I-10 Corridor Project
EA 0C2500, PN 0800000040
07-LA-10 PM 44.9/48.3
08-SBd-10 PM 0.0/R37.0
Program Code 800.100/HB5
May 2017

PROJECT REPORT

For Project Approval

On Route **10**

Between **0.4 Miles West of White Avenue Overcrossing**

And **Live Oak Canyon Road Overcrossing**

I have reviewed the right of way information contained in this Project Report and the Right of Way Data Sheet attached hereto, and find the data to be complete, current, and accurate:

***REBECCA GUIRADO**, Deputy District Director, Right of Way*

APPROVAL RECOMMENDED:

***RAGHURAM RADHAKRISHNAN**, Project Manager*

***DAVID BRICKER**, Deputy District Director, Environmental Planning*

***CHRISTY CONNORS**, Deputy District Director, Design*

Roger Banos, Senior - TMC for Catalino Pining III

***CATALINO A. PINING III**, Deputy District Director, Traffic Operations*

APPROVED BY:

***JOHN BULINSKI**, District Director* — *Date* 5/15/17

Vicinity Map

In Los Angeles and San Bernardino Counties
On Route 10 between 0.4 Miles West of White Avenue Overcrossing and Live Oak Canyon Road Overcrossing

This Project Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Kanogporn S. Tiberi

5-9-17

Kanogporn S. Tiberi
Registered Civil Engineer
Parsons

Date

SUBMITTED BY:

5-9-17

Paula Beauchamp
Director of Project Delivery
SBCTA

Date

CONCURRED BY:

5-9-17

Jonathan den Hartog
Senior Oversight Engineer
Caltrans District 8

Date

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ACRONYMS AND ABBREVIATIONS

TERM	DESCRIPTION
AB	Aggregate Base
AC	Asphalt Concrete
ACM	Asbestos-Containing Materials
ADA	Americans with Disabilities Act
ADL	Aerially Deposited Lead
ADT	Average Daily Traffic
a/mvm	Accidents per Million Vehicle Mile
APE	Area of Potential Effects
APS	Advance Planning Studies
AQMP	Air Quality Management Plan
AS	Aggregate Subbase
ASR	Archeological Survey Report
AST	Above-Ground Storage Tank
ATPB	Asphalt Treated Permeable Base
BMPs	Best Management Practices
BNSF	Burlington Northern – Santa Fe
BO	Biological Opinion
BRT	Bus Rapid Transit
BSA	Biological Study Area
CAG	Community Advisory Group
CAGN	Coastal California Gnatcatcher
CAMUTCD	California Manual of Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CAVs	Clean Air Vehicles
CCTV	Closed Circuit Television
CCUA	Consent to Common Use Agreement
C-D	Collector-Distributor
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
cfs	Cubic feet per second
CHIN	Caltrans Highway Information Network
CHP	California Highway Patrol
CIA	Community Impact Assessment
CIDH	Cast-in-drilled-hole
C&M	Construction and Maintenance
CMAQ	Congestion Mitigation and Air Quality
CM/GC	Construction Management/General Contractor
CMP	Corridor Master Plan
CMS	Changeable Message Sign
CO	Carbon Monoxide
COZEEP	Construction Zone Enhanced Enforcement Program
CPUC	California Public Utilities Commission
CRCP	Continuously Reinforced Concrete Pavement
CRHR	California Register of Historical Resources
CSDP	Comprehensive Storm Drain Plan

CTB	Cement Treated Base
dBA	A-Weighted Decibels
d/c	Demand-to-Capacity
DD	Decision Document, Deputy Directive
DEIR/EIS	Draft Environmental Impact Report/Environmental Impact Statement
DHV	Design Hourly Volume (two-way)
DOD	United States Department of Defense
DPGDR	District Preliminary Geotechnical Design Report
DPR	Draft Project Report
DRIS	Draft Relocation Impact Statement
DSF	Delhi Sands Flower-Loving Fly
DWR	Department of Water Resources
EB	Eastbound
ECR	Environmental Commitments Record
EEP	Establish Existing Planting
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
ESA	Environmentally Sensitive Area
ESAL	Equivalent Single Axle Load
FAA	Federal Aviation Administration
FEIR/EIS	Final Environmental Impact Report/Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FNAE	Finding of No Adverse Effect
FR	Foundation Report
FRIS	Final Relocation Impact Statement
FSP	Freeway Service Patrol
FTIP	Federal Transportation Improvement Program
GCC	Grid Control Center
GDR	Geotechnical Design Report
GP	General Purpose
GSRD	Gross Solids Removal Device
HDM	Highway Design Manual
HMA	Hot-Mixed Asphalt
HMDD	Hazardous Material Disclosure Document
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HOV 2	High Occupancy Vehicle with two occupants
HOV 2+	High Occupancy Vehicle with two or more occupants
HOV 3+	High Occupancy Vehicle with three or more occupants
HPSR	Historic Property Survey Report
HQ	Headquarters
HRER	Historical Resources Evaluation Report
I-10	Interstate 10
I-15	Interstate 15
I-215	Interstate 215
IC	Interchange
I/E	Ingress/Egress
ISA	Initial Site Assessment

ITS	Intelligent Transportation Systems
JPCP	Jointed Plain Concrete Pavement
kV	Kilovolt
LA	Los Angeles
LBP	Lead-Based Paint
LCB	Lean Concrete Base
LCCA	Life Cycle Cost Analysis
LCP	Lead-Containing Paint
LHS	Location Hydraulic Study
Lt	Left
LOS	Level of Service
LPA	Locally Preferred Alternative
LPR	License Plate Recognition
LRTP	Long-Range Transit Plan
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Fund
MAP-21	Moving Ahead for Progress in the 21st Century Act
MBTA	Migratory Bird Treaty Act
Metro	Los Angeles County Metropolitan Transportation Authority
MLD	Most Likely Descendent
MOU	Memorandum of Understanding
mph	Miles per Hour
MWD	Metropolitan Water District of Southern California
NAAQS	National Ambient Air Quality Standards
NADR	Noise Abatement Decision Report
NAHC	Native American Heritage Commission
NB	Northbound
NEPA	National Environmental Policy Act
NES	Natural Environment Study
NOC	Notification of Construction
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	Noise Study Report
NW	Northwest
OC	Overcrossing
OH	Overhead
PA	Preferred Alternative
PAC	Public Awareness Campaign
PA/ED	Project Approval/Environmental Document
PALM	Project Aesthetics and Landscape Masterplan
PCC	Portland Cement Concrete
PCMS	Portable Changeable Message Sign
PDPM	Project Development Procedures Manual
PDT	Project Development Team
PeMS	Performance Management System
PFR	Preliminary Foundation Report

PIR/PER	Paleontological Identification Report/Paleontological Evaluation Report
PMCS	Project Management Control System
PMCTB	Plant Mixed Cement Treated Base
PM	Post Mile
$PM_{2.5}$	Particulate Matter of 2.5 microns in diameter or smaller
PM_{10}	Particulate Matter of 10 microns in diameter or smaller
POA	Project Oversight Agreement
POAQC	Project of Air Quality Concern
PoDI	Project of Division Interest
PQS	Professional Qualified Staff
PSR/PDS	Project Study Report/Project Development Support
RACP	Request for Acquisition of Contaminated Property
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
REC	Recognized Environmental Concerns
Rect.	Rectangular
RHMA	Rubberized Hot-Mixed Asphalt
RIP	Regional Improvement Program
ROD	Record of Decision
RMCTB	Road Mixed Cement Treated Base
RMDP	Ramp Meter Development Plan
RMS	Ramp Metering System
RSS	Riversidean Sage Scrub
Rt	Right
RTP	Regional Transportation Plan
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
R/W	Right of Way
RWQCB	Regional Water Quality Control Board
SA	Site Assessment
SB	Southbound
SBd	San Bernardino
SBCFCD	San Bernardino County Flood Control District
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino County Transportation Analysis Model
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SCG	Southern California Gas
SD	Storm Drain
Sep	Separation
Shld	Shoulder
SHOPP	State Highway Operations and Protection Program
SHPO	State Historic Preservation Officer
SI	Site Investigation
SIP	State Implementation Plan
SLF	Sacred Lands File
SMARTS	Stormwater Multi-Application Report Tracking System
SOIS	Secretary of the Interior's Standards
SOV	Single Occupancy Vehicle
SPGR	Structures Preliminary Geotechnical Report

SR-26	State Route 26
SR-38	State Route 38 – Orange Street
SR-60	State Route 60
SR-71	State Route 71
SR-83	State Route 83 – Euclid Avenue
SR-210	State Route 210
SRTP	Short-Range Transit Plan
STAA	Surface Transportation Assistance Act
STIP	State Transportation Improvement Program
STP	Surface Transportation Program
Superpave	Superior Performing Asphalt Pavement Technology
SW	Southwest
SWDR	Storm Water Data Report
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TASAS	Traffic Accident Surveillance and Analysis Systems
TCE	Temporary Construction Easement
TCR	Transportation Concept Report
TCWG	Transportation Conformity Working Group
TDM	Transportation Demand Management
TI	Traffic Index
TIFIA	Transportation Infrastructure Finance and Innovation Act
TMC	Transportation Management Center
TMP	Transportation Management Plan
TMS	Traffic Management System
TMT	Traffic Management Team
TOPD	Traffic Operations Policy Directive
Trap.	Trapezoidal
TSAR	Traffic Accident Surveillance and Analysis Systems, Selective Accident Retrieval
TSM	Transportation System Management
UC	Undercrossing
UP	Underpass
UPRR	Union Pacific Railroad
US-395	United States Highway 395
USACE	U.S. Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VA	Value Analysis
v/c	Volume-to-Capacity
VIA	Visual Impact Assessment
vph	Vehicle per Hour
WB	Westbound
WDID	Waste Discharge Identification
WIM	Weigh-in-Motion
WQV	Water Quality Volume
WVDS	Wireless Vehicle Detector System

1. INTRODUCTION

California Department of Transportation (Caltrans), the lead agency, in cooperation with San Bernardino County Transportation Authority (SBCTA), the sponsoring agency, proposes to add freeway lanes along the 33-mile segment of Interstate 10 (I-10) between the Los Angeles/San Bernardino (LA/SBd) County Line and Ford Street in San Bernardino County to reduce traffic congestion, increase throughput, enhance trip reliability, and provide long-term congestion management of the corridor. The project limits which include transition areas extend from approximately 0.4 miles west of White Avenue in the City of Pomona at Post Mile (PM) 44.9 in Los Angeles County to Live Oak Canyon Road in the City of Yucaipa at PM R37.0 in San Bernardino County. A No Build (Alternative 1) and two build alternatives (Alternatives 2 and 3) have been considered for the I-10 Corridor Project.

In June 2016, Alternative 3 (also known as Express Lanes Alternative) was identified as the Preferred Alternative (PA) for the I-10 Corridor Project. The PA would provide two Express Lanes in each direction of I-10 from the LA/SBd County Line to California Street in the City of Redlands and one Express Lane in each direction from California Street to Ford Street in the City of Redlands, a total distance of 33 miles. The Express Lanes would serve both high occupancy vehicles (HOVs) and single occupancy vehicles (SOVs). HOVs not meeting the occupancy requirement and SOVs would be required to pay a toll to use the Express Lane facility while HOVs meeting the occupancy requirement would use the facility free of charge in the Express Lane segment west of Haven Avenue and either toll-free or at discounted rates in the segment east of Haven Avenue. Replacement of 13 structures and modification of 61 structures would be necessary. The improvements are primarily within San Bernardino County, with minor improvements in Los Angeles County to accommodate the roadway transition between the existing HOV cross section in Los Angeles County and the proposed Express Lane cross section in San Bernardino County. The project vicinity map is included in **Attachment A**.

The project is planned to proceed to the final design phase upon approval of the Project Report, and the Record of Decision (ROD) and Notice of Determination (NOD) are obtained for the final environmental document. The project is anticipated to utilize a design-build delivery process and be constructed in two contracts over a period of 60 months (5 years), with Contract 1 covering the proposed improvements from the LA/SBd County Line to Interstate 15 (I-15) and Contract 2 covering the improvements from I-15 to Ford Street, as described in **Table 1.1**.

Table 1.1 Alternative 3 Construction Contract Breakdown

Contract	General Description	EA	Project ID	Post Miles & Limits
1	LA/SBd County Line to I-15	0C2510	0816000076	07-LA-10 PM 44.9/48.3 08-SBd-10-PM 0.0/13.2 0.4 miles west of White Avenue overcrossing to Cherry Avenue overcrossing
2	I-15 to Ford Street	0C2520	0816000112	08-SBd-10 PM 8.0/R37.0 0.2 miles west of Haven Avenue overcrossing to Live Oak Canyon Road overcrossing

The project is estimated to cost $1.7 billion in current dollars or a total escalated cost of $1.9 billion for the future expenditure years. Detailed cost estimates are provided in Section 5.A.4.15 of this report. The total programmed cost for the project is $1.9 billion.

Proposed funding for the project is anticipated to be from a combination of San Bernardino County Measure I, Congestion Mitigation and Air Quality (CMAQ), local, State, and Federal funds, as well as, a Transportation Infrastructure Finance and Innovation Act (TIFIA) Federal loan. The project is included in the SBCTA's Measure I 10-Year Delivery Plan as well as in the Southern California Association of Governments (SCAG)'s conforming 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). The project is also included in the 2017 Federal Transportation Improvement Program (FTIP).

The I-10 Corridor Project is classified as a Category 3 project, as defined in the Caltrans Project Development Procedures Manual (PDPM) because the project is an existing access controlled facility and requires additional right of way and Revised Freeway Agreements (see **Attachment C**).

A summary of the project information is provided in **Table 1.2**:

Table 1.2 Project Summary

Project Limits	*07-LA-10 PM 44.9/48.3* *08-SBd-10 PM 0.0/R37.0*	
Number of Alternatives	*three*	
Preferred Alternative:	*Alternative 3*	
	Current Cost Estimate	**Escalated Cost Estimate**
Capital Outlay Support	*$332M*	*$366M*
Capital Outlay Construction	*$1,259M*	*$1,443M*
Capital Outlay Right-of-Way	*$83M*	*$101M*
Funding Source	*San Bernardino County Measure I* *CMAQ, Local, State, and Federal* *TIFIA Loan*	
Funding Year	*2008/2009 through 2024/2025*	
Type of Facility	*Freeway*	
Number of Structures	*74*	
Environmental Determination or Document	*Environmental Impact Report/Environmental Impact Statement (EIR/EIS)*	
Legal Description	*In Los Angeles and San Bernardino Counties* *From 0.4 Mile West of White Avenue Overcrossing in Pomona* *To Live Oak Canyon Road Overcrossing in Redlands*	
Project Development Category	*3*	

2. RECOMMENDATION

It is recommended that the project be approved using the PA (Alternative 3) and that the project proceed to the next phase in the project development process. The affected local agencies have been consulted with respect to the recommended plan and their views have been considered. Affected local agencies are in general accord for implementation of the I-10 Express Lanes between the LA/SBd County Line and Ford Street in Redlands. The draft environmental document for the project has been circulated for public review and all comments have been addressed.

Approval of the project report authorizes the State to enter into Cooperative Agreements with SBCTA and local agencies.

3. BACKGROUND

3A. Project History

The project was initiated through the preparation of a Project Study Report/Project Development Support (PSR/PDS) (EA 0C250K) which was approved in December 2006. The PSR/PDS proposed to extend the existing HOV lanes on I-10 from its current terminus at Haven Avenue in Ontario to Ford Street in Redlands to relieve congestion along the I-10 corridor in San Bernardino County. Three alternatives were studied in the PSR/PDS. The first alternative was a No Build Alternative. The second alternative (Standard HOV Alternative) proposed to add one HOV lane in each direction with standard cross sections throughout the project corridor. The third alternative (Reduced Standard HOV Alternative) proposed to add one HOV lane in each direction with varied lane and inside shoulder widths at selected locations. The No Build and both build alternatives were recommended to be carried forward to the subsequent Project Approval/Environmental Document (PA/ED) phase of the project development process.

During the beginning of the PA/ED study, the two HOV alternatives studied in the PSR/PDS were re-evaluated in response to Caltrans District 8's decision to change from a buffered-separated HOV facility to a continuous access facility for the I-10 freeway in San Bernardino County. This change results in elimination of the 4-foot buffer previously proposed in each direction (a total of 8 feet), allowing the Reduced Standard HOV Alternative to attain the standard cross section through most of the corridor. As such, the HOV alternatives studied in the PSR/PDS were consolidated into a single HOV alternative that generally provides standard cross sections throughout the corridor except for a few spot locations.

In April 2013, a Supplemental PSR/PDS was approved, proposing to include an additional alternative (Express Lanes) to the project. The new alternative would extend the roadway improvements westerly to provide two tolled Express Lanes in each direction from the LA/SBd County Line to approximately State Route 210 (SR-210) and a single Express Lane in each direction from SR-210 to Ford Street. The Express Lanes alternative was recommended to be carried forward to the PA/ED phase.

The project is in the PA/ED phase (EA 0C2500) with three alternatives being considered. Alternative 1 is the No Build Alternative. Alternative 2 is the HOV Alternative that is carried forward from the PSR/PDS. Alternative 3 is the Express Lanes Alternative proposed in the Supplemental PSR/PDS.

In addition, Alternatives 4 through 6 were also considered at the beginning of the PA/ED phase. Alternative 4 proposed to extend the existing HOV lane in each direction of I-10 from the current HOV terminus near Haven Avenue to Ford Street and add a general purpose lane in each direction from the LA/SBd County Line to SR-210. Alternative 5 proposed to extend the existing HOV lane in each direction of I-10 from the current HOV terminus near Haven Avenue to Ford Street and add a second HOV lane from the LA/SBd County Line to SR-210. Alternative 6 proposed adding two general purpose lanes in each direction from the LA/SBd County Line to Ford Street. However, these alternatives were not found to be effective in fulfilling the project purpose and need and could not be funded with the current available funds and, therefore, were not recommended for further evaluation in the PA/ED phase. A stand-alone Transportation System Management/Transportation Demand Management (TSM/TDM) Alternative with a focus on improving transportation system performance and reducing traffic demand was also considered but withdrawn from further evaluation due to its inability to satisfy the project purpose and need.

The Draft Project Report (DPR) and Draft Environmental Impact Report/Environmental Impact Statement (DEIR/EIS) for the project were completed and approved in April 2016. The public review period for the DEIR/EIS took place between April 25, 2016 and June 13, 2016. Three public hearings were held in May 2016. Subsequent to the public review period, three viable alternatives (i.e. Alternatives 1, 2, and 3) were evaluated by the Project Development Team (PDT) with consideration of the public comments. In June 2016, Alternative 3 (Express Lanes) was identified as the PA to be implemented.

After the public review of the Draft EIR/EIS, Assembly Bill 2542 was signed into law on September 23, 2016 and the requirement was effective as of January 1, 2017. This new act was added in Section 100.15 of the Streets and Highways Code, which requires Caltrans or a regional transportation planning agency, when submitting a capacity increasing project or a major street or highway lane realignment project to the California Transportation Commission for approval, to demonstrate that reversible lanes were considered for the project. The Reversible Lanes Alternative was analyzed and evaluated by the PDT in February 2017; however, it was withdrawn from further consideration due to its inability to meet the project purpose and need.

The FEIR/EIS was completed and approved on May 15, 2017.

3B. Community Interaction

The PA/ED process for the I-10 Corridor Project includes a public outreach program initiated in 2011 which is anticipated to continue through the subsequent design and construction phases of the project. Multiple meetings and public presentations have been carried out during the PA/ED phase of the project as listed below. The SBCTA Board of Directors and affected local agencies are in general accord for implementation of the I-10 Corridor Project.

- Periodic briefings to the SBCTA Board of Directors
- Periodic briefings to the San Bernardino County West Valley, East Valley, and High Desert Community Advisory Groups (CAG)
- Over 160 project briefings to elected officials of local municipalities along the project corridor, community groups, associations, and stakeholder groups
- Coordination meetings with City staff from local municipalities along the project corridor
- Coordination meetings with School districts
- Agency scoping meeting on November 15, 2012 in Ontario

- Public hearings in May 2016 in San Bernardino, Bloomington, and Ontario
- Monthly PDT meetings that include representatives from cities along the project corridor
- Over 640 site visits for outreach to project communities

Scoping Meetings

Two public scoping meetings were held at the beginning of the PA/ED phase as follows:

- November 13, 2012 in San Bernardino
- November 15, 2012 in Ontario

A total of 52 comments were received in response to information provided at the scoping meetings. The most common issues that members of the public identified during the scoping period were:

- Request for more information once available – 9 comments
- Right of way acquisitions – 8 comments
- Questions about noise impacts and soundwalls – 7 comments
- Expressed support for the project – 3 comments
- Explicitly expressed support for the Express Lanes Alternative – 4 comments
- Opposition to the project in general – 6 comments
- Opposition to the idea of being tolled and feedback/questions about tolling – 3 comments
- Suggestions or questions about alternatives and possible design modifications – 4 comments
- Suggestions about mass transit options – 1 comment
- Miscellaneous suggestions – 7 comments

Public Hearings

The DEIR/EIS was circulated for a 50-day public review period between April 25, 2016 and June 13, 2016. Three public meetings were held during the public review period as listed below:

- May 17, 2016 in San Bernardino
- May 18, 2016 in Bloomington
- May 19, 2016 in Ontario

A total of 56 comments were received during the public review period including:

- 4 comments from federal government agencies
- 2 comments from state government agencies
- 3 comments from regional government agencies
- 9 comments from local agencies and organizations
- 38 comments from the general public

One comment from the public included a petition with 26 signatures from residents of the Cities of Claremont and Pomona in Los Angeles County, expressing opposition to Alternative 3 and citing increased air and noise pollution and negative environmental impacts.

3C. Existing Facility

I-10 Freeway

In San Bernardino County, I-10 (also known as the San Bernardino Freeway) is approximately 39 miles long from the LA/SBd County Line to the San Bernardino/Riverside County Line. The original construction of the I-10 freeway began in 1953 as State Route 26 (SR-26) with two general purpose (GP) lanes in each direction. The highway was converted to the I-10 freeway through a route adoption in 1958 and infrastructure upgrade began in the mid 1960's. Inside and outside widening for the third and fourth general purpose lanes took place between the 1970's and 2000's. The addition of the HOV lanes between the LA/SBd County Line and Haven Avenue was completed in 2000.

Within the project limits, I-10 is generally an eight-lane divided, controlled-access freeway with four general purpose lanes in each direction and auxiliary lanes along portions of the route. Between the LA/SBd County Line and Haven Avenue, there is currently one HOV lane in each direction, with continuous access to and from the general purpose lanes. The existing lane width is generally 12 feet throughout the corridor. The outside shoulder has the standard width of 10 feet throughout the corridor. The inside shoulder is typically 8 feet west of I-15 and varies from 10 to 17 feet (not entirely paved) east of I-15, with wider median in the Etiwanda Avenue interchange area. There are 45 existing auxiliary lanes along the project corridor, 21 in the westbound (WB) direction and 24 in the eastbound (EB) direction, as listed below. All of the existing auxiliary lanes would be reestablished as part of the project improvements.

Existing WB auxiliary lanes are:

1. WB between Monte Vista Avenue and Central Avenue
2. WB between Vineyard Avenue and Archibald Avenue
3. WB between Archibald Avenue and Haven Avenue
4. WB between Haven Avenue and S15-W10 Connector
5. WB between Milliken Avenue and N15-W10 Connector
6. WB between Milliken Avenue and S15-W10 Connector (lane drops after Milliken Avenue)
7. WB between I-15 and Etiwanda Avenue
8. WB about 2,000 feet following Cherry Avenue loop on-ramp
9. WB about 4,100 feet preceding Cherry Avenue off-ramp
10. WB between Citrus Avenue and Sierra Avenue
11. WB about 1,300 feet preceding Sierra Avenue off-ramp
12. WB between Cedar Avenue and Riverside Avenue
13. WB about 650 feet preceding Riverside Avenue off-ramp
14. WB between 9th Street and Mt. Vernon Avenue
15. WB between Mt. Vernon Avenue and Interstate 215 (I-215) (lane drops after Mt. Vernon Avenue)
16. WB between I-215 and Carnegie Drive
17. WB between Carnegie Drive and Tippecanoe Avenue
18. WB between Tippecanoe Avenue and Mountain View Avenue (lane drops after Tippecanoe Ave)
19. WB between Mountain View Avenue and California Street
20. WB between California Street and W210-W10 Connector
21. WB between W10-E210 Connector and Orange Street

Existing EB auxiliary lanes are:

1. EB between Monte Vista Avenue and Central Avenue
2. EB between Central Avenue and Mountain Avenue
3. EB between Vineyard Avenue and Archibald Avenue
4. EB between Holt Boulevard and Haven Avenue
5. EB between Haven Avenue and Milliken Avenue
6. EB between Milliken Avenue and E10-N15 Connector
7. EB between N15-E10 Connector and Etiwanda Avenue
8. EB between Etiwanda Avenue and Cherry Avenue
9. EB about 1,000 following Cherry Avenue on-ramp
10. EB about 4,600 feet preceding Citrus Avenue off-ramp
11. EB between Citrus Avenue and Sierra Avenue
12. EB about 1,000 feet following Sierra Avenue on-ramp
13. EB about 4,400 feet preceding Cedar Avenue off-ramp
14. EB about 1,300 feet preceding Riverside Avenue off-ramp
15. EB between 9th Street and Mt. Vernon Avenue
16. EB between Mt. Vernon Avenue and E10-N/S215 Connector
17. EB between N215-E10 Connector and Waterman Avenue
18. EB between S215-E10 Connector and Redlands Boulevard
19. EB between Waterman Avenue and Tippecanoe Avenue
20. EB between Tippecanoe Avenue and Mountain View Avenue
21. EB between Mountain View Avenue and California Street
22. EB between California Street and Alabama Street
23. EB between Nevada Street and E10-E210 Connector
24. EB between S210-E10 Connector and Eureka Street

The freeway generally lies on gentle rolling terrain alternating between segments on embankment and in depressed sections. The eastbound and westbound roadbeds are typically at different elevations and separated by a median concrete barrier, thrie beam barrier, metal beam guard rails, or temporary K-rails. The pavement of each roadbed typically has a 1.5% cross slope with the crown point located at the inside edge of traveled way.

The I-10 freeway provides direct connection for the primary population centers in San Bernardino and Riverside Counties to the urban centers in Los Angeles County. The I-10 freeway traverses many types of land uses including urbanized areas of San Bernardino County with many residences, commercial/retail businesses, and recreational facilities west of I-15; a mix of residential, commercial and industrial land uses between I-15 and SR-210; and residential communities between SR-210 and Ford Street. The I-10 freeway also provides access to the Ontario International Airport, San Bernardino International Airport, University of Redlands, and California State University, San Bernardino. There are no pedestrian or bicycle accesses on I-10 within the project limits. The design speed for I-10 is 70 miles per hour (mph) and the posted speed limit is 65 mph.

State Route 83 (SR-83)

SR-83 (also known as Euclid Avenue) is a north-south highway with all 11 miles in San Bernardino County, extending from State Route 71 (SR-71) in Chino Hills to 7th Street in Upland. In vicinity of the I-10 freeway, SR-83 has been improved to local, divided arterial roadway standards rather than the Caltrans highway standards. This segment of SR-83 consists of 6 through lanes, which satisfies the Cities of Upland and Ontario General Plan designations. SR-83 is shown in the City of Upland

General Plan to include a Class II bikeway and in the City of Ontario General Plan as a bicycle corridor, which may include Class I, II, or III bikeway.

SR-83 is identified as a historic property in the National Register of Historic Places for its wide landscaped and irrigated median, landscaped parkways along both sides of the street, and cobblestone curbs and gutters.

I-10 Interchanges

The project improvements pass through three system interchanges (I-10/I-15, I-10/I-215, and I-10/SR-210) and 29 local service interchanges, as listed below. One interchange (Indian Hill Boulevard) is in Los Angeles County.

1. Indian Hill Boulevard
2. Monte Vista Avenue
3. Central Avenue
4. Mountain Avenue
5. Euclid Avenue/7th Street
6. 4th Street
7. Vineyard Avenue
8. Holt Boulevard/Archibald Avenue
9. Haven Avenue
10. Milliken Avenue
11. Etiwanda Avenue/Commerce Drive
12. Cherry Avenue
13. Citrus Avenue
14. Sierra Avenue
15. Cedar Avenue
16. Riverside Avenue
17. Pepper Avenue
18. Rancho Avenue
19. La Cadena Drive/9th Street
20. Mt. Vernon Avenue
21. Waterman Avenue/Redlands Boulevard/Carnegie Drive
22. Tippecanoe Avenue
23. Mountain View Avenue
24. California Street
25. Alabama Street
26. Tennessee Street
27. Eureka Street/Orange Street/6th Street
28. University Street/Cypress Avenue
29. Ford Street

Arterials

Table 3.1 provides a list of local arterials that cross I-10 from west to east along with their respective roadway classification, jurisdiction, and general roadway configuration.

Table 3.1 Existing Arterials

No.	Arterial	Roadway Classification	Thru Lane	Continuous Sidewalk	Bike Class	Design Speed (mph)	Posted Speed (mph)	Jurisdiction
1	Indian Hill Blvd	Major	4	NB/SB	-	45	35	Claremont
2	Mills Ave	Major	2	NB/SB	II	40	40	Montclair
3	Monte Vista Ave	Arterial	4	NB/SB	II*	45	40	Montclair
4	Central Ave	Divided	6	NB/SB	II*	45	40	Montclair
5	Benson Ave	Secondary/Minor	4	NB/SB	II/III/-*	35	35	Montclair/ Ontario/Upland
6	Mountain Ave	Major/Principal	4	NB/SB	-	45	40	Ontario/Upland
7	San Antonio Ave	Secondary/Minor	4	NB/SB	-	40	40	Ontario/Upland
8	Euclid Ave (SR-83)	Major/Principal	6	NB/SB	II/III*	45	40	Ontario/Upland
9	Sultana Ave	Local/Collector	2	NB/SB	-	35	35	Ontario/Upland
10	Campus Ave	Secondary/Collect	2	NB/SB	III/-*	35	35	Ontario/Upland
11	6th St	Collector	2	NB/SB	-	35	35	Ontario
12	Grove Ave	Principal	4	NB/SB	I/II/III*	45	45	Ontario
13	4th St	Principal	2	NB/SB	-	45	35	Ontario
14	Vineyard Ave	Principal	6	SB	III*	45	45	Ontario
15	Archibald Ave	Principal	7	SB	-	45	50	Ontario
16	Haven Ave	Principal	8	NB	II or III*	45	45	Ontario
17	Milliken Ave	Principal	8	SB	-	45	50	Ontario
18	Etiwanda Ave	Principal/Major	6	None	-	45	50	Ontario/Fontana
19	Cherry Ave	Major	6	NB/SB	II	45	50	Fontana
20	Citrus Ave	Major	5	NB/SB	II	45	35	Fontana
21	Cypress Ave	Secondary	4	NB/SB	II	45	45	Fontana
22	Sierra Ave	Major	6	NB/SB	II*	45	40/35	Fontana
23	Cedar Ave	Major	6	NB/SB	-	45	40	Bloomington
24	Riverside Ave	Major	5	NB/SB	II or III*	45	35	Rialto
25	Pepper Ave	Major	3	SB	II**	45	50	Colton
26	Rancho Ave	Major	4	NB	III*	45	35/45	Colton
27	La Cadena Dr	Major	4	NB/SB	III*	45	35/45	Colton
28	9th St	Secondary	2	NB/SB	-	45	40	Colton
29	Mt. Vernon Ave	Major	4	None	-	45	40	Colton

No.	Arterial	Roadway Classification	Thru Lane	Continuous Sidewalk	Bike Class	Design Speed (mph)	Posted Speed (mph)	Jurisdiction
30	Hunts Ln	Major	4	NB/SB	-	45	45	San Bernardino
31	Waterman Ave	Major	4	NB/SB	-	45	50	San Bernardino
32	Tippecanoe Ave	Major/Undivided	4	NB/SB	III/-*	45	35	San Bernardino/ Loma Linda
33	Richardson St	Local	2	SB	-	30	none	San Bernardino/ Redlands
34	Mountain View Ave	Major/Undivided	4	NB/SB	-/II*	45	40	Loma Linda/ Redlands
35	California St	Major	4	NB	II or III*	45	40	Redlands
36	Nevada St	Minor	2	NB/SB	-	30	none	Redlands
37	Alabama St	Major	4	NB	II or III*	45	40	Redlands
38	Tennessee St	Collector	4	NB	II or III*	45	40	Redlands
39	Colton Ave	Minor	4	NB/SB	II or III*	35	35	Redlands
40	New York St	Local	2	NB/SB	II or III*	30	none	Redlands
41	Texas St	Minor	4	NB/SB	II*	40	40	Redlands
42	Eureka St	Minor	2	NB/SB	-	45	none	Redlands
43	Orange St (SR-38)	Minor	4	NB/SB	II*	45	none	Redlands
44	6th St	Collector	2	NB/SB	-	30	none	Redlands
45	Church St	Collector	2	NB/SB	II*	30	30	Redlands
46	University St	Minor	4	NB/SB	II or III*	45	30	Redlands
47	Citrus Ave	Minor	4	NB/SB	II or II*	40	40	Redlands
48	Cypress Ave	Minor	2	NB/SB	II or III*	45	45	Redlands
49	Palm Ave	Collector	2	NB/SB	-	40	40	Redlands
50	Highland Ave	Minor	2	NB/SB	II or III*	40	40	Redlands
51	Ford St	Minor	2	NB/SB	-	45	40	Redlands

-There are no existing bike lanes and this street is not designated for a bicycle facility in local General Plans.
**There are no existing striped bike lanes along this street; however, this street is designated in the local General Plans as having a bicycle facility.*
***There are no existing striped bike lanes along this street; however, provisions for bike lanes are planned in a separate improvement project.*

Existing Nonstandard Geometric Features

Some of the existing geometric features along the freeway and at interchanges do not meet the current Caltrans geometric standards. Known nonstandard features include:

Existing Nonstandard Features on I-10:

- 8-foot inside shoulders on I-10 from Indian Hill Boulevard to Haven Avenue
- 11-foot HOV lanes on I-10 from LA/SBd County Line to Haven Avenue
- 11-foot GP lanes (No. 1 & 2) under existing overcrossing (OC) structures between San Antonio Avenue and Vineyard Avenue
- less than 0.3% minimum grade along portions of I-10 and at freeway ramp merges/diverges
- nonstandard stopping sight distance at horizontal curves along I-10
- nonstandard superelevation rates, transition, and runoff at horizontal curves along I-10
- nonstandard curve radii for 70 mph design speed at horizontal curves along I-10
- nonstandard curve length and stopping sight distance on vertical curves along I-10
- nonstandard vertical clearance at several undercrossing (UC) structures
- nonstandard spacing between various interchanges
- nonstandard weaving distances between interchanges
- lane drop through a local service interchange
- 2:1 embankment slopes throughout the project corridor

Existing Nonstandard Features on Connectors and Ramps:

- nonstandard superelevation rates, transition, and runoff in horizontal curves on interchange ramps
- nonstandard minimum curve radii on horizontal curves on interchange ramps
- nonstandard access rights opposite ramp terminals
- nonstandard access control
- nonstandard distance between various ramp intersections and local road intersections
- connection of ramp terminals to various local streets where the vertical profile grade is steeper than 4%
- use of partial interchanges and isolated off ramps
- nonstandard design of various freeway entrances and exit ramps and branch connections
- 2:1 embankment slopes throughout the project corridor

Existing Nonstandard Features on Arterials:

- 10-foot travel lanes along Euclid Avenue (SR-83)
- lower design speed of various local facilities having connection to I-10
- nonstandard sidewalk widths on various local streets with connection to I-10
- 2:1 embankment slopes throughout the project corridor

Some of these nonstandard geometric features would be eliminated or improved by the proposed project, while some would remain unchanged or resurface in varying degrees in the proposed design. A discussion of proposed nonstandard features is provided in Section 5.A.3.3 of this document.

Existing Structures

Table 3.2 provides a list of existing structures along I-10 within the project limits from west to east.

Table 3.2 Existing Structures Along I-10

No.	Post Mile	Structure Name	Bridge No.
1	47.74	Indian Hill Blvd UC (LA County)	53-0860
2	48.00	College Ave RCB/Pedestrian UC (LA County)	53-1019
3	0.01	Mills Ave UC	54-0453
4	0.32	San Antonio Wash Bridge	54-0451
5	0.68	Monte Vista Ave UC	54-0450
6	1.23	Central Ave UC	54-1186
7	1.75	Benson Ave UC	54-0448
8	2.37	Mountain Ave UC	54-1187
9	2.92	San Antonio Ave OC	54-0446
10	3.47	Euclid Ave OC (Route 83/10 Separation)	54-0445
11	3.75	Sultana Ave OC	54-0444
12	4.02	Campus Ave OC	54-0443
13	4.33	6th St OC	54-0442
14	4.70	West Cucamonga Channel Box Culvert	54-1117
15	4.88	Grove Ave UC	54-0441
16	5.24	4th St UC	54-0440
17	6.10	Vineyard Ave OC	54-0439
18	6.70	Cucamonga Wash Bridge (Lt)	54-0438L
19	6.70	Cucamonga Wash Bridge (Rt)	54-0438R
20	6.80	Holt Blvd Off-Ramp UC (Lt)	54-0437L
21	6.80	Holt Blvd Off-Ramp UC (Rt)	54-0437R
22	6.90	Archibald Ave EB Off-Ramp/Holt Blvd UC	54-1107
23	7.16	Archibald Ave OC	54-1166
24	8.16	Haven Ave OC (Lt)	54-1201L
25	8.16	Haven Ave OC (Rt)	54-0560R
26	9.17	Milliken Ave OC	54-0539
27	9.87	E10-N15 Connector OC	54-0913G
28	9.91	N15-W10 Connector OC	54-0908G
29	9.92	W10-S15 Connector OC over Railroad	54-1065F
30	9.93	Route 15/10 Separation (Lt)	54-0909L
31	9.94	Route 15/10 Separation (Rt)	54-0909R
32	9.96	S15-E10 Connector OC	54-0910F
33	9.98	W10-S15 Connector OC	54-0914F
34	10.12	Day Canyon Channel Bridge	54-0351
35	10.12	W10-S15 Bridge over Day Canyon	54-0351F
36	10.13	W10-N15 Bridge over Day Canyon	54-0927F

No.	Post Mile	Structure Name	Bridge No.
37	10.99	Etiwanda Wash Bridge (Lt)	54-0378L
38	10.99	Etiwanda Wash Bridge (Rt)	54-0378R
39	10.99	Etiwanda Wash Bridge (EB Off-Ramp)	54-0378S
40	11.13	Etiwanda Ave OC	54-0463
41	11.35	Valley Blvd WB On-Ramp Separation	54-1214K
42	11.50	Valley Blvd EB Off-Ramp UC (Lt)	54-0030L
43	11.50	Valley Blvd EB Off-Ramp UC (Rt)	54-0030R
44	11.64	Etiwanda-San Sevaine Channel (Lt)	54-0454L
45	11.64	Etiwanda-San Sevaine Channel (Rt)	54-0454R
46	11.64	Etiwanda-San Sevaine Channel (EB On-Ramp)	54-0454S
47	11.74	Kaiser Spur OH	54-0416
48	11.82	San Sevaine Creek Channel Box Culvert	54-0434
49	12.14	Mulberry Creek Channel Box Culvert	54-0425M
50	13.17	Cherry Ave OC	54-1292
51	15.18	Citrus Ave OC	54-1293
52	15.73	Cypress Ave OC	54-1280
53	16.22	Sierra Ave OC	54-1169
54	R18.49	Cedar Ave OC	54-0035
55	19.90	Rialto Channel RCB Bridge	54-1116
56	19.97	Riverside Ave OC	54-1267
57	20.97	Pepper Ave OC	54-1324
58	R21.46	Slover Mountain UP	54-0835
59	R21.96	Rancho Ave OC	54-0817
60	R22.36	Colton OH (Rt)	54-0464R
61	R22.38	Colton OH (Lt)	54-0464L
62	R22.62	La Cadena Dr UC	54-0462
63	R22.62	La Cadena Dr UC (EB Off-Ramp)	54-0462S
64	R22.71	9th St UC	54-0461
65	R22.82	Pavillion OH (9th St WB Off-Ramp)	54-0861K
66	R22.86	Pavillion Spur OH	54-0460
67	R23.25	Mt. Vernon Ave OC	54-0459
68	R23.60	Warm Creek Bridge (Lt)	54-0830L
69	R23.60	Warm Creek Bridge (Rt)	54-0830R
70	R23.80	Santa Ana River Bridge (E10-N/S215)	54-0292G
71	R23.82	Santa Ana River Bridge (Rt)	54-0292R
72	R23.83	Santa Ana River Bridge (Lt)	54-0292L
73	R24.19	E10-N215 Connector OC	54-0823G
74	R24.23	S215-E10 Connector OC	54-0824F
75	R24.23	Route 215/10 Separation (Lt)	54-0479L
76	R24.25	Route 215/10 Separation (Rt)	54-0479R

No.	Post Mile	Structure Name	Bridge No.
77	R24.27	W10-N215 Connector OC	54-1064F
78	R24.30	W10-S215 Connector OC	54-0822F
79	R24.57	E St/Sunwest Ln WB On-Ramp UC	54-0821F
80	24.76	Hunts Ln UC	54-0601
81	25.26	Waterman Ave UC	54-0600
82	25.46	San Timoteo Creek (Carnegie Dr WB On-Ramp)	54-1105K
83	25.54	San Timoteo Creek	54-0599
84	26.27	Tippecanoe Ave UC	54-0598
85	26.81	Richardson St OC	54-0597
86	27.30	Mountain View Ave UC	54-0596
87	27.64	West Redlands OH/Mission Channel	54-0570
88	28.30	California St UC	54-0595
89	28.80	Nevada St UC	54-0594
90	29.31	Alabama St OC	54-0593
91	29.58	E210-W10/Alabama St WB Off-Ramp UC	54-0937G
92	29.70	E10-W210 Connector OC	54-0938G
93	29.76	E210-E10 Connector OC	54-0929G
94	29.82	Tennessee St OC	54-0592
95	29.83	W10-W210/Tennessee St UC	54-0930F
96	30.10	Colton Ave UC/New York St UC	54-0591
97	30.38	Texas St UC	54-0583
98	30.66	Eureka St UC	54-0580
99	30.88	Orange St UC (Route 10/38 Separation)	54-0581
100	31.01	6th St UC	54-0579
101	31.41	Church St UC	54-0578
102	31.52	Redlands OH/Mill Creek Zanja	54-0472
103	31.87	University St UC	54-0582
104	31.99	Citrus Ave UC	54-0584
105	32.11	Cypress Ave UC	54-0585
106	32.36	Palm Ave UC	54-0586
107	32.61	Highland Ave UC	54-0587
108	33.13	Ford St UC	54-0588
109	33.29	Redlands Blvd WB Off-Ramp UC	54-0589

Existing Railroad Facilities

Union Pacific Railroad (UPRR) generally runs along the south side of the I-10 freeway between I-15 and I-215. In addition, there are six UPRR and Burlington Northern - Santa Fe (BNSF) railroad crossings on I-10 within the study limits as shown in **Table 3.3** below.

Table 3.3 Existing Railroad Crossings

No.	Facility	Type	Track	Owner	Location	City/County
1	Kaiser Spur	OH	Single	UPRR	East of Etiwanda	Fontana/SB County
2	Slover Mountain	UP	Single	UPRR	East of Pepper	SB County
3	Colton Crossing	OH	Three	BNSF	East of Rancho	Colton
4	Pavillion Spur*	OH	Single	UPRR/private	West of Mt. Vernon	Colton
5	West Redlands	OH	Single	BNSF/SBCTA	East of Mountain View	Redlands
6	Redlands	OH	Single	BNSF/SBCTA	West of University	Redlands

OH = overhead; UP = underpass; BNSF = Burlington Northern – Santa Fe; UPRR = Union Pacific Railroad
**Pavillion Spur crosses under I-10 via two structures: Pavillion Spur OH and Pavillion OH (under 9th St WB off-ramp)*

Existing Utilities

There are approximately 907 utilities within the project area (482 in Contract 1 and 425 in Contract 2) including electrical, natural gas, oil and petroleum pipelines, liquid oxygen line, hydrogen line, nitrogen gas line, telephone and communication, cable TV, water, and sewer. The following agencies/companies are identified as having utilities within or adjacent to the study limits:

Power:

- Atchison, Topeka and Santa Fe Railway
- City of Colton
- Southern California Edison (Transmission and Distribution)

Telephone/Cable TV/Fiber Optic:

- American Cablevision
- AT&T
- Charter
- Comcast
- Crown Castle
- Frontier
- Level 3 Communications
- Sprint
- SUNESYS
- Time Warner Cable
- Verizon
- Western Union Telegraph
- WILCON
- Zayo

Water/Wastewater:

- Chino Basin Municipal Water District
- City of Chino Hills
- City of Colton
- City of Fontana
- City of Montclair
- City of Ontario
- City of Riverside
- City of San Bernardino
- City of Upland
- County Sanitation District – San Gabriel
- Cucamonga Valley Water District
- Fontana Water Company
- Golden State Water Company
- Inland Empire Utilities Agency
- Marygold Mutual Water Company
- Metropolitan Water District
- Monte Vista Water District
- Riverside Highland Water Company
- San Antonio Water Company
- San Gabriel Valley Water Company
- Santa Ana Watershed Project Authority
- Southern California Water
- Southern Pacific Transportation Company/UPRR
- Water Facilities Authority
- West San Bernardino Water District
- West Valley Water District

Sewer:

- Chino Basin Municipal Water District
- City of Colton
- City of Fontana
- City of Loma Linda
- City of Montclair
- City of Ontario
- City of Rialto
- City of San Bernardino
- City of Upland
- Western Pacific Sanitation Company

Oil/Fuel/Petroleum/Gasoline:

- California-Nevada Pipeline
- Kinder Morgan
- Plains All American Pipeline
- Southern California Gas (Distribution)
- Union Carbide Company

Hydrogen Gas/Liquid Oxygen Gas/Nitrogen Gas

- Praxair
- Union Carbide Company

Existing Drainage

The project corridor west of San Timoteo Creek is located within the Upper Santa Ana River Watershed and Sub Watersheds. The existing off-site drainage generally flows from north to south. East of San Timoteo Creek, the drainage pattern is directed towards the west and northwest. Culverts and bridges are used to convey the offsite runoff (including major washes and rivers) under the freeway to the watersheds. Sheet flow directed towards the I-10 freeway is collected by parallel channels, such as the I-10 Channel. The onsite drainage system consists of catch basins and storm drain systems which capture and convey storm water runoff from the roadway to flood control facilities before discharging to larger flood control facilities. Roadway embankment runoff is typically collected by onsite ditches or longitudinal channels, and subsequently discharged to larger flood control facilities.

Major drainage facilities along the corridor include Santa Ana River, Warm Creek, flood control channels, and storm drain systems, as listed in **Table 3.4** below.

Table 3.4 Existing Major Drainage Facilities

No.	Drainage Facility	Approximate Station	Approximate Location	Jurisdiction
Crossing System				
1	College Ave RCB/Pedestrian UC	"A" 715+50	Near LA/SBd County Line	Claremont
2	San Antonio Wash	"A" 1017+00	East of Mills Ave	SBCFCD
3	Palmetto Ave SD & Vault	"A" 1134+00	East of Mountain Ave	Ontario/Caltrans
4	West Cucamonga Channel	"A" 1252+00	East of 6th St	SBCFCD
5	Cucamonga Wash	"A" 1354+00	East of Vineyard Ave	SBCFCD
6	Haven Ave RCB	"A" 1405+00	West of Haven Ave parallel Turner	SBCFCD
7	California Commerce SD	"A" 1450+00	East of I-15	SBCFCD
8	Day Creek Channel	"A" 1535+00	East of I-15	SBCFCD
9	Etiwanda Wash	"A" 1580+50	East of I-15	SBCFCD
10	Etiwanda-San Sevaine Channel	"A" 1615+00	East of Etiwanda Ave	SBCFCD
11	San Sevaine Creek RCB	"A" 1624+50	East of Etiwanda Ave	Caltrans
12	Mulberry Creek RCB	"A" 1641+50	East of Etiwanda Ave	Caltrans
13	Rialto Channel RCB	"A" 2050+00	West of Riverside Ave	SBCFCD
14	Colton SW & NW SD	"A" 2192+00	East of BNSF/Colton Crossing	SBCFCD
15	11th Street SD	"A" 2210+00	East of 9th St	SBCFCD
16	Warm (Lytle) Creek	"A" 2248+00	East of Mt. Vernon Ave	SBCFCD & USACE
17	Santa Ana River	"A" 2263+00	East of Mt. Vernon Ave	USACE
18	San Timoteo Creek	"A" 2349+00	East of Waterman Ave	SBCFCD

No.	Drainage Facility	Approximate Station	Approximate Location	Jurisdiction
19	Mission Channel	"A" 2460+00	West of California St	SBCFCD
20	Mill Creek Zanja Channel	"A" 2666+00	West of University Ave	SBCFCD
Longitudinal System				
1	Montclair Storm Drain	"A" 1023+50 to 1065+00	North side of I-10 from west of Monte Vista Ave to Central Ave (outside State right of way)	Montclair
2	I-10 Channel	"A" 1616+00 to 2050+00	Etiwanda Ave to Riverside Ave (inside State right of way)	Caltrans

SBCFCD = San Bernardino County Flood Control District
USACE = U.S. Army Corps of Engineers
SD = storm drain
RCB = reinforced concrete box

Existing Pavement Structural Sections

Existing pavement along the I-10 freeway is generally comprised of concrete pavement for the traffic lanes. The inside and outside shoulder pavement is typically concrete west of Haven Avenue and asphalt concrete east of Haven Avenue. The inside lane pavement is generally in good condition while the outside two lanes are generally in fair to poor condition. Three pavement rehabilitation projects were recently implemented to replace concrete pavement slabs within the project limits including:

- Pavement rehabilitation (random slab replacement) from LA/SBd County Line to Orange Street (EA 0Q7604), completed in 2016;
- Pavement rehabilitation (lane replacement) from Orange Street to Ford Street (EA 0K2914), expected completion in 2017; and
- Pavement rehabilitation (3rd and 4th lane replacement) from Ford Street to Live Oak Canyon Road (EA 0K2924), completed in 2016.

Table 3.5 below summarizes the existing pavement structural sections which are based on as-built drawings and will need to be verified during the final design.

Table 3.5 Existing Pavement Structural Sections

PM	Side	Lane	Existing Structural Section							
Zone 1 0.00 – 6.10 LA/SBd to Vineyard	WB	Lt Shld	0.85'	PCC	0.50'	ATPB	0.35'	AB		
		HOV	0.75'	PCC	0.45'	CTB				
		1	0.75'	PCC	0.45'	CTB				
		2	0.85'	PCC	0.35'	CTB				
		3	0.75'	PCC	0.45'	CTB				
		4	0.85'	PCC	0.50'	ATPB	0.35'	AB		
		Rt Shld	0.50'	PCC	0.35'	LCB				
	EB	Lt Shld	0.85'	PCC	0.50'	ATPB	0.35'	AB		
		HOV	0.75'	PCC	0.45'	CTB				

PM	Side	Lane	Existing Structural Section							
		1	0.75’	PCC	0.45’	CTB				
		2	0.85’	PCC	0.35’	CTB				
		3	0.75’	PCC	0.45’	CTB				
		4	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		Rt Shld	0.50’	PCC	0.35’	LCB				
Zone 2 6.10 – 7.16 Vineyard to Archibald	WB	Lt Shld	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		HOV	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		Rt Shld	0.25’	AC	0.17’	AB				
	EB	Lt Shld	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		HOV	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		Rt Shld	0.25’	AC	0.17’	AB				
Zone 3 7.16 – 8.16 Archibald to Haven	WB	Lt Shld	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		HOV	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.85’	PCC	0.50’	LCB				
		Rt Shld	0.50’	PCC	0.35’	LCB				
	EB	Lt Shld	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		HOV	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.85’	PCC	0.50’	LCB				
		Rt Shld	0.50’	PCC	0.35’	LCB				
Zone 4 8.16 – 9.17 Haven to Milliken	WB	Lt Shld	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		Rt Shld	0.50’	PCC	0.35’	LCB				
	EB	Lt Shld	0.85’	PCC	0.50’	ATPB	0.35’	AB		

PM	Side	Lane	Existing Structural Section							
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.85’	PCC	0.50’	ATPB	0.35’	AB		
		Rt Shld	0.50’	PCC	0.35’	LCB				
Zone 5 9.17 – 9.94 Milliken to I-15	WB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	CTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	CTB				
		Rt Shld	0.20’-0.25’	AC						
	EB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	CTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	CTB				
		Rt Shld	0.25’	AC						
Zone 6 9.94 – 13.17 I-15 to Cherry	WB	Lt Shld	0.25’	AC						
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		Rt Shld	0.25’	AC						
	EB	Lt Shld	0.25’	AC						
		1	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		2	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		3	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		4	0.67’-0.75’	PCC	0.41’-0.33’	CTB				
		Rt Shld	0.25’	AC						
Zone 7 13.17 – 15.18 Cherry to Citrus	WB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	LCB				
		Rt Shld	0.25’	AC						
	EB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	LCB				

PM	Side	Lane	Existing Structural Section							
		Rt Shld	0.25’	AC						
Zone 8 15.18 – 16.22 Citrus to Sierra	WB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.85’	PCC	0.50’	LCB				
		Rt Shld	0.85’	PCC	0.50’	LCB				
	EB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.85’	PCC	0.50’	LCB				
		Rt Shld	0.85’	PCC	0.50’	LCB				
Zone 9 16.22 – R18.49 Sierra to Cedar	WB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	CTB				
		Rt Shld	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
	EB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	CTB				
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	CTB				
		Rt Shld	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
Zone 10 R18.49 – 19.97 Cedar to Riverside	WB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.50’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	LCB				
		Rt Shld	0.25’	AC						
	EB	Lt Shld	0.25’	AC						
		1	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’	PCC	0.33’	PMCTB	0.50’	AS		
		3	0.67’	PCC	0.33’	CTB				
		4	0.67’	PCC	0.33’	LCB				
		Rt Shld	0.25’	AC						

PM	Side	Lane	Existing Structural Section							
Zone 11 19.97 – 20.97 Riverside to Pepper	WB	Lt Shld	0.20’-0.25’	AC	variable	AB	0.50’	AS		
		1	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		3	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		4	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		Rt Shld	0.25’	AC						
	EB	Lt Shld	0.20’-0.25’	AC	variable	AB	0.50’	AS		
		1	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		2	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		3	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		4	0.67’-0.75’	PCC	0.33’	PMCTB	0.50’	AS		
		Rt Shld	0.25’	AC						
Zone 12 20.97 – 24.24 Pepper to I-215	WB	Lt Shld	0.20’	AC	variable	AB	0.50’	AS		
		1	0.67’	PCC	0.35’	PMCTB	0.75’	AS		
		2	0.67’	PCC	0.35’	PMCTB	0.75’	AS		
		3	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		4	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		Rt Shld	0.20’	AC	variable	AB	0.50’	AS		
	EB	Lt Shld	0.20’	AC	variable	AB	0.50’	AS		
		1	0.67’	PCC	0.35’	PMCTB	0.75’	AS		
		2	0.67’	PCC	0.35’	PMCTB	0.75’	AS		
		3	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		4	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		Rt Shld	0.20’	AC	variable	AB	0.50’	AS		
Zone 13 24.24 – 25.26 I-215 to Waterman	WB	Lt Shld	0.17’-0.25’	AC	variable	AB	0.50’	AS		
		1	0.67’	PCC	0.42’	RMCTB	0.50’	AS		
		2	0.67’	PCC	0.42’	RMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
	EB	Lt Shld	0.17’-0.25’	AC	variable	AB	0.50’	AS		
		1	0.67’	PCC	0.42’	RMCTB	0.50’	AS		
		2	0.67’	PCC	0.42’	RMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
Zone 14 25.26 – 31.01	WB	Lt Shld	0.20’	AC	0.89’	AB				
		1	0.67’	PCC	0.42’	LCB				
		2	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		

PM	Side	Lane	Existing Structural Section							
Waterman to Sixth		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
	EB	Lt Shld	0.20’	AC	0.89’	AB				
		1	0.67’	PCC	0.42’	LCB				
		2	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
Zone 15 31.01 – 32.11 Sixth to Cypress	WB	Lt Shld	0.75’	PCC	0.10’	AC	0.39’	LCB		
		1	0.75’	PCC	0.10’	AC	0.39’	LCB		
		2	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
	EB	Lt Shld	0.75’	PCC	0.10’	AC	0.39’	LCB		
		1	0.75’	PCC	0.10’	AC	0.39’	LCB		
		2	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
Zone 16 32.11 – 34.29 Cypress to Wabash	WB	Lt Shld	0.75’	PCC	0.98’	AC	0.39’	LCB	0.61’	AS
		1	0.75’	PCC	0.98’	AC	0.39’	LCB	0.61’	AS
		2	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
	EB	Lt Shld	0.75’	PCC	0.98’	AC	0.39’	LCB	0.61’	AS
		1	0.75’	PCC	0.98’	AC	0.39’	LCB	0.61’	AS
		2	0.75’	PCC	0.50’	PMCTB	0.50’	AS		
		3	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		4	0.75’	PCC	0.33’	RMCTB	0.50’	AS		
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		

Shld = shoulder
PCC = Portland Cement Concrete
AC = Asphalt Concrete
AB = Aggregate Base
AS = Aggregate Subbase
ATPB = Asphalt Treated Permeable Base
LCB = Lean Concrete Base
CTB = Cement Treated Base
PMCTB = Plant Mixed Cement Treated Base
RMCTB = Road Mixed Cement Treated Base

3D. Related Projects

There are several transportation projects in planning, recently constructed, or currently under construction along the project corridor. Notable projects are listed in two categories below:

1. Recently Completed or Ongoing Improvements

- I-10/Cherry Avenue interchange project (EA 468004) completed in 2015
- I-10/Citrus Avenue interchange project (EA 468104) completed in 2015
- I-10/Cedar Avenue interchange project (EA 1A8301) in PS&E, construction by 2019
- I-10/Riverside Avenue interchange project (EA 422304) completed in 2012
- I-10/Pepper Avenue Bridge Replacement project (EA 1E0304) under construction
- I-10/Tippecanoe Avenue interchange project (EA 448114 & 448124) completed in 2015
- Ramp metering project (EA 384344) completed in 2013
- Auxiliary lane project (EA 497504) completed in 2013
- Colton Crossing project completed in 2013
- WB Lane Addition from Ford Street to Live Oak Canyon Road (EA 0F1504) completed in 2013
- Pavement rehabilitation (random slab replacement) from LA/SBd County Line to Orange Street (EA 0Q7604), completed in 2016
- Pavement rehabilitation (lane replacement) from Orange Street to Ford Street (EA 0K2914), expected completion in 2017
- Pavement rehabilitation (3rd and 4th lane replacement) from Ford Street to Live Oak Canyon Road (EA 0K2924), completed in 2016
- Redlands Passenger Rail Project

2. Planned Future Improvements

- I-15 Corridor Project (EA 0R8000)
- Preliminary Feasibility Study of I-10/I-15 Express Lane Direct Connector Ramps
- I-10/Grove Avenue interchange construction and I-10/4th Street interchange removal (EA 0J4000)
- I-10/Beech Avenue interchange construction (EA 0J120K)
- I-10/Alder Avenue interchange construction (EA 34090K)
- I-10/Mt. Vernon Avenue interchange improvements (EA 1G800K)
- I-10/Mountain View Avenue interchange improvements
- I-10/California Street interchange improvements
- I-10/Alabama Street interchange improvements (EA 1H160K)
- I-10/University Street interchange improvements (EA 1E7101)
- I-10/Wabash Avenue interchange improvements
- Mountain Avenue widening from 4 to 6 lanes south of I-10
- Vineyard Avenue widening from 4 to 6 lanes between Fourth Street and I-10
- Etiwanda Avenue widening from 4 to 6 lanes south of I-10
- Beech Avenue widening from 2 to 4 lanes north of I-10
- Alder Avenue widening from 2 to 4 lanes north and south of I-10
- Pepper Avenue widening from 2 to 4 lanes from Slover Avenue to Valley Boulevard
- Rancho Avenue EB on-ramp improvement to accommodate NB right truck turning
- Mt. Vernon Avenue OC widening over UPRR
- Waterman Avenue widening from 4 to 6 lanes from Hospitality Lane to Redlands Boulevard

- California Street widening from 5 to 6 lanes from Redlands Boulevard to I-10
- Cypress Avenue widening from 2 to 4 lanes from I-10 to Citrus Avenue
- Ford Street widening from 2 to 4 lanes north of I-10
- Ford Street signalization improvements (Encroachment Permit #08-11-6-SN-0659)
- Addition of HOV lanes on I-10 from Ford Street to San Bernardino/Riverside County Line
- Santa Ana River bridge retrofit (EA 0Q910)
- Median barrier upgrade from I-15 to I-215
- Curb ramp retrofit project (EA 1C490)
- Safety lighting project from Fourth Street to I-15 (EA 1F550K)
- Pavement rehabilitation from the LA/SBd County to I-15 (EA 1H320K)
- Comprehensive Storm Drain Project 3-5 in Colton (two 108-inch pipes under I-10)

Additional information relating to the I-15 Corridor Project and the I-10/I-15 Express Lanes Direct Connectors Preliminary Evaluation are provided in the following paragraphs.

I-15 Corridor Project

SBCTA is currently studying another Express Lane corridor along I-15 in San Bernardino County. The I-15 Corridor Project (EA 0R8000) is currently in the PA/ED phase, proposing to add two Express lanes in each direction from Cantu Galleano Ranch Road near State Route 60 (SR-60) to SR-210, approximately 13 miles. A future phase to extend the two Express Lanes in each direction northerly to U.S. Highway 395 (US-395) is also being considered.

I-10/I-15 Express Lanes Direct Connectors

As part of SBCTA's consideration of the Express Lane corridors on I-10 and I-15, a preliminary evaluation has been performed to evaluate the potential future direct connectors between the proposed I-10 and I-15 Express Lanes to provide system connectivity and further improve traffic operations in vicinity of the I-10/I-15 interchange. Based upon preliminary analysis, the direct connectors between the I-10 and I-15 Express Lanes in the northwest and southwest quadrants are geometrically feasible and are forecasted to attract sufficient traffic to provide mobility benefit for the corridor, though they are not economically viable at this time. The direct connectors could be implemented as a separate future project after construction of the I-10 and I-15 Express Lanes as additional system-wide improvements when additional funds are available. The conceptual design of the direct connectors has been coordinated with the I-10 and I-15 Corridor Projects to ensure that the I-10 and I-15 Express Lanes design would not preclude implementation of the direct connectors in the future. A memorandum titled *Preliminary Feasibility Study of I-10/I-15 Express Lane Direct Connector Ramps* (dated October 2015) summarizing the preliminary evaluation of the future Express Lanes direct connectors is included in **Attachment F**.

4. PURPOSE AND NEED

4A. Problem, Deficiencies, and Justification

Purpose of Project

The purpose of the I-10 Corridor Project is to improve traffic operations on the I-10 freeway in San Bernardino County to:

- Reduce congestion;
- Increase throughput;
- Enhance trip reliability; and
- Accommodate long-term congestion management of the corridor.

In furtherance of the project's purpose, the objectives of the project are to:

- Reduce volume-to-capacity (v/c) ratios along the corridor;
- Improve travel times within the corridor;
- Relieve congestion and improve traffic flow on the regional transportation system;
- Address increased travel associated with existing and planned development;
- Provide a facility that is compatible with transit and other modal options;
- Provide consistency with the SCAG RTP, where feasible and in compliance with Federal and State regulations;
- Provide a cost-effective project solution;
- Minimize environmental impacts and right of way acquisition; and
- Promote sustainable travel and livability for the corridor.

Need for the Project

I-10 is a critical link in the state transportation network and is used by interstate travelers, local commuters, and regional and inter-regional trucks. The efficient movement of people through San Bernardino County is limited by the existing capacity of the transportation networks.

Existing deficiencies of I-10 within the project limits are summarized below:

- General purpose lanes peak-period traffic demand currently exceeds capacity; and
- I-10 HOV lane operation is degraded during peak-periods.

