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 075.600/HB5
March 2016

DRAFT PROJECT REPORT

To Authorize Release of the Draft Environmental Document

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 Draft 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 — Date: 3/15/16

APPROVAL RECOMMENDED:

RAGHURAM RADHAKRISHNAN, Project Manager — Date: 3-9-16

DAVID BRICKER, Deputy District Director, Environmental Planning — Date: 4/15/16

CHRISTY CONNORS, Deputy District Director, Design/Engineering Services — Date: 3/17/16

APPROVED BY:

JOHN BULINSKI, District Director — Date: 4/15/16

Vicinity Map

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

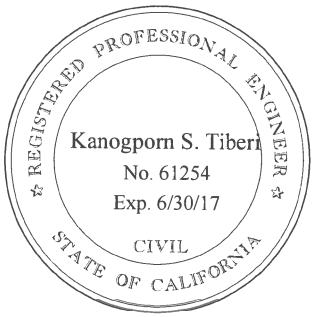
This Draft Project Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Kanogporn S. Tiberi

3/9/16

Kanogporn S. Tiberi
Registered Civil Engineer
Parsons

Date



SUBMITTED BY:

March 9, 2016

Garry Cohoe
Director of Project Delivery
SANBAG

Date

CONCURRED BY:

3/9/16

Jonathan den Hartog
Senior Oversight Engineer
Caltrans District 8

Date

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ACRONYMS AND ABBREVIATIONS

TERM	DECRIPTION
a/mvm	Accidents per Million Vehicle Mile
AB	Aggregate Base
AC	Asphalt Concrete
ACM	Asbestos-Containing Materials
ADA	Americans with Disabilities Act
ADL	Aerially Deposited Lead
ADT	Average Daily Traffic
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
BRT	Bus Rapid Transit
BSA	Biological Study Area
CAG	Community Advisory Group
CAMUTCD	California Manual of Uniform Traffic Control Devices
CAGN	Coastal California Gnatcatcher
Caltrans	California Department of Transportation
CCUA	Consent to Common Use Agreement
C-D	Collector-Distributor
CCTV	Closed Circuit Television
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CHIN	Caltrans Highway Information Network
CHP	California Highway Patrol
CIA	Community Impact Assessment
CMAQ	Congestion Mitigation and Air Quality
CM/GC	Construction Management/General Contractor
CMS	Changeable Message Sign
C&M	Construction and Maintenance
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
EB	Eastbound
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
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FNAE	Finding of No Adverse Effect
FR	Foundation Report
FSP	Freeway Service Patrol
FTIP	Federal Transportation Improvement Program
GCC	Grid Control Center
GDR	Geotechnical Design Report
GP	General Purpose
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
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
MBTA	Migratory Bird Treaty Act
Metro	Los Angeles County Metropolitan Transportation Authority
MAP-21	Moving Ahead for Progress in the 21st Century Act
MLD	Most Likely Descendent
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
mph	Miles per Hour
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
OC	Overcrossing
OH	Overhead
PA	Preferred Alternative
PAC	Public Awareness Campaign
PA/ED	Project Approval/Environmental Document
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
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
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
SANBAG	San Bernardino Associated Governments
SB	Southbound
SBd	San Bernardino
SBCFCD	San Bernardino County Flood Control District
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
SHPO	State Historic Preservation Officer
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
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 State Fish and Wildlife Service
UST	Underground Storage Tank
VA	Value Analysis
v/c	Volume-to-Capacity
vph	Vehicle per Hour
VIA	Visual Impact Assessment
WB	Westbound
WDID	Waste Discharge Identification
WQV	Water Quality Volume

1. INTRODUCTION

California Department of Transportation (Caltrans), the lead agency, in cooperation with San Bernardino Associated Governments (SANBAG), the sponsoring agency, proposes to add freeway lanes through all or a portion of 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 and two build alternatives are being considered for this project, as described below. The project vicinity map and project location maps of the proposed build alternatives are included in **Attachment A**.

- Alternative 1 (No Build) would maintain the existing lane configuration of I-10 within the project limits with no additional mainline lanes or associated improvements to be provided.

- Alternative 2 (One High Occupancy Vehicle Lane in Each Direction or HOV) would extend the existing High Occupancy Vehicle (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. The project improvements would require replacement of 3 structures and modification of 44 structures in Alternative 2. All of the improvements proposed for Alternative 2 are in San Bernardino County.

- Alternative 3 (Two Express Lanes in Each Direction or Express Lanes) 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 HOVs and single occupancy vehicles (SOVs). HOVs not meeting the occupancy requirement and SOVs would be required to pay a toll to use the facility while HOVs meeting the occupancy requirement would use the facility free of charge. Replacement of 12 structures and modification of 59 structures would be necessary in Alternative 3. The improvements proposed for Alternative 3 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 is currently in the Project Approval/Environmental Document (PA/ED) phase, with the circulation of the Draft Environmental Impact Report/Environmental Impact Statement (DEIR/EIS) anticipated in early 2016. In July 2014, the SANBAG Board of Directors reviewed the benefits and impacts associated with each of the build alternatives under consideration and designated Alternative 3 as the Locally Preferred Alternative (LPA). Approval of this Draft Project Report (DPR) does not constitute approval of the LPA. The identification of the project's Preferred Alternative (PA) is planned to occur after the circulation of the DEIR/EIS and the public hearing.

The project is planned to proceed to the final design phase upon approval of the Final Project Report and the Record of Decision (ROD) and Notice of Determination (NOD) are obtained for the final environmental document. For Alternative 2, the project is anticipated to be implemented using the design-bid-build delivery process and constructed over a period of 42 months (3.5 years) under one

construction contract. For Alternative 3, the project is anticipated to utilize a design-build delivery process. Alternative 3 is anticipated to 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	Description	EA	Project ID	Post Miles & Limits
1	LA/SBd County Line to I-15	OC2510	0816000076	07-LA-10 PM 44.9/48.3 08-SBd-10-PM 0.0/13.0 0.4 miles west of White Avenue overcrossing to 0.2 miles west of Cherry Avenue overcrossing
2	I-15 to Ford Street	OC2520	0816000112	08-SBd-10 PM 8.0/R37.0 0.2 miles west of Haven Avenue overcrossing to Live Oak Canyon Road overcrossing

Alternative 2 is estimated to cost $567 million in current dollars or a total escalated cost of $659 million in the future expenditure year. Alternative 3 is estimated to cost $1.491 billion in current dollars or a total escalated cost of $1.729 billion for the future expenditure year. Detailed cost estimates are provided in Section 5.A.4.15 of this report.

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. For Alternative 3, additional funding sources include a Federal loan and toll revenue bonds. Both build alternatives are included in the SANBAG's Measure I 10-Year Delivery Plan. Alternative 2 is also included in the Southern California Association of Governments (SCAG)'s 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and the 2015 Federal Transportation Improvement Program (FTIP). Alternative 3 descriptions have been submitted for inclusion in the Regional Transportation Plan (RTP) Consistency Amendment (which affects the RTP and FTIP simultaneously). The additional project information for Alternative 3 is anticipated to be approved as part of the 2016 RTP in June 2016 and added in the FTIP Amendment #12 in August 2016.

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	*3*
Current Capital Outlay Support Estimate	*Alternative 2: $100M, Alternative 3: $220M*
Current Capital Outlay Construction Estimate	*Alternative 2: $446M, Alternative 3: $1,175M*
Current Capital Outlay Right-of-Way Estimate	*Alternative 2: $13M, Alternative 3: $87M*
Funding Source	*San Bernardino County Measure I* *CMAQ, Local, State, and Federal* *TIFIA Loan & Toll Revenue Bond (Alternative 3 only)*
Funding Year	*2008/2009 through 2024/2025*
Type of Facility	*Freeway*
Number of Structures	*47 in Alternative 2, 71 in Alternative 3*
Environmental Determination or Document	*EIR/EIS*
Legal Description	*N/A*
Project Development Category	*3*

2. RECOMMENDATION

It is recommended that approval be granted to circulate the DEIR/EIS prepared for the I-10 Corridor Project and schedule the public hearings based upon the viable alternatives presented in this Draft Project Report.

3. BACKGROUND

3A. Project History

The project was initiated through the preparation of a Project Study Report/Project Development Support (PSR/PDS) (EA 08-0C2500) 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 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 currently in the PA/ED phase 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.

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 SANBAG Board of Directors and affected local agencies are in general accord for implementation of the I-10 Corridor Project.

- Periodic briefings to the SANBAG Board of Directors
- Periodic briefings to the San Bernardino County West Valley, East Valley, and High Desert Community Advisory Groups (CAG)
- Over 70 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
- Monthly Project Development Team (PDT) meetings that include representatives from cities along the project corridor
- Over 640 site visits for outreach to project communities

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

- November 13, 2012 in City of San Bernardino
- November 15, 2012 in City of 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 of 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

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 beginning 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, which is separated from the general purpose lanes via a 2 to 4 feet wide striped buffer. The existing lane width is generally 12 feet throughout the corridor except for the HOV lanes west of I-15 which are 11 feet wide. 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 re-established 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 Avenue

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 of its 11 miles in San Bernardino County, extending from State Route 71 (SR-71) in Chino Hills to 7th Street in Upland. In the 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 located in Los Angeles County.

1. Indian Hill Boulevard (Alternative 3 only)
2. Monte Vista Avenue (Alternative 3 only)
3. Central Avenue (Alternative 3 only)
4. Mountain Avenue (Alternative 3 only)
5. Euclid Avenue/7th Street (Alternative 3 only)
6. 4th Street (Alternative 3 only)
7. Vineyard Avenue (Alternative 3 only)
8. Holt Boulevard/Archibald Avenue (Alternative 3 only)
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/Hospitality Lane
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	Posted Speed (mph)	Jurisdiction
1	Indian Hill Blvd (LA)	Major	4	NB/SB	-	35	Claremont
2	Mills Ave	Major	2	NB/SB	II	40	Montclair
3	Monte Vista Ave	Arterial	4	NB/SB	II*	35	Montclair
4	Central Ave	Divided	6	NB/SB	II*	40	Montclair
5	Benson Ave	Secondary/Minor	4	NB/SB	II/III/-*	35	Montclair/Ontario/Upland
6	Mountain Ave	Major/Principal	4	NB/SB	-	40	Ontario/Upland
7	San Antonio Ave	Secondary/Minor	4	NB/SB	-	40	Ontario/Upland
8	Euclid Ave (SR-83)	Major/Principal	6	NB/SB	II/III*	40	Ontario/Upland
9	Sultana Ave	Local/Collector	2	NB/SB	-	35	Ontario/Upland
10	Campus Ave	Secondary/Collect	2	NB/SB	III/-*	35	Ontario/Upland
11	6th St	Collector	2	NB/SB	-	35	Ontario
12	Grove Ave	Principal	4	NB/SB	I/II/III*	45	Ontario
13	4th St	Principal	2	NB/SB	-	35	Ontario
14	Vineyard Ave	Principal	6	SB	III*	45	Ontario
15	Archibald Ave	Principal	7	SB	-	50	Ontario
16	Haven Ave	Principal	8	NB	II or III*	45	Ontario
17	Milliken Ave	Principal	8	SB	-	50	Ontario
18	Etiwanda Ave	Principal/Major	6	None	-	50	Ontario/Fontana
19	Cherry Ave	Major	6	NB/SB	II	50	Fontana
20	Citrus Ave	Major	5	NB/SB	II	35	Fontana
21	Cypress Ave	Secondary	4	NB/SB	II	45	Fontana
22	Sierra Ave	Major	6	NB/SB	II*	40/35	Fontana
23	Cedar Ave	Major	6	NB/SB	-	40	Bloomington

No.	Arterial	Roadway Classification	Thru Lane	Continuous Sidewalk	Bike Class	Posted Speed (mph)	Jurisdiction
24	Riverside Ave	Major	5	NB/SB	II or III*	35	Rialto
25	Pepper Ave	Major	3	SB	II**	50	Colton
26	Rancho Ave	Major	4	NB	III*	35/45	Colton
27	La Cadena Dr	Major	4	NB/SB	III*	35/45	Colton
28	9th St	Secondary	2	NB/SB	-	40	Colton
29	Mt. Vernon Ave	Major	4	None	-	40	Colton
30	Hunts Ln	Major	4	NB/SB	-	45	San Bernardino
31	Waterman Ave	Major	4	NB/SB	-	50	San Bernardino
32	Tippecanoe Ave	Major/Undivided	4	NB/SB	III/-*	40	San Bernardino/Loma Linda
33	Richardson St	Local	2	SB	-	none	San Bernardino/Redlands
34	Mountain View Ave	Major/Undivided	4	NB/SB	-/II*	40	Loma Linda/Redlands
35	California Ave	Major	4	NB	II or III*	40	Redlands
36	Nevada St	Minor	2	NB/SB	-	none	Redlands
37	Alabama St	Major	4	NB	II or III*	40	Redlands
38	Tennessee St	Collector	4	NB	II or III*	40	Redlands
39	Colton Ave	Minor	4	NB/SB	II or III*	35	Redlands
40	New York St	Local	2	NB/SB	II or III*	none	Redlands
41	Texas St	Minor	4	NB/SB	II*	40	Redlands
42	Eureka St	Minor	2	NB/SB	-	none	Redlands
43	Orange St (SR-38)	Minor	4	NB/SB	II*	none	Redlands
44	6th St	Collector	2	NB/SB	-	none	Redlands
45	Church St	Collector	2	NB/SB	II*	30	Redlands
46	University St	Minor	4	NB/SB	II or III*	30	Redlands
47	Citrus Ave	Minor	4	NB/SB	II or II*	40	Redlands
48	Cypress Ave	Minor	2	NB/SB	II or III*	45	Redlands
49	Palm Ave	Collector	2	NB/SB	-	40	Redlands
50	Highland Ave	Minor	2	NB/SB	II or III*	40	Redlands
51	Ford St	Minor	2	NB/SB	-	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 curve radii for 70 mph design speed on I-10 near Colton Crossing
- 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 in 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
- presence of a single curb ramp on intersection corners
- 2:1 embankment slopes throughout the project corridor

Some of these nonstandard geometric features would be eliminated or improved by the proposed project, some would remain unchanged, and some would resurface in varying degrees in the proposed design. A discussion of proposed nonstandard features is provided for each build alternative in Sections 5.A.2.3 and 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 Box Culvert (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 (9^{th} 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
77	R24.27	W10-N215 Connector OC	54-1064F

No.	Post Mile	Structure Name	Bridge No.
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	New York St/Colton Ave 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 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/SANBAG	East of Mountain View	Redlands
6	Redlands	OH	Single	BNSF/SANBAG	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 716 utilities within the project area 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
- Comcast
- Level 3 Communications
- Sprint
- SUNESYS
- Time Warner Cable
- Verizon
- Western Union Telegraph

Water/Wastewater:

- Chino Basin Municipal Water District
- City of Chino Hills
- City of Colton
- City of Montclair
- City of Ontario
- City of Riverside

- City of San Bernardino
- City of Upland
- Cucamonga Valley Water District
- Fontana Public Works Department
- Fontana Water Company
- 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 Sewer
- City of San Bernardino
- City of Upland
- Fontana Public Works Department
- Western Pacific Sanitation Company

Oil/Fuel/Petroleum/Gasoline:

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

Hydrogen Gas/Liquid Oxygen Gas/Nitrogen Gas

- 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	"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 Creek	"A" 1580+50	East of I-15	SBCFCD
10	Etiwanda-San Sevaine Wash	"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
19	Mission Channel	"A" 2460+00	West of California St	SBCFCD
20	Mill Creek Zanja Channel	"A" 2666+00	West of University Ave	SBCFCD

No.	Drainage Facility	Approximate Station	Approximate Location	Jurisdiction
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 2 lanes are generally in fair to poor condition. Three pavement rehabilitation projects are currently being implemented to replace concrete pavement slabs in the 3rd and 4th general purpose lanes and overlay the asphalt concrete shoulders in both directions between the LA/SBd County Line and Ford Street.

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				
		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				

PM	Side	Lane	Existing Structural Section							
		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		
		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						
	WB	Lt Shld	0.25’	AC						

PM	Side	Lane	Existing Structural Section							
Zone 6 9.94 – 13.17 I-15 to Cherry		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				
		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		

PM	Side	Lane	Existing Structural Section							
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						
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		

PM	Side	Lane	Existing Structural Section							
		Rt Shld	0.25’	AC	0.50’	AB	0.50’	AS		
Zone 14 25.26 – 31.01 Waterman to Sixth	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		
		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 (graphically shown in project plans as existing)

- I-10/Cherry Avenue interchange project (EA 468004) completed in 2015
- I-10/Citrus Avenue interchange project (EA 648104) completed in 2015
- I-10/Cedar Avenue interchange project (EA 1A8300) in PS&E, construction by 2019
- I-10/Riverside Avenue interchange project (EA 422304) completed in 2014
- I-10/Tippecanoe Avenue interchange project (EA 384204 & 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

2. Planned Improvements (not graphically shown in project plans)

- I-15 Corridor Project (EA 0R800K)
- Preliminary Feasibility Study of I-10/I-15 Express Lane Direct Connector Ramps
- I-10/Grove Avenue interchange construction and removal of I-10/4th Street interchange (EA 0J400)
- I-10/Beech Avenue interchange construction (EA 0J120K)
- I-10/Alder Avenue interchange construction (EA 34090K)
- I-10/Pepper Avenue Bridge Replacement project (EA 1E030)
- I-10/Mt. Vernon Avenue interchange improvements
- I-10/Mountain View Avenue interchange improvements
- I-10/California Street interchange improvements
- I-10/Alabama Street interchange improvements
- I-10/University Street interchange improvements
- 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
- 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)
- Addition of HOV lanes on I-10 from Ford Street to SB/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)
- Median lighting installation from Fourth Street to I-15 (EA 1F5500)

- Pavement rehabilitation from LA/SBd County Line to Orange Street (EA 0Q7604)
- Pavement rehabilitation from Orange Street to Ford Street (EA 0K2914)
- Pavement rehabilitation from Ford Street to Live Oak Canyon Road (EA 0K2924)

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

SANBAG is currently studying another Express Lane corridor along I-15 in San Bernardino County. The I-15 Corridor Project (EA 08 0R800K) 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 SANBAG'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 the 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. Both build alternatives are consistent with the *Route Concept Fact Sheet*. Alternative 2 would provide 2 HOV lanes and 8 general purpose lanes through the project corridor. Alternative 3 would provide 2 to 4 Express Lanes (with HOV usage) and 8 general purpose lanes.

The improvements proposed under Alternative 3 of the I-10 Corridor Project are consistent with the mitigation measures recommended in the *2013 California HOV Degradation Determination Report and 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 in 2013 and is considered to be "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 (Alternative 3) 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 2012-2035 RTP/SCS adopted by SCAG. The project descriptions in the RTP and FTIP below cover the proposed improvements under Alternative 2:

- RTP Project 4H01001: "I-10 HOV Lane Addition – From Haven (Ontario) to Ford St (Redlands) – Widening from 8-10 Lanes Aux Lanes Widening Undercrossings and Overcrossings and Reconstruction of Ramps Where Needed."

