr>
<tr>
<td>921</td>
<td>Mira Mesa Transit Center to UCSD West</td>
<td>15 Off-Peak</td>
<td>UCSD West, Executive Dr, UTC Transit Center</td>
<td>No</td>
</tr>
<tr>
<td>960</td>
<td>UTC Transit Center to Euclid Avenue Trolley Station</td>
<td>30 Off-Peak</td>
<td>Executive Dr, UTC Transit Center</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: SANDAG, 2012
Note: * Route 150 does not operate under the Build Alternative.
OTTC = Old Town Transit Center; UCSD = University of California, San Diego; UTC = University Towne Centre; VA = Veterans Administration
3.0 REGULATORY CONTEXT

This chapter describes the federal and state regulations that protect paleontological resources and non-renewable resources, most notably California environmental regulations (the California Environmental Quality Act [CEQA] Guidelines [California Code of Regulations, Title 14, Division 6, Chapter 3, §15000–15387] and Public Resource Code [PRC] §5097.5). In addition, professional standards for the assessment and mitigation of adverse impacts on paleontological resources have been published by the Society of Vertebrate Paleontology (SVP) (SVP Conformable Impact Mitigation Guidelines Committee, 1995; 1996). Federal regulations applicable to paleontological resources are generally applicable only to resources on federal land. Because none of the right-of-way for the Mid-Coast Corridor Transit Project is located on federal land, paleontological resources are not evaluated under the National Environmental Policy Act for the project.

3.1 Federal

3.1.1 American Antiquities Act

The American Antiquities Act of 1906 (16 USC 431–433) was enacted with the primary goal of protecting cultural resources in the United States. As such, it prohibits the appropriation, excavation, injury, or destruction of “any historic or prehistoric ruin or monument, or any object or antiquity” located on public land under federal jurisdiction. It also establishes criminal penalties, including fines or imprisonment, for these acts, and sets forth a permit requirement for the collection of antiquities on federal lands. The act does not apply to paleontological resources on non-federal lands.

3.1.2 National Registry of Natural Landmarks

The National Natural Landmarks (NNLs) Program (16 USC 461–467), established in 1962 under the authority of the Historic Sites Act of 1935, recognizes and encourages the conservation of outstanding examples our country’s natural history. This program is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. NNLs are designated by the Secretary of the Interior, with the owner's concurrence, as being of national significance, defined as being one of the best examples of a biological community or geological feature within a natural region of the United States. NNLs include terrestrial communities, landforms, geological features and processes, habitats of native plant and animal species, or fossil evidence of the development of life (36 Code of Federal Regulations §62.2). The National Park Service administers the NNLs Program and, if requested, assists NNL owners and managers with the conservation of these important sites. NNLs are not granted the same protections as historic properties.

3.1.3 Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act of 2009 (16 USC 6301) is part of the Omnibus Public Land Management Act of 2009 (Public Law 111-011, Title VI Subtitle D). This act directs the Secretary of the Interior or the Secretary of Agriculture to manage and protect paleontological resources on federal land and develop plans for inventorying, monitoring, and deriving the scientific and educational use of such
resources. It prohibits the removal of paleontological resources from federal land without a permit, establishes penalties for violation of this act, and establishes a program to increase public awareness about such resources. The bill imposes criminal penalties for violating this act, which include prison terms of up to 10 years if convicted.

3.1.4 Section 106 of the National Historic Preservation Act

Under Section 106 of the National Historic Preservation Act, historic properties refer to archaeological and historic architectural resources only, and not paleontological resources. As such, the protections afforded to archaeological and historic architectural resources determined to be historic properties does not apply to paleontological resources. Additionally, there is no requirement under Section 106 to evaluate paleontological resources for listing as NNLs.

3.2 State

3.2.1 California Environmental Quality Act

Under the CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, §15000–15387) and CEQA statute (PRC §21000–21178), lead agencies are required to consider impacts on unique paleontological resources. CEQA is concerned with assessing impacts associated with the direct or indirect destruction of archaeological or historical resources (defined in §15064.5 of the CEQA Guidelines). It should be noted that paleontological resources are considered “historical resources” in this CEQA guideline.

CEQA protects paleontological resources as cultural resources and requires an evaluation of potential impacts to such resources. Unique paleontological resources are defined as fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or important to define a particular time frame or geologic strata, or that add to an existing body of knowledge in specific areas, in local formations or regionally (SVP Conformable Impact Mitigation Guidelines Committee, 1995).

SANDAG is the lead agency under CEQA and is responsible for review of the environmental impacts of the Mid-Coast Corridor Transit Project. In that capacity, SANDAG must assess the potential for significant direct, indirect, and cumulative impacts on the environment that may result from approval and implementation of the project.

3.2.2 Public Resources Code

PRC §5097.5 protects paleontological resources and states:

“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, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands… a violation of this section is a misdemeanor.”
As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state or any city, county, district, authority, or public corporation, or any agency thereof.
4.0 METHODOLOGY

This chapter describes the study area for paleontological resources and non-renewable resources and the data sources and methodologies used and standards applied to assess potential impacts of the Mid-Coast Corridor Transit Project.

4.1 Study Area

The Paleontological Area of Effect (study area) was delineated using the following three base maps from the U.S. Geologic Survey 7.5-minute series topographic quadrangles: Del Mar (1975), La Jolla (1975), and Point Loma (1994), California. For this report, the study area encompasses the project alignment from the Santa Fe Depot to the University Towne Centre Transit Center. The study area for assessing construction impacts is limited to areas that could be affected by the maximum extent of project-related ground disturbance along the alignment. The types of ground disturbances include the following: 1) construction of new tracks, new stations, and new traction power substations (TPSSs); 2) modification of existing public or private facilities, including existing TPSSs proposed for expansion; 3) use of temporary construction easements and construction staging areas; 4) grading; and 5) trenching and boring for utilities.

4.2 Data Sources

4.2.1 Paleontological Background Resources

On December 3, 2008, Garcia and Associates paleontological resources specialist Ferdinand Oberle, M.Sc. requested a full site records search from the Berkeley Natural History Museum and the San Diego Natural History Museum. The records search was performed in order to compile data regarding previously conducted surveys and recorded paleontological resources within a quarter-mile radius of the project alignment for the Mid-Coast Corridor Transit Project study area.

A review was conducted of relevant published geologic reports and of museum paleontological site records. This approach was followed by an analysis of the potentially disturbed geologic units in order to establish the direct relationship between paleontological resources and the geologic formations within which they are entombed. Through knowledge of the geology of a particular area, and the fossil productivity of particular formations that occur in the area, it is possible to predict where fossils will, or will not, be encountered.

Sources consulted during the records search include the following documents: City of San Diego Paleontological Guidelines (2007); Deméré and Walsh (1993); Kennedy and Peterson (1975); Kennedy and Tan (1977); and published geologic mapping (Kennedy and Tan, 2008).

The primary records holder for the study area is the Department of Paleontology at the San Diego Natural History Museum. Currently, the database includes more than 108,000 numbered species lots. It is the only database for paleontological records with significant findings for the study area. All paleontological records searches were
administered through PaleoServices, the consulting arm of the San Diego Natural History Museum.

4.2.2 Field Survey

A pedestrian field survey of the study area was conducted May 23–27, 2011, by paleontological resources specialist Ferdinand Oberle, M.Sc. A supplemental survey was performed by Matthew Steinkamp, M.S., on November 14–15, 2011. Survey constraints consisted of limited ground visibility in most parts of the survey area because of urbanization or vegetation cover. However, all mapped geological units could be identified at, or adjacent to, the study area.

4.3 Impacts Assessment

4.3.1 Paleontological Sensitivity

Paleontological resources include fossil plants and animals, and other evidence of past life, such as preserved animal tracks and burrows. Data provided by the stratigraphic location and associated geologic units of fossils also are invaluable to their proper interpretation.

Paleontological sensitivity is assigned to geologic units that have a high, undetermined, or low potential to contain paleontological resources (Society of Vertebrate Paleontology [SVP] Conformable Impact Mitigation Guidelines Committee, 1995). The paleontological sensitivity of a geologic unit is first determined by background research. A paleontologist then conducts a field survey to determine the extent of particular geologic units within a project area if it appears likely that such deposits may be exposed at the ground surface.