Forecasted deficiencies of I-10 include:

- Local and regional traffic demand is expected to increase due to population growth, creating additional congestion on I-10;
- Increase in delays;
- Potential increase in accidents due to increased congestion;
- Regional/local circulation will worsen as additional traffic avoids congestion on the freeway;
- Interchange/junction traffic service will worsen as additional traffic attempts to enter and exit the freeway;

- Bus/multimodal travel time will increase due to congestion and become unreliable due to additional congestion; and
- I-10 HOV lanes will continue to degrade as speed decreases on the facility due to the increase in traffic volumes.

4B. Regional and System Planning

4B.1. Identify System

The entire length of the I-10 freeway in San Bernardino County is included in the State Interregional Road System and the California Freeway and Expressway System. I-10 is also part of the National Highway System, the Department of Defense Priority Network, and the Strategic Highway Corridor Network. The National Network for Surface Transportation Assistance Act (STAA) also identifies I-10 as a "National Network" route for STAA trucks. The Federal Functional Classifications for I-10 are Rural Principal Arterial and extension of a Rural Principal Arterial into an urban area.

4B.2. State Planning

The *I-10 Route Concept Fact Sheet*, dated 2000, calls for 8 general purpose lanes plus 2 HOV lanes on I-10 from the LA/SBd County Line to San Bernardino/Riverside County Line. The project is consistent with the *I-10 Route Concept Fact Sheet*, providing 8 general purpose lanes plus 2 to 4 Express Lanes (with HOV usage).

The proposed I-10 Express Lanes are consistent with the mitigation measures recommended in the *2015 California HOV Lane Degradation Action Plan* prepared by Caltrans to evaluate the performance of the HOV lanes statewide. The report found that the existing HOV lane in the eastbound direction of I-10 between 4th Street (PM 5.0) and Milliken Avenue (PM 9.9) experienced significant congestion since 2013 and is considered "degraded" requiring corrective actions in accordance with the mandates of the federal Moving Ahead for Progress in the 21st Century Act (MAP-21). The report cited provision of two Express Lanes as a remediation strategy to address the HOV lane degradation on I-10.

4B.3. Regional Planning

The I-10 Corridor Project is included in the SCAG's 2016-2040 RTP/SCS and the 2017 FTIP. The project description is divided into two contracts with Contract 1 (called Phase 1 in these documents) covering the proposed improvements from the LA/SBd County Line to I-15 and Contract 2 (called Phase 2 in these documents) covering from I-15 to Ford Street, as described below:

- RTP Project 4122004 and FTIP Project 20159902: "I-10 Corridor Express Lane widening (Phase 1): from San Antonio Ave to I-10/I-15 IC; implement 2 Express Lanes in each direction for a total of 4 general purpose and 2 Express Lanes in each direction and aux lane widening, undercrossing, overcrossings, and reconstruction of ramps and lane transitions where needed."

- RTP Project 4122005 and FTIP Project 20159903: "I-10 Corridor Express Lane widening (Phase 2): implement 2 Express Lanes in each direction from I-10/I-15 interchange to California St; implement 1 Express Lane in each direction from California St to Ford St in Redlands for a total of 10-12 lanes, and aux lanes, undercrossings, overcrossings, ramp reconstruction and lane transitions where needed."

4B.4. Local Planning

The I-10 Corridor Project is included the SBCTA's 2017 Measure I 10-Year Delivery Plan as:

- I-10 Express Lanes – Contract 1: The project will provide two express lanes in each direction for ten miles from the Los Angeles County line to just east of I-15 in Ontario.

- I-10 Express Lanes – Contract 2: The project will provide two express lanes in each direction from just east of I-15 to SR-210 in Redlands and one express lane in each direction from SR-210 to Ford Street in Redlands.

The 10-Year Delivery Plan is developed to define the scope, schedule, and budgets for projects to be implemented during the next 10 years, in conformance with the requirements of the Measure I 2010-2040 Strategic Plan, and is updated every 2 years.

The I-10 Corridor Project is also consistent with the San Bernardino County General Plans and local City General Plans. These local General Plans anticipate growth within the study area and have adopted goals and policies to reduce congestion. The Circulation Elements of these local General Plans specifically reference the SBCTA's proposed improvements to the I-10 corridor as part of the local transportation improvement plans.

4B.5. Transit Operator Planning

Omnitrans is the primary transit operator in the San Bernardino Valley providing bus services, special services for individuals with disabilities, and a bus rapid transit service (San Bernardino Express running along E Street corridor in downtown San Bernardino). Several of Omnitrans bus routes run parallel and/or cross the I-10 freeway and in September 2015, Omnitrans has added express bus lines along the I-10 freeway, connecting the downtown San Bernardino Transit Center with Arrowhead Regional Medical Center, Ontario Mills, and the Montclair Transit Center. Once the project is constructed, the proposed Omnitrans express routes would be able to use the proposed Express Lanes on I-10. In addition, the I-10 Corridor Project will add bus stops at the on-ramps of the Mountain Avenue and Sierra Avenue interchanges, and incorporate associated intersection, pedestrian access, and traffic signal improvements to accommodate the Omnitrans express bus services.

The Southern California Regional Rail Authority is the regional rail network operating the Metrolink Commuter Rail in San Bernardino County that runs parallel to the I-10 corridor from downtown Los Angeles to downtown San Bernardino with several stops along the corridor allowing connection to local Omnitrans transit buses.

The SBCTA's 2010-2035 Long-Range Transit Plan (LRTP) provides a long-range transit strategy to identify and implement transit service projects in San Bernardino County. In addition, to help guide transit service improvements over the next five years, SBCTA has developed a 2015-2019 Short-Range Transit Plan (SRTP). Several projects involving future Bus Rapid Transit (BRT) and Metrolink Commuter Rail extension are recommended in the LRTP and SRTP; however, none of the planned projects will be on the I-10 freeway. No improvements proposed on the I-10 Corridor Project would preclude the future implementation of the BRT corridors.

The Redlands Passenger Rail Project which will provide new passenger rail operations along a nine-mile corridor between E Street in San Bernardino and University Street in Redlands, is currently under

construction and is anticipated to be open in 2018 or 2019. This passenger rail consists of single-track infrastructure that crosses under the I-10 freeway at the existing West Redlands OH/Mission Channel bridge in San Bernardino and at the existing Redlands OH/Mill Creek Zanja bridge in Redlands. The Redlands Passenger Rail Project is compatible with the I-10 Corridor Project. Both railroad OH structures will be widened/modified in the I-10 Corridor Project and will be designed to accommodate operation of the passenger rail. No improvements proposed in the I-10 Corridor Project would preclude the operation of the Redlands Passenger Rail.

4C. Traffic

4C.1. Current and Forecasted Traffic

The *Traffic Study Report* and *Traffic Study Report Addendum #1* have been prepared for the project to analyze the existing (2012) and future year (2045) traffic conditions along the I-10 freeway, interchange ramps, and local arterials within the project study limits. The existing traffic analysis was based on 2012 peak hour volumes from Caltrans sources, and supplemented with actual field counts. The future traffic forecast was developed from the 2035 San Bernardino County Transportation Analysis Model (SBTAM), and extrapolated to year 2045. Traffic analyses of the I-10 mainline, interchange ramps, and intersections within the project study limits are summarized in the following sections. Graphical representation of existing and forecasted design year traffic volumes on I-10 as well as on freeway ramps are provided in **Attachment B** of this document. The *Traffic Study Report* and *Traffic Study Report Addendum #1 are* available at Caltrans District 8 office under Project No. 0800000040.

I-10 Mainline

Table 4.1 below provides a summary of the I-10 freeway average daily traffic (ADT) volumes within the project study limits for the existing and future year conditions. Truck traffic on I-10 accounts for approximately 7 to 11 percent of the mainline ADT volumes as shown in **Table 4.2**.

Table 4.1 Existing and Year 2045 ADT Volume

I-10 Freeway Segment	ADT (Both Directions)		
	2012 Existing	2045 Alternative 1 (No Build)	% Increase
LA/SBd County Line to I-15	230,000	313,000	36%
I-15 to I-215	168,000	254,000	51%
I-215 to SR-210	181,000	257,000	42%
SR-210 to Ford Street	151,000	241,000	60%

Table 4.2 Existing I-10 Mainline Truck Percentages

I-10 Freeway Segment	Eastbound			Westbound			Total		
	Peak Hour		ADT	Peak Hour		ADT			
	AM	PM		AM	PM		AM	PM	ADT
LA/SBd County Line to I-15	9%	7%	10%	10%	7%	10%	9%	7%	10%
I-15 to I-215	10%	8%	11%	9%	8%	10%	10%	8%	11%
I-215 to Ford Street	11%	5%	7%	3%	9%	7%	6%	6%	7%

Source: Manual Counts at Archibald Avenue OC, Citrus Avenue OC, and Alabama Street OC

The traffic study indicates that there is insufficient capacity on I-10 to accommodate existing travel demands with the current configuration. Based on 2012 traffic volumes, traffic capacity analysis shows that sections of I-10 currently operate at unacceptable level of service (LOS) during one or both peak hours. The existing EB HOV lane between Archibald Avenue and Haven Avenue also experiences congestion during the afternoon peak hours. By year 2045, San Bernardino County is projected to grow in population by approximately 36 percent and travel demands along the I-10 corridor are projected to increase 36 to 60 percent. Accordingly, traffic operations along the I-10 mainline and interchange ramps are projected to degrade if no improvements are made. **Tables 4.3** and **4.4** present existing and future peak-hour volumes as well as LOSs for eastbound and westbound I-10 general purpose lanes, respectively. **Tables 4.5** and **4.6** present existing and future peak-hour volumes and LOSs for eastbound and westbound I-10 HOV lanes between the LA/SBd County Line and Haven Avenue, respectively. In addition, travel speeds along the corridor are projected to degrade as shown in **Table 4.7** and travel time along the corridor is projected to increase as shown in **Table 4.8.**

As supplemental information, **Tables 4.7** and **4.8** present speed and travel time data from a recent survey conducted in October 2015 by CDM Smith and from the Caltrans Freeway Performance Management System (PeMS). As shown, the average speeds for the entire I-10 corridor have decreased between 2012 and 2015, predominantly in both directions between the LA/SBd County Line and I-15. Accordingly, the 2015 data shows that travel times between the LA/SBd County Line and I-15 as well as along the entire corridor have increased between 2012 and 2015.

Table 4.3 Existing and Year 2045 Alternative 1 EB GP Lane Peak Hour Volume & LOS

I-10 Segment	EB GP Lane Peak Hour Volume & LOS[1]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	5,400	0.73	C	6,560	0.89	D	7,410	1.01	F	7,400	1.00	D
Indian Hill – Monte Vista	6,060	0.82	C	6,900	0.93	D	7,610	1.03	F	7,650	1.03	F
Monte Vista - Central	6,260	0.85	C	6,940	0.94	D	7,910	1.07	F	7,850	1.06	F
Central - Mountain	5,170	0.62	B	5,200	0.62	B	8,150	0.97	C	8,190	0.98	C
Mountain - Euclid	6,690	0.90	D	7,350	0.99	D	8,180	1.11	F	8,040	1.09	F
Euclid – 4th/Grove[2]	7,070	0.96	D	7,080	0.96	D	8,330	1.13	F	7,580	1.02	F
4th/Grove[2] - Vineyard	7,010	0.95	D	6,720	0.91	D	8,210	1.11	F	6,970	0.94	D
Vineyard - Archibald	7,380	1.00	C	6,980	0.94	C	8,680	1.17	F	7,720	1.04	F
Archibald - Haven	5,470	0.74	C	5,410	0.73[4]	F	9,040	1.08	F	8,930	1.06	F
Haven - Milliken	7,430	0.72	C	8,160	0.80	C	11,170	1.09	F	11,720	1.14	F
Milliken – I-15	6,940	0.75	C	8,060	0.87	D	10,560	1.14	F	11,490	1.24	F
I-15 – Etiwanda	7,090	0.96	D	7,200	0.97[4]	F	10,530	1.25	F	10,350	1.23	F
Etiwanda – Cherry	6,280	0.85	D	7,080	0.96	D	9,600	1.04	F	10,240	1.11	F
Cherry – Citrus	5,960	0.81	C	6,680	0.90	D	-	-	-	-	-	-
Cherry – Beech[3]	-	-	-	-	-	-	9,390	1.27	F	10,120	1.37	F
Beech[3] – Citrus	-	-	-	-	-	-	9,640	1.30	F	10,090	1.36	F
Citrus – Sierra	6,000	0.71	C	6,410	0.76	C	9,810	1.33	F	9,600	1.30	F
Sierra – Cedar	5,470	0.74	C	6,250	0.84	D	-	-	-	-	-	-
Sierra – Alder[3]	-	-	-	-	-	-	9,320	1.26	F	9,410	1.27	F
Alder[3] – Cedar	-	-	-	-	-	-	9,490	1.28	F	9,270	1.25	F
Cedar – Riverside	5,460	0.74	C	6,310	0.85	D	9,200	1.24	F	8,770	1.19	F
Riverside – Pepper	5,430	0.73	C	6,220	0.84	C	9,210	1.24	F	8,840	1.19	F
Pepper – Rancho	5,830	0.79	C	6,480	0.88	D	9,580	1.29	F	9,140	1.24	F
Rancho – La Cadena/9th	6,630	0.90	D	6,590	0.89	D	9,680	1.31	F	9,240	1.25	F
La Cadena/9th – Mt. Vernon	6,850	0.93	C	6,760	0.91	C	9,960	1.35	F	9,480	1.28	F
Mt. Vernon – I-215	6,600	0.89	D	6,660	0.90	D	9,580	1.29	F	9,240	1.25	F
I-215 – Waterman	7,840	1.06	F	8,590	1.16	F	11,530	1.37	F	11,240	1.34	F
Waterman – Tippecanoe	5,440	0.74	C	7,600	1.03	F	8,530	1.15	F	9,950	1.34	F
Tippecanoe – Mountain View	4,920	0.66	B	7,570	1.02	F	7,840	1.06	F	9,980	1.35	F
Mountain View – California	4,440	0.60(	F	7,900	1.07	F	7,010	0.95	D	10,430	1.41	F
California – Alabama	4,030	0.44	A	7,910	0.86	C	6,330	0.68	B	10,690	1.16	F
Alabama – SR-210	3,460	0.37	B	7,050	0.76	C	5,490	0.59	B	9,670	1.05	F
SR-210 – Tennessee	2,710	0.37	B	5,510	0.74	C	4,280	0.58	B	7,420	1.00	F
SR-210 – Eureka/6th	4,370	0.52	B	8,240	0.98	D	6,590	0.78	D	11,230	1.34	F
Eureka/6th – University/Cypress	3,440	0.46	B	7,540	1.02	F	5,470	0.74	C	10,510	1.42	F
University/Cypress – Ford	2,830	0.38	B	6,620	0.89	C	4,780	0.65	C	9,860	1.33	F
Ford – Wabash	2,830	0.31	A	6,590	0.71	C	3,760	0.41	B	9,140	0.99	D

[1]LOS is based on density except when traffic v/c or demand-to-capacity (d/c) ratio is greater than 1.00, which is LOS F. LOS is presented in conjunction with a v/c ratio for the existing condition or a d/c ratio for the future years to provide additional measure of operational level.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[3]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[4]Freeway measured speed is less than 53mph, which is LOS F based on the Caltrans Standard Environmental Reference.

Table 4.4 Existing and Year 2045 Alternative 1 WB GP Lane Peak Hour Volume & LOS

I-10 Segment	WB GP Lanes Peak Hour Volume & LOS[1]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	7,890	1.07	F	7,220	0.98	D	8,500	1.15	F	8,800	1.19	F
Indian Hill – Monte Vista	7,760	1.05	F	7,330	0.99	D	8,650	1.17	F	9,000	1.22	F
Monte Vista - Central	7,560	1.02	F	7,350	0.99	D	8,700	1.18	F	9,202	1.24	F
Central - Mountain	7,540	1.02	F	7,340	0.99	D	8,920	1.21	F	9,590	1.30	F
Mountain - Euclid	7,310	0.99	D	7,450	1.01	F	8,990	1.21	F	10,010	1.35	F
Euclid – 4th/Grove[2]	6,530	0.88	D	6,980	0.94	D	8,870	1.20	F	10,280	1.39	F
4th/Grove[2] - Vineyard	6,210	0.84	D	7,240	0.98	D	8,700	1.18	F	10,650	1.44	F
Vineyard - Archibald	5,720	0.77	C	6,960	0.94	C	8,920	1.21	F	11,020	1.49	F
Archibald - Haven	6,610	0.79	C	7,340	0.87	C	10,350	1.23	F	11,250	1.34	F
Haven - Milliken	9,230	1.00	D	8,590	0.93	D	12,880	1.39	F	12,900	1.39	F
Milliken – I-15	9,300	1.01	F	8,360	0.90	D	13,280	1.44	F	12,710	1.37	F
I-15 – Etiwanda	7,100	0.85	C	7,410	0.85	D	10,140	1.21	F	10,780	1.28	F
Etiwanda – Cherry	6,920	0.94	D	6,540	0.88	D	9,720	1.31	F	9,540	1.29	F
Cherry – Citrus	6,840	0.92	D	6,510	0.88	D	-	-	-	-	-	-
Cherry – Beech[3]	-	-	-	-	-	-	9,890	1.34	F	9,770	1.32	F
Beech[3] – Citrus	-	-	-	-	-	-	9,540	1.29	F	9,680	1.31	F
Citrus – Sierra	6,550	0.89	C	6,420	0.87	C	8,890	1.20	F	9,590	1.30	F
Sierra – Cedar	5,400	0.73	C	5,350	0.72	C	-	-	-	-	-	-
Sierra – Alder[3]	-	-	-	-	-	-	8,600	1.16	F	9,210	1.24	F
Alder[3] – Cedar	-	-	-	-	-	-	8,340	1.13	F	9,350	1.26	F
Cedar – Riverside	6,010	0.81	C	6,530	0.88	D	7,670	0.91	C	9,040	1.08	F
Riverside – Pepper	4,570	0.62	C	5,160	0.70	C	7,710	1.04	F	9,020	1.22	F
Pepper – Rancho	4,250	0.57	B	5,060	0.68	C	7,710	1.04	F	9,110	1.23	F
Rancho – La Cadena/9th	4,370	0.59	C	5,270	0.71	C	7,730	1.04	F	9,260	1.25	F
La Cadena/9th – Mt. Vernon	6,060	0.82	C	6,960	0.94	C	7,850	1.06	F	9,530	1.29	F
Mt. Vernon – I-215	6,040	0.82	C	6,950	0.94	C	7,900	1.07	F	9,660	1.31	F
I-215 – Waterman	8,040	1.09	F	7,310	0.99	E	9,600	1.30	F	9,720	1.31	F
Waterman – Tippecanoe	8,630	1.17	F	6,620	0.89	C	10,100	1.36	F	8,840	1.19	F
Tippecanoe – Mountain View	6,920	0.94	C	5,750	0.78	C	9,960	1.35	F	8,120	1.10	F
Mountain View – California	8,630	1.17	F	5,680	0.77	C	10,350	1.40	F	7,160	0.97	D
California – Alabama	8,840	0.86	C	5,230	0.51	B	10,970	1.07	F	6,410	0.63	C
Alabama – SR-210	8,080	0.96	C	4,240	0.50	B	9,750	1.16	F	5,040	0.60	B
SR-210 – Tennessee	6.840	0.92	D	3,550	0.48	B	8,530	1.15	F	4,150	0.56	B
SR-210 – Orange/6th	8,890	1.06	F	5,360	0.64	B	12,600	1.50	F	7,610	0.91	F
Orange/6th – University/Cypress	7,960	1.08	F	4,570	0.62	C	11,430	1.54	F	6,750	0.91	D
University/Cypress – Ford	6,820	0.92	D	3,980	0.54	B	10,300	1.39	F	6,160	0.83	D
Ford – Wabash	6,200	0.84	C	3,920	0.53	B	8,850	1.20	F	4,620	0.62	C

[1]LOS is based on density except when traffic v/c or d/c ratio is greater than 1.00, which is LOS F. LOS is presented in conjunction with a v/c ratio for the existing condition or a d/c ratio for the future years to provide additional measure of operational level.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[3]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.

Table 4.5 Existing and Year 2045 Alternative 1 EB HOV Peak Hour Volume & LOS

I-10 Segment	EB HOV Peak Hour Volume & LOS[1]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	1,150	0.72	C	1,250	0.78	D	1,060	0.66	C	1,180	0.74	C
Indian Hill – Monte Vista	560	0.35	B	1,120	0.70	C	950	0.59	C	1,360	0.85	D
Monte Vista - Central	560	0.35	B	1,120	0.70	C	950	0.59	C	1,360	0.85	D
Central - Mountain	560	0.35	B	1,120	0.70	C	950	0.59	C	1,360	0.85	D
Mountain - Euclid	570	0.36	B	1,170	0.73	C	1,300	0.81	D	1,440	0.90	D
Euclid – 4th/Grove[2]	570	0.36	B	1,170	0.73	C	1,300	0.81	D	1,440	0.90	D
4th/Grove[2] - Vineyard	530	0.33	B	1,100	0.69	C	1,520	0.95	E	1,440	0.90	D
Vineyard - Archibald	490	0.31	A	1,030	0.64	C	1,240	0.78	D	1,540	0.96	E
Archibald - Haven	480	0.30	A	1,110	[3]	F	1,460	0.91	E	1,790	1.12	F

[1]LOS is based on the v/c ratio for the existing condition or d/c ratio for the future years.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[3]Freeway measured speed is less than 53mph, which is LOS F based on the Caltrans Standard Environmental Reference.

Table 4.6 Existing and Year 2045 Alternative 1 WB HOV Peak Hour Volume & LOS

I-10 Segment	WB HOV Peak Hour Volume & LOS[1]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	1,290	0.81	D	870	0.54	C	1,590	0.99	E	1,670	1.04	F
Indian Hill – Monte Vista	1,290	0.81	D	870	0.54	C	1,550	0.97	E	1,740	1.09	F
Monte Vista - Central	1,290	0.81	D	870	0.54	C	1,550	0.97	E	1,910	1.19	F
Central - Mountain	1,200	0.75	D	1,010	0.63	C	1,400	0.88	D	2,070	1.29	F
Mountain - Euclid	1,200	0.75	D	1,010	0.63	C	1,320	0.83	D	1,940	1.21	F
Euclid – 4th/Grove[2]	1,120	0.70	C	890	0.56	C	1,370	0.86	D	1,970	1.23	F
4th/Grove[2] - Vineyard	1,120	0.70	C	890	0.56	C	1,350	0.84	D	1,950	1.22	F
Vineyard - Archibald	1,040	0.65	C	980	0.61	C	1,630	1.02	F	2,330	1.46	F
Archibald - Haven	900	0.56	C	730	0.46	B	1,630	1.02	F	2,330	1.46	F

[1]LOS is based on the v/c ratio for the existing condition or d/c ratio for the future years.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.

Table 4.7 Existing and Year 2045 Alternative 1 Average Speed

I-10 Between LA/SBd County Line and Ford Street		Average Peak Hour Speed[2] (mph)											
		2012 Existing				2015[3]				2045 Alternative 1 (No Build)			
		GP		HOV[1]		GP		HOV[1]		GP		HOV[1]	
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
EB	LA/SBd County Line to I-15	57	54	65	63	54	34	56	41	28	33	57	44
	I-15 to I-215	60	56			58	36			14	16		
	I-215 to SR-210	63	42			63	28			40	10		
	SR-210 to Ford	65	42			60	45			63	10		
	Entire Corridor	60	53	61	56	59	36	58	37	29	21	36	27
WB	LA/SBd County Line to I-15	48	46	62	65	30	38	49	51	15	10	43	10
	I-15 to I-215	59	59			56	60			29	15		
	I-215 to SR-210	32	62			49	62			10	42		
	SR-210 to Ford	34	65			38	64			10	56		
	Entire Corridor	48	57	52	59	43	56	45	55	21	24	27	21

[1]HOV travel speeds are a combination of HOV lane speeds west of Haven Avenue and GP lane speeds east of Haven Avenue, weighted for the distance of each.
[2]Speed index is a mathematical estimate of speed relative to the variation of the d/c ratios which vary for differing values of capacity in each alternative. The speed index is a relative value and does not substitute for the actual speed and is not directly related to flow and density. Average peak hour speed is based on SBTAM post-processed forecast data.
[3]2015 speeds are provided as supplemental information. The 2015 GP lane speeds are based on a survey conducted in October 2015. The 2015 HOV lane speeds are based on Caltrans Freeway PeMS.

Table 4.8 Existing and Year 2045 Alternative 1 Travel Time

I-10 Between LA/SBd County Line and Ford Street		Travel Time[2] (minutes)											
		2012 Existing				2015[3]				2045 Alternative 1 (No Build)			
		GP		HOV[1]		GP		HOV[1]		GP		HOV[1]	
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
EB	LA/SBd County Line to I-15	8	9	7	8	9	14	8	12	17	14	8	11
	I-15 to I-215	13	14			14	22			57	50		
	I-215 to SR-210	5	7			5	11			8	31		
	SR-210 to Ford	2	3			2	3			2	12		
	Entire Corridor	29	33	28	31	29	48	29	46	59	80	47	63
WB	LA/SBd County Line to I-15	10	11	8	7	16	13	10	10	32	49	11	49
	I-15 to I-215	14	14			15	14			29	56		
	I-215 to SR-210	9	5			6	5			28	7		
	SR-210 to Ford	4	2			4	2			15	3		
	Entire Corridor	37	31	34	30	41	31	39	32	85	72	66	84

[1]HOV lanes exist only west of Haven Avenue. HOV travel times are a combination of travel times for the HOV lane west of Haven Avenue and GP lanes east of Haven Avenue, weighted for the distance of each.
[2]Corridor travel time is calculated using the average speed shown in Table 4.7 and the length of the corridor within the project limits
[3]2015 travel times are provided as supplemental information. The 2015 GP lane travel times are based on a survey conducted in October 2015. The 2015 HOV lane travel times are based on Caltrans Freeway PeMS.

Interchange Ramps

A ramp junction merge/diverge LOS analysis was performed for the interchange ramps along the project corridor. **Tables 4.9** and **4.10** below summarize existing and projected volumes as well as merge/diverge LOS for the interchange ramps along EB and WB I-10, respectively. It should be noted that ramp merge/diverge LOS is based on the density of the mainline upstream of a diverge or downstream of a merge. When the total flow of the merge/diverge area exceeds the capacity of the freeway section or when the mainline d/c ratio is greater than 1.00, then ramp LOS is determined to be LOS F. Ramp d/c ratio is also presented to provide additional measure of operational level. The d/c ratio presented is the density of the ramp and does not solely determine the operations of the ramp junction and therefore, does not directly correlate with the LOS reported for the ramp.

Table 4.9 Existing and Year 2045 Alternative 1 EB Ramp Peak Hour Volume & LOS

	EB Ramp Peak Hour Volume & LOS[4]											
	2012 Existing						**2045 Alternative 1 (No Build)**					
	AM			**PM**			**AM**			**PM**		
I-10 Segment	**Vol**	**v/c**	**LOS**	**Vol**	**v/c**	**LOS**	**Vol**	**d/c**	**LOS**	**Vol**	**d/c**	**LOS**
Indian Hill EB off-ramp	720	0.48	D	780	0.52	D	840	0.56	F	900	0.60	E
Indian Hill EB on-ramp	790	0.53	C	1,000	0.67	D	940	0.63	F	1,330	0.89	F
Monte Vista EB off-ramp	560	0.37	D	810	0.54	D	760	0.51	F	930	0.62	F
Monte Vista EB on-ramp	760	0.51	C	850	0.57	D	1,050	0.70	F	1,130	0.75	F
Central EB off-ramp	540	0.36	C	820	0.55	D	660	0.44	F	940	0.63	F
Central EB on-ramp	570	0.38	B	1,090	0.73	B	900	0.60	C	1,280	0.85	C
Mountain EB off-ramp	640	0.43	C	1,050	0.70	F	730	0.49	C	1,210	0.81	C
Mountain EB on-ramp	870	0.58	D	990	0.66	F	1,110	0.74	F	1,140	0.76	F
Euclid EB off-ramp	880	0.59	D	1,360	0.91	E	1,030	0.69	F	1,570	1.05	F
Euclid EB on-ramp	950	0.63	D	900	0.60	D	1,180	0.79	F	1,110	0.74	F
4th/Grove EB off-ramp[1]	550	0.37	D	860	0.57	D	970	0.65	F	1,420	0.95	F
4th/Grove EB on-ramp[1]	450	0.30	D	430	0.29	C	1,060	0.71	F	800	0.53	D
Vineyard EB off-ramp	500	0.33	D	370	0.25	D	920	0.31	F	420	0.14	D
Vineyard EB on-ramp	650	0.43	C	550	0.37	C	1,110	0.74	F	1,270	0.85	F
Archibald EB off-ramp	920	0.31	C	950	0.32	C	1,660	0.55	F	1,550	0.52	F
Holt EB on-ramp	1,090	0.73	B	1,630	1.09	F	1,560	1.04	F	2,050	1.37	C
Archibald EB on-ramp	550	0.37	C	770	0.51	F	680	0.45	F	950	0.63	F
Haven EB off-ramp	1,130	0.38	B	980	0.33	B	1,700	0.57	F	1,130	0.38	F
Haven EB loop on-ramp	480	0.32	C	580	0.39	C	560	0.37	F	670	0.45	F
Haven EB on-ramp	1,580	1.05	C	1,260	0.84	C	1,810	1.21	F	1,450	0.97	F
Milliken EB off-ramp	890	0.30	B	870	0.29	B	1,180	0.39	F	1,120	0.37	F
Milliken EB loop on-ramp	400	0.27	C	770	0.51	D	580	0.39	F	890	0.59	F
E10-N15 Connector	1,350	0.45	C	2,420	0.81	D	1,580	0.53	F	2,790	0.93	F
E10-S15 Connector	1,810	1.21	C	1,780	1.19	C	2,350	1.57	F	2,050	1.37	F
N15-E10 Connector	1,790	1.19	C	1,770	1.18	F	2,620	1.75	F	2,580	1.72	F
S15-E10 Connector	1,110	0.74	D	970	0.65	F	1,270	0.85	F	1,120	0.75	F

I-10 Segment	EB Ramp Peak Hour Volume & LOS[4]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Etiwanda EB C-D off-ramp	1,110	0.37	D	1,010	0.34	F	1,280	0.43	F	1,160	0.39	F
Etiwanda EB off-ramp	584	0.39	[3]	382	0.25	[3]	660	0.44	[3]	394	0.26	[3]
Etiwanda EB loop on-ramp	83	0.06	[3]	288	0.19	[3]	87	0.06	[3]	270	0.18	[3]
Etiwanda EB on-ramp	217	0.14	[3]	612	0.41	[3]	263	0.18	[3]	780	0.52	[3]
Valley EB off-ramp	526	0.35	[3]	628	0.42	[3]	620	0.41	[3]	766	0.51	[3]
Etiwanda EB C-D on-ramp	300	0.20	B	900	0.60	C	350	0.23	F	1,050	0.70	F
Cherry EB off-ramp	590	0.39	D	690	0.46	D	1,040	0.35	F	1,250	0.42	F
Cherry EB on-ramp	420	0.28	C	490	0.33	C	830	0.55	F	1,130	0.75	F
Beech EB off-ramp[2]	-	-	-	-	-	-	370	0.25	F	530	0.35	F
Beech EB on-ramp[2]	-	-	-	-	-	-	630	0.42	F	500	0.33	F
Citrus EB off-ramp	470	0.31	D	810	0.54	D	550	0.37	F	1,120	0.75	F
Citrus EB on-ramp	510	0.34	C	540	0.36	C	710	0.47	F	620	0.41	F
Sierra EB off-ramp	1,410	0.47	B	1,270	0.42	B	1,630	0.54	F	1,470	0.49	F
Sierra EB on-ramp	880	0.59	B	1,110	0.74	C	1,140	0.76	F	1,280	0.85	F
Alder EB off-ramp[2]	-	-	-	-	-	-	460	0.31	F	600	0.40	F
Alder EB on-ramp[2]	-	-	-	-	-	-	630	0.42	F	460	0.31	F
Cedar EB off-ramp	670	0.45	D	850	0.57	D	1,150	0.38	F	1,540	0.51	F
Cedar EB on-ramp	730	0.49	C	860	0.57	C	870	0.58	F	1,040	0.69	F
Riverside EB off-ramp	570	0.19	A	660	0.22	A	910	0.30	F	940	0.31	F
Riverside EB on-ramp	550	0.37	C	570	0.38	C	870	0.58	F	1,010	0.67	F
Pepper EB off-ramp	400	0.27	C	460	0.31	D	490	0.33	F	530	0.35	F
Pepper EB on-ramp	790	0.53	C	720	0.48	C	910	0.61	F	830	0.55	F
Rancho EB off-ramp	320	0.21	D	560	0.37	D	470	0.31	F	660	0.44	F
Rancho EB on-ramp	500	0.33	C	660	0.44	C	570	0.38	F	750	0.50	F
9th EB off-ramp	120	0.08	D	190	0.13	D	160	0.11	F	220	0.15	F
9th EB on-ramp	340	0.23	C	360	0.24	C	450	0.30	F	460	0.31	F
Mt. Vernon EB off-ramp	520	0.35	C	590	0.39	C	750	0.50	F	800	0.53	F
Mt. Vernon EB on-ramp	270	0.18	D	480	0.32	D	360	0.24	F	560	0.37	F
E10-N/S215 Connector	2,370	0.53	D	2,420	0.54	D	3,120	0.69	F	3,210	0.71	F
E10-N215 Connector	1,683	0.56	A	1,863	0.62	B	2,210	0.74	C	2,470	0.82	D
E10-S215 Connector	687	0.23	A	557	0.19	A	910	0.30	A	740	0.25	A
N215-E10 Connector	2,420	1.61	C	2,590	1.73	C	3,080	2.05	F	3,190	2.13	F
S215-E10 Connector	1,200	0.80	F	1,760	1.17	F	1,990	1.33	F	2,030	1.35	F
Redlands EB off-ramp	1,560	1.04	F	1,040	0.69	F	1,860	1.24	F	1,280	0.85	F
Waterman EB C-D/loop off-ramp	1,290	0.86	C	900	0.60	F	1,660	1.11	F	1,100	0.73	F
Waterman EB loop on-ramp	142	0.09	[3]	555	0.37	[3]	164	0.11	[3]	644	0.43	[3]
Waterman EB on-ramp	308	0.21	[3]	385	0.26	[3]	356	0.24	[3]	446	0.30	[3]

I-10 Segment	EB Ramp Peak Hour Volume & LOS[4]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Waterman EB C-D on-ramp	450	0.30	C	940	0.63	F	520	0.35	F	1,090	0.73	F
Tippecanoe EB off-ramp	880	0.59	C	950	0.63	F	1,100	0.37	F	1,090	0.36	F
Tippecanoe EB on-ramp	360	0.24	B	920	0.61	F	410	0.27	F	1,120	0.75	F
Mountain View EB off-ramp	940	0.63	B	570	0.38	F	1,360	0.91	F	770	0.51	F
Mountain View EB on-ramp	440	0.29	F	880	0.59	F	530	0.35	D	1,220	0.81	F
California EB off-ramp	720	0.48	F	740	0.49	F	1,090	0.73	D	1,030	0.69	F
California EB on-ramp	310	0.21	A	750	0.50	C	410	0.27	B	1,290	0.86	F
Alabama EB off-ramp	570	0.38	B	860	0.57	C	840	0.56	B	1,020	0.68	F
E10-W210 Connector	760	0.25	A	1,540	0.51	B	1,210	0.40	B	2,250	0.75	F
E210-E10 Connector	1,620	1.08	B	2,130	1.42	D	2,440	1.63	D	3,130	2.09	F
Tennessee EB off-ramp	270	0.18	B	390	0.26	C	500	0.33	C	480	0.32	F
Tennessee EB on-ramp	310	0.21	B	1,010	0.67	C	380	0.25	B	1,160	0.77	F
Eureka EB off-ramp	1,130	0.75	B	1,260	0.84	D	1,390	0.93	D	1,470	0.98	F
6th EB on-ramp	190	0.13	B	560	0.37	F	270	0.18	C	760	0.51	F
University EB off-ramp	770	0.51	C	1,140	0.76	F	880	0.59	D	1,310	0.87	F
Cypress EB on-ramp	160	0.11	B	220	0.15	D	190	0.13	C	660	0.44	F
Ford EB off-ramp	350	0.23	B	670	0.45	D	660	0.44	C	770	0.51	F
Ford EB on-ramp	360	0.24	A	640	0.43	C	600	0.40	B	1,500	1.00	D

[1]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[2]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[3]LOS is not calculated for ramps that connect to a collector-distributor (C-D) road.
[4]Ramp merge/diverge LOS is based on the density of the mainline upstream of a diverge or downstream of a merge. When the total flow of the merge/diverge area exceeds the capacity of the freeway section or when the mainline v/c or d/c ratio is greater than 1.00, then ramp LOS is determined to be LOS F. Ramp v/c ratio for the existing condition or d/c ratio for the future years is also presented to provide additional measure of operational level. The v/c or d/c ratio presented is the density of the ramp and does not solely determine the operations of the ramp junction and therefore, does not directly correlate with the LOS reported for the ramp.

Table 4.10 Existing and Year 2045 Alternative 1 WB Ramp Peak Hour Volume & LOS

I-10 Segment	WB Ramp Peak Hour Volume & LOS[4]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Indian Hill WB on-ramp	860	0.57	F	790	0.53	D	990	0.66	F	910	0.61	F
Indian Hill WB off-ramp	730	0.49	F	890	0.59	E	1,100	0.73	F	1,170	0.78	F
Monte Vista WB on-ramp	710	0.47	F	690	0.46	D	810	0.54	F	830	0.55	F
Monte Vista WB off-ramp	500	0.33	F	710	0.47	D	870	0. 58	F	1,240	0.83	F
Central WB on-ramp	800	0.53	F	790	0.53	D	920	0.61	F	910	0.61	F
Central WB off-ramp	690	0.46	F	920	0.61	E	990	0.66	F	1,430	0.95	F
Mountain WB on-ramp	1,080	0.72	F	970	0.65	D	1,240	0.83	F	1,070	0.71	F
Mountain WB off-ramp	850	0.57	E	1,090	0.73	F	1,300	0.87	F	1,480	0.99	F
Euclid WB on-ramp	650	0.43	C	550	0.37	F	750	0.50	F	650	0.43	F
Euclid WB loop on-ramp	410	0.27	C	460	0.31	C	470	0.31	F	530	0.35	F
Euclid WB hook off-ramp	660	0.44	D	870	0.58	E	1,050	1.03	F	1,330	0.89	F
4th/Grove WB on-ramp[1]	660	0.44	C	530	0.35	C	1,040	0.69	F	920	0.61	F
4th/Grove WB off-ramp[1]	320	0.21	D	430	0.29	D	870	0.58	F	1,290	0.86	F
Vineyard WB on-ramp	270	0.18	C	290	0.19	C	310	0.21	F	420	0.28	F
Vineyard WB loop on-ramp	180	0.12	C	270	0.18	C	210	0.14	F	300	0.20	F
Vineyard WB off-ramp	500	0.33	C	720	0.48	C	1,010	0.67	F	1,470	0.98	F
Archibald WB on-ramp	630	0.42	C	1,000	0.67	C	1,010	0.67	F	1,740	1.16	F
Holt WB off-ramp	1,060	0.71	C	760	0.51	C	1,740	1.16	F	1,420	0.95	F
Archibald WB off-ramp	610	0.41	D	480	0.32	D	700	0.47	F	560	0.37	F
Haven WB on-ramp	470	0.31	C	1,070	0.71	C	540	0.36	F	1,240	0.83	F
Haven WB loop on-ramp	330	0.22	C	500	0.33	C	380	0.25	F	860	0.57	F
Haven WB off-ramp	1,580	0.53	C	1,230	0.41	B	1,820	0.61	F	1,420	0.47	F
Milliken WB on-ramp	650	0.43	D	1,070	0.71	D	750	0.50	F	1,230	0.82	F
Milliken WB loop off-ramp	720	0.24	F	850	0.28	D	1,150	0.38	F	1,040	0.35	F
N15-W10 Connector	2,570	0.86	F	2,030	0.68	D	2,960	0.99	F	2,340	0.78	F
S15-W10 Connector	2,710	1.81	C	1,840	1.23	C	3,200	2.13	F	2,410	1.61	F
W10-N/S15 Connector	2,800	0.93	C	2,590	0.86	D	3,020	1.01	F	2,820	0.94	F
W10-N15 Connector	784	0.52	A	1,010	0.67	B	860	0.57	A	1,090	0.73	C
W10-S15 Connector	2,016	0.67	B	1,580	0.53	A	2,160	0.72	C	1,730	0.58	A
Etiwanda WB on-ramp	180	0.12	C	280	0.19	D	440	0.29	F	590	0.39	F
Etiwanda WB loop on-ramp	630	0.42	C	1,040	0.69	C	720	0.48	F	1,200	0.80	F
Valley WB on-ramp	292	0.19	(3)	466	0.31	(3)	334	0.22	(3)	538	0.36	(3)
Etiwanda WB off-ramp	620	0.41	D	440	0.29	D	730	0.49	F	550	0.37	F
Cherry WB on-ramp	750	0.50	C	570	0.38	C	810	0.54	F	490	0.33	F
Cherry WB loop on-ramp	-	-	-	-	-	-	290	0.19	F	240	0.16	F
Cherry WB off-ramp	670	0.45	D	550	0.37	D	1,270	0.42	F	970	0.32	F

I-10 Segment	WB Ramp Peak Hour Volume & LOS[4]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Beech WB on-ramp[2]	-	-	-	-	-	-	750	0.50	F	650	0.43	F
Beech WB off-ramp[2]	-	-	-	-	-	-	390	0.26	F	560	0.37	F
Citrus WB on-ramp	840	0.56	D	640	0.43	C	760	0.51	F	490	0.33	F
Citrus WB loop on-ramp	-	-	-	-	-	-	520	0.35	F	380	0.25	F
Citrus WB off-ramp	550	0.37	C	540	0.36	C	630	0.42	F	780	0.52	F
Sierra WB on-ramp	1,210	0.81	C	1,430	0.95	C	1,390	0.93	F	1,650	1.10	F
Sierra WB off-ramp	870	0.29	A	910	0.30	A	1,100	0.37	F	1,270	0.42	F
Alder WB on-ramp[2]	-	-	-	-	-	-	690	0.46	F	470	0.31	F
Alder WB off-ramp[2]	-	-	-	-	-	-	440	0.29	F	600	0.40	F
Cedar WB on-ramp	960	0.64	C	740	0.49	C	1,480	0.99	F	1,220	0.81	F
Cedar WB off-ramp	650	0.43	D	640	0.43	D	810	0.54	D	910	0.61	F
Riverside WB on-ramp	680	0.45	C	560	0.37	C	860	0.57	C	910	0.61	F
Riverside WB off-ramp	570	0.38	B	720	0.48	C	890	0.59	F	890	0.59	F
Pepper WB on-ramp	730	0.49	B	550	0.37	C	840	0.56	F	640	0.43	F
Pepper WB off-ramp	590	0.39	C	540	0.36	C	840	0.56	F	730	0.49	F
Rancho WB on-ramp	330	0.22	B	300	0.20	C	500	0.33	F	480	0.32	F
Rancho WB off-ramp	460	0.31	C	500	0.33	C	530	0.35	F	630	0.42	F
La Cadena WB on-ramp	230	0.15	C	300	0.20	C	270	0.18	F	340	0.23	F
9th WB off-ramp	340	0.23	C	370	0.25	C	390	0.26	F	610	0.41	F
Mt. Vernon WB on-ramp	360	0.24	C	550	0.37	C	590	0.39	F	780	0.52	F
Sperry WB off-ramp	340	0.23	C	540	0.36	C	650	0.43	F	910	0.61	F
S215-W10 Connector	1,280	0.85	C	1,550	1.03	C	2,140	1.43	F	2,520	1.68	F
N215-W10 Connector	790	0.53	C	1,270	0.85	C	910	0.61	C	1,460	0.97	D
W10-N/S215 Connector	3,860	1.29	F	3,470	1.16	E	5,000	1.67	F	4,940	1.65	F
W10-N215 Connector	3,339	1.11	F	2,058	0.69	B	4,360	1.45	F	2,930	0.98	E
W10-S215 Connector	942	0.31	A	2,142	0.71	C	1,210	0.40	A	3,110	1.04	F
E/Sunwest WB on-ramp	230	0.15	B	750	0.50	C	260	0.17	B	890	0.59	C
Carnegie WB hook on-ramp	290	0.19	F	1,250	0.83	E	540	0.36	F	1,560	1.04	F
Carnegie WB hook off-ramp	880	0.59	F	550	0.37	C	1,040	0.69	F	680	0.45	F
Tippecanoe WB on-ramp	770	0.51	F	1,250	0.83	C	590	0.39	F	840	0.56	F
Tippecanoe WB loop on-ramp	-		-	-		-	400	0.27	F	643	0.43	F
Tippecanoe WB off-ramp	730	0.49	C	660	0.44	C	840	0.56	F	760	0.51	F
Mountain View WB on-ramp	640	0.43	C	800	0.53	C	800	0.53	F	1,710	1.14	F
Mountain View WB off-ramp	750	0.50	F	460	0.31	C	1,200	0.80	F	750	0.50	D
California WB on-ramp	530	0.35	F	920	0.61	C	720	0.48	F	1,470	0.98	D
California WB off-ramp	740	0.49	C	470	0.31	B	1,340	0.89	F	720	0.48	C
Alabama WB on-ramp	760	0.51	C	990	0.66	B	1,220	0.81	F	1,370	0.91	C

I-10 Segment	WB Ramp Peak Hour Volume & LOS[4]											
	2012 Existing						2045 Alternative 1 (No Build)					
	AM			PM			AM			PM		
	Vol	v/c	LOS	Vol	v/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Alabama WB off-ramp	520	0.35	D	300	0.20	B	830	0.55	F	490	0.33	C
E210-W10 Connector	1,610	1.07	F	930	0.62	B	2,050	1.37	F	1,380	0.92	B
W10-W210 Connector	2,050	0.68	F	1,800	0.60	B	3,610	1.20	F	3,030	1.01	F
Tennessee WB off-ramp	360	0.24	D	350	0.23	B	460	0.31	F	430	0.29	C
Orange WB on-ramp	610	0.41	F	380	0.25	B	730	0.49	F	450	0.30	F
Orange WB loop on-ramp	710	0.47	C	760	0.51	B	900	0.60	F	900	0.60	C
6th WB off-ramp	400	0.27	F	350	0.23	C	460	0.31	F	490	0.33	D
University WB on-ramp	1,390	0.93	F	800	0.53	C	1,600	1.07	F	930	0.62	D
Cypress WB off-ramp	250	0.17	D	220	0.15	C	470	0.31	F	340	0.23	D
Ford WB on-ramp	970	0.65	D	380	0.25	B	1,110	0.74	F	540	0.36	C
Ford WB off-ramp	340	0.23	D	310	0.21	C	910	0.61	F	450	0.30	C

[1]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[2]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[3]LOS is not calculated for ramps that connect to a C-D road
[4]Ramp merge/diverge LOS is based on the density of the mainline upstream of a diverge or downstream of a merge. When the total flow of the merge/diverge area exceeds the capacity of the freeway section or when the mainline v/c or d/c ratio is greater than 1.00, then ramp LOS is determined to be LOS F. Ramp v/c ratio for the existing condition or d/c ratio for the future years is also presented to provide additional measure of operational level. The v/c or d/c ratio presented is the density of the ramp and does not solely determine the operations of the ramp junction and therefore, does not directly correlate with the LOS reported for the ramp.

Intersection Analysis

Intersection LOS analysis was conducted for select ramp terminal and local street intersections that have the potential to be impacted by the proposed Project, as agreed upon by the PDT in the project's Decision Document A-6 (see **Attachment N**). **Table 4.11** provides a summary of existing and projected delay and LOS for both signalized and unsignalized intersections.

Table 4.11 Existing and Year 2045 Alternative 1 Intersection LOS and Delay

Intersection	Intersection LOS and Delay[2]							
	2012 Existing				2045 Alternative 1 (No Build)			
	AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Monte Vista/WB ramps	25.3	C	22.3	C	39.6	D	57.7	E
Monte Vista/EB off-ramp/Palo Verde	31.7	C	45.8	D	46.1	D	74.6	E
Palo Verde/EB on-ramp	10.7	B	13.0	B	10.3	B	13.1	B
Mountain/7th/Shopping Center	16.5	B	26.4	C	19.6	B	40.3	D
Mountain/WB ramps	20.0	C	25.3	C	40.9	D	52.0	D
Mountain/EB ramps	16.2	B	29.1	C	25.7	C	34.6	C
Mountain/6th	18.7	B	21.7	C	18.5	B	23.3	C
Euclid SB/7th	18.1	B	20.6	C	32.8	C	29.6	C
Euclid NB/7th	10.3	B	13.8	B	13.6	B	20.4	C
Euclid/EB ramps	45.3	D	52.0	D	92.5	F	156.7	F
7th/WB hook ramps/2nd[3]	13.7	B	20.9	C	35.2	E	98.1	F
Vineyard/Inland Empire	8.3	A	9.2	A	8.2	A	10.8	B
Vineyard/WB ramps	10.0	A	11.9	B	20.8	C	44.3	D
Vineyard/EB ramps	16.6	B	12.1	B	61.9	E	41.5	D
Vineyard/G	9.8	A	8.9	A	18.2	B	12.2	B
Vineyard/D	15.0	B	18.3	B	20.0	C	31.5	C
Valley/Commerce	31.6	C	32.5	C	33.6	C	36.2	D
Etiwanda/Valley/Ontario Mills	16.5	B	20.3	C	18.6	B	26.2	C
Etiwanda/WB off-ramp	17.8	B	12.9	B	16.0	B	15.3	B
Etiwanda/EB off-ramp	24.5	C	13.3	B	18.6	B	12.1	B
Pepper/Valley	30.9	C	31.3	C	31.0	C	30.6	C
Pepper/WB ramps	24.3	C	14.9	B	28.8	C	23.2	C
Pepper/EB ramps	53.1	D	49.6	D	25.0	C	30.2	C
La Cadena/WB on-ramp	4.0	A	5.3	A	4.8	A	6.4	A
9th/WB off-ramp[3]	12.9	B	12.9	B	13.3	B	24.8	C
9th/EB ramps[3]	11.3	B	11.9	B	10.9	B	11.7	B
Tennessee/WB ramps	20.5	C	16.9	B	15.9	B	18.0	B
Tennessee/EB ramps	14.7	B	37.2	D	23.8	C	81.0	F
Ford/WB on-ramp/Reservoir[1]	253.2	F	45.6	E	20.9	C	22.0	C
Ford/EB off-ramp[3]	13.9	B	29.5	D	17.4	C	76.3	F
Ford/Parkford[3]	21.9	C	31.8	D	24.9	C	162.3	F
Ford/EB on-ramp/WB off-ramp	18.0	B	19.7	C	35.1	D	44.0	D
Ford/Oak[3]	19.1	C	12.4	B	20.6	C	14.6	B

[1]Intersection is unsignalized in the existing condition, but is anticipated to be signaled before 2045 by a separate project.
[2]Delay is shown in seconds
[3]Unsignalized intersection

4C.2. Collision Analysis

Traffic accident data for the I-10 freeway, interchange ramps, and SR-83 (Euclid Avenue) within the project study limits were obtained from Caltrans Traffic Accident Surveillance and Analysis Systems (TASAS) Table B and TASAS Selective Accident Retrieval (TSAR) for a 3-year period between April 1, 2012 and March 31, 2015.

I-10 Mainline

Table 4.12 presents the 3-year accident data between April 1, 2012 and March 31, 2015 for the I-10 freeway in 68 segments from Indian Hill Boulevard to Ford Street (34 eastbound and 34 westbound). As shown in the table, the total accident rates in 61 out of 68 freeway segments are lower than the statewide average for similar facilities, while the total accidents rates in 7 segments are marginally to moderately higher than the statewide average. These locations are shown in boldface in the table, as well as locations with higher fatality and injury accident rates than the statewide average. The breakdown of accidents by type that occurred on eastbound and westbound I-10 during the 3-year review period is summarized in **Table 4.13**. The table indicates that the predominant types of accidents on the I-10 mainline are rear end collisions, followed by sideswipe and hit object type collisions.

Table 4.12 I-10 Accident Data

I-10 Segment and Approximate Stations	Dir	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
PM 47.74 – 48.28 Indian Hills – County Line "A" 702+45 – 729+87	EB	0.000	0.20	0.56	0.004	0.34	1.11
	WB	**0.014**	0.16	0.73	0.004	0.34	1.01
PM 0.00 – 0.68 County Line – Monte Vista "A" 1000+00 – 1036+30	EB	0.000	0.24	0.86	0.004	0.31	1.01
	WB	0.000	**0.32**	0.96	0.004	0.31	1.01
PM 0.68 – 1.23 Monte Vista – Central "A" 1036+30 – 1065+50	EB	0.000	0.18	0.50	0.004	0.31	1.02
	WB	**0.014**	**0.39**	**1.31**	0.004	0.31	1.02
PM 1.23 -2.37 Central – Mountain "A" 1065+50 – 1125+50	EB	**0.006**	0.27	0.77	0.003	0.28	0.96
	WB	**0.006**	0.17	0.72	0.003	0.28	0.96
PM 2.37 – 3.47 Mountain – Euclid "A" 1125+50 – 1183+15	EB	0.000	0.22	0.75	0.004	0.32	1.04
	WB	**0.013**	0.29	0.81	0.004	0.32	1.04
PM 3.47 – 5.24 Euclid – 4th St "A" 1183+15 – 1277+20	EB	0.000	0.23	0.67	0.004	0.32	1.05
	WB	0.004	0.22	0.60	0.004	0.32	1.05
PM 5.24 – 6.10 4th - Vineyard "A" 1277+20 – 1322+45	EB	0.000	0.26	0.99	0.004	0.31	1.02
	WB	0.000	0.18	0.66	0.004	0.31	1.02
PM 6.10 – 7.16 Vineyard – Archibald "A" 1322+45 – 1377+95	EB	0.000	0.20	0.80	0.004	0.31	1.01
	WB	0.000	0.28	0.87	0.004	0.31	1.01
PM 7.16 – 8.16 Archibald - Haven "A" 1377+95 – 1431+10	EB	0.000	**0.44**	**1.24**	0.004	0.32	1.05
	WB	0.000	0.29	0.97	0.004	0.32	1.05

I-10 Segment and Approximate Stations	Dir	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
PM 8.16 – 9.17 Haven – Milliken "A" 1431+10 – 1484+45	EB	0.000	**0.51**	**1.61**	0.004	0.32	1.05
	WB	0.000	0.19	0.91	0.004	0.32	1.05
PM 9.17 – 9.94 Milliken – Route 15 "A" 1484+45 – 1524+65	EB	0.000	**0.62**	**1.84**	0.004	0.31	1.03
	WB	0.000	0.23	0.67	0.004	0.31	1.03
PM 9.94 – 11.13 Route 15 – Etiwanda "A" 1524+65 – 1587+80	EB	**0.012**	0.26	0.64	0.005	0.35	1.14
	WB	0.000	0.18	0.58	0.005	0.35	1.14
PM 11.13 – 13.17 Etiwanda – Cherry "A" 1587+80 – 1695+20	EB	**0.008**	**0.30**	**1.03**	0.004	0.28	0.90
	WB	0.000	0.19	0.60	0.004	0.28	0.90
PM 13.17 – 15.18 Cherry – Citrus "A" 1695+20 – 1802+20	EB	0.004	0.24	0.76	0.004	0.28	0.89
	WB	0.000	0.26	**0.91**	0.004	0.28	0.89
PM 15.18 – 16.22 Citrus – Sierra "A" 1802+20 – 1856+80	EB	0.000	0.16	0.89	0.004	0.28	0.89
	WB	0.000	0.25	**1.07**	0.004	0.28	0.89
PM 16.22 – 18.49 Sierra – Cedar "A" 1856+80 – 1976+75	EB	**0.008**	0.18	0.51	0.004	0.28	0.89
	WB	**0.008**	0.16	0.54	0.004	0.28	0.89
PM 18.49 – 19.97 Cedar – Riverside "A" 1976+75 – 2055+00	EB	**0.006**	0.26	0.54	0.004	0.28	0.90
	WB	0.000	0.13	0.35	0.004	0.28	0.90
PM 19.97 – 20.97 Riverside – Pepper "A" 2055+00 – 2107+05	EB	0.000	0.09	0.33	0.004	0.30	0.95
	WB	**0.028**	0.26	0.65	0.004	0.30	0.95
PM 20.97 – R21.96 Pepper – Rancho "A" 2107+05 – 2159+95	EB	**0.019**	0.20	0.51	0.004	0.26	0.82
	WB	0.000	0.10	0.25	0.004	0.26	0.82
PM R21.96 – R22.62 Rancho – La Cadena "A" 2159+95 – 2194+75	EB	**0.014**	0.21	0.56	0.004	0.30	0.95
	WB	0.000	0.17	0.56	0.004	0.30	0.95
PM R22.62 – R23.25 La Cadena – Mt. Vernon "A" 2194+75 – 2227+95	EB	0.000	0.07	0.37	0.004	0.29	0.93
	WB	0.000	0.16	0.40	0.004	0.29	0.93
PM R23.25 – R24.24 Mt. Vernon – Route 215 "A" 2227+95 – 2280+25	EB	0.000	0.19	0.46	0.004	0.28	0.92
	WB	0.000	0.15	0.50	0.004	0.28	0.92
PM R24.24 – 25.26 Route 215 – Waterman Ave "A" 2280+25 – 2334+40	EB	0.000	0.22	0.73	0.004	0.30	0.99
	WB	**0.016**	0.29	0.64	0.004	0.30	0.99
PM 25.26 – 26.27 Waterman – Tippecanoe 2334+40 – 2387+80	EB	0.000	0.20	0.57	0.004	0.29	0.94
	WB	0.000	0.28	0.75	0.004	0.29	0.94

I-10 Segment and Approximate Stations	Dir	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
PM 26.27 – 27.30 Tippecanoe – Mountain View "A" 2387+80 – 2441+85	EB	0.000	0.16	0.45	0.004	0.29	0.93
	WB	**0.018**	0.21	0.55	0.004	0.29	0.93
PM 27.30 – 28.30 Mountain View – California "A" 2441+85 – 2494+85	EB	0.000	0.09	0.31	0.004	0.29	0.93
	WB	**0.009**	0.28	0.68	0.004	0.28	0.91
PM 28.30 – 29.31 California – Alabama "A" 2494+85 – 2548+00	EB	0.000	0.12	0.35	0.003	0.24	0.81
	WB	0.000	**0.26**	0.70	0.003	0.24	0.81
PM 29.31 – 29.67 Alabama – E10-W210 "A" 2548+00 – 2566+50	EB	0.000	0.03	0.32	0.003	0.26	0.86
	WB	0.000	0.03	0.20	0.003	0.26	0.86
PM 29.67 – 29.80 E10-W210 – E210-E10 "A" 2566+50 – 2573+00	EB	**0.085**	0.25	0.51	0.003	0.27	0.87
	WB	0.000	**0.34**	0.68	0.003	0.27	0.87
PM 29.80 – 29.82 E210-E10 Conn – Tennessee "A" 2573+00 – 2574+50	EB	**0.722**	**0.72**	0.72	0.003	0.27	0.87
	WB	0.000	0.00	0.72	0.003	0.27	0.87
PM 29.82 – 30.88 Tennessee – Eureka/Orange "A" 2574+50 - 2631+30	EB	0.000	0.14	0.34	0.003	0.26	0.83
	WB	0.000	0.21	0.49	0.003	0.26	0.83
PM 30.88 – 31.01 Eureka/Orange – 6th "A" 2631+30 – 2637+95	EB	0.000	0.19	0.47	0.005	0.31	0.99
	WB	0.000	0.09	0.84	0.005	0.31	0.99
PM 31.01 – 31.87 6th – University "A" 2637+95 – 2683+70	EB	0.000	0.15	0.38	0.006	0.34	1.10
	WB	0.000	0.26	0.49	0.006	0.34	1.10
PM 31.87 – 33.13 University – Ford 2683+70 – 2750+00	EB	0.000	0.10	0.28	0.005	0.31	0.99
	WB	**0.021**	0.30	0.58	0.005	0.31	0.99

a/mvm = accidents per million vehicle miles
F = Fatality, I = Injury, TOT = Total
Boldface indicates that the actual accident rate is higher than the statewide average.