The project is also included in the 2015 FTIP as:

- FTIP Project 0C2500: "I-10 HOV Lane Addition – From Haven (Ontario) to Ford Street (Redlands) – Widening from 8-10 lanes, aux lanes widening undercrossings and overcrossings and reconstruction of ramps where needed."

In December 2014, SANBAG submitted new project descriptions covering Alternative 3 scope of improvements to the RTP Consistency Amendment (which affects the RTP and FTIP simultaneously). The additional project information is anticipated to be approved as part of the 2016 RTP in June 2016 and added in the FTIP Amendment #12 in August 2016. The submitted project description is divided into two contracts with Contract 1 (called Phase 1 in the submitted document) covering the proposed improvements from the LA/SBd County Line to I-15 and Contract 2 (called Phase 2 in the submitted document) covering from I-15 to Ford Street, as described below:

- RTP Project 4122004: "I10 Express Lane Addition (Garey Avenue in Los Angeles County to I-15/I-10 Interchange) – Express Lane Widening to implement two (2) Express Lanes in each direction for a total of 12 lanes including auxiliary lane widening, undercrossings, overcrossings, and reconstruction of ramps where needed."

- RTP Project 4122005: "I10 Express Lane Addition (I-15/I-10 Interchange to Ford Street Undercrossing) – Express Lane Widening to implement two (2) Express Lanes in each direction for a total of 12 lanes including auxiliary lane widening, undercrossings, overcrossings, and reconstruction of ramps where needed."

- 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."

- 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 SANBAG's 10-Year Delivery Plan (dated March 2014) and is defined with two build alternatives:

- HOV Alternative: Add one HOV lane in each direction from Haven Avenue in the City of Ontario to Ford Street in the City of Redlands.

- Express Lanes Alternative: Add one lane in each direction and operate the new lane and the existing HOV lanes as Express Lanes from the LA/SBd County line to Milliken Avenue; Add two Express Lanes in each direction from Milliken Avenue to SR-210; and add one Express Lane in each direction from SR-210 to Ford Street.

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 all of the General Plans

specifically reference the SANBAG'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 either of the build alternatives is constructed, the proposed Omnitrans express routes would be able to use the proposed HOV or Express Lanes on I-10. In addition, the I-10 Corridor Project will add bus stops at the on-ramps of the Mountain Avenue interchange in Alternative 3 and the Sierra Avenue interchange in both build alternatives 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 SANBAG'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, SANBAG 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.

4C. Traffic

4C.1. Traffic Analysis

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		
	2012 Existing	2045 Alternative 1	% 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 Ave OC, Citrus Ave OC, and Alabama St 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 of the 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 include 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[4]	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 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/W215 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[1]	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	12.9	B	12.9	B	13.3	B	24.8	C
9th/EB ramps	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	253.2	F	45.6	E	20.9	C	22.0	C
Ford/EB off-ramp	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	19.1	C	12.4	B	20.6	C	14.6	B

[1]Intersection is unsignalized.
[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 October 1, 2009 and September 20, 2012.

I-10 Mainline

Table 4.12 presents the 3-year accident data for the I-10 freeway in 66 segments from Indian Hill Boulevard to Ford Street (33 eastbound and 33 westbound). As shown in the table, the accident rates in 54 out of 66 freeway segments are lower than the statewide average for similar facilities. In 14 out of 66 segments, the total accident rates and/or the combined fatality and injury accident rates are marginally to moderately higher than the statewide average. These locations are shown in boldface in the table. 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	0.22	0.47	0.004	0.34	1.09
	WB	0.000	0.09	0.50	0.004	0.34	1.09
PM 0.00 – 0.68 County Line – Monte Vista "A" 1000+00 – 1036+30	EB	0.000	**0.32**	0.74	0.004	0.31	1.01
	WB	0.000	0.31	0.96	0.004	0.31	1.01
PM 0.68 – 1.23 Monte Vista – Central "A" 1036+30 – 1065+50	EB	0.000	0.27	0.62	0.004	0.31	1.02
	WB	0.000	**0.51**	**1.35**	0.004	0.31	1.02
PM 1.23 -2.37 Central – Mountain "A" 1065+50 – 1125+50	EB	0.000	0.25	0.81	0.003	0.28	0.94
	WB	0.000	**0.31**	0.87	0.003	0.28	0.94
PM 2.37 – 3.47 Mountain – Euclid "A" 1125+50 – 1183+15	EB	0.000	0.30	0.86	0.004	0.32	1.03
	WB	0.007	0.26	0.81	0.004	0.32	1.03
PM 3.47 – 5.24 Euclid – 4th St "A" 1183+15 – 1277+20	EB	0.000	0.20	0.59	0.004	0.31	1.00
	WB	0.004	0.19	0.50	0.004	0.31	1.00
PM 5.24 – 6.10 4th - Vineyard "A" 1277+20 – 1322+45	EB	0.000	**0.34**	**1.12**	0.004	0.30	0.99
	WB	0.018	0.30	0.83	0.004	0.30	0.99
PM 6.10 – 7.16 Vineyard – Archibald "A" 1322+45 – 1377+95	EB	0.015	**0.31**	0.88	0.004	0.30	0.99
	WB	0.000	0.24	0.76	0.004	0.30	0.99
PM 7.16 – 8.16 Archibald - Haven "A" 1377+95 – 1431+10	EB	0.015	**0.42**	**1.06**	0.004	0.32	1.03
	WB	0.000	**0.33**	0.89	0.004	0.32	1.03

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	**0.70**	**1.97**	0.004	0.32	1.03
	WB	0.000	0.23	0.86	0.004	0.32	1.03
PM 9.17 – 9.94 Milliken – Route 15 "A" 1484+45 – 1524+65	EB	0.000	**0.57**	**2.05**	0.004	0.29	0.97
	WB	0.000	0.22	0.82	0.004	0.29	0.97
PM 9.94 – 11.13 Route 15 – Etiwanda "A" 1524+65 – 1587+80	EB	0.000	**0.57**	**2.05**	0.004	0.29	0.97
	WB	0.000	0.22	0.82	0.004	0.29	0.97
PM 11.13 – 13.17 Etiwanda – Cherry "A" 1587+80 – 1695+20	EB	0.004	**0.36**	**1.05**	0.004	0.28	0.88
	WB	0.004	0.15	0.45	0.004	0.28	0.88
PM 13.17 – 15.18 Cherry – Citrus "A" 1695+20 – 1802+20	EB	0.000	0.26	0.72	0.004	0.27	0.88
	WB	0.000	0.24	0.69	0.004	0.27	0.88
PM 15.18 – 16.22 Citrus – Sierra "A" 1802+20 – 1856+80	EB	0.000	0.25	0.72	0.004	0.27	0.87
	WB	0.000	0.17	0.56	0.004	0.27	0.87
PM 16.22 – 18.49 Sierra – Cedar "A" 1856+80 – 1976+75	EB	0.014	0.27	0.73	0.004	0.27	0.87
	WB	0.010	0.16	0.43	0.004	0.27	0.87
PM 18.49 – 19.97 Cedar – Riverside "A" 1976+75 – 2055+00	EB	0.009	0.20	0.70	0.004	0.29	0.93
	WB	0.009	0.14	0.41	0.004	0.29	0.93
PM 19.97 – 20.97 Riverside – Pepper "A" 2055+00 – 2107+05	EB	0.009	0.16	0.46	0.004	0.29	0.94
	WB	0.000	**0.35**	0.75	0.004	0.29	0.94
PM 20.97 – R21.96 Pepper – Rancho "A" 2107+05 – 2159+95	EB	0.009	0.23	0.52	0.004	0.25	0.81
	WB	0.000	0.08	0.31	0.004	0.25	0.81
PM R21.96 – R22.62 Rancho – La Cadena "A" 2159+95 – 2194+75	EB	0.000	0.20	0.50	0.004	0.29	0.94
	WB	0.014	0.24	0.57	0.004	0.29	0.94
PM R22.62 – R23.25 La Cadena – Mount Vernon "A" 2194+75 – 2227+95	EB	0.000	0.14	0.53	0.004	0.28	0.91
	WB	0.000	0.07	0.30	0.004	0.28	0.91
PM R23.25 – R24.24 Mount Vernon – Route 215 "A" 2227+95 – 2280+25	EB	0.019	0.28	0.62	0.004	0.28	0.90
	WB	0.000	0.12	0.51	0.004	0.28	0.90
PM R24.24 – 25.26 Route 215 – Waterman Ave "A" 2280+25 – 2334+40	EB	0.013	0.23	0.53	0.004	0.30	0.97
	WB	0.007	0.21	0.54	0.004	0.30	0.97
PM 25.26 – 26.27 Waterman – Tippecanoe 2334+40 – 2387+80	EB	0.000	0.21	0.56	0.004	0.29	0.93
	WB	0.009	0.20	0.46	0.004	0.29	0.93
PM 26.27 – 27.30 Tippecanoe – Mountain View "A" 2387+80 – 2441+85	EB	0.000	0.21	0.54	0.004	0.28	0.91
	WB	0.018	0.23	0.58	0.004	0.28	0.91
PM 27.30 – 28.30 Mountain View – California "A" 2441+85 – 2494+85	EB	0.000	0.11	0.26	0.004	0.28	0.90
	WB	0.000	**0.31**	0.62	0.004	0.28	0.90

I-10 Segment and Approximate Stations	Dir	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
PM 28.30 – 29.31 California – Alabama "A" 2494+85 – 2547+40	EB	0.000	0.13	0.42	0.003	0.24	0.80
	WB	0.010	**0.29**	0.73	0.003	0.24	0.80
PM 29.31 – 29.83 Alabama – Tennessee "A" 2547+40 – 2574+40	EB	0.041	0.21	0.39	0.003	0.26	0.85
	WB	0.000	0.10	0.33	0.003	0.26	0.85
PM 29.83 – 30.66 Tennessee – Eureka "A" 2574+40 – 2619+40	EB	0.000	0.11	0.53	0.003	0.25	0.82
	WB	0.000	0.24	0.47	0.003	0.25	0.82
PM 30.66 – 31.01 Eureka – Sixth "A" 2619+40 – 2637+95	EB	0.000	0.13	0.38	0.004	0.27	0.88
	WB	0.000	0.19	0.51	0.004	0.27	0.88
PM 31.01 – 31.87 Sixth – University "A" 2637+95 – 2683+70	EB	0.000	0.10	0.36	0.005	0.33	1.08
	WB	0.000	0.29	0.66	0.005	0.33	1.08
PM 31.87 – 32.11 University – E Cypress "A" 2683+70 – 2696+15	EB	0.000	0.23	0.41	0.005	0.30	0.96
	WB	0.059	0.18	0.35	0.005	0.30	0.96
PM 32.11 – 33.13 E Cypress – Ford "A" 2696+15 – 2749+80	EB	0.000	0.03	0.18	0.005	0.31	0.99
	WB	0.000	0.21	0.42	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	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 47.74 – 48.28 Indian Hills – County Line "A" 702+45 – 729+87	EB	1	8	14	0	8	2	0	0	0	33
		3%	24%	42%	0%	24%	6%	0%	0%	0%	100%
	WB	0	7	20	2	7	0	0	1	0	37
		0%	19%	54%	5%	19%	0%	0%	3%	0%	100%
PM 0.00 – 0.68 County Line – Monte Vista "A" 1000+00 – 1036+30	EB	0	15	48	0	7	0	0	0	0	70
		0%	21%	69%	0%	10%	0%	0%	0%	0%	100%
	WB	0	20	50	2	16	0	0	0	0	88
		0%	23%	57%	2%	18%	0%	0%	0%	0%	100%
PM 0.68 – 1.23 Monte Vista – Central "A" 1036+30 – 1065+50	EB	0	14	27	0	5	0	0	1	0	47
		0%	30%	57%	0%	11%	0%	0%	2%	0%	100%
	WB	1	17	69	3	10	1	0	2	0	103
		1%	17%	67%	3%	10%	1%	0%	2%	0%	100%
PM 1.23 -2.37 Central – Mountain "A" 1065+50 – 1125+50	EB	0	33	69	3	21	0	0	0	0	126
		0%	26%	55%	2%	17%	0%	0%	0%	0%	100%
	WB	0	24	88	0	21	3	0	0	1	137
		0%	18%	64%	0%	15%	2%	0%	0%	1%	100%
PM 2.37 – 3.47 Mountain – Euclid "A" 1125+50 – 1183+15	EB	1	26	75	3	22	1	0	2	0	130
		1%	20%	58%	2%	17%	1%	0%	2%	0%	100%
	WB	0	20	81	2	19	1	0	0	0	123
		0%	16%	66%	2%	15%	1%	0%	0%	0%	100%
PM 3.47 – 5.24 Euclid – 4th St "A" 1183+15 – 1277+20	EB	0	34	68	2	31	1	0	2	0	138
		0%	25%	49%	1%	22%	1%	0%	1%	0%	100%
	WB	0	31	70	3	16	0	0	0	0	120
		0%	26%	58%	3%	13%	0%	0%	0%	0%	100%
PM 5.24 – 6.10 4th - Vineyard "A" 1277+20 – 1322+45	EB	1	28	70	3	25	1	0	0	1	129
		1%	22%	54%	2%	19%	1%	0%	0%	1%	100%
	WB	0	19	58	2	13	0	0	2	0	94
		0%	20%	62%	2%	14%	0%	0%	2%	0%	100%
PM 6.10 – 7.16 Vineyard – Archibald "A" 1322+45 – 1377+95	EB	0	29	58	2	35	4	0	1	0	129
		0%	22%	45%	2%	27%	3%	0%	1%	0%	100%
	WB	0	11	79	0	14	2	0	0	0	106
		0%	10%	75%	0%	13%	2%	0%	0%	0%	100%
PM 7.16 – 8.16 Archibald - Haven "A" 1377+95 – 1431+10	EB	1	27	111	3	13	1	0	0	0	156
		1%	17%	71%	2%	8%	1%	0%	0%	0%	100%
	WB	0	19	97	1	16	2	0	1	0	136
		0%	14%	71%	1%	12%	1%	0%	1%	0%	100%
PM 8.16 – 9.17 Haven – Milliken "A" 1431+10 – 1484+45	EB	0	42	222	1	15	0	0	1	1	282
		0%	15%	79%	0%	5%	0%	0%	0%	0%	100%
	WB	0	39	68	1	12	2	0	1	0	123
		0%	32%	55%	1%	10%	2%	0%	1%	0%	100%
PM 9.17 – 9.94 Milliken – Route 15 "A" 1484+45 – 1524+65	EB	0	33	167	2	12	3	0	1	0	218
		0%	15%	77%	1%	6%	1%	0%	0%	0%	100%
	WB	0	20	49	2	12	1	0	1	0	85
		0%	24%	58%	2%	14%	1%	0%	1%	0%	100%
PM 9.94 – 11.13 Route 15 – Etiwanda "A" 1524+65 – 1587+80	EB	0	13	52	3	17	5	0	5	0	95
		0%	14%	55%	3%	18%	5%	0%	5%	0%	100%
	WB	1	24	45	0	15	4	0	2	0	91
		1%	26%	49%	0%	16%	4%	0%	2%	0%	100%
PM 11.13 – 13.17 Etiwanda – Cherry "A" 1587+80 – 1695+20	EB	1	49	138	4	46	8	0	2	0	248
		0%	20%	56%	2%	19%	3%	0%	1%	0%	100%
	WB	1	33	43	4	23	2	0	2	0	108
		1%	31%	40%	4%	21%	2%	0%	2%	0%	100%

Location	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 13.17 – 15.18 Cherry – Citrus "A" 1695+20 – 1802+20	EB	0	29	104	1	31	3	0	1	0	169
		0%	17%	62%	1%	18%	2%	0%	1%	0%	100%
	WB	0	36	76	0	35	8	0	2	0	157
		0%	23%	48%	0%	22%	5%	0%	1%	0%	100%
PM 15.18 – 16.22 Citrus – Sierra "A" 1802+20 – 1856+80	EB	1	21	39	1	20	3	0	0	0	85
		1%	25%	46%	1%	24%	4%	0%	0%	0%	100%
	WB	0	14	29	1	18	3	0	0	0	65
		0%	22%	45%	2%	28%	5%	0%	0%	0%	100%
PM 16.22 – 18.49 Sierra – Cedar "A" 1856+80 – 1976+75	EB	0	21	131	2	23	2	1	0	0	180
		0%	12%	73%	1%	13%	1%	1%	0%	0%	100%
	WB	1	22	29	2	28	6	2	1	0	91
		1%	24%	32%	2%	31%	7%	2%	1%	0%	100%
PM 18.49 – 19.97 Cedar – Riverside "A" 1976+75 – 2055+00	EB	1	23	58	2	20	4	1	2	0	111
		1%	21%	52%	2%	18%	4%	1%	2%	0%	100%
	WB	0	24	40	2	15	0	0	1	0	82
		0%	29%	49%	2%	18%	0%	0%	1%	0%	100%
PM 19.97 – 20.97 Riverside – Pepper 2055+00 – 2107+05	EB	1	11	17	1	18	0	0	0	0	48
		2%	23%	35%	2%	38%	0%	0%	0%	0%	100%
	WB	0	18	28	6	26	2	0	0	0	80
		0%	23%	35%	8%	33%	3%	0%	0%	0%	100%
PM 20.97 – R21.96 Pepper – Rancho "A" 2107+05 – 2159+95	EB	1	14	13	4	20	4	1	0	0	57
		2%	25%	23%	7%	35%	7%	2%	0%	0%	100%
	WB	0	10	13	1	8	1	0	1	0	34
		0%	29%	38%	3%	24%	3%	0%	3%	0%	100%
PM R21.96 – R22.62 Rancho – La Cadena "A" 2159+95 – 2194+75	EB	0	11	9	1	13	1	0	1	0	36
		0%	31%	25%	3%	36%	3%	0%	3%	0%	100%
	WB	0	14	13	2	10	0	1	0	0	40
		0%	35%	33%	5%	25%	0%	3%	0%	0%	100%
PM R22.62 – R23.25 La Cadena – Mount Vernon "A" 2194+75 – 2227+95	EB	0	11	13	0	13	0	0	0	0	37
		0%	30%	35%	0%	35%	0%	0%	0%	0%	100%
	WB	0	3	8	1	10	0	0	1	0	23
		0%	13%	35%	4%	43%	0%	0%	4%	0%	100%
PM R23.25 – R24.24 Mount Vernon – Route 215 "A" 2227+95 – 2280+25	EB	0	20	17	3	22	1	1	1	1	66
		0%	30%	26%	5%	33%	2%	2%	2%	2%	100%
	WB	1	13	14	1	21	1	0	2	1	54
		2%	24%	26%	2%	39%	2%	0%	4%	2%	100%
PM R24.24 – 25.26 Route 215 – Waterman Ave "A" 2280+25 – 2334+40	EB	0	16	40	1	13	2	0	0	0	72
		0%	22%	56%	1%	18%	3%	0%	0%	0%	100%
	WB	0	15	30	1	17	2	1	3	0	69
		0%	22%	43%	1%	25%	3%	1%	4%	0%	100%
PM 25.26 – 26.27 Waterman – Tippecanoe "A" 2334+40 – 2387+80	EB	0	17	35	0	10	1	0	1	0	64
		0%	27%	55%	0%	16%	2%	0%	2%	0%	100%
	WB	0	15	19	1	7	5	1	2	1	51
		0%	29%	37%	2%	14%	10%	2%	4%	2%	100%
PM 26.27 – 27.30 Tippecanoe –Mountain View "A" 2387+80 – 2441+85	EB	0	11	32	2	13	0	0	1	0	59
		0%	19%	54%	3%	22%	0%	0%	2%	0%	100%
	WB	0	7	21	2	27	1	0	4	1	63
		0%	11%	33%	3%	43%	2%	0%	6%	2%	100%
PM 27.30 – 28.30 Mountain View – California "A" 2441+85 – 2494+85	EB	0	7	8	3	8	1	0	0	0	27
		0%	26%	30%	11%	30%	4%	0%	0%	0%	100%
	WB	0	13	24	1	25	0	1	1	1	66
		0%	20%	36%	2%	38%	0%	2%	2%	2%	100%