The levels of paleontological sensitivity are classified, per the SVP, as follows:

- **High**: Areas underlain by geologic units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered
- **Undetermined**: Areas underlain by geologic units for which little information regarding paleontological resources is available
- **Low**: Areas underlain by geologic units that are not known to have produced a substantial body of significant fossil material

The SVP identifies vertebrate fossils, their taphonomic\(^2\) and associated environmental data, and fossiliferous deposits as significant nonrenewable paleontological resources. Botanical and invertebrate fossils and assemblages also may be considered significant (SVP Conformable Impact Mitigation Guidelines Committee, 1995).

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\(^2\) Taphonomic processes (e.g., burial, decay, and preservation) are those that affect animal and plant remains after death that result in their fossilization.
4.3.2 Significance Criteria

Because of the rarity of fossils and the scientific information they provide, a paleontological resource can be considered significant if it meets any of the following criteria (Scott and Springer, 2003):

- Provides data on the evolutionary relationships and developmental trends among organisms, both living and extinct
- Provides data useful in determining the age(s) of the geologic unit or stratigraphy, as well as timing of associated geological events
- Provides information pertaining to biological community development and zoological/botanical biota interaction of the past
- Demonstrates unusual or spectacular circumstances in the history of life
- Is not abundant or found in other geographic locations and may be in danger of being depleted or destroyed by the elements or vandalism
- Is considered a type or topotype specimen

Ground-disturbing activities may reveal paleontological resources, but a determination must be made as to the significance of the resources. Significant paleontological resources must be diagnostic, or identifiable, to determine if any of the criteria above are applicable. Proper identification of paleontological resources is often difficult in the field; therefore, the recovery, preparation, and analysis of paleontological resources is necessary to determine their significance (Scott and Springer, 2003). This process must be done by, or under the supervision of, a qualified paleontologist (SVP Conformable Impact Mitigation Guidelines Committee, 1995). Microvertebrate fossils generally are not visible to the naked eye in the field and are recovered in the laboratory through processing of bulk samples from paleontologically sensitive geologic units (SVP Conformable Impact Mitigation Guidelines Committee, 1995; Scott and Springer, 2003).

The project would have a substantial adverse impact on paleontological resources if it would directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

4.4 Impact Determination

The California Environmental Quality Act (CEQA) does not define what constitutes “a unique paleontological resource or site;” however, Section 21083.2 states the following:

As used in this section, “unique archaeological resources” means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.

(3) Is directly associated with a scientifically recognized important prehistoric or historic event.

CEQA Section 15064.5 (a)(3)(D), also indicates “generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history.”

Based on the CEQA Environmental Checklist (Appendix G of the CEQA Guidelines) and the City of San Diego CEQA Significance Determination Thresholds (City of San Diego, 2011), SANDAG has developed the following thresholds of significance for use in evaluating the impacts of the Mid-Coast Corridor Transit Project.

For long-term operation and maintenance of the project:

- **Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?**

For construction of the project:

- **Would project construction cause substantial damage to, or destruction of, significant paleontological resources?**
5.0 EXISTING CONDITIONS

This chapter describes existing conditions in the study area in 2010 related to paleontological resources.

5.1 Geological Setting

The City of San Diego lies in the Coastal Plain province, which extends from the western edge of the Peninsular Ranges and runs roughly parallel to the coastline. The province is composed of dissected, mesa-like terraces that graduate inland into rolling hills. The terrain is underlain by sedimentary rocks composed mainly of sandstone, shale, and conglomerate beds, reflecting the erosion of the Peninsular Ranges to the east. This province is underlain by a sequence of marine and non-marine sedimentary rock units that record portions of the last 140 million years of earth history.

According to geologic mapping by Kennedy and Peterson (1975) seven geologic units underlie the Mid-Coast Corridor Transit Project study area. These are, from oldest to youngest, the Ardath Shale, Scripps Formation, San Diego Formation, Lindavista Formation, Bay Point Formation, Quaternary young alluvial floodplain deposits, and artificial fill. The Quaternary young alluvial floodplain deposits and artificial fill have no potential to entomb significant paleontological resources, and as such will not be discussed further in this report.

Paleontologically sensitive geological units and their represented ages are described below:

- The Pleistocene-age Bay Point Formation (approximately 85,000 to 700,000 years old)
- The Plio-Pleistocene-age Lindavista Formation (approximately 0.5 to 1 million years old [myo])
- The Pliocene-age San Diego Formation (approximately 2 to 4 myo)
- The Eocene-age Scripps Formation (approximately 46 to 48 myo)
- The Ardath Shale, which is of middle Eocene-age (approximately 37 to 48 myo)

Each of the above paleontologically sensitive geologic formations found in the study area are summarized below.

5.2 Paleontologically Sensitive Geologic Units

This section describes the five paleontologically sensitive units identified within the study area. Appendix B provides a table of the types of geological deposits, the potential fossil localities and the sensitivity rating that is used as the basis for assessing paleontological impacts. These paleontologically sensitive units are described in accordance with the City of San Diego Paleontological Guidelines (City of San Diego, 2002).
5.2.1 Bay Point Formation

The Bay Point Formation is a near shore marine sedimentary deposit. The Bay Point Formation is exposed along the northern shore of Mission Bay (i.e., Crown Point), along the San Diego waterfront, and throughout the City of Coronado. This formation has produced a large and diverse amount of well-preserved marine invertebrate and vertebrate fossils and is assigned a high paleontological resource sensitivity.

Within the study area, the Bay Point Formation was identified along the project alignment from the Santa Fe Depot to the Balboa Avenue Station (Appendix A, Map A).

Additionally, during the field survey, a fossil shell hash layer was observed in the Bay Point Formation along the eastern side of the Los Angeles—San Diego—San Luis Obispo Rail Corridor Agency tracks, west of the intersection of Morena Boulevard and McGraw Street (Figure 5-1 and Figure 5-2). The presence of the fossil shell hash layer indicates that there are paleontological resources present at the surface within the study area that could be affected by the project. The presence of the fossil shell hash layer also indicates that sediments present within the study area are favorable for the preservation of fossils.

Figure 5-1. Fossil Shell Hash Layer in the Bay Point Formation

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5.2.2 Lindavista Formation

The Lindavista Formation represents a marine and/or non-marine terrace deposit. These deposits accumulated on the sea floor during a period of dropping sea levels. Today, they form the extensive mesa surfaces characteristic of the Otay Mesa, San Diego Mesa, Linda Vista, Kearny Mesa, and Mira Mesa areas. Fossils are rare in the Lindavista Formation and have only been recorded in a few areas. The formation occurs over a large portion of the San Diego coast and is assigned a high paleontological resource sensitivity in Mira Mesa and Tierrasanta and a moderate resource sensitivity in all other areas of the city. The project alignment lies within the Mira Mesa and Tierrasanta areas of San Diego.

Within the study area, portions of the high paleontological resource sensitivity area of the Lindavista Formation were identified in the direct vicinity of the project alignment from the Executive Drive Station to the University Towne Centre (UTC) Transit Center (Appendix A, Map B).

5.2.3 San Diego Formation

The San Diego Formation is exposed extensively from Otay Mesa and Otay Ranch to Mission Valley, with isolated occurrences stretching along the Rose Canyon Fault Zone at Tecolote Canyon, Balboa Avenue, Rose Canyon, and all along the southern slopes of Mount Soledad from Interstate 5 to the sea cliffs at Pacific Beach. The San Diego Formation is a marine sedimentary deposit. The formation contains rich fossil beds that have yielded extremely diverse assemblages of marine organisms and is determined to have a high paleontological resource sensitivity. In addition, rare remains of terrestrial mammals, fossil wood, and leaves have been recovered from the San Diego Formation.

Within the study area, the San Diego Formation was identified in the direct vicinity of the project alignment from the Middletown Station to the Washington Street Station and northeast of the Balboa Avenue Station (Appendix A, Map C).

5.2.4 Scripps Formation

The Scripps Formation is considered to be potentially fossiliferous almost everywhere it occurs. Most of the fossils known from this formation consist of remains of marine organisms (e.g., bony fishes, sharks, and rays) and land mammals (e.g., uintather, brontothere, rhinoceros, and artiodactyl). Well-preserved pieces of fossil wood also have been recovered from the Scripps Formation. This formation crops out from Presidio Park in the south north to Del Mar, and from Clairemont east to the La Jolla valley. Based on the occurrence of marine invertebrate fossils and terrestrial vertebrates, the formation is assigned a high paleontological resource sensitivity.