Table 4.13 I-10 Accident Type

Location	Dir	Type of Accidents by Percent									
		Head-On	Side-swipe	Rear End	Broad-side	Hit Object	Over-turn	Auto-Ped	Other	Not Stated	Total
PM 47.74 – 48.28 Indian Hills – County Line "A" 702+45 – 729+87	EB	0%	18%	49%	10%	15%	8%	0%	0%	0%	100%
	WB	0%	25%	53%	2%	20%	0%	0%	0%	0%	100%
PM 0.00 – 0.68 County Line – Monte Vista "A" 1000+00 – 1036+30	EB	0%	24%	64%	0%	9%	0%	0%	3%	0%	100%
	WB	1%	18%	55%	1%	22%	1%	0%	0%	1%	100%
PM 0.68 – 1.23 Monte Vista – Central "A" 1036+30 – 1065+50	EB	0%	32%	49%	0%	16%	3%	0%	0%	0%	100%
	WB	0%	19%	64%	1%	13%	1%	0%	2%	0%	100%
PM 1.23 -2.37 Central – Mountain "A" 1065+50 – 1125+50	EB	0%	20%	60%	1%	17%	1%	0%	2%	1%	100%
	WB	0%	22%	63%	2%	12%	1%	0%	0%	0%	100%
PM 2.37 – 3.47 Mountain – Euclid "A" 1125+50 – 1183+15	EB	0%	18%	61%	2%	18%	1%	0%	0%	0%	100%
	WB	0%	20%	67%	2%	7%	3%	0%	1%	1%	100%
PM 3.47 – 5.24 Euclid – 4th St "A" 1183+15 – 1277+20	EB	0%	28%	54%	1%	13%	2%	0%	2%	0%	100%
	WB	0%	26%	55%	3%	16%	0%	0%	0%	0%	100%
PM 5.24 – 6.10 4th - Vineyard "A" 1277+20 – 1322+45	EB	0%	17%	63%	1%	16%	3%	0%	1%	0%	100%
	WB	0%	22%	67%	3%	7%	0%	0%	0%	1%	100%
PM 6.10 – 7.16 Vineyard – Archibald "A" 1322+45 – 1377+95	EB	0%	14%	64%	0%	23%	0%	0%	0%	0%	100%
	WB	0%	17%	72%	2%	8%	2%	0%	0%	0%	100%
PM 7.16 – 8.16 Archibald – Haven "A" 1377+95 – 1431+10	EB	1%	15%	67%	1%	14%	2%	1%	0%	0%	100%
	WB	0%	19%	72%	1%	6%	1%	0%	1%	0%	100%
PM 8.16 – 9.17 Haven – Milliken "A" 1431+10 – 1484+45	EB	0%	15%	79%	0%	5%	0%	0%	0%	0%	100%
	WB	0%	32%	55%	1%	10%	2%	0%	1%	0%	100%
PM 9.17 – 9.94 Milliken – Route 15 "A" 1484+45 – 1524+65	EB	1%	14%	81%	1%	4%	1%	0%	0%	0%	100%
	WB	0%	34%	54%	0%	8%	1%	0%	3%	0%	100%
PM 9.94 – 11.13 Route 15 – Etiwanda "A" 1524+65 – 1587+80	EB	0%	23%	58%	1%	15%	2%	0%	1%	0%	100%
	WB	0%	22%	62%	0%	14%	2%	0%	0%	0%	100%
PM 11.13 – 13.17 Etiwanda – Cherry "A" 1587+80 – 1695+20	EB	0%	24%	60%	2%	11%	2%	0%	0%	0%	100%
	WB	0%	27%	51%	1%	17%	2%	0%	1%	0%	100%
PM 13.17 – 15.18 Cherry – Citrus "A" 1695+20 – 1802+20	EB	1%	23%	51%	2%	2%	1%	1%	0%	0%	100%
	WB	0%	30%	54%	1%	14%	1%	0%	0%	0%	100%
PM 15.18 – 16.22 Citrus – Sierra "A" 1802+20 – 1856+80	EB	1%	22%	52%	3%	21%	0%	0%	1%	0%	100%
	WB	0%	29%	44%	2%	24%	2%	0%	0%	0%	100%

Location	Dir	Type of Accidents by Percent									
		Head-On	Side-swipe	Rear End	Broad-side	Hit Object	Over-turn	Auto-Ped	Other	Not Stated	Total
PM 16.22 – 18.49 Sierra – Cedar "A" 1856+80 – 1976+75	EB	0%	21%	48%	2%	28%	0%	1%	0%	0%	100%
	WB	2%	18%	56%	1%	21%	2%	0%	1%	0%	100%
PM 18.49 – 19.97 Cedar – Riverside "A" 1976+75 – 2055+00	EB	1%	16%	45%	3%	27%	5%	1%	1%	0%	100%
	WB	0%	20%	51%	4%	20%	2%	0%	4%	0%	100%
PM 19.97 – 20.97 Riverside – Pepper 2055+00 – 2107+05	EB	0%	11%	57%	0%	31%	0%	0%	0%	0%	100%
	WB	1%	19%	52%	1%	20%	3%	0%	3%	0%	100%
PM 20.97 – R21.96 Pepper – Rancho "A" 2107+05 – 2159+95	EB	0%	33%	29%	0%	31%	2%	4%	2%	0%	100%
	WB	0%	30%	33%	7%	15%	15%	0%	0%	0%	100%
PM R21.96 – R22.62 Rancho – La Cadena "A" 2159+95 – 2194+75	EB	3%	30%	20%	3%	40%	0%	3%	0%	3%	100%
	WB	0%	48%	28%	5%	20%	0%	0%	0%	0%	100%
PM R22.62 – R23.25 La Cadena – Mount Vernon "A" 2194+75 – 2227+95	EB	0%	38%	35%	0%	23%	0%	0%	4%	0%	100%
	WB	0%	25%	43%	4%	18%	4%	0%	7%	0%	100%
PM R23.25 – R24.24 Mount Vernon – Route 215 "A" 2227+95 – 2280+25	EB	0%	26%	46%	2%	24%	2%	0%	0%	0%	100%
	WB	0%	30%	35%	2%	28%	4%	0%	0%	2%	100%
PM R24.24 – 25.26 Route 215 – Waterman Ave "A" 2280+25 – 2334+40	EB	1%	25%	51%	2%	14%	2%	0%	4%	0%	100%
	WB	1%	27%	40%	4%	22%	1%	1%	2%	1%	100%
PM 25.26 – 26.27 Waterman – Tippecanoe "A" 2334+40 – 2387+80	EB	0%	33%	47%	0%	20%	0%	0%	0%	0%	100%
	WB	0%	21%	53%	4%	15%	5%	0%	1%	1%	100%
PM 26.27 – 27.30 Tippecanoe – Mountain View "A" 2387+80 – 2441+85	EB	0%	12%	72%	2%	8%	2%	0%	4%	0%	100%
	WB	2%	10%	45%	3%	28%	5%	2%	5%	0%	100%
PM 27.30 – 28.30 Mountain View – California "A" 2441+85 – 2494+85	EB	0%	27%	45%	6%	18%	3%	0%	0%	0%	100%
	WB	0%	24%	38%	3%	31%	3%	1%	0%	1%	100%
PM 28.30 – 29.31 California – Alabama "A" 2494+85 – 2548+00	EB	3%	27%	43%	0%	27%	0%	0%	0%	0%	100%
	WB	0%	27%	47%	3%	18%	4%	1%	0%	0%	100%
PM 29.31 – 29.67 Alabama – E10-W210 "A" 2548+00 – 2566+50	EB	0%	27%	18%	45%	9%	0%	0%	0%	0%	100%
	WB	0%	57%	43%	0%	0%	0%	0%	0%	0%	100%
PM 29.67 – 29.80 E10-W210 – E210-E10 "A" 2566+50 – 2573+00	EB	0%	25%	50%	0%	0%	0%	25%	0%	0%	100%
	WB	0%	50%	0%	0%	50%	0%	0%	0%	0%	100%
PM 29.80 – 29.82 E210-E10 Conn – Tennessee "A" 2573+00 – 2574+50	EB	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%
	WB	50%	0%	0%	0%	50%	0%	0%	0%	0%	100%
PM 29.82 – 30.88 Tennessee – Eureka/Orange "A" 2574+50 – 2631+30	EB	0%	29%	41%	0%	24%	6%	0%	0%	0%	100%
	WB	0%	44%	28%	0%	28%	0%	0%	0%	0%	100%

Location	Dir	Type of Accidents by Percent									
		Head-On	**Side-swipe**	**Rear End**	**Broad-side**	**Hit Object**	**Over-turn**	**Auto-Ped**	**Other**	**Not Stated**	**Total**
PM 30.88 – 31.01 Eureka/Orange – 6th "A" 2631+30 – 2637+95	EB	0%	33%	50%	0%	17%	0%	0%	0%	0%	100%
	WB	0%	43%	22%	4%	30%	0%	0%	0%	0%	100%
PM 31.01 – 31.87 6th – University "A" 2637+95 – 2683+70	EB	0%	18%	61%	0%	18%	4%	0%	0%	0%	100%
	WB	0%	33%	22%	3%	36%	3%	0%	3%	0%	100%
PM 31.87 – 33.13 University – Ford "A" 2683+70 – 2750+00	EB	0%	42%	35%	0%	23%	0%	0%	0%	0%	100%
	WB	0%	17%	39%	4%	33%	6%	0%	2%	0%	100%

The accident data above suggests that the prevalent cause of accidents along the I-10 mainline is traffic congestion, resulting in rear end, sideswipe, and hit object collisions. The I-10 Corridor Project would add one or two lanes in each direction of the freeway mainline to increase capacity as well as provide additional auxiliary lanes, where warranted, to improve lane continuity and traffic flow. These operational improvements are anticipated to provide countermeasures and may lead to a decrease in the accident rates on the freeway mainline. None of the proposed improvements are anticipated to result in an increase in accident potential or compromise safety along the corridor.

Freeway Ramps

Tables 4.14 and **4.15** summarize a 3-year accident history between April 1, 2012 and March 31, 2015 for the interchange ramps along the I-10 corridor within the study limits. The accident history reveals that 42 out of 74 ramps along EB I-10 have actual total accident rates that are higher than the statewide average accident rates for similar facilities. In the westbound direction, 38 out of 76 ramps were reported to have actual total accident rates that are higher than the statewide average for similar facilities. These locations are shown in boldface in the tables, as well as locations with higher fatality and injury accident rates than statewide average.

Table 4.14 EB I-10 Freeway Ramp Accident Data

PM	Location	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
47.879	Indian Hill EB on-ramp	0.000	0.22	**1.67**	0.002	0.22	0.63
0.452	Monte Vista EB off-ramp	0.000	**0.96**	**1.63**	0.003	0.35	1.01
0.801	Monte Vista EB on-ramp	0.000	**0.32**	**1.72**	0.001	0.13	0.46
1.117	Central EB off-ramp	0.000	0.24	0.79	0.003	0.35	1.01
1.356	Central EB on-ramp	0.000	0.15	0.22	0.002	0.22	0.63
2.227	Mountain EB off-ramp	0.000	**0.46**	**1.50**	0.003	0.35	1.01
2.539	Mountain EB on-ramp	0.000	**0.25**	**0.83**	0.002	0.22	0.63
3.352	Euclid EB off-ramp	0.000	**0.43**	**0.97**	0.001	0.25	0.76
3.607	Euclid EB on-ramp	0.000	**0.25**	**1.10**	0.001	0.18	0.54
5.082	4th EB off-ramp	0.000	**1.47**	**3.88**	0.003	0.35	1.01
5.342	4th EB on-ramp	0.000	**0.40**	**1.61**	0.002	0.22	0.63
5.978	Vineyard EB off-ramp	0.000	0.30	0.76	0.003	0.35	1.01
6.299	Vineyard EB on-ramp	0.000	**0.27**	**0.82**	0.002	0.22	0.63
6.809	Archibald EB off-ramp	0.000	0.00	0.00	0.002	0.08	0.25
6.985	Holt EB on-ramp	0.000	0.10	**0.61**	0.003	0.18	0.57
7.321	Archibald EB on-ramp	0.000	0.00	**0.35**	0.001	0.06	0.18
8.002	Haven EB off-ramp	0.000	**0.62**	**1.86**	0.003	0.35	1.01
8.119	Haven EB loop on-ramp	0.000	**0.30**	**0.76**	0.002	0.21	0.73
8.288	Haven EB on-ramp	0.000	0.12	0.24	0.003	0.18	0.57
8.994	Milliken EB off-ramp	0.000	0.23	**1.08**	0.003	0.35	1.01
9.123	Milliken EB loop on-ramp	0.000	0.20	**0.85**	0.003	0.24	0.72
9.557	E10-N15 Connector	0.000	0.07	0.46	0.004	0.16	0.49
9.755	E10-S15 Connector	0.000	0.12	**0.45**	0.005	0.13	0.38
10.130	N15-E10 Connector	0.000	0.13	**0.38**	0.003	0.11	0.32
10.277	S15-E10 Connector	0.000	**0.21**	**0.70**	0.004	0.16	0.49
10.844	Etiwanda EB C-D off-ramp	0.000	0.00	0.22	0.002	0.08	0.25
10.963	Etiwanda EB off-ramp	0.000	0.00	0.87	0.003	0.30	1.06
11.278	Etiwanda EB loop on-ramp	0.000	**0.65**	**2.94**	0.002	0.21	0.73
11.277	Etiwanda EB on-ramp	0.000	**0.28**	0.56	0.003	0.18	0.57
11.464	Valley EB off-ramp	0.000	**0.18**	**0.61**	0.004	0.16	0.49
11.709	Etiwanda EB C-D on-ramp	0.000	0.00	0.15	0.001	0.06	0.18
12.979	Cherry EB off-ramp	0.000	**0.80**	**2.56**	0.003	0.35	1.01
13.346	Cherry EB on-ramp	0.000	**0.29**	**0.69**	0.002	0.22	0.63
15.003	Citrus EB off-ramp	0.000	0.29	**1.26**	0.003	0.35	1.01
15.352	Citrus EB on-ramp	0.000	0.20	**1.18**	0.002	0.22	0.63
16.042	Sierra EB off-ramp	0.000	**0.46**	**2.08**	0.003	0.35	1.01
16.393	Sierra EB on-ramp	0.000	0.07	**1.11**	0.002	0.22	0.63
R18.167	Cedar EB off-ramp	0.000	**0.72**	**2.22**	0.003	0.35	1.01
R18.792	Cedar EB on-ramp	0.000	**0.29**	**1.08**	0.002	0.22	0.63
19.796	Riverside EB off-ramp	0.000	**0.55**	**2.92**	0.003	0.35	1.01
20.147	Riverside EB on-ramp	0.000	**0.33**	0.33	0.002	0.22	0.63

PM	Location	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
20.791	Pepper EB off-ramp	0.000	**0.37**	0.99	0.003	0.35	1.01
R21.145	Pepper EB on-ramp	0.000	0.13	0.26	0.002	0.22	0.63
R21.720	Rancho EB off-ramp	0.000	0.30	**1.35**	0.003	0.35	1.01
R22.089	Rancho EB on-ramp	0.000	**0.27**	**1.34**	0.002	0.22	0.63
R22.596	9th EB off-ramp	0.000	0.00	0.00	0.003	0.35	1.01
R22.863	9th EB on-ramp	0.000	0.00	0.43	0.002	0.22	0.63
R23.240	Mt. Vernon EB off-ramp	0.000	0.15	**1.31**	0.003	0.24	0.84
R23.442	Mt. Vernon EB on-ramp	0.000	0.00	0.14	0.001	0.13	0.46
R23.810	E10-N/S215 Connector	0.000	0.07	0.21	0.002	0.08	0.25
R24.423	N215-E10 Connector	**0.072**	**0.32**	**0.68**	0.003	0.14	0.41
24.621	S215-E10 Connector	0.000	0.04	0.35	0.003	0.14	0.41
25.004	Redlands EB off-ramp	0.000	0.14	0.54	0.003	0.24	0.84
25.193	Waterman EB C-D/loop off-ramp	0.000	**0.40**	**1.83**	0.003	0.30	1.06
25.347	Waterman EB loop on-ramp	0.000	0.61	1.22	0.002	0.21	0.73
25.432	Waterman EB on-ramp	0.000	**0.19**	0.19	0.003	0.18	0.57
25.498	Waterman EB C-D on-ramp	0.000	0.00	0.00	0.001	0.06	0.18
26.028	Tippecanoe EB off-ramp	0.000	0.17	0.70	0.003	0.35	1.01
26.525	Tippecanoe EB on-ramp	0.000	**0.26**	**0.78**	0.002	0.22	0.63
27.047	Mountain View EB off-ramp	0.000	**0.79**	**1.69**	0.003	0.35	1.01
27.536	Mountain View EB on-ramp	0.000	0.16	0.48	0.002	0.22	0.63
27.984	California EB off-ramp	0.000	0.21	**1.66**	0.003	0.35	1.01
28.554	California EB on-ramp	0.000	0.00	0.27	0.002	0.22	0.63
29.204	Alabama EB off-ramp	0.000	0.29	**1.17**	0.003	0.35	1.01
29.420	E10-W210 Connector	0.000	0.05	0.10	0.004	0.16	0.49
29.649	Tennessee EB off-ramp	0.000	**0.37**	**1.28**	0.002	0.08	0.25
29.917	Tennessee EB on-ramp	0.000	**0.37**	**0.86**	0.002	0.22	0.63
30.119	E210-E10 Connector	0.000	0.05	0.05	0.003	0.14	0.41
30.568	Eureka EB off-ramp	0.000	0.07	0.26	0.003	0.35	1.01
31.199	6th EB on-ramp	0.000	0.00	0.19	0.002	0.22	0.63
31.717	University EB off-ramp	0.000	**0.56**	**1.03**	0.003	0.35	1.01
32.301	Cypress EB on-ramp	0.000	**0.46**	0.46	0.002	0.22	0.63
33.010	Ford EB off-ramp	0.000	0.00	0.72	0.003	0.35	1.01
33.386	Ford EB on-ramp	0.000	**0.19**	0.19	0.000	0.13	0.41

a/mvm = accidents per million vehicle miles
F = Fatality, I = Injury, TOT = Total
Boldface indicates that the actual accident rate is higher than the statewide average.

Table 4.15 WB I-10 Freeway Ramp Accident Data

PM	Location	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
47.856	Indian Hill WB off-ramp	**0.084**	0.34	**1.17**	0.003	0.35	1.01
0.578	Monte Vista WB on-ramp	0.000	**0.67**	**1.63**	0.002	0.22	0.63
0.831	Monte Vista WB off-ramp	0.000	0.12	0.60	0.003	0.35	1.01
1.151	Central WB on-ramp	0.000	0.08	0.39	0.002	0.22	0.63
1.361	Central WB off-ramp	0.000	**0.36**	0.93	0.003	0.35	1.01
2.235	Mountain WB on-ramp	0.000	**0.53**	**0.67**	0.002	0.22	0.63
2.555	Mountain WB off-ramp	0.000	0.25	0.68	0.003	0.35	1.01
3.326	Euclid WB on-ramp	0.000	0.10	**1.10**	0.003	0.11	0.32
3.535	Euclid WB loop on-ramp	0.000	0.16	0.31	0.004	0.21	0.72
3.685	Euclid WB hook off-ramp	0.000	0.09	0.69	0.003	0.24	0.84
5.166	4th WB on-ramp	0.000	**0.64**	**1.59**	0.002	0.22	0.63
5.391	4th WB off-ramp	0.000	**0.39**	**1.57**	0.003	0.35	1.01
6.024	Vineyard WB on-ramp	0.000	**0.33**	**0.98**	0.003	0.18	0.57
6.126	Vineyard WB loop on-ramp	0.000	0.00	0.00	0.002	0.21	0.73
6.286	Vineyard WB off-ramp	0.000	0.08	0.17	0.003	0.35	1.01
6.802	Archibald WB on-ramp	0.000	0.00	**0.19**	0.001	0.06	0.18
7.073	Holt WB off-ramp	0.000	0.19	0.58	0.004	0.24	0.75
7.347	Archibald WB off-ramp	0.000	0.00	0.09	0.002	0.08	0.25
7.998	Haven WB on-ramp	0.000	**0.49**	**2.52**	0.003	0.18	0.57
8.213	Haven WB loop on-ramp	0.000	**0.54**	**1.35**	0.002	0.21	0.73
8.329	Haven WB off-ramp	0.000	**0.57**	**1.57**	0.003	0.35	1.01
8.987	Milliken WB on-ramp	0.000	**0.29**	**1.37**	0.002	0.22	0.63
9.230	Milliken WB loop off-ramp	0.000	**0.57**	**2.51**	0.004	0.33	1.00
9.577	N15-W10 Connector	**0.040**	0.08	**0.44**	0.003	0.14	0.41
9.770	S15-W10 Connector	0.000	0.04	**0.44**	0.005	0.13	0.38
10.396	W10-N/S15 Connector	0.000	0.08	**0.34**	0.002	0.08	0.25
10.983	Etiwanda WB on-ramp	0.000	**0.23**	**1.38**	0.003	0.18	0.57
10.835	Etiwanda/Valley WB on-ramp	0.000	0.00	0.11	0.001	0.06	0.18
10.982	Etiwanda WB loop on-ramp	0.000	**0.33**	0.49	0.002	0.21	0.73
11.418	Valley WB on-ramp	0.000	0.00	0.25	0.003	0.18	0.57
11.465	Etiwanda WB off-ramp	0.000	**0.10**	**0.41**	0.002	0.08	0.25
13.041	Cherry WB on-ramp	0.000	0.07	**0.68**	0.002	0.22	0.63
13.083	Cherry WB loop on-ramp*(2)*	0.000	0.00	**13.51**	0.002	0.21	0.73
13.337	Cherry WB off-ramp	0.000	**0.58**	**1.74**	0.003	0.35	1.01
14.916	Citrus WB on-ramp	0.000	0.00	**3.33**	0.003	0.18	0.57
15.176	Citrus WB loop on-ramp	0.000	0.00	0.00	0.002	0.21	0.73
15.343	Citrus WB off-ramp	0.000	**0.47**	0.66	0.003	0.35	1.01
16.080	Sierra WB on-ramp	0.000	**0.62**	**1.47**	0.002	0.22	0.63
16.372	Sierra WB off-ramp	0.000	0.27	**1.15**	0.003	0.35	1.01
R18.362	Cedar WB on-ramp	0.000	0.17	**0.74**	0.002	0.22	0.63
R18.673	Cedar WB off-ramp	0.000	**0.65**	**2.77**	0.003	0.35	1.01

PM	Location	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
19.849	Riverside WB on-ramp	0.000	**0.27**	0.63	0.002	0.22	0.63
20.137	Riverside WB off-ramp	0.000	**0.61**	**1.48**	0.003	0.35	1.01
20.818	Pepper WB on-ramp	0.000	0.12	0.37	0.002	0.22	0.63
R21.138	Pepper WB off-ramp	0.000	0.13	0.66	0.003	0.35	1.01
R21.852	Rancho WB on-ramp	0.000	0.18	0.53	0.002	0.22	0.63
R22.094	Rancho WB off-ramp	0.000	0.13	0.81	0.003	0.35	1.01
R22.482	9th WB on-ramp	0.000	0.27	0.27	0.002	0.22	0.63
R22.844	9th WB off-ramp	0.000	**0.42**	0.42	0.003	0.35	1.01
R23.135	Mt. Vernon WB on-ramp	0.000	0.00	0.24	0.002	0.22	0.63
R23.563	Sperry WB off-ramp	0.000	0.16	0.48	0.003	0.35	1.01
R24.073	S215-W10 Connector	0.000	0.10	0.24	0.003	0.11	0.32
R24.307	N215-W10 Connector	0.000	**0.32**	**0.51**	0.003	0.11	0.32
R24.543	E/Sunwest WB on-ramp	0.000	0.00	0.33	0.001	0.13	0.46
24.807	W10-N/S215 Connector	0.000	**0.28**	**0.52**	0.002	0.08	0.25
24.816	Waterman WB on-ramp to 215	0.000	0.20	0.51	0.002	0.22	0.63
25.388	Carnegie WB hook on-ramp	0.000	**0.21**	**0.54**	0.001	0.13	0.46
25.623	Carnegie WB hook off-ramp	0.000	0.10	0.39	0.003	0.24	0.84
26.021	Tippecanoe WB on-ramp	0.000	**0.60**	**0.87**	0.002	0.22	0.63
	Tippecanoe WB loop on-ramp[(1)]	-	-	-	-	-	-
26.506	Tippecanoe WB off-ramp	0.000	**0.49**	0.90	0.003	0.35	1.01
26.985	Mountain View WB on-ramp	0.000	0.11	**0.76**	0.002	0.22	0.63
27.530	Mountain View WB off-ramp	0.000	**1.30**	**2.22**	0.003	0.35	1.01
27.983	California WB on-ramp	0.000	0.10	0.20	0.002	0.22	0.63
28.537	California WB off-ramp	0.000	**0.84**	**1.26**	0.003	0.35	1.01
29.172	Alabama WB on-ramp	0.000	**0.30**	0.61	0.002	0.22	0.63
29.687	Alabama WB off-ramp	0.000	**2.74**	**5.18**	0.002	0.08	0.25
29.915	Tennessee WB off-ramp	0.000	0.25	**1.48**	0.003	0.35	1.01
29.944	W10-W210 Connector	0.000	**0.23**	**0.69**	0.005	0.13	0.38
30.778	Orange WB on-ramp	0.000	0.00	0.32	0.003	0.11	0.32
30.924	Orange WB loop on-ramp	0.000	0.10	0.10	0.004	0.21	0.72
31.164	6th WB off-ramp	0.000	**0.39**	0.58	0.003	0.35	1.01
31.756	University WB on-ramp	0.000	0.15	0.44	0.002	0.22	0.63
32.277	Cypress WB off-ramp	0.000	**0.40**	0.79	0.003	0.35	1.01
32.997	Ford WB on-ramp	0.000	0.00	0.00	0.002	0.22	0.63
33.565	Ford WB off-ramp	0.000	**0.28**	**0.78**	0.004	0.16	0.49

a/mvm = accidents per million vehicle miles
F = Fatality, I = Injury, TOT = Total
Boldface indicates that the actual accident rate is higher than the statewide average.
[(1)]Ramp location does not exist during the requested accident data period (April 1, 2012 to March 31, 2015); therefore no accident data is available.
[(2)]It should be noted that construction of the I-10/Cherry Avenue interchange project was under construction between 2012 and 2015 and the higher accident rate on this ramp is likely attributable to construction activities.

The majority of the interchange ramps along the project corridor would be partially reconstructed to tie in to the proposed freeway widening or reconstructed in entirety, where needed. Ramp improvements would have slightly different alignments, but generally retain the current configurations. None of the improvements are anticipated to result in an increase in accident potential or compromise safety.

SR-83 or Euclid Avenue (Conventional Highway)

Table 4.16 below provides the 3-year accident data between April 1, 20012 and March 31, 20015 for northbound and southbound SR-83 or Euclid Avenue between 6th Street (PM 10.7) and the 83/10 Separation (PM 11.11), which is under Caltrans jurisdiction. The street portion north of the 83/10 Separation is within the City of Upland jurisdiction. The breakdown of the accidents by type is summarized in **Table 4.17**.

Table 4.16 SR-83 Euclid Avenue Accident Data

SR-83 Segment	Dir	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
PM 10.97 – 11.11 6th Street – 83/10 Separation	NB	0.000	**5.62**	**10.11**	0.009	0.69	1.48
	SB	0.000	**3.37**	**4.87**	0.009	0.69	1.48

a/mvm = accidents per million vehicle miles, F = Fatality, I = Injury, TOT = Total
Boldface indicates that the actual accident rate is higher than the statewide average for similar facilities.

Table 4.17 SR-83 Euclid Avenue Accident Type

SR-83 Segment	Dir	No. of Accidents and Percent By Type									
		Head-On	Side-swipe	Rear End	Broad-side	Hit Object	Over-turn	Auto-Ped	Other	Not Stated	Total
PM 10.97 – 11.11 6th Street – 83/10 Separation	NB	0%	11%	33%	52%	0%	0%	0%	4%	0%	100%
	SB	8%	8%	8%	69%	0%	0%	0%	0%	7%	100%

The actual total accident rate in this conventional highway segment was 10.11 a/mvm northbound, and 4.87 a/mvm southbound, both of which are higher than the statewide average of 1.48 a/mvm for similar facilities. Broadside (52%) and rear end (33%) collisions accounted for most collisions along Euclid Avenue in the northbound direction while broadside (69%) collisions were predominant in the southbound direction. Under the I-10 Corridor Project, Euclid Avenue and the overcrossing structure will be reconstructed to accommodate a new dedicated right-turn lane in the northbound direction to the WB loop on-ramp as well as an additional SB left-turn lane to the EB on-ramp, along with extension of the existing SB left-turn lane. The proposed lane additions are anticipated to improve the operation and enhance the safety along Euclid Avenue.

5. ALTERNATIVES

5A. Viable Alternatives

Preferred Alternative

On June 22, 2016, the PDT identified Alternative 3 as the PA for the I-10 Corridor Project. During the alternative evaluation, considerations were given to the project purpose and need; public comments and concerns; input from local, regional, state, and federal agencies, PDT, and stakeholders; project funding; as well as environmental, social, and economic impacts. The evaluation criteria established for identifying the PA is based on the established purpose and need of the project which are:

- Reduce congestion
- Increase throughput
- Enhance trip reliability
- Accommodate long-term congestion management of the corridor
- Reduce volume-to-capacity (v/c) ratios along the corridor
- Improve travel times within the corridor
- Relieve congestion and improve traffic flow on the regional transportation system
- Address increased travel associated with existing and planned development
- Provide a facility that is compatible with transit and other modal options
- Provide consistency with the SCAG RTP, where feasible and in compliance with Federal and State regulations
- Provide a cost-effective project solution
- Minimize environmental impacts and right of way acquisition
- Promote sustainable travel and livability for the corridor

Upon consideration of these factors, the PDT determined that both build alternatives would have similar social and economic impacts, with Alternative 3's impacts being more than Alternative 2's impacts due to the additional lane in each direction. Both Alternatives would generally meet the project's purpose and objectives; however, the extents to which the build alternatives meet the project's purpose and objectives are significantly different. The table below presents a comparison of the mobility benefits provided by each of the build alternatives under consideration. **Table 5.1** summarizes the conclusion that Alternative 3, the PA, is a more beneficial alternative overall as compared to Alternative 2. The No Build Alternative is also shown in the table to provide the baseline for the comparison.

Table 5.1 Summary of Evaluation of Build Alternatives

Evaluation Criteria	Alternative 1 (No Build)	Alternative 2 (HOV)	Alternative 3 (Express Lanes)
Reduce congestion	No	Yes	Yes
Increase throughput	No	Yes	Yes
Enhance trip reliability	No	Limited	Yes
Accommodate long-term congestion management	No	Limited	Yes
Reduce volume-to-capacity (v/c) ratios along the corridor	No	Yes	Yes
Improve travel times within the corridor	No	Yes	Yes
Relieve congestion and improve traffic flow on the regional transportation system	No	Yes	Yes
Address increased travel associated with existing and planned development	No	Yes	Yes
Provide a facility that is compatible with transit and other modal options	No	Yes	Yes
Provide consistency with the SCAG RTP, where feasible and in compliance with Federal and State regulations	No	Yes, except HOV degradation action plan	Yes
Provide a cost-effective project solution	No	Somewhat	Yes
Minimize environmental impacts and right of way acquisition	Yes	Yes	Yes
Promote sustainable travel and livability for the corridor	No	Yes	Yes

The extension of the HOV lanes proposed in Alternative 2 would provide additional capacity to accommodate additional vehicle throughput and reduce congestion east of Haven Avenue. However, Alternative 2 would have limited ability to enhance trip reliability or accommodate long-term congestion management of the corridor. Currently, portion of the existing HOV lanes are considered degraded. Within 10 years of construction, the HOV lane extension east of Haven Avenue would also be congested in several segments, significantly reducing trip reliability. One means of addressing degradation of the HOV lanes is to change the HOV occupancy requirement from 2+ to 3+ on the I-10 HOV facility. However, this change is anticipated to shift a substantial volume of HOV 2 to the GP lanes, resulting in more congestion, while the HOV lanes become underutilized. Alternative 2 would not be consistent with the *2015 California HOV Lane Degradation Action Plan* which recommended provision of two Express Lanes as a remediation strategy to address the HOV lane degradation on I-10.

The proposed Express Lanes in Alternative 3 would provide additional capacity to accommodate additional vehicle throughput and reduce congestion. The dynamic pricing of the Express Lanes would also provide Alternative 3 the ability to better handle the future traffic demand and provide sustainable trip reliability for the corridor for the long term. Alternative 3 would be consistent with the mitigation measures recommended in the *2015 California HOV Lane Degradation Action Plan* which is required in accordance with the mandates of MAP-21. Alternative 3 was also identified as the Locally Preferred Alternative (LPA) for the I-10 Corridor Project at the SBCTA Board meeting in July 2014 after comparing the benefits and impacts of the project alternatives under consideration.

Based on the rationale above, the PDT reached a conclusion that Alternative 3 provides the greatest mobility benefits that are much needed for the corridor as well as provides flexibility for sustainable long-term congestion management. As a result, the PDT identified Alternative 3 as the PA to move forward to the next project development phase because of its mobility benefits, as summarized below:

- provides the most vehicle throughput and travel time savings along the corridor
- maximizes performance of the existing system
- offers trip reliability
- accommodates long-term congestion management

The construction cost for Alternative 3 (due to the additional lane in each direction) is higher than the construction cost for Alternative 2. However, the projected revenue from toll collection is expected to offset the increase in the construction cost.

Design Modifications after Public Review

In responses to the public and agency review comments, the following design modifications were made to Alternative 3 after distribution of the DPR and DEIR/EIS:

- The I-10/Monte Vista Avenue interchange was modified to include a single-span UC instead of the previously proposed two-span bridge. Modifications were also made to lane configurations on Monte Vista Avenue and Palo Verde Street.
- The design of Sultana Avenue was modified to eliminate all impacts including temporary construction easement (TCE) from the Edison Elementary School.
- The I-10/Vineyard Avenue interchange was modified to include an additional right-turn lane at the WB off-ramp and a dedicated free NB right-turn to the EB on-ramp.

These changes are reflected in the conceptual layouts for Alternative 3 included in **Attachment D**.

5A.1. Alternative 1: No Build

Alternative 1 was not identified as the PA because it does not meet the project's purpose and objectives to improve mobility along the I-10 corridor. Upon identification of Alternative 3 as the PA, no further analysis was carried out for Alternative 1; and therefore, Alternative 1 description provided below has not changed from the DPR.

The No Build Alternative would maintain the existing lane configuration of I-10 within the project limits with no additional mainline lanes or associated improvements to be provided. Without additional mainline lanes, additional traffic congestion resulting from regional growth would further degrade traffic condition along the corridor and worsen operational deficiencies, resulting in reduced travel speeds and longer commute times. The future traffic condition associated with the No Build Alternative is discussed earlier in Section 4C.1 of this report. Additionally, the No Build Alternative is inconsistent with the I-10 Route Concept Fact Sheet, the regional programs for transportation improvements, the Caltrans' goal of providing an efficient and effective interregional mobility system, and the recommendations made in the *2015 California HOV Lane Degradation Action Plan*. Since there are no improvements anticipated within the project limits, there are no construction or right of way costs associated with this alternative.

5A.2. Alternative 2: One HOV Lane in Each Direction or HOV

Alternative 2 was not identified as the PA because it does not meet all of the purpose and objectives of the project and provides less mobility benefits to the corridor than Alternative 3. Upon identification of Alternative 3 as the PA, no further analysis or design refinement was carried out for Alternative 2; and therefore, Alternative 2 description provided below has not changed from the DPR. Conceptual drawings and detailed analysis of Alternative 2 are provided in the DPR, which is available at Caltrans District 8 office under Project No. 0800000040.

Alternative 2 would extend the existing HOV lane in each direction of I-10 from the current HOV terminus near Haven Avenue in the City of Ontario to Ford Street in the City of Redlands, a distance of approximately 25 miles. Alternative 2 traverses seven cities (Ontario, Fontana, Rialto, Colton, San Bernardino, Loma Linda, and Redlands) and unincorporated areas of San Bernardino County including Etiwanda, Bloomington, and Bryn Mawr. The proposed improvements under Alternative 2 would involve construction work within the following routes and post miles. The work on I-15, I-215, SR-210, and SR-38 (Orange Street) is anticipated to primarily involve temporary placement of construction area and detour signs.

08-SBd-10 PM 4.7/R37.0
08-SBd-15 PM 0.7/4.0
08-SBd-38 PM 0.0/0.3
08-SBd-210 PM R33.0/R31.5
08-SBd-215 PM 2.1/5.7

In addition to the mainline widening, the project includes reconstruction and/or modification of freeway connector and interchange ramps, local arterials, and structures that are necessary to accommodate the proposed freeway widening. New or replacement of existing retaining walls and soundwalls would be constructed where required. Existing concrete barrier, temporary railings, metal beam guardrails, and thrie-beam barriers in the median of I-10 would be replaced with concrete barrier Type 60 (or Type 60G in tangent sections with nonstandard shoulder width). Median lighting would be provided at selected locations along the corridor where lighting is anticipated to improve headlight sight distance in sag vertical curves. Existing auxiliary lanes would be reestablished. The HOV lanes in Alternative 2 would have continuous access to and from the mainline lanes per Caltrans District 8.

5A.3. Alternative 3 (PA): Two Express Lanes in Each Direction or Express Lanes

Alternative 3 has been identified as the PA in June 2016 because it meets all of the project's purpose and objectives, and provides the most mobility benefits for the I-10 corridor.

Alternative 3 would provide two Express Lanes in each direction of I-10 from the LA/SBd County Line to California Street in the City of Redlands, and one Express Lane in each direction from California Street to Ford Street in the City of Redlands, a total distance of 33 miles. West of Haven Avenue, a single new lane would be constructed and combined with the existing HOV lane to provide two Express Lanes in each direction. Between Haven Avenue and California Street, two new Express Lanes would be constructed in each direction by the project, and between California Street and Ford Street, one new Express Lane would be constructed in each direction. In compliance with Federal regulations, HOVs meeting the occupancy requirements would travel in the Express Lane segment west of Haven Avenue (where there is an existing HOV lane in each direction) toll-free. East of Haven Avenue (where there are no existing HOV lanes), HOVs meeting the occupancy requirements

would travel in the Express Lane toll-free or at discount rates. SOVs and HOVs not meeting the occupancy requirement would also have the option to pay a toll to use the Express Lanes.

Alternative 3 traverses ten cities (Claremont, Pomona, Montclair, Ontario, Fontana, Rialto, Colton, San Bernardino, Loma Linda, and Redlands) and unincorporated areas of San Bernardino County including Etiwanda, Bloomington, and Bryn Mawr. The proposed improvements under Alternative 3 would involve construction work within the following routes and post miles. The improvements required in Los Angeles County involve minor widening, wall construction, and signing and striping to construct the Express Lane terminus and transition into the existing HOV cross section. The improvements on SR-83 (Euclid Avenue) involve reconstruction of the highway and replacement of its structure over I-10. The work on I-15, I-215, SR-210, and SR-38 (Orange Street) is anticipated to primarily involve construction area and detour signs.

07-LA-10 PM 44.9/48.3
08-SBd-10 PM 0.0/R37.0
08-SBd-15 PM 0.7/4.0
08-SBd-38 PM 0.0/0.3
08-SBd-83 PM 10.7/11.5
08-SBd-210 PM R33.0/R31.5
08-SBd-215 PM 2.1/5.7

In addition to the mainline widening, the project includes reconstruction and/or modification of interchange ramps, local arterials, and structures that are necessary to accommodate the proposed freeway widening including new or reconstruction of retaining walls and soundwalls where appropriate. Existing concrete barrier, temporary railings, metal beam guardrails, and thrie-beam barriers in the median of I-10 would be replaced with concrete barrier Type 60 (or Type 60G in tangent sections where it does not restrict sight distance). Median lighting would be provided at access points to and from the Express Lanes, at California Highway Patrol (CHP) enforcement/observation areas, and at selected locations to improve headlight sight distance in sag vertical curves. Existing auxiliary lanes would be reestablished in kind and additional ones added where warranted. CHP enforcement/observation areas would be provided in the I-10 median at selected locations. The conceptual layout plans of Alternative 3 are included in **Attachment D**.

The base condition for Alternative 3 assumes the completion of improvements along the project corridor currently in planning or being implemented as listed under Section 3D, Related Projects. Proposed engineering features in Alternative 3 are summarized in the following sections.

5.A.3.1 Alternative 3 Proposed Engineering Features

Proposed engineering features in Alternative 3 are summarized as follows:

<u>Alternative 3 Mainline Improvements</u>

- Add one Express Lane in each direction from the LA/SBd County Line to Haven Avenue to operate jointly with existing HOV lanes as two Express Lanes in each direction
- Add two Express Lanes in each direction from Haven Avenue to California Street
- Add one Express Lane in each direction from California Street to Ford Street
- Provide ten at-grade access points, nine with an additional weave lane and one as a weave zone

- Provide CHP enforcement/observation areas in the median at selected locations along the corridor
- Reestablish existing auxiliary lanes along the corridor
- Construct new EB auxiliary lane between Mountain Avenue and Euclid Avenue
- Construct new WB auxiliary lane for 1,300 feet preceding Mountain Avenue WB off-ramp
- Modify existing WB auxiliary lane at Haven Avenue WB on-ramp to begin at Haven Avenue WB loop on-ramp
- Modify existing EB auxiliary lane at Haven Avenue EB on-ramp to begin at Haven Avenue EB loop on-ramp
- Construct new EB auxiliary lane from just west of Milliken Avenue OC to E10-S15 Connector
- Construct new WB auxiliary lane at the Cedar Avenue WB on-ramp for 1,000 feet
- Extend WB auxiliary lane preceding the Riverside Avenue off-ramp to Pepper Avenue
- Construct new WB auxiliary lane between Rancho Avenue and La Cadena Drive

In addition, a safety lighting project between Fourth Street and I-15 (EA 1F550K) currently in planning by Caltrans is anticipated to be incorporated into the I-10 Corridor Project through a financial contribution. The project includes installation of double-luminaire mast arm lighting at approximately 200-foot intervals from PM 5.00 to PM 6.35 and from PM 7.03 to PM 10.00; installation of high mast lighting at seven locations from PM 6.45 to PM 6.95 and at four locations within the I-10/I-15 interchange; and replacement of approximately 28 overhead signs along the freeway between PM 5.00 and PM 10.75.

Alternative 3 Interchange Improvements

Alternative 3 improvements pass through 3 system interchanges (I-10/I-15 Interchange, I-10/I-215 Interchange, and I-10/SR-210 Interchange) and 29 local street interchanges including one interchange (Indian Hill Boulevard) in Los Angeles County. Alternative 3 would require reconstruction of several freeway-to-freeway connectors and interchange ramps to accommodate the I-10 widening. **Table 5.2** summarizes ramp improvements proposed under Alternative 3.

Table 5.2 Alternative 3 Ramp Improvements

Interchange	No.	Ramps	Alternative 3 Ramp Improvement			
			None	Gore	Partial	Full
Indian Hill	1	Indian Hill EB off-ramp	x			
	2	Indian Hill EB on-ramp	x			
	3	Indian Hill WB on-ramp	x			
	4	Indian Hill WB off-ramp		x		
Monte Vista	5	Monte Vista EB off-ramp				x
	6	Monte Vista EB on-ramp				x
	7	Monte Vista WB on-ramp				x
	8	Monte Vista WB off-ramp				x
Central	9	Central EB off-ramp		x		
	10	Central EB on-ramp				x
	11	Central WB on-ramp				x
	12	Central WB off-ramp			x	

Interchange	No.	Ramps	Alternative 3 Ramp Improvement			
			None	Gore	Partial	Full
Mountain	13	Mountain EB off-ramp				x
	14	Mountain EB on-ramp				x
	15	Mountain WB on-ramp				x
	16	Mountain WB off-ramp				x
Euclid	17	Euclid EB off-ramp				x
	18	Euclid EB on-ramp				x
	19	Euclid WB on-ramp				x
	20	Euclid WB loop on-ramp				x
	21	Euclid WB hook off-ramp				x
4th	22	4th EB off-ramp				x
	23	4th EB on-ramp				x
	24	4th WB on-ramp				x
	25	4th WB off-ramp				x
Vineyard	26	Vineyard EB off-ramp			x	
	27	Vineyard EB on-ramp				x
	28	Vineyard WB on-ramp		x		
	29	Vineyard WB loop on-ramp				x
	30	Vineyard WB off-ramp				x
Archibald	31	Archibald EB off-ramp	x			
	32	Holt EB on-ramp			x	
	33	Archibald EB on-ramp			x	
	34	Archibald WB on-ramp	x			
	35	Holt WB off-ramp			x	
	36	Archibald WB off-ramp			x	
Haven	37	Haven EB off-ramp			x	
	38	Haven EB loop on-ramp				x
	39	Haven EB on-ramp			x	
	40	Haven WB on-ramp				x
	41	Haven WB loop on-ramp				x
	42	Haven WB off-ramp			x	
Milliken	43	Milliken EB off-ramp	x			
	44	Milliken EB loop on-ramp			x	
	45	Milliken WB on-ramp			x	
	46	Milliken WB loop off-ramp		x		

Interchange	No.	Ramps	Alternative 3 Ramp Improvement			
			None	Gore	Partial	Full
I-15	47	E10-N15 Connector			x	
	48	E10-S15 Connector			x	
	49	N15-E10 Connector			x	
	50	S15-E10 Connector			x	
	51	N15-W10 Connector			x	
	52	S15-W10 Connector			x	
	53	W10-N/S15 Connector C-D			x	
	54	W10-N15 Connector			x	
	55	W10-S15 Connector			x	
Etiwanda	56	Etiwanda EB C-D off-ramp			x	
	57	Etiwanda EB off-ramp			x	
	58	Etiwanda EB loop on-ramp	x			
	59	Etiwanda EB on-ramp	x			
	60	Valley EB off-ramp			x	
	61	Etiwanda EB C-D on-ramp			x	
	62	Etiwanda WB on-ramp		x		
	63	Etiwanda WB loop on-ramp	x			
	64	Valley WB on-ramp	x			
	65	Etiwanda WB off-ramp	x			
Cherry	66	Cherry EB off-ramp		x		
	67	Cherry EB on-ramp			x	
	68	Cherry WB on-ramp		x		
	69	Cherry WB loop on-ramp			x	
	70	Cherry WB off-ramp		x		
Citrus	71	Citrus EB off-ramp			x	
	72	Citrus EB on-ramp			x	
	73	Citrus WB on-ramp			x	
	74	Citrus WB loop on-ramp			x	
	75	Citrus WB off-ramp			x	
Sierra	76	Sierra EB off-ramp			x	
	77	Sierra EB on-ramp				x
	78	Sierra WB on-ramp				x
	79	Sierra WB off-ramp				x
Cedar	80	Cedar EB off-ramp			x	
	81	Cedar EB on-ramp			x	
	82	Cedar WB on-ramp				x
	83	Cedar WB off-ramp			x	

Interchange	No.	Ramps	Alternative 3 Ramp Improvement			
			None	Gore	Partial	Full
Riverside	84	Riverside EB off-ramp			x	
	85	Riverside EB on-ramp			x	
	86	Riverside WB on-ramp			x	
	87	Riverside WB off-ramp			x	
Pepper	88	Pepper EB off-ramp			x	
	89	Pepper EB on-ramp				x
	90	Pepper WB on-ramp				x
	91	Pepper WB off-ramp				x
Rancho	92	Rancho EB off-ramp				x
	93	Rancho EB on-ramp				x
	94	Rancho WB on-ramp				x
	95	Rancho WB off-ramp				x
La Cadena/9th	96	9th EB off-ramp				x
	97	9th EB on-ramp				x
	98	La Cadena WB on-ramp			x	
	99	9th WB off-ramp	x			
Mt. Vernon	100	Mt. Vernon EB off-ramp			x	
	101	Mt. Vernon EB on-ramp			x	
	102	Mt. Vernon WB on-ramp				x
	103	Sperry WB off-ramp				x
I-215	104	E10-N/S215 Connector C-D		x		
	105	E10-N215 Connector	x			
	106	E10-S215 Connector	x			
	107	N215-E10 Connector			x	
	108	S215-E10 Connector			x	
	109	S215-W10 Connector			x	
	110	N215-W10 Connector			x	
	111	W10-N/S215 Connector C-D		x		
	112	W10-N215 Connector	x			
	113	W10-S215 Connector	x			
	114	E/Sunwest WB on-ramp				x
Waterman	115	Redlands EB off-ramp	x			
	116	Waterman EB C-D off-ramp		x		
	117	Waterman EB loop on-ramp	x			
	118	Waterman EB loop off-ramp	x			
	119	Waterman EB on-ramp			x	
	120	Waterman EB C-D on-ramp			x	
	121	Waterman WB on-ramp to 215			x	
	122	Carnegie WB hook on-ramp				x
	123	Carnegie WB hook off-ramp			x	

Interchange	No.	Ramps	Alternative 3 Ramp Improvement			
			None	Gore	Partial	Full
Tippecanoe	124	Tippecanoe EB off-ramp			x	
	125	Tippecanoe EB on-ramp			x	
	126	Tippecanoe WB on-ramp			x	
	127	Tippecanoe WB loop on-ramp			x	
	128	Tippecanoe WB off-ramp			x	
Mountain View	129	Mountain View EB off-ramp				x
	130	Mountain View EB on-ramp				x
	131	Mountain View WB on-ramp				x
	132	Mountain View WB off-ramp				x
California	133	California EB off-ramp				x
	134	California EB on-ramp				x
	135	California WB on-ramp				x
	136	California WB off-ramp				x
Alabama	137	Alabama EB off-ramp			x	
	138	Alabama WB on-ramp			x	
	139	Alabama WB off-ramp			x	
SR-210	140	E10-W210 Connector			x	
	141	E210-W10 Connector		x		
	142	E210-E10 Connector		x		
Tennessee	143	Tennessee EB off-ramp				x
	144	Tennessee EB on-ramp				x
	145	Tennessee WB off-ramp			x	
Eureka/Orange/6th	146	Eureka EB off-ramp	x			
	147	6th EB on-ramp(1)	x			
	148	Orange WB on-ramp(1)	x			
	149	Orange WB loop on-ramp	x			
	150	6th WB off-ramp	x			
University/Cypress	151	University EB off-ramp	x			
	152	Cypress EB on-ramp	x			
	153	University WB on-ramp	x			
	154	Cypress WB off-ramp	x			
Ford	155	Ford EB off-ramp				x
	156	Ford EB on-ramp				x
	157	Ford WB on-ramp				x
	158	Ford WB off-ramp	x			

(1)No physical modifications are proposed to the ramp, but a new soundwall is proposed along the ramp.

Alternative 3 Local Street Improvements

Ten (10) arterial streets crossing under or over I-10 would be reconstructed to accommodate the I-10 improvements. Eight (8) overcrossing structures would need to be replaced with longer-span structures to accommodate the widen freeway. The Monte Vista Avenue and 4th Street undercrossing structures would also need to be replaced to accommodate the proposed widening of the local streets.

1. Monte Vista Avenue
2. San Antonio Avenue
3. Euclid Avenue
4. Sultana Avenue
5. Campus Avenue
6. 6th Street
7. 4th Street
8. Vineyard Avenue
9. Richardson Street
10. Tennessee Street

Several arterials parallel to I-10 would be modified as part of the proposed project improvements, including:

1. Palo Verde Street between Mills Avenue and Monte Vista Avenue (reduced landscaped parkway along north side)
2. Azure Court near San Antonio Avenue (minor intersection modification)
3. Alvarado Street at Sultana Avenue (minor roadway reconstruction to tie in to the higher profile of Sultana Avenue)
4. Richland Street at Sultana Avenue (minor roadway reconstruction to tie in to the higher profile of Sultana Avenue)
5. 7th Street between Euclid Avenue and the Euclid Avenue WB hook off-ramp (minor roadway modification)
6. Richland Street at Campus Avenue (minor intersection improvements)
7. Hope Avenue at 6th Street (minor roadway reconstruction to tie in to the higher profile of 6th Street)
8. El Dorado Avenue at 4th Street (minor intersection reconstruction)
9. J Street between 3rd Street and Pennsylvania Avenue (widening on the north side with new curb, gutter, sidewalk, curb ramps, driveway approaches, and on-street parking; and rehabilitation of existing pavement)

Alternative 3 Railroad Involvement

Five (5) railroad crossings over or under I-10 would be impacted and require bridge work to accommodate the proposed freeway widening, as listed below:

1. UPRR Kaiser Spur OH (widen)
2. UPRR Slover Mountain UP (replace)
3. BNSF Colton Crossing OH (widen)
4. UPRR Pavillion Spur OH (widen or abandon)
5. BNSF West Redlands OH (widen)

Alternative 3 Structure Improvements

Alternative 3 would necessitate replacement of 13 structures and modification of 61 structures. **Table 5.3** summarizes the proposed structure improvements under Alternative 3.

Table 5.3 Alternative 3 Structure Improvements

No.	Post Mile	Structure Name	Bridge No.	Proposed Work
1	47.74	Indian Hill Blvd UC (LA County)	53-0860	No work
2	48.00	College Ave RCB/Pedestrian UC (LA County)	53-1019	No work
3	0.01	Mills Ave UC	54-0453	Widen
4	0.32	San Antonio Wash Bridge	54-0451	Widen
5	0.68	Monte Vista Ave UC	54-0450*	Replace
6	1.23	Central Ave UC	54-1186	Widen
7	1.75	Benson Ave UC	54-0448	Widen
8	2.37	Mountain Ave UC	54-1187	Widen
9	2.92	San Antonio Ave OC	54-0446*	Replace
10	3.47	Euclid Ave OC (Route 83/10 Separation)	54-0445*	Replace
11	3.75	Sultana Ave OC	54-0444*	Replace
12	4.02	Campus Ave OC	54-0443*	Replace
13	4.33	6th St OC	54-0442*	Replace
14	4.70	West Cucamonga Channel Box Culvert	54-1117	Modify
15	4.88	Grove Ave UC	54-0441	Widen
16	5.24	4th St UC	54-0440*	Replace
17	6.10	Vineyard Ave OC	54-0439*	Replace
18	6.70	Cucamonga Wash Bridge (Lt)	54-0438L	Widen
19	6.70	Cucamonga Wash Bridge (Rt)	54-0438R	Widen
20	6.80	Holt Blvd Off-Ramp UC (Lt)	54-0437L	Widen
21	6.80	Holt Blvd Off-Ramp UC (Rt)	54-0437R	Widen
22	6.90	Archibald Ave EB Off-Ramp/Holt Blvd UC	54-1107	No work
23	7.16	Archibald Ave OC	54-1166	No work
24	8.16	Haven Ave OC (Lt)	54-1201L	Tie-back wall
25	8.16	Haven Ave OC (Rt)	54-0560R	Tie-back wall
26	9.17	Milliken Ave OC	54-0539	Tie-back wall
27	9.87	E10-N15 Connector OC	54-0913G	No work
28	9.91	N15-W10 Connector OC	54-0908G	No work
29	9.92	W10-S15 Connector OC over Railroad	54-1065F	No work
30	9.93	Route 15/10 Separation (Lt)	54-0909L	Modify slope paving for wall
31	9.94	Route 15/10 Separation (Rt)	54-0909R	Modify slope paving for wall
32	9.96	S15-E10 Connector OC	54-0910F	No work
33	9.98	W10-S15 Connector OC	54-0914F	No work
34	10.12	Day Canyon Channel Bridge	54-0351	Widen

No.	Post Mile	Structure Name	Bridge No.	Proposed Work
35	10.12	W10-S15 Bridge over Day Canyon	54-0351F	No work
36	10.13	W10-N15 Bridge over Day Canyon	54-0927F	No work
37	10.99	Etiwanda Wash Bridge (Lt)	54-0378L	Widen
38	10.99	Etiwanda Wash Bridge (Rt)	54-0378R	Widen
39	10.99	Etiwanda Wash Bridge (EB Off-Ramp)	54-0378S	Widen
40	11.13	Etiwanda Ave OC	54-0463	No work
41	11.35	Valley Blvd WB On-Ramp Separation	54-1214K	No work
42	11.50	Valley Blvd EB Off-Ramp UC (Lt)	54-0030L	Widen
43	11.50	Valley Blvd EB Off-Ramp UC (Rt)	54-0030R	Widen
44	11.64	Etiwanda-San Sevaine Channel (Lt)	54-0454L	Widen
45	11.64	Etiwanda-San Sevaine Channel (Rt)	54-0454R	Widen
46	11.64	Etiwanda-San Sevaine Channel (EB On-Ramp)	54-0454S*	Replace
47	11.74	Kaiser Spur OH	54-0416	Widen
48	11.82	San Sevaine Creek Channel	54-0434	Abandon
49	12.14	Mulberry Creek Channel	54-0425M	Abandon
50	13.17	Cherry Ave OC	54-1292	No work
51	15.18	Citrus Ave OC	54-1293	No work
52	15.73	Cypress Ave OC	54-1280	No work
53	16.22	Sierra Ave OC	54-1169	No work
54	R18.49	Cedar Ave OC	54-0035	Tie-back wall
55	19.90	Rialto Channel RCB Bridge	54-1116	No work
56	19.97	Riverside Ave OC	54-1267	No work
57	20.97	Pepper Ave OC	54-1324	No work
58	R21.46	Slover Mountain UP	54-0835*	Replace
59	R21.96	Rancho Ave OC	54-0817	Tie-back wall
60	R22.36	Colton OH (Rt)	54-0464R	Widen
61	R22.38	Colton OH (Lt)	54-0464L	Widen
62	R22.62	La Cadena Dr UC	54-0462	Widen
63	R22.62	La Cadena Dr UC (EB Off-Ramp)	54-0462S*	Replace
64	R22.71	9th St UC	54-0461	Widen
65	R22.82	Pavillion OH (9th St WB Off-Ramp)	54-0861K	No work
66	R22.86	Pavillion Spur OH	54-0460	Widen or Abandon**
67	R23.25	Mt. Vernon Ave OC	54-0459	Tie-back wall
68	R23.60	Warm Creek Bridge (Lt)	54-0830L	Widen
69	R23.60	Warm Creek Bridge (Rt)	54-0830R	Widen
70	R23.80	Santa Ana River Bridge (E10-N/S215)	54-0292G	No work
71	R23.82	Santa Ana River Bridge (Rt)	54-0292R	Widen
72	R23.83	Santa Ana River Bridge (Lt)	54-0292L	Widen
73	R24.19	E10-N215 Connector OC	54-0823G	No work

No.	Post Mile	Structure Name	Bridge No.	Proposed Work
74	R24.23	S215-E10 Connector OC	54-0824F	No work
75	R24.23	Route 215/10 Separation (Lt)	54-0479L	Modify slope paving for wall
76	R24.25	Route 215/10 Separation (Rt)	54-0479R	Modify slope paving for wall
77	R24.27	W10-N215 Connector OC	54-1064F	No work
78	R24.30	W10-S215 Connector OC	54-0822F	No work
79	R24.57	E St/Sunwest Ln WB On-Ramp UC	54-0821F	No work
80	24.76	Hunts Ln UC	54-0601	No work
81	25.26	Waterman Ave UC	54-0600	Widen
82	25.46	San Timoteo Creek (Carnegie Dr WB On-Ramp)	54-1105K	Widen
83	25.54	San Timoteo Creek	54-0599	Widen
84	26.27	Tippecanoe Ave UC	54-0598	Widen
85	26.81	Richardson St OC	54-0597*	Replace
86	27.30	Mountain View Ave UC	54-0596	Widen
87	27.64	West Redlands OH/Mission Channel	54-0570	Widen
88	28.30	California St UC	54-0595	Widen
89	28.80	Nevada St UC	54-0594	Widen
90	29.31	Alabama St OC	54-0593	No work
91	29.58	E210-W10/Alabama St WB Off-Ramp UC	54-0937G	No work
92	29.70	E10-W210 Connector OC	54-0938G	No work
93	29.76	E210-E10 Connector OC	54-0929G	No work
94	29.82	Tennessee St OC	54-0592*	Replace
95	29.83	W10-W210/Tennessee St UC	54-0930F	No work
96	30.10	Colton Ave UC/New York St UC	54-0591	No work
97	30.38	Texas St UC	54-0583	Widen
98	30.66	Eureka St UC	54-0580	Modify to add soundwall
99	30.88	Orange St UC (Route 10/38 Separation)	54-0581	No work
100	31.01	6th St UC	54-0579	Reconstruct median
101	31.41	Church St UC	54-0578	Modify median
102	31.52	Mill Creek Zanja Channel/Redlands OH	54-0472	Modify median
103	31.87	University St UC	54-0582	Modify median
104	31.99	Citrus Ave UC	54-0584	Reconstruct median
105	R32.11	Cypress Ave UC	54-0585	Reconstruct median
106	32.36	Palm Ave UC	54-0586	Modify median
107	32.61	Highland Ave UC	54-0587	Reconstruct median
108	33.13	Ford St UC	54-0588	Widen
109	33.29	Redlands Blvd WB Off-Ramp UC	54-0589	Widen

**Replacement structure will be assigned a new bridge number.*
***Railroad facility is no longer in service; structure could be widened or abandoned in place by filling with earth material.*

APSs have been prepared between 2014 and 2017 for structure replacements and major structure modifications proposed under Alternative 3 to define the scope and cost of the structure work in the project. The APSs also discuss conceptual stage construction and falsework requirements and include the *Structure Preliminary Geotechnical Reports*, prepared by EMI in 2014 and 2015, which provide preliminary geotechnical, seismic and foundation recommendations for the structure improvements. The APS general plans are included in **Attachment E** of this document.

Alternative 3 Drainage Improvements

Several major drainage structures along the project corridor would be improved as part of the proposed project as summarized in **Table 5.4**.

Table 5.4 Alternative 3 Major Drainage Improvements

No.	Drainage Facility	Approximate Station	Approximate Location	Proposed Work
Crossing System				
1	College Ave RCB/Pedestrian UC	"A" 715+50	Near LA/SBd County Line	No work
2	San Antonio Wash	"A" 1017+00	East of Mills Ave	Widen I-10 bridge
3	Palmetto Ave SD & Vault	"A" 1134+00	East of Mountain Ave	Extend RCB
4	West Cucamonga Channel	"A" 1252+00	East of 6th St	Widen I-10 bridge
5	Cucamonga Wash	"A" 1354+00	East of Vineyard Ave	Widen I-10 bridges
6	Haven Ave RCB	"A" 1405+00	West of Haven Ave parallel Turner	Extend RCB
7	California Commerce SD	"A" 1450+00	East of I-15	Extend RCB
8	Day Creek Channel	"A" 1535+00	East of I-15	Widen I-10 bridges
9	Etiwanda Wash	"A" 1580+50	East of I-15	Widen I-10 bridges
10	Etiwanda-San Sevaine Channel	"A" 1615+00	East of Etiwanda Ave	Widen I-10 bridges
11	San Sevaine Creek RCB	"A" 1624+50	East of Etiwanda Ave	Abandon culvert
12	Mulberry Creek RCB	"A" 1641+50	East of Etiwanda Ave	Abandon culvert
13	Rialto Channel RCB	"A" 2050+00	West of Riverside Ave	No work
14	Colton SW & NW SD	"A" 2192+00	East of BNSF/Colton Crossing	Lengthen culvert
15	11th Street SD	"A" 2210+00	East of 9th St	Lengthen culvert
16	Warm (Lytle) Creek	"A" 2248+00	East of Mt. Vernon Ave	Widen I-10 bridge
17	Santa Ana River	"A" 2263+00	East of Mt. Vernon Ave	Widen I-10 bridges
18	San Timoteo Creek	"A" 2349+00	East of Waterman Ave	Widen I-10 bridges
19	Mission Channel	"A" 2460+00	West of California St	Widen I-10 bridge
20	Mill Creek Zanja Channel	"A" 2666+00	West of University Ave	No work
Longitudinal System				
1	Montclair Storm Drain	"A" 1023+50 to 1065+00	North side of I-10 from west of Monte Vista Ave to Central Ave (outside State right of way)	Reconstruct underground
2	I-10 Channel	"A" 1616+00 to 2050+00	Etiwanda Ave to Riverside Ave (inside State right of way)	Reconstruct portions

Alternative 3 TSM/TDM Improvements

The Express Lanes proposed in Alternative 3 are managed lanes which is a TSM/TDM measure that will accommodate long-term management of the facility as well as foster a synergy for carpooling and transit uses. The "pricing" feature of the Express Lanes would provide the ability to actively manage traffic demand to free flow condition which improves the response time for emergency services and encourages transit agencies to implement future bus services and routes. Specifically, the project would support Omnitrans' new express bus services along the I-10 freeway between Montclair and San Bernardino. With implementation of Alternative 3, the proposed Omnitrans express routes would be able to use the proposed Express Lanes on I-10. In addition, bus stops will be incorporated at the on-ramps of the Mountain Avenue and Sierra Avenue interchanges along with associated intersection, pedestrian access, and traffic signal improvements to accommodate the Omnitrans express bus services.

Several ITS elements are also anticipated to be incorporated into the project improvements including fiber-optic and other communication systems, changeable message signs, CCTV, ramp metering, and vehicle detection systems. At locations of interchange improvements, upgraded traffic signals would be installed to be interconnected and/or coordinated with adjacent signals and ramp meters.

Express Lane Begin/End Transitions

Transition areas between the existing HOV lanes in Los Angeles County and the proposed Express Lanes in San Bernardino County would be provided near the LA/SBd County Line. In the EB direction, advance Express Lane signage would be placed west of the LA/SBd County Line informing motorists of the minimum occupancy requirement to use the Express Lanes free of charge. HOVs not meeting the occupancy requirement would have the option to pay the normal toll rates to use the Express Lanes. Signage indicating the transponder requirement and toll rates would also be provided in advance of traffic entering the Express Lanes. In the WB direction, the Express Lane delineation would end just west of Monte Vista Avenue, where the No. 2 Express Lane becomes a general purpose lane and the No. 1 Express Lane would continue to become the HOV lane following the transition area. Advance signage would be provided to advise SOVs to exit the No. 1 Express Lane. HOVs in the No. 1 Express Lane would be able to continue into the HOV lane in Los Angeles.

The toll-free usage of the Express Lanes would apply to HOVs meeting the minimum occupancy requirement using the facility west of Haven Avenue where there is an existing HOV lane in each direction and the toll-free usage for HOVs meeting the minimum occupancy requirement is required to meet Federal regulations. HOVs meeting the minimum occupancy requirement would travel in the Express Lanes east of Haven Avenue either toll-free or be charged a toll at discounted rates. A separate sign package will be installed in each direction on I-10 in advance of Haven Avenue to advise motorists of this change in the toll charges.

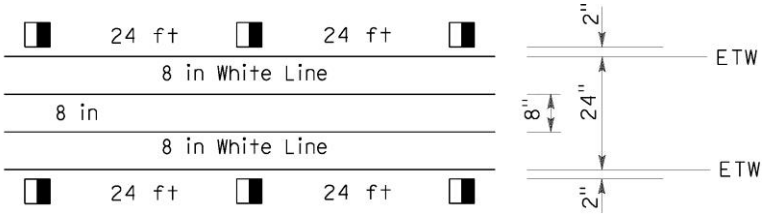
At the eastern end of the project, transition areas between the proposed Express Lanes and the existing cross sections would be provided near Ford Street. Under the existing condition, there are 5 lanes in the EB direction including 4 general purpose lanes and a truck climbing lane that begins at the Redlands Boulevard EB on-ramp. With the proposed improvements, the single Express Lane restriction would end just west of Ford Street and the lane would continue as a general purpose lane, resulting in 5 general purpose lanes in the EB direction. The Ford Street EB on-ramp would merge into the outermost general purpose lane rather than adding a 5th lane as it currently does. In the WB direction, advance signage would be provided to inform motorists of the transponder requirement and

toll rates in advance of traffic entering the Express Lane, which is opened as an additional lane on the left side just east of Ford Street.

Express Lane Buffer

The proposed Express Lanes would be in the median of the I-10 freeway and consist of two lanes in each direction between the LA/SBd County Line and California Street and one lane in each direction between California Street and Ford Street. The Express Lanes are expected to be buffer-separated from general purpose lanes by striping in combination with surface mounted channelizers placed within the buffer space throughout the corridor except at the easterly segment between SR-210 and Ford Street. In the easterly segment, there is one Express Lane in each direction with narrow inside shoulder (typically 4 feet in the eastbound direction and 8 feet in the westbound direction) such that channelizers are not contemplated because they could potentially restrict motorists from passing disabled vehicles or objects in the Express Lane.