Location	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 28.30 – 29.31 California – Alabama "A" 2494+85 – 2547+40	EB	0	15	17	1	9	0	0	1	0	43
		0%	35%	40%	2%	21%	0%	0%	2%	0%	100%
	WB	0	19	36	1	16	2	1	1	0	76
		0%	25%	47%	1%	21%	3%	1%	1%	0%	100%
PM 29.31 – 29.83 Alabama – Tennessee "A" 2547+40 – 2574+40	EB	0	7	4	1	6	1	0	0	0	19
		0%	37%	21%	5%	32%	5%	0%	0%	0%	100%
	WB	0	4	2	1	8	1	0	0	0	16
		0%	25%	13%	6%	50%	6%	0%	0%	0%	100%
PM 29.83 – 30.66 Tennessee – Eureka "A" 2574+40 – 2619+40	EB	0	17	13	0	7	3	0	2	0	42
		0%	40%	31%	0%	17%	7%	0%	5%	0%	100%
	WB	0	9	12	1	14	0	0	1	0	37
		0%	24%	32%	3%	38%	0%	0%	3%	0%	100%
PM 30.66 – 31.01 Eureka – Sixth "A" 2619+40 – 2637+95	EB	0	3	3	1	4	0	0	1	0	12
		0%	25%	25%	8%	33%	0%	0%	8%	0%	100%
	WB	0	6	7	1	2	0	0	0	0	16
		0%	38%	44%	6%	13%	0%	0%	0%	0%	100%
PM 31.01 – 31.87 Sixth – University "A" 2637+95 – 2683+70	EB	0	4	15	0	6	1	0	0	0	26
		0%	15%	58%	0%	23%	4%	0%	0%	0%	100%
	WB	0	18	10	2	17	0	0	1	0	48
		0%	38%	21%	4%	35%	0%	0%	2%	0%	100%
PM 31.87 – 32.11 University – E Cypress "A" 2683+70 – 2696+15	EB	0	2	4	0	1	0	0	0	0	7
		0%	29%	57%	0%	14%	0%	0%	0%	0%	100%
	WB	0	2	1	0	2	1	0	0	0	6
		0%	33%	17%	0%	33%	17%	0%	0%	0%	100%
PM 32.11 – 33.13 E Cypress – Ford "A" 2696+15 – 2749+80	EB	0	4	7	0	3	0	0	0	0	14
		0%	29%	50%	0%	21%	0%	0%	0%	0%	100%
	WB	0	6	6	1	14	4	0	1	0	32
		0%	19%	19%	3%	44%	13%	0%	3%	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 October 1, 2009 and December 31, 2012 for the interchange ramps along the I-10 corridor within the study limits. The accident history reveals that 45 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, 40 out of 74 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.

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
47.617	Indian Hill EB off-ramp	0.000	0.25	0.92	0.003	0.35	1.01
47.879	Indian Hill EB on-ramp	0.000	0.15	**1.30**	0.002	0.22	0.63
0.452	Monte Vista EB off-ramp	0.000	**0.77**	**1.63**	0.003	0.35	1.01
0.801	Monte Vista EB on-ramp	0.000	**0.21**	**1.61**	0.001	0.13	0.46
1.117	Central EB off-ramp	0.000	0.31	0.94	0.003	0.35	1.01
1.356	Central EB on-ramp	0.000	0.07	0.44	0.002	0.22	0.63
2.227	Mountain EB off-ramp	0.000	**0.59**	**1.76**	0.003	0.35	1.01
2.539	Mountain EB on-ramp	0.000	**0.57**	**0.95**	0.002	0.22	0.63
3.352	Euclid EB off-ramp	0.000	0.12	**0.91**	0.001	0.25	0.76
3.607	Euclid EB on-ramp	0.000	**0.25**	**0.59**	0.001	0.18	0.54
5.082	4th/Grove EB off-ramp	0.000	**1.15**	**3.25**	0.003	0.35	1.01
5.342	4th/Grove EB on-ramp	0.000	**0.54**	**1.61**	0.002	0.22	0.63
5.978	Vineyard EB off-ramp	0.000	**0.38**	**1.21**	0.003	0.35	1.01
6.299	Vineyard EB on-ramp	0.000	**0.36**	**1.19**	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	**0.30**	0.41	0.003	0.18	0.57
7.321	Archibald EB on-ramp	0.000	0.00	0.12	0.001	0.06	0.18
8.002	Haven EB off-ramp	0.000	**0.74**	**2.48**	0.003	0.35	1.01
8.119	Haven EB loop on-ramp	0.000	**0.61**	**1.52**	0.002	0.21	0.73
8.288	Haven EB on-ramp	0.000	0.00	**0.60**	0.003	0.18	0.57
8.994	Milliken EB off-ramp	0.000	0.29	0.91	0.003	0.35	1.01
9.123	Milliken EB loop on-ramp	0.000	0.20	**1.04**	0.003	0.24	0.72
9.557	E10-N15 Connector	0.000	**0.20**	0.46	0.004	0.16	0.49
9.755	E10-S15 Connector	0.000	**0.16**	**0.49**	0.005	0.13	0.38
10.130	N15-E10 Connector	0.000	0.08	**0.38**	0.003	0.11	0.32
10.277	S15-E10 Connector	0.000	**0.48**	**1.45**	0.004	0.16	0.49
10.844	Etiwanda EB C-D off-ramp	0.000	0.07	0.07	0.002	0.08	0.25
10.963	Etiwanda EB off-ramp	0.000	0.22	**1.30**	0.003	0.30	1.06
11.278	Etiwanda EB loop on-ramp	0.000	**0.33**	0.65	0.002	0.21	0.73
11.277	Etiwanda EB on-ramp	0.000	0.14	0.56	0.003	0.18	0.57
11.464	Valley EB off-ramp	0.000	0.00	0.24	0.004	0.16	0.49
11.709	Etiwanda EB C-D on-ramp	0.000	0.00	0.00	0.001	0.06	0.18
12.979	Cherry EB off-ramp	0.000	0.07	**2.34**	0.003	0.35	1.01
13.346	Cherry EB on-ramp	**0.098**	**0.39**	**1.28**	0.002	0.22	0.63
15.003	Citrus EB off-ramp	0.000	0.19	**1.46**	0.003	0.35	1.01
15.352	Citrus EB on-ramp	0.000	**0.39**	**0.88**	0.002	0.22	0.63
16.042	Sierra EB off-ramp	0.000	**0.52**	**2.08**	0.003	0.35	1.01
16.393	Sierra EB on-ramp	0.000	0.07	**0.90**	0.002	0.22	0.63
18.167	Cedar EB off-ramp	0.000	**0.72**	**2.54**	0.003	0.35	1.01
18.792	Cedar EB on-ramp	0.000	0.21	**0.78**	0.002	0.22	0.63
19.796	Riverside EB off-ramp	0.000	**0.64**	**1.46**	0.003	0.35	1.01

PM	Location	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
20.147	Riverside EB on-ramp	0.000	**0.33**	0.42	0.002	0.22	0.63
20.791	Pepper EB off-ramp	0.000	0.25	0.99	0.003	0.35	1.01
21.145	Pepper EB on-ramp	0.000	0.00	**0.91**	0.002	0.22	0.63
21.720	Rancho EB off-ramp	0.000	**0.45**	**1.20**	0.003	0.35	1.01
22.089	Rancho EB on-ramp	0.000	0.13	0.54	0.002	0.22	0.63
22.596	9th EB off-ramp	0.000	0.00	0.00	0.003	0.35	1.01
22.863	9th EB on-ramp	0.000	**0.64**	**0.85**	0.002	0.22	0.63
23.240	Mt. Vernon EB off-ramp	0.000	**0.29**	**1.16**	0.003	0.24	0.84
23.442	Mt. Vernon EB on-ramp	0.000	0.00	0.00	0.001	0.13	0.46
23.810	E10-N/S215 Connector	0.000	0.00	0.25	0.002	0.08	0.25
24.423	N215-E10 Connector	0.000	0.04	**0.79**	0.005	0.13	0.38
24.621	S215-E10 Connector	0.000	0.13	0.30	0.003	0.14	0.41
25.004	Redlands EB off-ramp	0.000	0.14	0.81	0.003	0.24	0.84
25.193	Waterman EB C-D/loop off-ramp	0.000	**0.56**	**1.90**	0.003	0.30	1.06
25.347	Waterman EB loop on-ramp	0.000	0.00	0.41	0.810	0.00	0.73
25.432	Waterman EB on-ramp	0.000	0.00	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	0.29	**1.16**	0.003	0.35	1.01
26.525	Tippecanoe EB on-ramp	0.000	**0.35**	**1.30**	0.002	0.22	0.63
27.047	Mountain View EB off-ramp	0.000	0.23	**1.13**	0.003	0.35	1.01
27.536	Mountain View EB on-ramp	0.000	0.00	**1.47**	0.002	0.22	0.63
27.984	California EB off-ramp	0.000	0.10	**1.56**	0.003	0.35	1.01
28.554	California EB on-ramp	0.000	0.14	0.14	0.002	0.22	0.63
29.204	Alabama EB off-ramp	0.000	0.19	**1.36**	0.003	0.35	1.01
29.649	Tennessee EB off-ramp	0.000	**0.37**	**1.10**	0.002	0.08	0.25
29.917	Tennessee EB on-ramp	0.000	**0.25**	0.62	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	0.13	0.46	0.003	0.35	1.01
31.199	6th EB on-ramp	0.000	**0.57**	**0.76**	0.002	0.22	0.63
31.717	University EB off-ramp	0.000	**0.56**	**1.51**	0.003	0.35	1.01
32.301	Cypress EB on-ramp	0.000	**0.91**	**1.37**	0.002	0.22	0.63
33.010	Ford EB off-ramp	0.000	**0.89**	**1.61**	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
47.607	Indian Hill WB on-ramp	0.000	0.18	**1.19**	0.002	0.22	0.63
47.856	Indian Hill WB off-ramp	0.000	0.33	**1.26**	0.003	0.35	1.01
0.578	Monte Vista WB on-ramp	0.000	**0.86**	**1.73**	0.002	0.22	0.63
0.831	Monte Vista WB off-ramp	0.000	0.12	**1.20**	0.003	0.35	1.01
1.151	Central WB on-ramp	0.000	**0.46**	**0.85**	0.002	0.22	0.63
1.361	Central WB off-ramp	0.000	**0.71**	**1.35**	0.003	0.35	1.01
2.235	Mountain WB on-ramp	0.000	**0.53**	**0.73**	0.002	0.22	0.63
2.555	Mountain WB off-ramp	0.000	**0.37**	0.68	0.003	0.35	1.01
3.326	Euclid WB on-ramp	0.000	**0.20**	**1.12**	0.003	0.11	0.32
3.535	Euclid WB loop on-ramp	0.000	0.15	**0.93**	0.004	0.21	0.72
3.685	Euclid WB off-ramp	0.000	0.17	0.52	0.003	0.24	0.84
5.166	4th/Grove WB on-ramp	0.000	**0.43**	**1.93**	0.002	0.22	0.63
5.391	4th/Grove WB off-ramp	0.000	0.13	**1.30**	0.003	0.35	1.01
6.024	Vineyard WB on-ramp	0.000	**0.33**	**0.82**	0.003	0.18	0.57
6.126	Vineyard WB loop on-ramp	0.000	**0.57**	**0.86**	0.002	0.21	0.73
6.286	Vineyard WB off-ramp	0.000	0.07	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	**0.78**	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	**0.19**	**0.87**	0.003	0.18	0.57
8.213	Haven WB loop on-ramp	0.000	**0.57**	**2.57**	0.002	0.21	0.73
8.329	Haven WB off-ramp	0.000	**0.86**	**1.71**	0.003	0.35	1.01
8.987	Milliken WB on-ramp	0.000	0.17	**0.86**	0.002	0.22	0.63
9.230	Milliken WB loop off-ramp	0.000	**0.68**	**2.68**	0.004	0.33	1.00
9.577	N15-W10 Connector	**0.040**	**0.24**	**0.60**	0.003	0.14	0.41
9.770	S15-W10 Connector	0.000	0.04	**0.56**	0.005	0.13	0.38
10.396	W10-N/S15 Connector	0.000	**0.15**	**0.49**	0.002	0.08	0.25
10.983	Etiwanda WB on-ramp	0.000	0.00	0.47	0.003	0.18	0.57
10.835	Etiwanda/Valley WB on-ramp	0.000	0.00	0.05	0.001	0.06	0.18
10.982	Etiwanda WB loop on-ramp	0.000	0.16	0.65	0.002	0.21	0.73
11.418	Valley WB on-ramp	0.000	0.13	0.50	0.003	0.18	0.57
11.465	Etiwanda WB off-ramp	0.000	**0.10**	0.10	0.002	0.08	0.25
13.041	Cherry WB on-ramp	0.000	0.14	**0.74**	0.002	0.22	0.63
	Cherry WB loop on-ramp(1)	-	-	-	-	-	-
13.337	Cherry WB off-ramp	0.000	**0.41**	**1.49**	0.003	0.35	1.01
15.055	Citrus WB on-ramp	0.000	0.00	0.44	0.002	0.22	0.63
	Citrus WB loop on-ramp(1)	-	-	-	-	-	-
15.343	Citrus WB off-ramp	0.000	**0.38**	**1.41**	0.003	0.35	1.01
16.080	Sierra WB on-ramp	0.000	**0.62**	**1.18**	0.002	0.22	0.63
16.372	Sierra WB off-ramp	0.000	0.07	**1.28**	0.003	0.35	1.01
18.362	Cedar WB on-ramp	0.000	0.00	0.46	0.002	0.22	0.63

PM	Location	Accident Rate (a/mvm)					
		Actual Rate			Average Rate		
		F	F+I	TOT	F	F+I	TOT
18.673	Cedar WB off-ramp	0.000	**0.90**	**3.75**	0.003	0.35	1.01
19.849	Riverside WB on-ramp	0.000	0.09	0.09	0.002	0.22	0.63
20.137	Riverside WB off-ramp	0.000	0.26	0.87	0.003	0.35	1.01
20.818	Pepper WB on-ramp	0.000	0.00	0.49	0.002	0.22	0.63
21.138	Pepper WB off-ramp	0.000	0.26	0.93	0.003	0.35	1.01
21.852	Rancho WB on-ramp	0.000	0.18	0.53	0.002	0.22	0.63
22.094	Rancho WB off-ramp	0.000	0.13	0.67	0.003	0.35	1.01
22.482	La Cadena WB on-ramp	0.000	0.00	0.00	0.002	0.22	0.63
22.844	9th WB off-ramp	0.000	**0.42**	0.42	0.003	0.35	1.01
23.135	Mt. Vernon WB on-ramp	0.000	0.00	0.12	0.002	0.22	0.63
23.563	Sperry WB off-ramp	0.000	0.32	0.32	0.003	0.35	1.01
24.073	S215-W10 Connector	0.000	**0.14**	0.31	0.003	0.11	0.32
24.307	N215-W10 Connector	0.000	**0.24**	0.47	0.004	0.20	0.68
24.807	W10-N/W215 Connector	0.000	**0.24**	**0.56**	0.002	0.08	0.25
24.543	E/Sunwest WB on-ramp	0.000	**0.49**	**0.65**	0.001	0.13	0.46
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**	**1.18**	0.001	0.13	0.46
25.623	Carnegie WB hook off-ramp	0.000	0.10	0.38	0.003	0.24	0.84
26.021	Tippecanoe WB on-ramp	0.000	**0.27**	0.40	0.002	0.22	0.63
	Tippecanoe WB loop on-ramp[(1)]	-	-	-	-	-	-
26.506	Tippecanoe WB off-ramp	0.000	0.24	0.73	0.003	0.35	1.01
26.985	Mountain View WB on-ramp	0.000	**0.44**	**0.99**	0.002	0.22	0.63
27.530	Mountain View WB off-ramp	0.000	**1.43**	**3.65**	0.003	0.35	1.01
27.983	California WB on-ramp	0.000	0.00	0.32	0.002	0.22	0.63
28.537	California WB off-ramp	0.000	0.28	**1.97**	0.003	0.35	1.01
29.172	Alabama WB on-ramp	0.000	**0.85**	**1.58**	0.002	0.22	0.63
29.687	Alabama WB off-ramp	0.000	**3.95**	**7.30**	0.002	0.08	0.25
29.915	Tennessee WB off-ramp	0.000	**0.74**	**2.22**	0.003	0.35	1.01
29.944	W10-W210 Connector	0.000	**0.23**	**0.61**	0.005	0.13	0.38
30.778	Orange WB on-ramp	0.000	0.00	0.00	0.003	0.11	0.32
30.924	Orange WB loop on-ramp	0.000	0.00	0.10	0.004	0.21	0.72
31.164	6th WB off-ramp	0.000	0.00	0.19	0.003	0.35	1.01
31.756	University WB on-ramp	0.000	0.07	0.15	0.002	0.22	0.63
32.277	Cypress WB off-ramp	0.000	**1.19**	**1.59**	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	0.00	0.00	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 (October 1, 2009 to September 20, 2012); therefore no accident data is available.

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 accident data for northbound and southbound SR-83 or Euclid Avenue between 6th Street (PM 10.7) and 7th Street (PM 11.5). 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 – 7th Street	NB	0.000	3.02	7.17	0.009	0.69	1.48
	SB	0.000	3.77	6.79	0.009	0.69	1.48

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
6th Street – 7th Street	NB	0	4	13	1	0	0	0	0	1	19
		0%	21%	68%	5%	0%	0%	0%	0%	5%	100%
	SB	1	2	4	0	4	0	1	0	0	12
		8%	17%	33%	0%	33%	0%	8%	0%	0%	100%

5. ALTERNATIVES

5A. Viable Alternatives

5A.1. Alternative 1: No Build

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 *2013 Degradation Determination Report and 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.