Within the study area, the Scripps Formation was identified along the project alignment from the Clairemont Drive Station to the UTC Transit Center (Appendix A, Map D).

5.2.5 Ardath Shale Formation

The Ardath Shale Formation has yielded diverse and well-preserved assemblages of marine microfossils, macroinvertebrates, and vertebrates. This formation crops out from Soledad Valley in the north to La Jolla, Pacific Beach, and Clairemont in the south.
Because of its production of diverse and well-preserved assemblages of fossils, a high paleontological resource sensitivity is assigned to this formation.

Within the study area, the Ardath Shale Formation was identified along the project alignment from the Clairemont Drive Station to the Executive Drive Station (Appendix A, Map E).

5.3 Paleontological Sensitivity Rating Summary

Table 5-1 lists the paleontological sensitivity rating, by formation, within the study area. High sensitivity ratings mean there is a high likelihood of productivity within a formation. Therefore, most of the study area is likely to yield paleontologic resources.

<table>
<thead>
<tr>
<th>Geologic Unit</th>
<th>Sensitivity Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Point Formation</td>
<td>High</td>
</tr>
<tr>
<td>Lindavista Formation</td>
<td>High</td>
</tr>
<tr>
<td>San Diego Formation</td>
<td>High</td>
</tr>
<tr>
<td>Scripps Formation</td>
<td>High</td>
</tr>
<tr>
<td>Ardath Shale Formation</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: SANDAG, 2011

5.4 Paleontological Resources

The San Diego Natural History Museum has identified 88 recorded locations of fossil finds within a quarter-mile of the project alignment. None of the previously recorded fossil localities occur directly within the study area boundaries, but the fossil find locations can be within the same paleontologically sensitive geologic units as indicated in Figure 5-1.

Twenty-five of the fossil locations occur within the near shore marine Bay Point Formation. These localities have produced fossils of various marine invertebrates (e.g., bryozoans, barnacles, shrimp, crabs, ostracods, snails, clams, oysters, pectens, chitons, and tusk shells).

One fossil locality occurs in the marine Lindavista Formation. This locality produced fossils of marine invertebrates (e.g., clams).

Thirty-seven fossil localities were identified in the marine sedimentary San Diego Formation. These localities produced fossils of extremely diverse assemblages of marine organisms, in addition to rare remains of terrestrial mammals, fossil wood, and leaves.

Twelve fossil localities were discovered in the near shore marine Scripps Formation. These localities produced fossils of plants (e.g., almond trees, sycamore, willows, and horsetails), marine invertebrates (e.g., worms, bryozoans, crabs, snails, clams, tusk shells, and sea biscuits), and marine vertebrates (e.g., sharks and rays).
Eleven fossil localities were discovered from the deep marine Ardath Shale Formation. These localities produced fossils of plants, marine invertebrates (e.g., foraminifers, bryozoans, crabs, shrimp, brachiopods, snails, clams, oysters, tusk shells, and sea biscuits), and marine vertebrates (e.g., sharks and fish).

Two fossil localities were found in the undifferentiated Ardath Shale/Scripps Formation. These localities produced fossilized plants (e.g., horsetails), marine invertebrates (e.g., crabs, snails, and clams), and marine vertebrates (e.g., fish).

All paleontological localities within a quarter-mile of the project alignment are listed in Appendix B.
6.0 ENVIRONMENTAL IMPACTS

This chapter describes the impacts under the California Environmental Quality Act (CEQA) of the No-Build and Build Alternatives on paleontological resources in the Mid-Coast Corridor. Anticipated changes to existing conditions as a result of implementation of the Mid-Coast Corridor Transit Project also are described. The CEQA significance determination is described in Chapter 8.0. The analysis of impacts addresses direct and indirect and cumulative (long-term) impacts of the alternatives under consideration. Construction-related (short-term) impacts also are addressed in this chapter.

This chapter evaluates the potential impacts of the No-Build and Build Alternatives on paleontological resources, which occur within five geologic units of high sensitivity in the Mid-Coast Corridor study area. Each of these formations has the potential to yield significant paleontological resources.

6.1 Direct and Indirect Impacts

This section describes the direct and indirect long-term impacts of the project (both operational and facilities impacts of the No-Build and Build Alternatives).

6.1.1 No-Build Alternative

Under the No-Build Alternative, transit service improvements would be limited to the continuation and enhancement of services provided by the existing bus Route 150, which operates between Downtown San Diego, the Old Town Transit Center (OTTC), and University City. Route 150 would be modified to operate within the proposed Interstate (I-) 5 high-occupancy vehicle (HOV) lanes north of the OTTC to Nobel Drive. North of Nobel Drive to the University Towne Centre (UTC) Transit Center, Route 150 would operate on existing streets in mixed traffic. The improvement in transit services under the No-Build Alternative would not result in ground-disturbing activities; therefore, no adverse impacts on paleontological resources would occur.

6.1.2 Build Alternative

Under the Build Alternative, including the Genesee Avenue Design Option and Veterans Administration (VA) Medical Center Station Option, transit service improvements would include the implementation of the Mid-Coast Corridor Transit Project. The Trolley Blue Line would be extended north from the OTTC to University City. The routine operation and maintenance of this segment of the San Diego Trolley (Trolley) system would not require ground-disturbing activities. As such, these improvements would not result in long-term adverse impacts on paleontological resources.

6.2 Cumulative Impacts

This section describes the long-term cumulative impacts of the project (both operational and facilities impacts) of the No-Build and Build Alternatives.

The No-Build Alternative assumes that transportation improvements would be limited to improvements planned for and funded as identified in the Revenue Constrained Scenario of the 2030 San Diego Regional Transportation Plan: Pathways for the Future.
The analysis of cumulative impacts included the following major projects in the 2030 RTP that are located in the Mid-Coast Corridor, along with other projects and regional growth and demographic changes described in the 2030 RTP:

- Double tracking of the Los Angeles—San Diego—San Luis Obispo Rail Corridor Agency tracks and other rail improvements, with an increase in frequency of service of the COASTER to 20 minutes during peak periods and 60 minutes during off-peak periods in both directions
- Constructing high-occupancy vehicle (HOV) lanes on I-5 from I-8 north to Oceanside, with direct-access ramps (DARs) at various locations, of which the DARs at Voigt Drive would be located within the Mid-Coast Corridor; the HOV lanes would be restricted to vehicles with two or more occupants
- Adding a combination of high-occupancy vehicle and managed lanes on I-805 from I-5 to South Bay, with DARs at Carroll Canyon Road and Nobel Drive
- Improving the low-floor system for the Trolley Blue and Trolley Orange Lines, including station platform, power, and signaling improvements, to allow for the extension of the Trolley Green Line to the 12th and Imperial Avenue Transit Center and use of low-floor vehicles throughout the system

The No-Build Alternative includes continued and enhanced bus service for existing Route 150 in place of the Mid-Coast Corridor Transit Project to provide improved service between Downtown San Diego, the OTTC, and University City. Otherwise, the transit system within the project area would largely be the same as it is now (SANDAG, 2011).

Under the Build Alternative, including options, the same transportation improvements proposed under the No-Build Alternative, with the exception that the continuation of Route 150 would not occur and the Mid-Coast Corridor Transit Project would be implemented.

Adverse ground-disturbing activities are not expected to occur in relation to the operation of the major projects included in the Revenue Constrained Scenario of the 2030 RTP that are located within the Mid-Coast Corridor. Operation of the projects, as well as other public and private projects associated with regional development and growth, would result in little or no ground disturbance. Further, for each of these projects in the Mid-Coast Corridor, separate paleontological studies would be undertaken, environmental review would be conducted, and avoidance and mitigation measures similar to the recommendations in this report would be implemented to reduce the impacts, if any. Therefore, during operation, the No-Build and Build Alternatives would not result in cumulative adverse impacts on paleontological resources.

### 6.3 Construction Impacts

This section describes the short-term and cumulative impacts associated with construction of the Mid-Coast Corridor Transit Project. This description also is summarized in the *Mid-Coast Corridor Transit Project Construction Impacts Technical Report* (SANDAG, 2013c).
Paleontological resources corresponding to geologic and geographic site data and fossil-bearing strata could be adversely affected by ground disturbances within the study area during construction. Impacts on paleontological resources are expected to occur during construction only and once constructed, as indicated above, no adverse impacts are expected from continued operation and maintenance of the project.