Where placement of channelizers is proposed, a minimum buffer width of 2 feet will be provided. The diagram below presents the anticipated striping detail for the 2-foot buffer which is Detail 44 with an 8-inch separation per the 2012 California Manual of Uniform Traffic Control Devices (CAMUTCD) and has been agreed to by Caltrans in the project's Decision Document A-5 (see **Attachment N**). Final striping detail will be developed during the final design in conformance with applicable standards.



Source: CAMUTCD, Striping Detail 44 with 8-Inch Separation and Channelizers for a 2-Foot Buffer

Express Lane Intermediate Access Points

Ten at-grade ingress/egress (I/E) access points are proposed in each direction along the project corridor, typically spaced at 3- to 4-mile intervals, to provide access to and from the Express Lanes for all freeway-to-freeway and local street interchanges along the corridor. The locations of these access points were selected to serve heavy traffic interchanges along the corridor and major destinations such as the Ontario International Airport, while meeting the requirements for geometric, safety and operational constraints. A diagram depicting locations of proposed access points is included in this document in **Attachment I.**

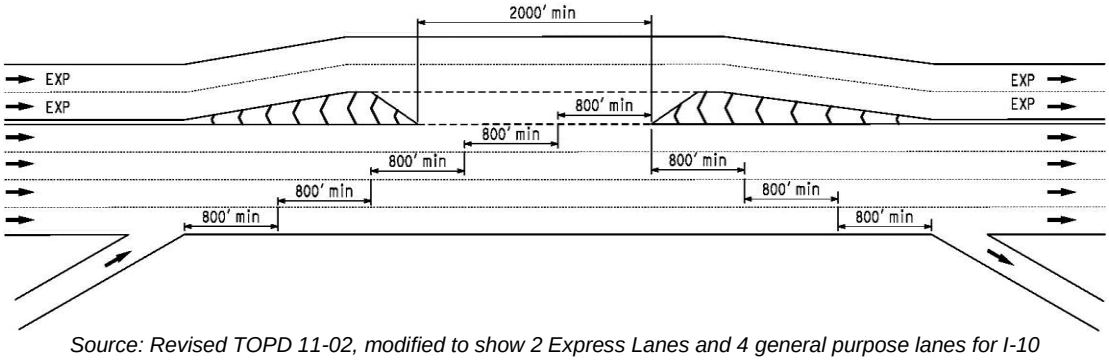
1. Mountain Avenue
2. 6th Street
3. Haven Avenue
4. Etiwanda Avenue
5. Citrus Avenue
6. Cedar Avenue
7. Pepper Avenue
8. Tippecanoe Avenue
9. California Street (transition from 2 to 1 Express Lane)
10. Orange Street

Except for the California Street I/E and the Orange Street I/E, all other access points are proposed with an additional weave or speed change lane provided between the No. 1 general purpose lane and the No. 2 Express Lane.

At the California Street I/E, a separate ingress and egress access configuration is provided in the EB direction. At the egress location, the No. 1 EB Express Lane continues while the No. 2 Express Lane becomes a general purpose lane. A separate ingress opening is provided downstream. In the WB direction, the No. 2 Express Lane is opened just upstream of the California Street I/E and essentially operates as a weave lane.

The Orange Street I/E is proposed as a weave zone in both directions without a weave lane between the No. 1 general purpose lane and the No. 2 Express Lane. It will operate similarly to existing HOV lane ingress and egress locations.

The Traffic Operations Policy Directive (TOPD) 11-02, dated March 2011, specifies a minimum of 2,000 feet for access opening and a minimum of 800 feet per each lane change between the access opening and the nearest freeway on-ramp or off-ramp. A typical layout of a combined access point is shown in the diagram below.



Source: Revised TOPD 11-02, modified to show 2 Express Lanes and 4 general purpose lanes for I-10

The I/E access point will be designed in conformance with the TOPD 11-02 except for slight variations in the ingress weaving distance between the on- or off-ramp and access opening at some locations. Design variations have been discussed and concurred with by Caltrans and is documented in the project's Decision Document A-2, included in **Attachment N**.

CHP Observation/Enforcement Areas

Pending future agreements, it is anticipated that the CHP will be contracted to provide toll enforcement including Express Lane violation (crossing the buffer), eligibility violations, and toll violation.

Nine (9) CHP observation/enforcement areas are proposed in the WB direction and 8 in the EB direction, to provide enforcement for the Express Lanes, as listed below. A diagram showing proposed CHP observation/enforcement locations is attached to this document in **Attachment I.**

Proposed WB CHP Areas include:

1. WB between Central Avenue and Mountain Avenue
2. WB between Mountain Avenue and Euclid Avenue

3. WB between Vineyard Avenue and Archibald Avenue
4. WB between Cherry Avenue and Citrus Avenue
5. WB between Sierra Avenue and Cedar Avenue
6. WB between Riverside Avenue and Pepper Avenue
7. WB between La Cadena Drive and Mt. Vernon Avenue
8. WB near Mountain View Avenue interchange
9. WB between California Street and Alabama Street

Proposed EB CHP Areas include:

1. EB between Mountain Avenue and Euclid Avenue
2. EB between Vineyard Avenue and Archibald Avenue
3. EB between Cherry and Citrus Avenue
4. EB between Sierra Avenue and Cedar Avenue
5. EB between Cedar Avenue and Riverside Avenue
6. EB between 9th Street and Mt. Vernon Avenue
7. EB between Mountain View Avenue and California Street
8. EB between California Street and Alabama Street

The CHP is anticipated to be contracted to conduct routine and supplemental enforcement services on the I-10 Express Lanes. The CHP currently provides enforcement on all toll roads in southern California under several different institutional arrangements.

Toll Infrastructure

The Express Lane facility would incorporate various toll infrastructure including toll gantries with transponder readers and high speed digital cameras, directional and informational signage approaching Express Lane entry and exit points, dynamic message signs to communicate real-time toll rates to drivers, complete closed circuit television coverage of the entire Express Lanes corridor, and fiber optics linking the infrastructure to a centralized toll operations office. Toll equipment would meet Title 21 specification and national protocol, as well as interoperability with other toll facilities in California.

Tolling Policies

The *I-10 and I-15 Corridor Project Concept of Operations Report* was prepared by Parsons Brinckerhoff in December 2016 to address various tolling policies under which the Express Lanes would be operated. This report provides preliminary information regarding the type of tolling, toll exemption or rate reduction for HOVs, maximum target volume to maintain speed and minimize congestion in the Express Lanes, method for determining toll amount, methods for toll collection and toll enforcement, penalty rates for toll violations, and provision of supplemental service patrol. The items listed below represent key policies which have been developed for the I-10 Express Lanes; however, they are subject to change pending further studies.

- The Express Lanes are anticipated to operate 24 hours a day, 365 days a year with a minimum toll rate.
- It is anticipated that HOVs with three or more occupants (HOV 3+) will be allowed to use the Express Lanes toll-free west of Haven Avenue and either toll-free or at a discounted rate in the

Express Lane segment east of Haven Avenue. SOVs and HOVs not meeting the occupancy requirement will be allowed to use the Express Lanes for a toll.

- Motorcycles will be allowed to travel in the Express Lanes toll-free and are not required to have a transponder.
- Exempted vehicles including emergency response vehicles, highway maintenance vehicles serving the Express Lane facility, and CHP vehicles assigned to patrol the Express Lane facility will have toll-free access to the Express Lanes, by registering these vehicles with SBCTA as toll exempt in the License Plate Recognition (LPR) system.
- The current State law allowing Clean Air Vehicles (CAVs), including hybrids, electric vehicles, and vehicles using other sources of alternative fuel, free or discounted travel in Express Lane facilities will expire in 2019. SBCTA intends to provide a discount to CAVs if the State law is extended.
- The tolling operation will be fully electronic, with no means to accept cash payments. Vehicles are anticipated to use switchable transponders or LPR for toll collection except that HOV 3+ must have a valid switchable transponder (declaring HOV 3+) to be eligible to travel in the Express Lanes free of charge or at discounted rates.
- Tolling is anticipated to be dynamic pricing based on real-time traffic levels to ensure peak period speed of no less than 45 mph.

Additional studies will be performed to establish the operating policies and business rules and determine pricing structures and toll violation rates.

Toll Operations and Maintenance

The institutional arrangements for operation and maintenance of the Express Lanes have not been determined and would be subject to a future agreement between Caltrans and SBCTA. Pending future agreements, it is anticipated that a toll authority would be established with responsibility for operations and maintenance of the Express Lanes, including incident management and maintenance of the tolling system.

Express Lanes Incident Responses

At this time, it is anticipated that Freeway Service Patrol (FSP) will be contracted to provide incident response for the Express Lanes similar to the current arrangement on the HOV and general purpose lanes. It is currently planned to have dedicated roving FSP patrolling the Express Lanes during hours of peak congestion, to respond to incidents that might affect the Express Lanes including clearing of debris, towing disabled vehicles, and minor auto repairs.

5.A.3.2 Alternative 3 Traffic Analysis

The traffic information discussed in this section is a summary of the traffic analysis performed for the project and presented in the approved *Traffic Study Report* and *Traffic Study Report Addendum #1*. Graphical representation of the forecasted year 2045 peak-hour traffic volumes on I-10 as well as on freeway ramps are provided in **Attachment B** of this document.

Table 5.5 presents a summary of the I-10 freeway ADT volumes under the No Build and Alternative 3 conditions. As shown, Alternative 3 is projected to carry approximately 8 to 18 percent more traffic volumes than the No Build condition due to the additional capacity being provided by the proposed improvements.

Table 5.5 Year 2045 No Build and Alternative 3 ADT Volume

I-10 Freeway Segment	Year 2045 ADT Volume		
	Alternative 1 (No Build)	Alternative 3 (Express Lanes)	% Increase
LA/SBd County Line to I-15	313,000	369,000	18%
I-15 to I-215	254,000	297,000	17%
I-215 to SR-210	257,000	300,000	17%
SR-210 to Ford Street	241,000	260,000	7.9%

It should be noted that the traffic model forecasts higher traffic volumes for the Alternative 3 mainline and interchange ramps along the entire traffic study limits from Towne Avenue to Wabash Avenue because there is additional capacity added between the LA/SBd County line and Ford Street in both directions. However, two lanes are added in each direction between Haven Avenue and Ford Street while only one lane is added in each direction west of Haven Avenue. As a result, the operation of some freeway segments and ramps west of Haven Avenue may be slightly worse than the No Build condition. However, the improvements proposed in Alternative 3 overall would still provide the operational benefit to the I-10 corridor as reflected in the following mainline and ramp analyses.

Table 5.6 presents year 2045 peak-hour traffic volumes, d/c ratios, and LOSs for EB I-10 general purpose lanes under the No Build and Alternative 3 conditions. As shown, 23 segments in Alternative 3 are projected to operate at the same LOSs as the No Build and 7 segments are projected to perform at better LOSs than the No Build during the morning peak hours. Five (5) segments in Alternative 3 are projected to perform at worse LOSs than the No Build due to the higher traffic volumes projected for Alternative 3; however, the LOSs in these 5 segments would provide acceptable operation at LOS D or better. During the afternoon peak hours, 29 segments in Alternative 3 are projected to operate at the same LOSs as the No Build and 2 segments are projected to perform at better LOSs than the No Build. Due to the higher traffic volume forecast, 4 segments in Alternative 3 are projected to perform at LOS F, compared to LOS C and D in the No Build.

Table 5.7 presents year 2045 peak-hour traffic volumes, d/c ratios, and LOSs for WB I-10 general purpose lanes under the No Build and Alternative 3 conditions. During the morning peak hours, all WB freeway segments in Alternative 3 are projected to perform at the same or better LOSs than the No Build (26 same and 9 better). During the afternoon peak hours, the WB general purpose lanes in Alternative 3 are projected to operate at the same LOSs as the No Build in 30 segments and at better LOSs in 4 segments. The operation in 1 WB segment is degraded from LOS B in the No Build to LOS C in Alternative 3.

Table 5.8 presents year 2045 peak-hour traffic volumes, d/c ratios, and LOSs for the EB HOV lane in the No Build Alternative and the EB Express Lanes in Alternative 3. As shown, the proposed EB Express Lanes are predicted to operate at LOSs ranging from LOS A to LOS D during both morning and afternoon peak hours between the LA/SBd County Line and Ford Street, which is an improvement over LOS E and LOS F projected for some of the EB HOV segments in the No Build. West of the proposed Express Lane improvement limits, LOS F is projected for the existing HOV lane between

Towne Avenue and Indian Hill Boulevard during both peak hours, compared to LOS C in the No Build. The degradation of the LOS is due to the higher traffic demand projected for the I-10 corridor in Alternative 3, compared to the demand projected for the No Build Alternative. East of the proposed Express Lane improvement limits, it is assumed that there will be an HOV lane implemented as a separate future project by the horizon year 2045. LOS A is projected for the future HOV lane between Ford Street and Wabash Avenue during the morning peak hours and LOS E is projected during the afternoon peak hours.

Table 5.9 presents year 2045 peak-hour traffic volumes, d/c ratios, and LOSs for the WB HOV lane in the No Build Alternative and the WB Express Lanes in Alternative 3. As shown, the proposed WB Express Lanes are predicted to operate at LOSs ranging from LOS B to LOS D during both morning and afternoon peak hours between the LA/SBd County Line and Ford Street, which is an improvement over LOS E and LOS F projected for some of the WB HOV segments in the No Build. West of the proposed Express Lane improvement limits, LOS F is projected in the existing HOV lane between Towne Avenue and Indian Hill Boulevard during both peak hours, compared to LOS E during the morning peak hours and LOS F during the afternoon peak hour in the No Build. The slight LOS degradation during the morning peak hours is due to the higher traffic demand projected for Alternative 3, as compared to the demand projected for the No Build Alternative.

Overall, the traffic analysis indicates that the mainline operation in Alternative 3 is similar or slightly better than the No Build Alternative for the general purpose lanes. The Express Lanes proposed under Alternative 3; however, are predicted to operate at better LOSs than the HOV lanes in the No Build condition, providing users (HOVs and solo drivers) with higher speed and faster travel time through the corridor as well as offer trip reliability, which are improvements over the No Build Condition.

Two additional performance measures (speed and travel time) were evaluated in the traffic study to assess the relative differences in operational improvement between the No Build and Build alternatives. As presented in **Table 5.10**, the proposed improvements in Alternative 3 are projected to increase the average speed along the I-10 corridor during the peak hours, as compared to the No Build condition. Accordingly, **Table 5.11** shows that the average corridor travel times along the corridor are projected to improve during the peak hours compared to the No Build.

Table 5.6 Year 2045 No Build and Alternative 3 EB GP Lane Peak Hour Volume & LOS

I-10 Segment	Year 2045 EB GP Lanes Peak Hour Volume & LOS[1]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	7,410	1.01	F	7,400	1.00	D	8,490	1.15	F	8,760	1.18	**F**
Indian Hill – Monte Vista	7,610	1.03	F	7,650	1.03	F	10,360	0.93	D	10,800	0.97	D
Monte Vista - Central	7,910	1.07	F	7,850	1.06	F	8,090	1.09	F	8,160	1.10	F
Central - Mountain	8,150	0.97	C	8,190	0.98	C	8,360	1.00	**D**	8,600	1.02	**F**
Mountain - Euclid	8,180	1.11	F	8,040	1.09	F	8,230	1.11	F	8,570	1.16	F
Euclid – 4th/Grove[2]	8,330	1.13	F	7,580	1.02	F	8,820	1.19	F	8,910	1.20	F
4th/Grove[2] - Vineyard	8,210	1.11	F	6,970	0.94	D	8,330	1.13	F	7,470	1.01	**F**
Vineyard - Archibald	8,680	1.17	F	7,720	1.04	F	8,480	1.15	F	8,550	1.16	F
Archibald - Haven	9,040	1.08	F	8,930	1.06	F	9,050	1.08	F	10,100	1.20	F
Haven - Milliken	11,170	1.09	F	11,720	1.14	F	9,550	1.14	F	11,020	1.31	F
Milliken – I-15	10,560	1.14	F	11,490	1.24	F	9,010	1.07	F	10,890	1.30	F
I-15 – Etiwanda	10,530	1.25	F	10,350	1.23	F	8,900	1.06	F	9,800	1.17	F
Etiwanda – Cherry	9,600	1.04	F	10,240	1.11	F	8,510	0.92	C	10,450	1.13	F
Cherry – Beech[3]	9,390	1.27	F	10,120	1.37	F	7,660	1.04	F	9,380	1.27	F
Beech[3] – Citrus	9,640	1.30	F	10,090	1.36	F	7,880	1.06	F	9,180	1.24	F
Citrus – Sierra	9,810	1.33	F	9,600	1.30	F	8,220	0.98	C	8,800	1.05	F
Sierra – Alder[3]	9,320	1.26	F	9,410	1.27	F	7,740	1.05	F	8,610	1.16	F
Alder[3]- Cedar	9,490	1.28	F	9,270	1.25	F	7,890	1.07	F	8,390	1.13	F
Cedar – Riverside	9,200	1.24	F	8,770	1.19	F	7,880	1.06	F	8,200	1.11	F
Riverside – Pepper	9,210	1.24	F	8,840	1.19	F	7,920	1.07	F	8,150	1.10	F
Pepper – Rancho	9,580	1.29	F	9,140	1.24	F	8,270	1.12	F	8,440	1.14	F
Rancho – La Cadena/9th	9,680	1.31	F	9,240	1.25	F	8,390	1.13	F	8,490	1.15	F
La Cadena/9th – Mt. Vernon	9,960	1.35	F	9,480	1.28	F	8,700	1.18	F	8,740	1.18	F
Mt. Vernon – I-215	9,580	1.29	F	9,240	1.25	F	8,290	0.99	E	8,550	1.02	F
I-215 – Waterman	11,530	1.37	F	11,240	1.34	F	10,150	1.21	F	11,010	1.31	F
Waterman – Tippecanoe	8,530	1.15	F	9,950	1.34	F	7,160	0.97	C	9,830	1.33	F
Tippecanoe – Mountain View	7,840	1.06	F	9,980	1.35	F	7,240	0.86	C	9,530	1.13	F
Mountain View – California	7,010	0.95	D	10,430	1.41	F	6,380	0.76	C	10,010	1.19	F
California – Alabama	6,330	0.68	B	10,690	1.16	F	7,090	0.69	**C**	11,210	1.09	F
Alabama – SR-210	5,490	0.59	B	9,670	1.05	F	6,220	0.67	**C**	10,090	1.09	F
SR-210 – Tennessee	4,280	0.58	B	7,420	1.00	F	4,930	0.67	**C**	7,380	1.00	D
SR-210 - Eureka/6th	6,590	0.78	D	11,230	1.34	F	7,130	0.85	D	10,730	1.28	F
Eureka/6th – University/Cypress	5,470	0.74	C	10,510	1.42	F	6,030	0.81	C	9,970	1.35	F
University/Cypress – Ford	4,780	0.65	C	9,860	1.33	F	5,840	0.63	C	10,750	1.16	F
Ford – Wabash	3,760	0.41	B	9,140	0.99	D	5,300	0.72	**C**	9,670	1.31	**F**

Boldface indicates LOS in the build alternative that is worse than the No Build condition.
[1]LOS is based on density except when traffic d/c ratio is greater than 1.00, which is LOS F. LOS is presented in conjunction with a d/c ratio to provide additional measure of operational level.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[3]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.

Table 5.7 Year 2045 No Build and Alternative 3 WB GP Lane Peak Hour Volume & LOS

I-10 Segment	Year 2045 WB GP Lanes Peak Hour Volume & LOS[1]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	8,500	1.15	F	8,800	1.19	F	9,270	1.25	F	10,140	1.37	F
Indian Hill – Monte Vista	8,650	1.17	F	9,000	1.22	F	11,040	0.99	D	12,160	1.10	F
Monte Vista - Central	8,700	1.18	F	9,202	1.24	F	8,330	1.13	F	9,330	1.26	F
Central - Mountain	8,920	1.21	F	9,590	1.30	F	8,450	1.14	F	9,950	1.34	F
Mountain - Euclid	8,990	1.21	F	10,010	1.35	F	8,490	1.15	F	10,320	1.39	F
Euclid – 4th/Grove[2]	8,870	1.20	F	10,280	1.39	F	8,520	1.15	F	11,124	1.50	F
4th/Grove[2] - Vineyard	8,700	1.18	F	10,650	1.44	F	7,940	1.07	F	10,960	1.48	F
Vineyard - Archibald	8,920	1.21	F	11,020	1.49	F	8,690	1.17	F	11,780	1.59	F
Archibald - Haven	10,350	1.23	F	11,250	1.34	F	10,210	1.22	F	12,170	1.45	F
Haven - Milliken	12,880	1.39	F	12,900	1.39	F	11,160	1.21	F	11,550	1.25	F
Milliken – I-15	13,280	1.44	F	12,710	1.37	F	11,710	1.27	F	11,400	1.23	F
I-15 – Etiwanda	10,140	1.21	F	10,780	1.28	F	8,770	1.04	D	9,420	1.12	F
Etiwanda – Cherry	9,720	1.31	F	9,540	1.29	F	8,940	1.21	F	8,700	1.18	F
Cherry – Beech[3]	9,890	1.34	F	9,770	1.32	F	8,590	1.16	F	8,540	1.15	F
Beech[3] – Citrus	9,540	1.29	F	9,680	1.31	F	8,160	1.10	F	8,450	1.14	F
Citrus – Sierra	8,890	1.20	F	9,590	1.30	F	7,700	1.04	F	8,420	1.14	F
Sierra – Alder[3]	8,600	1.16	F	9,210	1.24	F	7,430	1.00	D	8,060	1.09	F
Alder[3]- Cedar	8,340	1.13	F	9,350	1.26	F	7,120	0.96	D	8,150	1.10	F
Cedar – Riverside	7,670	0.91	C	9,040	1.08	F	6,720	0.80	C	7,930	0.94	C
Riverside – Pepper	7,710	1.04	F	9,020	1.22	F	6,580	0.78	C	7,690	0.92	C
Pepper – Rancho	7,710	1.04	F	9,110	1.23	F	6,470	0.87	D	8,860	1.20	F
Rancho – La Cadena/9th	7,730	1.04	F	9,260	1.25	F	6,510	0.88	C	9,050	1.22	F
La Cadena/9th – Mt. Vernon	7,850	1.06	F	9,530	1.29	F	6,620	0.89	C	9,280	1.25	F
Mt. Vernon – I-215	7,900	1.07	F	9,660	1.31	F	6,650	0.90	D	9,390	1.27	F
I-215 – Waterman	9,600	1.30	F	9,720	1.31	F	8,650	1.17	F	9,330	1.26	F
Waterman – Tippecanoe	10,100	1.36	F	8,840	1.19	F	9,340	1.26	F	8,450	1.14	F
Tippecanoe – Mountain View	9,960	1.35	F	8,120	1.10	F	9,210	1.24	F	8,310	1.12	F
Mountain View – California	10,350	1.40	F	7,160	0.97	D	9,430	1.27	F	7,140	0.96	D
California – Alabama	10,970	1.07	F	6,410	0.63	C	11,160	1.33	F	7,050	0.84	C
Alabama – SR-210	9,750	1.16	F	5,040	0.60	B	9,890	1.18	F	5,620	0.67	B
SR-210 – Tennessee	8,530	1.15	F	4,150	0.56	B	8,910	1.20	F	4,920	0.66	**C**
SR-210 - Orange/6th	12,600	1.50	F	7,610	0.91	F	12,200	1.45	F	7,740	0.92	D
Orange/6th – University/Cypress	11,430	1.54	F	6,750	0.91	D	11,000	1.49	F	6,870	0.93	D
University/Cypress – Ford	10,300	1.39	F	6,160	0.83	D	9,820	1.33	F	6,270	0.85	C
Ford – Wabash	8,850	1.20	F	4,620	0.62	C	11,210	1.21	F	6,840	0.74	C

Boldface indicates LOS in the build alternative that is worse than the No Build condition.
[1]LOS is based on density except when traffic d/c ratio is greater than 1.00, which is LOS F. LOS is presented in conjunction with a d/c ratio to provide additional measure of operational level.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[3]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.

Table 5.8 Year 2045 No Build and Alternative 3 EB HOV/Express Peak Hour Volume & LOS

I-10 Segment	Year 2045 EB HOV/Express Volume & LOS[1]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	1,060	0.66	C	1,180	0.74	C	1,700	1.06	**F**[5]	1,660	1.04	**F**[5]
Indian Hill – Monte Vista	950	0.59	C	1,360	0.85	D	[4]	[4]	[4]	[4]	[4]	[4]
Monte Vista - Central	950	0.59	C	1,360	0.85	D	2,600	0.65	C	3,020	0.76	D
Central - Mountain	950	0.59	C	1,360	0.85	D	2,600	0.65	C	3,020	0.76	D
Mountain - Euclid	1,300	0.81	D	1,440	0.90	D	3,060	0.77	D	3,040	0.76	D
Euclid – 4th/Grove[2]	1,300	0.81	D	1,440	0.90	D	2,600	0.65	C	2,310	0.58	C
4th/Grove[2] - Vineyard	1,520	0.95	E	1,440	0.90	D	3,060	0.77	D	3,120	0.78	D
Vineyard - Archibald	1,240	0.78	D	1,540	0.96	E	3,060	0.77	D	3,120	0.78	D
Archibald - Haven	1,460	0.91	E	1,790	1.12	F	3,060	0.77	D	3,120	0.78	D
Haven - Milliken	-	-	-	-	-	-	3,140	0.79	D	3,200	0.80	D
Milliken – I-15	-	-	-	-	-	-	3,140	0.79	D	3,200	0.80	D
I-15 – Etiwanda	-	-	-	-	-	-	3,140	0.85	D	3,200	0.80	D
Etiwanda – Cherry	-	-	-	-	-	-	2,610	0.65	C	2,500	0.63	C
Cherry – Beech[3]	-	-	-	-	-	-	3,200	0.80	D	3,260	0.82	D
Beech[3] – Citrus	-	-	-	-	-	-	3,200	0.80	D	3,260	0.82	D
Citrus – Sierra	-	-	-	-	-	-	3,040	0.76	D	3,050	0.76	D
Sierra – Alder[3]	-	-	-	-	-	-	3,040	0.76	D	3,050	0.76	D
Alder[3]- Cedar	-	-	-	-	-	-	3,040	0.76	D	3,050	0.76	D
Cedar – Riverside	-	-	-	-	-	-	2,720	0.68	C	2,630	0.66	C
Riverside – Pepper	-	-	-	-	-	-	2,720	0.68	C	2,630	0.66	C
Pepper – Rancho	-	-	-	-	-	-	2,680	0.67	C	2,600	0.65	C
Rancho – La Cadena/9th	-	-	-	-	-	-	2,680	0.67	C	2,600	0.65	C
La Cadena/9th – Mt. Vernon	-	-	-	-	-	-	2,680	0.67	C	2,600	0.65	C
Mt. Vernon – I-215	-	-	-	-	-	-	2,680	0.67	C	2,600	0.65	C
I-215 – Waterman	-	-	-	-	-	-	2,680	0.67	C	2,600	0.65	C
Waterman – Tippecanoe	-	-	-	-	-	-	2,680	0.67	C	2,600	0.65	C
Tippecanoe – Mountain View	-	-	-	-	-	-	1,920	0.48	B	2,880	0.72	C
Mountain View – California	-	-	-	-	-	-	1,920	0.48	B	2,880	0.72	C
California – Alabama	-	-	-	-	-	-	520	0.26	A	1,690	0.85	D
Alabama – SR-210	-	-	-	-	-	-	520	0.26	A	1,690	0.85	D
SR-210 – Tennessee	-	-	-	-	-	-	520	0.26	A	1,690	0.85	D
SR-210 - Eureka/6th	-	-	-	-	-	-	520	0.26	A	1,690	0.85	D
Eureka/6th – University/Cypress	-	-	-	-	-	-	510	0.26	A	1,610	0.81	D
University/Cypress – Ford	-	-	-	-	-	-	[4]	[4]	[4]	[4]	[4]	[4]
Ford – Wabash	-	-	-	-	-	-	460	0.29	A[6]	1,560	0.98	E[6]

Boldface indicates LOS in the build alternative that is worse than the No Build condition.
[1]LOS is based on density except when traffic d/c ratio is greater than 1.00, which is LOS F. LOS is presented in conjunction with a d/c ratio to provide additional measure of operational level.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[3]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[4]LOS is not calculated for transition area between existing HOV/GP lane and proposed Express Lane.
[5]No Express Lane improvements; LOS is calculated for the existing HOV lane in LA County.
[6]LOS is calculated for the future HOV lane east of Ford Street to be constructed by 2045 by others.
-HOV lanes exist only west of Haven Avenue under Alternative 1 (No Build).

Table 5.9 Year 2045 No Build and Alternative 3 WB HOV/Express Peak Hour Volume & LOS

I-10 Segment	Year 2045 WB HOV/Express Peak Hour Volume & LOS[1]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Towne – Indian Hill	1,590	0.99	E	1,670	1.04	F	1,710	1.07	**F**[5]	1,720	1.08	**F**[5]
Indian Hill – Monte Vista	1,550	0.97	E	1,740	1.09	F	[4]	[4]	[4]	[4]	[4]	[4]
Monte Vista - Central	1,550	0.97	E	1,910	1.19	F	2,940	0.74	C	3,400	0.85	D
Central - Mountain	1,400	0.88	D	2,070	1.29	F	2,940	0.74	C	3,400	0.85	D
Mountain - Euclid	1,320	0.83	D	1,940	1.21	F	3,040	0.76	D	3,400	0.85	D
Euclid – 4th/Grove[2]	1,370	0.86	D	1,970	1.23	F	2,920	0.73	C	2,806	0.70	C
4th/Grove[2] - Vineyard	1,350	0.84	D	1,950	1.22	F	3,400	0.85	D	3,400	0.85	D
Vineyard - Archibald	1,630	1.02	F	2,330	1.46	F	3,400	0.85	D	3,400	0.85	D
Archibald - Haven	1,630	1.02	F	2,330	1.46	F	3,400	0.85	D	3,400	0.85	D
Haven - Milliken	-	-	-	-	-	-	3,390	0.85	D	3,400	0.85	D
Milliken – I-15	-	-	-	-	-	-	3,390	0.85	D	3,400	0.85	D
I-15 – Etiwanda	-	-	-	-	-	-	3,390	0.85	D	3,400	0.85	D
Etiwanda – Cherry	-	-	-	-	-	-	2,900	0.73	C	2,820	0.71	C
Cherry – Beech[3]	-	-	-	-	-	-	3,280	0.82	D	3,200	0.80	D
Beech[3] – Citrus	-	-	-	-	-	-	3,280	0.82	D	3,200	0.80	D
Citrus – Sierra	-	-	-	-	-	-	3,000	0.75	D	3,220	0.81	D
Sierra – Alder[3]	-	-	-	-	-	-	3,000	0.75	D	3,220	0.81	D
Alder[3]- Cedar	-	-	-	-	-	-	3,000	0.75	D	3,220	0.81	D
Cedar – Riverside	-	-	-	-	-	-	2,720	0.68	C	3,240	0.81	D
Riverside – Pepper	-	-	-	-	-	-	2,720	0.68	C	3,240	0.81	D
Pepper – Rancho	-	-	-	-	-	-	2,840	0.71	C	2,220	0.56	C
Rancho – La Cadena/9th	-	-	-	-	-	-	2,840	0.71	C	2,220	0.56	C
La Cadena/9th – Mt. Vernon	-	-	-	-	-	-	2,840	0.71	C	2,220	0.56	C
Mt. Vernon – I-215	-	-	-	-	-	-	2,840	0.71	C	2,220	0.56	C
I-215 – Waterman	-	-	-	-	-	-	2,840	0.71	C	2,220	0.56	C
Waterman – Tippecanoe	-	-	-	-	-	-	2,840	0.71	C	2,220	0.56	C
Tippecanoe – Mountain View	-	-	-	-	-	-	2,880	0.72	C	1,600	0.40	B
Mountain View – California	-	-	-	-	-	-	2,880	0.72	C	1,600	0.40	B
California – Alabama	-	-	-	-	-	-	1,720	0.86	D	760	0.38	B
Alabama – SR-210	-	-	-	-	-	-	1,720	0.86	D	760	0.38	B
SR-210 – Tennessee	-	-	-	-	-	-	1,720	0.86	D	760	0.38	B
SR-210 - Orange/6th	-	-	-	-	-	-	1,720	0.86	D	760	0.38	B
Orange/6th – University/Cypress	-	-	-	-	-	-	1,700	0.85	D	740	0.37	B
University/Cypress – Ford	-	-	-	-	-	-	1,700	0.85	D	740	0.37	B
Ford – Wabash	-	-	-	-	-	-	[4]	[4]	[4]	[4]	[4]	[4]

[1]LOS is based on density except when traffic d/c ratio is greater than 1.00, which is LOS F. LOS is presented in conjunction with a d/c ratio to provide additional measure of operational level.
[2]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[3]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[4]LOS is not calculated for transition area between existing HOV/GP lane and proposed Express Lane.
[5]No Express Lane improvements; LOS is calculated for the existing HOV lane in LA County.
-HOV lanes exist only west of Haven Avenue under Alternative 1 (No Build).

Table 5.10 Year 2045 No Build and Alternative 3 Average Speed

I-10 Between LA/SBd County Line and Ford Street		Year 2045 Average Peak Hour Speed[2] (mph)							
		Alternative 1 (No Build)				Alternative 3 (Express Lanes)			
		GP		HOV[1]		GP		EXP	
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Eastbound	LA/SBd County Line to I-15	28	33	57	44	32	26	61	60
	I-15 to I-215	14	16			38	27	62	62
	I-215 to SR-210	40	10			49	10	65	62
	SR-210 to Ford	63	10			61	10	65	58
	Entire Corridor	29	21	36	27	42	25	62	61
Westbound	LA/SBd County Line to I-15	15	10	43	10	22	10	57	54
	I-15 to I-215	29	15			48	31	60	59
	I-215 to SR-210	10	42			16	44	61	65
	SR-210 to Ford	10	56			10	55	54	65
	Entire Corridor	21	24	27	21	31	31	58	60

[1]Alternative 1 (No Build) HOV travel speeds are a combination of HOV lane speeds west of Haven Avenue and GP lane speeds east of Haven Avenue weighted for the distance of each.
[2]Speed index is a mathematical estimate of speed relative to the variation of the d/c ratios which vary for differing values of capacity in each alternative. The speed index is a relative value and does not substitute for the actual speed and is not directly related to flow and density. Average peak hour speed is based on SBTAM post-processed forecast data.

Table 5.11 Year 2045 No Build and Alternative 3 Travel Time

I-10 Between LA/SBd County Line and Ford Street		Year 2045 Travel Time[2] (minutes)							
		Alternative 1 (No Build)				Alternative 3 (Express Lanes)			
		GP		HOV[1]		GP		EXP	
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Eastbound	LA/SBd County Line to I-15	17	14	8	11	15	18	8	8
	I-15 to I-215	57	50			21	30	13	13
	I-215 to SR-210	8	31			6	31	5	5
	SR-210 to Ford	2	12			2	12	2	2
	Entire Corridor	59	80	47	63	41	70	27	28
Westbound	LA/SBd County Line to I-15	32	49	11	49	22	49	9	9
	I-15 to I-215	29	56			17	27	14	14
	I-215 to SR-210	28	7			18	6	5	4
	SR-210 to Ford	15	3			15	3	3	2
	Entire Corridor	85	72	66	84	57	57	30	29

[1]Alternative 1 (No Build) HOV travel times are a combination of HOV lane travel times west of Haven Avenue and GP lane travel times east of Haven Avenue weighted for the distance of each.
[2]Corridor travel time is calculated using the average speed shown in Table 5.24 and the length of the corridor within the project limits.

Table 5.12 presents the peak-hour traffic volumes, d/c ratios, and merge/diverge LOS for the interchange ramps along EB I-10 under the future No Build and Alternative 3 conditions. As shown, most of the EB interchange ramps in Alternative 3 are projected to operate at the same or better LOSs than the No Build Alternative during the morning peak hours (55 same, 20 better) and afternoon peak hours (69 same, 4 better). Due to the higher traffic demand projected for Alternative 3, the merge/diverge LOSs (which are based on the mainline density upstream/downstream of a ramp junction) for Alternative 3 are projected to be worse for 6 ramps during the morning peak hours and 8 ramps during the afternoon peak hours, as compared to the No Build Alternative.

Table 5.13 presents the peak-hour traffic volumes, d/c ratios, and merge/diverge LOS for the interchange ramps along WB I-10 under the future No Build and Alternative 3 conditions. As shown, most of the WB interchange ramps in Alternative 3 are projected to operate at the same or better LOSs than the No Build Alternative during the morning peak hours (63 same, 20 better) and afternoon peak hours (75 same, 7 better). Due to the higher traffic demand projected for Alternative 3, one (1) ramp in Alternative 3 during the morning peak hours and 2 ramps during the afternoon peak hours are projected to operate at worse LOS than the No Build; however, all are LOS D or better.

It should be noted that ramp merge/diverge LOS is based on the density of the mainline upstream of a diverge or downstream of a merge. When the total flow of the merge/diverge area exceeds the capacity of the freeway section or when the mainline d/c ratio is greater than 1.00, then ramp LOS is determined to be LOS F. Ramp d/c ratio is also presented to provide additional measure of operational level. The d/c ratio presented is the density of the ramp and does not solely determine the operations of the ramp junction and therefore, does not directly correlate with the LOS reported for the ramp.

Table 5.12 Year 2045 No Build and Alternative 3 EB Ramp Peak Hour Volume & LOS

	Year 2045 EB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						**Alternative 3 (Express Lanes)**					
	AM			**PM**			**AM**			**PM**		
I-10 Segment	**Vol**	**d/c**	**LOS**	**Vol**	**d/c**	**LOS**	**Vol**	**d/c**	**LOS**	**Vol**	**d/c**	**LOS**
Indian Hill EB off-ramp	840	0.56	F	900	0.60	E	820	0.55	F	900	0.60	**F**
Indian Hill EB on-ramp	940	0.63	F	1,330	0.89	F	990	0.66	F	1,280	0.85	F
Monte Vista EB off-ramp	760	0.51	F	930	0.62	F	750	0.50	D	930	0.62	E
Monte Vista EB on-ramp	1,050	0.70	F	1,130	0.75	F	1,090	0.73	F	1,310	0.87	F
Central EB off-ramp	660	0.44	F	940	0.63	F	690	0.46	F	940	0.63	F
Central EB on-ramp	900	0.60	C	1,280	0.85	C	950	0.63	**D**	1,380	0.92	**F**
Mountain EB off-ramp	730	0.49	C	1,210	0.81	C	800	0.53	**F**	1,210	0.81	**F**
Mountain EB on-ramp	1,110	0.74	F	1,140	0.76	F	1,130	0.75	F	1,200	0.80	F
Euclid EB off-ramp	1,030	0.69	F	1,570	1.05	F	1,060	0.35	F	1,570	0.52	F
Euclid EB on-ramp	1,180	0.79	F	1,110	0.74	F	1,200	0.80	F	1,170	0.78	F
4th/Grove EB off-ramp[1]	970	0.65	F	1,420	0.95	F	1,120	0.75	F	1,470	0.98	F
4th/Grove EB on-ramp[1]	1,060	0.71	F	800	0.53	D	1,090	0.73	F	840	0.56	**F**
Vineyard EB off-ramp	920	0.31	F	420	0.14	D	980	0.65	F	490	0.33	**F**
Vineyard EB on-ramp	1,110	0.74	F	1,270	0.85	F	1,130	0.75	F	1,570	1.05	F
Archibald EB off-ramp	1,660	0.55	F	1,550	0.52	F	1,690	0.56	F	1,570	0.52	F
Holt EB on-ramp	1,560	1.04	F	2,050	1.37	C	1,580	1.05	D	2,100	1.40	**F**

I-10 Segment	Year 2045 EB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Archibald EB on-ramp	680	0.45	F	950	0.63	F	680	0.45	F	1,030	0.69	F
Haven EB off-ramp	1,700	0.57	F	1,130	0.38	F	1,790	0.60	F	1,130	0.38	F
Haven EB loop on-ramp	560	0.37	F	670	0.45	F	560	0.37	C	670	0.45	F
Haven EB on-ramp	1,810	1.21	F	1,450	0.97	F	1,810	1.21	F	1,450	0.97	F
Milliken EB off-ramp	1,180	0.39	F	1,120	0.37	F	1,140	0.38	F	1,090	0.36	F
Milliken EB loop on-ramp	580	0.39	F	890	0.59	F	600	0.40	F	950	0.63	F
E10-N15 Connector	1,580	0.53	F	2,790	0.93	F	1,610	0.54	F	2,790	0.93	F
E10-S15 Connector	2,350	1.57	F	2,050	1.37	F	2,390	1.59	C	2,060	1.37	C
N15-E10 Connector	2,620	1.75	F	2,580	1.72	F	2,620	1.75	C	2,640	1.76	F
S15-E10 Connector	1,270	0.85	F	1,120	0.75	F	1,270	0.85	F	1,120	0.75	F
Etiwanda EB C-D off-ramp	1,280	0.43	F	1,160	0.39	F	1,290	0.43	F	1,160	0.39	F
Etiwanda EB off-ramp	660	0.44	[3]	394	0.26	[3]	661	0.44	[3]	417	0.28	[3]
Etiwanda EB loop on-ramp	87	0.06	[3]	270	0.18	[3]	93	0.06	[3]	300	0.20	[3]
Etiwanda EB on-ramp	263	0.18	[3]	780	0.52	[3]	278	0.19	[3]	810	0.54	[3]
Valley EB off-ramp	620	0.41	[3]	766	0.51	[3]	629	0.42	[3]	745	0.50	[3]
Etiwanda EB C-D on-ramp	350	0.23	F	1,050	0.70	F	370	0.25	C	1,110	0.74	F
Cherry EB off-ramp	1,040	0.35	F	1,250	0.42	F	1,060	0.35	B	1,390	0.46	F
Cherry EB on-ramp	830	0.55	F	1,130	0.75	F	800	0.53	C	1,090	0.73	F
Beech EB off-ramp[2]	370	0.25	F	530	0.35	F	410	0.27	F	730	0.49	F
Beech EB on-ramp[2]	630	0.42	F	500	0.33	F	630	0.42	F	540	0.36	F
Citrus EB off-ramp	550	0.37	F	1,120	0.75	F	550	0.37	F	1,220	0.81	F
Citrus EB on-ramp	710	0.47	F	620	0.41	F	720	0.48	C	620	0.41	F
Sierra EB off-ramp	1,630	0.54	F	1,470	0.49	F	1,630	0.54	B	1,470	0.49	F
Sierra EB on-ramp	1,140	0.76	F	1,280	0.85	F	1,150	0.77	F	1,280	0.85	F
Alder EB off-ramp[2]	460	0.31	F	600	0.40	F	470	0.31	F	710	0.47	F
Alder EB on-ramp[2]	630	0.42	F	460	0.31	F	630	0.42	F	490	0.33	F
Cedar EB off-ramp	1,150	0.38	F	1,540	0.51	F	1,170	0.39	F	1,660	0.55	F
Cedar EB on-ramp	870	0.58	F	1,040	0.69	F	840	0.56	F	1,040	0.69	F
Riverside EB off-ramp	910	0.30	F	940	0.31	F	940	0.31	F	1,180	0.39	F
Riverside EB on-ramp	870	0.58	F	1,010	0.67	F	980	0.65	F	1,130	0.75	F
Pepper EB off-ramp	490	0.33	F	530	0.35	F	620	0.41	F	570	0.38	F
Pepper EB on-ramp	910	0.61	F	830	0.55	F	930	0.62	F	830	0.55	F
Rancho EB off-ramp	470	0.31	F	660	0.44	F	460	0.31	F	710	0.47	F
Rancho EB on-ramp	570	0.38	F	750	0.50	F	570	0.38	F	750	0.50	F
9th EB off-ramp	160	0.11	F	220	0.15	F	160	0.11	F	230	0.15	F
9th EB on-ramp	450	0.30	F	460	0.31	F	470	0.31	F	480	0.32	F
Mt. Vernon EB off-ramp	750	0.50	F	800	0.53	F	770	0.51	F	870	0.58	F

I-10 Segment	Year 2045 EB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Mt. Vernon EB on-ramp	360	0.24	F	560	0.37	F	360	0.24	E	680	0.45	F
E10-N/S215 Connector	3,120	0.69	F	3,210	0.71	F	3,220	0.72	E	3,530	0.78	F
E10-N215 Connector	2,210	0.74	C	2,470	0.82	D	2,290	0.76	C	2,720	0.91	**E**
E10-S215 Connector	910	0.30	A	740	0.25	A	930	0.31	A	810	0.27	A
N215-E10 Connector	3,080	2.05	F	3,190	2.13	F	3,080	2.05	C	3,380	2.25	D
S215-E10 Connector	1,990	1.33	F	2,030	1.35	F	2,000	1.33	F	2,610	1.74	F
Redlands EB off-ramp	1,860	1.24	F	1,280	0.85	F	1,860	1.24	F	1,260	0.84	F
Waterman EB C-D/loop off-	1,660	1.11	F	1,100	0.73	F	1,650	1.10	D	1,080	0.72	F
Waterman EB loop on-ramp	164	0.11	(3)	644	0.43	(3)	164	0.11	(3)	680	0.45	(3)
Waterman EB on-ramp	356	0.24	(3)	446	0.30	(3)	356	0.24	(3)	470	0.31	(3)
Waterman EB C-D on-ramp	520	0.35	F	1,090	0.73	F	520	0.35	C	1,150	0.77	F
Tippecanoe EB off-ramp	1,100	0.37	F	1,090	0.36	F	1,100	0.37	C	1,150	0.38	F
Tippecanoe EB on-ramp	410	0.27	F	1,120	0.75	F	410	0.27	C	1,130	0.75	F
Mountain View EB off-ramp	1,360	0.91	F	770	0.51	F	1,370	0.91	C	880	0.59	F
Mountain View EB on-ramp	530	0.35	D	1,220	0.81	F	520	0.35	C	1,360	0.91	F
California EB off-ramp	1,090	0.73	D	1,030	0.69	F	1,100	0.73	C	1,100	0.73	F
California EB on-ramp	410	0.27	B	1,290	0.86	F	410	0.27	**C**	1,110	0.74	F
Alabama EB off-ramp	840	0.56	B	1,020	0.68	F	870	0.58	**C**	1,120	0.75	F
E10-W210 Connector	1,210	0.40	B	2,250	0.75	F	1,290	0.43	B	2,710	0.90	F
E210-E10 Connector	2,440	1.63	D	3,130	2.09	F	2,340	1.56	D	2,670	1.78	F
Tennessee EB off-ramp	500	0.33	C	480	0.32	F	520	0.35	C	560	0.37	D
Tennessee EB on-ramp	380	0.25	B	1,160	0.77	F	380	0.25	**C**	1,240	0.83	F
Eureka EB off-ramp	1,390	0.93	D	1,470	0.98	F	1,390	0.93	D	1,490	0.99	F
6th EB on-ramp	270	0.18	C	760	0.51	F	270	0.18	C	660	0.44	F
University EB off-ramp	880	0.59	D	1,310	0.87	F	880	0.59	D	1,310	0.87	F
Cypress EB on-ramp	190	0.13	C	660	0.44	F	190	0.13	C	480	0.32	F
Ford EB off-ramp	660	0.44	C	770	0.51	F	670	0.45	C	900	0.60	F
Ford EB on-ramp	600	0.40	B	1,500	1.00	D	590	0.39	**E**	1,370	0.91	**F**

Boldface indicates LOS in the build alternative that is worse than the No Build condition.
(1)Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
(2)Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
(3)LOS is not calculated for ramps that connect to a C-D road.
(4)Ramp merge/diverge LOS is based on the density of the mainline upstream of a diverge or downstream of a merge. When the total flow of the merge/diverge area exceeds the capacity of the freeway section or when the mainline d/c ratio is greater than 1.00, then ramp LOS is determined to be LOS F. Ramp d/c ratio is also presented to provide additional measure of operational level. The d/c ratio presented is the density of the ramp and does not solely determine the operations of the ramp junction and therefore, does not directly correlate with the LOS reported for the ramp.

Table 5.13 Year 2045 No Build and Alternative 3 WB Ramp Peak Hour Volume & LOS

I-10 Segment	Year 2045 WB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Indian Hill WB on-ramp	990	0.66	F	910	0.61	F	990	0.66	F	910	0.61	F
Indian Hill WB off-ramp	1,100	0.73	F	1,170	0.78	F	1,050	0.70	D	1,210	0.81	F
Monte Vista WB on-ramp	810	0.54	F	830	0.55	F	810	0.54	D	790	0.53	F
Monte Vista WB off-ramp	870	0. 58	F	1,240	0.83	F	1,040	0.35	F	1,370	0.46	F
Central WB on-ramp	920	0.61	F	910	0.61	F	920	0.61	F	860	0.57	F
Central WB off-ramp	990	0.66	F	1,430	0.95	F	1,040	0.69	F	1,480	0.99	F
Mountain WB on-ramp	1,240	0.83	F	1,070	0.71	F	1,240	0.83	F	1,120	0.75	F
Mountain WB off-ramp	1,300	0.87	F	1,480	0.99	F	1,380	0.46	F	1,490	0.50	F
Euclid WB on-ramp	750	0.50	F	650	0.43	F	820	0.55	F	729	0.49	F
Euclid WB loop on-ramp	470	0.31	F	530	0.35	F	400	0.27	C	441	0.29	F
Euclid WB hook off-ramp	1,050	1.03	F	1,330	0.89	F	1,130	0.75	F	1,380	0.92	F
4th/Grove WB on-ramp[1]	1,040	0.69	F	920	0.61	F	1,030	0.69	F	910	0.61	F
4th/Grove WB off-ramp[1]	870	0.58	F	1,290	0.86	F	920	0.61	F	1,340	0.89	F
Vineyard WB on-ramp	310	0.21	F	420	0.28	F	310	0.21	F	340	0.23	F
Vineyard WB loop on-ramp	210	0.14	F	300	0.20	F	230	0.15	F	330	0.22	F
Vineyard WB off-ramp	1,010	0.67	F	1,470	0.98	F	1,290	0.86	F	1,490	0.99	F
Archibald WB on-ramp	1,010	0.67	F	1,740	1.16	F	970	0.65	F	1,700	1.13	F
Holt WB off-ramp	1,740	1.16	F	1,420	0.95	F	1,790	0.60	F	1,540	0.51	F
Archibald WB off-ramp	700	0.47	F	560	0.37	F	700	0.47	F	560	0.37	F
Haven WB on-ramp	540	0.36	F	1,240	0.83	F	540	0.36	F	1,230	0.82	F
Haven WB loop on-ramp	380	0.25	F	860	0.57	F	380	0.25	F	810	0.54	F
Haven WB off-ramp	1,820	0.61	F	1,420	0.47	F	1,860	0.62	F	1,420	0.47	F
Milliken WB on-ramp	750	0.50	F	1,230	0.82	F	750	0.50	F	1,230	0.82	F
Milliken WB loop off-ramp	1,150	0.38	F	1,040	0.35	F	1,290	0.43	F	1,090	0.36	F
N15-W10 Connector	2,960	0.99	F	2,340	0.78	F	2,960	0.99	F	2,340	0.78	F
S15-W10 Connector	3,200	2.13	F	2,410	1.61	F	3,200	2.13	D	2,550	1.70	D
W10-N/S15 Connector	3,020	1.01	F	2,820	0.94	F	3,230	1.08	D	2,900	0.97	F
W10-N15 Connector	860	0.57	A	1,090	0.73	C	920	0.61	**B**	1,120	0.75	C
W10-S15 Connector	2,160	0.72	C	1,730	0.58	A	2,310	0.77	C	1,780	0.59	A
Etiwanda WB on-ramp	440	0.29	F	590	0.39	F	370	0.25	D	610	0.41	F
Etiwanda WB loop on-ramp	720	0.48	F	1,200	0.80	F	720	0.48	D	1,270	0.85	F
Valley WB on-ramp	334	0.22	[3]	538	0.36	[3]	334	0.22	[3]	569	0.38	[3]
Etiwanda WB off-ramp	730	0.49	F	550	0.37	F	770	0.51	F	580	0.39	F
Cherry WB on-ramp	810	0.54	F	490	0.33	F	900	0.60	F	500	0.33	F
Cherry WB loop on-ramp	290	0.19	F	240	0.16	F	320	0.21	F	300	0.20	F
Cherry WB off-ramp	1,270	0.42	F	970	0.32	F	1,250	0.42	F	1,020	0.34	F

I-10 Segment	Year 2045 WB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Beech WB on-ramp[2]	750	0.50	F	650	0.43	F	840	0.56	F	690	0.46	F
Beech WB off-ramp[2]	390	0.26	F	560	0.37	F	420	0.28	F	600	0.40	F
Citrus WB on-ramp	760	0.51	F	490	0.33	F	800	0.53	F	410	0.27	F
Citrus WB loop on-ramp	520	0.35	F	380	0.25	F	570	0.38	F	430	0.29	F
Citrus WB off-ramp	630	0.42	F	780	0.52	F	630	0.42	F	830	0.55	F
Sierra WB on-ramp	1,390	0.93	F	1,650	1.10	F	1,390	0.93	F	1,650	1.10	F
Sierra WB off-ramp	1,100	0.37	F	1,270	0.42	F	1,120	0.37	F	1,290	0.43	F
Alder WB on-ramp[2]	690	0.46	F	470	0.31	F	780	0.52	F	550	0.37	F
Alder WB off-ramp[2]	440	0.29	F	600	0.40	F	470	0.31	D	640	0.43	F
Cedar WB on-ramp	1,480	0.99	F	1,220	0.81	F	1,570	1.05	D	1,220	0.81	F
Cedar WB off-ramp	810	0.54	D	910	0.61	F	890	0.59	C	1,020	0.68	C
Riverside WB on-ramp	860	0.57	C	910	0.61	F	1,030	0.69	C	1,160	0.77	C
Riverside WB off-ramp	890	0.59	F	890	0.59	F	890	0.59	C	920	0.61	D
Pepper WB on-ramp	840	0.56	F	640	0.43	F	840	0.56	C	640	0.43	C
Pepper WB off-ramp	840	0.56	F	730	0.49	F	860	0.57	D	790	0.53	F
Rancho WB on-ramp	500	0.33	F	480	0.32	F	530	0.35	C	540	0.36	F
Rancho WB off-ramp	530	0.35	F	630	0.42	F	560	0.37	C	720	0.48	F
La Cadena WB on-ramp	270	0.18	F	340	0.23	F	270	0.18	C	340	0.23	F
9th WB off-ramp	390	0.26	F	610	0.41	F	390	0.26	C	570	0.38	F
Mt. Vernon WB on-ramp	590	0.39	F	780	0.52	F	640	0.43	C	810	0.54	F
Sperry WB off-ramp	650	0.43	F	910	0.61	F	660	0.44	D	920	0.61	F
S215-W10 Connector	2,140	1.43	F	2,520	1.68	F	2,280	1.52	D	2,760	1.84	F
N215-W10 Connector	910	0.61	C	1,460	0.97	D	910	0.61	C	1,460	0.97	D
W10-N/S215 Connector	5,000	1.67	F	4,940	1.65	F	5,460	1.82	F	5,070	1.69	F
W10-N215 Connector	4,360	1.45	F	2,930	0.98	E	4,690	1.56	F	2,940	0.98	E
W10-S215 Connector	1,210	0.40	A	3,110	1.04	F	1,310	0.44	A	3,200	1.07	F
E/Sunwest WB on-ramp	260	0.17	B	890	0.59	C	270	0.18	B	900	0.60	C
Carnegie WB hook on-ramp	540	0.36	F	1,560	1.04	F	450	0.30	F	1,560	1.04	F
Carnegie WB hook off-ramp	1,040	0.69	F	680	0.45	F	1,140	0.38	F	680	0.23	F
Tippecanoe WB on-ramp	590	0.39	F	840	0.56	F	550	0.37	F	740	0.49	F
Tippecanoe WB loop on-ramp	400	0.27	F	643	0.43	F	390	0.26	F	780	0.52	F
Tippecanoe WB off-ramp	840	0.56	F	760	0.51	F	860	0.57	F	770	0.51	F
Mountain View WB on-ramp	800	0.53	F	1,710	1.14	F	1,020	0.68	F	1,900	1.27	F
Mountain View WB off-ramp	1,200	0.80	F	750	0.50	D	1,240	0.83	F	720	0.48	D
California WB on-ramp	720	0.48	F	1,470	0.98	D	720	0.48	F	1,600	1.07	D
California WB off-ramp	1,340	0.89	F	720	0.48	C	1,290	0.86	F	670	0.45	C
Alabama WB on-ramp	1,220	0.81	F	1,370	0.91	C	1,270	0.85	F	1,430	0.95	C

I-10 Segment	Year 2045 WB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 3 (Express Lanes)					
	AM			PM			AM			PM		
	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS	Vol	d/c	LOS
Alabama WB off-ramp	830	0.55	F	490	0.33	C	810	0.54	F	430	0.29	C
E210-W10 Connector	2,050	1.37	F	1,380	0.92	B	2,270	1.51	F	1,570	1.05	**C**
W10-W210 Connector	3,610	1.20	F	3,030	1.01	F	3,290	1.10	F	2,820	0.94	D
Tennessee WB off-ramp	460	0.31	F	430	0.29	C	480	0.32	F	440	0.29	C
Orange WB on-ramp	730	0.49	F	450	0.30	F	760	0.51	F	490	0.33	D
Orange WB loop on-ramp	900	0.60	F	900	0.60	C	950	0.63	F	900	0.60	C
6th WB off-ramp	460	0.31	F	490	0.33	D	490	0.33	F	500	0.33	D
University WB on-ramp	1,600	1.07	F	930	0.62	D	1,600	1.07	F	930	0.62	D
Cypress WB off-ramp	470	0.31	F	340	0.23	D	420	0.28	F	330	0.22	D
Ford WB on-ramp	1,110	0.74	F	540	0.36	C	1,110	0.74	F	600	0.40	**D**
Ford WB off-ramp	910	0.61	F	450	0.30	C	800	0.53	F	430	0.29	C

Boldface indicates LOS in the build alternative that is worse than the No Build condition.
[1]Future interchange at Grove Avenue and removal of 4th Street ramps are assumed to be constructed by 2045 by others.
[2]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[3]LOS is not calculated for ramps that connect to a C-D road.
[4]Ramp merge/diverge LOS is based on the density of the mainline upstream of a diverge or downstream of a merge. When the total flow of the merge/diverge area exceeds the capacity of the freeway section or when the mainline d/c ratio is greater than 1.00, then ramp LOS is determined to be LOS F. Ramp d/c ratio is also presented to provide additional measure of operational level. The d/c ratio presented is the density of the ramp and does not solely determine the operations of the ramp junction and therefore, does not directly correlate with the LOS reported for the ramp.

Projected delay and LOS for key intersections within the project study limits are presented in **Table 5.14**.

Table 5.14 Year 2045 No Build and Alternative 3 Intersection LOS and Delay

Intersection	Year 2045 Intersection LOS and Delay[2]							
	Alternative 1 (No Build)				Alternative 3 (Express Lanes)			
	AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Monte Vista/WB ramps	39.6	D	57.7	E	20.5	C	28.2	C
Monte Vista/EB off-ramp/Palo	46.1	D	74.6	E	36.2	C	42.3	D
Palo Verde/EB on-ramp	10.3	B	13.1	B	8.4	A	10.2	B
Mountain/7th/Shopping Center	19.6	B	40.3	D	21.2	C	42.7	D
Mountain/WB ramps	40.9	D	52.0	D	46.2	D	54.2	D
Mountain/EB ramps	25.7	C	34.6	C	19.0	B	36.9	D
Mountain/6th	18.5	B	23.3	C	19.2	B	24.2	C
Euclid SB/7th	32.8	C	29.6	C	46.5	D	40.1	D
Euclid NB/7th	13.6	B	20.4	C	12.9	B	38.7	D
Euclid/EB ramps	92.5	F	156.7	F	24.9	C	49.1	D
7th/WB hook ramps/2nd[1]	35.2	E	98.1	F	15.9	B	16.7	B
Vineyard/Inland Empire	8.2	A	10.8	B	8.3	A	9.4	A
Vineyard/WB ramps	20.8	C	44.3	D	29.2	C	23.4	C
Vineyard/EB ramps	61.9	E	41.5	D	41.2	D	20.5	C
Vineyard/G	18.2	B	12.2	B	24.1	C	10.2	B
Vineyard/D	20.0	C	31.5	C	17.3	B	40.4	D
Valley/Commerce	33.6	C	36.2	D	34.7	C	31.6	C
Etiwanda/Valley/Ontario Mills	18.6	B	26.2	C	17.0	B	21.6	C
Etiwanda/WB off-ramp	16.0	B	15.3	B	16.7	B	13.0	B
Etiwanda/EB off-ramp	18.6	B	12.1	B	19.6	B	12.4	B
Pepper/Valley	31.0	C	30.6	C	52.3	D	33.8	C
Pepper/WB ramps	28.8	C	23.2	C	32.4	C	22.9	C
Pepper/EB ramps	25.0	C	30.2	C	26.7	C	34.6	C
La Cadena/WB on-ramp	4.8	A	6.4	A	5.2	A	6.6	A
9th/WB off-ramp[3]	13.3	B	24.8	C	14.6	B	26.4	D
9th/EB ramps[3]	10.9	B	11.7	B	11.2	B	12.1	B
Tennessee/WB ramps	15.9	B	18.0	B	14.6	B	14.9	B
Tennessee/EB ramps	23.8	C	81.0	F	15.4	B	29.1	C
Ford/WB on-ramp/Reservoir	20.9	C	22.0	C	10.2	B	9.6	A
Ford/EB off-ramp[3]	17.4	C	76.3	F	15.7	C	33.2	D
Ford/Parkford[3]	24.9	C	162.3	F	25.9	D	197.6	F
Ford/EB on-ramp/WB off-ramp	35.1	D	44.0	D	32.4	C	42.6	D
Ford/Oak[3]	20.6	C	14.6	B	21.2	C	14.6	B

[1]Intersection is unsignalized in the No Build condition, but will be signalized under the proposed project.
[2]Delay is shown in seconds.
[3]Unsignalized intersection

5.A.3.3 Alternative 3 Design Exception Features

Fact sheets have been prepared for each of the two Contracts to document mandatory and advisory design exceptions required by the project as part of the PA/ED approval. **Tables 5.15** through **5.17** summarize the nonstandard mandatory and advisory design features that have been identified to date for the project under Alternative 3 for the Contract 1 portion covering the proposed improvements from the LA/SBd County Line to I-15. **Tables 5.18** through **5.20** summarize the nonstandard mandatory and advisory design features that have been identified to date for the project under Alternative 3 for the Contract 2 portion covering the proposed improvements from I-15 to Ford Street.

Proposed design exceptions are based on the December 2016 version of the Highway Design Manual (HDM), 6th Edition, except for the superelevation related standards in Contract 2 (see Approval of Temporary Exemption for Superelevation Standards dated April 13, 2017 in **Attachment H**).