The I-10 configuration under the No Build Alterative assumes the completion of transportation improvements along the project corridor by SANBAG, Caltrans, and local agencies that are currently in planning or being implemented as described in Section 3D of this document.

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

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 60G where appropriate. 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 re-established. The HOV lanes in Alternative 2 would have continuous access to and from the mainline lanes per Caltrans District 8. A conceptual drawing of Alternative 2 is included in **Attachment D** of this report.

The base condition for Alternative 2 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 2 are summarized in the following sections.

5.A.2.1 Alternative 2 Proposed Engineering Features

Proposed engineering features in Alternative 2 are summarized as follows:

Alternative 2 Mainline Improvements

- Add one HOV lane in each direction from Haven Avenue to Ford Street
- Re-establish existing auxiliary lanes along the corridor
- Construct new WB auxiliary lane at the Cedar Avenue WB on-ramp for 1,000 feet
- Construct new WB auxiliary lane between Rancho Avenue and La Cadena Drive

Alternative 2 Interchange Improvements

Alternative 2 improvements extend through 3 system interchanges (I-10/I-15, I-10/I-215, and I-10/SR-210) and 21 local street interchanges from Haven Avenue to Ford Street. Alternative 2 would require reconstruction of several freeway-to-freeway connectors and interchange ramps to accommodate the I-10 widening. **Table 5.1** below provides a summary of ramp improvements that are required in Alternative 2:

Table 5.1 Alternative 2 Ramp Improvements

Interchange	No.	Ramps	Alternative 2 Ramp Improvement			
			None	Gore	Partial	Full
Haven	1	Haven EB off-ramp	x			
	2	Haven EB loop on-ramp	x			
	3	Haven EB on-ramp	x			
	4	Haven WB on-ramp	x			
	5	Haven WB loop on-ramp	x			
	6	Haven WB off-ramp	x			
Milliken	7	Milliken EB off-ramp		x		
	8	Milliken EB loop on-ramp				x
	9	Milliken WB on-ramp		x		
	10	Milliken WB loop off-ramp		x		
I-15	11	E10-N15 Connector			x	
	12	E10-S15 Connector			x	
	13	N15-E10 Connector			x	
	14	S15-E10 Connector			x	
	15	N15-W10 Connector			x	
	16	S15-W10 Connector			x	
	17	W10-N/S15 Connector C-D			x	
	18	W10-N15 Connector	x			
	19	W10-S15 Connector	x			

Interchange	No.	Ramps	Alternative 2 Ramp Improvement			
			None	Gore	Partial	Full
Etiwanda	20	Etiwanda EB C-D off-ramp			x	
	21	Etiwanda EB off-ramp			x	
	22	Etiwanda EB loop on-ramp	x			
	23	Etiwanda EB on-ramp	x			
	24	Valley EB off-ramp	x			
	25	Etiwanda EB C-D on-ramp			x	
	26	Etiwanda WB on-ramp	x			
	27	Etiwanda WB loop on-ramp	x			
	28	Valley WB on-ramp	x			
	29	Etiwanda WB off-ramp	x			
Cherry	30	Cherry EB off-ramp		x		
	31	Cherry EB on-ramp	x			
	32	Cherry WB on-ramp		x		
	33	Cherry WB loop on-ramp			x	
	34	Cherry WB off-ramp		x		
Citrus	35	Citrus EB off-ramp		x		
	36	Citrus EB on-ramp		x		
	37	Citrus WB on-ramp		x		
	38	Citrus WB loop on-ramp			x	
	39	Citrus WB off-ramp			x	
Sierra	40	Sierra EB off-ramp				x
	41	Sierra EB on-ramp				x
	42	Sierra WB on-ramp				x
	43	Sierra WB off-ramp				x
Cedar	44	Cedar EB off-ramp		x		
	45	Cedar EB on-ramp			x	
	46	Cedar WB on-ramp			x	
	47	Cedar WB off-ramp			x	
Riverside	48	Riverside EB off-ramp		x		
	49	Riverside EB on-ramp			x	
	50	Riverside WB on-ramp			x	
	51	Riverside WB off-ramp			x	
Pepper	52	Pepper EB off-ramp			x	
	53	Pepper EB on-ramp				x
	54	Pepper WB on-ramp		x		
	55	Pepper WB off-ramp			x	
Rancho	56	Rancho EB off-ramp				x
	57	Rancho EB on-ramp				x
	58	Rancho WB on-ramp				x
	59	Rancho WB off-ramp				x

Interchange	No.	Ramps	Alternative 2 Ramp Improvement			
			None	Gore	Partial	Full
La Cadena/9th	60	9th EB off-ramp				x
	61	9th EB on-ramp				x
	62	La Cadena WB on-ramp	x			
	63	9th WB off-ramp		x		
Mt. Vernon	64	Mt. Vernon EB off-ramp			x	
	65	Mt. Vernon EB on-ramp	x			
	66	Mt. Vernon WB on-ramp		x		
	67	Sperry WB off-ramp			x	
I-215	68	E10-N/S215 Connector C-D	x			
	69	E10-N215 Connector	x			
	70	E10-S215 Connector	x			
	71	N215-E10 Connector			x	
	72	S215-E10 Connector	x			
	73	S215-W10 Connector		x		
	74	N215-W10 Connector			x	
	75	W10-N/S215 Connector C-D		x		
	76	W10-N215 Connector	x			
	77	W10-S215 Connector	x			
	78	E/Sunwest WB on-ramp			x	
Waterman	79	Redlands EB off-ramp	x			
	80	Waterman EB C-D off-ramp			x	
	81	Waterman EB loop on-ramp	x			
	82	Waterman EB loop off-ramp	x			
	83	Waterman EB on-ramp	x			
	84	Waterman EB C-D on-ramp			x	
	85	Waterman WB on-ramp to N/S215			x	
	86	Carnegie WB hook on-ramp				x
	87	Carnegie WB hook off-ramp			x	
Tippecanoe	88	Tippecanoe EB off-ramp		x		
	89	Tippecanoe EB on-ramp			x	
	90	Tippecanoe WB on-ramp		x		
	91	Tippecanoe WB loop on-ramp			x	
	92	Tippecanoe WB off-ramp			x	
Mountain View	93	Mountain View EB off-ramp			x	
	94	Mountain View EB on-ramp				x
	95	Mountain View WB on-ramp			x	
	96	Mountain View WB off-ramp			x	
California	97	California EB off-ramp			x	
	98	California EB on-ramp			x	
	99	California WB on-ramp			x	
	100	California WB off-ramp			x	

Interchange	No.	Ramps	Alternative 2 Ramp Improvement			
			None	Gore	Partial	Full
Alabama	101	Alabama EB off-ramp			x	
	102	Alabama WB on-ramp			x	
	103	Alabama WB off-ramp			x	
SR-210	104	E10-W210 Connector			x	
	105	E210-W10 Connector		x		
	106	E210-E10 Connector			x	
Tennessee	107	Tennessee EB off-ramp				x
	108	Tennessee EB on-ramp				x
	109	Tennessee WB off-ramp			x	
Eureka/Orange/6th	110	Eureka EB off-ramp		x		
	111	6th EB on-ramp*	x			
	112	Orange WB on-ramp*	x			
	113	Orange WB loop on-ramp	x			
	114	6th WB off-ramp	x			
University/Cypress	115	University EB off-ramp	x			
	116	Cypress EB on-ramp	x			
	117	University WB on-ramp	x			
	118	Cypress WB off-ramp	x			
Ford	119	Ford EB off-ramp				x
	120	Ford EB on-ramp				x
	121	Ford WB on-ramp				x
	122	Ford WB off-ramp	x			

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

Alternative 2 Local Street Improvements

Two overcrossing structures would need to be replaced with longer-span structures to accommodate the widened freeway under Alternative 2:

1. Richardson Street
2. Tennessee Street

Alternative 2 Railroad Involvement

Four 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. BNSF Colton Crossing OH (widen)
3. Pavillion Spur OH (widen or abandon)
4. BNSF West Redlands OH (widen)

Alternative 2 Structure Improvements

Alternative 2 would necessitate replacement of 3 structures and modification of 44 structures along the corridor. **Table 5.2** summarizes the proposed structure improvements under Alternative 2.

Table 5.2 Alternative 2 Structure Improvements

No.	Post	Structure Name	Bridge No.	Proposed Work
1	8.16	Haven Ave OC (Lt)	54-1201L	No work
2	8.16	Haven Ave OC (Rt)	54-1201R	No work
3	9.17	Milliken Ave OC	54-0539	Tie-back wall
4	9.87	E10-N15 Connector OC	54-0913G	No work
5	9.91	N15-W10 Connector OC	54-0908G	No work
6	9.92	W10-S15 Connector OC over Railroad	54-1065F	No work
7	9.93	Route 15/10 Separation (Lt)	54-0909L	No work
8	9.94	Route 15/10 Separation (Rt)	54-0909R	No work
9	9.96	S15-E10 Connector OC	54-0910F	No work
10	9.98	W10-S15 Connector OC	54-0914F	No work
11	10.12	Day Canyon Channel Bridge	54-0351	Widen
12	10.12	W10-S15 Bridge over Day Canyon	54-0351F	No work
13	10.13	W10-N15 Bridge over Day Canyon	54-0927F	No work
14	10.99	Etiwanda Wash Bridge (Lt)	54-0378L	Widen
15	10.99	Etiwanda Wash Bridge (Rt)	54-0378R	Widen
16	10.99	Etiwanda Wash Bridge (EB Off-Ramp)	54-0378S	Widen
17	11.13	Etiwanda Ave OC	54-0463	No work
18	11.35	Valley Blvd WB On-Ramp Separation	54-1214K	No work
19	11.50	Valley Blvd EB Off-Ramp UC (Lt)	54-0030L	Widen
20	11.50	Valley Blvd EB Off-Ramp UC (Rt)	54-0030R	Widen
21	11.64	Etiwanda-San Sevaine Channel (Lt)	54-0454L	Widen
22	11.64	Etiwanda-San Sevaine Channel (Rt)	54-0454R	Widen
23	11.64	Etiwanda-San Sevaine Channel (EB On-Ramp)	54-0454S	No work
24	11.74	Kaiser Spur OH	54-0416	Widen
25	11.82	San Sevaine Creek Channel Box Culvert	54-0434	Abandon
26	12.14	Mulberry Creek Channel Box Culvert	54-0425M	Abandon
27	13.17	Cherry Ave OC	54-1292	No work
28	15.18	Citrus Ave OC	54-1293	No work
29	15.73	Cypress Ave OC	54-1280	No work
30	16.22	Sierra Ave OC	54-1169	No work
31	R18.49	Cedar Ave OC	54-0035	Tie-back wall
32	19.90	Rialto Channel RCB Bridge	54-1116	No work
33	19.97	Riverside Ave OC	54-1267	No work
34	20.97	Pepper Ave OC	54-1324	No work
35	R21.46	Slover Mountain UP	54-0835	No work
36	R21.96	Rancho Ave OC	54-0817	Tie-back wall
37	R22.36	Colton OH (Rt)	54-0464R	Widen
38	R22.38	Colton OH (Lt)	54-0464L	Widen
39	R22.62	La Cadena Dr UC	54-0462	Widen

No.	Post	Structure Name	Bridge No.	Proposed Work
40	R22.62	La Cadena Dr UC (EB Off-Ramp)	54-0462S*	Replace
41	R22.71	9th St UC	54-0461	Widen
42	R22.82	Pavillion OH (9th St WB Off-Ramp)	54-0861K	No work
43	R22.86	Pavillion Spur OH	54-0460	Widen or Abandon**
44	R23.25	Mt. Vernon Ave OC	54-0459	Tie-back wall
45	R23.60	Warm Creek Bridge (Lt)	54-0830L	Widen
46	R23.60	Warm Creek Bridge (Rt)	54-0830R	Widen
47	R23.80	Santa Ana River Bridge (E10-N/S215)	54-0292G	No work
48	R23.82	Santa Ana River Bridge (Rt)	54-0292R	Widen
49	R23.83	Santa Ana River Bridge (Lt)	54-0292L	Widen
50	R24.19	E10-N215 Connector OC	54-0823G	No work
51	R24.23	S215-E10 Connector OC	54-0824F	No work
52	R24.23	Route 215/10 Separation (Lt)	54-0479L	No work
53	R24.25	Route 215/10 Separation (Rt)	54-0479R	No work
54	R24.27	W10-N215 Connector OC	54-1064F	No work
55	R24.30	W10-S215 Connector OC	54-0822F	No work
56	R24.57	E St/Sunwest Ln WB On-Ramp UC	54-0821F	No work
57	24.76	Hunts Ln UC	54-0601	No work
58	25.26	Waterman Ave UC	54-0600	Widen
59	25.46	San Timoteo Creek (Carnegie Dr WB On-Ramp)	54-1105K	Widen
60	25.54	San Timoteo Creek	54-0599	Widen
61	26.27	Tippecanoe Ave UC	54-0598	Widen
62	26.81	Richardson St OC	54-0597*	Replace
63	27.30	Mountain View Ave UC	54-0596	Widen
64	27.64	West Redlands OH/Mission Channel	54-0570	Widen
65	28.30	California St UC	54-0595	Widen
66	28.80	Nevada St UC	54-0594	Widen
67	29.31	Alabama St OC	54-0593	No work
68	29.58	E210-W10/Alabama St WB Off-Ramp OC	54-0937G	No work
69	29.70	E10-W210 Connector OC	54-0938G	No work
70	29.76	E210-E10 Connector OC	54-0929G	No work
71	29.82	Tennessee St OC	54-0592*	Replace
72	29.83	W10-W210 over Tennessee St UC	54-0930F	No work
73	30.10	New York St/Colton Ave UC	54-0591	No work
74	30.38	Texas St UC	54-0583	Widen
75	30.66	Eureka St UC	54-0580	Modify to add soundwall
76	30.88	Orange St UC (Route 10/38 Separation)	54-0581	No work
77	31.01	6th St UC	54-0579	Reconstruct median
78	31.41	Church St UC	54-0578	Modify median
79	31.52	Mill Creek Zanja Channel/Redlands OH	54-0472	Modify median
80	31.87	University St UC	54-0582	Modify median
81	31.99	Citrus Ave UC	54-0584	Reconstruct median
82	32.11	Cypress Ave UC	54-0585	Reconstruct median
83	32.36	Palm Ave UC	54-0586	Modify median

No.	Post	Structure Name	Bridge No.	Proposed Work
84	32.61	Highland Ave UC	54-0587	Reconstruct median
85	33.13	Ford St UC	54-0588	Widen
86	33.29	Redlands Blvd WB Off-Ramp UC	54-0589	Widen

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

Advance Planning Studies (APSs) were prepared and approved in 2008 and 2009 for structure modifications proposed under the HOV Alternative to define the scope and cost of the structure work in the project. However, a considerable change has been made to the HOV Alternative design since the APS development as a result of the change from buffer-separated HOV facility to continuous access. As such, the structure cost estimate for the HOV Alternative has been developed based on recent structure cost estimates developed for Alternative 3 APSs. The APS general plans for Alternative 2 are included for reference in **Attachment E** of this document.

Alternative 2 Drainage Improvements

Several drainage structures along the project corridor would be improved as part of the proposed project as shown in **Table 5.3**:

Table 5.3 Alternative 2 Major Drainage Improvements

No.	Drainage Facility	Approximate Station	Approximate Location	Proposed Work
Crossing System				
1	Haven Ave RCB	"A" 1405+00	West of Haven Ave parallel Turner Ave	No work
2	California Commerce SD	"A" 1450+00	East of I-15	Extend RCB
3	Day Creek Channel	"A" 1535+00	East of I-15	Widen I-10 bridges
4	Etiwanda Creek	"A" 1580+50	East of I-15	Widen I-10 bridges
5	Etiwanda-San Sevaine Wash	"A" 1615+00	East of Etiwanda Ave	Widen I-10 bridges
6	San Sevaine Creek RCB	"A" 1624+50	East of Etiwanda Ave	Abandon culvert
7	Mulberry Creek RCB	"A" 1641+50	East of Etiwanda Ave	Abandon culvert
8	Rialto Channel RCB	"A" 2050+00	West of Riverside Ave	No work
9	Colton SW & NW SD	"A" 2192+00	East of BNSF/Colton Crossing	Lengthen culvert
10	11th Street SD	"A" 2210+00	East of 9th St	Lengthen culvert
11	Warm (Lytle) Creek	"A" 2248+00	East of Mt. Vernon Ave	Widen I-10 bridge
12	Santa Ana River	"A" 2263+00	East of Mt. Vernon Ave	Widen I-10 bridges
13	San Timoteo Creek	"A" 2349+00	East of Waterman Ave	Widen I-10 bridges
14	Mission Channel	"A" 2460+00	West of California St	Widen I-10 bridge
15	Mill Creek Zanja Channel	"A" 2666+00	West of University Ave	No work
Longitudinal System				
1	I-10 Channel	"A" 1616+00 to 2050+00	Etiwanda Ave to Riverside Ave (inside State right of way)	Reconstruct portions

Alternative 2 TSM/TDM Improvements

The HOV lane extension proposed in Alternative 2 is a TSM/TDM measure that would reduce system demand by promoting carpooling and transit uses. Specifically, the project would support Omnitrans' new express bus services along the I-10 freeway between Ontario and San Bernardino. With implementation of Alternative 2, the proposed Omnitrans express routes would be able to use the proposed HOV lanes on I-10. In addition, bus stops will be incorporated at the on-ramps of the Sierra Avenue interchange along with associated intersection, pedestrian access, and traffic signal improvements to accommodate the Omnitrans express bus services.

Several Intelligent Transportation Systems (ITS) elements are also anticipated to be incorporated into the project improvements including fiber-optic and other communication systems, changeable message signs (CMS), closed circuit television (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.

5.A.2.2 Alternative 2 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*. It should be noted that the HOV extension proposed in Alternative 2 begins at Haven Avenue, with no physical improvements west of Haven Avenue. However, for comparison purposes, traffic volume projections and analysis performed for this alternative cover the same limits as Alternative 1 and Alternative 3. 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 5.4 presents a summary of the I-10 freeway ADT volumes under the No Build and Alternative 2 conditions. As shown, Alternative 2 is projected to carry approximately 5 to 10 percent more traffic volumes than the No Build condition between I-15 and Ford Street due to the additional capacity being provided by the improvements. Between the LA/SBd County and I-15 where the there is no additional capacity added west of Haven Avenue, the projected increase in traffic volume declines to approximately 3 percent and would eventually diminish west of the LA/SBd County Line.