6.3.1 No-Build Alternative

The No-Build Alternative would not result in any new excavation that could impact paleontological resources. The only change in planned projects that would occur if the Mid-Coast Corridor Transit Project is not implemented is continuation and enhancement of services of Route 150. This change would not involve any excavation that would impact paleontological resources. As a result, the No-Build Alternative would not result in adverse construction impacts on paleontological resources.

6.3.2 Build Alternative

Fossils can be significant nonrenewable scientific resources. Therefore, a loss of paleontological resources resulting from construction of the Build Alternative, including options, could result in an adverse impact to paleontological resources. Adverse impacts could include destruction and/or damage to fossils and their associated geologic units that may contain paleontological resources within the study area. The Build Alternative would result in construction-related ground disturbance, including grading related to station preparation activities, excavation for the La Jolla Colony Drive undercrossing, trenching and boring for utilities, and construction of new track north of the San Diego River.

As a result, construction has the potential to impact fossil localities within all five geologic units with a high sensitivity for paleontological resources in the study area. These fossiliferous sediments can crop out at the surface and also may be encountered below the surface at many locations within the study area. The formations (see Appendix A, Paleontology Sensitivity Maps), and their locations relative to project construction in the study are described below:

- The Bay Point Formation was identified along the project alignment from the Santa Fe Depot to the Balboa Avenue Station. Construction proposed in this area includes new track north of the OTTC; new stations at Tecolote Road, Clairemont Drive, and Balboa Avenue; and several new traction power substations (TPSSs), and a construction staging area at Clairemont Drive.

- The Lindavista Formation was identified in the direct vicinity of the project alignment from the Executive Drive Station to the UTC Transit Center. Construction in this area includes two new stations, the Executive Drive Station and the UTC Transit Center, plus associated new TPSSs and construction staging areas. An aerial alignment is proposed within this segment and foundations for the supporting columns that would require ground disturbance.

- The San Diego Formation was identified in the direct vicinity of the project alignment from the Middletown Station to the Washington Street Station and northeast of the Balboa Avenue Station. Proposed construction would include a new TPSS and staging area north of Balboa Avenue.
The Scripps Formation was identified along the project alignment from the Clairemont Drive Station to the UTC Transit Center. Construction proposed in this area includes new track from Clairemont Drive northward (with the exception of an aerial segment north of Ariane Drive) until the aerial tracks begin south of Nobel Drive, plus new stations at Clairemont Drive, Balboa Avenue, UCSD West Campus, UCSD East Campus, Executive Drive, and the UTC Transit Center. New bridges, several new TPSSs, and construction staging areas are proposed in this portion of the study area.

The Ardath Shale Formation was identified along the project alignment from the Clairemont Drive Station to the Executive Drive Station. Similar to construction proposed for the Scripps Formation, new track would be constructed from Clairemont Drive northward (with the exception of an aerial segment north of Ariane Drive) until the aerial tracks begin south of Nobel Drive, plus new stations at Clairemont Drive, Balboa Avenue, UCSD West, UCSD East, and Executive Drive. New bridges, several new TPSSs, and construction staging areas are proposed in this portion of the study area.

Construction-related activities may include vegetation clearing, grading, drilling, excavations, and any other earth-moving activity that might disturb or bury previously undisturbed fossiliferous sediments, making those sediments and their paleontologic resources unavailable for future scientific investigation. Construction impacts occur when vehicles or other work equipment affect sediments beyond previous ground disturbance by excavating, grading, or crushing bedrock either exposed in or underlying a project site. The results of the background research and field survey indicate that, without mitigation, adverse impacts to paleontological resources may occur during all ground-disturbing activities along the project alignment, including the construction of bridges, new stations, utilities, and the undercrossing.

Mitigation measures are discussed in Chapter 7.0 and conform to the professional standards determined by the Society of Vertebrate Paleontology (SVP) (SVP Conformable Impact Mitigation Guidelines Committee, 1995). During construction, implementation of the mitigation measures outlined in Chapter 7.0 would reduce impacts to undocumented paleontological resources.

6.3.3 Cumulative Construction Impacts

Cumulatively, any ground disturbances associated with the construction of projects that are located in the Mid-Coast Corridor, or that affect any of the five geologic units listed above, could result in cumulative impacts to the same formations (see Appendix A, Paleontology Sensitivity Maps). For each of these projects separate paleontological studies would be undertaken, environmental review would be conducted, and suitable mitigation (e.g., monitoring plan, recovery of resources) is likely to adequately mitigate impacts to resources within each formation. Thus, impacts to paleontological resources would be mitigated for both the Build Alternative and for other projects as the majority of resources would be recovered. However, even with mitigation, some damage or destruction of paleontological resources in the course of recovery could occur. As a result, the combined impact to paleontological resources from reasonably foreseeable projects located throughout the geologic units could result in an adverse cumulative impact.
7.0 MITIGATION MEASURES

This chapter describes the mitigation measures that will be incorporated to reduce potential adverse impacts on paleontological resources. These measures are based on the Society of Vertebrate Paleontology (SVP) guidelines (1995) and California Environmental Quality Act (CEQA) requirements, and are consistent with those used throughout California, with results that protect paleontological resources in areas of high paleontological sensitivity, while permitting completion of construction projects without lengthy delays.

Potential impacts on paleontological resources would occur during construction activities only. As such, mitigation would not be required after construction has been completed. Therefore, no mitigation measures are required for project operation under the No-Build or Build Alternatives.

Adverse impacts can be mitigated by collection, preservation, and curation of a representative sample of a fossil assemblage and its geologic information in the study area where ground disturbances are proposed. The mitigation measures described below were developed because the project could adversely impact geologic formations with the potential for significant paleontological resources.

7.1 Paleontological Resources Monitoring and Mitigation Plan

Prior to final project design and as a measure to protect significant paleontological resources, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) will be prepared and implemented during construction. The PRMMP will be developed in accordance with the guidelines of the SVP.

Additional details on the PRMMP are provided below.

7.1.1 Guidelines and Requirements of the PRMMP

The general guidelines and requirements of the PRMMP are as follows:

- SANDAG will retain the services of a qualified paleontologist to oversee the preparation and execution of the PRMMP that includes the key elements outlined in Section 7.1.2.
- The paleontologist will establish a monitoring plan, which will include procedures for temporarily halting or redirecting construction to allow for fossil identification, sample collection, processing, and evaluation.
- The areas to be examined will be determined based on project plans and in consultation between construction staff and the qualified paleontologist during pre-construction meetings and as needed throughout the construction process. Staging areas yet to be identified will be reviewed as part of this process.
- A qualified paleontological monitor will be present where ground-disturbances occur within the limits of the five paleontological sensitive formations, where fossiliferous sediments are exposed at the ground surface and anticipated depths.
The PRMMP will describe how much sampling is expected to take place within specific geologic formations, and it will describe sampling procedures to be used for fine-grained and course-grained units. It will include a description of the types of supplies and equipment required to collect, sample, pack, load, transport, and analyze fossils.

The PRMMP will include a discussion of procedures used to prepare, catalog, and deliver paleontological resources for curation in an appropriate museum or repository that meets the requirements of the SVP. The name and contact information for the repository that has agreed to curate the collection will be stated in the PRMMP.

In addition, Paleontological Awareness Training will be provided to all construction workers prior to the start of work on the project. Training will discuss the laws protecting paleontological resources, types of paleontological resources that could be encountered on the project, and the procedures to be followed if a paleontological resource were discovered.

Paleontological resources monitoring is recommended because of the potential for impacts on paleontologically sensitive geologic units and, therefore, potentially significant paleontological resources, during construction activities. Detailed procedures regarding monitoring will be presented in a PRMMP to be prepared specifically for this project.

### 7.1.2 Key Elements of a PRMMP

The methods for monitoring, data recovery, reporting, and curation of fossils are detailed in the following section.

#### 7.1.2.1 Monitoring

The following is a brief discussion of paleontological monitoring procedures.

A qualified professional paleontologist, as defined by the SVP, will be retained to supervise paleontological monitoring of ground-disturbance for paleontological resources. The paleontological monitor under the authority of the paleontologist will be authorized to redirect and/or halt construction activities at the location of a discovery, to review the potential paleontological material, and to protect the resource while it is evaluated. Monitoring will continue at the project area until the supervising qualified professional paleontologist determines that no native sediments are present or that significant paleontological resources are not likely to be discovered.