Table 5.15 Alternative 3 Mandatory (Headquarters) Design Exceptions – Contract 1

HDM	Location and Description	HDM Standard	Existing	Proposed
201.1 Horizontal Stopping Sight Distance(2)	1. EB I-10 1021+00 – 1043+00 (5000' Lt) to median barrier	750'	736'	736'
	2. WB I-10 1073+99 – 1090+00 (3500' Rt) to median barrier	750'	616'	616'
	3. WB I-10 1206+49 – 1221+43 (5000' Rt) to median barrier	750'	736'	736'
	4. WB I-10 1221+43 – 1232+35 (4800' Rt) to median barrier	750'	736'	721'
	5. WB I-10 1211+59 – 1213+36 (5000' Rt) at Campus OC columns	750'	694'	679'
	6. WB I-10 1227+40 – 1229+15 (4800' Rt) at 6th OC columns	750'	555'	665'
	7. Haven Ave EB off-ramp 20+43 – 24+06 (500' Rt) to barrier, Rt	430'	300'	300'
201.1 Vertical Stopping Sight Distance(2)	1. WB & EB I-10 725+35 – 1003+46 (800' crest)	750'	483'	483'
	2. WB & EB I-10 1015+00 – 1019+00 (400' crest)	750'	600'	600'
	3. WB & EB I-10 1021+07 – 1029+07 (800' sag)	750'	701'	701'
	4. WB & EB I-10 1030+85 – 1040+35 (950' crest)	750'	458'	458'
	5. WB & EB I-10 1041+35 – 1047+35 (600' sag)	750'	671'	671'
	6. WB & EB I-10 1060+33 – 1069+83 (950' crest)	750'	460'	460'
	7. WB & EB I-10 1088+33 – 1097+33 (900' crest)	750'	459'	459'
	8. WB & EB I-10 1120+08 – 1129+08 (900' crest)	750'	505'	505'
	9. WB & EB I-10 1252+83 – 1262+83 (1000' crest)	750'	723'	723'
	10. WB & EB I-10 1273+08 – 1282+58 (950' crest)	750'	487'	487'
	11. EB I-10 1357+25 – 1363+25 (600' crest)	750'	433'	433'
202.2(1) Super-elevation Rate(2)	1. WB I-10 1022+52 to 1048+33 (5000' Lt), 70 mph	4.4%	2% (5000' Lt)	3% Lt, 2% Rt
	2. EB I-10 1022+52 to 1048+33 (5000' Lt), 70 mph	4.4%	2% (5000' Lt)	2%
	3. WB I-10 1070+12 to 1087+16 (3500' Rt), 70 mph	6%	3% (3500' Rt)	3%
	4. EB I-10 1070+12 to 1087+16 (3500' Rt), 70 mph	6%	3% (3500' Rt)	3%
	5. WB I-10 1200+20 to 1221+43 (5000' Rt), 70 mph	4.4%	2% (5000' Rt)	2%
	6. EB I-10 1200+20 to 1221+43 (5000' Rt), 70 mph	4.4%	2% (5000' Rt)	2% Lt, 3% Rt
	7. WB I-10 1221+43 to 1230+40 (4800' Rt), 70 mph	4.4%	2% (5000' Rt)	2%
	8. EB I-10 1221+43 to 1230+40 (4800' Rt), 70 mph	4.4%	2% (5000' Rt)	2% Lt, 3% Rt
	9. WB I-10 1317+45 to 1321+74 (5000' Lt), 70 mph	4.4%	2% (7071' Lt)	3% Lt, 2% Rt
	10. EB I-10 1317+45 to 1321+74 (5000' Lt), 70 mph	4.4%	2% (7071' Lt)	2%
	11. WB I-10 1329+75 to 1338+87 (6027' Lt), 70 mph	3.6%	2% (6027' Lt)	3% Lt, 2% Rt
	12. EB I-10 1324+74 to 1346+20 (7071' Lt), 70 mph	3.2%	2% (7071' Lt)	2%
	13. WB I-10 1338+87 to 1352+18 (6750' Lt), 70 mph	3.2%	2% (6027' Lt)	3% Lt, 2% Rt
	14. EB I-10 1346+20 to 1362+71 (9000' Lt), 70 mph	2.6%	2% (7485' Lt)	2%
	15. Central Ave WB on-ramp (800' Rt), 30 mph	5.6%	3% (550' Rt)	3%
	16. Central Ave WB off-ramp (550' Lt), 35 mph	9.2%	-3% (550' Lt)	-3%
	17. Central Ave EB on-ramp (550' Lt), 30 mph	7.4%	-2% (550' Lt)	-2%

HDM	Location and Description	HDM Standard	Existing	Proposed
	18. 4th St WB on-ramp (180' Rt), 25 mph	11%	-2% (500' Rt)	2%
	19. 4th St WB off-ramp (295' Lt), 35 mph	12%	5% (500' Lt)	6%
	20. 4th St EB off-ramp (650' Rt), 30 mph	6.6%	2% (2000' Rt)	2%
	21. 4th St EB on-ramp (4700' Lt), 40 mph	2%	-2% (2000' Lt)	-2%
	22. Vineyard Ave WB off-ramp (300' Rt), 35 mph	12%	2% (175' Rt)	9.4%
	23. Archibald Ave EB on-ramp (5000' Lt), 45 mph	2.2%	N/A (tangent)	-2%
203.2 Minimum Curve Radius[(2)]	1. WB I-10 1022+52 to 1048+33, 5000' Lt (e_R = 3% Lt, 70 mph)	7140'	5000'	5000'
	(e_R = 2% Rt, 70 mph)	10900'	5000'	5000'
	2. EB I-10 1022+52 to 1048+33, 5000' Lt (e_R = 2%, 70 mph)	10900'	5000'	5000'
	3. WB I-10 1070+12 to 1087+16, 3500' Rt (e_R = 3%, 70 mph)	7140'	3500'	3500'
	4. EB I-10 1070+12 to 1087+16, 3500' Rt (e_R = 3%, 70 mph)	7140'	3500'	3500'
	5. WB I-10 1200+20 to 1221+43, 5000' Rt (e_R = 2%, 70 mph)	10900'	5000'	5000'
	6. EB I-10 1200+20 to 1221+43, 5000' Rt (e_R = 2% Lt, 70 mph)	10900'	5000'	5000'
	(e_R = 3% Rt, 70 mph)	7140'	5000'	5000'
	7. WB I-10 1221+43 to 1230+40, 4800' Rt (e_R = 2%, 70 mph)	10900'	5000'	4800'
	8. EB I-10 1221+43 to 1230+40, 4800' Rt (e_R = 2% Lt, 70 mph)	10900'	5000'	4800'
	(e_R = 3% Rt, 70 mph)	7140'	5000'	4800'
	9. WB I-10 1317+45 to 1321+74, 5000' Lt (e_R = 3% Lt, 70 mph)	7140'	7071'	5000'
	(e_R = 2% Rt, 70 mph)	10900'	7071'	5000'
	10. EB I-10 1317+45 to 1321+74, 5000' Lt (e_R = 2%, 70 mph)	10900'	7071'	5000'
	11. WB I-10 1329+75 to 1338+87, 6027' Lt (e_R = 3% Lt, 70 mph)	7140'	6027'	6027'
	(e_R = 2% Rt, 70 mph)	10900'	6027'	6027'
	12. EB I-10 1324+74 to 1346+20, 7071' Lt (e_R = 2%, 70 mph)	10900'	7071'	7071'
	13. WB I-10 1338+87 to 1352+18, 6750' Lt (e_R = 3% Lt, 70 mph)	7140'	6027'	6750'
	(e_R = 2% Rt, 70 mph)	10900'	6027'	6750'
	14. EB I-10 1346+20 to 1362+71, 9000' Lt (e_R = 2%, 70 mph)	10900'	7485'	9000'
	15. Central Ave WB on-ramp, 800' Rt (e_R = 3%, 30 mph)	1620'	550'	800'
	16. Central Ave WB off-ramp, 550' Lt (e_R = -3%, 35 mph)	2120' Rt	550'	550'
	17. Central Ave EB on-ramp, 550' Lt (e_R = -2%, 30 mph)	3370'	550'	550'
	18. 4th St WB on-ramp, 180' Rt (e_R = 2%, 25 mph)	1820'	500'	180'
	19. 4th St WB off-ramp, 295' Lt (e_R = 6%, 35 mph)	960'	500'	295'
	20. 4th St EB off-ramp, 650' Rt (e_R = 2%, 30 mph)	2490'	2000'	650'
	21. 4th St EB on-ramp, 4700' Lt (e_R = -2%, 40 mph)	5580'	2000'	4700'
	22. Vineyard Ave WB off-ramp, 300' Rt (e_R = 9.4%, 35 mph)	516'	175'	300'
	23. Archibald Ave EB on-ramp, 5000' Lt (e_R = -2%, 45 mph)	6910'	N/A (tangent)	5000'
301.1 Lane Width[(2)]	1. WB I-10 HOV/Trans 704+25 – 729+87	12'	11' (HOV)	11'
	2. WB I-10 GP Lanes 704+25 –729+87 (No. 1 & No. 2)	12'	12'	11'-12'
	3. WB I-10 GP Lane 716+46 –729+87 (No. 3)	12'	12'	11'-12'
	4. WB I-10 Trans No. 1/GP Lanes 1000+00 –1045+31 (No. 1 to No. 3)	12'	12' (HOV)	11'
	5. WB I-10 Express Lanes 1045+31–1256+23	12'	12' (HOV)	11'
	6. WB I-10 GP Lanes 1045+31–1213+41 (No. 1 & No. 2)	12'	12'	11'-12'
	7. WB I-10 Express/GP Lanes 1284+07 – 1332+66 (No. 1 & No. 2)	12'	12' (HOV)	11'-12'
	8. WB I-10 Express Lanes 1363+52 – 1526+00	12'	12' (HOV)	11'-12'
	9. WB I-10 GP Lanes 1476+95 – 1496+76 (No. 1 to No. 3 + aux)	12'	12'	11'-12'
	10. EB I-10 Trans/HOV Lane 706+75 – 717+99	12'	11' (HOV)	11'-12'
	11. EB I-10 Express Lanes 1000+00 – 1326+75	12'	12' (HOV)	11'-12'
	12. EB I-10 GP Lanes 1000+00 – 1219+47 (No. 1 & No. 2)	12'	12'	11'-12'
	13. EB I-10 GP Lanes 1262+23 – 1326+75 (No. 1 & No. 2)	12'	12'	11'-12'
	14. EB I-10 Express Lanes 1366+58 – 1526+00	12'	12' (HOV)	11'-12'

HDM	Location and Description	HDM Standard	Existing	Proposed
301.3(2)(b) Cross Slope[(2)]	1. WB/EB I-10 704+25 – 1526+00	1.5% - 3%	1.5% & varies	3%
302.1 & 309.1(3)(a) Shoulder Width[(2)]& Horizontal Clearance	1. WB I-10 704+25 – 729+87 – Med Shld	10’	8’	4’-8’
	2. WB I-10 1000+00 – 1070+12 – Med Shld	10’	8’	4’-8’
	3. WB I-10 1070+12 – 1089+46 – Med Shld	10’	8’	8’-10’
	4. WB I-10 1104+37 – 1112+83 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-6.5’
	5. WB I-10 1112+83 – 1146+73 – Med Shld	10’	8’	4’-10’
	6. WB I-10 1168+29 – 1181+29 – Med Shld @ Bi-CHP	10’	8’	2’-10’
	7. WB I-10 1188+03 – 1230+82 – Med Shld	10’	1’-8’	8’-10’
	8. WB I-10 1230+82 – 1256+23 – Med Shld	10’	1’-8’	4’-10’
	9. WB I-10 1284+08 – 1332+66 – Med Shld	10’	8’	4’-10’
	10. WB I-10 1354+89 – 1360+04 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’
	11. WB I-10 1363+52 – 1405+16 – Med Shld	10’	8’	8’-10’
	12. WB I-10 1405+16 – 1476+95 – Med Shld	10’	8’	4’-8’
	13. WB I-10 1476+95 – 1521+02 – Med Shld	10’	8’	3’-7’
	14. EB I-10 699+29 – 718+00 – Med Shld	10’	8’	8’-10’
	15. EB I-10 1003+56 – 1022+52 – Med Shld	10’	8’	4’-10’
	16. EB I-10 1022+52 – 1048+33 – Med Shld	10’	8’	8’
	17. EB I-10 1048+33 – 1087+16 – Med Shld	10’	8’	4’-8’
	18. EB I-10 1087+16 – 1113+13 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-7’
	19. EB I-10 1113+13 – 1155+00 – Med Shld	10’	8’	4’-9’
	20. EB I-10 1155+00 – 1168+29 – Med Shld @ Uni-CHP (EB)	10’	8’	2’-9’
	21. EB I-10 1184+18 – 1211+38 – Med Shld	10’	1’-8’	8’-10’
	22. EB I-10 1211+38 – 1262+23 – Med Shld	10’	1’-8’	4’-8’
	23. EB I-10 1262+23 – 1326+75 – Med Shld	10’	1’-15’	4’-10’
	24. EB I-10 1340+08 – 1344+23 – Med Shld @ Uni-CHP (EB)	10’	8’	4’-10’
	25. EB I-10 1374+42 – 1410+67 – Med Shld	10’	8’	7’-10’
	26. EB I-10 1410+67 – 1521+02 – Med Shld	10’	10’	4’- 8’
	27. WB I-10 1376+80 – 1380+45 – Med Shld	10’	10’	8’-10’
	28. EB I-10 1375+47 – 1379+60 – Med Shld	10’	10’	8’-10’
	29. WB I-10 1483+96 – 1485+90 – Med Shld	10’	10’	8’-10’[(4)]
	30. N15-W10 Connector 32+93 – 33+43 – Right Shld[(3)]	10’	5’	5’-10’
	31. WB/EB I-10 1152+98 – 1154+97 – Med Shld @ San Antonio OC	10’	1.5’-3’	7’-10’/5’-10’
	32. WB/EB I-10 1181+70 – 1184+54 – Med Shld @ Euclid OC	10’	0’-2’/2’	7’-10’
	33. WB/EB I-10 1197+21 – 1198+96 – Med Shld @ Sultana OC	10’	6.5’-8’/5’-8’	5’-8’[(4)]
	34. WB/EB I-10 1211+59 – 1213+36 – Med Shld @ Campus OC	10’	6.5’-8’	6’-8’/5’-8’[(4)]
	35. WB/EB I-10 1227+40 – 1229+70 – Med Shld @ 6th OC	10’	2.5’-5’	6’-8’/2’-4’[(4)]
	36. WB/EB I-10 1320+85 – 1323+25 – Med Shld @ Vineyard OC	10’	2’-3.5’/ 2.5’-3.5’	2.25’-6’/ 4.5’-8’[(4)]
	37. WB/EB I-10 1376+45 – 1379+45 – Med Shld @ Archibald OC	10’	5.25’-8’	4.75’-8’
	38. WB/EB I-10 1429+77 – 1432+23 – Med Shld @ Haven OC	10’	4.25’-8’/ 5.25’-8’	3’-4’[(4)]
	39. WB/EB I-10 1483+23 – 1485+72 – Med Shld @ Milliken OC	10’	8.5’-10.5’/ 9’-10.5’	2’-4’/3’-4’[(4)]
	40. WB/EB I-10 1521+02 – 1526+00 – Med Shld	10’	7.5’-10’	3.5’-8’
	41. NB Euclid Ave 5+70 – 6+95 Right Shld	8’	7’	3’-5’
	42. Haven Ave WB off-ramp 11+08 – 11+53 Left Shld	4’	2’-4’	2’-4’
	43. Haven Ave WB off-ramp 11+08 – 11+98 Right Shld	8’	4’-8’	4’-8’

HDM	Location and Description	HDM Standard	Existing	Proposed
305.1(3)(a) Median Width	1. 699+29 – 729+87 I-10 Indian Hill Blvd to LA/SBd County Line	22’	18’	14’-18’
	2. 1000+00 – 1022+74 I-10 LA/SBd County Line to Monte Vista Ave	22’	18’	10’-16’
	3. 1022+74 – 1048+33 I-10 Monte Vista Ave IC area	22’	18’	14’
	4. 1048+33 – 1070+12 I-10 Monte Vista Ave to Central Ave	22’	18’	10’-14’
	5. 1070+12 – 1091+78 I-10 Central Ave to Benson Ave	22’	16’-18’	14’-22’
	6. 1103+63 – 1155+93 I-10 Benson Ave to San Antonio Ave	22’	8’-18’	10’-22’
	7. 1184+18 – 1200+78 I-10 Euclid Ave to Sultana Ave	22’	6’-18’	18’-22’
	8. 1200+78 – 1235+23 I-10 Sultana Ave to 6th St	22’	6’-18’	10’-18’
	9. 1235+23 – 1256+23 I-10 6th St to Grove Ave	22’	6’-18’	10’-16’
	10. 1256+23 – 1284+08 I-10 Grove Ave to 4th St	22’	6’-18’	16’
	11. 1284+08 – 1317+45 I-10 4th St to Vineyard Ave	22’	10’-18’	10’-16’
	12. 1317+45 – 1332+66 I-10 Vineyard Ave IC area	22’	10’-18’	10’-22’
	13. 1371+76 – 1405+16 I-10 Archibald Ave IC area	22’	18’-24’	18’-22’
	14. 1405+16 – 1526+00 I-10 Archibald Ave to I-15	22’	18’-24’	10’-18’
309.2(1)(c) Vertical Clearance[(2)]	1. Mills Ave UC	15’	14’-8”	14’-8”
501.3 Interchange Spacing	1. I-10 between Monte Vista Ave and Central Ave	1 mile	0.55 miles	0.55 miles
	2. I-10 between 4th St and Vineyard Ave	1 mile	0.86 miles	0.86 miles
	3. I-10 between Haven Ave and I-15	2 miles	1.78 miles	1.78 miles
	4. I-10 between Milliken Ave and I-15	2 miles	0.77 miles	0.77 miles
502.2 Isolated Off-Ramps/ Partial Inter-	1. Monte Vista Ave EB off-ramp	Not used	Isolated off	Isolated off
	2. Euclid Ave WB hook off-ramp	Not used	Isolated off	Isolated off
	3. Holt Blvd EB on-ramp/WB off-ramp	Not used	Partial IC	Partial IC
504.7 Weaving Length	1. EB I-10 between Monte Vista Ave EB on-ramp and Central Ave EB off-ramp	2000’	1,146’	1,173’
	2. WB I-10 between Monte Vista Ave WB off-ramp and Central Ave WB on-ramp	2000’	1,064’	1,214’
	3. EB I-10 between Milliken Ave EB loop on-ramp and E10-N15	5000’	1,687’	1,696’
	4. WB I-10 between Milliken Ave WB loop off-ramp and N15-W10	5000’	1,305’	1,519’
504.8 Access Control	1. Euclid Ave WB loop on-ramp near 7th St	50’	175’	0’
	2. 4th St EB off-ramp near Yum Yum Donuts driveway	50’	58’	49’
	3. Vineyard Ave EB on-ramp near Mobil Gas Station driveway	50’	90’	21’
504.8 Access Rights Opposite Ramp Terminal	1. Monte Vista Ave EB off-ramp	Acquire access rights opposite ramp terminal	Palo Verde St 2nd Ave	Palo Verde St 2nd Ave
	2. Euclid Ave WB hook off-ramp			

[(1)]Not used
[(2)]FHWA Controlling Criteria
[(3)]No Horizontal Clearance exception at this location since no obstruction, only shoulder width exception is requested.
[(4)]The proposed shoulder width/horizontal clearance at this location is based on the use of concrete barrier type 60R to maximize the shoulder width.

Table 5.16 Alternative 3 Mandatory (District Delegated) Design Exceptions – Contract 1

HDM	Location and Description	HDM Standard	Existing	Proposed
201.1 Vertical Stopping Sight Distance[2]	1. Vineyard Ave (1000' crest)	360'	316'	316'
202.7 Super-elevation on City Streets	1. Vineyard Ave NB 312+14 – 317+13 (4000' Lt) 2. Vineyard Ave SB 317+13 – 325+12 (3000' Rt)	2.4% 3%	-2% -2%	-2% -2%
203.2 Minimum Curve Radius[2]	1. Vineyard Ave NB 312+14 – 317+13, 4000' Lt (e_R = -2%, 45 mph) 2. Vineyard Ave SB 317+13 – 325+12, 3000' Rt (e_R = -2%, 45 mph)	6480' 6480'	4000' 3000'	4000' 3000'
204.3 Maximum Grade[2]	1. WB & EB I-10 1027+05 – 1032+01 2. WB & EB I-10 1056+44 – 1062+65 3. WB & EB I-10 1280+08 – 1286+36	3% 3% 3%	3.95% 4.46% 4.40%	3.95% 4.46% 4.40%
308.1 Lane Widths on City Streets	1. Vineyard Ave NB 315+66 – 319+45 Lanes No. 1, No. 2, No. 3 and Rt-Turn	12'	10'-11'	10'-12'
405.3(2)(a) Shoulder Width at Right-Turn Lane	1. Euclid Ave NB 6+95 – 8+35 2. Vineyard Ave NB 316+95 – 317+27	4' 4'	N/A N/A	2' 2'

[1]Not used
[2]FHWA Controlling Criteria

Table 5.17 Alternative 3 Advisory Design Exceptions – Contract 1

HDM	Location and Description	HDM Standard	Existing	Proposed
201.7 Decision Sight Distance	1. WB I-10 at Euclid WB off-ramp	1105'(70mph)	1079' (67 mph)	864' (54 mph)
202.5(1) & 202.5(2) Super-elevation Transition[1]	1. Monte Vista Ave EB on-ramp (enter 5079' Lt)	150', 2/3-1/3	109', 2/3-1/3	**51', all tangent**
	2. Central Ave WB on-ramp (exit 4000' Lt)	150', 2/3-1/3	31', 1/5-4/5	**43', all in curve**
	3. Central Ave WB on-ramp (enter 800' Rt)	150', 2/3-1/3	91.5', 4/5-1/5	**50'**, 2/3-1/3
	4. Euclid Ave WB hook off-ramp (enter 250' Lt)	300', 2/3-1/3	200', 2/3-1/3	270', **1/2-1/2**
	5. Euclid Ave EB on-ramp (enter & exit 3000' Rt)	150', 2/3-1/3	150', all tangent	150', **all tangent**
	6. 4th St WB on-ramp (exit 4500' Lt)	150', 2/3-1/3	150', 2/3-1/3	**133'**, 2/3-1/3
	7. 4th St WB on-ramp (enter 180' Rt)	150', 2/3-1/3	62.5' all in curve	**133'**, 2/3-1/3
	8. 4th St WB on-ramp (exit 180' Rt)	150', 2/3-1/3	No super trans	**55' all in curve**
	9. Vineyard Ave WB off-ramp (exit 300' Rt)	240', 2/3-1/3	Realigned	**208'**, 2/3-1/3
	10. Vineyard Ave WB off-ramp (enter 500' Lt)	300', 2/3-1/3	Realigned	**266'**, 2/3-1/3
	11. Holt Blvd WB off-ramp (exit 850' Rt)	270', 2/3-1/3	240', 2/3-1/3	270', **3/5-2/5**
	12. Haven Ave WB off-ramp (exit 300' Rt)	300', 2/3-1/3	200', all tangent	**200', 1/2-1/2**
	13. Haven Ave WB off-ramp (enter 500' Lt)	300', 2/3-1/3	200', all tangent	**200', 1/2-1/2**
	14. Haven Ave EB off-ramp (exit 500' Rt)	300', 2/3-1/3	180', 3/5-2/5	**200', 1/3-2/3**
	15. Haven Ave EB loop on-ramp (enter 165' Rt)	300', 2/3-1/3	260', 1/5-4/5	**200', 1/4-3/4**
	16. Milliken Ave EB loop on-ramp (enter 142' Rt)	300', 2/3-1/3	250', 1/4-3/4	**197', 1/2-1/2**

HDM	Location and Description	HDM Standard	Existing	Proposed
202.6 Super-elevation of Compound Curves	1. Euclid WB loop on-ramp (3000'-0.04/186'-0.108)	Case 1	0.046@PCC/ 0.062@BC	0.043@PCC/ 0.03@BC
	2. Vineyard WB on-ramp (3000'-0.04/212'-0.12)	Case 1	0.061@PCC/ 0.03@BC	0.061@PCC/ 0.03@BC
	3. Holt Blvd WB off-ramp (1088'-0.096/850'-0.112)	Case 2	Realigned	0.10@PCC/ 0.067@BC
	4. Haven WB on-ramp (3000'-0.04/625'-0.116)	Case 1	0.084@PCC/ 0.026@BC	0.077@PCC/ 0.03@BC
	5. Haven WB loop on-ramp (3000'-0.04/180'-0.11)	Case 1	0.107@PCC/ 0.026@BC	0.071@PCC/ 0.03@BC
	6. Haven EB loop on-ramp (165'-0.114/3000'-0.04)	Case 1	0.112@PCC/ 0.026@EC	0.07@PCC/ 0.03@EC
	7. Haven EB on-ramp (700'-0.11/630'-0.114)	Case 1	Realigned	0.11@PCC/ 0.073@BC
	8. Haven EB on-ramp (630'-0.114/3000'-0.04)	Case 1	0.11@PCC/ 0.026@EC	0.069@PCC/ 0.03@EC
	9. Milliken EB loop on-ramp (142'-0.118/3000'-0.04)	Case 1	0.055@PCC/ 0.02@EC	0.076@PCC/ 0.03@EC
	10. E10-S15 Connector (850'-0.112/900'-0.108)	Case 2	Realigned	0.10@PCC/ 0.067@EC
	11. S15-W10 Connector (875'-0.11/900'-0.108)	Case 1	Realigned	0.10@PCC/ 0.067@EC
203.5 Compound Curves	1. EB I-10 east of Sultana Ave	Shorter R >= 2/3 longer R and/or larger R to follow smaller R	Single 5000'	5000'/4800'*(4)*
	2. WB I-10 at Vineyard Ave		Single 7071'	20000'/5000'*(4)*
	3. EB I-10 east of Vineyard Ave		Single 7071'	20000'/7071'*(4)*
	4. WB I-10 East of Vineyard Ave		Single 6027'	6750'/6027'*(4)*
	5. Monte Vista Ave EB off-ramp		Single 5079'	5079'/3386'*(4)*
	6. Monte Vista Ave EB on-ramp		200'/1000'*(3)*	215'/850'*(3)*
	7. Central Ave WB on-ramp		4000'/3000'*(4)*	4000'/3000'*(4)*
	8. Central Ave WB off-ramp		Single 3571'	3579'/2000'*(4)*
	9. Central Ave EB on-ramp		3000'/2200'*(4)*	4325'/1600'*(4)*
	10. Euclid WB loop on-ramp		197.6'/3000'*(3)*	186'/3000'*(3)*
	11. Vineyard WB on-ramp		212'/3000'*(3)*	212'/3000'*(3)*
	12. Holt Blvd WB off-ramp		Single 2000'	14919'/2500'*(4)*
	13. Archibald Ave EB on-ramp		Single 470'	470'/5000'*(3)*
	14. Haven WB on-ramp		700'/3000'*(3)*	625'/3000'*(3)*
	15. Haven WB loop on-ramp		190'/3000'*(3)*	180'/3000'*(3)*
	16. Haven EB loop on-ramp		190'/3000'*(3)*	165'/3000'*(3)*
	17. Haven EB on-ramp		700'/630'*(4)*	700'/630'*(4)*
	18. Haven EB on-ramp		630'/3000'*(3)*	630'/3000'*(3)*
	19. Milliken WB on-ramp		830'/3000'*(3)*	850'/3000'*(3)*
	20. Milliken EB loop on-ramp		148'/3000'*(3)*	142'/3000'*(3)*
	21. S15-W10 Connector		900'/3000'*(3)*	875'/3000'*(3)*
	22. S15-W10 Connector		Single 900'	900'/875'*(4)*
203.6 Tangent Length Between Reversing Curves	1. Monte Vista Ave EB on-ramp (850'/5079')	240'	No reversing	191'
	2. Central Ave WB on-ramp (4000'/800')	200'	0'	0'
	3. 4th St WB on-ramp (4500'/180')	200'*(5)*	Realigned	166'
	4. 4th St EB on-ramp (4700'/3000')	12'*(6)*	276'	0'
	5. Vineyard Ave WB off-ramp (300'/500')	360'*(7)*	Realigned	315'
	6. Holt Blvd WB off-ramp (850'/2500')	280'	184'	271'
	7. Haven Ave WB off-ramp (300'/500')	400'	281'	194'

HDM	Location and Description	HDM Standard	Existing	Proposed
204.3 Minimum Grade	1. WB/EB I-10 1152+58 – 1202+83	0.30%	0.12%	0.12%
	2. WB/EB I-10 1221+08 – 1253+13	0.30%	0.25%	0.25%
	3. EB I-10 1366+80 – 1373+30	0.30%	0.27%	0.27%
	4. EB I-10 1373+30 – 1375+30	0.30%	0.20%	0.20%
	5. EB I-10 1375+30 – 1376+30	0.30%	0.15%	0.15%
	6. WB I-10 1381+16 – 1389+11	0.30%	0.17%	0.17%
	7. EB I-10 1382+21 – 1393+15	0.30%	0.12%	0.12%
	8. WB I-10 1389+11 – 1403+61	0.30%	0.23%	0.23%
	9. EB I-10 1395+95 – 1404+95	0.30%	0.20%	0.20%
	10. WB I-10 1403+61 – 1411+71	0.30%	0.05%	0.05%
	11. EB I-10 1404+95 – 1412+15	0.30%	0.07%	0.07%
	12. EB I-10 1417+25 – 1422+15	0.30%	0.18%	0.18%
	13. WB I-10 1417+76 – 1422+31	0.30%	0.17%	0.17%
	14. EB I-10 1434+96 – 1452+95	0.30%	0.13%	0.13%
	15. EB I-10 1452+95 – 1466+45	0.30%	0.29%	0.29%
	16. EB I-10 1466+45 – 1478+45	0.30%	0.04%	0.04%
	17. WB I-10 1478+45 – 1485+46	0.30%	0.08%	0.08%
	18. EB I-10 1478+45 – 1485+20	0.30%	0.02%	0.02%
	19. Monte Vista WB off-ramp 14+30 – 15+44	0.30%	0.15%, 0.18%	0.15%, 0.18%
	20. Euclid EB on-ramp 11+50 – 16+08	0.30%	0.05%	0.05%
	21. Milliken WB on-ramp 17+81 – 23+31	0.30%	0.13%	0.13%
	22. E10-S15 Connector 10+24 – 13+60	0.30%	0.00%	0.14%
	23. N15-W10 Connector 19+69 – 24+60	0.30%	0.17%	0.17%
	24. S15-W10 Connector 19+67 – 24+55	0.30%	0.10% - 0.30%	0.03%
204.4 Vertical Curve Length	1. WB/EB I-10 1004+00 – 1008+00 (sag)	700’	400’	400’
	2. WB/EB I-10 1041+35 – 1047+35 (sag)	700’	600’	600’
	3. WB/EB I-10 1070+33 – 1076+33 (sag)	700’	600’	600’
	4. WB/EB I-10 1097+58 – 1103+58 (sag)	700’	600’	600’
	5. WB/EB I-10 1114+83 – 1119+83 (sag)	700’	500’	500’
	6. EB I-10 1357+25 – 1363+25 (crest)	700’	600’	600’
	7. EB I-10 1363+80 – 1366+80 (sag)	700’	300’	300’
	8. WB I-10 1371+94 – 1377+44 (sag)	700’	550’	550’
	9. Central WB off-ramp 8+60 – 11+80 (crest)	500’	300’	320’
305.1(1)(a) Median Width	1. Benson Ave 1091+78 – 1103+63	36’	18’	22’
	2. San Antonio to Euclid Ave 1155+93 – 1184+18	36’	7’-12’	22’
	3. East of Vineyard Ave 1332+66 – 1345+00	36’	20’-58’	22’-36’
	4. West of Archibald Ave 1367+36 – 1371+76	36’	28’-54’	22’-36’
310.2 Outer Separation	1. EB I-10 and Palo Verde (near Monte Vista) 1000+60 – 1018+00	26’	32’-38’	19’-26’
403.3 Angle of Intersection	1. Central WB on-ramp	75° min	58°48’47”	58°48’47”
	2. Central EB on-ramp	75° min	66°53’41”	66°53’41”
	3. 4th WB on-ramp	75° min	40°27’32”	58°24’25”
	4. 4th WB off-ramp	75° min	62°28’04”	65°29’34”
	5. 4th EB off-ramp	75° min	40°41’18”	46°10’13”
	6. 4th EB on-ramp	75° min	34°34’59”	34°35’45”
	7. Vineyard EB on-ramp	75° min	68°18’42”	68°18’42”
504.2(2) Freeway Entrances and Exits	1. Indian Hill WB off-ramp	4°52’08”	2°40’26”	2°40’26”
	2. Monte Vista WB off-ramp	4°52’08”	2°53’14”	2°51’45”
	3. Monte Vista EB on-ramp	14’ @ 467.11’	14’ @ 427’	14’ @ 503’
	4. Euclid EB on-ramp	14’ @ 467.11’	14’ @ 495’	14’ @ 498’
	5. 4th EB off-ramp	4°52’08”	3°22’00”	2°52’17”

HDM	Location and Description	HDM Standard	Existing	Proposed
	6. 4th EB on-ramp	14' @ 467.11'	14' @ 461'	14' @ 487'
	7. Vineyard WB on-ramp	14' @ 467.11'	14' @ 559'	14' @ 481'
	8. Vineyard WB loop on-ramp	14' @ 467.11'	14' @ 174'	14' @ 273'
	9. Vineyard EB on-ramp	6' @ 300'	7.4' @ 300'	9' @ 300'
504.2(5)(a) Vertical Curve Just Beyond Exit Nose	1. Central WB off-ramp	430' (50 mph)	301' (40 mph)	301' (40 mph)
	2. Central EB off-ramp	430' (50 mph)	363' (45 mph)	363' (45 mph)
	3. Euclid WB hook off-ramp	430' (50 mph)	254' (35 mph)	343' (43 mph)
504.3(1)(d) Ramp Lane Drops	1. Archibald EB on-ramp	Lane drop tapers should not extend beyond the 6-foot point	20:1 (ending @ 6-foot point)	30:1 (238' beyond the 6-foot point)
504.3(2)(c) Auxiliary Lane Beyond Ramp Conver-gence Point	1. Monte Vista WB on-ramp (810/790 vph)	300'	0'	0'
	2. Euclid WB on-ramp (820/730 vph)	300'	0'	0'
	3. Euclid WB loop on-ramp (400/440 vph)	300'	0'	0'
	4. Euclid EB on-ramp (1200/1170 vph)	300'	0'	0'
	5. 4th WB on-ramp (1030/910 vph)	300'	0'	0'
	6. 4th EB on-ramp (1090/840 vph)	300'	0'	0'
	7. Vineyard WB on-ramp (310/340 vph)	300'	0'	0'
	8. Vineyard WB loop on-ramp (230/330 vph)	300'	0'	0'
	9. Archibald EB on-ramp (680/1030 vph)	300'	0'	0'
	10. Haven WB on-ramp (540/1230 vph)	300'	0'	0'
	11. Haven EB on-ramp (1810/1450 vph)	300'	0'	0'
	12. Milliken WB on-ramp (750/1230 vph)	300'	0'	0'
504.3(3) Crossroad Grade at Ramp Terminal	1. Vineyard WB loop on-ramp	4%	N/A (slip on)	4.83%
	2. Vineyard WB off-ramp	4%	5.16%	5.16%
504.3(6) Two-Lane Exit Ramps	1. Monte Vista EB off-ramp (750/930 vph)	Provide for 2-lane exit & 1300' aux lane	1-lane exit and no provision for second ramp lane and aux lane	1-lane exit[8]
	2. Central WB off-ramp (1040/1480 vph)			1-lane exit[8]
	3. Mountain EB off-ramp (800/1210 vph)			1-lane exit[9]
	4. 4th WB off-ramp (920/1340 vph)			1-lane exit[8]
	5. 4th EB off-ramp (1120/1470 vph)			1-lane exit[8]
	6. Vineyard EB off-ramp (980/490 vph)			1-lane exit[8]
504.4(5) Single-Lane Connect-ions	1. E10-S15 Connector	L>1000', add a passing lane	L=2022', single lane	L=1997', single-lane
504.4(6) Branch Connection Merge/ Diverge	1. E10-S15 Connector (diverge – case 1)	2-lane exit & 2500' aux	1-lane exit (from GP No. 4) & no aux	1-lane exit & 3574' aux
	2. N15-W10 Connector (merge)	2-lane at merge & 2500' aux beyond lane drop	2-lane beyond merge & 1730' aux	2-lane beyond merge & 1811' aux

HDM	Location and Description	HDM Standard	Existing	Proposed
504.6 Mainline Lane Reduction	1. WB I-10 Indian Hill WB Off-Ramp	No lane drop through local IC	No lane drop	Lane drop at off-ramp
504.8 Access Control	1. Monte Vista EB on-ramp (to Spirit Freedom Plaza)	100’	53’	53’
	2. Monte Vista Ave EB off-ramp (to Water District)	100’	90’	86’
	3. Euclid EB off ramp (to Caroline Court)	100’	103’	80’

(1)Bold font identifies proposed nonstandard superelevation transition features for which a design exception is being requested.
(2)Curve radii are shown in the direction of travel
(3)Shorter radius is not at least two-thirds of longer radius when shorter radius is 1,000 feet or less
(4)On one-way roads, the larger radius does not follow the smaller radius
(5)Because proposed eR=2% (not 11%), only 200' (2/3 of 150' & 2/3 of 150') of tangent between reversing curves is required.
(6)Because proposed eR=-2% (not 2%), only 12' of tangent between reversing curves is required to transition from -2% to -2.67%.
(7)Because proposed eR=9.4% (not 12%), only 360' (2/3 of 240' & 2/3 of 300') of tangent between reversing curves is required.
(8)1-lane exit and no provision for second ramp lane and 1,300-foot auxiliary lane.
(9)1-lane exit and no provision for second ramp lane.

Table 5.18 Alternative 3 Mandatory (Headquarters) Design Exceptions – Contract 2

HDM	Location and Description	HDM Standard	Existing	Proposed
201.1 Horizontal Stopping Sight Distance[(2)]	1. WB I-10 2055+89 – 2060+71 (5042’ Rt) to median barrier	750’	667’	620’
	2. WB I-10 2150+98 – 2159+50 (3400’ Rt) to median barrier	750’	696’	651’
	3. EB I-10 2176+00 – 2179+50 (2624’ Lt) to median barrier	750’	440’	629’
	4. WB I-10 2190+30 – 2194+30 (2624’ Rt) to median barrier	750’	583’	636’
	5. EB I-10 2221+20 – 2228+60 (4600’ Lt) to median barrier	750’	902’	589’
	6. WB I-10 2336+74 – 2343+22 (3003’ Rt) to median barrier	750’	696’	667’
	7. EB I-10 2342+05 – 2349+24 (5750’ Lt) to median barrier	750’	941’	662’
	8. WB I-10 2561+94 – 2579+06 (3000’ Rt) to median barrier	750’	746’	660’
	9. EB I-10 2584+75 – 2602+05 (3000’ Lt) to median barrier	750’	746’	660’
	10. WB I-10 2640+22 – 2660+37 (4000’ Rt) to median barrier	750’	861’	659’
	11. WB I-10 2691+50 – 2706+40 (3600’ Rt) to median barrier	750’	817’	673’
	12. WB I-10 2723+10 – 2730+18 (4000’ Rt) to median barrier	750’	861’	660’
	13. EB I-10 2744+25 – 2762+24 (3200’ Lt) to median barrier	750’	771’	642’
	14. WB I-10 2182+38 – 2183+88 (2363’ Lt) to soundwall	750’	703’	548’
	15. WB I-10 2229+73 – 2234+46 (4600’ Lt) to outside abut/wall	750’	750’	713’
	16. WB I-10 2597+80 – 2609+73 (3000’ Lt) to outside bridge rail/SW	750’	612’	612’
	17. EB I-10 2634+58 – 2635+84 (4000’ Rt) to outside bridge rail	750’	710’	710’
	18. EB I-10 2684+52 – 2695+92 (3600’ Rt) to outside bridge rail/SW	750’	673’	673’
	19. EB I-10 2716+12 – 2722+75 (4000’ Rt) to outside bridge rail/SW	750’	710’	710’
	20. WB I-10 2752+28 – 2768+92 (3200’ Lt) to outside bridge rail/SW	750’	644’	672’
	21. N15-E10 48+23 – 52+66 (850’ Rt) to S15-E10 bridge column/barrier	430’	430’	327’
	22. WB I-10 2056+15 – 2060+69 (5042’ Rt) at Riverside OC columns	750’	551’	586’
	23. N215-E10 21+20 – 22+88 (850’ Rt) at S215-E10 bridge column	430’	430’	334’
	24. EB I-10 2225+53 – 2227+16 (4600’ Lt) at Mt. Vernon OC columns	750’	871’	526’
	25. WB I-10 2417+60 – 2420+46 (4400' Rt) at Richardson OC columns	750’	538’	716’
	26. WB I-10 2568+10 – 2569+72 (3000’ Rt) at E10-W210 columns	750’	678’	610’
	27. WB I-10 2574+15 – 2576+22 (3000' Rt) at E210-E10 bridge column	750’	662’	588’
	28. WB I-10 2576+22 – 2579+36 (3000’ Rt) at Tennessee OC columns	750’	678’	641’

HDM	Location and Description	HDM Standard	Existing	Proposed
201.1 Vertical Stopping Sight Distance[(2)]	1. WB & EB I-10 1531+95 – 1534+95 (300' crest)	750'	573'	573'
	2. WB I-10 1614+34 – 1624+34 (1000' crest)	750'	479'	479'
	3. EB I-10 1619+87 – 1624+87 (500' crest)	750'	477'	477'
	4. WB I-10 1959+05 – 1964+05 (500' crest)	750'	491'	491'
	5. EB I-10 1959+05 – 1964+05 (500' crest)	750'	486'	486'
	6. WB I-10 2178+85 – 2183+85 (500' crest)	750'	590'	590'
	7. EB I-10 2176+85 – 2183+85 (700' crest)	750'	613'	613'
	8. EB I-10 2201+45 – 2208+45 (700' crest)	750'	583'	583'
	9. WB I-10 2201+95 – 2206+95 (500' crest)	750'	515'	515'
	10. WB & EB I-10 2225+10 – 2232+10 (700' sag)	750'	485'	485'
	11. WB & EB I-10 2232+10 – 2237+10 (500' crest)	750'	412'	412'
	12. WB I-10 2296+89 – 2299+89 (300' sag)	750'	567'	567'
	13. WB I-10 2301+10 – 2314+60 (1350' crest)	750'	567'	567'
	14. EB I-10 2303+52 – 2311+52 (800' crest)	750'	482'	482'
	15. WB I-10 2314+82 – 2322+82 (800' sag)	750'	687'	687'
	16. WB & EB I-10 2329+32 – 2339+32 (1000' crest)	750'	618'	618'
	17. WB & EB I-10 2381+99 – 2393+49 (1150' crest)	750'	583'	583'
	18. WB & EB I-10 2434+58 – 2440+58 (600' crest)	750'	583'	583'
	19. WB & EB I-10 2457+58 – 2467+58 (1000' crest)	750'	640'	640'
	20. WB & EB I-10 2492+83 – 2499+83 (700' crest)	750'	625'	625'
	21. WB & EB I-10 2518+83 – 2525+83 (700' crest)	750'	610'	610'
	22. WB & EB I-10 2589+34 – 2593+34 (400' crest)	750'	571'	571'
	23. WB & EB I-10 2663+84 – 2671+34 (750' crest)	750'	728'	728'
	24. N15-E10 35+38 – 44+38 (900' crest)	430'	391'	391'
	25. S215-W10 27+60 – 32+60 (500' crest)	430'	344'	344'
202.2(1) Super-elevation Rate[(2)]	The superelevation related standard per the December 2016 HDM will be addressed through a supplemental Fact Sheet. See the April 13, 2017 memo regarding approval of temporary exemption to meeting the December 2016 HDM superelevation related standards for Contract 2.			
203.2 Minimum Curve Radius[(2)]	The superelevation related standard per the December 2016 HDM will be addressed through a supplemental Fact Sheet. See the April 13, 2017 memo regarding approval of temporary exemption to meeting the December 2016 HDM superelevation related standards for Contract 2.			
301.1 Lane Width[(2)]	1. WB I-10 Express Lanes 1526+00 – 1591+85	12'	N/A	11'-12'
	2. WB I-10 Express Lanes 1847+97 – 1940+65	12'	N/A	11'-12'
	3. WB I-10 GP Lanes 1847+66 – 1940+65 (No. 1 & No. 2)	12'	12'	11'-12'
	4. WB I-10 Express Lanes 2041+98 – 2105+73	12'	N/A	11'-12'
	5. WB I-10 GP Lanes 2039+63 – 2105+73 (No. 1 & No. 2)	12'	12'	11'-12'
	6. WB I-10 Express Lanes 2135+77 – 2165+95	12'	N/A	11'-12'
	7. WB I-10 GP Lanes 2135+77 – 2165+95 (No. 1 & No. 2)	12'	12'	11'-12'
	8. WB I-10 Express Lanes 2206+09 – 2243+14	12'	N/A	11'-12'
	9. WB I-10 GP Lanes 2206+09 – 2243+14 (No. 1 & No. 2)	12'	12'	11'-12'
	10. WB I-10 Express Lanes 2281+07 – 2404+85	12'	N/A	11'-12'
	11. WB I-10 GP Lanes 2278+77 – 2406+00 (No. 1 & No. 2)	12'	12'	11'-12'
	12. WB I-10 Express Lane No. 1 2576+36 – 2626+84	12'	N/A	11'-12'
	13. WB I-10 Express Lane No. 1 2648+16 – 2735+74	12'	N/A	11'-12'
	14. WB I-10 GP Lanes 2633+31 – 2735+74 (No. 1 & No. 2)	12'	12'	11'-12'
	15. WB I-10 GP Lane No. 3 2685+93 – 2704+45	12'	12'	11'-12'
	16. EB I-10 Express Lanes 1526+00 – 1591+85	12'	N/A	11'-12'
	17. EB I-10 Express Lanes 1777+76 – 1952+65	12'	N/A	11'-12'
	18. EB I-10 GP Lanes 1813+59 – 1952+65 (No. 1 & No. 2)	12'	12'	11'-12'

HDM	Location and Description	HDM Standard	Existing	Proposed
	19. EB I-10 Express Lanes 2041+95 – 2068+64	12’	N/A	11’-12’
	20. EB I-10 GP Lanes 2039+63 – 2068+64 (No. 1 & No. 2)	12’	12’	11’-12’
	21. EB I-10 Express Lanes 2213+10 – 2272+77	12’	N/A	11’-12’
	22. EB I-10 GP Lanes 2213+10 – 2272+77 (No. 1 & No. 2)	12’	12’	11’-12’
	23. EB I-10 Express Lanes 2283+37 – 2420+85	12’	N/A	11’-12’
	24. EB I-10 GP Lanes 2283+37 – 2420+85 (No. 1 & No. 2)	12’	12’	11’-12’
	25. EB I-10 Express Lane No. 1 2570+02 – 2587+65	12’	N/A	11’-12’
	26. EB I-10 Express Lane No. 1 2606+24 – 2625+33	12’	N/A	11’-12’
	27. EB I-10 Express Lane No. 1 2645+33 – 2706+72	12’	N/A	11’-12’
	28. EB I-10 GP Lanes 2585+55 – 2733+44 (No. 1 & No. 2)	12’	12’	11’-12’
301.3(2)(b) Cross Slope[(2)]	1. WB & EB I-10 1526+00 – 2755+00	1.5% - 3%	1.5% & varies	3%
302.1 & 309.1(3)(a) Shoulder Width[(2)] & Horizontal Clearance	1. WB I-10 1527+80 – 1597+30 – Med Shld	10’	8’-28’	4’-10’
	2. WB I-10 1730+71 – 1746+71 – Med Shld @ Bi-CHP	10’	18’	2’-10’
	3. WB I-10 1861+37 – 1875+45 – Med Shld	10’	4’-8’	8’-10’
	4. WB I-10 1875+45 – 1898+70 – Med Shld @ Uni-CHP (EB)	10’	8’-9’	2’-8’
	5. WB I-10 1898+70 – 1940+65 – Med Shld	10’	9’-10’	8’
	6. WB I-10 1958+26 – 1963+34 – Med Shld @ Uni-CHP (WB)	10’	10’	2’-10’
	7. WB I-10 2001+41 – 2021+99 – Med Shld @ Uni-CHP (EB)	10’	9’-10’	2’-10’
	8. WB I-10 2044+26 – 2062+29 – Med Shld	10’	4’-8’	4’-10’
	9. WB I-10 2062+29 – 2073+96 – Med Shld	10’	4’-8’	8’-10’
	10. WB I-10 2088+39 – 2093+54 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’
	11. WB I-10 2206+09 – 2220+80 – Med Shld @ Bi-CHP	10’	8’	2’-8’
	12. WB I-10 2220+80 – 2243+14 – Med Shld	10’	8’	2.5’-10’
	13. WB I-10 2283+38 – 2331+29 – Med Shld	10’	6’-9’	4’-10’
	14. WB I-10 2341+53 – 2411+75 – Med Shld	10’	4’-18’	4’-10’
	15. WB I-10 2451+33 – 2467+33 – Med Shld @ Bi-CHP	10’	4’-6’	2’-10’
	16. WB I-10 2524+10 – 2542+33 – Med Shld @ Bi-CHP	10’	5’-17’	2’-4’
	17. WB I-10 2542+33 – 2556+54 – Med Shld	10’	17’	3’-10’
	18. WB I-10 2578+95 – 2635+58 – Med Shld	10’	17’-18’	4’-10’
	19. WB I-10 2635+58 – 2735+74 – Med Shld	10’	18’	8’-10’
	20. EB I-10 1527+80 – 1597+30 – Med Shld	10’	8’-24’	4’-10’
	21. EB I-10 1714+71 – 1730+71 – Med Shld @Bi-CHP	10’	18’	2’-10’
	22. EB I-10 1777+76 – 1829+60 – Med Shld	10’	10’-18’	4’-10’
	23. EB I-10 1829+60 – 1875+45 – Med Shld	10’	4’-8’	8’
	24. EB I-10 1875+45 – 1881+67 – Med Shld @ Uni-CHP (EB)	10’	10’-11’	2’-8’
	25. EB I-10 1897+55 – 1943+50 – Med Shld	10’	8’-10’	8’-10’
	26. EB I-10 1943+50 – 1963+34 – Med Shld @ Uni-CHP (WB)	10’	9’-10’	2’-10’
	27. EB I-10 2001+41 – 2006+56 – Med Shld @ Uni-CHP (EB)	10’	10’	2’-10’
	28. EB I-10 2044+26 – 2069+19 – Med Shld	10’	9’-10’	4’-10’
	29. EB I-10 2072+96 – 2093+54 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’
	30. EB I-10 2191+94 – 2206+09 – Med Shld @ Bi-CHP	10’	8’-9’	2’-10’
	31. EB I-10 2220+00 – 2236+15 – Med Shld	10’	8’	2.5’-10’
	32. EB I-10 2236+15 – 2267+64 – Med Shld	10’	8’-10’	8’-10’
	33. EB I-10 2283+38 – 2304+31 – Med Shld	10’	8’	8’-10’
	34. EB I-10 2304+31 – 2420+85 – Med Shld	10’	8’-16’	4’-10’
	35. EB I-10 2435+33 – 2451+33 – Med Shld @ Bi-CHP	10’	5’-8’	2’-10’
	36. EB I-10 2511+11 – 2524+10 – Med Shld @ Bi-CHP	10’	5’-6’	2’-10’
	37. EB I-10 2541+65 – 2555+44 – Med Shld	10’	17’	5’-10’
	38. EB I-10 2608+84 – 2733+44 – Med Shld	10’	17’-18’	4’-10’
	39. WB I-10 2226+13 – 2230+31 – Outside Shld @ Mt. Vernon	10’	8.5’-10’	8’-10’

HDM	Location and Description	HDM Standard	Existing	Proposed
	40. EB I-10 2227+34 – 2229+30 – Outside Shld @ Mt. Vernon	10’	10’	8’-10’
	41. WB I-10 2312+62 – 2314+61 – Right Shld	10’	10’	4’-10’
	42. N15-E10 41+24 – 41+74 – Right Shld(3)	10’	5’	5’-10’
	43. S15-E10 6+05 – 7+30 – Right Shld(3)	10’	5’	5’-10’
	44. W10-S15 34+50 – 35+82 – Right Shld	10’	6.6’-10’	6.6’-10’
	45. N215-W10 25+82 – 25+92 – Left Shld(3)	5’	4’	4’-5’
	46. WT-R2 28+80 – 29+00 – Left Shld(3)	4’	2’	2’-4’
	47. WT-R2 28+80 – 29+20 – Right Shld(3)	8’	4’	4’-8’
	48. WB/EB I-10 1526+00 – 1527+80 – Med Shld @15/10 OC	10’	7.5’-10’	3.5’-8’
	49. WB/EB I-10 1586+53 – 1589+03 – Med Shld @ Etiwanda OC	10’	23’/24’	1.5’-2.5’/ 2’-2.5’(4)
	50. WB/EB I-10 1693+79 – 1696+48 – Med Shld @ Cherry OC	10’	2’-5’	8’-10’(4)
	51. WB/EB I-10 1800+90 – 1803+40 – Med Shld @ Citrus OC	10’	10’-13’	8’-10’/2’-10’
	52. WB/EB I-10 1829+16 – 1831+46 – Med Shld @ Cypress OC	10’	16’-18’/ 13’-17’	8.5’-10’/ 4’-10’
	53. WB/EB I-10 1855+00 – 1858+30 – Med Shld @ Sierra OC	10’	2.75’-4.5’	8’-10’/5’-10’
	54. WB/EB I-10 1975+58 – 1978+25 – Med Shld @ Cedar OC	10’	11’-13’/ 12’-18’	7.25’-10’
	55. WB/EB I-10 2053+89 – 2056+04 – Med Shld @ Riverside OC	10’	2.5’-5’/1.5’-5’	3’-4’(4)
	56. WB/EB I-10 2106+15 – 2108+05 – Med Shld @ Pepper OC	10’	18’-24’	8.25’-10’
	57. WB/EB I-10 2133+42 – 2134+97 – Med Shld @ Slover Mt UP	10’	11’-14’	7.5’-10’(4)
	58. WB/EB I-10 2159+00 – 2160+92 – Med Shld @ Rancho Ave OC	10’	12’-16’	9’-10’(4)
	59. WB/EB I-10 2227+36 – 2228+57 – Med Shld @ Mt Vernon Ave OC	10’	12’/13’-15’	2’-2.5’(4)
	60. WB/EB I-10 2275+96 – 2284+77 – Med Shld @ 215/10 Sep	10’	14’-24’/ 15’-28’	2’-10’/3’-10’
	61. WB/EB I-10 2414+39 – 2416+08 – Med Shld @ Richardson St OC	10’	3’-5’	7.5’-10’/ 3.5’-10’
	62. WB/EB I-10 2546+70 – 2548+57 – Med Shld @ Alabama St OC	10’	13’-16’/ 13’-17’	2’-3’/ 3.75’-5’(4)
	63. WB/EB I-10 2565+83 – 2567+41 – Med Shld @ E10-W210 OC	10’	13’-16’/ 14’-17’	7.3’-12’/ 5.5’-10’
	64. EB I-10 2571+86 – 2575+40 – Med Shld @ E210-E10/Tennessee OC	10’	12’-15’/ 14’-17’	8.5’-12’/ 6.5’-10’(4) 11’-12’/ 8.5’-10’(4)
	65. La Cadena Dr WB on-ramp 21+61 – 22+85 – Right Shld	8’	6’-8’	6’-8’
	66. Sierra Ave EB on-ramp 21+64 – 29+70 – Right Shld	8’	4’-8’	4’-8’
	67. E10-W210 Connector 15+87 – 17+74 – Right Shld(3)	10’	5’	5’-10’
305.1(3)(a) Median Width	1. I-10 1526+00 – 1597+30 between I-15 and Etiwanda	22’	22’-72’	10’-22’
	2. I-10 1777+76 – 1829+60 I/E at Citrus (on curve)	22’	11’-28’	16’-22’
	3. I-10 1829+60 – 1880+05 near Sierra (on curve)	22’	11’-36’	20’-22’
	4. I-10 1894+10 – 1943+50 Sierra to Locust	22’	36’	18’-20’
	5. I-10 1943+50 – 1963+34 CHP west of Cedar	22’	36’	20’-22’
	6. I-10 2044+26 – 2092+90 near Riverside	22’	10’-36’	10’-22’
	7. I-10 2205+90 – 2256+96 East of 9th to Santa Ana River	22’	36’-40’	7’-22’
	8. I-10 2283+38 – 2327+10 near Redlands Blvd	22’	15’-46’	10’-22’
	9. I-10 2327+10 – 2344+65 curve at Waterman	22’	34’	10’-19’
	10. I-10 2344+65 – 2404+86 I/E at Tippecanoe	22’	34’	10’
	11. I-10 2404+86 – 2420+85 curve at Richardson	22’	15’	10’-22’
	12. I-10 2531+36 – 2556+54 at Alabama	22’	15’-36’	10’-22’
	13. I-10 2578+95 – 2606+24 Tennessee to Texas	22’	36’	18’-22’
	14. I-10 2606+24 – 2635+58 I/E at Orange/Rt 38	22’	36’	10’-14’
	15. I-10 2635+58 – 2735+74 curves at Church and Citrus/Cypress	22’	36’	14’-22’

HDM	Location and Description	HDM Standard	Existing	Proposed
309.2(1)(c) Vertical Clearance[(2)]	1. Sierra Ave OC	16'-6"	17'-5"	16'-2"
	2. Rancho Ave OC	16'-6"	16'-7"	16'-5"
	3. Mt. Vernon Ave OC	16'-6"	16'-1"	16'-1"
	4. Alabama St OC	16'-6"	16'-1"	16'-1"
	5. Eureka St UC	15'	14'-10"	14'-10"
	6. Ford St UC	15'	14'-7"	14'-7"
405.1(2)(b) Corner Sight Distance	1. Rancho WB off-ramp looking at NB Rancho (Lt & Rt turn)	360' (S)	167'(S)	167'(S)
	2. Rancho EB off-ramp looking at SB Rancho (Lt & Rt turn)	360'(S)	133'(S)	133'(S)
	3. Tippecanoe EB off-ramp looking at SB Tippecanoe (Lt & Rt turn)	360'(S)	130'(S)	113'(S)
	4. California WB off-ramp looking at NB California (Lt & Rt turn)	360'(S)	216'(S)	113'(S)
	5. California EB off-ramp looking at SB California (Lt & Rt turn)	360'(S)	184'(S)	124'(S)
	(S) - Signalized			
501.3 Interchange Spacing	1. I-10 between I-15 and Etiwanda	2 miles	1.19 miles	1.19 miles
	2. I-10 between Rancho and La Cadena/9th	1 mile	0.66 miles	0.66 miles
	3. I-10 between La Cadena/9th and Mt. Vernon	1 mile	0.54 miles	0.54 miles
	4. I-10 between La Cadena/9th and I-215	2 miles	1.53 miles	1.53 miles
	5. I-10 between Mt. Vernon and I-215	2 miles	0.99 miles	0.99 miles
	6. I-10 between I-215 and Waterman	2 miles	1.02 miles	1.02 miles
	7. I-10 between California and SR-210	2 miles	1.53 miles	1.53 miles
	8. I-10 between Alabama and Tennessee	1 mile	0.52 miles	0.52 miles
	9. I-10 between Alabama and SR-210	2 miles	0.52 miles	0.52 miles
	10. I-10 between SR-210 and Tennessee	2 miles	0 mile	0 mile
	11. I-10 between SR-210 and Eureka/Orange/6th	2 miles	0.83 miles	0.83 miles
	12. I-10 between Tennessee and Eureka/Orange/6th	1 mile	0.83 miles	0.83 miles
	13. I-10 between Eureka/Orange/6th and University/Cypress	1 mile	0.88 miles	0.88 miles
502.2 Isolated Off-Ramps/ Partial Interchanges	1. Valley EB off-ramp	Not used	Isolated off	Isolated off
	2. La Cadena WB on-ramp	Not used	Partial IC	Partial IC
	3. 9th WB off-ramp	Not used	Isolated off	Isolated off
	4. Sperry WB off-ramp	Not used	Isolated off	Isolated off
	5. E St/Sunwest Ln WB on-ramp	Not used	Partial IC	Partial IC
	6. Waterman WB on-ramp to I-215	Not used	Partial IC	Partial IC
504.2(2) Deceleration Length	1. Waterman Ave EB C-D Road off-ramp	270'	148.9'	217'
504.3(1)(b) Ramp Lane Width	1. N215-W10 Connector (160' R)	16'	12'	12'
504.7 Weaving Length	1. EB I-10 between S15-E10 and Etiwanda EB C-D Road off-ramp	5000'	2425'	2628'
	2. WB I-10 between W10-N/S15 and Etiwanda WB on-ramp	5000'	2536'	2625'
	3. WB I-10 between Rancho WB off-ramp and La Cadena WB on-ramp	2000'	1606'	1611'
	4. WB I-10 between 9th WB off-ramp and Mt. Vernon WB on-ramp	2000'	955'	968'
	5. EB I-10 between 9th EB on-ramp and Mt. Vernon EB off-ramp	2000'	1556'	1562'
	6. WB I-10 between Sperry WB off-ramp and S215-W10	5000'	2216'	1995'
	7. EB I-10 between Mt. Vernon EB on-ramp and E10-N/S215	5000'	1400'	1396'
	8. WB I-10 between W10-N/S215 and Carnegie WB on-ramp	5000'	2508'	2596'
	9. EB I-10 between S215-E10 and Redlands EB hook off-ramp	5000'	1461'	1400'
	10. EB I-10 between N215-E10 and Waterman EB C-D road off-ramp	5000'	3401'	3085'
	11. WB I-10 between W10-W210 and Orange WB on-ramp	5000'	2172'	2172'
	12. EB I-10 between E210-E10 and Eureka EB off-ramp	5000'	1613'	1695'

HDM	Location and Description	HDM Standard	Existing	Proposed
504.8 Access Control	1. Mt. Vernon WB on-ramp near Valley Blvd	50’	0’	0’
	2. Mountain View WB on-ramp near Driveway to Valero gas station	50’	0’	0’
	3. Ford EB off-ramp near Parkford Dr	50’	32’	16’
	4. Ford EB on-ramp opposite Oak St	50’	26’	15’
504.8 Access Rights Opposite Ramp Terminal	1. Sperry WB off-ramp – driveway opposite ramp	Obtain access rights opposite ramp terminal	driveway	driveway
	2. E/Sunwest WB on-ramp – Sunwest Ln opposite ramp		local road	local road
	3. Carnegie WB on-ramp & off-ramp – Carnegie Dr opposite ramp		local road	local road
	4. Ford WB on-ramp – Reservoir Rd opposite ramp		local road	local road
	5. Ford WB off-ramp/EB on-ramp - Redlands Blvd opposite ramp		local road	local road

(1) Not used.
(2) FHWA Controlling Criteria
(3) No Horizontal Clearance exception at this location since no obstruction, only shoulder width exception is requested.
(4) The proposed shoulder width/horizontal clearance at this location is based on the use of concrete barrier type 60R to maximize the shoulder width.