Table 5.4 Year 2045 No Build and Alternative 2 ADT Volume

I-10 Freeway Segment	Year 2045 ADT Volume		
	Alternative 1 (No Build)	Alternative 2 (HOV)	% Increase
LA/SBd County Line to I-15	313,000	322,000	2.9%
I-15 to I-215	254,000	268,000	5.5%
I-215 to SR-210	257,000	283,000	10.0%
SR-210 to Ford Street	241,000	254,000	5.4%

It should be noted that the traffic model forecasts higher traffic volumes for the Alternative 2 mainline and interchange ramps along the entire traffic study limits from Towne Avenue to Wabash Avenue while the additional capacity is only added between Haven Avenue and Ford Street. As a result, the operation of some freeway segments and ramps west of Haven Avenue and east of Ford Street (where there are no improvements) may be slightly worse than the No Build condition. However, the improvements proposed in Alternative 2 overall would still provide the operational benefit to the I-10 corridor as reflected in the following mainline and ramp analyses.

Table 5.5 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 2 conditions. As shown, during the morning peak hours, 31 segments in Alternative 2 are projected to operate at the same LOSs as the No Build and 2 segments are projected to operate at better LOSs than the No Build. Due to the higher traffic demand projected in Alternative 2, two (2) segments are projected to operate at worse LOSs in Alternative 2 than in the No Build. During the afternoon peak hours, 31 segments in Alternative 2 are projected to operate at the same LOSs as the No Build and 1 segment is projected to operate at better LOS than the No Build. Due to the higher traffic volume forecast, 3 segments in Alternative 2 are projected to operate at worse LOSs than the No Build.

Table 5.6 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 2 conditions. As shown, all of the WB segments in Alternative 2 are projected to operate at the same or better LOSs than the No Build during the morning peak hours (33 same, 2 better) as well as the afternoon peak hours (30 same, 5 better).

Tables 5.7 and 5.8 present year 2045 peak-hour traffic volumes, d/c ratios, and LOSs for the EB and WB HOV lane, respectively, under the No Build and Alternative 2 conditions. As shown, the HOV lanes under Alternative 2 are projected to operate at LOS ranging from LOS A to LOS F. Due to the higher traffic demand forecast for Alternative 2, the existing HOV lanes west of Haven Avenue are projected to operate at the same or worse LOSs under Alternative 2 than under the No Build, except for a few segments where the operation is predicted to improve under Alternative 2.

Overall, the traffic analysis indicates that the mainline operation in Alternative 2 is similar or slightly better than the No Build Alternative for the general purpose lanes. Due to the higher volume forecast and the absence of additional improvements, LOSs in the existing HOV lanes west of Haven Avenue are projected to be worse in Alternative 2 than the No Build; however, the added HOV lanes east of Haven Avenue would operate at better LOSs than the general purpose lanes under the No Build in most segments.

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 5.9,** the speeds in some of the freeway segments are predicted to be lower in Alternative 2 than in the No Build Alternative; however, the proposed HOV extension in Alternative 2 overall would increase the average speed along the I-10 corridor during the peak hours, as compared to the No Build Alternative. Accordingly, **Table 5.10** shows that average corridor travel times along the corridor would be slightly faster during the peak hours compared to the No Build.

Table 5.5 Year 2045 No Build and Alternative 2 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 2 (HOV)					
	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	8,110	1.10	F	7,910	1.07	**F**
Indian Hill – Monte Vista	7,610	1.03	F	7,650	1.03	F	8,440	1.14	F	7,860	1.06	F
Monte Vista - Central	7,910	1.07	F	7,850	1.06	F	9,030	1.22	F	8,160	1.10	F
Central - Mountain	8,150	0.97	C	8,190	0.98	C	9,080	1.08	**F**	8,380	1.00	**D**
Mountain - Euclid	8,180	1.11	F	8,040	1.09	F	8,640	1.17	F	8,350	1.13	F
Euclid – 4th/Grove[2]	8,330	1.13	F	7,580	1.02	F	8,750	1.18	F	8,040	1.09	F
4th/Grove[2] - Vineyard	8,210	1.11	F	6,970	0.94	D	8,580	1.16	F	7,260	0.98	D
Vineyard - Archibald	8,680	1.17	F	7,720	1.04	F	9,270	1.25	F	8,440	1.14	F
Archibald - Haven	9,040	1.08	F	8,930	1.06	F	9,570	1.14	F	9,470	1.13	F
Haven - Milliken	11,170	1.09	F	11,720	1.14	F	10,490	1.25	F	10,290	1.23	F
Milliken – I-15	10,560	1.14	F	11,490	1.24	F	10,270	1.22	F	10,350	1.23	F
I-15 – Etiwanda	10,530	1.25	F	10,350	1.23	F	10,300	1.23	F	9,310	1.11	F
Etiwanda – Cherry	9,600	1.04	F	10,240	1.11	F	9,400	1.02	F	9,380	1.01	F
Cherry – Beech[3]	9,390	1.27	F	10,120	1.37	F	9,160	1.24	F	9,250	1.25	F
Beech[3] – Citrus	9,640	1.30	F	10,090	1.36	F	9,420	1.27	F	9,360	1.26	F
Citrus – Sierra	9,810	1.33	F	9,600	1.30	F	9,420	1.27	F	8,670	1.17	F
Sierra – Alder[3]	9,320	1.26	F	9,410	1.27	F	8,990	1.21	F	8,640	1.17	F
Alder[3]- Cedar	9,490	1.28	F	9,270	1.25	F	9,180	1.24	F	8,500	1.15	F
Cedar – Riverside	9,200	1.24	F	8,770	1.19	F	8,920	1.21	F	8,110	1.10	F
Riverside – Pepper	9,210	1.24	F	8,840	1.19	F	8,990	1.21	F	8,200	1.11	F
Pepper – Rancho	9,580	1.29	F	9,140	1.24	F	9,110	1.23	F	8,460	1.14	F
Rancho – La Cadena/9th	9,680	1.31	F	9,240	1.25	F	9,000	1.22	F	8,570	1.16	F
La Cadena/9th – Mt. Vernon	9,960	1.35	F	9,480	1.28	F	9,190	1.24	F	8,590	1.16	F
Mt. Vernon – I-215	9,580	1.29	F	9,240	1.25	F	8,820	1.19	F	8,380	1.13	F
I-215 – Waterman	11,530	1.37	F	11,240	1.34	F	10,650	1.27	F	10,400	1.24	F
Waterman – Tippecanoe	8,530	1.15	F	9,950	1.34	F	8,140	1.10	F	9,100	1.23	F
Tippecanoe – Mountain View	7,840	1.06	F	9,980	1.35	F	7,460	1.01	F	9,160	1.24	F
Mountain View – California	7,010	0.95	D	10,430	1.41	F	6,650	0.90	C	9,440	1.28	F
California – Alabama	6,330	0.68	B	10,690	1.16	F	5,990	0.71	**C**	9,760	1.16	F
Alabama – SR-210	5,490	0.59	B	9,670	1.05	F	5,180	0.62	B	8,770	1.04	F
SR-210 – Tennessee	4,280	0.58	B	7,420	1.00	F	3,950	0.53	B	6,340	0.86	C
SR-210 - Eureka/6th	6,590	0.78	D	11,230	1.34	F	6,140	0.73	D	10,070	1.20	F
Eureka/6th – University/Cypress	5,470	0.74	C	10,510	1.42	F	4,850	0.66	C	9,260	1.25	F
University/Cypress – Ford	4,780	0.65	C	9,860	1.33	F	4,130	0.56	B	8,520	1.15	F
Ford – Wabash	3,760	0.41	B	9,140	0.99	D	3,950	0.53	B	8,880	1.20	**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 5.6 Year 2045 No Build and Alternative 2 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 2 (HOV)					
	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	8,660	1.17	F	9,140	1.24	F
Indian Hill – Monte Vista	8,650	1.17	F	9,000	1.22	F	8,570	1.16	F	8,980	1.21	F
Monte Vista - Central	8,700	1.18	F	9,202	1.24	F	8,700	1.18	F	9,480	1.28	F
Central - Mountain	8,920	1.21	F	9,590	1.30	F	8,500	1.15	F	9,900	1.34	F
Mountain - Euclid	8,990	1.21	F	10,010	1.35	F	9,080	1.23	F	10,220	1.38	F
Euclid – 4th/Grove[2]	8,870	1.20	F	10,280	1.39	F	8,730	1.18	F	10,280	1.39	F
4th/Grove[2] - Vineyard	8,700	1.18	F	10,650	1.44	F	8,450	1.14	F	10,490	1.42	F
Vineyard - Archibald	8,920	1.21	F	11,020	1.49	F	9,400	1.27	F	11,350	1.53	F
Archibald - Haven	10,350	1.23	F	11,250	1.34	F	10,500	1.25	F	11,680	1.39	F
Haven - Milliken	12,880	1.39	F	12,900	1.39	F	11,100	1.20	F	11,080	1.20	F
Milliken – I-15	13,280	1.44	F	12,710	1.37	F	11,790	1.27	F	11,050	1.19	F
I-15 – Etiwanda	10,140	1.21	F	10,780	1.28	F	9,130	1.09	F	9,350	1.11	F
Etiwanda – Cherry	9,720	1.31	F	9,540	1.29	F	9,310	1.26	F	8,870	1.20	F
Cherry – Beech[3]	9,890	1.34	F	9,770	1.32	F	9,530	1.29	F	9,490	1.28	F
Beech[3] – Citrus	9,540	1.29	F	9,680	1.31	F	9,320	1.26	F	9,400	1.27	F
Citrus – Sierra	8,890	1.20	F	9,590	1.30	F	8,900	1.20	F	9,290	1.26	F
Sierra – Alder[3]	8,600	1.16	F	9,210	1.24	F	8,320	1.12	F	8,490	1.15	F
Alder[3]- Cedar	8,340	1.13	F	9,350	1.26	F	8,420	1.14	F	9,170	1.24	F
Cedar – Riverside	7,670	0.91	C	9,040	1.08	F	7,790	0.93	C	9,020	1.07	F
Riverside – Pepper	7,710	1.04	F	9,020	1.22	F	7,790	1.05	F	9,020	1.22	F
Pepper – Rancho	7,710	1.04	F	9,110	1.23	F	7,350	0.99	D	8,480	1.15	F
Rancho – La Cadena/9th	7,730	1.04	F	9,260	1.25	F	7,390	1.00	C	8,590	1.16	F
La Cadena/9th – Mt. Vernon	7,850	1.06	F	9,530	1.29	F	7,530	1.02	F	8,710	1.18	F
Mt. Vernon – I-215	7,900	1.07	F	9,660	1.31	F	7,530	1.02	F	8,710	1.18	F
I-215 – Waterman	9,600	1.30	F	9,720	1.31	F	9,470	1.28	F	8,860	1.20	F
Waterman – Tippecanoe	10,100	1.36	F	8,840	1.19	F	9,380	1.27	F	8,140	1.10	F
Tippecanoe – Mountain View	9,960	1.35	F	8,120	1.10	F	9,400	1.27	F	7,530	1.02	F
Mountain View – California	10,350	1.40	F	7,160	0.97	D	9,710	1.31	F	6,580	0.89	C
California – Alabama	10,970	1.07	F	6,410	0.63	C	10,230	1.22	F	5,870	0.70	B
Alabama – SR-210	9,750	1.16	F	5,040	0.60	B	8,920	1.06	F	4,520	0.54	B
SR-210 – Tennessee	8,530	1.15	F	4,150	0.56	B	7,980	1.08	F	3,980	0.54	B
SR-210 - Orange/6th	12,600	1.50	F	7,610	0.91	F	11,230	1.34	F	6,690	0.80	C
Orange/6th – University/Cypress	11,430	1.54	F	6,750	0.91	D	10,160	1.37	F	5,700	0.77	C
University/Cypress – Ford	10,300	1.39	F	6,160	0.83	D	9,440	1.28	F	5,120	0.69	C
Ford – Wabash	8,850	1.20	F	4,620	0.62	C	9,320	1.26	F	5,100	0.69	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 5.7 Year 2045 No Build and Alternative 2 EB HOV Peak Hour Volume & LOS

I-10 Segment	Year 2045 EB HOV Peak Hour Volume & LOS[1]											
	Alternative 1 (No Build)						Alternative 2 (HOV)					
	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	1,620	1.01	**F**	1,420	0.89	**D**
Indian Hill – Monte Vista	950	0.59	C	1,360	0.85	D	1,350	0.84	**D**	1,720	1.08	**F**
Monte Vista - Central	950	0.59	C	1,360	0.85	D	1,000	0.63	C	1,620	1.01	**F**
Central - Mountain	950	0.59	C	1,360	0.85	D	1,100	0.69	C	1,750	1.09	**F**
Mountain - Euclid	1,300	0.81	D	1,440	0.90	D	1,860	1.16	**F**	1,710	1.07	**F**
Euclid – 4th/Grove[2]	1,300	0.81	D	1,440	0.90	D	1,910	1.19	**F**	1,570	0.98	**E**
4th/Grove[2] - Vineyard	1,520	0.95	E	1,440	0.90	D	1,920	1.20	**F**	1,690	1.06	**F**
Vineyard - Archibald	1,240	0.78	D	1,540	0.96	E	1,370	0.86	D	1,430	0.89	D
Archibald - Haven	1,460	0.91	E	1,790	1.12	F	1,480	0.93	E	1,890	1.18	F
Haven - Milliken	-	-	-	-	-	-	810	0.51	B	1,630	1.02	F
Milliken – I-15	-	-	-	-	-	-	560	0.35	B	1,520	0.95	E
I-15 – Etiwanda	-	-	-	-	-	-	500	0.31	A	1,440	0.90	D
Etiwanda – Cherry	-	-	-	-	-	-	430	0.27	A	1,360	0.85	D
Cherry – Beech[3]	-	-	-	-	-	-	450	0.28	A	1,200	0.75	D
Beech[3] – Citrus	-	-	-	-	-	-	440	0.28	A	990	0.62	C
Citrus – Sierra	-	-	-	-	-	-	570	0.36	B	1,180	0.74	C
Sierra – Alder[3]	-	-	-	-	-	-	480	0.30	A	1,020	0.64	C
Alder[3]- Cedar	-	-	-	-	-	-	490	0.31	A	950	0.59	C
Cedar – Riverside	-	-	-	-	-	-	540	0.34	B	860	0.54	B
Riverside – Pepper	-	-	-	-	-	-	500	0.31	A	880	0.55	C
Pepper – Rancho	-	-	-	-	-	-	740	0.46	B	910	0.57	C
Rancho – La Cadena/9th	-	-	-	-	-	-	1,010	0.63	C	920	0.58	C
La Cadena/9th – Mt. Vernon	-	-	-	-	-	-	1,100	0.69	C	1,100	0.69	C
Mt. Vernon – I-215	-	-	-	-	-	-	1,190	0.74	C	1,280	0.80	D
I-215 – Waterman	-	-	-	-	-	-	1,360	0.85	D	1,650	1.03	F
Waterman – Tippecanoe	-	-	-	-	-	-	850	0.53	B	1,670	1.04	F
Tippecanoe – Mountain View	-	-	-	-	-	-	850	0.53	B	1,610	1.01	F
Mountain View – California	-	-	-	-	-	-	860	0.54	B	1,930	1.21	F
California – Alabama	-	-	-	-	-	-	880	0.55	C	1,890	1.18	F
Alabama – SR-210	-	-	-	-	-	-	880	0.55	C	1,890	1.18	F
SR-210 – Tennessee	-	-	-	-	-	-	980	0.61	C	1,920	1.20	F
SR-210 - Eureka/6th	-	-	-	-	-	-	1,080	0.68	C	1,950	1.22	F
Eureka/6th – University/Cypress	-	-	-	-	-	-	1,270	0.79	D	2,000	1.25	F
University/Cypress – Ford	-	-	-	-	-	-	1,290	0.81	D	1,890	1.18	F
Ford – Wabash	-	-	-	-	-	-	1,290	0.81	D[4]	1,890	1.18	F[4]

Boldface indicates LOS in the build alternative that is worse than the No Build condition.
[1]LOS is based on the 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]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[4]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.

Table 5.8 Year 2045 No Build and Alternative 2 WB HOV Peak Hour Volume & LOS

I-10 Segment	Year 2045 WB HOV Peak Hour Volume & LOS[1]											
	Alternative 1 (No Build)						Alternative 2 (HOV)					
	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	1,700	1.06	**F**	1,700	1.06	F
Indian Hill – Monte Vista	1,550	0.97	E	1,740	1.09	F	1,710	1.07	**F**	1,980	1.24	F
Monte Vista - Central	1,550	0.97	E	1,910	1.19	F	1,680	1.05	**F**	1,940	1.21	F
Central - Mountain	1,400	0.88	D	2,070	1.29	F	1,960	1.23	**F**	2,100	1.31	F
Mountain - Euclid	1,320	0.83	D	1,940	1.21	F	1,510	0.94	**E**	2,160	1.35	F
Euclid – 4th/Grove[2]	1,370	0.86	D	1,970	1.23	F	1,760	1.10	**F**	2,290	1.43	F
4th/Grove[2] - Vineyard	1,350	0.84	D	1,950	1.22	F	1,860	1.16	**F**	2,480	1.55	F
Vineyard - Archibald	1,630	1.02	F	2,330	1.46	F	1,680	1.05	F	2,410	1.51	F
Archibald - Haven	1,630	1.02	F	2,330	1.46	F	2,170	1.36	F	2,470	1.54	F
Haven - Milliken	-	-	-	-	-	-	2,470	1.54	F	2,460	1.54	F
Milliken – I-15	-	-	-	-	-	-	2,240	1.40	F	2,340	1.46	F
I-15 – Etiwanda	-	-	-	-	-	-	1,850	1.16	F	2,120	1.33	F
Etiwanda – Cherry	-	-	-	-	-	-	1,260	0.79	D	1,290	0.81	D
Cherry – Beech[3]	-	-	-	-	-	-	1,260	0.79	D	1,100	0.69	C
Beech[3] – Citrus	-	-	-	-	-	-	1,050	0.66	C	1,100	0.69	C
Citrus – Sierra	-	-	-	-	-	-	810	0.51	B	1,200	0.75	D
Sierra – Alder[3]	-	-	-	-	-	-	1,040	0.65	C	1,590	0.99	E
Alder[3]- Cedar	-	-	-	-	-	-	680	0.43	B	1,030	0.64	C
Cedar – Riverside	-	-	-	-	-	-	640	0.40	B	960	0.60	C
Riverside – Pepper	-	-	-	-	-	-	590	0.37	B	890	0.56	C
Pepper – Rancho	-	-	-	-	-	-	990	0.62	C	1,540	0.96	E
Rancho – La Cadena/9th	-	-	-	-	-	-	970	0.61	C	1,510	0.94	E
La Cadena/9th – Mt. Vernon	-	-	-	-	-	-	950	0.59	C	1,480	0.93	E
Mt. Vernon – I-215	-	-	-	-	-	-	1,170	0.73	C	1,790	1.12	F
I-215 – Waterman	-	-	-	-	-	-	1,310	0.82	D	1,970	1.23	F
Waterman – Tippecanoe	-	-	-	-	-	-	2,020	1.26	F	1,810	1.13	F
Tippecanoe – Mountain View	-	-	-	-	-	-	1,920	1.20	F	1,670	1.04	F
Mountain View – California	-	-	-	-	-	-	1,880	1.18	F	1,600	1.00	E
California – Alabama	-	-	-	-	-	-	2,000	1.25	F	1,550	0.97	E
Alabama – SR-210	-	-	-	-	-	-	2,110	1.32	F	1,500	0.94	E
SR-210 – Tennessee	-	-	-	-	-	-	2,330	1.46	F	1,400	0.88	D
SR-210 - Eureka/6th	-	-	-	-	-	-	2,260	1.41	F	1,360	0.85	D
Orange/6th – University/Cypress	-	-	-	-	-	-	2,260	1.41	F	1,360	0.85	D
University/Cypress – Ford	-	-	-	-	-	-	1,750	1.09	F	1,330	0.83	D
Ford – Wabash	-	-	-	-	-	-	1,520	0.95	E[4]	1,310	0.82	D[4]

Boldface indicates LOS in the build alternative that is worse than the No Build condition.
[1]LOS is based on the 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]Future interchanges at Beech Avenue and Alder Avenue are assumed to be constructed by 2045 by others.
[4]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.