The qualified paleontological monitor must be able to:

- Recognize and appropriately handle fossils and paleontological deposits
- Take accurate and detailed field notes, photographs, and locality coordinates
- Document project-related ground-disturbing activities, their location, and other relevant information, including a photographic record

These data will be compiled as a comprehensive database for use in preparation of the data recovery report if significant resources are discovered during monitoring.
Upon discovery of possible fossil material, the monitor will redirect or halt project-related ground disturbance as appropriate. The paleontological monitor must be authorized to redirect or halt construction activities within 50 feet of a discovery, in accordance with the guidelines of the SVP, to (1) evaluate the resource and (2) make recommendations regarding its treatment. Should further investigation or protection of the discovery be warranted, the monitor will determine and clearly mark the boundaries of the discovery to avoid additional ground-disturbing activities at that location.

Macrovertebrate, microvertebrate, invertebrate, and plant fossils may be found during construction. Macrovertebrate fossils are often discernible to the eye and can be identified during observation of subsurface construction activities. All vertebrate fossil material must be recovered. Invertebrate and plant fossils are generally visible to the eye when encountered, and protocols require that a representative sample be recovered. Microvertebrate fossils generally are not visible to the eye and are not easily identified by observing ground-disturbing activities during construction. In the event that significant microvertebrate fossils are discovered during construction activities, a sampling program with laboratory work will be necessary. In the event that project-related ground disturbance affects geologic units with high paleontological sensitivity, the qualified paleontologist will determine the potential of the geologic unit to contain microvertebrate fossils. If a geologic unit is found to have a high potential for yielding microvertebrate fossils, it may be possible to mechanically remove bulk samples of soil matrix to process the samples offsite for fossil extraction.

Any sampling will be coordinated so as to avoid interference with construction-related activities. Per standard paleontological techniques in accordance with professional standards (SVP Conformable Impact Mitigation Guidelines Committee, 1995; 1996), an initial sample of 500 pounds will be screen-washed and sorted to determine if microvertebrate fossils are present. A construction contractor’s front-end loader is usually used to transport a single large scoop of material to a temporary stockpile area where the sediment is screen-washed for fossils by a paleontological technician or monitor. For each geological deposit in which microvertebrate fossils are present in the initial 500-pound sample, it may be appropriate to process up to an additional 5,500 pounds of matrix (SVP Conformable Impact Mitigation Guidelines Committee, 1995). The goal is to achieve a sample size that contains all representative fossil taxa that may be affected by construction activities in each paleontologically sensitive geologic unit. The total amount of matrix sampled per geological unit may vary as determined by the qualified paleontologist.

7.1.2.2 Data Recovery

In the event that paleontological resources are discovered, fossil specimens must be properly collected and sufficiently documented to be of scientific value. Exposed fossils left in situ are subject to weathering that damages the fossil; therefore, documentation and recovery of the fossil is necessary soon after any such material is exposed. Non-fossil sediment samples also will be collected with each recorded locality for lithologic and/or palynologic analysis. Depending on the nature of the fossil material, samples will be collected in buckets, cloth sample bags, or plaster field jackets.
For each fossil collected, the following information will be recorded twice: (1) in permanent ink on the outside of the container in which the material was collected, and (2) written on archival paper with permanent ink and placed within the container in which the fossils are stored:

- Date
- Project/Locality Name
- Field Locality Number/Code
- Geological Unit or Formation Name
- Global Positioning System Location in Latitude/Longitude or Universal Transverse Mercator Coordinates
- Depth Below Ground Surface
- Monitor/Collector Name

The fossil material will be documented on a fossil locality sheet. All fossils from the same area will be recorded as one locality unless obviously from a different lithologic or stratigraphic unit. The location of the sample(s) should be identified on project maps, and all photographs and comments will be referenced on the fossil locality sheet. Subsequently, the sample(s) will be brought to a laboratory for preparation, analysis, and identification.

7.1.2.3 Technical Reporting

In the event that paleontological resources are discovered, a data recovery report will be prepared that documents the methods and results of monitoring and provides an analysis of the nature and significance of fossils recovered. SANDAG, any supervising agencies, and the repository to which the fossil material is accessioned will receive copies of the final report. At a minimum, this report will include the following:

- A brief introduction to the background of the project from which they were recovered
- An account of the legislative context under which the fossils were recovered and accessioned
- A description of the project area and location
- A methods section detailing any background research conducted, monitoring procedures, and fossil recovery techniques
- A description of the geological and paleontological setting in the project area
- The results of monitoring activities, including an account of all fossil specimens recovered
- A discussion of the significance of the paleontological resources recovered
7.1.2.4 Curation of Recovered Fossils

After the data recovery report is prepared, the fossil material recovered during project monitoring activities will be accessioned for curation to a recognized paleontological repository, such as the San Diego Natural History Museum.

Fossils recovered during monitoring must be prepared for curation prior to accession (SVP Conformable Impact Mitigation Guidelines Committee, 1996). Preparation of fossil specimens for accession must be conducted according to specifications provided by the repository that will receive the specimens. Preparation and accession requirements vary with each repository and must be met before fossil material can be accessioned. Arrangements to accession fossil material should be made with such a repository before monitoring begins so that the repository can inform the qualified monitoring paleontologist of requirements necessary to accession the fossil material (SVP Conformable Impact Mitigation Guidelines Committee, 1996). The data recovery report (see above) also will be submitted to the repository at which the fossils are curated.

7.1.3 Paleontological Monitoring for the Project

7.1.3.1 Project Alignment between Santa Fe Depot and Nobel Drive Station

Full-time paleontological monitoring of project ground disturbance is recommended where all ground disturbances are expected along the project alignment between the Santa Fe Depot and the Nobel Drive Station because of the presence of highly sensitive geologic units in and adjacent to the study area. If the project requires removal of more than 2,500 cubic yards of soil, then a qualified paleontologist (SVP Conformable Impact Mitigation Guidelines Committee, 1995) will be required to directly monitor ground disturbances. However, if excavation of less than 2,500 cubic yards of soil is anticipated for removal by construction, then monitoring by a paleontological technician, working under the supervision of a qualified paleontologist, will be sufficient.

Full-time monitoring for paleontological resources between the Santa Fe Depot and the Nobel Drive Station will continue until the supervising paleontologist determines that no native sediments are present or that significant paleontological resources are not likely to be discovered.

7.1.3.2 Project Alignment between Nobel Drive Station and UTC Transit Center

Although the University of California, San Diego (UCSD) campus contains geological units such as Ardath Shale, Scripps Formation, Lindavista Formation, and the Bay Point Formation, which have a high paleontologic sensitivity rating, full-time paleontological monitoring is not required within this area; there are no known significant fossil localities at UCSD, and no significant fossils were encountered during paleontological monitoring conducted for 12 campus construction projects with substantial excavations between 1999 and 2004 (UCSD, 2004). Therefore, for the UCSD campus, the preponderance of evidence suggests that the likelihood of encountering fossils in the above formations is low. Because no unique geologic features or recorded significant paleontological resource sites are located on the campus, and the formations that underlie the campus have been demonstrated to have a low potential to produce fossils locally, it is unlikely that the construction activities between the Nobel Drive Station and the University
Towne Centre (UTC) Transit Center would directly or indirectly destroy, disturb, or remove a unique paleontological resource.

Part-time monitoring of excavations between the Nobel Drive Station and the UTC Transit Center is recommended. In the event that any unanticipated fossil discoveries at this location are encountered, fossils would require evaluation of their significance by a professional paleontologist. If the find is determined to be significant, full-time monitoring in this area would be required for the duration of the construction in this area. This conclusion is in accordance with the UCSD 2004 Long Range Development Plan Final Environmental Impact Report (UCSD, 2004).

If a find is not significant or no fossil discoveries are made, part-time monitoring for paleontological resources would continue during construction between the Nobel Drive Station and the UTC Transit Center until the supervising paleontologist determines that no native sediments are present or that significant paleontological resources are not likely to be discovered.