Table 5.19 Alternative 3 Mandatory (District Delegated) Design Exceptions – Contract 2

HDM	Location and Description	HDM Standard	Existing	Proposed
204.3 Maximum Grade*(2)*	1. WB & EB I-10 2231+37 – 2232+94	3%	3.64%	3.64%
	2. WB I-10 2299+12 – 2303+18	3%	3.56%	3.56%
	3. EB I-10 2299+98 – 2304+55	3%	3.21%	3.21%

Table 5.20 Alternative 3 Advisory Design Exceptions – Contract 2

HDM	Location and Description	HDM Standard	Existing	Proposed
201.7 Decision Sight Distance	1. WB I-10 at Rancho WB off-ramp	1105’ (70 mph)	992’ (60 mph)	609’ (40 mph)
	2. EB I-10 at 9th EB off-ramp	1105’ (70 mph)	712’ (47 mph)	641’ (42 mph)
	3. WB I-10 at W10-N/S215 Connector	1105’ (70 mph)	558’ (37 mph)	558’ (37 mph)
	4. WB I-10 at Cypress WB off-ramp	1105’ (70 mph)	965’ (59 mph)	965’ (59 mph)
202.5(1) & 202.5(2) Super-elevation Transition	The superelevation related standard per the December 2016 HDM will be addressed through a supplemental Fact Sheet. See the April 13, 2017 memo regarding approval of temporary exemption to meeting the December 2016 HDM superelevation related standards.			
202.6 Super-elevation of Compound Curves	The superelevation related standard per the December 2016 HDM will be addressed through a supplemental Fact Sheet. See the April 13, 2017 memo regarding approval of temporary exemption to meeting the December 2016 HDM superelevation related standards.			
203.5 Compound Curves	1. WB I-10 east of Etiwanda	Shorter R >= 2/3 longer R and/or larger R to follow smaller R	Single 5000’	8000’/4962’*(4)*
	2. EB I-10 at Pepper		Single 26000’	50000’/26000’*(4)*
	3. EB I-10 at Waterman		Single 3000’	20000’/3003’*(4)*
	4. WB I-10 east of Ford		7943’/3200’*(4)*	7943’/3200’*(4)*
	5. N15-E10 Connector		850’/3000’*(3)*	850’/3000’*(3)*
	6. Etiwanda EB off-ramp		20011’/2000’*(4)*	25082’/2000’*(4)*
	7. Etiwanda EB off-ramp		Single 6562’	20000’/5400’*(4)*
	8. Valley EB off-ramp		1265’/843’*(4)*	1265’/843’*(4)*
	9. Pepper EB off-ramp		Single 750’	49905’/1000’*(3)(4)*

HDM	Location and Description	HDM Standard	Existing	Proposed
	10. Mt. Vernon EB off-ramp		Single 2000'	4673'/2000'*(4)*
	11. Mt. Vernon EB on-ramp		300'/3000'*(3)*	300'/3000'*(3)*
	12. S215-W10 Connector		Single 850'	850'/800'*(4)*
	13. S215-W10 Connector		850'/3000'*(3)*	800'/3000'*(3)*
	14. N215-W10 Connector		Single 175'	175'/160'*(4)*
	15. N215-W10 Connector		175'/3000'*(3)*	160'/3000'*(3)*
	16. Sunwest WB on-ramp		175'/3000'*(3)*	150'/5425'*(3)*
	17. Tippecanoe WB loop on-ramp		331'/3000'*(3)*	315'/6500'*(3)*
	18. Tippecanoe WB loop on-ramp		Single 331'	331'/315'*(4)*
	19. Tippecanoe EB off-ramp		10066'/2000'*(4)*	10083'/2000'*(4)*
	20. Tennessee EB off-ramp		3000'/1000'*(3)(4)*	2927'/1000'*(3)(4)*
	21. Tennessee EB on-ramp		1000'/3000'*(3)*	850'/3000'*(3)*
203.6 Tangent Length Between Reversing Curves	The superelevation related standard per the December 2016 HDM will be addressed through a supplemental Fact Sheet. See the April 13, 2017 memo regarding approval of temporary exemption to meeting the December 2016 HDM superelevation related standards			
204.3 Minimum Grade	1. EB I-10 1541+20 – 1561+20	0.30%	0.12%	0.12%
	2. WB I-10 1541+20 – 1563+91	0.30%	0.12%	0.12%
	3. WB I-10 1568+86 – 1580+51	0.30%	0.14%	0.14%
	4. EB I-10 1570+15 – 1577+61	0.30%	0.06%	0.06%
	5. EB I-10 1577+61 – 1582+81	0.30%	0.00%	0.00%
	6. WB I-10 1586+59 – 1588+99	0.30%	0.16%	0.16%
	7. EB I-10 1633+35 – 1646+16	0.30%	0.00%	0.00%
	8. WB I-10 1633+55 – 1641+46	0.30%	0.12%	0.12%
	9. EB I-10 1647+82 – 1663+42	0.30%	0.04%	0.04%
	10. WB I-10 1641+46 – 1654+42	0.30%	0.00%	0.00%
	11. WB I-10 1654+42 – 1664+42	0.30%	0.13%	0.13%
	12. WB & EB I-10 1746+46 – 1758+46	0.30%	0.27%	0.27%
	13. WB & EB I-10 1822+85 – 1833+50	0.30%	0.28%	0.28%
	14. WB & EB I-10 1833+50 – 1840+10	0.30%	0.15%	0.15%
	15. WB & EB I-10 1847+57 – 1864+57	0.30%	0.17%	0.17%
	16. WB & EB I-10 1864+57 – 1874+57	0.30%	0.25%	0.25%
	17. WB & EB I-10 1874+57 – 1887+57	0.30%	0.15%	0.15%
	18. WB & EB I-10 1914+65 – 1936+55	0.30%	0.09%	0.09%
	19. WB & EB I-10 1936+55 – 1946+55	0.30%	0.12%	0.12%
	20. EB I-10 1946+55 – 1965+55	0.30%	0.19%	0.19%
	21. WB I-10 1946+55 – 1950+55	0.30%	0.24%	0.24%
	22. WB I-10 1954+55 – 1965+55	0.30%	0.19%	0.19%
	23. WB & EB I-10 1992+55 – 2037+55	0.30%	0.11%	0.11%
	24. WB I-10 2162+94 – 2172+14	0.30%	0.14%	0.14%
	25. EB I-10 2162+94 – 2171+19	0.30%	0.15%	0.15%
	26. EB I-10 2188+58 – 2201+99	0.30%	0.20%	0.20%
	27. WB I-10 2190+11 – 2193+48	0.30%	0.21%	0.21%
	28. WB I-10 2193+48 – 2202+01	0.30%	0.16%	0.16%
	29. WB I-10 2236+43 – 2254+93	0.30%	0.28%	0.28%
	30. WB & EB I-10 2268+21 – 2281+46	0.30%	0.12%	0.12%
	31. S15-E10 Connector 13+00 – 16+34	0.30%	0.14%	0.14%
	32. W10-S15 Connector 39+50 – 50+79	0.30%	0.00%	0.12%, 0.00%
	33. Sierra WB on-ramp 15+90 – 20+50	0.30%	0.14%	0.14%
	34. Cedar EB off-ramp 18+58 – 20+60	0.30%	0.11%	0.11%

HDM	Location and Description	HDM Standard	Existing	Proposed
	35. Waterman EB C-D Rd 27+15 – 30+31	0.30%	0.19%, 0.13%	0.19%, 0.13%
204.4 Vertical Curve Length	1. WB I-10 1608+53 – 1613+53 (sag)	700’	500’	500’
	2. EB I-10 1619+66 – 1624+66 (crest)	700’	500’	500’
	3. WB I-10 1628+00 – 1634+00 (sag)	700’	600’	600’
	4. WB & EB I-10 1959+05 – 1964+05 (crest)	700’	500’	500’
	5. WB & EB I-10 1969+05 – 1974+05 (sag)	700’	500’	500’
	6. WB I-10 2201+01 – 2206+01 (crest)	700’	500’	500’
	7. WB & EB I-10 2231+04 – 2236+04 (crest)	700’	500’	500’
	8. EB I-10 2294+54 – 2299+54 (sag)	700’	600’	600’
	9. WB I-10 2296+89 – 2299+89 (sag)	700’	300’	300’
	10. WB & EB I-10 2373+83 – 2377+83 (sag)	700’	400’	400’
	11. WB & EB I-10 2396+33 – 2400+33 (sag)	700’	400’	400’
	12. WB & EB I-10 2434+58 – 2440+58 (crest)	700’	600’	600’
	13. WB & EB I-10 2475+08 – 2480+08 (sag)	700’	500’	500’
	14. Pepper Ave EB off-ramp 17+05 – 20+55 (sag)	500’	350’	350’
208.3 Bridge Median	1. Valley Blvd EB off-ramp Lt & Rt Bridges	Decked when less than 36’	Open (70’)	Open (25’)
	2. Etiwanda-San Sevaine Wash Lt & Rt Bridges		Open (50’)	Open (27’)
	3. Colton OH Lt & Rt Bridges		Open (30’)	Open (27’-30’)
	4. Santa Ana River Lt & Rt Bridges		Open (38’)	Open (20’-25’)
305.1(1)(a) Median Width	1. I-10 1597+31 – 1777+76 Etiwanda to Citrus	36’	13’-72’	22’-29’
	2. I-10 1880+05 – 1894+10 East of Sierra	36’	36’-38’	22’
	3. I-10 1963+34 – 2044+26 Cedar to Rialto Chnl	36’	23’-38’	22’
	4. I-10 2092+90 – 2206+09 Pepper to 9th	36’	33’-58’	22’-30’
	5. I-10 2256+96 – 2283+38 Santa Ana River	36’	36’-46’	22’-25’
	6. I-10 2420+85 – 2531+39 Richardson to Alabama	36’	12’-14’	22’
	7. I-10 2556+54 – 2578+95 Tennessee St	36’	34’-36’	22’-24’
	8. I-10 2735+74 – 2774+99 Ford St	36’	29’-36’	22’-34’
309.5(1) Vertical Clearance	1. West Redlands OH	23’-4”	23’-2”	23’-2”
310.2 Outer Separation	1. WB I-10 1557+00 – 1563+10 (near Valley)	26’	41’	20’-26’
	2. WB I-10 2122+25 – 2150+00 (between Pepper and Rancho)	26’	39’-45’	18’-26’
	3. WB I-10 2162+10 – 2162+70 (near Rancho)	26’	41’	14’-26’
	4. WB I-10 2165+52 – 2165+65 (near Rancho)	26’	40’	25’
	5. WB I-10 2170+36 – 2180+50 (near Rancho)	26’	17’-26’	14’-26’
	6. WB I-10 2235+92 – 2239+10 (near Mt. Vernon)	26’	16’-26’	14’-26’
	7. EB I-10 2301+05 – 2304+45 (near Waterman)	26’	23’-26’	13’-26’
	8. EB I-10 2538+85 – 2540+15 (near Alabama)	26’	40’-55’	23’-26’
403.3 Angle of Intersection	1. Rancho WB off-ramp	75° min	67°53’24”	67°53’24”
	2. Ford WB on-ramp	75° min	65°25’32”	65°25’32”
405.1(2)(b) Corner Sight Distance	1. Sperry WB off-ramp looking at EB Valley	275’	195’	195’
504.2(2) Freeway Entrances & Exits	1. Etiwanda EB off-ramp	DL = 420’	DL = 372’	DL = 334’
	2. Cherry EB off-ramp	4°52’08”	4°52’08”	3°29’08”
	3. Cherry EB on-ramp	6’ @ 300’	8.2’ @ 300’	8.7’ @ 300’
	4. Citrus WB loop on-ramp	14’ @ 467.11’	14’ @ 486’	14’ @ 501’
	5. Citrus EB on-ramp	14’ @ 467.11’	14’ @ 473’	14’ @ 557’

HDM	Location and Description	HDM Standard	Existing	Proposed
	6. Sierra EB on-ramp	14’ @ 467.11’	14’ @ 490’	14’ @ 559’
	7. Riverside WB on-ramp	14’ @ 461.11’	14’ @ 520’	14’ @ 522’
	8. Rancho WB on-ramp	14’ @ 461.11’	14’ @ 475’	14’ @ 476’
	9. La Cadena WB on-ramp	14’ @ 467.11’	14’ @ 393’	14’ @ 400’
	10. E10-N/S215 Connector	20’ @ 400’	31’ @ 360’	26’ @ 346’
	11. N215-E10 Connector	6’ @ 300’	5.6’ @ 300’	9’ @ 300’
	12. S215-E10 Connector	6’ @ 300’	6.47’ @ 300’	8.65’ @ 300’
	13. E/Sunwest WB on-ramp	14’ @ 467.11’	14’ @ 501’	14’ @ 614’
	14. Carnegie WB hook on-ramp	14’ @ 467.11’	14’ @ 427’	14’ @ 597’
	15. Waterman EB C-D road off-ramp	4°52’08”	4°05’31”	3°44’14”
	16. Waterman EB C-D road on-ramp	14’ @ 467.11’	14’ @ 284’	14’ @ 516’
	17. Tippecanoe WB loop on-ramp	14’ @ 467.11’	14’ @ 694’	14’ @ 590’
	18. E210-E10 Connector	14’ @ 467.11’	14’ @ 190’	14’ @ 357’
	19. Ford EB on-ramp	6’ @ 300’	6’ @ 300’	9.25’ @ 300’
504.3(1)(d) Ramp Lane Drops	1. Tennessee EB on-ramp	Lane drop tapers should not extend beyond the 6’point	257’ beyond 6’ point	93’ beyond 6’ point
504.3(2)(c) Auxiliary Lane Beyond Ramp Conver-gence Point	1. Etiwanda WB on-ramp (370/610 vph)	300’	0’	0’
	2. Citrus WB loop on-ramp (570/430 vph)	300’	0’	0’
	3. Cedar EB on-ramp (840/1040 vph)	300’	0’	0’
	4. Pepper EB on-ramp (930/830 vph)	300’	0’	0’
	5. Rancho EB on-ramp (570/750 vph)	300’	0’	0’
	6. Mt. Vernon EB on-ramp (360/680 vph)	300’	0’	0’
	7. E/Sunwest WB on-ramp (270/900 vph)	300’	0’	0’
	8. Tippecanoe WB loop on-ramp (390/780 vph)	300’	0’	0’
	9. Tennessee EB on-ramp (380/1240 vph)	300’	0’	0’
504.3(3) Crossroad Grade at Ramp Terminal	1. Rancho WB on-ramp	4%	6.5%	6.5%
	2. Rancho WB off-ramp	4%	6.5%	6.5%
504.3(5) Single-Lane Ramps	1. 9th EB off-ramp	1000’ max w/o passing lane	818’ single lane	1006’ single lane
	2. Mt. Vernon EB off-ramp		1330’ single lane	1312’ single lane
	3. Waterman WB on-ramp		2383’ single lane	2110’ single lane
504.3(6) Two-Lane Exit Ramps	1. Waterman EB C-D Road off-ramp (1650/1080 vph)	Provide for 2-lane exit & 1300’ aux lane	1-lane exit and no provision for second ramp lane and aux lane	1-lane exit and no provision for second ramp lane and aux lane
504.3(9) Successive On-Ramps	1. Tennessee EB on-ramp and E210-E10 merge	1000’	1020’	948’
504.4(5) Single-lane Connections	1. W10-N15 Connector	L>1000’, add a passing lane	L=2350’, single lane	L=2365’, single-lane
	2. N215-W10 loop Connector		L=1870’, single lane	L=1835’, single-lane

HDM	Location and Description	HDM Standard	Existing	Proposed
504.4(6) Branch Connection Merge/ Diverge	1. S215-W10 Connector (merge)	2-lane at merge & 2500' aux beyond lane drop	2-lane before merge & 1696' aux	1-lane at merge & 1696' aux
	2. N215-E10 Connector (merge)	2-lane at merge & 2500' aux beyond lane drop	2-lane beyond merge & 2560' aux	2-lane near merge & 2500' aux
	3. S215-E10 Connector (merge)	2-lane at merge & 2500' aux beyond lane drop	2-lane beyond merge & 525' aux	2-lane at merge & 1158' aux
	4. E10-N/S215 Connector (diverge – Case 2)	2-lane exit & 4000'/2500' aux	2-lane exit & 2170' aux	2-lane exit & 2110' aux
	5. W10-N/S215 Connector (diverge – Case 2)	2-lane exit & 4000'/2500' aux	2-lane exit & 2050'aux	2-lane exit & 2063' aux
	6. E210-E10 Connector (merge)	2-lane at merge & 2500' aux beyond lane drop	2-lane beyond merge & 1628' aux	1-lane at merge & 2876' aux
504.8 Access Control	1. Rancho WB on-ramp near Valley	100'	70'	70'

(1)Not used
(2)Curve radii are shown in the direction of travel
(3)Shorter radius is not at least two-thirds of longer radius when shorter radius is 1,000 feet or less
(4)On one-way roads, the larger radius does not follow the smaller radius
DL = deceleration length

Several design exception features have been discussed with Caltrans throughout the course of the study and are documented in the project's Decision Documents (see **Attachment N**), as listed below:

- DD A-3 regarding the use of 3% cross slope on outside widening to facilitate drainage runoff
- DD A-4 regarding reduced median shoulder width to accommodate CHP areas
- DD A-7 regarding vertical clearance at UC structures
- DD A-8 regarding reduced cross sections along the project corridor
- DD B-1 regarding reduced cross sections between Orange Street and Ford Street

In addition, a number of overhead signs and toll gantries will be placed along the I-10 median, resulting in a reduction of the median shoulder widths at spot locations. Similarly, crash cushions and various safety devices may be placed along the freeway corridor, which may reduce the shoulder width to less than the standard width. Specific locations will be identified during the final design, and thus, a request for design exceptions for these features would be deferred until the final design phase.

Side slopes will be made 4:1 or flatter or retaining walls will be considered to achieve standard side slopes, where practical. However, the use of 2:1 or flatter embankment (fill) slopes in lieu of the standard 4:1 may be necessary in various embankment areas along the I-10 corridor including the interchange ramps and arterials, where right of way is limited. A design exception will be needed during the final design once locations of the nonstandard embankment slopes are identified.

5A.4. Project Features

5.A.4.1 Interim Features

There are no interim features proposed in this project.

5.A.4.2 High Occupancy Vehicle (Bus and Carpool Lanes)

Mainline

The project will add one or two lanes in each direction of I-10 to provide 2 Express Lanes in each direction from the LA/SBd County Line to California Street and 1 Express Lane in each direction from California Street to Ford Street. These Express Lanes, which include existing HOV lanes between the LA/SBd County Line and Haven Avenue, will be managed as tolled Express Lanes 24 hours a day, 365 days a year, and available as a travel choice by both SOVs and HOVs. Under the preliminary operating policy presented in the *I-10 and I-15 Express Lanes Preliminary Concept of Operations Report*, the Express Lanes are anticipated to provide free travel for HOV 3+ in the segment west of Haven Avenue and either toll-free or at discounted rates east of Haven Avenue. Motorcycles will be permitted in the Express Lanes and are not required to have a transponder. Emergency response vehicles and other exempted vehicles registered with SBCTA will be permitted free travel in the Express Lanes. SBCTA intends to provide a discount to CAVs (hybrids, electric vehicles, and vehicles using other sources of alternative fuel) if the current State law allowing CAVs free or discounted travel in Express Lane facilities (set to expire in 2019) is extended.

The Express Lanes will be buffer-separated from the general purpose lanes by striping in combination with channelizers for the majority of the corridor and will have 10 intermediate ingress/egress access points. Transition areas will also be provided at each end of the I-10 Corridor Project to accommodate the Express Lane transition into and out of the existing HOV lanes in Los Angeles County and into and out of the existing general purpose lane east of Ford Street.

Ramps

Table 5.21 provides a summary of the existing and proposed locations of the HOV preferential lane at on-ramps along the project corridor. In most cases, the existing HOV preferential lanes are retained. However, in some cases, the HOV preferential ramp lanes are proposed for conversion to general purpose lanes in order to provide needed ramp meter queue storage. New HOV preferential lanes are also proposed at some ramp locations where geometrically feasible and right of way is available.

The Caltrans ramp metering policy per Deputy Directive (DD) 35-R1 and the April 2016 Ramp Metering Design Manual requires that an HOV preferential lane be provided at every ramp meter location. As discussed and documented in Decision Document A-11 (see **Attachment N**), deviation from the ramp metering policy has been formally documented in a Fact Sheet for exceptions to the ramp metering policy.

Table 5.21 Existing and Proposed HOV Preferential Lane at Interchange On-Ramps

No.	Interchange Ramps	HOV Preferential Lane	
		Existing & Future No Build	Alternative 3
Eastbound Ramps			
1	Monte Vista Ave/Palo Verde St EB On-Ramp		
2	Central Ave EB On-Ramp		
3	Mountain Ave EB On-Ramp		
4	Euclid Ave EB On-Ramp		
5	4th St EB On-Ramp	x	x
6	Vineyard Ave EB On-Ramp	x	
7	Holt Blvd EB On-Ramp	x	x
8	Archibald Ave EB On-Ramp		
9	Haven Ave EB Loop On-Ramp	x	x
10	Haven Ave EB On-Ramp	x	x
11	Milliken Ave EB Loop On-Ramp		
12	Etiwanda Ave EB On-Ramp	x	x
13	Etiwanda Ave EB Loop On-Ramp	x	x
14	Etiwanda Ave EB On-Ramp (C-D road)		
15	Cherry Ave EB On-Ramp		
16	Citrus Ave EB On-Ramp		
17	Sierra Ave EB On-Ramp		
18	Cedar Ave EB On-Ramp	x	x
19	Riverside Ave EB On-Ramp	x	x
20	Pepper Ave EB On-Ramp		x
21	Rancho Ave EB On-Ramp		
22	9th St EB On-Ramp		x
23	Mt. Vernon Ave EB On-Ramp		
24	Waterman Ave EB On-Ramp		
25	Waterman Ave EB Loop On-Ramp		
26	Waterman Ave EB On-Ramp (C-D road)		
27	Tippecanoe Ave EB On-Ramp		x
28	Mountain View Ave EB On-Ramp		x
29	California St EB On-Ramp		x
30	Tennessee St EB On-Ramp		
31	Sixth St EB On-Ramp		
32	Cypress Ave EB On-Ramp		
33	Ford St EB On-Ramp		x
Westbound Ramps			
1	Monte Vista Ave WB On-Ramp	x	
2	Central Ave WB On-Ramp		
3	Mountain Ave WB On-Ramp		
4	Euclid Ave WB On-Ramp		
5	Euclid Ave WB Loop On-Ramp		x

No.	Interchange Ramps	HOV Preferential Lane	
		Existing & Future No Build	Alternative 3
6	4th St WB On-Ramp	x	x
7	Vineyard Ave WB On-Ramp		
8	Vineyard Ave WB Loop On-Ramp		x
9	Archibald Ave WB On-Ramp	x	x
10	Haven Ave WB On-Ramp	x	x
11	Haven Ave WB Loop On-Ramp	x	x
12	Milliken Ave WB On-Ramp	x	x
13	Etiwanda Ave WB On-Ramp	x	x
14	Etiwanda Ave WB Loop On-Ramp	x	x
15	Valley Blvd WB on-ramp	x	x
16	Cherry WB On-Ramp	x	x
17	Cherry WB Loop On-Ramp	x	x
18	Citrus WB On-Ramp	x	x
19	Citrus Ave WB Loop On-Ramp	x	x
20	Sierra Ave WB On-Ramp	x	x
21	Cedar Ave WB On-Ramp	x	x
22	Riverside Ave WB On-Ramp	x	x
23	Pepper Ave WB On-Ramp	x	x
24	Rancho Ave WB On-Ramp	x	x
25	La Cadena Dr WB On-Ramp		
26	Mt. Vernon Ave WB On-Ramp	x	x
27	E St/Sunwest Ln WB On-Ramp		
28	Waterman Ave WB On-Ramp to W10-N/S215		
29	Hospitality Ln/Carnegie Dr WB On-Ramp		x
30	Tippecanoe Ave WB On-Ramp		
31	Tippecanoe Ave WB Loop On-Ramp		
32	Mountain View Ave WB On-Ramp		x
33	California St WB On-Ramp		x
34	Alabama St WB On-Ramp		
35	Orange St WB On-Ramp		
36	Orange St WB Loop On-Ramp		
37	University St WB On-Ramp		
38	Ford St WB On-Ramp		x

5.A.4.3 Ramp Metering

The Caltrans ramp metering policy per the DD 35-R1 requires that provisions for ramp metering be included in any project that proposes additional capacity, modification of an existing interchange, or construction of a new interchange, within the freeway corridors identified in the *Ramp Meter Development Plan (RMDP)*, regardless of funding source. In addition, Caltrans District 8 has additional criteria to consider ramp metering on all on-ramps for capacity improvement projects, including freeway-to-freeway connectors and on-ramps on or leading to collector-distributor (C-D) roads.

Most interchange on-ramps along the I-10 corridor are currently metered. Existing ramp meters impacted by the proposed project improvements will be replaced. Existing ramp meters and equipment will be reused, where possible. In addition, as documented in Decision Document A-10 (**Attachment N**), a new ramp meter will be added at all interchanges that are currently unmetered except for the following locations:

- Three (3) local interchange on-ramps that are on or connect to a C-D road (Etiwanda Avenue EB C-D Road on-ramp, Waterman Avenue EB on-ramp, and Waterman Avenue EB loop on-ramp) and
- Ten (10) freeway-to-freeway connectors (I-10/I-15, I-10/I-215, and I-10/SR-210) that merge onto I-10.

5.A.4.4 California Highway Patrol (CHP) Enforcement Areas

Mainline

Currently, there are two existing bi-directional CHP enforcement areas along I-10 within the project limits. These CHP enforcement areas are in the median of the freeway at the following general locations:

- Between Mountain Avenue and Euclid Avenue in Ontario (Station 1126+72 to 1142+72)
- Between Grove Avenue and Fourth Street in Ontario (Station 1263+56 to 1290+12)

A total of 17 CHP enforcement/observation areas are proposed, 8 in the eastbound direction and 9 in the westbound direction as listed below. These CHP areas are typically located between two Express Lane access zones along tangent sections where adequate sight distance is provided. The proposed CHP locations were identified jointly by Caltrans and the CHP, Inland Division in February 2013, September 2013, and September 2015. The proposed CHP locations are:

1. EB between Mountain Avenue and Euclid Avenue
2. EB between Vineyard Avenue and Archibald Avenue
3. EB between Cherry and Citrus Avenue
4. EB between Sierra Avenue and Cedar Avenue
5. EB between Cedar Avenue and Riverside Avenue
6. EB between 9th Street and Mt. Vernon Avenue
7. EB between Mountain View Avenue and California Street
8. EB between California Street and Alabama Street
9. WB between Central Avenue and Mountain Avenue
10. WB between Mountain Avenue and Euclid Avenue

11. WB between Vineyard Avenue and Archibald Avenue
12. WB between Cherry Avenue and Citrus Avenue
13. WB between Sierra Avenue and Cedar Avenue
14. WB between Riverside Avenue and Pepper Avenue
15. WB between La Cadena Drive and Mt. Vernon Avenue
16. WB near Mountain View Avenue interchange
17. WB between California Street and Alabama Street

Ramps

There are existing CHP enforcement areas on approximately half of the existing interchange on-ramps along the project corridor. Within the limits of the proposed I-10 improvements, a CHP enforcement area is proposed at entrance ramps where there is available room within the existing or proposed right of way to accommodate the enforcement area pavement. **Table 5.22** presents a summary of existing and proposed CHP enforcement areas on interchange on-ramps along the project corridor.

Table 5.22 Existing and Proposed CHP Enforcement Areas at Interchange On-Ramps

No.	Interchange Ramps	CHP Enforcement Area	
		Existing & Future No Build	Alternative 3
Eastbound Ramps			
1	Monte Vista Ave/Palo Verde St EB On-Ramp		x
2	Central Ave EB On-Ramp		
3	Mountain Ave EB On-Ramp		
4	Euclid Ave EB On-Ramp		x
5	4th St EB On-Ramp		
6	Vineyard Ave EB On-Ramp	x	x
7	Holt Blvd EB On-Ramp	x	x
8	Archibald Ave EB On-Ramp	x	x
9	Haven Ave EB Loop On-Ramp	x	x
10	Haven Ave EB On-Ramp	x	x
11	Milliken Ave EB Loop On-Ramp	x	x
12	Etiwanda Ave EB On-Ramp	x	x
13	Etiwanda Ave EB Loop On-Ramp	x	x
14	Etiwanda Ave EB On-Ramp (C-D road)		
15	Cherry Ave EB On-Ramp	x	x
16	Citrus Ave EB On-Ramp	x	x
17	Sierra Ave EB On-Ramp		
18	Cedar Ave EB On-Ramp	x	x
19	Riverside Ave EB On-Ramp	x	
20	Pepper Ave EB On-Ramp	x	x
21	Rancho Ave EB On-Ramp		
22	9th St EB On-Ramp		x
23	Mt. Vernon Ave EB On-Ramp	x	x
24	Waterman Ave EB On-Ramp		

No.	Interchange Ramps	CHP Enforcement Area	
		Existing & Future No Build	Alternative 3
25	Waterman Ave EB On-Ramp (C-D road)		x
26	Waterman Ave EB Loop On-Ramp		
27	Tippecanoe Ave EB On-Ramp		x
28	Mountain View Ave EB On-Ramp		x
29	California St EB On-Ramp		x
30	Tennessee St EB On-Ramp		x
31	Sixth St EB On-Ramp		
32	Cypress Ave EB On-Ramp		
33	Redlands Ave EB On-Ramp		
Westbound Ramps			
1	Monte Vista Ave WB On-Ramp	x	x
2	Central Ave WB On-Ramp	x	
3	Mountain Ave WB On-Ramp	x	x
4	Euclid Ave WB On-Ramp		x
5	Euclid Ave WB Loop On-Ramp		x
6	4th St WB On-Ramp		
7	Vineyard Ave WB On-Ramp		x
8	Vineyard Ave WB Loop On-Ramp		x
9	Archibald Ave WB On-Ramp	x	x
10	Haven Ave WB On-Ramp	x	x
11	Haven Ave WB Loop On-Ramp	x	x
12	Milliken Ave WB On-Ramp	x	x
13	Etiwanda Ave WB On-Ramp	x	x
14	Etiwanda Ave WB Loop On-Ramp	x	x
15	Cherry Ave WB On-Ramp	x	x
16	Cherry Ave WB Loop On-Ramp	x	x
17	Citrus Ave WB On-Ramp	x	x
18	Citrus Ave WB Loop On-Ramp	x	x
19	Sierra Ave WB On-Ramp	x	x
20	Cedar Ave WB On-Ramp	x	
21	Riverside Ave WB On-Ramp	x	x
22	Pepper Ave WB On-Ramp	x	x
23	Rancho Ave WB On-Ramp	x	x
24	La Cadena Dr WB On-Ramp		
25	Mt. Vernon Ave WB On-Ramp	x	
26	E St/Sunwest Ln WB On-Ramp		
27	Waterman Ave WB On-Ramp to W10-N/S215		
28	Hospitality Ln/Carnegie Dr WB On-Ramp		x
29	Tippecanoe Ave WB On-Ramp		x
30	Tippecanoe Ave WB Loop On-Ramp	x	x

No.	Interchange Ramps	CHP Enforcement Area	
		Existing & Future No Build	Alternative 3
31	Mountain View Ave WB On-Ramp	x	x
32	California St WB On-Ramp	x	x
33	Alabama St WB On-Ramp		x
34	Orange St WB On-Ramp		
35	Orange St WB Loop On-Ramp		
36	University St WB On-Ramp		
37	Ford St WB On-Ramp		x

5.A.4.5 Park-and-Ride Facilities

No additional park-and-ride facilities are proposed as part of this project. Caltrans District 8 Park & Ride Coordinator and SBCTA have been consulted relating to park-and-ride facilities. At this time, there are no plans to add additional park-and-ride facilities along the I-10 corridor. There are three existing park-and-ride lots in vicinity of the I-10 corridor between the LA/SBd County Line and Ford Street as listed below:

- Montclair Transportation Center, 5091 Richton Street in Montclair
- Bloomington Facility, 10175 Cedar Avenue in Bloomington
- San Bernardino Express Redlands Parking Facility, 10554 Anderson Street in Loma Linda

These park-and-ride lots are part of SBCTA's mobility program that promotes public transit and carpooling/van pooling throughout San Bernardino County. Caltrans and SBCTA will continue to work together to identify the need for park-and-ride lots for the future. No improvements to the existing parking lots are proposed as part of this project.

5.A.4.6 Utility and Other Owner Involvement

Approximately 907 utilities exist within the project area (482 in Contract 1 and 425 in Contract 2), including overhead and underground electrical, natural gas, oil and gasoline pipelines, liquid Oxygen lines, hydrogen gas lines, nitrogen gas lines, telephone and communication, cable TV, water, and sewer.

Approximately 281 utilities (152 in Contract 1 and 129 in Contract 2) have the potential to be impacted, including cable TV, fiber optic, gas, gasoline, petroleum, power/electrical, power transformer, sewer, telephone, water, and wastewater, facilities. Approximately 117 of these potentially impacted utilities (11 in Contract 1 and 106 in Contract 2) would require minor to moderate work, such as extending the utility, constructing a structure or encasement around the utility, pouring a slurry mixture over the utility or requiring a hand digging method when performing excavation around the utility. The remaining 164 utilities (141 in Contract 1 and 23 in Contract 2) are anticipated to require removal or relocation due to conflict with the proposed project improvements. Several utilities are located inside the OC structures to be replaced. Installation of temporary structures may be necessary to support these utilities during the bridge replacement.

Notable utility involvement includes proposed relocation of two existing transmission towers outside of the I-10 median east of Etiwanda Avenue and a potential impact to a large water pipeline west of Monte Vista Avenue. Both facilities are discussed in more detail in the following paragraphs.

Detailed analysis of these utilities including survey and potholing of high-risk utilities will be undertaken during the final design phase to determine the final dispositions and required actions. The estimated cost for relocation or modification of various affected utilities by the proposed improvements is $36 million (or $43 million escalated for future expenditure years). The Utility Information Sheet and cost estimate are attached to the Right of Way Data Sheet, included in this document as **Attachment K**.

Southern California Edison (SCE) Tower Relocation

Two bulk transmission lines, owned by SCE, currently cross I-10 east of Etiwanda Avenue with lattice steel towers situated in the I-10 median area. It is proposed to relocate the SCE towers from the existing I-10 median to proposed locations outside the State right of way, as discussed below:

Westerly Line (No. 1 Etiwanda-San Bernardino)

The No. 1 Etiwanda-San Bernardino transmission line crosses I-10 approximately 285 feet east of Etiwanda Avenue. This facility is a single-circuit 220 kV transmission line with 3 conductors. The support structures in the immediate vicinity of I-10 consist of a lattice steel tower (M13-T4) in the I-10 median, a lattice steel tower approximately 470 feet north of the State right of way, and two lattice steel towers south of I-10 (one just outside the State right of way and another approximately 300 feet south of the State right of way). The existing structures range from approximately 55 to 100 feet in height.

Tower M13-T4 was installed in the I-10 median (previously Route 26) in 1952 under a Caltrans Encroachment Permit B88131 dated December 31, 1951 (after the freeway resolution in 1948 but prior to the freeway route adoption in 1958). However, SCE has prior rights from a 100-foot overhead transmission line easement recorded on September 4, 1940 prior to the I-10 freeway construction.

The proposed project would relocate Tower M13-T4 outside of the I-10 median. Removal of Tower M13-T4 requires rearrangement of 3 lattice steel towers and wire reinstallation of approximately 1,950 feet across I-10 and 790 feet along the UPRR property on the south side of I-10. The existing tower in the I-10 median would be removed and replaced with a new structure just north of the State right of way. Both towers on the south side would also be removed and replaced with new structures in the same proximity. The existing tower at 470 feet north of the State right of way would remain in place. It is anticipated that tubular steel poles will be used as new support structures for the westerly line. However, it may be determined during the final design that lattice steel towers or H-frame structures are preferred to accommodate reinstallation of the conductors in a horizontal configuration. The maximum span over the I-10 freeway is approximately 1,200 feet. The vertical height of the support structures is estimated to range from 120 to 200 feet.

Easterly Line (Etiwanda-Vista)

The Etiwanda Vista transmission line crosses I-10 approximately 470 feet east of Etiwanda Avenue. This facility is a double-circuit 220 kV transmission line with 6 conductors. The support structures in the immediate vicinity of I-10 consist of a lattice steel tower (M222-T1N or M1-T4) in the I-10 median, a lattice steel tower approximately 550 feet north of the State right of way, and another lattice

steel tower approximately 75 feet south of the State right of way. The existing structures range from approximately 120 to 150 feet in height.

Tower M1-T4 was installed in 1940 by an easement prior to the freeway resolution in 1948 and route adoption in 1958. This facility has prior rights under the Consent to Common Use Agreement (CCUA) 11748(1).

The proposed project would relocate Tower M1-T4 outside of the I-10 median. Removal of Tower M1-T4 requires rearrangement of 2 towers and approximately 1,465 feet of wire reinstallation across I-10. The existing tower in the I-10 median would be removed and replaced with a new structure just north of the State right of way. The tower south of the State right of way would also be removed and replaced with a new structure in the same proximity. The existing tower, 550 feet north of the State right of way, would remain in place. Tubular steel poles are anticipated to replace the two lattice towers on the easterly line. Reinstallation of the conductors in a vertical configuration is not foreseen as an issue at this location. The maximum span over the I-10 freeway is approximately 1,060 feet. The vertical height of the support structures is estimated to range from120 to 200 feet.

Construction of Both Transmission Lines

No new right of way or easement is anticipated to be required for the new structures. SCE owns parcels or has underlying easement along the entire path of the subject transmission lines and therefore, does not foresee any constraints for pole placement location.

There are four wireless communication facilities (owned by AT&T, Nextel, T-Mobile, and Sprint) on existing towers that would also be impacted. These existing cellular facilities cannot be attached to the tubular steel poles; and therefore, will need to be removed if tubular steel poles are used as the new support structures. A lead time of 18 months is required for the cellular site owners to remove their facilities before relocation of the towers.

Transfer of the conductors from existing towers to new support structures is not anticipated to result in any outage/service disruption because there is some redundancy in the power grid. However, the work should be staged for cooler weather to avoid potential impact to the power grid. If the relocation takes place during the summer months or during hot weather, line outages will require coordination with the SCE Grid Control Center (GCC). During hot weather, line outages can be granted and subsequently cancelled with short notice.

A lead time of 18 to 24 months from the date of the SCE's approved relocation design is typically required for fabrication of tubular steel poles.

Metropolitan Water District (MWD) Upper Feeder Pipeline

The I-10 freeway widening would cross over the existing 140-inch precast concrete water pipeline at three locations and will require work to protect the pipeline as part of the I-10 Corridor Project. The pipeline was installed circa 1940's before the I-10 became a freeway and is owned by the MWD. The Upper Feeder is part of the principal features of the MWD distribution system, which furnishes water from the Colorado River aqueduct in wholesale quantities to cities across the region for distribution by local municipal water departments, to augment local water supplies. This facility has prior rights under an easement and a Joint Use Agreement.

Location 1: MWD Crossing West of Monte Vista Avenue in Montclair

At its crossing under I-10 west of Monte Vista Avenue, the MWD Upper Feeder is a 140-inch diameter precast concrete pipe, which runs diagonally across I-10 in a northwest to southeast orientation (at approximately 28 degrees to the freeway centerline) before it turns and continues easterly between Palo Verde Street and the Monte Vista Avenue EB off-ramp. The facility is approximately 6 feet deep beneath the freeway, approximately 5 feet below grade where it crosses under the San Antonio Channel, and 5 to 25 feet below grade between Palo Verde Street and the Monte Vista Avenue EB off-ramp. The facility is protected by a concrete protection structure where it crosses under the freeway and encasement provides protection for shallower portions of the pipe not under freeway traffic load. The Upper Feeder design capacity is 750 cubic feet per second at this location.

Under the proposed project, the I-10 freeway will be widened and encroach onto the pipeline for about 1,200 feet. A proposed retaining wall and soundwall will be constructed along the EB freeway edge of shoulder, either on top or adjacent to the MWD facility. To address the conflict, it is proposed that concrete encasement or an isolation protection structure be constructed around the pipeline within the conflict area and the retaining wall footing constructed over the encasement. Detailed geotechnical analyses will be required to assess the integrity of the pipeline including:

- Stress analysis by 2D/3D finite element modeling to determine the increased load imposed on the affected reach of the pipeline;
- Settlement/rebound analysis to determine potential settlement and lateral displacement; and
- Slope stability analysis to determine potential induced instability of the affected reach of the pipeline.

The San Antonio Wash bridge will also be widened approximately 10 feet towards the pipeline. The widening design of the San Antonio Wash bridge includes flared abutments and support bent that avoids conflict with the MWD pipeline. Pile foundations of the proposed bridge widening will remain in approximately the same location as the existing piles.

In addition, the MWD Pomona Valley service connection (PM-17) near I-10 Station 1018+41 will be reconstructed to maintain accessibility from Palo Verde Street.

Coordination with MWD started in 2014 and has been ongoing. MWD has reviewed and concurred with the above general design concept of addressing the conflicts between the I-10 project improvements and the MWD Upper Feeder in order to protect the existing pipeline in place. The design of the San Antonio Wash bridge has been advance to a 65% level and preliminary numerical analysis has been completed to assess the interaction between the bridge and MWD pipeline during a seismic event.

Location 2: MWD Crossing East of Sixth Street in Ontario

At its crossing under I-10 east of 6th Street, the MWD Upper Feeder is a 140-inch diameter precast concrete pipe, which runs diagonally across I-10 in a southwest to northeast orientation at approximately 57 degrees from the freeway centerline. The facility is approximately 7 feet deep beneath the freeway. The portion of the pipe under the existing freeway pavement is protected with a

concrete protection structure. The I-10 Corridor Project will widen the south side of the freeway at this location. Concrete encasement/protection structure will be extended under the widened pavement.

Location 3: MWD Crossing East of Cherry Avenue in Fontana

At its crossing under I-10 east of Cherry Avenue, the MWD Upper Feeder is a 140-inch diameter precast concrete pipe, which runs diagonally across I-10 in a northwest to southeast orientation at approximately 44 degrees from the freeway centerline. The facility is approximately 8 feet deep beneath the freeway. The MWD facility is not currently encased under the freeway. The MWD facility is protected by a structure under UPRR main tracks and a structure under a spur track, both of which are outside the State right of way. The I-10 Corridor Project will widen the north side of the freeway at this location. Since the existing MWD facility is not protected by encasement under the freeway, concrete encasement is not being proposed under the widened pavement. MWD has indicated that the pipeline was designed to withstand the required loading. However, additional geotechnical analysis is anticipated to be required during the final design to confirm the pipeline's structural adequacy.

Longitudinal Encroachments

The preliminary utility investigation performed for the project indicates that 24 existing utilities are considered longitudinal encroachments on the State right of way. Approval from Caltrans headquarters for exceptions to the Caltrans' encroachment policy will be necessary for any utilities proposed to remain within the State right of way. Such approval is not being sought at this time due to the preliminary nature of the investigation. Further discussion and coordination will be needed with the utility companies during the design phase of the project to determine options for protecting in place or relocating these existing utilities. If necessary, approval for exceptions to the Caltrans' encroachment policy will be sought later in the project development process. The following paragraphs provide brief descriptions of these potential longitudinal encroachment facilities along with initial dispositions. These utilities are not anticipated to adversely affect the safety, design, construction, maintenance, or stability of the highway.

Utility Crossing No. 0414A is a 140-inch water line (MWD Upper Feeder) that crosses I-10 at 28 degrees from the freeway centerline between I-10 Stations 1006+74 and 1010+40 and runs parallel to EB I-10 and under Monte Vista Avenue EB off-ramp between I-10 Stations 1010+40 and 1036+00. A portion of this facility between 1006+74 and 1036+00 is currently inside the State right of way. Under the proposed project, the I-10 freeway will be widened over this pipeline for approximately 1,200 feet. Given the size and the importance of this utility as MWD's principal distribution system, relocation of this pipeline is not practical. It is proposed to protect this facility in place by way of constructing a protection structure over the pipeline before widening the freeway and constructing retaining wall and soundwall. In addition, there is a turnout structure on the pipeline that will be located under proposed EB I-10 outside shoulder at Station 1011+03. MWD will need periodic maintenance access to this turnout structure by lifting the cover from Palo Verde Street through a soundwall access gate. Closure of the freeway shoulder and a lane on Palo Verde Street will be necessary during the maintenance operation. A longitudinal encroachment exception will be requested for this utility to remain inside the State right of way with maintenance access.

Utility Crossing No. 0414B is a 140-inch water line (MWD Upper Feeder) that crosses I-10 at 57 degrees from the freeway centerline at I-10 Station 1239+50 (near 6th Street). This facility is currently inside the State right of way and does not appear to require regular maintenance from the freeway side. Given the size and the importance of this utility as MWD's principal distribution system, relocation of

this pipeline is not practical. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way.

Utility Crossing No. 0433 is a 21-inch wastewater line (Monte Vista Water District) that crosses I-10 at 33 degrees from the freeway centerline between I-10 Stations 1006+23 and 1009+00 and runs parallel to EB I-10 and under Monte Vista Avenue EB off-ramp between I-10 Stations 1009+00 and 1036+00. This facility is currently inside the State right of way between I-10 Stations 1006+23 and 1009+00 and Stations 1019+74 and 1036+00. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this existing utility is an existing utility and does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 0701 is an overhead telephone line that runs parallel to EB I-10 between I-10 Stations 1077+42 and 1083+16. This utility is located inside a row of residential properties which are subject to right of way acquisitions including full acquisition of 4 parcels (with excess land to be disposed of). To accommodate the freeway widening, this utility will need to be relocated outside of the proposed State right of way where partial right of way acquisitions are proposed and in the excess land area of the 4 fully acquired parcels. A longitudinal encroachment exception may be necessary until the State disposes of the excess land. The utility owner might be granted an easement or provided the opportunity to acquire right of way from the State. This utility does not require an access from the freeway or ramps.

Utility Crossing No. 0702 is an overhead electric line (SCE) that runs parallel to EB I-10 between I-10 Stations 1077+42 and 1083+16. This utility is located inside a row of residential properties which are subject to right of way acquisitions including full acquisition of 4 parcels (with excess land to be disposed of). To accommodate the freeway widening, this utility will need to be relocated outside of the proposed State right of way where partial right of way acquisitions are proposed and in the excess land area of the 4 fully acquired parcels. A longitudinal encroachment exception may be necessary until the State disposes of the excess land. The utility owner might be granted an easement or provided the opportunity to acquire right of way from the State. This utility does not require an access from the freeway or ramps.

Utility Crossing No. 0703 is an overhead cable TV line (Comcast) that runs parallel to EB I-10 between I-10 Stations 1077+42 and 1083+16. This utility is located inside a row of residential properties which are subject to right of way acquisitions including full acquisition of 4 parcels (with excess land to be disposed of). To accommodate the freeway widening, this utility will need to be relocated outside of the proposed State right of way where partial right of way acquisitions are proposed and in the excess land area of the 4 fully acquired parcels. A longitudinal encroachment exception may be necessary until the State disposes of the excess land. The utility owner might be granted an easement or provided the opportunity to acquire right of way from the State. This utility does not require an access from the freeway or ramps.

Utility Crossing No. 1026 is a 4-inch water line that runs parallel to WB I-10 between I-10 Stations 1154+28 and 1156+13. This water line is potentially a part of the Caltrans irrigation system. If, upon further investigation and confirmation that this facility is Caltrans owned, no request for exceptions to the Caltrans' encroachment policy will be needed. In the event that this utility is owned by the City of Upland, a longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is outside the proposed improvement areas. This utility does not require an access from the freeway mainline or ramps.

Utility Crossing No. 1313 is a 24-inch wastewater line (Chino Basin Municipal Water District) that crosses I-10 at 57 degrees from the freeway centerline at I-10 Station 1239+50 near 6th Street. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this existing utility is an existing utility and does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 1401 is an overhead electric line (SCE) that crosses I-10 at 54 degrees from the freeway centerline at I-10 Station 1245+70. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this existing utility is outside the proposed improvement area and does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 1402 is an overhead telephone line (Verizon) that crosses I-10 from the freeway centerline at I-10 Station 1245+70. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this existing utility is outside the proposed improvement area and does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 1903 is a sewer line that runs parallel to the Archibald Avenue EB off-ramp. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this existing utility is outside the proposed improvement area and does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 1908 is a 10-inch water line that runs parallel to Holt Boulevard EB on-ramp. This utility is currently inside the State right of way for a short segment between I-10 Stations 1368+92 and 1371+57, while the remainder of the facility resides in the adjacent property (Cardenas Market). A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is outside the proposed improvement areas and does not appear to require regular maintenance from the freeway side.

Utility Crossing No. 2101 is an electric line (SCE) that runs parallel to the Haven Avenue WB off-ramp. This utility is currently inside the State right of way between I-10 Stations 1438+12 and 1440+32 and provides electricity to a pumping station located inside the State right of way. A portion of this facility near the exit ramp departure will need to be relocated due to a conflict with the ramp reconstruction. Another portion closer to Haven Avenue will not be impacted and is proposed to remain in place. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is outside the proposed improvement areas and no access is required from the freeway side.

Utility Crossing No. 2804 is a sewer line parallel to EB I-10. This utility is currently inside the existing State right of way between I-10 Station 1581+36 and 1586+95. This utility needs to be accessed from the ramps. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this existing utility is outside the proposed improvement area and does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 3403 is a 140-inch water line (MWD Upper Feeder) that crosses I-10 at 45 degrees from the freeway centerline at I-10 Station 1760+50. This facility is currently inside the State right of way and does not appear to require regular maintenance from the freeway side. Given the size and the importance of this utility as MWD's principal distribution system, relocation of this pipeline is

not practical. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way.

Utility Crossing No. 3404 is an overhead electric line that crosses I-10 at 46 degrees from the freeway centerline at I-10 Station 1761+00. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this existing utility is outside the proposed improvement area and it does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 4606 is an overhead electric line (SCE) that crosses I-10 at 31 degrees from the freeway centerline at I-10 Station 2099+00. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is an existing utility and it does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 5205 is an overhead electric line (SCE) along southbound Mt. Vernon Avenue. This utility is currently inside the State right of way between I-10 Stations 2228+57 and 2236+24 and is accessed from Mt. Vernon Avenue. This utility is potentially a Caltrans lighting facility. If, upon further investigation and confirmation that this facility is an electric line owned by Southern California Edison, a longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is outside the proposed improvement areas.

Utility Crossing No. 5306 is a 2-inch waterline that crosses I-10 at 45 degrees from the freeway centerline at I-10 Station 2260+00. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is an existing utility and it does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 5307 is a 4-inch waterline that crosses I-10 at 50 degrees from the freeway centerline at I-10 Station 2267+00. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is an existing utility and it does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 5401 is a 30-inch waterline that crosses I-10 at 59 degrees from the freeway centerline at I-10 Station 2279+50. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is an existing utility and it does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 5402 is a 36-inch waterline (Riverside Highland Water Company) that crosses I-10 at I-10 Station 2277+00 and then crosses I-215 at 46 degrees from the I-215 freeway centerline. This facility is currently inside the State right of way. A longitudinal encroachment exception will be requested for the portion of this utility that crosses I-215 to remain in place inside the State right of way, since this existing utility is outside the proposed improvement areas and it does not appear to require regular maintenance access from the freeway side.

Utility Crossing No. 6605 is an overhead power line (SCE Transmission) that runs along the south side of Colton Avenue and crosses I-10 at 63 degrees normal to the freeway centerline. This utility is currently inside the State right of way between I-10 Stations 2588+97 and 2594+65 and does not

appear to require regular maintenance access from the freeway mainline or ramps. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is outside the proposed improvement areas. This facility has adequate vertical clearance over the I-10 freeway.

Utility Crossing No. 6615 is an overhead power line (SCE Distribution) that runs along the south side of Colton Avenue and crosses I-10 at 63 degrees normal to the freeway centerline, on the same support structures as Utility Crossing No. 6605. This utility is currently inside the State right of way between I-10 Stations 2588+97 and 2594+65 and does not appear to require regular maintenance access from the freeway mainline or ramps. A longitudinal encroachment exception will be requested for this utility to remain in place inside the State right of way, since this utility is outside the proposed improvement areas. This facility has adequate vertical clearance over the I-10 freeway.

5.A.4.7 Railroad Involvement

There are six railroad crossings within the project limits, five of which are impacted by the project. **Table 5.23** provides a summary of the railroad bridge improvements required for the project.

Table 5.23 Railroad Improvements

No.	Facility	Type	Track	Owner	Location	Alternative 3
1	Kaiser Spur	OH	Single	UPRR	East of Etiwanda	Widen
2	Slover Mountain	UP	Single	UPRR	East of Pepper	Replace
3	Colton Crossing	OH	Three	BNSF	East of Rancho	Widen
4	Pavillion Spur	OH	Single	UPRR/private	West of Mt. Vernon	Widen or Abandon*
	Pavillion (9th St WB off-ramp)	OH	Single	UPRR/private	West of Mt. Vernon	No work
5	West Redlands	OH	Single	BNSF/SBCTA	East of Mountain View	Widen
6	Redlands	OH	Single	BNSF/SBCTA	West of University	No work

OH = overhead, UP = underpass
BNSF = Burlington Northern – Santa Fe
UPRR = Union Pacific Railroad
**Railroad is no longer in service; structure may be widened to accommodate the proposed I-10 widening or abandoned in place by filling with earth material and construction of additional embankment to accommodate the proposed I-10 widening.*

The Kaiser Spur crosses under I-10 via an overhead (OH) structure just east of Etiwanda Avenue in Fontana and an unincorporated area of San Bernardino County. The Kaiser Spur consists of a single track under the bridge. The Kaiser Spur OH (concrete slab bridge) will be widened on both sides with the counterfort retaining wall extended to the toe of the new embankment.

The Slover Mountain crosses over I-10 via an underpass (UP) structure just east of Pepper Avenue in an unincorporated area of San Bernardino County. The UPRR Slover Mountain railroad track and UP bridge will be replaced as part of the project. An adjacent bridge south of I-10 will be constructed with two tracks on a slab bridge with reinforced concrete columns. There is also another track under the railroad bridge (south of the I-10) that will be impacted.

The Colton Crossing line crosses under I-10 via an OH structure east of Rancho Avenue. This crossing is occupied by BNSF with a single connection track between the 2nd and 3rd bridge piers and

two main tracks between the 4th and 5th bridge piers. Both Colton OH structures (left and right) will be widened to accommodate the proposed freeway widening.

The Pavillion Spur from UPRR crosses under I-10 via an OH just east of 9th Street in the City of Colton. This spur is a single track and is currently out of service. This railroad structure will be widened or abandoned by filling the reinforced concrete box with cellular concrete. Right of way for this crossing is currently owned by Dominguez Plaza LLC.

The West Redlands Line crosses under I-10 via an OH structure just east of Mountain View Avenue in the City of Redlands. This facility is maintained by BNSF. There is a single track located between the 3rd and 4th bridge piers. The Redlands Passenger Rail Project is currently under construction, which will provide passenger rail operations on this railroad facility. The West Redlands OH will be widened on both sides under the proposed I-10 Corridor Project.

The Redlands Line crosses under I-10 via an OH structure just west of University Street in the City of Redlands. This facility is maintained by BNSF and is currently out of service. However, the Redlands Passenger Rail Project is currently under construction, which will provide passenger rail operations on a single track located between the 3rd and 4th bridge piers. No freeway widening is proposed at this location as part of the I-10 Corridor Project and the Redlands OH will be maintained (except for median barrier reconstruction and minor bridge deck repair).

Permanent easement of one UPRR parcel is required for the replacement of the Slover Mountain UP replacement and permanent easement of one parcel is required for the widening of the West Redlands OH structure. Temporary construction easements will be needed from several UPRR parcels to accommodate the railroad structure modification/replacement. Railroad involvement is noted in the Right of Way Data Sheet (**Attachment K**).

Separate Construction and Maintenance (C&M) Agreements with the UPRR and BNSF will be needed for construction of the structure modifications and replacements. Service Agreements for flagging and plan review will also be required with UPRR and BNSF. The flagging cost has been included in the project cost estimate.

5.A.4.8 Highway Planting

Existing planting and irrigation systems removed during construction of the proposed improvements will be replaced within Caltrans right of way, along other highway right of way, or in adjacent public space within adjacent communities, in accordance with the Environmental Commitments Record (ECR). Generally, existing vegetation in and around interchange areas will be replanted; however, due to limited space between the freeway improvements and right of way, planting replacement will not always be possible along the mainline.

Planting design efforts will be coordinated and provided during all design submittals and will consider safety, maintainability, and aesthetic compatibility with adjacent urban communities. Quantity, size, and location for replacement planting will be determined by the District Landscape Architect. Irrigation controller cabinets will be connected to the fiber optic communication system. Highway planting and irrigation design will also include roadside management strategies that improve worker safety by reducing the frequency and duration of worker exposure. Features such as vegetation control under guardrail, fence access gates, slope paving on slope steeper than 2:1 ratio, paved maintenance vehicle pullouts, and maintenance access and paths, will be incorporated into the landscape design.

The landscape design will incorporate aesthetic and landscape elements recommended in the *I-10 Project Aesthetics and Landscape Masterplan (PALM)* document along with the *I-10 Corridor Master Plan (CMP), San Bernardino County*. The landscape design will also take into consideration that segments of the I-10 freeway are identified as Classified Landscaped Freeways per the criteria of the 2014 Edition of the State Outdoor Advertising Act and Regulations, Sections 2500-2513. The freeway segments listed below have been landscaped within the State right of way and, therefore, landscaping will be replaced if removed by the project. Quantity of replacement planting will be calculated to meet the requirements for continuous planting.

Existing highway planting will be replaced in all areas where there is existing planting, including but not limited to the following segments:

- PM 47.92/48.27 (Indian Hill to LA/SBd County Line)
- PM 0.00/5.44 (LA/SBd County Line to Fourth Street)
- PM 5.63/6.30 (Fourth Street to Vineyard Avenue)
- PM 6.73/7.43 (Vineyard Avenue to Archibald Avenue)
- PM 11.74/19.73 (Commerce Drive to Riverside Avenue)
- PM 19.81/20.41 (Riverside Avenue to Pepper Avenue)
- PM 20.48/21.39 (Pepper Avenue to Slover Mountain UPRR)
- PM 21.46/22.40 (Slover Mountain UPRR to La Cadena Drive)
- PM 22.44/22.85 (La Cadena Drive to Pavillion UPRR)
- PM 22.89/23.56 (Pavillion UPRR to Warm Creek)
- PM 23.97/30.06 (Warm Creek to Orange Street)
- PM 30.15/32.72 (Orange Street to Highland Avenue)
- All areas that existing landscape exists including mainline and interchange areas

Replacement planting shall be sustainable drought-tolerant and native species of trees and shrubs to the extent feasible. The District Landscape Architect will approve the locations and amounts of planting. A Tree Removal and Replacement Plan will be prepared, which will include locations of trees to be removed, diameter of trees at breast height, trees to be protected in place, and replacement locations to be reviewed and approved by the Caltrans District Landscape Architect.

It is anticipated that replacement planting, including a 3-year plant establishment period or equivalent 1-year plant establishment plus a 2-year Establish Existing Planting (EEP) period, will be included in the highway construction contract. An exception will be requested from Caltrans for deviation from the Caltrans Highway Planting General Policy that requires replacement planting over $200,000 be split from the roadway construction contract and implemented as a separate follow-up contract.

5.A.4.9 Erosion Control

The amount of disturbed soil area associated with the project improvements is estimated to be approximately 661 acres. The project has been categorized as Risk Level 2 for the Santa Ana River, San Gabriel River, San Antonio Creek, and Cucamonga Creek Watersheds, based on the estimated amount of construction sediment yield and proximity to sensitive receiving waters.

Erosion control measures will be implemented during construction as well as after the project completion in accordance with the requirements of the Santa Ana Regional Water Quality Control Board and the current Statewide National Pollutant Discharge Elimination System (NPDES) Construction General Permit, issued July 1, 2010. During construction, potential construction site

Best Management Practices (BMPs), such as temporary fiber rolls, temporary mulch, drainage inlet protection, concrete washout facilities, street sweeping, and hydroseeding, will be used to minimize erosion. All finished slopes will receive replacement planting or vegetative erosion control application.

The cost for erosion control and construction site BMPs have been included in the project cost estimate. Specific erosion control measures and construction site BMP design will be developed during the final project design. Preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) will be required during construction.

5.A.4.10 Noise Barriers

A *Noise Study Report (NSR)* has been prepared for the project to evaluate impacts of the proposed project on noise sensitive receivers in the project vicinity and identify noise abatement measures. Subsequently, a *Noise Abatement Decision Report (NADR)* was prepared to provide a reasonableness analysis to determine whether noise abatement measures identified in the NSR would be reasonable from a cost perspective. An *NSR Addendum* and two NADR addenda were also prepared to evaluate traffic noise impacts and abatement for impacted receivers for additional locations.

A total of 45 noise barriers were recommended for the project as summarized in **Table 5.24**. The recommended noise barriers include new soundwalls, as well as replacement in kind or at a greater height of the existing soundwalls, which would be impacted by construction of the proposed improvements, and lateral extensions of replacement soundwalls. The recommended noise barriers range from 8 to 22 feet in height and are typically located either along the freeway/ramp edge of shoulder or the right of way. A minimum of 10 feet horizontal clearance is provided between the soundwall and the edge of travel way. To the extent practical, soundwalls exceeding 14 feet in height have been placed at least 15 feet from the roadway edge of travel way.

Table 5.24 Soundwall Recommendations

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Height (feet)	Length (feet)
		WB	EB			
1	699	X		New soundwall at the edge of shoulder along Indian Hill Blvd WB on-ramp	16, 18, 20	450
2	2		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between Mills Ave and Monte Vista Ave EB off-ramp	14	508
3	6		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between Mills Ave and Monte Vista Ave EB off-ramp	14	440
4	10		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between Mills Ave and Monte Vista Ave EB off-ramp	14	986
5	29	X		Replaces an existing soundwall with the same height along the right edge of shoulder of Monte Vista Ave WB on-ramp	16	197
6	30		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between Monte Vista Ave EB off ramp and Monte Vista Ave UC	12	655

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Height (feet)	Length (feet)
		WB	EB			
7	66		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between Central Ave UC and Central Ave EB on-ramp	14	452
8	68		X	Replaces an existing soundwall with the same height along the right edge of shoulder of Central Ave EB on-ramp and EB I-10 between Central Ave and Mountain Ave	10	334
9	94		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between Central Ave and Mountain Ave	8, 14	4,596
10	1117	X		New soundwall at the right of way line along Mountain Ave WB on-ramp	12	222
11	1132		X	New soundwall along the right edge of shoulder of Mountain Ave EB on-ramp.	14	590
12	1190		X	New soundwall at the right of way line along Euclid Ave EB on-ramp	12	873
13	230		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between 6th St and Grove Ave	14, 16	1,317
14	1244		X	New soundwall along the edge of shoulder of EB I-10 between 6th St and Grove Ave (gap closure)	14	175
15	246		X	Replaces an existing soundwall with the same height along the edge of shoulder of EB I-10 between 6th St and Grove Ave	14	599
16	231	X		Replaces an existing soundwall with the same height at the edge of shoulder along WB I-10 between 6th St and Grove Ave	14	1,178
17	245	X		Replaces an existing soundwall with the same height at the edge of shoulder along WB I-10 between 6th St and Grove Ave	14	1,474
18	1262		X	New soundwall along the edge of shoulder of EB I-I0 between Grove Ave and 4th St	14	297
19	1266		X	New soundwall along the right edge of shoulder of 4th St EB off-ramp	12	685
20	259	X		Replaces an existing soundwall with the same height along the right edge of shoulder of 4th St WB on-ramp	14	775
21	275	X		Replaces an existing soundwall with the same height along the edge of shoulder of WB I-10 between 4th St EB off-ramp and EB on-ramp	14	898
22	1285	X		New soundwall along the right edge of shoulder of 4th St WB off-ramp	14	407

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Height (feet)	Length (feet)
		WB	EB			
23	1276		X	New soundwall at the right edge of shoulder of 4th St EB on-ramp	10	216
24	278		X	Replaces an existing soundwall with the same height along the edge of shoulder of 4th St EB on-ramp and EB I-10 between 4th St and Vineyard Ave	14, 16	1,840
25	1306		X	New soundwall along the edge of shoulder of EB I-I0 between 4th St and Vineyard Ave and along the right edge of shoulder of Vineyard Ave EB off-ramp	8, 10, 12, 14	2,448
26	296	X		Replaces an existing soundwall with the same height along the right edge of shoulder of Vineyard Ave WB on-ramp	14	832
27	334		X	Replaces an existing soundwall with the same height along the edge of shoulder of Vineyard Ave EB on-ramp	14	580
28	697	X		Replaces an existing soundwall with the same height at the right of way line along WB I-10 between Cherry Ave and Citrus Ave	14	3,738
29	1819	X		New soundwall along the north edge of I-10 channel (inside right of way line) between Citrus Ave and Cypress Ave and Citrus Ave WB off-ramp	18	2,055
30	1877	X		New soundwall at the right of way line along WB I-10 between Sierra Ave and Alder Ave	14, 16	1,502
31	1907	X		New soundwall at the right of way line along WB I-10 between Alder Ave and Cedar Ave	16	3,587
32	1969	X		New soundwall at the right of way line along Cedar Ave WB on-ramp	12	369
33	2033	X		New soundwall at the right of way line along WB I-10 between Cedar Ave and Riverside Ave	20	444
34	2145	X		New soundwall at the right of way line along WB I-10 between Pepper Ave and Rancho Ave and Rancho Ave WB on-ramp	14, 16	2,388
35	5	X		Replaces existing soundwalls with the same height at the right of way line along WB I-10 between Rancho Ave and La Cadena Dr and Rancho Ave WB off-ramp	8,10,12	1,356
36	2238	X		New soundwall at the right of way line along WB I-10 between Mt. Vernon Ave and I-215	14, 16	1,462
37	2435	X		New soundwall at the right of way line along Mountain Ave WB on-ramp	14	469
38	2437	X		New soundwall along the edge of shoulder of WB I-I0 between Mountain View Ave WB on-ramp and Mountain View Ave UC	14	971

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Height (feet)	Length (feet)
		WB	EB			
39	2438		X	New soundwall at the edge of shoulder of EB I-I0 between Mountain View Ave EB off-ramp and Mountain View Ave UC	14	772
40	2434B		X	New soundwall at the edge of shoulder along Mountain View Ave EB off-ramp	12, 14	1,390
41	2476		X	New soundwall along the edge of shoulder of EB I-I0 between Mountain View Ave and California St and California St EB off-ramp	14	1,957
42	2619	X		New soundwall along the right edge of shoulder of Orange St WB on-ramp and I-10 WB between Texas St and Orange St	10, 12, 14	2,301
43	2638B		X	New soundwall along the right edge of shoulder of EB I-I0 between Orange St and EB I-10 6th St on-ramp	12	419
44	2654B		X	New soundwall along the right edge of shoulder of EB I-I0 and EB I-10 6th St on-ramp in City of Redlands from 6th St to Church St	12	1,898
45	2765	X		New soundwall along the edge of shoulder of WB I-10 between Ford St and Devonshire Dr	14	1,424

5.A.4.11 Non-Motorized and Pedestrian Features, etc.