Table 5.9 Year 2045 No Build and Alternative 2 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 2 (HOV)			
		GP		HOV[1]		GP		HOV	
		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	21	30	44	28
	I-15 to I-215	14	16			19	28	65	62
	I-215 to SR-210	40	10			46	18	62	21
	SR-210 to Ford	63	10			64	18	60	10
	Entire Corridor	29	21	36	27	30	29	57	38
Westbound	LA/SBd County Line to I-15	15	10	43	10	15	10	16	10
	I-15 to I-215	29	15			33	22	60	49
	I-215 to SR-210	10	42			15	50	12	27
	SR-210 to Ford	10	56			10	63	10	54
	Entire Corridor	21	24	27	21	24	30	32	29

[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 5.10 Year 2045 No Build and Alternative 2 Travel Time

I-10 Between LA/SBd County Line and Ford Street		Year 2045 Travel Time[2] (minutes)							
		Alternative 1 (No Build)				Alternative 2 (HOV)			
		GP		HOV[1]		GP		HOV	
		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	23	16	11	17
	I-15 to I-215	57	50			42	29	12	13
	I-215 to SR-210	8	31			7	17	5	15
	SR-210 to Ford	2	12			2	7	2	12
	Entire Corridor	59	80	47	63	56	59	30	45
Westbound	LA/SBd County Line to I-15	32	49	11	49	32	49	30	49
	I-15 to I-215	29	56			25	38	14	17
	I-215 to SR-210	28	7			19	6	24	10
	SR-210 to Ford	15	3			15	2	15	3
	Entire Corridor	85	72	66	84	72	59	55	60

[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 5.9 and the length of the corridor within the project limits.

Table 5.11 presents the peak-hour traffic volumes, d/c ratios, and merge/diverge LOS for the interchange ramps along EB I-10 under the No Build and Alternative 2 conditions. As shown, most of the EB interchange ramps in Alternative 2 are projected to operate at the same or better LOSs than the No Build Alternative during the morning peak hours (68 same, 8 better) and afternoon peak hours (71 same, 5 better). Due to the higher traffic volume forecast, ramp LOSs in Alternative 2 (which are based on the mainline density upstream/downstream of a ramp junction) are projected to be worse for 5 ramps during the morning peak hours and 5 ramps during the afternoon peak hours, compared to the No Build.

Table 5.12 presents the peak-hour traffic volumes, d/c ratios, and merge/diverge LOS for the interchange ramps along WB I-10 under the No Build and Alternative 2 conditions. As shown, all of the WB interchange ramps in Alternative 2 are projected to operate at the same or better LOSs than the No Build during the morning peak hours (79 same, 5 better). During the afternoon peak hours, 71 ramps are projected to operate at the same LOSs as the No Build and 12 ramps are projected to operate at better LOSs. Due to the higher traffic demand forecast, 1 WB ramp is projected to operate at LOS F under Alternative 2, compared to LOS E in the No Build.

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 5.11 Year 2045 No Build and Alternative 2 EB Ramp Peak Hour Volume & LOS

	Year 2045 EB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						**Alternative 2 (HOV)**					
	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	880	0.59	F	900	0.60	**F**
Indian Hill EB on-ramp	940	0.63	F	1,330	0.89	F	940	0.63	F	1,150	0.77	F
Monte Vista EB off-ramp	760	0.51	F	930	0.62	F	800	0.53	F	930	0.62	F
Monte Vista EB on-ramp	1,050	0.70	F	1,130	0.75	F	1,040	0.69	F	1,130	0.75	F
Central EB off-ramp	660	0.44	F	940	0.63	F	780	0.52	F	970	0.65	F
Central EB on-ramp	900	0.60	C	1,280	0.85	C	920	0.61	**F**	1,320	0.88	**D**
Mountain EB off-ramp	730	0.49	C	1,210	0.81	C	770	0.51	**F**	1,210	0.81	**D**
Mountain EB on-ramp	1,110	0.74	F	1,140	0.76	F	1,100	0.73	F	1,140	0.76	F
Euclid EB off-ramp	1,030	0.69	F	1,570	1.05	F	1,030	0.69	F	1,570	1.05	F
Euclid EB on-ramp	1,180	0.79	F	1,110	0.74	F	1,180	0.79	F	1,120	0.75	F
4th/Grove EB off-ramp[1]	970	0.65	F	1,420	0.95	F	1,200	0.80	F	1,510	1.01	F
4th/Grove EB on-ramp[1]	1,060	0.71	F	800	0.53	D	1,040	0.69	F	860	0.57	D
Vineyard EB off-ramp	920	0.31	F	420	0.14	D	930	0.62	F	460	0.31	D
Vineyard EB on-ramp	1,110	0.74	F	1,270	0.85	F	1,060	0.71	F	1,370	0.91	F
Archibald EB off-ramp	1,660	0.55	F	1,550	0.52	F	1,720	0.57	F	1,650	0.55	F
Holt EB on-ramp	1,560	1.04	F	2,050	1.37	C	1,450	0.97	F	2,080	1.39	**F**

I-10 Segment	Year 2045 EB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 2 (HOV)					
	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	690	0.46	F	1,060	0.71	F
Haven EB off-ramp	1,700	0.57	F	1,130	0.38	F	2,120	0.71	F	1,580	0.53	F
Haven EB loop on-ramp	560	0.37	F	670	0.45	F	560	0.37	F	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	1,060	0.35	F	1,000	0.33	F
Milliken EB loop on-ramp	580	0.39	F	890	0.59	F	590	0.39	F	950	0.63	F
E10-N15 Connector	1,580	0.53	F	2,790	0.93	F	1,560	0.52	F	2,790	0.93	F
E10-S15 Connector	2,350	1.57	F	2,050	1.37	F	2,340	1.56	E	2,050	1.37	C
N15-E10 Connector	2,620	1.75	F	2,580	1.72	F	2,590	1.73	D	2,600	1.73	C
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	1,340	0.45	F	1,160	0.39	F
Etiwanda EB off-ramp	660	0.44	(3)	394	0.26	(3)	681	0.45	(3)	392	0.26	(3)
Etiwanda EB loop on-ramp	87	0.06	(3)	270	0.18	(3)	91	0.06	(3)	290	0.19	(3)
Etiwanda EB on-ramp	263	0.18	(3)	780	0.52	(3)	279	0.19	(3)	860	0.57	(3)
Valley EB off-ramp	620	0.41	(3)	766	0.51	(3)	659	0.44	(3)	768	0.51	(3)
Etiwanda EB C-D on-ramp	350	0.23	F	1,050	0.70	F	370	0.25	F	1,150	0.77	F
Cherry EB off-ramp	1,040	0.35	F	1,250	0.42	F	970	0.32	F	1,290	0.43	F
Cherry EB on-ramp	830	0.55	F	1,130	0.75	F	750	0.50	F	1,010	0.67	F
Beech EB off-ramp[2]	370	0.25	F	530	0.35	F	350	0.23	F	650	0.43	F
Beech EB on-ramp[2]	630	0.42	F	500	0.33	F	590	0.39	F	550	0.37	F
Citrus EB off-ramp	550	0.37	F	1,120	0.75	F	550	0.37	F	1,130	0.75	F
Citrus EB on-ramp	710	0.47	F	620	0.41	F	680	0.45	F	620	0.41	F
Sierra EB off-ramp	1,630	0.54	F	1,470	0.49	F	1,630	0.54	F	1,470	0.49	F
Sierra EB on-ramp	1,140	0.76	F	1,280	0.85	F	1,110	0.74	F	1,280	0.85	F
Alder EB off-ramp[2]	460	0.31	F	600	0.40	F	420	0.28	F	680	0.45	F
Alder EB on-ramp[2]	630	0.42	F	460	0.31	F	610	0.41	F	470	0.31	F
Cedar EB off-ramp	1,150	0.38	F	1,540	0.51	F	1,060	0.35	F	1,500	0.50	F
Cedar EB on-ramp	870	0.58	F	1,040	0.69	F	860	0.57	F	1,020	0.68	F
Riverside EB off-ramp	910	0.30	F	940	0.31	F	910	0.30	F	980	0.33	F
Riverside EB on-ramp	870	0.58	F	1,010	0.67	F	940	0.63	F	1,100	0.73	F
Pepper EB off-ramp	490	0.33	F	530	0.35	F	560	0.37	F	540	0.36	F
Pepper EB on-ramp	910	0.61	F	830	0.55	F	920	0.61	F	830	0.55	F
Rancho EB off-ramp	470	0.31	F	660	0.44	F	420	0.28	F	640	0.43	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	150	0.10	F	250	0.17	F
9th EB on-ramp	450	0.30	F	460	0.31	F	440	0.29	F	460	0.31	F
Mt. Vernon EB off-ramp	750	0.50	F	800	0.53	F	710	0.47	F	770	0.51	F

I-10 Segment	Year 2045 EB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 2 (HOV)					
	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	420	0.28	F	730	0.49	F
E10-N/S215 Connector	3,120	0.69	F	3,210	0.71	F	3,080	0.68	F	3,260	0.72	F
E10-N215 Connector	2,210	0.74	C	2,470	0.82	D	2,190	0.73	C	2,510	0.84	D
E10-S215 Connector	910	0.30	A	740	0.25	A	890	0.30	A	750	0.25	A
N215-E10 Connector	3,080	2.05	F	3,190	2.13	F	3,040	2.03	F	3,270	2.18	C
S215-E10 Connector	1,990	1.33	F	2,030	1.35	F	2,040	1.36	F	2,380	1.59	F
Redlands EB off-ramp	1,860	1.24	F	1,280	0.85	F	1,890	1.26	F	1,270	0.85	F
Waterman EB C-D/loop off-ramp	1,660	1.11	F	1,100	0.73	F	1,660	1.11	F	1,130	0.75	F
Waterman EB loop on-ramp	164	0.11	(3)	644	0.43	(3)	164	0.11	(3)	651	0.43	(3)
Waterman EB on-ramp	356	0.24	(3)	446	0.30	(3)	356	0.24	(3)	469	0.31	(3)
Waterman EB C-D on-ramp	520	0.35	F	1,090	0.73	F	520	0.35	F	1,120	0.75	F
Tippecanoe EB off-ramp	1,100	0.37	F	1,090	0.36	F	1,090	0.36	F	1,130	0.38	F
Tippecanoe EB on-ramp	410	0.27	F	1,120	0.75	F	410	0.27	F	1,130	0.75	F
Mountain View EB off-ramp	1,360	0.91	F	770	0.51	F	1,340	0.89	F	800	0.53	F
Mountain View EB on-ramp	530	0.35	D	1,220	0.81	F	540	0.36	C	1,400	0.93	F
California EB off-ramp	1,090	0.73	D	1,030	0.69	F	1,060	0.71	C	970	0.65	F
California EB on-ramp	410	0.27	B	1,290	0.86	F	430	0.29	**C**	1,250	0.83	F
Alabama EB off-ramp	840	0.56	B	1,020	0.68	F	810	0.54	**C**	1,000	0.67	F
E10-W210 Connector	1,210	0.40	B	2,250	0.75	F	1,130	0.38	B	2,400	0.80	F
E210-E10 Connector	2,440	1.63	D	3,130	2.09	F	2,390	1.59	**F**	2,940	1.96	F
Tennessee EB off-ramp	500	0.33	C	480	0.32	F	470	0.31	B	470	0.31	D
Tennessee EB on-ramp	380	0.25	B	1,160	0.77	F	370	0.25	B	1,290	0.86	D
Eureka EB off-ramp	1,390	0.93	D	1,470	0.98	F	1,360	0.91	D	1,460	0.97	F
6th EB on-ramp	270	0.18	C	760	0.51	F	260	0.17	B	700	0.47	F
University EB off-ramp	880	0.59	D	1,310	0.87	F	880	0.59	C	1,310	0.87	F
Cypress EB on-ramp	190	0.13	C	660	0.44	F	190	0.13	B	460	0.31	F
Ford EB off-ramp	660	0.44	C	770	0.51	F	790	0.53	C	840	0.56	F
Ford EB on-ramp	600	0.40	B	1,500	1.00	D	600	0.40	B	1,210	0.81	**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 5.12 Year 2045 No Build and Alternative 2 WB Ramp Peak Hour Volume & LOS

I-10 Segment	Year 2045 WB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 2 (HOV)					
	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	910	0.61	F	1,030	0.61	F
Monte Vista WB on-ramp	810	0.54	F	830	0.55	F	810	0.54	F	790	0.53	F
Monte Vista WB off-ramp	870	0. 58	F	1,240	0.83	F	910	0.61	F	1,250	0.83	F
Central WB on-ramp	920	0.61	F	910	0.61	F	920	0.61	F	910	0.61	F
Central WB off-ramp	990	0.66	F	1,430	0.95	F	1,000	0.67	F	1,490	0.99	F
Mountain WB on-ramp	1,240	0.83	F	1,070	0.71	F	1,240	0.83	F	1,100	0.73	F
Mountain WB off-ramp	1,300	0.87	F	1,480	0.99	F	1,370	0.91	F	1,480	0.99	F
Euclid WB on-ramp	750	0.50	F	650	0.43	F	750	0.50	F	630	0.42	F
Euclid WB loop on-ramp	470	0.31	F	530	0.35	F	470	0.31	F	530	0.35	F
Euclid WB off-ramp	1,050	1.03	F	1,330	0.89	F	1,120	0.75	F	1,360	0.91	F
4th/Grove WB on-ramp[1]	1,040	0.69	F	920	0.61	F	1,000	0.67	F	900	0.60	F
4th/Grove WB off-ramp[1]	870	0.58	F	1,290	0.86	F	830	0.55	F	1,290	0.86	F
Vineyard WB on-ramp	310	0.21	F	420	0.28	F	310	0.21	F	370	0.25	F
Vineyard WB loop on-ramp	210	0.14	F	300	0.20	F	210	0.14	F	310	0.21	F
Vineyard WB off-ramp	1,010	0.67	F	1,470	0.98	F	1,280	0.85	F	1,470	0.98	F
Archibald WB on-ramp	1,010	0.67	F	1,740	1.16	F	910	0.61	F	1,710	1.14	F
Holt WB off-ramp	1,740	1.16	F	1,420	0.95	F	1,810	1.21	F	1,550	1.03	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	790	0.53	F
Haven WB off-ramp	1,820	0.61	F	1,420	0.47	F	1,820	0.61	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	1,210	0.40	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	3,180	2.12	D	2,470	1.65	D
W10-N/S15 Connector	3,020	1.01	F	2,820	0.94	F	3,090	1.03	F	2,880	0.96	F
W10-N15 Connector	860	0.57	A	1,090	0.73	C	880	0.59	A	1,110	0.74	C
W10-S15 Connector	2,160	0.72	C	1,730	0.58	A	2,210	0.74	C	1,770	0.59	A
Etiwanda WB on-ramp	440	0.29	F	590	0.39	F	480	0.32	F	790	0.53	F
Etiwanda WB loop on-ramp	720	0.48	F	1,200	0.80	F	720	0.48	F	1,200	0.80	F
Valley WB on-ramp	334	0.22	[3]	538	0.36	[3]	334	0.22	[3]	538	0.36	[3]
Etiwanda WB off-ramp	730	0.49	F	550	0.37	F	790	0.53	F	680	0.45	F
Cherry WB on-ramp	810	0.54	F	490	0.33	F	860	0.57	F	590	0.39	F
Cherry WB loop on-ramp	290	0.19	F	240	0.16	F	320	0.21	F	330	0.22	F
Cherry WB off-ramp	1,270	0.42	F	970	0.32	F	1,400	0.47	F	1,350	0.45	F

I-10 Segment	Year 2045 WB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 2 (HOV)					
	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	830	0.55	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	770	0.51	F	430	0.29	F
Citrus WB loop on-ramp	520	0.35	F	380	0.25	F	520	0.35	F	390	0.26	F
Citrus WB off-ramp	630	0.42	F	780	0.52	F	630	0.42	F	810	0.54	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	1,040	0.35	F	1,240	0.41	F
Alder WB on-ramp[2]	690	0.46	F	470	0.31	F	730	0.49	F	540	0.36	F
Alder WB off-ramp[2]	440	0.29	F	600	0.40	F	470	0.31	F	660	0.44	F
Cedar WB on-ramp	1,480	0.99	F	1,220	0.81	F	1,540	1.03	F	1,220	0.81	F
Cedar WB off-ramp	810	0.54	D	910	0.61	F	870	0.58	D	1,000	0.67	F
Riverside WB on-ramp	860	0.57	C	910	0.61	F	940	0.63	C	1,000	0.67	F
Riverside WB off-ramp	890	0.59	F	890	0.59	F	890	0.59	F	930	0.62	F
Pepper WB on-ramp	840	0.56	F	640	0.43	F	840	0.56	F	640	0.43	F
Pepper WB off-ramp	840	0.56	F	730	0.49	F	810	0.54	E	750	0.50	F
Rancho WB on-ramp	500	0.33	F	480	0.32	F	500	0.33	C	530	0.35	F
Rancho WB off-ramp	530	0.35	F	630	0.42	F	530	0.35	C	600	0.40	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	F	440	0.29	F
Mt. Vernon WB on-ramp	590	0.39	F	780	0.52	F	650	0.43	F	810	0.54	F
Sperry WB off-ramp	650	0.43	F	910	0.61	F	870	0.58	F	1,120	0.75	F
S215-W10 Connector	2,140	1.43	F	2,520	1.68	F	2,170	1.45	F	2,600	1.73	F
N215-W10 Connector	910	0.61	C	1,460	0.97	D	910	0.61	C	1,460	0.97	C
W10-N/W215 Connector	5,000	1.67	F	4,940	1.65	F	5,420	1.81	F	5,280	1.76	F
W10-N215 Connector	4,360	1.45	F	2,930	0.98	E	4,680	1.56	F	3,020	1.01	**F**
W10-S215 Connector	1,210	0.40	A	3,110	1.04	F	1,300	0.43	A	3,330	1.11	F
E/Sunwest WB on-ramp	260	0.17	B	890	0.59	C	260	0.17	B	890	0.59	C
Carnegie WB hook on-ramp	540	0.36	F	1,560	1.04	F	490	0.33	F	1,550	1.03	F
Carnegie WB hook off-ramp	1,040	0.69	F	680	0.45	F	1,110	0.37	F	670	0.22	F
Tippecanoe WB on-ramp	590	0.39	F	840	0.56	F	550	0.37	F	790	0.53	F
Tippecanoe WB loop on-ramp	400	0.27	F	643	0.43	F	370	0.25	F	720	0.48	F
Tippecanoe WB off-ramp	840	0.56	F	760	0.51	F	840	0.56	F	760	0.51	F
Mountain View WB on-ramp	800	0.53	F	1,710	1.14	F	980	0.65	F	1,890	1.26	F
Mountain View WB off-ramp	1,200	0.80	F	750	0.50	D	1,250	0.83	F	870	0.58	C
California WB on-ramp	720	0.48	F	1,470	0.98	D	710	0.47	F	1,450	0.97	C
California WB off-ramp	1,340	0.89	F	720	0.48	C	1,350	0.90	F	690	0.46	B
Alabama WB on-ramp	1,220	0.81	F	1,370	0.91	C	1,200	0.80	F	1,400	0.93	B