7.1.4 Unanticipated Discovery of Paleontological Resources

If an unanticipated discovery of paleontological resources occurs during construction anywhere along the alignment, the following will be implemented following the discovery:

- Stop all construction work within a 50-foot radius of the find until a qualified paleontologist can assess the significance of the find

If the discovery is determined to be significant or potentially significant by a qualified paleontologist, the following tasks will be undertaken by the qualified paleontologist:

- Recovery and analysis of fossil material and associated data
- Preparation of a data recovery report or other reports
- Accessioning recovered fossil material to an accredited paleontological repository, such as the San Diego Natural History Museum

A general recommendation is to avoid adverse impacts to paleontological resources. If avoidance is not feasible, the paleontological resources should be evaluated for their significance by a qualified paleontologist. If the resources are not significant, avoidance is not necessary. If the resources are significant, adverse impacts must be avoided or such impacts must be mitigated through data recovery. If significant paleontological resources are discovered, upon completion of project ground disturbance, a data recovery report should be prepared documenting the methods and results of the assessment. This report will be submitted to the lead agency and the accredited paleontological repository where the fossils are curated.

7.2 Implementation Responsibility

Implementation of the paleontological resources mitigation measures described in this section will be the responsibility of SANDAG and/or the construction contractor.
SANDAG and/or the construction contractor assures compliance with these mitigation measures to protect fossil resources from the beginning of the project by: implementing the mitigation measures during project construction arranging for recovered specimens to be prepared and identified so that the specimens can be housed in an institutional paleontological repository, and requiring the Final Report which demonstrates compliance with the mitigation plan/program as required by the SVP and CEQA.

The qualified paleontologist is responsible for the assessment and development of the program for impact mitigation during initial planning phases and construction phases, the repository agreement, the adequacy and execution of the mitigation measures, and production of the Final Report.
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8.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT DETERMINATION

This chapter presents the California Environmental Quality Act (CEQA) significance determination analysis for the project. For this analysis, the impacts of the project are compared to existing conditions, which are described in Chapter 5.0. This section describes CEQA and other state and local considerations for geologic units with the potential for producing unique paleontological resources.

8.1 Significance Criteria and Application

Based on the CEQA Environmental Checklist (Appendix G of the CEQA Guidelines) and the City of San Diego CEQA Significance Determination Thresholds (City of San Diego, 2011), the San Diego Association of Governments has developed thresholds of significance for use in evaluating the impacts of the Mid-Coast Corridor Transit Project.

8.1.1 No-Build Alternative

The continuation and enhancement of bus Route 150 under the No-Build Alternative would not result in ground-disturbing activities; therefore, no adverse impacts on paleontological resources would occur.

8.1.2 Build Alternative

For long-term operation and maintenance of the Build Alternative:

Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact. Since operation of the project does not entail ground disturbance, there would be no impacts to paleontological resources during operation and maintenance of the project.

For construction of the Build Alternative:

Would project construction cause substantial damage to, or destruction of, significant paleontological resources?

Potentially Significant Impact. Five geologic units that have been assigned a high paleontologic sensitivity were identified in the study area (see Appendix A, Paleontology Sensitivity Maps) and are described in Sections 5.2 and 6.3. These formations are as follows:

- Bay Point Formation
- Lindavista Formation
- San Diego Formation
- Scripps Formation
- Ardath Shale Formation
All of these geologic units contain previously recorded paleontological localities. Within a quarter-mile radius of the study area, 88 fossil localities have been recorded; however, none of the previously recorded fossil localities were within the study area.

Construction could impact previously unidentified fossil localities within the five geologic units with a high sensitivity for paleontological resources. These fossil sediments can crop out at the surface or may be encountered below the surface at many locations within the study area. This can occur during excavating, grading, or crushing bedrock either exposed in or underlying a project site. Thus, any new ground disturbance could have adverse impacts on significant paleontological resources. Although earth moving associated with construction would be a comparatively short-term activity, the loss of fossil resources, unrecorded fossil localities, and associated specimen data would be a potentially significant impact. Mitigation has been proposed, as described in Chapter 7, to reduce the potentially significant impacts of construction to a level below significance.

### 8.2 Significance after Mitigation

As stated above, no impacts to paleontological resources would occur as a result of the No-Build Alternative.

Under the Build Alternative, mitigation would be required to avoid, minimize, and reduce potential significant construction impacts. Implementation of the recommended mitigation measures, as described in Chapter 7.0, would allow data recovery for affected paleontological resource localities affected by construction and therefore would reduce potentially significant construction-related impacts on paleontological resources to a less-than-significant level. These measures are based on the Society of Vertebrate Paleontology guidelines (1995) and CEQA requirements, and are consistent with those used throughout California, with results that protect paleontological resources in areas of high paleontological sensitivity. Significant impacts would be mitigated to a level below significance by collection, preservation, and curation of a representative sample of a fossil assemblage and its geologic information in the study area where ground disturbances are proposed.

### 8.3 Cumulative Impacts

The continuation and enhancement of bus Route 150 under the No-Build Alternative would not result in ground-disturbing activities; therefore, no adverse impacts on paleontological resources would occur. As a result, the No-Build Alternative would not contribute to any cumulatively significant impact.

Cumulatively, impacts from ground disturbance associated with construction of reasonably foreseeable projects in the Mid-Coast Corridor—when combined with construction associated with the project, including options—could impact the same or similar formations with a high sensitivity for paleontological resources. Separate paleontological studies would be undertaken; environmental review would be conducted; and suitable mitigation (e.g., a monitoring plan and a recovery of resources) likely would mitigate impacts to resources within each formation to a less-than-significant level on a project-by-project basis. The proposed mitigation would reduce the potential impacts for each project and would allow data recovery for affected paleontological resource
localities affected by the projects. However, even with mitigation, some damage or destruction of paleontological resources in the course of recovery could occur. As a result, the combined impact to paleontological resources from reasonably foreseeable projects located throughout the geologic units could result in a cumulatively significant impact even after mitigation. Because of the unique nature of the resources that could be affected, the project’s potential contribution to the significant impact would be considered cumulatively considerable and, thus, significant.
9.0 REFERENCES

City of San Diego. 2002. *City of San Diego Paleontological Guidelines*. Available from the City of San Diego Development Services Department, Environmental Analysis Section, 1222 First Avenue, San Diego, California.


Kennedy, Michael P. and Siang S. Tan. 1977. “Geology of National City, Imperial Beach, and Otay Mesa Quadrangles, Southern San Diego Metropolitan Area, California.” Published in *California Division of Mines & Geology Bulletin*, Sacramento, California.


Appendix A
Paleontology Sensitivity Maps
APPENDIX A  PALEONTOLOGY SENSITIVITY MAPS

Map A: Bay Point Formation

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Map B: Lindavista Formation

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Map C: San Diego Formation

CONFIDENTIAL INFORMATION
Map D: Scripps Formation

CONFIDENTIAL INFORMATION
Map E: Ardath Shale Formation

CONFIDENTIAL INFORMATION
Appendix B
Paleontological Monitoring Determination Matrix
# APPENDIX B  PALEONTOLOGICAL MONITORING DETERMINATION MATRIX

<table>
<thead>
<tr>
<th>Geological Deposit/Formation/Rock Unit</th>
<th>Potential Fossil Localities</th>
<th>Sensitivity Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvium (Qsw, Qal, or Qls)</td>
<td>All communities where this unit occurs</td>
<td>Low</td>
</tr>
<tr>
<td>Ardath Shale (Ta)</td>
<td>All communities where this unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Bay Point/Marine Terrace (Qbp) 1</td>
<td>All communities where this unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Cabrillo Formation (Kcs)</td>
<td>All communities where unit occurs</td>
<td>Moderate</td>
</tr>
<tr>
<td>Delmar Formation (Td)</td>
<td>All communities where unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Friars Formation (Tf)</td>
<td>All communities where unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Granite/Plutonic (Kg)</td>
<td>All communities where unit occurs</td>
<td>Zero</td>
</tr>
<tr>
<td>Lindavista Formation (Qln, Qlb) 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lusardi Formation (Ki)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mission Valley Formation (Tmv)</td>
<td>All communities where unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Mt. Soledad Formation (Tm, Tmss, Tmssc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otay Formation (To)</td>
<td>All communities where unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Point Loma Formation (Kp)</td>
<td>All communities where unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Pomerado Conglomerate (Tp)</td>
<td>A. Scripps Ranch/Tierrasanta B. All other areas</td>
<td>High</td>
</tr>
<tr>
<td>River /Stream Terrace Deposits (Qt)</td>
<td>A. South Eastern/Chollas Valley/Fairbanks Ranch/Skyline/Paradise Hills/Otay Mesa, Nestor/San Ysidro B. All other areas</td>
<td>A. Moderate B. Low</td>
</tr>
<tr>
<td>San Diego Formation (Qsd)</td>
<td>All communities where this unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Santiago Peak Volcanics (Jsp)</td>
<td>A. Black Mountain Ranch/La Jolla Valley, Fairbanks Ranch/Mira Mesa/Peñasquitos B. All other areas</td>
<td>A. Moderate B. Zero</td>
</tr>
<tr>
<td>Scripps Formation (Tsd)</td>
<td>All communities where this unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Stadium Conglomerate (Tst)</td>
<td>All communities where this unit occurs</td>
<td>High</td>
</tr>
<tr>
<td>Sweetwater Formation</td>
<td>All communities where this unit occurs</td>
<td>High</td>
</tr>
</tbody>
</table>
Appendix C
San Diego Natural History Museum Department of Paleontology Locality List
CONFIDENTIAL INFORMATION
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APPENDIX D  SOCIETY OF VERTEBRATE PALEONTOLOGY GUIDELINES
– ASSESSMENT AND MITIGATION OF ADVERSE IMPACTS