Existing bike lanes and trails within the project limits will be maintained. In addition, new bike lanes (Class II or Class III) will be incorporated in the design of the proposed arterial improvements at Monte Vista Avenue, Euclid Avenue, Vineyard Avenue, and Tennessee Street. These streets have been identified in their respective local circulation plans as having a bicycle facility.

Existing sidewalks within the project limits will be maintained. Sidewalks will be provided on both sides of proposed arterial improvement locations including Monte Vista Avenue, San Antonio Avenue, Euclid Avenue, Sultana Avenue, Campus Avenue, 6th Street, and Vineyard Avenue. Reconstruction of Richardson Street and Tennessee Street will provide one continuous sidewalk on these streets, similar to the current condition. Pedestrian facilities on arterials being improved will meet current Americans with Disabilities Act (ADA) standards. In addition, there is a project currently in the planning phase to retrofit existing curb ramps on various cross streets along the I-10 corridor (EA 1C490).

Existing pedestrian and bicycle/trail facilities within the project limits are anticipated to be maintained during construction, except where the arterial roadways are closed to traffic during construction. A Transportation Management Plan (TMP) will be prepared prior to construction to identify methods to minimize impacts to pedestrian and bicycle traffic. The project may require periodic or temporary closure of the Santa Ana River Trail and the Class I bicycle facility along the river during widening of the Santa Ana River bridges. During construction, the trail on at least one riverbank will remain open at all times.

5.A.4.12 Needed Roadway Rehabilitation and Upgrading

The existing I-10 freeway mainline and HOV lanes are primarily comprised of Portland cement concrete (PCC) pavement. Freeway inside shoulders are comprised of PCC pavement west of Haven Avenue and asphalt concrete (AC) pavement east of Haven Avenue. Freeway outside shoulders, interchange ramps, and local streets typically consist of AC pavement. The inside lane pavement is generally in good condition while the outside 2 lanes are generally in fair to poor condition. Three pavement rehabilitation projects were recently implemented to replace concrete pavement slabs within the project limits including:

- Pavement rehabilitation (random slab replacement) from LA/SBd County Line to Orange Street (EA 0Q7604), completed in 2016;
- Pavement rehabilitation (lane replacement) from Orange Street to Ford Street (EA 0K2914), expected completion in 2017; and
- Pavement rehabilitation (3rd and 4th lane replacement) from Ford Street to Live Oak Canyon Road (EA 0K2924), completed in 2016.

The I-10 Corridor Project primarily consists of freeway widening, interchange ramp reconstruction, structure replacement, and local street improvements. The project does not specifically include roadway rehabilitation and upgrading but any damage to the existing pavement as a result of the project construction will be repaired by the project.

5.A.4.13 Needed Structure Rehabilitation and Upgrading

The project will require modification of existing structures. As part of the APSs performed for the project, each of the structures to be modified has been reviewed qualitatively with respect to the general seismicity and the structure system of the final configuration for potential seismic vulnerabilities. Rehabilitation or seismic upgrading is anticipated for some of the structures as summarized in **Table 5.25** below. The cost for seismic retrofits has been included in the project cost estimate. Further investigation and analysis will be required during the final design to conform the need for retrofit for all structures being modified by the project.

Table 5.25 Structure Rehabilitation

No.	PM	Structure Name	Bridge No.	Proposed Retrofit
1	11.50	Valley Blvd EB off-ramp UC Lt	54-0030L	Encase existing columns
2	11.50	Valley Blvd EB off-ramp UC Rt	54-0030R	Construct infill walls
3	11.74	Kaiser Spur OH	54-0416	Retrofit ground anchors
4	25.26	Waterman Ave UC	54-0600	Add steel casing around column bents
5	27.64	West Redlands OH	54-0570	Add in-fill walls and add seat extender
6	30.38	Texas UC	54-0583	Retrofit abutment and add catcher blocks
7	33.29	Redlands Blvd Off-Ramp UC	54-0589	Retrofit bent cap (pre-stress & add anchor blocks)
8	23.83	Santa Ana River Bridge	54-0292L/R/G	Retrofit by EA 0Q910 (separate project)

Santa Ana River Bridges (Bridge No. 54-0292L/R/G)

The Santa Ana River bridges carrying the I-10 traffic (54-0292L and 54-0292R) will need to be widened while the bridge carrying the E10-N/S215 Connector traffic (54-0292G) is maintained. Widening of the two left and right bridges will require seismic retrofit on all three structures; however, there is a seismic retrofit project currently in the planning phase. A PA/ED was recently approved in December 2015 (EA 0Q910) which evaluates the rehabilitation and seismic retrofit needed for three bridges over the Santa Ana River. The project recommends rehabilitating the bridge decks on all three bridges over the river, widening the decks to upgrade the existing barrier rail from Type 9 to Type 732, sealing cracks, replacing joint seals, installing chain link fence at northeast corner of the bridge 54-0292L, and clearing debris under the structures. For seismic retrofit, it was recommended that new 4'6" cast-in-drilled-hole (CIDH) piles/shafts be installed and existing grouted restrainers be replaced with pipe seat extenders at each bridge.

Coordination has been made between the two projects and the seismic retrofit project was modified in April 2016 to be compatible with the future widening by the I-10 Corridor Project. It is anticipated that the seismic retrofit project will move forward to the final design and be constructed prior to the I-10 Corridor Project. As such, no additional rehabilitation or seismic retrofit is assumed as part of the I-10 Corridor Project. Furthermore, pending further consideration during the final design, the seismic retrofit project may include widening of the Santa Ana River bridges to accommodate the proposed I-10 Express Lanes.

5.A.4.14 Geotechnical

A *District Preliminary Geotechnical Design Report (DPGDR)* has been prepared to provide preliminary geotechnical information for the project. Key information provided in the *DPGDR* is as follows:

- Groundwater levels along the project corridor are generally within 10 feet of the lowest site elevations. Deep open excavations may require dewatering.
- Fill slopes should generally be limited to 2h:1v inclination and paved slopes limited to 1.5h:1v inclination.
- There is potential for corrosive soil conditions within the project site. A Materials Report should be prepared early in the final design phase to evaluate culvert materials and concrete mix designs.
- Due to near-surface soft alluvial soil condition, magnitude and time rate of settlement may be an issue where new embankments are placed. Embankment settlement should be evaluated quantitatively and mitigated as necessary during the final design.

Site-specific geotechnical investigation and preparation of a *Geotechnical Design Report* (*GDR*) and a *Materials Report* will be required during the final design phase of the project.

Structures Preliminary Geotechnical Reports (SPGRs) have been prepared to provide preliminary geotechnical, seismic, and foundation recommendations for the proposed structure replacements and modifications in support of the structure APSs. Supplemental site-specific investigation and analysis and preparation of *Preliminary Foundation Reports (PFRs)* and *Foundation Reports (FRs)* will be required during the final design phase of the project.

5.A.4.15 Cost Estimate

The project cost estimates are included in this document in **Attachment J**. A breakdown of the current estimated costs is summarized in **Table 5.26**.

Table 5.26 Cost Estimate

	Contract 1		Contract 2		Total	
Preliminary Estimate	**Current**	**Escalated**	**Current**	**Escalated**	**Current**	**Escalated**
Roadway Items	$389,659,000	$429,201,000	$707,347,000	$829,073,000	$1,097,006,000	$1,258,274,000
Structure Items	$67,297,000	$74,126,000	$94,449,000	$110,703,000	$161,746,000	$184,829,000
Subtotal Construction	**$456,956,000**	**$503,327,000**	**$801,796,000**	**$939,776,000**	**$1,258,752,000**	**$1,443,103,000**
R/W & Utilities	$38,500,000	$44,221,000	$44,779,000	$56,705,000	$83,279,000	$100,926,000
Total Construction	**$495,456,000**	**$547,548,000**	**$846,575,000**	**$996,481,000**	**$1,342,031,000**	**$1,544,029,000**
Support	$90,918,000	$97,461,000	$157,516,000	$173,556,000	$248,434,000	$271,017,000
EEP	$3,136,000	$3,224,000	$7,102,000	$8,630,000	$10,238,000	$11,854,000
Design Build Cost	$35,862,000	$39,407,000	$37,079,000	$43,291,000	$72,941,000	$82,698,000
Total Support	**$129,916,000**	**$140,092,000**	**$201,697,000**	**$225,477,000**	**$331,613,000**	**$365,569,000**
Total Project Cost	**$625,372,000**	**$687,640,000**	**$1,048,272,000**	**$1,221,958,000**	**$1,673,644,000**	**$1,909,598,000**

The support cost ratio is approximately 18%. EEP = Establish Existing Plant

5.A.4.16 Right of Way Data

The right of way costs, including utility work are presented in **Table 5.27**. The Right of Way Data Sheet which provides detailed information and right of way costs is included in **Attachment K**.

Table 5.27 Right of Way Costs

	Contract 1		Contract 2		Total	
Preliminary Estimate	**Current**	**Escalated**	**Current**	**Escalated**	**Current**	**Escalated**
Right of Way Acquisitions	$16,211,000	$18,620,000	$31,323,000	$39,666,000	$47,534,000	$58,286,000
Utility Work	$22,289,000	$25,601,000	$13,455,000	$17,039,000	$35,744,000	$42,640,000
Total Right of Way & Utility	**$38,500,000**	**$44,221,000**	**$44,778,000**	**$56,705,000**	**$83,278,000**	**$100,926,000**

5.A.4.17 Effect of Projects Funded by Others on State Highway

The I-10 Corridor Project would favorably affect the capacity and operating characteristics of the freeways and interchanges within the improvement limits. The proposed Express Lanes will provide additional capacity as well as long-term congestion management to better handle the future traffic demand and provide sustainable trip reliability for the corridor. The project will provide the additional lanes recommended in the *I-10 Route Concept Fact Sheet* and satisfy the commitment of the Measure I program to provide added capacity on I-10.

Several projects are currently in the planning phase along the project corridor that may be funded by SBCTA and/or other local agencies, including:

- I-15 Corridor Project from SR-60 to SR-210 (EA 0R8000)
- I-10/Grove Avenue Interchange Improvement Project (EA 0J4000)
- I-10/Cedar Avenue Interchange Improvement Project (EA 1A8300)
- I-10/Mt. Vernon Avenue Interchange Improvement Project (EA 1G800K)
- I-10/Mountain View Avenue Interchange Improvement Project
- I-10/California Street Interchange Improvement Project
- I-10/Alabama Street Interchange Improvement Project (EA 1H160K)
- I-10/University Street Interchange Improvement Project (EA 1E7101)

Except for the I-10/Cedar Avenue interchange improvement, these projects are anticipated to occur after the I-10 Corridor Project is complete. The I-10 Corridor Project is not anticipated to restrict nor adversely affect these foreseeable future projects. The I-10/Cedar Avenue interchange improvement is currently in the final design phase and is planned to be opened to traffic in 2019. The proposed improvement design has been coordinated with the I-10 Corridor Project.

It is worth noting that the I-10 and I-15 Express Lanes will be built and operated independently of one another. In the future, Express Lane direct connectors may be constructed as a separate project, connecting certain movements between the I-10 and I-15 Express Lanes to complete the Express Lane network between two of the County's major freeways.

5B. Rejected Alternatives

The No Build Alternative from the PSR/PDS is carried forward into the PA/ED phase as Alternative 1. Build Alternatives 2 and 3 considered during the PSR/PDS are carried forward into the PA/ED phase as one Alternative 2. The additional alternative proposed in the Supplemental PSR/PDS is carried forward into the PA/ED as Alternative 3. Alternatives 4, 5, and 6 as well as a stand-alone TSM/TDM Alternative were also considered during the initial stage of the PA/ED process; however, they were not recommended for further consideration because they are not effective or viable alternatives that address the project purpose and need. Below is a brief description of the alternatives developed for the corridor that have been withdrawn during the initial screening. A Reversible Lane Alternative was also considered in compliance with Assembly Bill 2542 that was signed was signed into law on September 23, 2016 and became effective as of January 1, 2017. Additional detail of the rejected alternatives is provided in the Chapter 2 of the FEIR/EIS.

5B.1. Alternative 4: One HOV and One General Purpose Lane in Each Direction

Description: Alternative 4 would extend the existing HOV lane in each direction of I-10 from the current HOV terminus near Haven Avenue in Ontario to Ford Street in Redlands and add a general purpose lane in each direction from the LA/SBd County Line to SR-210.

Finding: This alternative would provide some congestion relief in the corridor. However, it would not maximize throughput, provide trip reliability, or accommodate future conversion of the general purpose lane into a tolled Express Lane for long-term congestion management (since MAP-21 prohibits the conversion of a free general purpose lane to a tolled Express Lane). In addition, this alternative would have comparatively high cost due to the addition of 2 lanes in each direction through most of the corridor (similar to Alternative 3), of which less than 50 percent of the cost could be funded with available funding sources (without toll revenue that is available for Alternative 3). As such, the PDT agreed that Alternative 4 is not a cost-effective option; and therefore, was not recommended for further evaluation in the PA/ED phase.

5B.2. Alternative 5: Two HOV Lanes in Each Direction

Description: Alternative 5 would extend the existing HOV lane in each direction of I-10 from the current HOV terminus near Haven Avenue in Ontario to Ford Street in Redlands (as in Alternative 2) and add a second HOV lane from the LA/SBd County Line to SR-210.

Finding: This alternative would improve the traffic flow in the HOV lanes but it would not relieve traffic congestion in the general purpose lanes. While a single HOV lane is congested and degraded, two HOV lanes would result in excess capacity that cannot be used by SOVs willing to pay a toll in exchange for faster traffic. In addition, this alternative would not maximize throughput nor provide trip reliability for the corridor. This alternative would have comparatively high cost due to the addition of 2 lanes in each direction through most of the corridor (similar to Alternative 3), of which less than 50 percent of the cost could be funded with available funding sources (without toll revenue that is available for Alternative 3). As such, the PDT agreed that Alternative 5 is not a cost-effective option; and therefore, was not recommended for further evaluation in the PA/ED phase.

5B.3. Alternative 6: Two General Purpose Lanes in Each Direction

Description: Alternative 6 would add two general purpose lanes in each direction from the LA/SBd County Line to Ford Street.

Finding: This alternative would provide some congestion relief in the general purpose lanes. However, it would not maximize throughput, provide trip reliability, provide incentives for carpooling, or accommodate future conversion of the general purpose lanes into tolled Express Lanes for long-term congestion management (since MAP-21 prohibits the conversion of a free general purpose lane to a tolled Express Lane). In addition, this alternative would have comparatively high cost due to the addition of 2 lanes in each direction (similar to Alternative 3), of which less than 50 percent of the cost could be funded with available funding sources (without toll revenue that is available for Alternative 3). As such, the PDT agreed that Alternative 6 is not a cost-effective option; and therefore, was not recommended for further evaluation in the PA/ED phase.

5B.4. TSM/TDM Alternative

Description: A stand-alone TSM/TDM Alternative consisting primarily of operational investments, policies, and actions aimed at improving traffic flow, promoting travel safety, and increasing transit usage and rideshare participation was considered at the early stage of the PA/ED phase. The TSM focuses on improvements that increase transportation system performance, including minor geometric improvements, signal synchronization, improved information gathering and dissemination by using CCTV with Pan-Tilt-Zoom capability, bus signal priority implementation, freeway ramp metering upgrades, and upgrades and linkages between Caltrans and cities' Traffic Management Centers. The TDM focuses on programs that reduce system demand including promoting rideshare programs; facilitating carpool, vanpool and intermodal transfers; implementing transit signal priority systems; improving park-and-ride facilities/intermodal facilities; and providing managed lanes to accommodate long-term management.

Finding: The stand-alone TSM/TDM Alternative was not recommended for further evaluation by the PDT due to its inability to satisfy the purpose and need of the project. The TSM/TDM Alternative would partially improve freeway operations, accelerate project delivery, and enhance safety. However, it would not reduce congestion, increase mobility, nor improve trip reliability for the I-10 corridor. In addition, this alternative does not satisfy the commitment of the Measure I program. Furthermore, the improvements proposed in this alternative do not meet the project description in the SCAG RTP/SCS and would not be consistent with the recommendations for improvements on I-10 made in the *I-10 Route Concept Fact Sheet*. Hence, no further analyses were conducted for this alternative. However, several components of the TSM/TDM alternatives, particularly the managed lane element, will be incorporated into the project to foster a synergy for carpooling and transit uses. ITS elements, including fiber-optic and other communication systems, changeable message signs, closed circuit television, ramp metering, and vehicle detection systems, would be incorporated in the project where appropriate.

5B.5. Reversible Lanes Alternative

Description: A Reversible Lanes Alternative was considered during the PA/ED phase in compliance with Assembly Bill 2542. This alternative would generally utilize the existing HOV lanes between the LA/SBd County Line and Haven Avenue and the existing No. 1 general purpose lanes between Haven Avenue and Ford Street, to operate as reversible lanes by adding capacity to one (peak) direction while temporarily borrowing capacity from the other (off-peak) direction.

Finding: The Reversible Lanes Alternative was not recommended for further evaluation by the PDT due to its inability to satisfy the project's purpose and need. With congestion projected in both directions of I-10 and the absence of large directional split of traffic flow during the peak hours, this alternative would not provide the overall benefit to the corridor. While employing the reversible lane would provide a slight congestion relief in the peak direction, traffic operation in the off-peak direction would degrade to very poor LOS, which does not meet the purpose of the project. In addition, substantial amount of freeway widening and structure modifications are needed to accommodate and operate the reversible lanes. There are also several geometric challenges that pose operational difficulties and safety concerns.

6. CONSIDERATIONS REQUIRING DISCUSSION

6A. Hazardous Waste

Initial Site Assessment

An *Initial Site Assessment (ISA)* report, dated September 2014, has been prepared for the project to identify apparent and potential sources of contamination within the project area that may impact the proposed project construction. The ISA was performed for the general project area, within or immediately adjacent to the State right of way, including investigation of potential properties to be acquired under the proposed improvements. The ISA primarily consists of a regulatory record search regarding possible handling, spills, storage or production of hazardous materials and field reconnaissance of the project site.

The ISA identifies several potential Recognized Environmental Concerns (REC) areas within the project area, as follows:

- Leaking underground storage tank (LUST) at former M&M Smog & Muffler, 1915 Tippecanoe:
- Wooden utility poles and railroad ties (if impacted) which may be coated with creosote;
- Asbestos-containing materials (ACM) in bridge components;
- ACM in several residential and non-residential structures identified for acquisition;
- Lead-based paint (LBP) used for lane striping;
- Aerially deposited lead (ADL) in unpaved areas adjacent to the existing roadway facilities;
- Underground storage tanks (USTs) or above-ground storage tanks (ASTs) at parcels identified for right of way acquisition; and
- Herbicides and pesticides on parcels where historic and current agricultural activities occur.

Fifty-three (53) potential REC parcels subject to right of way acquisitions (38 partial and 15 full acquisitions) are identified including:

- 35 parcels with structures to be demolished that may contain ACM and LBP;
- 6 parcels within 25 feet of rail lines that should be sampled for pesticides containing arsenic;
- 2 parcels containing at least one AST;
- 9 parcels containing at least one UST; and
- 1 parcel containing herbicides and pesticides.

Based on the findings of the ISA, further investigation will be required, as recommended below:

- Continued monitoring of remedial activities at the LUST site at 1915 Tippecanoe Avenue;
- Sampling and analysis of wooden utility poles and railroad ties for creosote contamination to determine proper disposal methods;
- ACM and LBP testing on bridges to be demolished or modified;
- ACM and LBP testing on buildings or structures to be demolished as part of right of way acquisition;
- LBP testing on lane striping;
- ADL;
- site investigation for areas along the unpaved freeway shoulder;

- Groundwater and soil contamination investigation to determine if USTs or ASTs exist on properties to be acquired and site investigations to determine if they contain hazardous materials. Soils surrounding the tanks should be collected and analyzed for said hazardous materials after the removal of the tanks to determine proper handling and disposal requirements. Because the contents of these USTs and ASTs are not known, these sites are considered RECs for the project; and
- Soil sampling for presence of herbicides and pesticides.

Phase II Site Assessment (SA)

Based on the recommendations of the ISA, a Phase II Site Assessment (SA) was performed by Group Delta Consultants to assess the presence of potential RECs along the project corridor, including a Site Investigation for 7 properties with potential of containing arsenic, ADL testing along unpaved areas within the State right of way, and ACM and LBP testing in bridges. Through coordination with Caltrans, it was determined that an investigation to evaluate the presence of chromium or lead in the thermoplastic yellow stripes is not required as Caltrans standard specifications comprehensively cover the management of striping removal. Additionally, it was decided that surveys of hazardous building materials for buildings on acquisition parcels will be performed after the properties are acquired due to inaccessibility of the sites at this time.

Site Investigation

A Site Investigation (SI) was performed to evaluate the potential soil and groundwater contamination at 7 properties to be acquired, including 6 properties associated with railroad use and 1 property associated with former agricultural land use. The results of the testing are reported in the *Site Investigation* report dated October 2016. The SI report concludes that non-RCRA hazardous concentrations of lead may be present on 3 properties to be acquired (Parcels #025424106, #016303116, and #029206402). However, the report notes that soil samples were taken adjacent to the freeway right of way and the non-RCRA hazardous concentrations of lead may be attributable to aerially deposited lead from the historical use of leaded gasoline that extended over from the freeway. Regardless, excavation and disposal of soil from these properties should be managed as non-RCRA hazardous materials similar to the recommended ADL handling and management.

ADL Testing

Additional investigations were performed in July and August 2016 to assess the presence of ADL along the unpaved areas of the project corridor, as recommended by the ISA. The results of the investigations are reported in the *Aerially Deposited Lead Site Investigation* report, dated October 2016. The following paragraphs summarize the analytical results and provide recommendations based on the Department of Toxic Substances Control *Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils*, dated June 2016.

- Along WB I-10 between the LA/SBd County Line and Ford Street, tested soil in the top layer (0.00 to 0.5 feet) is classified as soil Type R-1 which may be reused on-site beneath one foot of clean soil or under pavement. If disposed, the soil would need to be disposed at a Class I disposal site as soil Type Z-2. Soil below the 0.5-foot depth is unregulated and may be reused on-site or disposed off-site without restriction.

- Along EB I-10 between the LA/SBd County Line and I-15, tested soil is unregulated and may be reused on-site or disposed off-site without restriction.

- Along EB I-10 between I-15 and Ford Street, tested soil in the top layer (0.00 to 0.5 feet) is classified as soil Type R-1 and if reused on-site, would need to be buried beneath one foot of clean soil or under pavement. If disposed, the soil would need to be disposed at a Class I disposal site as soil Type Z-2. Below the 0.5-foot depth, the soil is unregulated and may be reused on-site or disposed off-site without restriction.

- Along the unpaved areas in the I-10 median between Vineyard Avenue and Archibald Avenue, tested soil in the top 3.0 feet is classified as soil Type R-1 and if reused on-site, would need to be buried beneath one foot of clean soil or under pavement. If disposed, the soil would need to be disposed at a Class I disposal site as soil Type Z-2. Below the 3.0-foot depth, tested soil is unregulated and may be reused on-site or off-site without restriction.

- Along the unpaved areas in the I-10 median at the Etiwanda Avenue interchange and between Sierra Avenue and Waterman Avenue, tested soil in the top 4.0 feet is classified as soil Type R-1 and if reused on-site, would need to be buried beneath one foot of clean soil or under pavement. If disposed, the soil would need to be disposed at a Class I disposal site as soil Type Z-2. Below the 4.0-foot depth, tested soil is unregulated and may be reused on-site or off-site without restriction.

ACM Testing

An ACM testing has been performed to assess the presence of ACM in 44 bridges to be replaced, widened, or modified by the project. Due to restricted access, testing was not performed for the 9th Street UC. The results of the testing are presented in the *Hazardous Material Survey* report, dated October 2016, which concludes that ACM concentrations greater than 1% (considered hazardous) are present at the following locations.

- In leveling shims between bridge railing support and concrete barrier at 20 bridges including Euclid Avenue OC, Campus Avenue OC, 6th Street OC, Vineyard Avenue OC, Holt Boulevard WB Off-Ramp UC, Etiwanda Avenue Wash Bridge (EB Off-Ramp), Valley Boulevard EB Off-Ramp UC, Etiwanda-San Sevaine Channel Bridge, Etiwanda-San Sevaine Channel Bridge (EB On-Ramp), Colton OH, La Cadena Drive UC, La Cadena Drive EB Off-Ramp UC, Pavillion Spur OH, Warm Creek Bridge, Santa Ana River Bridge, Hunts Lane UC, Richardson Street OC, Mountain View Avenue UC, West Redlands OH/Mission Channel Bridge, and California Street UC.

- In horizontal leveling shims between bridge railing and fence in 2 bridges including Campus Avenue OC and Vineyard Avenue OC.

- In washer sealants between bridge railing support and concrete barrier at 3 bridges including Richardson Street OC, Mountain View Avenue UC, and California Street UC.

The report notes that ACM may potentially be present at the Tennessee Street OC, in the black piping on the underside of the bridge deck, which was not tested due to inaccessibility.

LBP Testing

A LBP testing was performed in August 2016 to assess the presence of LBP and lead-containing paint (LCP) in 30 bridges to be replaced, widened, or modified by the project. The results of the testing are presented in the *Hazardous Material Survey* report, dated October 2016, which concludes that LBP and LCP are present at the following locations:

- LBP concentrations of 5,000 mg/kg or greater (considered RCRA hazardous) are present at 2 bridges: Slover Mountain UP and Colton OH.

- LCP concentrations of 600 mg/kg or greater and up to 5,000 mg/kg (considered California non-RCRA hazardous) is present at 1 bridge: Central Avenue UC.

- Paint samples at 9 bridges are also classified as non-LCP but would become California non-RCRA hazardous waste if removed and disposed: Mills Avenue UC, San Antonio Wash Bridge, Monte Vista Avenue UC, San Antonio Avenue OC, Euclid Avenue OC, Vineyard Avenue OC, Valley Boulevard EB Off-Ramp UC, La Cadena Drive UC, and La Cadena Drive EB Off-Ramp UC.

LBP testing was not completed for the 9th Street UC due to inability to separate the paint from the substrate. In addition, LBP survey was not performed at the Valley Boulevard EB Off-Ramp UC due to lead paint abatement/stabilization activities occurring at the time of the LBP survey.

UST/AST Location Research

Additional research and surveys were performed in November 2016 to determine the locations of USTs and ASTS on 11 parcels considered for partial acquisitions that were identified as RECs in the ISA. One additional partial acquisition parcel with a UST was also identified by Caltrans subsequent to the preparation of the ISA, totaling to 12 REC parcels. The study included file reviews at the San Bernardino County Fire Department, Office of the Fire Marshall and the State Water Resources Control Board's online database. Through coordination with Caltrans, it has been determined that USTs/ASTs located greater than 40 to 50 feet from the State right of way generally should not continue to be considered possible RECs for the project, unless other factors are identified that require further investigation.

Based on the records review and the distance established for REC determination, the following 5 sites would remain possible RECs or require additional records review or interviews with property owners to confirm the location and status of the reported USTs/ASTs:

- Mobil Gas Station, 540 N. Vineyard Avenue, Ontario (APN 01032112) – this site would remain as a REC since the gasoline dispensers are in close proximity to the proposed construction and temporary construction easement along Vineyard Avenue.

- Office building at 3401 Centre Lake Drive, Ontario (APN 021055109) – presence of USTs is not likely at this site; however, interviews with property owners or knowledgeable individuals are needed to confirm this determination.

- Myers Select, 1762 Sycamore Avenue, Rialto (APN 013221111) – it is likely that the UST reported on the site is associated with an emergency generator for the facility. Interviews with

property owners or knowledgeable individual(s) are recommended to determine the location and status of the reported UST.

- Valero Gas Station, 1880 Mountain View Avenue, Loma Linda (APN 028124311) – this site has been reported to contain leaking UST that affected soil only. The extent of residual contamination is reportedly limited to within the area of dispenser islands. The site is considered an REC.

- Werner Enterprises, 10251 Calabash Avenue, Fontana (APN 023418112) – Additional research and interviews with property owners or knowledgeable individual(s) are recommended for this site.

Based on the records review and the distance established for RECs, it was determined that 7 sites may be eliminated as possible RECs, including:

- 3801 E. Guasti Road, Ontario (APN 021021220)
- 10288 Calabash Avenue, Fontana (APN 023416111)
- 10268 Almond Avenue, Fontana (APN 023420113)
- 10238 Cherry Avenue, Fontana (APN 023421122)
- 16005 Valley Boulevard, Fontana (APN 023522153)
- 161 E. Valley Boulevard, Rialto (APN 013213228)
- 195 E. Valley Boulevard, Rialto (APN 013213229)

6B. Value Analysis

2009 Value Analysis

In March 2009, a Value Analysis (VA) was performed for the HOV Alternative (Alternative 2) to evaluate the performance of the proposed project design and develop alternate methods to improve value of the proposed improvements. Two design variations of the HOV Alternative were reviewed at that time. Through a 6-day study, the VA team developed 6 ideas (or alternatives) to help improve the proposed design features and reduce the environmental impacts associated with the proposed improvements. Of the proposed VA alternatives, one alternative was accepted by the PDT and has been incorporated into the current project design for both the HOV and Express Lanes alternatives:

- Relocate the utility towers in the freeway median outside of Caltrans right of way and construct I-10 widening to the inside to eliminate replacement of the Etiwanda Avenue OC.

Five (5) other VA alternatives presented but not implemented were:

- Eliminate the buffer between the HOV lanes and the mixed-flow lanes and increase the inside shoulder width to 14 feet – this alternative was not incorporated during the time of the VA study because the decision to eliminate buffers would require a region-wide policy change.

- Eliminate the buffer between the HOV lanes and the mixed-flow lanes and provide 10-foot inside and outside shoulders – this alternative was not incorporated because it has minor savings and reduces the ability for future conversion of the HOV to High Occupancy Toll (HOT) lanes.

- Add HOV drop ramps at the Richardson Street overcrossing – this alternative was not incorporated because Richardson Street is a small arterial extending 0.5 miles north and 0.3 miles south of the freeway and would not attract sufficient users. Also, the vertical curve and steep grades (over 6%) would create sight distance issue for a median drop ramp intersection.

- Reduce the inside shoulder width between Cedar Avenue and Riverside Avenue interchanges along westbound lanes in HOV alternative (reduced standard option) – this alternative was not incorporated because the new auxiliary lane project is scheduled for construction in late 2009.

- Replace the utility towers in the I-10 median east of Etiwanda Avenue with steel poles to reduce the median width – this alternative was not incorporated since the design already incorporates the VA alternative recommending relocating these towers outside the I-10 median.

Detailed documentation of the value analysis alternatives is provided in a report titled *Value Analysis Study Report*, dated December 2009, prepared by VMS, which is available at Caltrans District 8 office under Project No. 0800000040.

2013 Value Analysis

In March 2013, a second VA was conducted covering the Express Lanes Alternative (Alternative 3). Through a 6-day study, the VA team developed 8 ideas (or alternatives) that aim to improve the proposed design and implementation, and reduce the environmental impacts. Of the proposed VA alternatives, 6 ideas have been accepted by the PDT for incorporation where practical and upon verification of concept viability. Four (4) of these 6 accepted VA alternatives have been incorporated into the project design and cost estimate, including:

- Utilize Superior Performing Asphalt Pavement technology (Superpave) specifications for hot mixed asphalt pavement.
- Modify ramps at the Haven Avenue interchange to avoid right of way acquisitions.
- Use precast/pre-stressed concrete girders for bridge replacements, where feasible, to reduce traffic impacts and closures.
- Reduce landscaping cost from 4% to 3% of the project (roadway) costs to align with typical project bids in District 8.

The following 2 VA alternatives were previously accepted by the PDT, but were not incorporated into the project:

- Construct two Express Lanes in each direction in Segment 1 from the I-15/I-10 system interchange to Cherry Avenue and then one Express Lane each direction in segments 2-4 initially. This alternative was studied further and found to not meet the projected traffic demand and the operational improvement needs.
- Replace/rehabilitate two outside lanes with 40-year concrete pavement when performing widening in both directions. This alternative was not incorporated due to unavailability of the project funds. Caltrans is currently planning a separate project to implement this lane rehabilitation.

Two other VA alternatives presented but not implemented were:

- Consider Construction Management/General Contractor (CM/GC) project delivery approach which was not implemented because legislative approval would be required and the design-build project delivery was determined to be more ideal for the I-10 Corridor Project accommodating a faster delivery schedule.

- Construct a single Express Lane in each direction initially which was not implemented because year 2025 traffic forecasts (opening year) indicate a need for two Express Lanes on I-10 between the LA/SBd County Line and I-15.

Detailed documentation of the value analysis alternatives is provided in a report titled *Value Analysis Study Report*, dated July 2013, prepared by VMS, which is available at Caltrans District 8 office under Project No. 0800000040.

6C. Resource Conservation

The proposed project will maintain most of existing pavement along the project corridor. The improvements primarily consist of freeway widening and not reconstruction of the pavement structural sections. However, there will be some pavement removal and replacement on the freeway (mainly inside and outside shoulders), interchange ramps, and local streets to accommodate the design concept. Several existing overcrossing bridges would also need to be demolished and reconstructed.

Existing asphalt pavement (on ramps, local streets, freeway shoulders, etc.) removed as a result of the proposed improvements will be recycled and reused in the construction to the extent possible. Existing concrete pavement (freeway median area, bridges, etc.) to be removed will be crushed and used as base material wherever possible. Reinforcing steel in existing bridges to be demolished would be removed and recycled as scrap metal.

Hardware (such as roadside signs, guardrails, drainage grates, etc.) and electrical equipment (such as controller cabinets, light standards, CCTV poles and assemblies, CMS units, etc.) will be reused on the project wherever possible or stockpiled for future uses.

The proposed improvements will promote ridesharing and fuel conservation, by discounting the toll for HOVs in the Express Lanes.

6D. Right of Way Issues

6D.1. Right of Way Required

The following paragraphs provide a summary of right of way needs for the project. The Right of Way Data Sheet is included in **Attachment K**.

Right of way impacts associated with the project improvements affect 485 parcels along the corridor, totaling 56 acres. Right of way impacts include full acquisition of 20 parcels, comprised of 10 single-family residences, 4 multi-family residential buildings, 1 office building, and 5 industrial/commercial properties. Partial acquisitions, permanent easements, and TCEs shown in **Table 6.1** are also required from private residences, commercial/recreational properties, and public land uses.

Table 6.1 Right of Way Impacts

Type of Right of Way Impact	No. of Impacted Parcels		
	Contract 1	Contract 2	Total
Full acquisition	5	15	20
Partial acquisition only	9	1	10
Partial acquisition with TCE	42	54	96
Partial acquisition with permanent easement & TCE	45	15	60
Permanent easement only	29	0	29
Permanent easement with TCE	30	17	47
TCE only	103	120	223
Total Parcels with ROW Impacts	**263**	**222**	**485**

Montclair Storm Drain Right of Way

The Montclair Storm Drain system runs along the north side of I-10 between the Chino Basin Water Conservation - Montclair Basin #3 (west of Monte Vista Avenue) and Central Avenue and consists of a series of reinforced concrete pipes, reinforced concrete boxes, and open concrete channels. The proposed freeway widening will encroach onto the Montclair Storm Drain system and require acquisition of right of way where the Montclair Storm Drain currently lies within. Portions of the Montclair Storm Drain will be reconstructed to the north outside the proposed State right of way and under the parking lot pavement of Montclair Entertainment Plaza and Montclair Place. Right of way acquisition (to be transferred to the City of Montclair) or a joint use easement will be required from Montclair Entertainment Plaza and Montclair Place to accommodate the Montclair Storm Drain relocation.

Palmetto Storm Drain/Detention Vault Right of Way

The Palmetto Storm Drain, consisting of one 24-inch and three 42-inch reinforced concrete pipes, were installed under I-10 as part the HOV addition project in 1998. These pipes convey off-site flow from an open channel on the north side of the I-10 freeway and discharge into a 2.5-foot deep detention vault on the south side of I-10 east of Mountain Avenue (located inside the State right of way adjacent to the Church of Christ's parking lot). The vault serves as a temporary storage that slowly discharges the water onto the Church's property and surrounding surfaces.

The proposed freeway widening will require extension of the existing pipes, relocation of the detention vault to the south, as well as installation of a new Gross Solids Removal Device (GSRD). Right of way acquisition will be required from the Church of Christ to accommodate the proposed drainage improvements. It is anticipated that there will be approximately 41 feet of space remaining between the proposed right of way fence and the walkway bordering the church's building to accommodate reestablishment of 19-foot long parking stalls and 22-foot aisle. An open V-ditch is proposed to convey water from the vault/GSRD along the east and south sides around the church's parking lot and outlet onto Palmetto Avenue. Additional right of way or permanent easement will be required to accommodate the open ditch.

Sprint Tower Right of Way

A Sprint cellular tower site, consisting of a "monopine" tower and enclosure with 2 cabinets, occupies the ground space on MacArthur Park (east of Central Avenue) in Montclair under a lease agreement with the City of Montclair. Right of way acquisition will be required along the northern edge of MacArthur Park to accommodate the I-10 widening and soundwall replacement. The cell site will be impacted requiring relocation of the cell tower and enclosure unit. The cell site is under a 10-year lease agreement executed in 1998 with four 5-year extensions. In 2018, the lease will be up for renewal. Coordination of the I-10 Corridor Project with the City of Montclair and Sprint should be undertaken in 2018 during the lease renewal.

Subsurface Easements for Ground Anchors

A 2-mile segment of I-10 between Mountain Avenue and east of 6th Street is generally depressed vertically relative to the surrounding development and local road system with existing soil nail retaining walls on both sides of I-10 along the edge of shoulder and soundwalls at the top of slope at the State right of way line. The proposed widening of the I-10 freeway will necessitate reconstruction of the existing retaining walls along the proposed edge of shoulder.

On the south side of the freeway from approximately 900 feet west of San Antonio Avenue to Sultana Avenue, a combination of ground anchor (tie-back) and soil nail walls are proposed to replace the existing soil nail walls, averaging from 18 to 26 feet in height. Due to the height of the retaining walls and the close proximity to the right of way, ground anchors or soil nails reinforcing the slopes and connected to the wall face will need to extend underneath 35 properties. The affected properties are residential except for a public street and 7 parcels east of Euclid Avenue that are combined and used as a utility yard by the City of Ontario.

On the north side of the freeway adjacent to the Euclid Avenue WB on-ramp and WB off-ramp, soil nail walls are proposed with wall heights ranging from 14 to 28 feet. Soil nails will need to extend approximately 25 feet underneath 2 residential and 2 commercial parcels on the north side.

Subsurface permanent easements will be required from these 39 parcels for ground anchors and soil nails.

6D.2. Relocation Impact Study

A *Final Relocation Impact Statement (FRIS)* has been prepared for the project to address the potential displacement of 52 units including 21 single-family residences, 19 multi-family residential units, and 12 non-residential properties that are subject to acquisition. Relocations are required from 20 full-acquisition parcels as well as from partial-acquisition parcels that have multiple buildings/uses, some of which will be removed by the project. These properties are located in the Cities of Montclair, Ontario, Fontana, Rialto, and Colton.

The FRIS concludes that a sufficient amount of comparable replacement housing is available in the Cities of Montclair, Ontario, Fontana, Rialto, and Colton and nearby cities for relocation of the 40 residential units potentially displaced. Adequate replacement properties in these cities and adjacent cities are also available on the market for non-residential relocation. All displacees will be treated in accordance with the Federal Uniform Relocation Assistance and Real Property Act of 1970, as amended and the California Relocation Act for relocation assistance benefits or entitlements.

6D.3. Airspace Lease Areas

The project is not in an area of high land values having potential for future airspace leases.

6E. Environmental Compliance

The FEIR/EIS has been prepared for the project in accordance with Caltrans' environmental procedures, as well as State and federal environmental regulations. The EIR/EIS is the appropriate document for the project. Caltrans is the lead agency under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) for this project. The FEIR/EIS has been prepared subsequent to the DEIR/EIS (approved in April 2016). The signature page of the FEIR/EIS is attached to this document as **Attachment L** and the entire environmental document and technical studies are available at Caltrans District 8 office under Project No. 0800000040. The FEIR/EIS documents are also available at libraries, as well as on line via the Caltrans and SBCTA's I-10 Corridor Project websites.

A Notice of Preparation (NOP) was filed with the County of San Bernardino on October 30, 2012. A Notice of Intent (NOI) was published in the Federal Register on November 5, 2012 (Federal Register, Volume 77, No. 214/Notices).

The FEIR/EIS concludes that with incorporation of the proposed avoidance, minimization and/or mitigation measures, a NEPA finding of no adverse effects to environmental resources is anticipated as a result of the project. Under CEQA, the FEIR/EIS concludes that the project will not result in any unavoidable significant environmental impacts. There will be environmental resources that are significantly affected by the implementation of the proposed project, but they would be considered less than significant with incorporation of mitigation measures. It should be noted that the CEQA determination for greenhouse gas emissions and climate change was not made as it is considered to be too speculative to make a CEQA determination due to the absence of further regulatory or scientific information.

Various environmental technical studies have been performed in support of the FEIR/EIS efforts. These studies include:

- Aerially Deposited Lead Survey Report (Group Delta Consultants, October 2016)
- Air Quality Conformity Analysis (Terry A. Hayes Associates, October 2016)
- Air Quality Report (Terry A. Hayes Associates, March 2016)
- Archaeological Survey Report (Applied EarthWorks, April 2015)
- Combined Paleontological Identification Report/Evaluation Report (Cogstone, December 2014)
- Community Impact Assessment (Parsons, October 2015)
- Concept Drainage Report (Parsons, May 2015)
- District Preliminary Geotechnical Design Report (EMI, April 2015)
- Environmentally Sensitive Area Protection Plan (Applied EarthWorks, August 2014)
- Final Relocation Impact Statement (Parsons, July 2016)
- Finding of No Adverse Effect with Non-Standard Conditions (Applied EarthWorks, May 2015)
- Floodplain Evaluation Report (Parsons, December 2014)
- Hazardous Materials Survey (Group Delta Consultants, October 2016)
- Historical Resources Evaluation Report (Applied EarthWorks, April 2015)
- Historic Property Survey Report (Applied EarthWorks, April 2015)
- Initial Site Assessment (Parsons, September 2014)

- Jurisdictional Delineation Report (ECORP, September 2016)
- Natural Environment Study (ECORP, December 2015)
- Noise Abatement Decision Report (Parsons, July 2015)
- Noise Abatement Decision Report Addendum (Parsons, August 2015)
- Noise Abatement Decision Report Addendum #2 (Parsons, March 2017)
- Noise Study Report (Parsons, July 2015)
- Noise Study Report Addendum (Parsons, August 2015)
- Preliminary Materials Report (EMI, December 2015)
- Site Investigation Report (Group Delta Consultants, October 2016)
- Resources Evaluated Relative to the Requirements of Section 4(f) (Parsons, April 2016)
- Storm Water Data Report (Parsons, September 2015)
- Supplemental Natural Environmental Study (ECORP, January 2017)
- Traffic Study Report (Parsons, August 2014)
- Traffic Study Report Addendum #1 (Parsons, February 2016)
- Visual Impact Assessment (Parsons, March 2015)
- Water Quality Assessment Report (Parsons, May 2015)

The findings of these technical studies are fully described in Chapter 3 of the FEIR/EIS. The following subsections summarize some of the key environmental issues discussed in the FEIR/EIS.

6E.1. Wetlands

Wetlands and other water bodies are regulated primarily by the U.S. Army Corp of Engineers (USACE), Regional Water Quality Control Board (RWQCB) and the California Department of Fish and Wildlife (CDFW). A *Jurisdictional Delineation Report* has been prepared for the project to disclose and evaluate any special aquatic resource areas within the project's Biological Study Area (BSA). The report identifies 52 separate features as potentially subject to the USACE, RWQCB, and CDFW jurisdictions including 2 percolation basins (Chino Basin Water Conservation and Montclair Basin #3 and #4) and 1 detention basin. There is one USACE-jurisdictional wetland identified within the BSA; however, no impacts are anticipated to this feature.

All 52 features within the BSA totaling 170.02 acres and 124,832 linear feet of drainage are considered RWQCB or CDFW jurisdictional. USACE jurisdictional waters only apply to 27 of these 52 features which represent approximately 156.81 acres and 74,363 linear feet of non-wetland Waters of the United States and 0.28 acres and 256 linear feet of wetland Waters of the United States.

Table 6.2 below summarizes the potential impacted areas to the USACE jurisdictional waters within the BSA. The project will result in 0.09 acres of permanent impacts to waters pursuant to USACE jurisdiction. **Table 6.3** presents the potential impacted areas to the RWQCB and CDFW jurisdictional waters. The project will result in 0.09 acres of permanent impacts to RWQCB and CDFW jurisdictional waters.

Table 6.2 Potential Impacts to USACE Jurisdictional Waters

Geomorphic Feature	Potential USACE Impacts (Acres)	
	Temporary	Permanent
9 (Cucamonga Creek Channel)	0.17	0.00
12 (Lower Deer Creek Channel)	0.01	0.00
16 (Day Creek Channel)	0.02	0.00
19 (Lower Etiwanda Creek Channel)	0.00	0.08
20 (San Sevaine Creek)	0.15	0.00
21 (I-10 Channel)	12.53	0.00
24 (Rialto Tributary)	5.68	0.00
35 (Warm Creek Channel)	0.71	0.00
36 (Santa Ana River Channel)	0.59	0.00
38 (San Timoteo Creek Channel)	0.08	0.00
51	0.47	0.00
52	0.00	0.01
Total	**20.41**	**0.09**

Table 6.3 Potential RWQCB and CDFW Jurisdictional Area Impacts

Geomorphic Feature Number	Potential RWQCB and CDFW Impacts (Acres)	
	Temporary	Permanent
4	0.21	0.00
5	0.32	0.00
6	0.48	0.00
8	0.07	0.00
9 (Cucamonga Creek Channel)	0.17	0.00
11	0.05	0.00
12 (Lower Deer Creek Channel)	0.01	0.00
13	0.27	0.00
16 (Day Creek Channel)	0.02	0.00
17	0.15	0.00
19 (Lower Etiwanda Creek Channel)	0.00	0.08
20 (San Sevaine Creek)	0.15	0.00
21 (I-10 Channel)	12.53	0.00
24 (Rialto Tributary)	5.68	0.00
27	0.02	0.00
28	0.03	0.00
29	0.01	0.00
30	0.05	0.00
31	0.01	0.00

Geomorphic Feature Number	Potential RWQCB and CDFW Impacts (Acres)	
	Temporary	Permanent
33	0.09	0.00
35 (Warm Creek Channel)	0.71	0.00
36 (Santa Ana River Channel)	0.59	0.00
38 (San Timoteo Creek Channel)	0.08	0.00
39	2.93	0.00
41	1.69	0.00
42	0.56	0.00
43	0.01	0.00
45	0.04	0.00
51	0.47	0.00
52	0.00	0.01
Total	**27.40**	**0.09**

Prior to project implementation, a 1602 Streambed Alteration Agreement with the CDFW and completion of an application/report for report of Waste Discharge from RWQCB will be required for any impacts to their jurisdictional areas. Section 404 and Section 408 permits from USACE and a 401 water quality certification from RWQCB will be required for impacts to the USACE and RWQCB jurisdictional areas, respectively. With incorporation of all permit conditions, no temporary adverse effects on jurisdictional areas are anticipated. With incorporation of all permit conditions and permanent BMPs, no permanent adverse effects on jurisdictional areas are anticipated. The Santa Ana RWQCB Region 8 has jurisdiction within the project limits.

6E.2. Hydrology and Floodplains

A *Location Hydraulic Study* (LHS) and a *Floodplain Evaluation Report* have been prepared for the project to evaluate potential floodplain impacts from longitudinal or transverse encroachments by the proposed project improvements. The studies conclude that implementation of the proposed project would not create a high-risk condition to the floodplains within the project corridor. **Table 6.4** summarizes the potentially affected floodplain/location, zone, encroachment type and risk associated with implementation of the proposed project.

Table 6.4 Potential Floodplain Encroachment

Affected Floodplain/Location	FIRM Zone	Type of Encroachment	Risk
West Cucamonga Creek	AO/A	Transverse	Low
Cucamonga Creek/Deer Creek	A	Transverse	Low
Lower Deer Creek	A	Transverse	Low
California Commerce SD	AH	Transverse	Low
East Etiwanda Creek	AH	Longitudinal & Transverse	Low
San Sevaine Creek	A	Transverse	Low
I-10 Channel	A	Longitudinal	Low
Colton Southwest SD	AH	Longitudinal & Transverse	Low

Affected Floodplain/Location	FIRM Zone	Type of Encroachment	Risk
11th Street SD	AE	Transverse	Low
Warm Creek Channel	AE	Longitudinal & Transverse	Low
Santa Ana River	AE	Transverse	Low
San Timoteo Creek	A	Transverse	Low
Mission Channel	A/AO	Transverse	Low
Zanja Creek	A/AO	Longitudinal & Transverse	Low

FIRM = Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps

6E.3. Water Quality

The project is estimated to increase the volume of drainage runoff by approximately 140 acres or 14.4%. Additional vehicle pollutants would also be generated due to the projected increase in traffic volume along the corridor.

A *Water Quality Assessment Report* has been prepared for the project to assess the potential impacts of the proposed improvements on surface waters, groundwater, flooding, water quality and designated waters of beneficial uses. The report indicates that there are opportunities to implement Permanent Treatment BMPs, Design Pollution Prevention BMPs, and Temporary Construction BMPs at various locations within the project limits to address water quality. Specific measures and locations to improve water quality will be developed during the final design phase. The report concludes that by following the guidelines and regulations established by the NPDES and with implementation of temporary and permanent BMPs, the effects to water resources or water quality from construction and operation of the I-10 Corridor Project would be less than significant.

6E.4. NPDES/Storm Water Compliance

The project will conform to the following permits and requirements including any subsequent revisions and/or additional requirements at the time of construction:

- California Statewide NPDES Storm Water Permit (Order No. 2012-0011-DWQ, NPDES No. CAS00003)
- NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ and 2012-0006-DWQ, NPDES No. CAS00002)
- Los Angeles County MS4 (Order No. R4-2012-0175)
- San Bernardino County MS4 (R8-2010-0036)
- Caltrans Storm Water Management Plan (SWMP)

This project will require notification to the State Water Resources Control Board (SWRCB) via the Stormwater Multi-Application Report Tracking System (SMARTS). Project registration documents will also be filed and a Waste Discharge Identification (WDID) number will then be assigned. A SWPPP will be prepared prior to commencing any construction activities. A Notification of Construction (NOC) is anticipated to be submitted in 2019.

A *Storm Water Data Report* (SWDR) has been prepared for the project to assess the project water quality issues and recommend appropriate measures to address water quality for the project. A total of

8 biolfiltration swales and 22 WQV are proposed. Existing treatment BMPs along the I-10 corridor exist within or in vicinity of the Cherry Avenue, Citrus Avenue, and Ford Street interchange areas and consist of 6 biofiltration swales, 1 bio strip, 1 infiltration basin, and 1 detention basin.

With implementation of the proposed Treatment BMPs, the design of the proposed project is estimated to treat approximately 20.4% of the total onsite runoff WQV from both proposed and existing paved surfaces within the State right of way. It should be noted that the proposed permanent Treatment BMP strategy will treat 100 percent of the net new impervious surface area proposed by this project (140 acres or 14.4% increase). The project will not discharge directly into unlined channels and no bridge runoff will be directly discharged into waterways. The runoff from the Santa Ana River bridges currently discharges into the river. However, the proposed widening will install deck drain or inlet to capture the runoff and prevents direct discharge into the river. The costs for temporary and permanent Treatment BMPs have been included in the project cost estimate. The SWDR signature page is attached to this document as **Attachment M**.

6E.5. Community Impacts and Relocations

A *Community Impact Assessment (CIA)* report has been prepared for the project to assess potential major impacts or substantial issues to be resolved with changes in community elements that could result from implementation of the I-10 Corridor Project. The CIA concludes that changes to the community's visual character and quality may occur as a result of the proposed project improvements due to removal of mature trees and the addition of urbanizing elements (e.g., new bridges, soundwalls, additional pavement, etc.). However, the proposed freeway widening will be constructed along an existing corridor; therefore, permanent impacts to community character and cohesion within the study area are not anticipated.

The project requires the conversion of existing land uses to public transportation uses. The report concludes that conversion of existing residential and commercial land uses to public transportation uses is consistent with applicable land use and transportation policies and, thus, would not adversely impact community character and cohesion, public services, community facilities and economic conditions in the study area. The proposed project would not disproportionately impact low-income and environmental justice populations. Sufficient replacement properties are available in the surrounding communities to accommodate relocation of the occupants of the 40 residential units and 12 non-residential properties that are required for the project.

The project will require partial right of way acquisitions/footing easements and TCE from 4 parcels in Ontario and TCE from 1 parcel in Ontario that are designated as grazing land. However, these parcels have not been used for grazing or other agricultural purposes in recent years and are zoned as office/commercial uses. Temporary impacts would not permanently convert existing agricultural land to another use. Environmentally sensitive area (ESA) fencing will be installed at the limits of construction prior to commencing work to prevent accidental damage to these areas.

A potential loss of approximately 217 parking spaces (54 of which are on-street parking) is anticipated.

During construction, some public transit, bicycle and pedestrian facilities could be disrupted by construction activities. Local residents and businesses located near the construction zone could experience inconveniences from construction activities on a temporary basis.

6E.6. Biological Issues

A *Natural Environment Study (NES)* has been performed for the project to assess and document the presence of biological resources within the BSA. The study indicates that 3 riparian vegetation communities were identified within the BSA including freshwater marsh (found within Montclair Basins, near San Antonio Creek Channel, and within some smaller channels); southern willow scrub (along Santa Ana River beyond the immediate I-10 footprint), and mule fat scrub (found within some of the southern willow scrub areas and in some isolate patches). Riversidean sage scrub (RSS) was also found at various locations along the study corridor. These vegetation communities (freshwater march, southern willow scrub, mule fat scrub, and RSS) are sensitive plant communities listed in the California Natural Diversity Database and would be considered environmentally sensitive areas, requiring fencing or barrier for protection.

According to the database search, 14 special-status plant species potentially occur within the region, 5 of which are federal and/or State listed endangered species and 9 of which are considered special-status plants. The study indicates that 2 of 4 plant species on the threatened and endangered species list, the slender-horned spineflower and Santa Ana River woolly-star, have low potential to occur in the BSA within the Santa Ana River and Warm Creek. Although these plants were not observed within the BSA during the rare plant assessment/survey in spring 2013 and summer 2016, limited habitat may occur in the Santa Ana River and Warm Creek in the future due to seasonal and annual variability of the species and variability of climate or physical conditions as well as the passage of time. None of the 9 special-status plants identified in the database are likely to occur within the BSA because there is no suitable habitat and none were observed during the field surveys.

According to the *NES*, 33 special-status wildlife species are reported to occur within the region, 10 of which are on the federal and/or State threatened or endangered species list. Of the 10 species on the threatened and endangered list, 3 species (least Bell's vireo, southwestern willow flycatcher, and coastal California gnatcatcher) are identified as having a low potential to occur within the BSA, 1 species (Delhi Sands flower-loving fly) is identified with a moderate potential to occur within the BSA, and the remaining 6 species are considered not likely to occur. Of the 23 special-status animal species which are not threatened and/or endangered, 8 species (yellow-breasted chat, Cooper's hawk, yellow warbler, silvery-legless lizard, orange-throated whiptail, San Diego horned lizard, western mastiff bat, and San Diego black-tailed jackrabbit) have low potential to occur, 5 species (burrowing owl, pallid bat, northwestern San Diego pocket mouse, western yellow bat, and Los Angeles pocket mouse) have moderate potential to occur, and 10 of these species are considered not likely to occur. Areas with the highest potential for special-status wildlife species include undeveloped areas within and adjacent to Etiwanda Wash, undeveloped areas identified as potential staging areas, and areas within bridges and in trees and shrubs within the BSA.

The *NES* indicates that the BSA is within the United States Fish and Wildlife Service (USFWS) designated critical habitat for the southwestern willow flycatcher and Santa Ana sucker. However, the physical condition in the Santa Ana River is completely devoid of dense riparian vegetation and has low insect prey populations that would support these species. Based on this information, Caltrans has determined that the project would have "no effect" on southwest willow flycatcher and Santa Ana sucker.

The coastal California gnatcatcher (CAGN) is a State or federal threatened and endangered-listed species that has a low potential to occur within the BSA. However, based on the negative survey results for this species, no known occurrence of CAGN in the vicinity, and absence of critical habitat, Caltrans has determined that the project would have "no effect" on CAGN.

Delhi Sands flower-loving fly (DSF) is a federally endangered-listed species that has a moderate potential to occur within the BSA. During the surveys conducted in 2016, DSF was found in the I-10/Pepper Avenue interchange area, between the Pepper Avenue EB on-ramp and the right of way. As such, Caltrans has re-initiated formal Section 7 consultation with USFWS and has amended the previously issued Biological Opinion (BO) on April 17, 2017 (amended BO: FWS-SB-08B0369-17F0669). It has been determined that the project would result in 0.77 acres of permanent impacts to potentially suitable occupied DSF habitat which will be mitigated at 3:1 ratio. The project would result in 1.63 acres of temporary impacts to potentially suitable DSF habitat which will be mitigated at 1:1 ratio. In summary, a total of 3.94 acres will be mitigated through the purchase of mitigation credits at a USFWS-approved mitigation bank.

The *NES* concludes that implementation of identified measures and compliance with applicable codes, ordinances, laws, and other required regulations, are required to avoid or minimize temporary and permanent effects to threatened and endangered, and candidate species. Key measures identified for the project include:

- The ESAs for biological resources including the Santa Ana River, Warm Creek, and suitable habitat for Delhi Sands flower-loving fly species will be delineated by a qualified biologist during the final design phase. Highly visible fence or barrier will be placed to protect the footprint of designated ESAs prior to start of construction activities. Earthwork activities will not be permitted within the ESAs.

- Areas of sensitive plant communities which are temporarily impacted by the project construction will be hydroseeded with plant species similar to the types that currently exist.

- A habitat reassessment will be conducted by a qualified biologist for the Santa Ana River woolly-star and slender-horned spineflower within the BSA in vicinity of Warm Creek and Santa Ana River during the blooming season between May and September at least 1 year prior to initiation of construction activities in the area.

- Permanent impacts to DSF will be mitigated at a 3:1 ratio and temporary impacts to DSF will be mitigated at a 1:1 ratio through the purchase of mitigation credits at a USFWS-approved conservation program such as the Reichel HCP, the Angelus Block Property, the Owl Company Property, the Laing Homes (King is Coming) Site, the Hospital Site, the Colton Substation Site, and/or the Vulcan Materials DSF Mitigation Bank.

- In compliance with the Migratory Bird Treaty Act (MBTA) and relevant sections of the CDFW Code, any vegetation clearing within the project's disturbance footprint should take place outside the typical avian nesting season between February 15 and August 31 to the maximum extent practical. If vegetation clearing is necessary during bird nesting season (February 15 through August 31), pre-construction surveys of birds and raptors within 300 feet of construction areas are to be performed by a qualified biologist no more than 30 days prior to ground disturbing activities. To the maximum extent possible, a minimum buffer zone from occupied nests shall be maintained during physical ground-disturbing activities. If work is scheduled during the swallow/swift nesting season (March 1 through August 31), exclusion devices will be installed under supervision of a qualified biologist during non-breeding season prior to construction.

- Due to future land development, a potential habitat for burrowing owls may occur in the future; consequently, a habitat assessment should be performed during the final design phase. A pre-construction survey is also required within 30 days prior to any construction activities in the area identified as potential habitat.

- In addition, a pre-construction survey of bats is to be performed by a qualified biologist at bridges and other structures that have sufficient thermal cover to support roosting. In the event that a roosting, breeding or material colony of bats is observed, the Caltrans District 8 Biologist will be consulted.

6E.7. Visual/Aesthetic Issues

A *Visual Impact Assessment (VIA)* report has been prepared for the project to assess the potential effects of the project to the visual environment. The report concludes that the project has the potential to moderately effect existing visual environment, including removal of approximately 1,148 trees, most of which are trees from Eucalyptus windrows between I-15 and the Santa Ana River. The project will also result in additional hard surfaces, including pavement, longer/wider bridges, and walls.

Mitigation measures have been proposed in the VIA report requiring a multidisciplinary design approach to reduce the project's visual impacts. The measures propose context-sensitive design solutions through incorporation of aesthetic elements from the Caltrans' *Interstate 10 Corridor Master Plan, San Bernardino County* and Caltrans' *Aesthetics and Landscape Master Plan*, as well as inclusion of structural aesthetics in the project design and provision of replacement planting along the project corridor. With effective implementation of the proposed mitigation measures, the visual impacts of the project can be reduced and would not result in a substantial change in the overall visual quality for the area.

6E.8. Cultural Resources

A *Historic Property Survey Report (HPSR) including* a *Historical Resources Evaluation Report (HRER)*, an *Archeological Survey Report (ASR)*, and a *Finding of No Adverse Effect (FNAE) with Non-Standard Conditions*, has been prepared to evaluate and document the presence of cultural, historical, and archeological resources within the project Area of Potential Effects (APE). The HPSR identifies 67 cultural resources that required evaluation, 5 of which are National Historic Preservation Act (NHPA) Section 106 Historic Properties under NEPA and 11 are Historical Resources for the purposes of CEQA. One of the 67 cultural resources is a historic archaeological site (CA-SBR-12989H). There are no prehistoric archaeological sites within the project APE. A records search of the Sacred Lands File (SLF) maintained by the California Native American Heritage Commission (NAHC) was also performed and indicated that no sites within the Sacred Lands Files are located within the immediate project area.

Five NHPA Section 106 Historic Properties under NEPA are Euclid Avenue (SR-83), Mill Creek Zanja, 1055 E. Highland Avenue, 926 E. Highland Avenue, and Curtis Homestead. In the May 12, 2015 letter, the State Historic Preservation Officer (SHPO) concurred that 62 of the 67 properties evaluated are not individually eligible for the National Register of Historic Places (NRHP). Euclid Avenue and Mill Creek Zanja were previously listed in the NRHP and are considered historic properties. In addition, SHPO recommended that Caltrans consider 2 properties in Redlands (1055 E. Highland Avenue and 926 E. Highland Avenue) eligible for the NRHP for the purposes of the project.

Finally, SHPO concurred that the Curtis Homestead in Loma Linda (CA-SBR-12989H) can be assumed eligible for the NRHP for the purposes of the project.

Five cultural resources listed or formally determined eligible for listing in the NRHP are automatically listed in the California Register of Historical Resource (CRHR) and are historical resources for the purposes of CEQA. In addition, Euclid Avenue and three fronting properties (1531 N. Euclid Avenue, 1540 N. Euclid Avenue, and 1524 N. Euclid Avenue) have been designated by the City of Ontario as a local historic district and are historical resources for the purposes of CEQA. Terrace Park in Redlands, has been designated a City of Redlands local "Historic Property" (Historic and Scenic Resource No. 115) and is a historical resource for the purposes of CEQA. In addition, the study finds the B.W. Cave Residence/322 The Terrace in Redlands potentially eligible for local designation and is considered a historical resource for the purposes of CEQA.

Required measures to minimize and/or avoid adverse effects to the historic properties are discussed in Section 3.1.8 of the FEIR/EIS and are summarized below:

- If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find.

- If human remains are discovered, further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner contacted. If the remains are thought to be Native American, the coroner will notify the NAHC, which will notify the Most Likely Descendent (MLD). The person who discovered the remains will contact Gary Jones, District 8 Native American Coordinator, who will work with the MLD on the respectful treatment and disposition of the remains.

- The design of the Euclid Avenue OC replacement structure will include landscaping in a manner consistent with the historic landscape design of Euclid Avenue to the north and south of the bridge, including a double tree line in the median (or a single tree line where there is sight distance or other safety concerns). The existing raised median will be maintained to the extent feasible. The final design of the replacement structure shall be reviewed by the Caltrans Professional Qualified Staff (PQS) Architectural Historian. The cities of Ontario and Upland will also be consulted on the design of the replacement structure and landscape schemes.