I-10 Segment	Year 2045 WB Ramp Peak Hour Volume & LOS[4]											
	Alternative 1 (No Build)						Alternative 2 (HOV)					
	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	800	0.53	F	380	0.25	B
E210-W10 Connector	2,050	1.37	F	1,380	0.92	B	2,110	1.41	F	1,390	0.93	B
W10-W210 Connector	3,610	1.20	F	3,030	1.01	F	3,360	1.12	F	2,650	0.88	C
Tennessee WB off-ramp	460	0.31	F	430	0.29	C	470	0.31	F	430	0.29	C
Orange WB on-ramp	730	0.49	F	450	0.30	F	720	0.48	F	520	0.35	C
Orange WB loop on-ramp	900	0.60	F	900	0.60	C	920	0.61	F	930	0.62	C
6th WB off-ramp	460	0.31	F	490	0.33	D	500	0.33	F	420	0.28	C
University WB on-ramp	1,600	1.07	F	930	0.62	D	1,600	1.07	F	930	0.62	C
Cypress WB off-ramp	470	0.31	F	340	0.23	D	370	0.25	F	320	0.21	C
Ford WB on-ramp	1,110	0.74	F	540	0.36	C	1,110	0.74	F	550	0.37	C
Ford WB off-ramp	910	0.61	F	450	0.30	C	770	0.51	F	500	0.33	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 5.13**.

Table 5.13 Year 2045 No Build and Alternative 2 Intersection LOS and Delay

Intersection	Year 2045 Intersection LOS and Delay[2]							
	Alternative 1 (No Build)				Alternative 2 (HOV)			
	AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Monte Vista/WB ramps	39.6	D	57.7	E	46.4	D	49.8	D
Monte Vista/EB off-ramp/Palo Verde	46.1	D	74.6	E	49.5	D	69.9	E
Palo Verde/EB on-ramp	10.3	B	13.1	B	10.6	B	13.5	B
Mountain/7th/Shopping Center	19.6	B	40.3	D	21.3	C	46.1	D
Mountain/WB ramps	40.9	D	52.0	D	45.7	D	59.4	E
Mountain/EB ramps	25.7	C	34.6	C	21.5	C	35.9	D
Mountain/6th	18.5	B	23.3	C	18.2	B	24.0	C
Euclid SB/7th	32.8	C	29.6	C	32.0	C	28.1	C
Euclid NB/7th	13.6	B	20.4	C	14.9	B	21.5	C
Euclid/EB ramps	92.5	F	156.7	F	93.9	F	166.5	F
7th/WB hook ramps/2nd[1]	35.2	E	98.1	F	46.2	E	105.7	F
Vineyard/Inland Empire	8.2	A	10.8	B	8.4	A	8.8	A
Vineyard/WB ramps	20.8	C	44.3	D	28.2	C	41.5	D
Vineyard/EB ramps	61.9	E	41.5	D	58.7	E	49.8	D
Vineyard/G	18.2	B	12.2	B	16.8	B	10.4	B
Vineyard/D	20.0	C	31.5	C	19.5	B	35.8	D
Valley/Commerce	33.6	C	36.2	D	32.7	C	32.8	C
Etiwanda/Valley/Ontario Mills	18.6	B	26.2	C	18.0	B	21.9	C
Etiwanda/WB off-ramp	16.0	B	15.3	B	17.0	B	18.9	B
Etiwanda/EB off-ramp	18.6	B	12.1	B	20.1	C	12.1	B
Pepper/Valley	31.0	C	30.6	C	32.8	C	32.2	C
Pepper/WB ramps	28.8	C	23.2	C	30.1	C	20.8	C
Pepper/EB ramps	25.0	C	30.2	C	27.9	C	34.0	C
La Cadena/WB on-ramp	4.8	A	6.4	A	5.7	A	7.2	A
9th/WB off-ramp	13.3	B	24.8	C	14.0	B	18.3	C
9th/EB ramps	10.9	B	11.7	B	10.7	B	12.2	B
Tennessee/WB ramps	15.9	B	18.0	B	14.9	B	13.9	B
Tennessee/EB ramps	23.8	C	81.0	F	15.1	B	28.5	C
Ford/WB on-ramp/Reservoir	20.9	C	22.0	C	19.1	B	17.8	B
Ford/EB off-ramp	17.4	C	76.3	F	17.1	C	27.3	D
Ford/Parkford[3]	24.9	C	162.3	F	30.0	D	89.6	F
Ford/EB on-ramp/WB off-ramp	35.1	D	44.0	D	31.7	C	28.6	C
Ford/Oak	20.6	C	14.6	B	20.1	C	14.2	B

[1]Intersection is unsignalized.
[2]Delay is shown in seconds
[3]Unsignalized intersection

5.A.2.3 Alternative 2 Design Exception Features

Tables 5.14 and 5.15 summarize the nonstandard mandatory and advisory design features that have been identified to date for the project under Alternative 2. Additional design exceptions may be discovered during the final design. The detailed design standards risk assessment tables are included as **Attachment H.**

Table 5.14 Alternative 2 Proposed Mandatory Design Exception Features

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
201.1 Horizontal Stopping Sight Distance (2)	1.	WB I-10 2146+28 – 2157+53 (3500' Rt) to median barrier	750'	730'	671'	H
	2.	EB I-10 2178+70 – 2184+50 (2600' Lt) to median barrier	750'	597'	664'	H
	3.	WB I-10 2186+61 – 2192+26 (2600' Rt) to median barrier	750'	597'	664'	H
	4.	WB I-10 2330+59 – 2341+18 (3500' Rt) to median barrier	750'	696'	671'	H
	5.	WB I-10 2557+96 – 2576+45 (3000' Rt)(3) to median barrier	750'	746'	660'	H
	6.	EB I-10 2587+73 – 2606+33 (3000' Lt) to median barrier	750'	746'	650'	H
	7.	WB I-10 2635+53 – 2657+15 (4000' Rt) to median barrier	750'	861'	706'	H
	8.	WB I-10 2687+16 – 2703+37 (3599.75' Rt) to median barrier	750'	817'	670'	H
	9.	WB I-10 2718+18 – 2727+85 (3999.72' Rt) to median barrier	750'	861'	706'	H
	10.	EB I-10 2747+23 – 2766+14 (3199.23' Lt) to median barrier	750'	771'	642'	H
	11.	WB I-10 2603+54 – 2605+58 (2928' Lt) @ outside Br rail- Texas	750'	612'	612'	H
	12.	EB I-10 2637+33 – 2638+75 (4000' Rt) @ outside Br rail - 6th St	750'	710'	710'	H
	13.	EB I-10 2687+16 – 2703+37 (3599.75' Rt) @ outside Br rail/SW	750'	673'	673'	H
	14.	EB I-10 2718+18 – 2727+85 (3999.72' Rt) @ outside Br rail/SW	750'	710'	710'	H
	15.	WB I-10 2747+22 – 2766+14 (3199.23' Lt) @ outside Br rail-Ford	750'	644'	672'	H
	16.	WB I-10 1693+70 – 1696+70 (5042' Rt) @ Cherry Ave OC	750'	569'	725'	H
	17.	WB I-10 2053+50 – 2056+50 (5042' Rt) @ Riverside Ave OC	750'	586'	739'	H
	18.	WB I-10 2414+50 – 2416+50 (4000' Rt) @ Richardson St OC	750'	567'	728'	H
	19.	WB I-10 2565+50 – 2567+50 (3000' Rt) @ E10-W210 Connector	750'	678'	610'	H
	20.	WB I-10 2572+00 – 2574+00 (3000' Rt) @ E210-E10 Connector	750'	662'	592'	H
	21.	WB I-10 2572+00 – 2576+00 (3000' Rt) @ Tennessee Ave OC	750'	678'	641'	H
201.1 Vertical Stopping Sight Distance (2)	1.	WB & EB I-10 1531+95 – 1534+95 (300' crest)	750'	573'	573'	H
	2.	WB I-10 1614+43 – 1624+43 (1000' crest)	750'	479'	479'	H
	3.	EB I-10 1619+50 – 1624+50 (500' crest)	750'	477'	477'	H
	4.	WB I-10 1959+10 – 1964+10 (500' crest)	750'	496'	496'	H
	5.	EB I-10 1959+10 – 1964+10 (500' crest)	750'	486'	486'	H
	6.	EB I-10 2177+04 – 2184+04 (700' crest)	750'	613'	613'	H
	7.	WB I-10 2179+04 – 2184+04 (500' crest)	750'	590'	590'	H
	8.	EB I-10 2200+55 – 2207+55 (700' crest)	750'	583'	583'	H
	9.	WB I-10 2201+04 – 2206+04 (500' crest)	750'	515'	515'	H
	10.	WB & EB I-10 2224+04 – 2231+04 (700' sag)	750'	485'	485'	H
	11.	WB & EB I-10 2231+04 – 2236+04 (500' crest)	750'	412'	412'	H
	12.	WB I-10 2296+78 – 2299+78 (300' sag)	750'	567'	567'	H
	13.	WB I-10 2301+18 – 2314+68 (1350' crest)	750'	567'	567'	H

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
	14.	EB I-10 2303+59 – 2311+59 (800' crest)	750'	482'	482'	H
	15.	WB I-10 2314+68 – 2322+68 (800' sag)	750'	687'	687'	H
	16.	WB & EB I-10 2328+95 – 2338+95 (1000' crest)	750'	618'	618'	H
	17.	WB & EB I-10 2385+07 – 2396+57 (1150' crest)	750'	583'	583'	H
	18.	WB & EB I-10 2434+22 – 2440+22 (600' crest)	750'	583'	583'	H
	19.	WB & EB I-10 2457+22 – 2467+22 (1000' crest)	750'	640'	640'	H
	20.	WB & EB I-10 2492+47 – 2499+47 (700' crest)	750'	625'	625'	H
	21.	WB & EB I-10 2518+47 – 2525+47 (700' crest)	750'	610'	610'	H
	22.	WB & EB I-10 2588+97 – 2592+97 (400' crest)	750'	571'	571'	H
	23.	WB & EB I-10 2663+47 – 2670+97 (750' crest)	750'	728'	728'	H
	24.	9th St EB off-ramp (620' crest)	430'	Realigned	335'	H
	25.	Richardson (200' sag)	200'	200'	163'	H
202.2(1) Super-elevation Rate (2)	1.	WB & EB I-10 2160+46 – 2169+94 (4500' Lt)	2%	4%	4%	H
	2.	EB I-10 2179+82 – 2184+14 (2600' Lt)	5%	6%	6%	H
	3.	WB I-10 2186+39 – 2192+03 (2600' Lt)	5%	6%	6%	H
	4.	WB I-10 2292+76 – 2303+02 (4189' Lt)	3%	4%	4%	H
	5.	EB I-10 2291+87 – 2303+22 (4535' Lt)	2%	4%	4%	H
	6.	Sierra WB off-ramp (4500' Rt)	2%	3%	-2%	H
	7.	Riverside WB off-ramp (3500' Rt)	3%	4%	-3%	H
	8.	Carnegie WB hook on-ramp (250' Lt)	12%	4.5%	4.5%	H
	9.	Carnegie WB hook off-ramp (600' Lt)	12%	4%	4%	H
	10.	Mountain View WB off-ramp (4500' Rt)	2%	4%	-2%	H
	11.	Mountain View EB off-ramp (5000' Lt)	2%	6%	-2%	H
	12	California WB off-ramp (8000' Rt)	2%	4%	-2%	H
	13.	California EB off-ramp (5000' Lt)	2%	7%	-2%	H
	14.	Alabama WB off-ramp (5000' Lt)	-2%	1%	2%	H
	15.	Ford WB on-ramp (4500' Rt)	2%	5%	-2%	H
	16.	Ford EB off-ramp (500' Rt)	12%	8%	6%	H
301.1 Traveled Way Width(2)	1.	WB I-10 HOV Lane 2630+93 – 2733+52	12'	12'	11'-12'	H
	2.	WB I-10 GP Lanes 2630+93 – 2733+52 (GP No.1 & No.2)	12'	12'	11'-12'	H
	3.	EB I-10 HOV Lane 2585+43 –2733+52	12'	12'	11'-12'	H
301.3 Cross Slopes	1.	WB & EB I-10 outside lane widening	2%	1.5% (typ)	3%	H
302.1 & 309.1(3)(a) Shoulder Width & Minimum Horizontal Clearance(2)	1.	WB I-10 1443+07 – 1445+37 – Med Shld (trans)	10'	8'	8'-10'	H
	2.	WB I-10 1480+81 – 1488+11 – Med Shld	10'	10'	9'-10'	H
	3.	WB I-10 2541+34 – 2557+38 – Med Shld	10'	17'	5'-10'	H
	4.	WB I-10 2576+44 – 2635+53 – Med Shld	10'	8'	4'-10'	H
	5.	EB I-10 1436+67 – 1439+54 – Med Shld (trans)	10'	8'	8'-10'	H
	6.	EB I-10 2543+64 – 2557+96 – Med Shld	10'	17'	7'-10'	H
	7.	EB I-10 2606+32 – 2733+52 – Med Shld	10'	8'	4'-10'	H
	8.	WB I-10 1482+70 – 1485+90 – Outside Shld @ Milliken OC	10'	18'	8.5'	H

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
	9.	N15-W10 Connector 26+32 – 32+82 – Right Shld (4)	10’	5’	5’-10’	H
	10.	N15-E10 Connector 41+28 – 42+93 – Right Shld (4)	10’	5’	5’-10’	H
	11.	S15-E10 Connector 26+58 – 27+59 – Right Shld (4)	10’	5’	5’-10’	H
	12.	E10-W210 Connector 16+85 – 17+85 – Right Shld (4)	10’	5’	5’-10’	H
	13.	WB & EB I-10 1483+50 – 1485+50 – Med Shld @ Milliken OC	10’	8.5’-10’	8’-10’	H
	14.	WB & EB I-10 1521+12 – 1527+75 – Med Shld @ 15/10 Sep	10’	7.5’-10’	6.5’-10’	H
	15.	WB & EB I-10 1693+70 – 1696+70 – Med Shld @ Cherry OC	10’	2’-10’	7’-10’	H
	16.	WB & EB I-10 1801+00 – 1803+40 – Med Shld @ Citrus OC	10’	11’	8’-10’	H
	17.	WB & EB I-10 1828+35 – 1832+35 – Med Shld @ Cypress OC	10’	13’-15’	4’-10.5’	H
	18.	WB & EB I-10 1855+00 – 1858+35 – Med Shld @ Sierra OC	10’	2.75’-10’	8.25’-10’	H
	19.	WB & EB I-10 1975+60 – 1978+35 – Med Shld @ Cedar OC	10’	16’	8’-10’	H
	20.	WB & EB I-10 2053+50 – 2056+50 – Med Shld @ Riverside OC	10’	1.5’-5’	7.5’-10’	H
	21.	WB & EB I-10 2105+00 – 2108+50 – Med Shld @ Pepper OC	10’	22’	6.75’-10’	H
	22.	EB I-10 2132+00 – 2135+50 – Med Shld @ Slover Mt UP	10’	15’	3’-10’	H
	23.	WB & EB I-10 2158+50 – 2161+50 – Med Shld @ Rancho OC	10’	15’	9’-10’	H
	24.	WB & EB I-10 2226+50 – 2229+00 – Med Shld @ Mt Vernon OC	10’	15’	9’-10’	H
	25.	WB & EB I-10 2414+50 – 2416+50 – Med Shld @ Richardson OC	10’	3’-5’	8.5’-10’	H
	26.	WB & EB I-10 2546+50 – 2548+50 – Med Shld @ Alabama OC	10’	15’	2.75’-5’	H
	27.	WB & EB I-10 2565+50 – 2567+50 – Med Shld @ E10-W210	10’	13’	7.4’-10’	H
	28.	WB & EB I-10 2571+94 – 2575+47 – Med Shld @ E210-E10/Tenn	10’	12’-13’	6.4’-11’	H
	29.	Sierra Ave EB on-ramp – Right Shld	8’	4’-8’	4’-8’	H
305.1(3)(a) Median Width	1.	I-10 1436+67 – 1445+37	22’	18’-22’	18’-22’	H
	2.	I-10 1480+81 – 1488+11	22’	23’	21’-22’	H
	3.	I-10 2541+34 – 2557+96	22’	36’	14’-22’	H
	4.	I-10 2576+44 – 2606+32	22’	36’	18’-22’	H
	5.	I-10 2606+32 – 2635+53	22’	36’	10’-16’	H
	6.	I-10 2635+53 – 2733+52	22’	36’	16’-22’	H
309.2(1)(c) Vertical Clearance(2)	1.	Rancho Ave OC	16’-6”	16’-7”	16’-5”	H
	2.	Mt. Vernon Ave OC	16’-6”	16’-1”	16’-1”	H
	3.	Alabama St OC	16’-6”	16’-4”	16’-3”	H
	4.	Eureka St. UC	15’	14’-10”	14’-10”	H
	5.	Ford St UC	15’	14’-7”	14’-7”	H
405.1(2)(b) Corner Sight Distance (Signalized)	1.	Rancho Ave WB off-ramp looking at NB Rancho Ave	250'	183'	183’	H
	2.	Rancho Ave EB off-ramp looking at SB Rancho Ave	360’	96’	96’	M
	3.	Rancho Ave EB off-ramp looking at NB Rancho Ave	250’	138’	138’	M
	4.	Tippecanoe Ave EB off-ramp looking at SB Tippecanoe Ave	300’	155’	155’	M
	5.	California Ave WB off-ramp looking at NB California Ave	300’	224’	224’	H
	6.	California Ave EB off-ramp looking at SB California Ave	300’	200’	200’	H
501.3 Interchange Spacing	1.	I-10 between Haven and I-15	2 mi	1.78 mi	1.78 mi	H
	2.	I-10 between Milliken Ave and I-15	2 mi	0.77 mi	0.77 mi	H
	3.	I-10 between I-15 and Etiwanda Ave	2 mi	1.19 mi	1.19 mi	H