ASSESSMENT AND MITIGATION OF ADVERSE IMPACTS TO NONRENEWABLE PALEONTOLOGIC RESOURCES:
STANDARD GUIDELINES

Society of Vertebrate Paleontology
Conformable Impact Mitigation Guidelines Committee
Robert E. Reynolds, Chairman
Society of Vertebrate Paleontology News Bulletin Number 163, pages 22-27
February 1995

INTRODUCTION
Vertebrate fossils are significant nonrenewable paleontological resources that are afforded protection by federal, state, and local environmental laws and guidelines. The potential for destruction or degradation by construction impacts to paleontologic resources on public lands (federal, state, county, or municipal) and land selected for development under the jurisdiction of various governmental planning agencies is recognized. Protection of paleontologic resources includes: (a) assessment of the potential for property to contain significant nonrenewable paleontologic resources which might be directly or indirectly impacted, damaged, or destroyed by development, and (b) formulation and implementation of measures to mitigate adverse impacts, including permanent preservation of the site and/or permanent preservation of salvaged materials in established institutions. Decisions regarding the intensity of the Paleontological Resource Impact Mitigation Program (PRIMP) will be made by the Project Paleontologist on the basis of the paleontologic resources, not on the ability of an applicant to fund the project.

ASSESSMENT OF THE PALEONTOLOGICAL POTENTIAL OF ROCK UNITS
Sedimentary rock units may be described as having (a) high (or unknown) potential for containing significant nonrenewable paleontologic resources, (b) low potential for containing nonrenewable paleontologic resources or (c) undetermined potential. It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case. Paleontologists can thus develop maps which suggest sensitive areas and units that are likely to contain paleontological resources. These maps form the bases for preliminary planning decisions. Lead agency evaluation of a project relative to paleontologic sensitivity maps should trigger a “request for opinion” from a state paleontologic clearing house or an accredited institution with an established paleontological repository. The determination of a site’s (or rock unit’s) degree of paleontological potential is first founded on a review of pertinent geological and paleontological literature and on locality records of specimens deposited in institutions. This preliminary review may suggest particular areas of known high potential. If an area of high potential cannot be delimited from the literature search and specimen records, a surface survey will determine the fossiliferous potential and extent of the sedimentary units within a specific project. The field survey may extend outside the defined project to areas where rock units are better exposed. If an area is determined to have a high potential for containing paleontologic resources, a program to mitigate impacts is developed. In areas of high sensitivity, a pre-excavation survey prior to excavation is recommended to locate surface concentrations
of fossils which might need special salvage methods. The sensitivity of rock units in which fossils occur may be divided into three operational categories.

A. HIGH POTENTIAL
Rock units from which 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 paleontologic 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.

B. UNDETERMINED POTENTIAL
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.

C. LOW POTENTIAL
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. Such units will be poorly represented by specimens in institutional collections. These deposits generally will not require protection or salvage operations.

MEASURES TO MITIGATE ADVERSE IMPACTS RESULTING FROM DEVELOPMENT

Measures for adequate protection or salvage of significant nonrenewable paleontologic resources are applied to areas determined to have a high potential for containing significant fossils. Specific mitigation measures generally need not be developed for areas of low paleontological potential. Developers and contractors should be made aware, however, that it is necessary to contact a qualified paleontologist if fossils are unearthed in the course of excavation. The paleontologist will then salvage the fossils and assess the necessity for further mitigation measures, if applicable.

A. AREAS OF HIGH POTENTIAL
In areas determined to have a high potential for significant paleontologic resources, an adequate program for mitigating the impact of development should include:

1. a preliminary survey and surface salvage prior to construction;
2. monitoring and salvage during excavation;
3. preparation, including screen washing to recover small specimens (if applicable), and specimen preparation to a point of stabilization and identification;
4. identification, cataloging, curation, and storage; and
5. a final report of the finds and their significance, after all operations are complete.

All phases of mitigation are supervised by a professional paleontologist who maintains the necessary paleontologic collecting permits and repository agreements. The Lead Agency assures compliance with the measures developed to mitigate impacts of excavation during the initial assessment. To assure
compliance with the start of the project, a statement that confirms the site’s potential sensitivity, confirms the repository agreement with an established institution, and describes the program for impact mitigation, should be deposited with the Lead Agency and contractors before work begins. The program will be reviewed and accepted by the Lead Agency’s designated vertebrate paleontologist. If a mitigation program is initiated early during the course of project planning, construction delays due to paleontologic salvage activities can be minimized or avoided.

RECOMMENDED GENERAL GUIDELINES

These guidelines are designed to apply to areas of high paleontologic potential.

A. ASSESSMENT BEFORE CONSTRUCTION STARTS
Preconstruction assessment will develop an adequate program of mitigation. This may include a field survey to delimit the specific boundaries of sensitive areas and pre-excavation meetings with contractors and developers. In some cases it may be necessary to conduct field surveys and/or a salvage program prior to grading to prevent damage to known resources and to avoid delays to construction schedules. Such a program may involve surface collection and/or quarry excavations. A review of the initial assessment and proposed mitigation program by the Lead Agency before operations begin will confirm the adequacy of the proposed program.

B. ADEQUATE MONITORING
An excavation project will retain a qualified project paleontologist. In areas of known high potential, the project paleontologist may designate a paleontologic monitor to be present during 100% of the earth-moving activities. If, after 50% of the grading is completed, it can be demonstrated that the level of monitoring should be reduced, the project paleontologist may so amend the mitigation program.

Paleontologists who monitor excavations must be qualified and experienced in salvaging fossils and authorized to divert equipment temporarily while removing fossils. They should be properly equipped with tools and supplies to allow rapid removal of specimens.

Provision should be made for additional assistants to monitor or help in removing large or abundant fossils to reduce potential delays to excavation schedules. If many pieces of heavy equipment are in use simultaneously but at diverse locations, each location may be individually monitored.

C. MACROFOSSIL SALVAGE
Many specimens recovered from paleontological excavations are easily visible to the eye and large enough to be easily recognized and removed. Some may be fragile and require hardening before moving. Others may require encasing within a plaster jacket for later preparation and conservation in a laboratory. Occasionally specimens encompass all or much of a skeleton and will require moving either as a whole or in blocks for eventual preparation. Such specimens require time to excavate and strengthen before removal and the patience and understanding of the contractor to recover the specimens properly. It is thus important that the contractors and developers are fully aware of the importance and fragility of fossils for their recovery to be undertaken with the optimum chances of successful extraction. The monitor must be empowered to temporarily halt or redirect the excavation equipment away from the fossils to be salvaged.

D. MICROFOSSIL SALVAGE
Many significant vertebrate fossils (e.g., small mammal, bird, reptile, or fish remains) are too small to be visible within the sedimentary matrix. Fine-grained sedimentary horizons and paleosols most often contain such fossils. They are recovered through concentration by screen washing. If the sediments are fossiliferous, bulk samples are taken for later processing to recover any fossils. An adequate sample comprises 12 cubic meters (6,000 lbs or 2,500 kg) of matrix for each site horizon or paleosol, or as
determined by the supervising paleontologist. The uniqueness of the recovered fossils may dictate salvage of larger amounts. To avoid construction delays, samples of matrix should be removed from the site and processed elsewhere.