- All contributing trees (original trees or their mature replacement regardless of tree species) required to be removed from the Euclid Avenue parkway and median will be replaced within the parkway or median. Locations of contributing tree replacement will be determined by the Caltrans PQS Architectural Historian in consultation with the Caltrans Landscape Design, SBCTA, and the appropriate city (Ontario or Upland). Preference will be given to infilling holes in existing tree lines in vicinity of the project area, followed by recreating the double tree line between 6th Street and the Euclid Avenue OC where the majority of contributing trees are to be removed. The total number of trees replanted within the median will equal, at a minimum, the total number removed from the median within the APE (contributing and noncontributing). California pepper trees are the preferred variety for median planting. Silk oak or similar oak species are the preferred variety for parkway planting. If circumstances warrant, other acceptable species may include deodar cedar, magnolia, and camphor. Planting activities shall be spot monitored by the Caltrans PQS architectural historian and Caltrans Landscape Design's criteria will apply.

- All sections of contributing cobblestone curbs along Euclid Avenue removed will be replaced in-kind using the Secretary of the Interior's Standards (SOIS) for Rehabilitation based on plans provided and approved by the cities. Existing concrete median curbs that will be removed and replaced between 6th Street and the Euclid Avenue overcrossing structure will be replaced or restored with cobblestone curb using the SOIS for Rehabilitation based on plans provided by the cities to recreate a continuous cobblestone curb along the entire section of median affected by the undertaking. Reconstruction of the stone curbs shall be spot monitored by the Caltrans PQS architectural historian.

- Any streetlights required to be installed on Euclid Avenue will be King Standard Lighting design for consistency with the existing lighting.

- Develop a Cultural Resources monitoring plan prior to commencement of any preconstruction or construction-related activities at Euclid Avenue and provide the cultural resources monitor. Upon completion of all construction related to the conditions in the FNAE, a Monitoring Report will be prepared to document that all conditions have been met. The monitoring report will be approved by the Caltrans PQS architectural historian and submitted to SHPO to document compliance with the FNAE conditions. In addition, construction plans and activities in vicinity of the remaining historic properties in the APE (the Mill Creek Zanja, Curtis Homestead, 1055 E. Highland Avenue, and 926 E. Highland Avenue) will be spot monitored throughout construction by the Caltrans PQS to ensure that the potential for effect has not changed.

- Establish and enforce ESA for Curtis Homestead.

6E.9. Paleontological Resources

A *Combined Paleontological Identification Report and Paleontological Evaluation Report (PIR/PER)* has been prepared for the project to assess the paleontological resource potential within the Resource Study Area. The report concludes that sediments in the project area have the potential to contain vertebrate fossils. Therefore, disturbance of sediments below grade has the potential to impact paleontological resources. The greatest likelihood for encountering paleontological resources will be where deep excavation, soil boring, augering, or foundation construction takes place.

Monitoring for paleontological resource is recommended as follows:

- All excavation in areas mapped as San Timoteo Formation is highly sensitive for paleontological resources and should be monitored full time.

- Excavation deeper than 5 feet in areas mapped as Quaternary old alluvial fan, very old alluvial fan, very old axial channel sediments, and old eolian deposits should be monitored full time.

- Excavation deeper than 10 feet in areas mapped as young alluvial fan, young eolian deposits, young axial channel sediments, and very young deposits should be spot checked periodically for the presence of underlying older, paleontologically sensitive sediments.

A Paleontological Mitigation Plan will be prepared by a qualified paleontologist prior to the start of construction.

6E.10. Section 4(f)

A *Resources Evaluated Relative to the Requirements of Section 4(f)* has been prepared to identify Section 4(f) resources within 0.5 miles of the project study area and evaluate potential impacts of the proposed project improvements on these resources. The report identifies 82 properties within 0.5 miles of the project site as Section 4(f) resources including 39 outdoor parks, 34 public schools with publicly accessible recreational facilities, 4 trails, 4 NRHP-eligible historic sites, and 1 NRHP-eligible archeological site. Seventy-seven (77) properties (39 outdoor parks, 34 public schools, and 4 trails) are publicly owned lands.

Of 82 properties, Euclid Avenue (historical resource) and 4 properties including MacArthur Park, Edison Elementary School, Santa Ana River Trail, and Orange Blossom Trail have the potential to be impacted. All other Section 4(f) resources are not anticipated to be impacted by the project.

Further review of the potentially affected Section 4(f) resources is summarized below:

- Euclid Avenue in the City of Ontario is subject to direct use. Euclid Avenue will be modified between 6th Street and 7th Street to provide additional traffic lanes and the Euclid Avenue overcrossing structure will be replaced. With implementation of mitigation measures to minimize and/or avoid adverse effects, the direct use of Euclid Avenue is not anticipated to diminish the overall historic character, driving experience, and integrity of this resource. Mitigation measures to minimize and/or avoid adverse effects to Euclid Avenue are discussed in Section 6E.8 Cultural Resources of the FEIR/EIS.

- MacArthur Park in the City of Montclair is subject to direct and temporary uses. Approximately 0.14 acres of the park is required to accommodate the proposed improvements, which will convert this acquired right of way to transportation uses. In addition, 0.04 acres of the park is required for a wall footing easement below ground. During construction, approximately 0.16 acres of the park adjacent to the State right of way will be occupied as a temporary construction staging area. The areas to be acquired or used for construction staging consist only of landscaping. The direct and temporary uses of the park are not anticipated to affect the recreational facilities or uses.

- Edison Elementary School in the City of Ontario was previously subject to temporary use, as approximately 0.07 acres of property was required as a TCE to accommodate the construction of a short retaining wall along Sultana Avenue. After the circulation of the DEIR/EIS, the design of Sultana Avenue was modified to eliminate all impacts to the school property including TCE. As such, the project will not result in any Section 4(f) impacts (direct, temporary, or constructive use) of the school, and concurrence from the Ontario-Montclair School District is not required.

- Santa Ana River Trail is a paved trail/bike path that crosses under I-10 along the Santa Ana River in the City of Colton. This trail will be subject to temporary use during construction. A falsework opening will be provided during widening of the Santa Ana River bridges in order to maintain accessibility of this trail. However, periodic temporary nighttime closure of the trail will be necessary during erection and removal of the falsework and during certain construction activities. Since the trail is accessible from sunrise to sunset, the anticipated nighttime closure of the trail is not anticipated to diminish its recreational use. The project will not result in direct or constructive use of the trail.

- Orange Blossom/Zanja Trail is a planned paved trail/bike path that crosses under I-10 along Mission Channel in the City of Redlands. This trail, if constructed prior to the I-10 Corridor Project, will be subject to temporary use during construction. During widening of the Mission Channel bridge/West Redlands OH, temporary closure of the trail is anticipated. Trail users will be detoured to nearby on-street bike routes along Lugonia Avenue and California Street. The project will not result in direct or constructive use of the trail.

The report concludes that the project would result in a de minimis finding for each of the Section 4(f) properties since none of the direct uses would diminish the historical attribute or recreational function of the properties. The project is not anticipated to result in constructive use of any of the identified 4(f) properties. The project would not indirectly impact access, visual resources, air quality, water quality, vegetation and wildlife, and/or noise, so severely that the functions of the Section 4(f) properties are substantially impaired. Coordination with affected agencies was conducted to confirm the de minimis finding and appropriate mitigation measures to minimize harm to Section 4(f) properties. In November 2016, concurrence was received from the City of Montclair regarding MacArthur Park, City of Redlands regarding Orange Blossom/Zanja Trail, and from the County of San Bernardino Regional Parks regarding Santa Ana River Trail. In March and April 2017, concurrence was received from the Cities of Upland and Ontario regarding Euclid Avenue.

6E.11. Section 6(f)

Section 6(f)(3) of the 1965 Land and Water Conservation Fund (LWCF) Act, which contains provisions to protect federal investments in park and recreation resources and the quality of those federal-assisted resources, is fully discussed in the *Resources Evaluated Relative to the Requirements of Section 4(f)* report. The law states that no property acquired or developed with federal assistance under Section 6(f)(3) shall without the approval of the Secretary of Transportation be converted to other than public outdoor recreational uses. A review of the LCWF grant database indicated that one property within 0.5 miles of the project site has received LCWF grants: Sylvan Park located in the City of Redlands. The project will not require acquisition of Sylvan Park. Accordingly, there will be no conversion or use of Sylvan Park and the Section 6(f) provisions will not be violated.

6E.12. Traffic Study Report

Information in the *Traffic Study Report* and *Traffic Study Report Addendum #1* prepared for the project is presented in Section 4C for the existing and future No Build conditions. Traffic analysis of the proposed project is presented in Section 5. As part of the EIR/EIS process, information in the traffic study is used to identify significant traffic impacts of the proposed project alternatives. The report reveals that each of the project alternatives is anticipated to increase or maintain existing vehicle throughput along the freeway. Consequently, no adverse traffic impacts of the proposed project are anticipated on the freeway mainline.

During the project construction, construction-related delays along the I-10, I-15, I-215, and SR-210 freeways and interchanges, as well as, on the surrounding local arterials, are anticipated. Temporary and short-term closures would likely be required and would occur intermittently throughout the construction duration. Full freeway lane, ramp, and arterial street closures could also be required and would likely occur during the nighttime and on weekends during various roadway and structure construction activities. Some prolonged closures up to 30 days are also anticipated to facilitate construction of certain interchange ramps, arterials, and overcrossing structures. Long-term closure up

to 16 months is also proposed on some of the local arterials to facilitate an expedited replacement of their overcrossing structures over I-10.

During arterial street closures, pedestrian facilities and bikeways along arterial streets will also be temporarily closed. As mitigation for these temporary impacts, a TMP will be prepared prior to construction to identify methods to avoid and minimize construction-related traffic and circulation effects and minimize impacts to pedestrian and bicycle access, including ADA-compliant features as a result of the proposed project. During construction, the contractor shall implement the methods identified in the TMP. Since no improvements are proposed under Alternative 1, there would be no construction-related traffic impacts to the corridor.

6F. Air Quality Conformity

An *Air Quality Report* has been prepared for the project to assess the impacts of the project on air quality locally and regionally. An *Air Quality Conformity Analysis* report has also been prepared to address the conformity requirements of the Federal Clean Air Act, with focus on pollutants for which the project area is designated nonattainment or attainment with an approved Maintenance State Implementation Plan (SIP). A summary of the air quality analysis findings is discussed below.

Regional Conformity

All major projects in Southern California that are capacity-enhancing are required to be included in the SCAG RTP/SCS for air quality conformity analysis. Alternative 3 is included in the conforming 2016-2040 RTP/SCS, which Federal Highway Administration (FHWA) determined on June 1, 2016 to conform to the SIP for attaining and maintaining the National Ambient Air Quality Standards (NAAQS). The project is also included in the 2017 FTIP. Alternative 3 is fully compatible with the design concept and scope described in the 2016-2040 RTP/SCS and 2017 FTIP.

Project-Level Conformity

The San Bernardino County portion of the South Coast Air Basin is designated as an extreme nonattainment area for ozone (O_3), a moderate nonattainment area for Particulate Matter of 2.5 microns in diameter or smaller ($PM_{2.5}$), unclassified/attainment for lead, and a maintenance area for Particulate Matter of 10 microns in diameter or smaller (PM_{10}), carbon monoxide (CO), and nitrogen dioxide (NO_2). The project is subject to Project-Level Transportation Conformity Assessments for CO and PM. According to the CO protocol, it was determined that the project would not be expected to create a CO hot-spot. The project was presented before the SCAG Transportation Conformity Working Group (TCWG) on September 22, 2015, followed by additional interagency coordination in January and February 2016. On February 23, 2016, the TCWG determined that the I-10 Corridor Project is not a Project of Air Quality Concern (POAQC) and does not require a $PM_{2.5}$ and PM_{10} hot spot analysis.

Regional Emissions and Mobile Source Air Toxics

According to the air quality technical study performed for the project, existing emissions are estimated to be greater than project emissions for all pollutants except $PM_{2.5}$ in 2025 and PM_{10} in 2025 and 2045. The study also indicates that existing Mobile Source Air Toxics emissions, including diesel particulate matter, are significantly greater than projected emissions in 2025 and 2045 despite increases in vehicle volumes due to improvements in engine efficiencies and associated emission rates.

Construction Emissions

During construction, temporary degradation of air quality may occur due to construction emissions including fugitive dust and exhaust from equipment, trucks, and worker vehicles. However, most of the construction impacts to air quality would be short-term in duration and therefore, will not result in long-term adverse conditions. Implementation of avoidance, minimization and/or mitigation measures would reduce construction emissions and are discussed in Section 3.2.6 of the FEIR/EIS.

6G. Title VI Considerations

The project will not have adverse effects on public transit, pedestrian traffic, or low mobility groups. Existing transportation facilities for transit, pedestrian, and low mobility groups will be maintained. Implementation of additional transportation facilities, as discussed in Section 5.A.4.11 of this document, will comply with the Title VI of the Civil Rights Act with provisions for low mobility and minority groups, where applicable. Pedestrian facilities within the improvement limits will meet current ADA standards.

7. OTHER CONSIDERATIONS AS APPROPRIATE

7A. Public Hearing Process

The DEIR/EIS was circulated for a 50-day public review period between April 25, 2016 and June 13, 2016. Three public hearings were held during the public review period, as listed below:

- May 17, 2016 in San Bernardino
- May 18, 2016 in Bloomington
- May 19, 2016 in Ontario

A total of 56 comments were received during the public review period including 4 comments from federal government agencies, 2 comments from state government agencies, 3 comments from regional government agencies, 9 comments from local agencies and organizations, and 38 comments from the general public. One comment from the public included a petition with 26 signatures from residents of the Cities of Claremont and Pomona in Los Angeles County, expressing opposition to Alternative 3 and citing increased air and noise pollution and negative environmental impacts.

Four (4) comments from federal government agencies included:

- National Park Service relating to the Old Spanish Historic Trail
- US Department of Interior relating to federally listed species and natural communities
- US EPA relating to traffic, air quality, noise, acquisition, environmental justice, health, and climate change
- US Department of Interior relating to the Old Spanish Historic Trail

Two (2) comments from state government agencies included:

- Department of Motor Vehicles relating to the project schedule
- Department of Water Resources relating to construction affecting their properties and facilities

Three (3) comments from regional government agencies included:

- Southern California Regional Rail Authority relating to support for the project and coordination during construction
- San Bernardino County Public Works Department relating to flood control facilities
- Southern California Edison relating to utility impact analysis and coordination

Nine (9) comments from local agencies and organizations included:

- Old Spanish Trail Association requesting inclusion for future coordination
- San Antonio Water Company relating to SAWC facilities within the project area
- City of Pomona Public Works Department relating to potential traffic impacts in Pomona
- Old Spanish Trail Association relating to the Old Spanish Historic Trail
- City of Colton relating to potential parking, drainage, and visual impacts along J Street
- City of Claremont relating to potential traffic impacts in Claremont
- Ontario-Montclair School District relating to potential impacts to school facilities
- City of Rialto relating to various environmental and cumulative impacts
- City of Ontario relating to improvements at Vineyard Avenue and Grove Avenue/4th Street interchanges

Thirty-eight (38) comments from the general public included:

- Inquiries about the project and potential construction and property impacts – 7 comments
- Inquiries about noise impacts and soundwalls – 5 comments
- Inquiries about environmental impact analyses – 1 comment
- Satisfaction with provided information – 3 comments
- Expressed support for the project – 5 comments
- Expressed opposition to the project in general – 6 comments (one comment was in the form of a petition with 26 signatures from residents in LA County)
- Expressed opposition to Alternative 3 – 9 comments
- Information and suggestions – 2 comments

The affected local agencies along the project corridor have been consulted with respect to the recommended plan and their views have been considered. Affected local agencies are in general accord for implementation of the I-10 Express Lanes between the LA/SBd County Line and Ford Street in Redlands.

In responses to the public and agency review comments, the following design modifications were made to Alternative 3 after distribution of the DPR and DEIR/EIS:

- The I-10/Monte Vista Avenue interchange was modified to include a single-span UC bridge instead of the previously proposed two-span bridge. In addition, modifications of lane configurations/assignments on Monte Vista Avenue and Palo Verde Street were made.

- The design of Sultana Avenue was modified to eliminate all impacts including TCE from the Edison Elementary School.

- The I-10/Vineyard Avenue interchange was modified to include an additional right-turn lane at the WB off-ramp and a dedicated free NB right-turn to the EB on-ramp.

7B. Route Matters

Freeway Agreements

Superseding Freeway Agreements will be required between Caltrans and the County of San Bernardino and various Cities along the project corridor to outline operational and maintenance responsibilities.

New Connections

No new public road connections are proposed as part of the I-10 Corridor Project.

Modified Access

No access modifications are proposed as part of the I-10 Corridor Project.

7C. Permits

Permits and/or approvals required for the proposed project improvements are listed in **Table 7.1**.

Table 7.1 Permits and Approvals

Agency	Permits/Approval	Status
Federal Agency Permits/Approvals		
United States Army Corps of Engineers	Section 404 Permit for filling or dredging waters of the U.S.	Section 404 Permit will be obtained prior to project construction. Application for Section 404 Permit is anticipated after Final EIR/EIS distribution.
	Section 408 Permit	Section 408 Permit will be obtained prior to project construction. Application for Section 408 Permit has been initiated.
FHWA	Project-Level Air Quality Conformity Finding	FHWA determined in February 2016 that the project is not a project of air quality concern.
	Project Management Plan, Initial Financial Plan, and Cost Estimate Review	The Cost Estimate Review was performed in March 2017. The Project Management Plan and Initial Financial Plan are required and will be submitted to FHWA after the approval of the Final EIR/EIS.

Agency	Permits/Approval	Status
United States Fish and Wildlife Service	Section 7 Consultation for potential impacts to DSF (previous BO: FWS-SB-4339.5, April 2006)	An amendment to the previous BO has been issued in April 2017 (amended BO: FWS-SB-08B0369-17F0669).
State Agency Permits/Approvals		
California Department of Fish and Wildlife	Section 1602 Streambed Alteration Agreement	Section 1602 Permit will be obtained prior to project construction. Application for Section 1602 agreement is anticipated after Final EIR/EIS distribution.
Regional Water Quality Control Board, Region 8 (Santa Ana)	Section 401 Water Quality Certification	Section 401 Permit will be obtained prior to project construction. Application for Section 401 certification is anticipated after Final EIR/EIS distribution.
State Water Resources Control Board	Construction General Stormwater and Caltrans' Statewide NPDES Permits	Project design plans will comply with RWQCB General Orders No. 2009-0009-DWQ (NPDES Permit No. CAS000002) and 99-06-DWQ (NPDES Permit No. CAS000003).
California Department of Water Resources (DWR)	Encroachment permit/review	Prior to construction activities near the Santa Ana Pipeline, approval to construct with DWR right of way will be obtained.
California Public Utilities Commission (CPUC)	Compliance with CPUC General Order 131-D regarding relocation electrical lines 50 kilovolts (kV) or greater. The relocation may qualify for an exemption from the CPUC Certificate of Public Convenience and Necessity requirements discussed in Section III.A of CPUC General Order 131-D and/or pursuant to related case law.	SCE will make the determination of CPUC permitting upon review of further engineering and the Final EIR/EIS. Prior to relocation of electrical lines 50 kV or greater, permit approval must be obtained from CPUC. Coordination to obtain the permit is ongoing.
	Approval of the project, based on review of the Railroad Construction and Maintenance Agreement	Must be completed prior to construction within or above railroad right of way. Coordination will begin after the Final EIR/EIS circulation.
UPRR and BNSF	Memorandum of Understanding and Construction and Maintenance Agreement with the Railroad	Must be completed prior to construction within or above railroad right of way. Coordination will begin after the Final EIR/EIS circulation.

Agency	Permits/Approval	Status
County Agency Permits/Approvals		
San Bernardino County Flood Control District	Encroachment Permit	Letter or permit will be obtained during final design or construction within SBCFCD property. Coordination will begin after the final EIR/EIS circulation.
SBCTA	Maintenance, Operations, and Law Enforcement Agreements	Maintenance, toll operations, and law enforcement agreements between SBCTA, the toll operator, CHP, and Caltrans will be required prior to opening of the Express Lanes.
Utility Company/County and Municipal Service Provider Permits/Approvals		
Various local entities and utility agencies identified as having utilities within the project limits	Approval to relocate, protect in place, or remove utility facilities	Approval will be obtained prior to any construction within utility conflict areas. Coordination will begin following the identification of the PA.
Local Jurisdiction Permits/Approvals		
Cities of Pomona, Montclair, Upland, Claremont, Ontario, Fontana, Rialto, Colton, San Bernardino, Loma Linda, and Redlands, County of San Bernardino	Freeway Agreements	Freeway Agreements will be concluded with each of the cities in which project construction will take place. Freeway Agreements will be developed following completion of the final design.
	Section 4(f) *De Minimis* Impact Finding	Concurrence on "*De Minimis* Finding" to Section 4(f) resources has been received for MacArthur Park, Euclid Avenue, Santa Ana River Trail, and Orange Blossom/Zanja Trail.

7D. Cooperative Agreements

SBCTA is the sponsoring agency for funding and administering the project development effort. A Cooperative Agreement, which sets forth the terms and conditions between Caltrans and SBCTA, and outlines respective responsibilities for the PA/ED phase, has been in place. Separate Cooperative Agreements will be executed for the design, right of way, and construction phases of the project prior to completion of the PA/ED phase. In addition, Cooperative Agreements will be entered between SBCTA and Caltrans for the financial contribution from Caltrans to incorporate the safety lighting project between Fourth Street and I-15 (EA 1F550K) into the I-10 Corridor Project.

7E. Other Agreements

Several transportation agencies will be involved in the project development and coordination, including Caltrans Districts 7 and 8, SBCTA, the Los Angeles County Metropolitan Transportation Authority (Metro), County of San Bernardino, and various Cities along the project corridor. Interagency agreements or memoranda of understanding (MOU) will be entered between transportation agencies during the final design phase.

Other agreements will be developed as required over the course of the project development between SBCTA, Caltrans, and numerous resource agencies along the project corridor including, but not limited to, SBCFCD, CPUC, railroad agencies, utility agencies, and various city departments. These agreements will cover the following topics.

- Construction and maintenance agreements with UPRR and BNSF including right of entry, temporary construction easement, and permanent aerial/underground easement.
- Service agreements with UPRR and BSNF for plan review and railroad flagging cost.
- Agreements between SBCTA and Caltrans to define utility cost sharing, FSP and towing operations, accident/incident clearance responsibilities, and other roles and responsibilities.
- Joint use and maintenance agreements between Caltrans and various utility agencies, the SBCFCD, and various local cities.
- Reimbursable service agreements between Caltrans, SBCTA, and the CHP to identify enforcement responsibilities for the proposed Express Lanes.
- Agreements between SBCTA and CHP for Construction Zone Enhanced Enforcement Program (COZEEP) during construction.
- Agreements for extended FSP support during construction.
- Agreements with OmniTrans for maintenance of bus loading facilities on interchange ramps.
- Agreements between SBCTA, Caltrans, and FHWA for authorization of federal funds for tolling implementation on I-10.
- Tolling operational and maintenance agreements between SBCTA and Caltrans to delineate toll operation and maintenance responsibilities.

7F. Report on Feasibility of Providing Access to Navigable Rivers

There are no navigable waterways within the project area.

7G. Public Boat Ramps

There are no public boat ramps within the project area.

7H. Transportation Management Plan for Use During Construction

The total duration of construction for the project is approximately 60 months (5 years). Contract 1 which covers the proposed improvements from the LA/SBd County Line to I-15 is anticipated to be constructed within 36 months (3 years) between 2019 and 2022. Contract 2 which covers the improvements from I-15 to Ford Street is anticipated to be constructed within 36 months (3 years) between 2021 and 2024. There would be some construction overlap between the two contracts.

Construction-related delays are anticipated along the I-10, I-15, I-215, and SR-210 freeways as well as on the surrounding local arterials including SR-83 (Euclid Avenue) and SR-38 (Orange Street). Full closures will be required during night times and on weekends to accommodate various roadway and structure construction activities. Temporary ramp and local arterial closure less than 10 days will be necessary at various locations to facilitate certain construction activities. Complete closure up to 30 days is also anticipated on select interchange ramps where traffic maintenance does not appear to be feasible. Prolonged closure up to 16 months is also anticipated for some local arterials where the existing overcrossing bridge is too narrow to accommodate traffic maintenance during bridge replacement in multiple stages, or where full closure appears beneficial to facilitate faster construction of the street improvements and overcrossing structure replacements and, allow quicker return of the public use of the facilities.

TMP data sheets along with alternative route maps for closure of the I-10 freeway and local arterials during bridge replacement and closure of select interchange ramps where traffic maintenance is not feasible are included in this document in **Attachment O**. The estimated TMP costs have been included in the project cost estimate.

A TMP and lane requirement charts will be developed and certified during the final design phase. For the I-10 Corridor Project, the following TMP strategies are anticipated based on the type of work planned, the geographic and demographic area and the anticipated traffic impacts:

Public Information

A Public Awareness Campaign (PAC) will be established to provide the public with information relating to planned and on-going highway work. Construction activities, upcoming detours and/or lane closures, possible alternate routes, and alternate transportation modes information will be disseminated to the public via a number of methods including:

- Brochures and mailers to residents and businesses in targeted area;
- Press releases and news media events during key construction milestones;
- Paid advertisements through local newspapers, radio, and television broadcasts;
- Public information center/kiosk;
- Community outreach/public meetings;
- 24-hour telephone hotline providing automated update of construction activities and closures;
- Project websites;
- Community task force (local businesses/merchants) to help disseminate the information;
- Notification to targeted groups such as rideshare, transit, and bicycle organizations;
- Posting of construction information at local libraries, schools and City public work offices;
- Direct e-mails or e-newsletters to residents and businesses in targeted area; and
- Social network sites such as Facebook and Twitter.

Motorist Information

Motorist information strategies are used to relay near "real time" information regarding potential delays and available detours to motorists, enabling them to make travel plans accordingly. The following mechanisms will be employed to provide motorist information:

- Existing CMSs to report changing travel conditions;
- Portable Changeable Message Signs (PCMS) to report changing travel conditions;

- Stationary ground-mounted signs to provide information about immediate road conditions;
- Traffic radio announcements; and
- Caltrans Highway Information Network (CHIN), 1-800-427-ROAD.

Incident Management

An incident is any event that interrupts traffic flow for a significant amount of time. An Incident Management Plan is proposed for this project to manage the effects of traffic incidents or vehicular breakdown in or near the work zone. Key components of incident management strategies are:

- Traffic Management Team (TMT) to help manage traffic during incidents and lane closures;
- District Transportation Management Center (TMC) to coordinate traffic and incident information dissemination;
- Existing traffic surveillance equipment to be maintained during construction;
- Expanded FSP to remove disabled vehicles from highway facilities; and
- COZEEP to increase CHP presence in construction zone.

Construction Strategies

Construction strategies will be implemented through staging construction and will be incorporated into the construction contract documents (traffic handling plans, construction area sign plans, contract special provisions, etc.). These strategies are designed to minimize impacts of construction activities on traffic circulation and may include:

- Lane closure restrictions during holidays and special local events;
- Closure of secondary streets during construction to allow quick construction and re-opening;
- Lane modifications (lane reductions, shifts) to maintain the number of lanes needed;
- Allowing night work and extended weekend work;
- Maintaining business access;
- Maintaining pedestrian and bicycle access;
- Use of rapid strength concrete to accelerate construction at appropriate locations; and
- Adding liquidated damages clauses in the contract documents.

Demand Management

This strategy entails promoting the use of public transit, ride sharing and variable work hours to reduce the amount of traffic using the freeway and roadways in and around the construction zone. Through the PAC, large employers will be urged to consider staggered working hours and encourage their employees to use the transit system and rideshare resources. Incentive programs, such as free transit tickets and free/discounted merchant coupons for rideshare participants, could be used to attract participants.

Alternative Route Strategies

Alternate routes and detours will be used to give motorists the opportunity to avoid the work zone by diverting to other highways or adjacent surface streets. Due to added traffic, improvements may be necessary on alternate and detour routes to add capacity, increase vehicle throughput and improve traffic flow in order to handle detour traffic. These strategies include:

- Street/intersection improvements;
- Signal improvements, signal timing adjustment, and/or signal coordination;
- Turn restrictions at selected intersections and roadways; and
- Parking restrictions on alternate and detour routes during work hours.

Contingency Plans

The following contingency plans will be developed to address potential construction and traffic related issues that could arise:

- Construction Operations Contingency Plan to identify elements that could potentially fail and cause delayed opening of lane closures, and provide the alternatives to ensure continuing operations and on-time opening of traffic lanes for each of the identified critical work operations; and
- Traffic Handling Contingency Plan to identify traffic handling contingency strategies to be employed in the event of work zone incidents or late lane closure pickups.

Coordination Elements

Coordination with local jurisdictions and emergency service providers (CHP, local police, fire, paramedics, etc.) will be made during the final design phase to identify emergency service routes that serve hospitals, fire/police stations, emergency shelters, emergency command centers and other facilities that provide essential services in times of emergencies within the study area. These emergency service routes would be maintained during construction or alternate routes provided. Alternate emergency service routes to be used during construction would need to be coordinated with emergency service providers. Construction contract documents would require that emergency service providers be notified in advance prior to any lane closures, interruptions on emergency service routes, or changes in traffic control.

Transit agencies would be informed during the final design phase about temporary lane and street closures. Commercial vehicle operators would be notified of all planned construction activities, implementation of detours or road closures.

7I. Stage Construction

The project is anticipated to utilize a design-build delivery process and be constructed in two contracts over a period of 60 months (5 years) with Contract 1 covering the proposed improvements from the LA/SBd County Line to I-15 and Contract 2 covering the improvements from I-15 to Ford Street, respectively. Construction staging concept will be developed during the final design phase. The project construction is envisioned to be carried out in several construction stages with construction progressing from west to east and some overlap between stages.

Construction of interchange improvements (consisting of freeway ramp reconstruction, local arterial improvements, and overcrossing structure replacement) is envisioned to be staggered throughout the corridor to minimize impacting two consecutive interchanges or closing two consecutive on- or off-ramps at the same time. If feasible, arterials and overcrossing improvements that add capacity over the existing condition would be constructed in the earlier stages in efforts to ease traffic congestion during subsequent construction stages.

Closures and Lane Restrictions

Construction operation will necessitate the full closures of various facilities such as the freeway mainline, branch connectors, interchange ramps and local arterials. Closures of these facilities are anticipated for the work listed below and may be overnight, short-term, or during weekends:

- installation, moving and removal of k-rails;
- striping and removal operations;
- falsework erection and removal;
- bridge demolition;
- construction of new overcrossings and foundations;
- widening of undercrossing structures and foundations;
- installation and removal of overhead signs and toll gantries;
- installation and removal of loop detectors;
- structure approach slab construction;
- placement of concrete pavement using rapid set concrete such as at ramp termini;
- asphalt concrete pavement construction and overlay operations;
- utility work; and
- extension or modifications of flood control channel.

Lane reductions and restrictions are also anticipated on mainline, connector, ramp and arterial roadway facilities to accommodate construction activities. These restrictions may include:

- Narrower lane and shoulder widths;
- Reduction in number of lanes;
- Elimination of separate turn lanes at intersections; and
- Speed reduction due to sharper lane transition/taper.

Arterial Closures

Arterials which cross under the I-10 freeway are expected to be open for traffic during construction. However, reduction in the number of traffic lanes will be necessary on some arterials crossing under the freeway to accommodate the support bent and abutment construction for the undercrossing bridge widening or replacement. Full nighttime or weekend closure will also be required on some arterials during demolition and construction of the undercrossing bridges (e.g. during installation of precast beams). Additionally, Monte Vista Avenue and 4th Street will need to be lowered to accommodate the standard vertical clearance of the replacement bridge, as such full nighttime or weekend closure will be necessary at various times during the roadway reconstruction and utility relocation.

For arterials which cross over the I-10 freeway, long-term closure lasting up to 16 months may be employed to facilitate construction of certain streets and overcrossing structures. Potential locations for long-term closures include the following arterial improvements and structure replacements:

1. San Antonio Avenue – 8 to 16 months
2. Sultana Avenue – 8 to 16 months
3. Campus Avenue – 8 to 16 months
4. 6th Street – 8 to 16 months
5. Richardson Street – 8 to 16 months

In addition, Palo Verde Street between Mills Avenue and Helena Avenue (west of Monte Vista Avenue) and Alvarado Street between Euclid Avenue and Sultana Avenue will need to be modified to a one-way street during certain periods of the project construction to facilitate the I-10 freeway widening and construction of the proposed retaining walls along the freeway right of way.

During arterial closures, vehicular, bicycle, and pedestrian traffic would be re-directed to alternate routes. Closure of streets that are in close proximity of one another will not coincide, such that there will be convenient nearby alternate routes available for pedestrians. Further evaluation and studies will be conducted during the final design to evaluate the locations and feasibility of the long-term closures and determine required mitigation measures.

Ramp Closures

Most interchange ramps are expected to be open for at least one lane of traffic during construction. Where necessary and space is available, temporary pavement may be constructed to maintain traffic. Periodic ramp closure may be necessary at night, during a weekend (55-hour closure) or for a period less than 10 days. Periodic short-term ramp closure is not expected to cause excessive inconvenience to the traveling public since the interchanges along I-10 are spaced approximately 1 mile apart, such that there are nearby alternate accesses to and from the freeway. No two consecutive off-ramps or two consecutive on-ramps in the same direction will be closed concurrently.

However, the Monte Vista Avenue EB on-ramp is anticipated to require long-term closure of approximately 16 to 24 months during the replacement of the Monte Vista Avenue UC structure. In addition, there are 13 ramps that may require prolonged closure for a period up to 30 days during reconstruction because the new ramp alignments are proposed over the existing alignments and there is limited space and right of way to accommodate a detour pavement. Interchange ramps that are expected to require long-term closure are identified below:

1. Monte Vista Avenue WB off-ramp (up to 30 days)
2. Monte Vista Avenue WB on-ramp (up to 30 days)
3. Monte Vista Avenue EB off-ramp (up to 30 days)
4. Monte Vista Avenue EB on-ramp (approximately 16 to 24 months)
5. Central Avenue EB on-ramp (up to 30 days)
6. Central Avenue WB off-ramp (up to 30 days)
7. 4th Street EB off-ramp (up to 30 days)
8. Etiwanda Avenue EB loop on-ramp (up to 30 days)
9. Etiwanda Avenue EB on-ramp (up to 30 days)
10. 9th Street EB off-ramp (up to 30 days)
11. E Street/Sunwest Lane WB on-ramp (up to 30 days)
12. Waterman Avenue EB on-ramp (up to 30 days)
13. Alabama Street EB off-ramp (up to 30 days)
14. Tennessee Street EB off-ramp (up to 30 days)

During closure of these ramps, alternative routes will be provided to motorists. Further evaluation and studies will be needed during the final design to evaluate the locations and feasibility of long-term ramp closures and determine required improvements.

Construction Staging Areas

Areas within the State right of way may be used as construction staging area. In addition, several private parcels along the project corridor are identified for potential use as construction staging areas, as shown in **Attachment P.** These parcels are vacant at the time of this report preparation and are within the project's Area of Potential Effects boundaries. Environmental studies did not reveal any adverse issues with these properties. However, future investigations are required during the final design phase to develop the final determination of construction staging areas.

Maintenance of Existing Traffic Management System (TMS) Elements

There are several existing TMS elements along the project corridor including existing CMS, CCTV, wireless vehicle detector system (WVDS), ramp metering system (RMS), and traffic monitoring stations. Fiber optic infrastructure also exists along the corridor from the LA/SBd County Line to SR-210. Existing TMS elements will be maintained and operated during construction and will be used as part of the TMP where appropriate. There is also a weight-in-motion (WIM) station within the project limits, located on EB I-10 near PM 12.467 west of Cherry Avenue. The WIM station will be maintained and operated during construction.

7J. Accommodation of Oversize Loads

The I-10 freeway is on the United States Department of Defense (DOD) 42,000 kilometer Priority Network of selected Interstate System routes on which a 16-foot minimum vertical clearance is required. All of the I-10 overcrossing structures along the project corridor meet the 16-foot minimum vertical clearance requirement set by the DOD.

The Caltrans mandatory design standard for minimum vertical clearance over State highways is 16 feet 6 inches. A minimum vertical clearance of 16 feet 6 inches will be provided at all I-10 overcrossing structures within the project limits except at Sierra Avenue OC (proposed condition), Rancho Avenue OC (proposed condition), Mt. Vernon Avenue OC (existing and proposed conditions), and Alabama Street OC (existing and proposed conditions), where the minimum vertical clearance exceeds the 16-foot minimum requirement set by the DOD but is below the Caltrans standard of 16 feet 6 inches. Design exceptions have been requested for nonstandard vertical clearance locations.

During construction, there is the potential for restriction of oversize loads on the I-10 freeway at overcrossing structures. Vertical clearance may be reduced to 15 feet at some overcrossings during construction. Temporary vertical clearance less than 16 feet will require approval from FHWA and the DOD Military Traffic Management Command Traffic Engineering Agency.

7K. Graffiti Control

Sections of the project are located in the urban area of San Bernardino County, which is an identified graffiti-prone area in the Caltrans PDPM, Appendix K. Graffiti deterrent techniques will be used as part of the proposed design to limit accessibility to bridges and overhead sign structures. These may include the use of curved tubular sign structures and/or placement of collars and barbed wire around overhead signs. For wall surfaces, graffiti resistant/deterrent paint and/or protective coating, wall texturing, and/or aesthetic surface treatments will be used, incorporating elements of the Caltrans' *Interstate 10 Corridor Master Plan, San Bernardino County*, where practical. Details of graffiti deterrent techniques will be provided during the final design.

7L. Disposition of Existing Facility

No disposition of existing State right of way is anticipated. However, proposed right of way acquisitions for the project include full acquisitions of 20 properties may result in excess land to be disposed of. Final decisions regarding disposition of excess land will be made during the final design.

No State facility within project limits (except for SR-83) is anticipated to be relinquished. According to the SR-83 Transportation Concept Report (TCR), Caltrans is considering relinquishment of Euclid Avenue between SR-71 and I-10 to the local jurisdictions. The relinquishment would not be a part of the I-10 Corridor Project but could occur before or after the I-10 Corridor Project. The northern segment of Euclid Avenue from I-10 to 26th Street was relinquished to the City of Upland in 2008.

It is anticipated that some of the parcels to be acquired along local arterials and intersections for the project improvements would be relinquished to local agencies.

7M. Hydraulic Issues

I-10 Channel

The I-10 Channel generally runs parallel along the north side of I-10 between Etiwanda-San Sevaine Creek (east of Etiwanda Avenue) and Rialto Channel (west of Riverside Avenue). The channel is located within the State right of way except the last ½ mile near San Sevaine Channel. The channel is owned and managed by Caltrans; however, it receives runoff from several drainage systems in the region. From San Sevaine Creek to Sierra Avenue, the channel flows westerly, discharging into the San Sevaine Channel. From Sierra Avenue to Rialto Channel, the channel flows easterly and discharges into the Rialto Channel.

The project necessitates reconstruction of portions of the I-10 Channel. The impacted portions of the channel would be reconstructed to meet the ultimate hydraulic requirement, and transitioned back to the existing non-impacted portions. **Table 7.2** summarizes the I-10 channel reconstruction required.

Table 7.2 I-10 Channel Improvements

Loc	Approximate I-10 Station From - To		Existing Facilities	Proposed Facilities
1	1626+76	1639+00	Trap. Channel (30'x7.5'-9')	Rect. Channel (48'x15') & Trans Structure
2	1639+00	1680+50	Trap. Channel (30'x6')	Rect. Channel (48'x12') & Trans Structure
3	1680+50	1690+90	Rect. Channel (20'x6')	Rect. Channel (48'x12') & Trans Structure
4	1708+78	1750+80	Trap. Channel (20'x4.3'-6')	Rect. Channel (44'x12.5') & Trans Structure
5	1772+64	1790+48	Trap. Channel (20'-50'x4')	Rect. Channel (24'x7.5') & Trans Structure
6	1815+43	1829+17	Trap. Channel (12'x4.5-5.5')	Rect. Channel (16.5'x9.5') & Trans Structure
7	1836+93	1843+36	Trap. Channel (12'x4.5')	15'x7.25' RCB & Trans Structure
8	1861+30	1888+71	Trap. Channel (7'x9')	Rect. Channel (10'x8') & Trans Structure
9	1944+50	1961+89	Trap. Channel (10'x12')	14' RCP & Trans Structure
10	1993+45	2046+33	Trap. Channel (9'-13.5'x7.3')	Rect. Channel (28'x9') & Trans Structure

Trap. = trapezoidal; Rect. = rectangular; RCB = reinforced concrete box; RCP = reinforced concrete pipe

Palmetto Storm Drain/Detention Vault

The Palmetto Storm Drain, consisting of one 24-inch and three 42-inch reinforced concrete pipes, were installed under I-10 as part the HOV addition project in 1998. These pipes convey off-site flow from an open channel on the north side of the freeway and discharge into a 2.5-foot deep detention vault on the south side of I-10 east of Mountain Avenue (located inside the State right of way adjacent to the Church of Christ's parking lot). The vault serves as a temporary storage that slowly discharges the water onto the church's parking lot and surrounding surfaces.

The proposed freeway widening will require extension of the existing pipes and relocation of the detention vault to the south. Hydraulic analysis will need to be analyzed to determine the required size and capacity of the detention vault while minimizing right of way impact and removal of parking spaces. A GSRD will also be installed downstream of the vault to collect trash and debris. An open V-ditch is proposed to convey water from the vault/GSRD along the east and south sides around the church's parking lot and outlet onto Palmetto Avenue. Detailed analysis and coordination with local drainage systems will be required during the final design.

San Sevaine and Mulberry RCBs

Immediately east of San Sevaine Creek (located east of Etiwanda Avenue), two cross-culverts (San Sevaine RCB and Mulberry RCB) are shown to exist on the as-built plans. These cross-culverts were constructed prior to the construction of the I-10 channel which conveys runoff from the east to the west along the north side of I-10. The cross-culverts were originally used to allow off-site storm flow to cross the freeway from the north to the south. This offsite storm flow is now intercepted by the I-10 channel and conveyed westward to cross under I-10 at the San Sevaine Creek crossing. The cross-culverts now convey only on-site flows from the freeway to the south.

The project improvements include widening on both sides of the freeway at these cross-culvert locations. The widening will ultimately cover the inlet headwalls of these cross-culverts. The on-site runoff will be conveyed to the outside of the pavement edges and will be collected via inlets and laterals and conveyed to the I-10 channel. With this revision of the I-10 drainage system, the cross-culverts would be rendered obsolete and it is therefore recommended that they be abandoned as part of this project. APS plans have been prepared for abandonment of these culverts.

J Street Drainage

There is currently a local drainage issue along J Street, which parallels the north side of I-10 between Rancho Avenue and the Colton Crossing in the City of Colton. This local drainage issue is an existing condition and is not specifically caused or impacted by the I-10 Corridor Project. However, J Street will be modified by the project, which proposes freeway widening encroaching onto J Street.

A preliminary drainage study reveals an existing condition of moderate flooding potential for the 10-year storm event at the intersection of J Street and Pennsylvania Avenue, which is a natural low point in this area. There is an existing inlet at this intersection connecting to a 36-inch RCP under the I-10 freeway that conveys flows southerly to a junction structure and then to the Colton Southwest Drain. Due to capacity restriction at the junction structure which connects multiple drainage systems, the 36-inch RCP experiences backwater effects during storm events, causing water to flow out of the inlet and flood the J Street/Pennsylvania Avenue intersection. The SBCFCD has a Comprehensive Storm Drain Plan (CSDP) Project 3-9 to upgrade the downstream capacity; however, it is not scheduled for construction within the next 10 years.

As part of the project improvements, it is proposed to install a larger catch basin (14-foot curb/grated catch basin) at the J Street/Pennsylvania Avenue intersection and realign a portion of the 36-inch pipe south of the I-10 freeway to outlet via surface flow along 5th Street south of the UPRR, rather than discharging into the junction structure and the Colton Southwest Drain. These drainage improvements will be interim improvements until the CSDP Project 3-9 is implemented.

Relocation of Weir Structure

Due to the proposed widening, the existing 50-foot long weir structure located on the south side of I-10 just west of the Colton OH structure, will need to be relocated to the south. This weir structure was constructed as part of the Colton Crossing project in 2013, with 0.7 feet weir depth to accommodate 80 cubic feet per second (cfs) of flow from the 78-inch RCP (parallel the south side of I-10) before entering the 54-inch RCP, which subsequently converges with the Laurel Street Storm Drain and the 5th Street Storm Drain at the Colton Southwest Storm Drain junction structure. The size and configuration of the relocated weir structure will need to be adjusted from the existing design in order to be reconstructed within the right of way.

7N. Airway Highway Clearance

The project is in close proximity to the Ontario International Airport located on the south side of I-10 between Grove Avenue and Haven Avenue. The proposed improvements between Grove Avenue and Haven Avenue consist of widening of the I-10 freeway, widening of the Grove Avenue UC, replacement of the Fourth Street UC and the Vineyard Avenue OC, reconstruction of the interchange ramps, utility relocations, and highway lighting. None of the improvements are anticipated to have a substantial change in elevation. The permanent improvements or construction equipment to be used on the project site are not anticipated to encroach into the airway-highway clearance zone.

A notice to the Federal Aviation Administration (FAA) is required for any highway construction near an airport. FAA Form 7460-1 "Notice of Proposed Construction" must be sent to FAA, Western Pacific Regional Office.

7O. Life Cycle Cost Analysis

A *Life Cycle Cost Analysis* (LCCA) report has been prepared in February 2016 to evaluate the pavement alternatives for the project improvements and provide a preliminary determination of the pavement structural sections for the project. The *LCCA* is an economic analysis that compares initial construction cost, future maintenance cost, and user delay cost of different pavement alternatives over an analysis period of 55 years. The LCCA forms are included in this document as **Attachment G** and **Table 7.3** below presents a summary of the LCCA analysis.

Table 7.3 Summary of Life-Cycle Pavement Cost

Option		Pavement Sections*	Agency Cost	User Cost	Total Life Cycle Cost
Inside Lane and Shoulder					
1A	40-yr JPCP	0.95' JPCP/0.25' HMA/0.60' AS[(1)]	$35,082,540	$2,698,830	$37,781,370
2A	40-yr CRCP	0.85' CRCP/0.25' HMA/0.60' AS[(1)]	$34,201,150	$0	$34,201,150
Outside Lane					
1B	40-yr JPCP	1.20'-1.30' JPCP[(2)]/0.25' HMA/0.70' AS[(1)]	$50,850,140	$3,934,070	$54,784,210
2B	40-yr CRCP	1.05'-1.10' CRCP[(2)]/0.25' HMA/0.70' AS[(1)]	$49,135,410	$0	$49,135,410
Outside Shoulder					
1C	40-yr JPCP	0.80' JPCP/0.55'-1.40' AB[(3)]	$10,842,880	$1,425,620	$12,268,500
2C	20-yr HMA w/RHMA	0.20' RHMA-G/ 0.30'-0.40' HMA/0.85'-1.60' AB[(3)]	$21,491,790	$37,850,230	$59,342,020
Ramp					
1D	20-yr HMA w/RHMA	0.20' RHMA-G/0.55' HMA/1.70' AB	$424,120	$1,705,060	$2,129,180
2D	40-yr HMA w/RHMA	0.20' RHMA-G/1.65' HMA/0.50' AB	$496,170	$441,010	$937,180
3D	40-yr JPCP	1.05' JPCP/0.25' HMA/0.70' AS	$317,440	$178,720	$496,160

JPCP = Jointed Plain Concrete Pavement
CRCP = Continuously Reinforced Concrete Pavement
HMA = Hot-Mixed Asphalt
RHMA = Rubberized Hot-Mixed Asphalt
AB = Aggregate Base
AS = Aggregate Subbase
**Pavement sections shown are used in the LCCA analysis. I-10 pavement structural sections to be constructed will vary depending on the traffic index (TI) and R value determined for the different segments of the corridor.*
[(1)]The LCCA analysis does not include the AS layer west of Rancho Avenue based on preliminary R value > 40. The AS layer is included east of Rancho Avenue based on preliminary R value of 15.
[(2)]The outside lane pavement thickness in the LCCA analysis varies depending on the TI for various freeway segments.
[(3)]The shoulder thickness used in the LCCA analysis varies to match the total pavement thickness of the adjoining lane.

The report concludes that a 40-year rigid pavement design would have the lowest life cycle cost for the I-10 mainline lane and shoulders as well as for the interchange ramps. Below are specific recommendations for different areas of the pavement construction:

- For I-10 inside lane and shoulder, two pavement options (40-year JPCP and 40-year CRCP) were analyzed. The 40-year CRCP was found to have lower life cycle cost. However, the 40-year JPCP is recommended because the life cycle cost is only slightly higher and the JPCP would provide pavement consistency and similar ride quality with the adjoining existing pavement.

- For I-10 outside lane, two pavement options (40-year JPCP and 40-year CRCP) were analyzed. The 40-year CRCP option was found to have lower life cycle cost. However, the 40-year JPCP is recommended because the JPCP would provide pavement consistency and similar ride quality with the adjoining existing pavement.

- For I-10 outside shoulder, two pavement options (40-year JPCP and 20-year HMA with RHMA) were analyzed. The JPCP option was found to have the lowest life cycle cost and is recommended.

- For interchange ramps, three pavement options (20-year HMA with RHMA, 40-year HMA with RHMA, and 40-year JPCP) were analyzed. The 40-year JPCP was found to have the lowest life cycle cost and is recommended.

The assumptions for the pavement design for the I-10 mainline are summarized in **Table 7.4**.

Table 7.4 Pavement Design Designation

LA/SBd County Line to I-15				
ADT (2025) = 336,000	D = 51%	TI_{40}	Inside lane =	12.0
ADT (2045) = 369,000	T = 11%	TI_{40}	Inside shoulder =	12.0
DHV = 24,465	V = 70 mph	TI_{40}	Outside lane =	18.0
ESAL = 394,627,929		TI_{40}	Outside shoulder =	9.0
I-15 to I-215				
ADT (2025) = 255,000	D = 51%	TI_{40}	Inside lane =	12.0
ADT (2045) = 297,000	T = 7%	TI_{40}	Inside shoulder =	12.0
DHV = 21,963	V = 70 mph	TI_{40}	Outside lane =	16.5
ESAL = 198,154,904		TI_{40}	Outside shoulder =	9.0
I-215 to SR-210				
ADT (2025) = 265,000	D = 52%	TI_{40}	Inside lane =	12.0
ADT (2045) = 300,000	T = 7%	TI_{40}	Inside shoulder =	12.0
DHV = 22,620	V = 70 mph	TI_{40}	Outside lane =	16.0
ESAL = 168,480,762		TI_{40}	Outside shoulder =	9.0
SR-210 to Ford Street				
ADT (2025) = 223,000	D = 50%	TI_{40}	Inside lane =	12.0
ADT (2045) = 260,000	T = 7%	TI_{40}	Inside shoulder =	12.0
DHV = 18,200	V = 70 mph	TI_{40}	Outside lane =	15.5
ESAL = 136,583,265		TI_{40}	Outside shoulder =	9.0

ADT = average daily traffic; DHV = design hourly volume (two-way); ESAL = equivalent single axle load

The *LCCA* report has been prepared in accordance with the Caltrans LCCA procedure manual and is available at Caltrans District 8 office under the Project No. 0800000040.

7P. Equity Assessment

In November 2013, an Equity Assessment for I-10 and I-15 was conducted by Network Public Affairs to address the concerns that the Express Lanes may be inequitable to low-income motorists. The objective of the study was to determine if the proposed I-10 and I-15 Express Lanes would benefit or adversely affect low-income travelers, and, if the impacts are adverse, to recommend measures to address those impacts.

Overall, the assessment found that the Express Lanes are projected to provide several benefits for low-income drivers. Notably, the travel modeling (VISSIM Microsimulation Model) developed to support the study indicated that travel times in the general purpose lanes will be faster on both I-10 and I-15 if the Express Lanes are implemented, as compared with other project alternatives. Time saving is a benefit to all motorists using the free general purpose lanes if the Express Lanes were implemented. In addition, the Express Lanes provide an alternate travel option for low-income (and other) drivers that they do not enjoy today. Analysis of potential toll levels indicated that there could be times when a low-income driver would find the Express Lane time savings attractive.

The study also examined equity concerns relating to who pays for the facility as compared to who benefits, and how toll revenues will be used. A key research study on a similar project (State Route 91 Express Lanes) found that tolls, which are paid by users for the direct benefit of an uncongested trip, are even more equitable than sales taxes, which have found broad support in San Bernardino County. Eventually, toll revenues could become a primary source of project funding, meaning that the project funding would become more equitable over time.

The assessment concluded with recommendations for SBCTA to consider adopting policies that waive account maintenance fees for low-income households, allow the use of cash to open and replenish toll accounts, implement video license plate recognition technology to eliminate a transponder deposit, include plans to enhance public transit system, and continue outreach activities targeted to low-income residents during the project development process. These items are continuing to be discussed in order to recommend appropriate tolling policies at SBCTA Board meetings as the project progresses.

8. FUNDING, PROGRAMMING AND ESTIMATE

8A. Funding

It has been determined that this project is eligible for federal-aid funding. It is anticipated that the funding of the proposed I-10 Corridor Project will require several sources of funds as shown in the funding tables in Section 8B. SBCTA, as the project sponsor, is currently seeking additional funding sources to support the project implementation.

8B. Programming

Tables 8.1 and **8.2** present the escalated estimates for each fiscal funding year for the I-10 Corridor Project, which is divided into Contract 1 covering the proposed improvements from the LA/SBd County Line to I-15 and Contract 2 covering the improvements from I-15 to Ford Street, respectively.

The I-10 Corridor Project is currently programmed in the SBCTA's Freeway Program of Measure I 2010-2040 for the San Bernardino Valley Subarea. The I-10 Corridor Project also includes additional local improvements to the Monte Vista Avenue, Euclid Avenue, and Vineyard Avenue interchanges as well as the Fourth Street bridge replacement, as such additional local funds will be contributed to the I-10 programmed funding shown in **Tables 8.1** and **8.2**. These local projects are being coordinated with SBCTA and local agencies to ensure appropriate funding contribution to the I-10 Corridor Project funding

In addition, a Project Initiation Document has been completed for a safety lighting project between Fourth Street and I-15 (EA 1F550K) which was amended into the 2016 State Highway Operations and Protection Program (SHOPP) in October 2016. The safety lighting project is anticipated to be implemented as part of the I-10 Corridor Project through a financial contribution in fiscal year 2017/2018. The funding for the safety lighting project is not included in the funding/programming tables below.

Table 8.1 Contract 1 Capital Outlay Support and Programmed Funds

Fund Source	Sup-port	R/W	Const	Total	Fiscal Year Estimate in Thousands of Dollars (1,000)							
					Prior	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Total
CMAQ			80,000	80,000		26,210	20,732	8,912	12,378	9,368	2,400	80,000
STP Local			30,000	30,000						15,000	15,000	30,000
Local Advance Construction						83,790	-20,732	-8,912	-12,378	-24,368	-17,400	0
Tolls			306,273	306,273			306,273					306,273
Measure I	7,292		218,609	225,901	7,292		218,609					225,901
RIP (State)	27,815	11,930		39,745			39,745					39,745
Total	35,107	11,930	634,882	681,919	7,292	110,000	564,627	0	0	0	0	681,919

CMAQ = Congestion Mitigation and Air Quality; RIP = Regional Improvement Program; STP = Surface Transportation Program

Table 8.2 Contract 2 Capital Outlay Support and Programmed Funds

Fund Source	Sup-port	R/W	Const	Total	Fiscal Year Estimate in Thousands of Dollars (1,000)										
					Prior	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	Total
CMAQ			52,977	52,977				11,305		18,918	22,754				52,977
STP Local			1,012	1,012						506	506				1,012
Agency				0											0
Local Advance Const			64,654	64,654				107,338		-19,424	-23,260				64,654
Tolls			533,348	533,348				533,348							533,348
Measure I			594,651	594,651				594,651							594,651
RIP (State)				0											0
Total			1,246,642	1,246,642				1,246,642	0						1,246,642

CMAQ = Congestion Mitigation and Air Quality; RIP = Regional Improvement Program; STP = Surface Transportation Program

8C. Estimate

The project will be constructed in two contracts. Separate cost estimates for each of the contracts are provided in Section 5.A.4.15 and **Attachment J** of this document.

A safety lighting project between Fourth Street and I-15 (EA 1F550K) is currently in planning by Caltrans and is anticipated to be implemented as part of the I-10 Corridor Project through a financial contribution. The cost estimate for the safety lighting project is $8.2 million and is not included in the project cost estimates for the I-10 Corridor Project discussed in Section 5.A.4.15 or **Attachment J**.

9. DELIVERY SCHEDULE

The project is anticipated to utilize a design-build delivery process and be constructed in two contracts over a period of 60 months (5 years), with Contract 1 covering the proposed improvements from the LA/SBd County Line to I-15 and Contract 2 covering the improvements from the I-15 to Ford Street, respectively. **Table 9.1** presents a summary of the tentative milestones for the project.

Table 9.1 Project Milestones

Project Milestone		Contract 1	Contract 2
PSR/PDS Approval	M010	December 2006	
Supplemental PSR/PDS Approval	M010	April 2013	
Begin Environmental	M020	2007	
Notice of Preparation	M030	October 30, 2012	
Notice of Intent	M035	November 5, 2012	
Circulate Draft EIR/EIS	M120	April-June 2016	
PA/ED Approval	M160	May 2017	
ROD/NOD Approval	M200	June 2017	
Issue Design-Build Request for Proposal		July 2017	May 2019
Award Design-Build Contract	M495	January 2018	May 2020
Design-Build Notice to Proceed		February 2018	June 2020
Begin Construction		March 2019	July 2021
Construction Completion	M800	2022	2024

10. RISKS

A Level 3 qualitative risk analysis has been performed for the project which is estimated to have capital and support cost greater than $100 million. Project risks have been identified to include risks associated with project funding, environmental issues, design, right of way, and construction. Separate project risk registers have been developed for Contract 1 (from the LA/SBd County Line to I-15) and Contract 2 (from I-15 to Ford Street) in accordance with the Caltrans' Project Risk Management Handbook. The risk registers are included in this document as **Attachment Q**.

11. EXTERNAL AGENCY COORDINATION

FHWA

On March 21, 2017, a Project Oversight Agreement (POA) between FHWA and Caltrans was executed and serves as a supplement to the Oversight Agreement on Project Assumption and Program Oversight between FHWA and Caltrans, dated May 28, 2015. A POA is required for the I-10 Corridor Project which has been classified as a Project of Division Interest (PoDI) due to its status as a major project with the total costs greater than $500 million; innovative financing; innovative contracting; and high-risk ITS element. The POA assigns specific project responsibilities among FHWA and Caltrans that are necessary for the development and delivery of a PoDI.

FHWA has been apprised of the proposed improvements and several meetings were held at Caltrans District 8 to review the proposed alternatives with FHWA including:

- January 29, 2013 to review I-10 Corridor Project and Modified Access Report requirements
- July 24, 2013 to review I-10 and I-15 Corridor Projects
- September 13, 2013 to discuss CHP enforcement strategies
- July 23, 2015 to review I-10 Corridor Project
- September 24, 2015 to review I-10 and I-15 Concept for Operations and CHP enforcement

There are no access modifications proposed in the project. As such, a modified access report is not required. Fact Sheets requesting exceptions to the mandatory design standards have been developed for the PA and will be submitted to FHWA for review and approval.

The project requires the following coordination:

USACE

- Department of the Army Permit for Section 404 and Section 408 Permits

United States Fish and Wildlife Service

- Mitigation for DSF per amended BO FWS-SB-08B0369-17F0669

California Department of Fish and Wildlife

- California Fish and Game Code Section 1602

State Water Resources Control Board

- California Statewide NPDES Storm Water Permit (Order No. 2012-0011-DWQ, NPDES No. CAS00003)
- NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ and 2012-0006-DWQ, NPDES No. CAS00002)

Regional Water Quality Control Board

- Clean Water Act Section 401
- Water Quality Certification
- San Bernardino County Flood Control District
- Los Angeles County MS4 (Order No. R4-2012-0175)
- San Bernardino County MS4 (R8-2010-0036)

Local Agencies

- Cooperative Agreements with the City of Pomona
- Cooperative Agreements with the City of Claremont
- Cooperative Agreements with the City of Montclair

- Cooperative Agreements with the City of Upland
- Cooperative Agreements with the City of Ontario
- Cooperative Agreements with the City of Fontana
- Cooperative Agreements with the City of Rialto
- Cooperative Agreements with the City of Colton
- Cooperative Agreements with the City of San Bernardino
- Cooperative Agreements with the City of Loma Linda
- Cooperative Agreements with the City of Redlands
- Cooperative Agreements with the County of San Bernardino

Railroads

- Railroad Agreements with UPRR for separated-grade crossings, right of way, and accesses
- Railroad Agreements with BNSF for separated-grade crossings, right of way, and accesses

Others

- Toll Agreements with Toll Service Provider
- FSP Agreements for incident management
- CHP Agreements for toll enforcement
- Agreements with various utility agencies
- CPUC approval for various utility and railroad work

12. PROJECT REVIEWS

The project has been reviewed by the following Caltrans Headquarters (HQ) and District 8 staff:

HQ Project Delivery Coordinator	*Luis Betancourt*	Date	*April 2017*
Project Manager	*Raghuram Radhakrishnan*	Date	*April 2017*
Design/FHWA Liaison	*Anthony Ng*	Date	*April 2017*
District Safety Review	*Jerry Champa*	Date	*April 2017*
HQ Managed Lane Reviewer	*David Liu*	Date	*April 2017*
Design Oversight	*Jonathan den Hartog*	Date	*April 2017*
Traffic Operations	*Haissam Yahya*	Date	*July 2015*

Coordination meetings with Caltrans District 7 were held on:

- October 1, 2014
- January 21, 2015
- April 15, 2015
- September 17, 2015

Limited review of the project improvements within Los Angeles County have been performed by the following Caltrans HQ and District 7 staff:

HQ Design Reviewer	*Brian Frazer*	Date	*April 2015*
Project Manager	*John Lee*	Date	*September 2015*
Traffic Operations	*Dawn Helou*	Date	*September 2015*
Design Oversight	*Simon Kuo*	Date	*September 2015*

13. PROJECT PERSONNEL

Name	Organization	Role	Phone
Raghuram Radhakrishnan	Caltrans	Project Manager	909-383-6288
Jesus Paez	Caltrans	Project Director	909-383-8861
Jonathan den Hartog	Caltrans	Senior Oversight Engineer, Design	909-383-5998
Haissam Yahya	Caltrans	Office Chief, Traffic Operations	909-383-4065
Oscar Alejandre	Caltrans	Acting Office Chief, Traffic Design	909-383-8869
Lawrence Kelly	Caltrans	Senior Right of Way Agent, Local Programs	909-888-7153
Aaron Burton	Caltrans	Senior Planner, Environmental Studies “B”	909-383-2841
Robert Zezoff	Caltrans	HQ Structures	916-227-9881
Paula Beauchamp	SBCTA	Director of Project Delivery	909-884-8276
John Meier	SBCTA	Project Director, I-10 & I-15 Corridor Projects	909-884-8276
Chad Costello	SBCTA	Project Manager	909-884-8276
Julie Beeman	SBCTA	Environmental Manager	909-884-8276
Surf Teshale	Parsons	Project Manager	949-333-4540
Patti Tiberi	Parsons	Engineer Lead	949-333-4541
James Santos	Parsons	Environmental Lead	949-333-4468
Ryan Todaro	ESA	Environmental Planner	213-559-4316

14. ATTACHMENTS (Number of Pages)

Attachment A – Project Vicinity Map (1)
Attachment B – Traffic Volume Diagrams (18)
Attachment C – Project Category Determination (1)
Attachment D – Conceptual Layouts (Separately Bound) (261)
Attachment E – Structure Advance Planning Studies (Separately Bound) (60)
Attachment F – Preliminary Feasibility Study of I-10/I-15 Express Lane Direct Connector Ramps (11)
Attachment G – Life Cycle Cost Analysis Forms (3)
Attachment H – Approval of Temporary Exemption from Superelevation Standards, 4/13/17 (3)
Attachment I – Express Lane Access Points and CHP Locations Diagram (2)
Attachment J – Project Cost Estimates (18)
Attachment K – Right of Way Data Sheet (13)
Attachment L – Final EIR/EIS Signature Page (1)
Attachment M – Storm Water Data Report Signature Page (1)
Attachment N – Decision Documents (44)
Attachment O – TMP Data Sheets and Alternative Route Maps (35)
Attachment P – Potential Construction Staging Areas (7)
Attachment Q – Level 3 Risk Register (7)