E. PRESERVATION OF SAMPLES
Oriented samples must be preserved for paleomagnetic analysis. Samples of fine matrices should be obtained and stored for pollen analysis. Other matrix samples may be retained with the samples for potential analysis by later workers, for clast source analysis, as a witness to the source rock unit and possibly for procedures that are not yet envisioned.

F. PREPARATION
Recovered specimens are prepared for identification (not exhibition) and stabilized. Sedimentary matrix with microfossils is screen washed and sorted to identify the contained fossils. Removal of excess matrix during the preparation process reduces storage space.

G. IDENTIFICATION
Specimens are identified by competent qualified specialists to a point of maximum specificity. Ideally, identification is of individual specimens to element, genus, and species. Batch identification and batch numbering (e.g., “mammals, 75 specimens”) should be avoided.

H. ANALYSIS
Specimens may be analyzed by stratigraphic occurrence, and by size, taxa, or taphonomic conditions. This results in a faunal list, a stratigraphic distribution of taxa, or evolutionary, ecological, or depositional deductions.

I. STORAGE
Adequate storage in a recognized repository institution for the recovered specimens is an essential goal of the program. Specimens will be cataloged and a complete list will be prepared of specimens introduced into the collections of a repository by the curator of the museum or university. Adequate storage includes curation of individual specimens into the collections of a recognized, nonprofit paleontologic specimen repository with a permanent curator, such as a museum or a university. A complete set of field notes, geologic maps, and stratigraphic sections accompany the fossil collections. Specimens are stored in a fashion that allows retrieval of specific, individual specimens by researchers in the future.

J. SITE PROTECTION
In exceptional instances the process of construction may reveal a fossil occurrence of such importance that salvage or removal is unacceptable to all concerned parties. In such cases, the design concept may be modified to protect and exhibit the occurrence with the project’s design, e.g., as an exhibit in a basement mall. Under such circumstances, the site may be declared and dedicated as a protected resource of public value. Associated fragments recovered from such a site will be placed in an approved institutional repository.

K. FINAL REPORT
A report is prepared by the project paleontologist including a summary of the field and laboratory methods, site geology and stratigraphy, faunal list, and a brief statement of the significance and relationship of the site to similar fossil localities. A complete set of field notes, geological maps, stratigraphic sections, and a list of identified specimens accompany the report. The report is finalized only after all aspects of the program are completed. The Final Report together with its accompanying documents constitute the goals of a mitigation project. Full copies of the Final Report are deposited with the Lead Agency and the repository institution.
L. COMPLIANCE
The Lead Agency assures compliance with measures to protect fossil resources from the beginning of the project by:

1. requesting an assessment and program for impact mitigation which includes salvage and protection during the initial planning phases;
2. by arranging for recovered specimens to be housed in an institutional paleontologic repository; and
3. by requiring the Final Report.

The supervising paleontologist is responsible for:

1. assessment and development of the program for impact mitigation during initial planning phases;
2. the repository agreement;
3. the adequacy and execution of the mitigation measures; and
4. the Final Report.

Acceptance of the Final Report for the project by the Lead Agency signifies completion of the program of mitigation for the project. Review of the Final Report by a vertebrate paleontologist designated by the Lead Agency will establish the effectiveness of the program and adequacy of the report. Inadequate performances in either field comprise noncompliance, and may result in the Lead Agency removing the paleontologist from its list of qualified consultants.

DEFINITIONS

A QUALIFIED VERTEBRATE PALEONTOLOGIST is a practicing scientist who is recognized in the paleontologic community and is proficient in vertebrate paleontology, as demonstrated by:

1. institutional affiliations or appropriate credentials;
2. ability to recognize and recover vertebrate fossils in the field;
3. local geological and biostratigraphic expertise;
4. proficiency in identifying vertebrate fossils; and
5. publications in scientific journals.

A PALEONTOLOGICAL REPOSITORY is a publicly supported, not-for-profit museum or university employing a permanent curator responsible for paleontological records and materials. Such an institution assigns accession and catalog numbers to individual specimens which are stored and conserved to ensure their preservation under adequate security and climate control. The repository will also retain site lists of recovered specimens, and any associated field notes, maps, diagrams, or associated data. It makes its collections of cataloged specimens available to researchers.

SIGNIFICANT NONRENEWABLE PALEONTOLOGIC RESOURCES are fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or botanical fossils except when present within a given vertebrate assemblage. Certain plant and invertebrate fossils or assemblages may be defined as significant by a project paleontologist, local paleontologist, specialists, or special interest groups, or by Lead Agencies or local governments.

A SIGNIFICANT FOSSILIFEROUS DEPOSIT is a rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable
material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years BP.

**A LEAD AGENCY** is the agency responsible for addressing impacts to nonrenewable resources that a specific project might generate.

**PALEONTOLOGIC POTENTIAL** is the potential for the presence of significant nonrenewable paleontological resources. All sedimentary rocks, some volcanic rocks, and some metamorphic rocks have potential for the presence of significant nonrenewable paleontologic resources. Review of available literature may further refine the potential of each rock unit, formation, or facies.

**PALEONTOLOGIC SENSITIVITY** is determined only after a field survey of the rock unit in conjunction with a review of available literature and paleontologic locality records. In cases where no subsurface data are available, sensitivity may be determined by subsurface excavations.

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Appendix E
Society of Vertebrate Paleontology Guidelines – Paleontologic Salvage Collections
APPENDIX E  
SOCIETY OF VERTEBRATE PALEONTOLOGY GUIDELINES
– PALEONTOLOGIC SALVAGE COLLECTIONS

CONDITIONS OF RECEIVERSHIP FOR PALEONTOLOGIC SALVAGE COLLECTIONS

Society of Vertebrate Paleontology
Conformable Impact Mitigation Guidelines Committee
Robert E. Reynolds, Chairman
Society of Vertebrate Paleontology News Bulletin Number 166, pages 31-32
February 1996

1. The repository museum and its curator maintain the right to accept or refuse the materials.

2. The materials received must fit with the repository museum’s mission and policy statements.

3. All repository arrangements must be made with the curator in advance of receipt. All arrangements for inventory numbers and locality numbers must be made in advance. “Museums are not a dumping ground.”

4. The museum will act as the trustee for the specimens. A deed of gift from the land owner or agent must be provided. A loan form or M.O.U. must be prepared for specimens from government lands.

5. Specimens must receive discrete locality numbers. Locality data must be to the maximum specificity available and plotted on 7.5 minute topographic maps, and as specific as allowed by stratigraphic collecting and field mapping. The repository may require the repositor to bear the cost of entering locality data into computerized data files.

6. All reports prepared to meet mitigation requirements, field notes, and photographs must be provided at the time of transfer to the repository museum.

7. Specimens must be delivered to the repository fully prepared and stabilized. Standards of stabilization and modern conservation techniques must be established prior to preparation and must be acceptable to the repository institution. Details of stabilizing materials and chemicals must be provided by the repositor. For microvertebrates, this means sorting and mounting. For large specimens, including whales, this means removal of all unnecessary materials and full stabilization. Fossiliferous matrix must be washed and processed. Earthquake-proofing includes inventory numbers on corks and in vials. In storage, specimens must be insulated or cushioned to protect each from contact or abrasion. Oversized specimens must be stored on shelves or on racks developed to fit existing constraints of the repository museum. The repositor must provide for all nonstandard materials for storage.

8. Specimens must be individually inventoried in accordance with the established system at the repository museum. The specimen inventory must be acceptable to and meet the requirements of the lead agency. Specimens must be identified to element and to maximum reasonable taxonomic specificity. Batch or bulk cataloging must be avoided.

9. Specimens must be cataloged in accord with the repository system so that specimens are retrievable to curators and to researchers. The repository museum may require that the repositor bear the cost of having repository staff catalog specimens into computerized data bases.
10. The repository may require the repositor to bear the cost for completing preparation and stabilization, completing inventory, and completing cataloging.

11. There will be a one-time fee charged by the repository for permanent storage of specimens. This fee will be utilized to compensate the repository for storage space, cabinets or shelves, access or aisle space, a retrievable catalog system, additional preparation, specimen filing, and labor involved in the above. The repository reserves the right to charge the repositor for unpacking and placement of specimens in approved storage cabinets.

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