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
	4.	I-10 between Rancho Ave and La Cadena Dr/9th St	1 mi	0.66 mi	0.66 mi	H
	5.	I-10 between La Cadena Dr/9th St and Mount Vernon Ave	1 mi	0.54 mi	0.54 mi	H
	6.	I-10 between La Cadena Dr/9th St and I-215	2 mi	1.53 mi	1.53 mi	H
	7.	I-10 between Mount Vernon Ave and I-215	2 mi	0.99 mi	0.99 mi	H
	8.	I-10 between I-215 and Waterman Ave	2 mi	1.02 mi	1.02 mi	H
	9.	I-10 between Alabama St and Tennessee St	1 mi	0.52 mi	0.52 mi	H
	10.	I-10 between Alabama St and SR-210	2 mi	0.52 mi	0.52 mi	H
	11.	I-10 between SR-210 and Tennessee St	2 mi	0 mi	0 mi	H
	12.	I-10 between SR-210 and Eureka St/Orange Ave/6th St	2 mi	0.83 mi	0.83 mi	H
	13.	I-10 between Tennessee St and Eureka St/Orange Ave/6th St	1 mi	0.83 mi	0.83 mi	H
	14.	I-10 between Eureka/Orange/6th & University/Cypress	1 mi	0.88 mi	0.88 mi	H
502.2 Partial Interchange and Isolated Off-ramp	1.	La Cadena WB on-ramp	Not used	Partial IC	Partial IC	H
	2.	9th WB off-ramp	Not used	Isolated off	Isolated off	H
	3.	Sperry WB off-ramp	Not used	Isolated off	Isolated off	H
	4.	Sunwest WB on-ramp	Not used	Partial IC	Partial IC	H
504.3(1)(b) Ramp Lane Width	1.	N215-W10 Connector (175’ R)	16’	12’	12’	H
504.7 Weaving Length	1.	EB I-10 between Milliken and I-15	5000’	1687’	1735’	H
	2.	WB I-10 between Milliken and I-15	5000’	1359’	1485’	H
	3.	EB I-10 between I-15 and Etiwanda	5000’	2423’	2488’	H
	4.	WB I-10 between I-15 and Etiwanda	5000’	2525’	2666’	H
	5.	WB I-10 between Rancho and La Cadena	2000’	1603’	1554’	H
	6.	WB I-10 between La Cadena/9th and Mount Vernon	2000’	954’	1115’	H
	7.	EB I-10 between La Cadena/9th and Mount Vernon	2000’	1523’	1729’	H
	8.	WB I-10 between Mount Vernon and I-215	5000’	2207’	2289’	H
	9.	EB I-10 between Mount Vernon and I-215	5000’	1404’	1397’	H
	10.	WB I-10 between I-215 and Carnegie	5000’	2503’	2705’	H
	11.	EB I-10 between I-215 and Redlands	5000’	1458’	1465’	H
	12.	WB I-10 between SR-210 and Orange	5000’	2208’	2190’	H
	13.	EB I-10 between SR-210 and Eureka	5000’	1612’	1680’	H
504.8 Access Control	1.	Ford EB off-ramp near Parkford	50’	32’	16’	H
	2.	Ford EB on-ramp opposite Oak	50’	26’	15’	H
504.8 Access Rights Opposite Ramp Terminal	1.	Sperry WB off-ramp – driveway opposite ramp	Obtain access rights opposite ramp terminal	driveway	driveway	H
	2.	Carnegie WB on-ramp – Carnegie Dr opposite ramp		local road	local road	H
	3.	Ford WB on-ramp – Reservoir Rd opposite ramp		local road	local road	H
	4.	Ford WB off-ramp/EB on-ramp – Redlands Blvd opposite ramp		local road	local road	H

(1) Probability of design exception approval: H=High, M=Medium, L=Low
(2) Federal Highway Administration (FHWA) Controlling Criteria
(3) Horizontal Stopping Sight Distance reduced at bridge column(s) within station range
(4) No Horizontal Clearance exception at this location since no obstruction, only shoulder width exception is requested.

Table 5.15 Alternative 2 Proposed Advisory Design Exception Features

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
105.5(2) Curb Ramps	1.	Sierra/WB ramps (4 corners)	2	1	1	H
	2.	Sierra/EB ramps (4 corners)	2	1	1	H
	3.	Pepper EB on-ramp (east side) (2 corners)	2	0	0	H
	4.	Rancho/WB on-ramp (west side) (2 corners)	2	0	0	H
	5.	Rancho/EB off-ramp (west side) (2 corners)	2	0	0	H
	6.	Rancho/WB off-ramp (east side) (2 corners)	2	1	1	H
	7.	Rancho/EB on-ramp (east side) (2 corners)	2	1	1	H
	8.	9th/EB ramps (2 corners)	2	1	1	H
	9.	Hospitality/WB hook on-ramp (1 corner)	2	1	1	H
	10.	Mountain View/EB Ramps (4 corners)	2	1	1	H
	11.	Tennessee/WB on-ramp (west side) (2 corners)	2	0	0	H
	12.	Tennessee/EB off-ramp (west side) (2 corners)	2	0	0	H
	13.	Tennessee/WB off-ramp (east side) (2 corners)	2	1	1	H
	14.	Tennessee/EB on-ramp (east side) (2 corners)	2	1	1	H
	15.	Ford/WB on-ramp (1 corner)	2	1	1	H
	16.	Ford/EB off-ramp (2 corners)	2	1	1	H
	17.	Ford/EB on-ramp (2 corners)	2	1	1	H
201.7 Decision Sight Distance	1.	WB I-10 at Cypress WB Off-ramp	1105’(70mph)	965’ (59mph)	965’ (59mph)	M
202.5(1) & 202.5(2) Super-elevation Transition	1.	WB & EB I-10 east of Cherry, (exit 5042’ Rt)	240’, 2/3-1/3	180’, 2/3-1/3	180’, all on tangent	H
	2.	WB & EB I-10 east of Cherry (enter 8000’ Lt)	240’, 2/3-1/3	180’, 2/3-1/3	180’, all on tangent	H
	3.	WB & EB I-10 east of Cherry (exit 8000’ Lt)	240’, 2/3-1/3	180’, 2/3-1/3	180’, all on tangent	H
	4.	WB & EB I-10 west of Rancho (enter 3500’ Rt)	390’, 2/3-1/3	300’, 2/3-1/3	300’, 2/5-3/5	H
	5.	WB & EB I-10 west of Rancho (exit 3500’ Rt)	390’, 2/3-1/3	300’, 2/3-1/3	300’, 2/3-1/3	H
	6.	WB & EB I-10 east of Rancho (enter 4500’ Lt)	390’, 2/3-1/3	300’, 2/3-1/3	300’, 3/5-2/5	H
	7.	WB & EB I-10 east of Rancho (exit 4500’ Lt)	390’, 2/3-1/3	300’, 2/3-1/3	300’, all in curve	H
	8.	WB I-10 west of Colton OH (enter 2378’ Lt)	480’, 2/3-1/3	300’, 2/3-1/3	300’, 1/6-5/6	H
	9.	WB I-10 west of Colton OH (exit 2378’ Lt)	480’, 2/3-1/3	300’, 2/3-1/3	300’, 1/2-1/2	H
	10.	EB I-10 west of Colton OH (enter 2600’ Lt)	480’, 2/3-1/3	320’, 2/3-1/3	320’, 1/2-1/2	H
	11.	EB I-10 west of Colton OH (exit 2600’ Lt)	480’, 2/3-1/3	230’, 2/3-1/3	230’, 1/2-1/2	H
	12.	WB I-10 east of Colton OH (enter 2600’ Rt)	480’, 2/3-1/3	300’, 2/3-1/3	300’, 1/5-4/5	H
	13.	WB I-10 east of Colton OH (exit 2600’ Rt)	480’, 2/3-1/3	300’, 2/3-1/3	300’, 1/2-1/2	H
	14.	EB I-10 east of Colton OH (enter 2100’ Rt)	480’, 2/3-1/3	230’, 2/3-1/3	230’, 1/5-4/5	H
	15.	EB I-10 east of Colton OH (exit 2100’ Rt)	480’, 2/3-1/3	300’, 2/3-1/3	300’, 4/5-1/5	H
	16.	Etiwanda EB off-ramp (exit 680’ Rt)	300’, 2/3-1/3	354’, 3/4-1/4	334’, 3/4-1/4	H
	17.	Cherry WB Loop on-ramp (enter 12000’ Rt)	150’, 2/3-1/3	Realigned	75’, 2/3-1/3	H
	18.	Citrus WB loop on-ramp (enter 8000’ Rt)	150’, 2/3-1/3	300’, 2/3-1/3	75’, 2/3-1/3	H
	19.	Cedar WB on-ramp (enter 4500’ Rt)	150’, 2/3-1/3	75’, all on tangent	75’, all on tangent	H
	20.	Pepper EB on-ramp (exit 1000’ Lt)	240’, 2/3-1/3	240’, 2/3-1/3	167’,2/3-1/3	H
	21.	Pepper EB on-ramp (enter 1900’ Rt)	150’, 2/3-1/3	240’, 2/3-1/3	100’,5/6-1/6	H
	22.	Rancho EB off-ramp (exit 2001.5’ Lt)	150’, 2/3-1/3	Realigned	150’, all in curve	H
	24.	9th EB on-ramp (enter 2700’ Lt)	150’, 2/3-1/3	Realigned	100’, 1/3-2/3	H
	25.	Sperry WB off-ramp (enter 500’ Lt)	300’, 2/3-1/3	Realigned	200’, 1/2-1/2	H
	26.	Mt Vernon EB off-ramp (exit 1900’ Lt)	150’, 2/3-1/3	Realigned	150’, 1/3-2/3	H
	27.	N215-E10 Connector (enter 6800’ Lt)	150’, 2/3-1/3	Realigned	144’, all in curve	H

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
	28.	Waterman WB on-ramp to I-215 (exit 3500' Lt)	150', 2/3-1/3	Realigned	150', all in curve	H
	29.	Tennessee EB off-ramp (exit 850' Lt)	240', 2/3-1/3	Realigned	167', all in curve	H
	30.	Ford WB on-ramp (exit 1900' Lt)	150, 2/3-1/3	Realigned	150', 2/5-3/5	H
	31.	Ford EB off-ramp (exit 500' Lt)	150', 2/3-1/3	Realigned	150', 2/5-3/5	H
	32.	Ford EB on-ramp (exit 5000' Rt)	150', 2/3-1/3	150', 2/3-1/3	150', all on tangent	H
202.6 Super-elevation of compound curves	1.	Milliken WB on-ramp, 3000'-0.04/850'-0.10	Case 1	0.12@PCC/0.02@BC	0.03@PCC/0.03@BC	H
	2.	Milliken EB loop on, 145'-0.12/3000'-0.04	Case 1	0.05@PCC/0.026@BC	0.08@PCC/0.03@BC	H
	3.	N15-E10 Connector, 850'-0.10/3000'-0.04	Case 1	0.07@PCC/0.03@EC	0.04@PCC/0.03@EC	H
	4.	S15-W10 Connector, 3000'-0.04/850'-0.10	Case 1	0.10@PCC/0.03@BC	0.06@PCC/0.03@BC	H
	5.	N215-W10 Connector, 3000'-0.04/160'-0.12	Case 1	0.07@PCC/0.03@BC	0.06@PCC/0.03@BC	H
	6.	Tippecanoe WB off-ramp 850'-0.10/700'-0.11	Case 2	Realigned	0.11@PCC/39' Trans	H
203.5 Compound Curves	1.	Milliken WB on-ramp	Shorter R=/>2/3 longer R and/or larger R to follow smaller R	850'/3000'	850'/3000'	H
	2.	S15-W10 Connector		950'/3000'	850'/3000'	H
	3.	N15-E10 Connector		850'/3000'	850'/3000'	H
	4.	Valley EB off-ramp		1265'/843'	1265'/843'	H
	5.	S215-W10 Connector		850'/800'	850'/800'	H
	6.	S215-W10 Connector		3000'/850'	800'/6590'	H
	7.	N215-W10 Connector		175'/160'	175'/160'	H
203.6 Tangent Length Between Reversing Curves	1.	WB & EB I-10 at Rancho OC – 3500'/4500'	560'	468'	294'	H
	2.	WB I-10 at Colton OH – 2387'/2600'	560'	316'	252'	H
	3.	EB I-10 at Colton OH – 2600'/2100'	560'	316'	280'	H
	4.	Cedar WB on-ramp – 2700'/4500'	200'	Realigned	140'	H
	5.	Cedar EB on-ramp – 3830'/17500'	200'	0'	0'	H
	6.	Pepper EB off-ramp – 1100'/800'	340'	212'	214'	H
	7.	Pepper EB on-ramp – 1000'/1900'	260'	Realigned	136'	H
	8.	N215-E10 Connector – 850'/6800'	360'	Realigned	240'	H
204.3 Minimum Grade	1.	WB & EB I-10 1436+11 – 1451+95	0.30%	-0.13%	-0.13%	H
	2.	EB I-10 1453+95 – 1465+45	0.30%	0.29%	0.29%	H
	3.	EB I-10 1467+45 – 1477+45	0.30%	-0.04%	-0.04%	H
	4.	WB I-10 1479+45 – 1484+45	0.30%	0.08%	0.08%	H
	5.	EB I-10 1479+45 – 1485+45	0.30%	0.02%	0.02%	H
	6.	EB I-10 1542+45 – 1559+95	0.30%	0.12%	0.12%	H
	7.	WB I-10 1542+45 – 1561+16	0.30%	0.12%	0.12%	H
	8.	WB I-10 1569+61 –1579+11	0.30%	-0.14%	-0.14%	H
	9.	EB I-10 1570+95 – 1576+61	0.30%	-0.06%	-0.06%	H
	10.	EB I-10 1578+61 – 1581+71	0.30%	0.00%	0.00%	H
	11.	WB I-101587+09 –1588+19	0.30%	0.16%	0.16%	H
	12.	EB I-10 1633+92 – 1642+93	0.30%	0.00%	0.00%	H
	13.	WB I-10 1634+27 – 1639+43	0.30%	0.12%	0.12%	H
	14.	EB I-10 1651+43 – 1659+43	0.30%	0.04%	0.04%	H
	15.	WB 1-10 1643+43 – 1652+43	0.30%	0.00%	0.00%	H
	16.	WB I-10 1656+43 – 1659+43	0.30%	-0.13%	-0.13%	H
	17.	WB & EB I-10 1746+50 – 1758+50	0.30%	0.27%	0.27%	H
	18.	WB & EB I-10 1823+05 – 1831+55	0.30%	0.28%	0.28%	H
	19.	WB & EB I-10 1835+55 – 1836+55	0.30%	-0.15%	-0.15%	H
	20.	WB & EB I-10 1847+62 – 1862+62	0.30%	0.17%	0.17%	H
	21.	WB & EB I-10 1866+62 – 1872+62	0.30%	0.25%	0.25%	H
	22.	WB & EB I-10 1876+60 – 1885+60	0.30%	-0.15%	-0.15%	H
	23.	WB & EB I-10 1916+60 – 1935+10	0.30%	-0.09%	-0.09%	H

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
	24.	WB & EB I-10 1938+10 – 1944+60	0.30%	0.12%	0.12%	H
	25.	EB I-10 1948+60 – 1959+10	0.30%	-0.19%	-0.19%	H
	26.	WB I-10 1948+60 – 1959+10	0.30%	-0.24%	-0.24%	H
	27.	WB & EB I-10 1974+10 – 2035+60	0.30%	-0.11%	-0.11%	H
	28.	WB I-10 2164+04 – 2171+04	0.30%	-0.14%	-0.14%	H
	29.	EB I-10 2164+04 – 2170+04	0.30%	-0.15%	-0.15%	H
	30.	EB I-10 2190+53 – 2200+54	0.30%	0.20%	0.20%	H
	31.	WB I-10 2193+04 – 2193+51	0.30%	0.21%	0.21%	H
	32.	WB I-10 2193+51 – 2201+04	0.30%	0.16%	0.16%	H
	33.	WB I-10 2237+13 – 2252+13	0.30%	-0.28%	-0.28%	H
	34.	WB & EB I-10 2270+66 – 2280+16	0.30%	0.12%	0.12%	H
	35.	Milliken WB on-ramp	0.30%	-0.21%-0.26%	-0.21%-0.26%	H
	36.	E10-S15 Connector	0.30%	0.00%	0.13%	H
	37.	N15-W10 Connector	0.30%	0.16%	0.16%	H
	38.	S15-E10 Connector	0.30%	0.17%	0.17%	H
	39.	W10-S15 Connector	0.30%	0.00%	-0.03%	H
	40.	Sierra WB on-ramp	0.30%	0.14%	0.22%	H
204.4 Vertical Curve Length	1.	WB I-10 1608+37 –1613+37 (sag)	700’	500’	500’	H
	2.	EB I-10 1619+50 – 1624+50 (crest)	700’	500’	500’	H
	3.	WB I-10 1627+84 – 1633+84 (sag)	700’	600’	600’	H
	4.	WB & EB I-10 1959+10 – 1964+10 (crest)	700’	500’	500’	H
	5.	WB & EB I-10 1969+10 – 1974+10 (sag)	700’	500’	500’	H
	6.	WB I-10 2201+04 – 2206+04 (crest)	700’	500’	500’	H
	7.	WB & EB I-10 2231+04 – 2236+04 (crest)	700’	500’	500’	H
	8.	EB I-10 2294+53 – 2300+53 (sag)	700’	600’	600’	H
	9.	WB I-10 2296+78 – 2299+78 (sag)	700’	300’	300’	H
	10.	WB & EB I-10 2373+91 – 2377+91 (sag)	700’	400’	400’	H
	11.	WB & EB I-10 2396+41 – 2400+41 (sag)	700’	400’	400’	H
	12.	WB & EB I-10 2434+22 – 2440+22 (crest)	700’	600’	600’	H
	13.	WB & EB I-10 2475+16 –2480+16 (sag)	700’	500’	500’	H
208.3 Bridge Median	1.	Colton OH Lt & Rt Bridges	Decked when less than 36’	Open (approx 30’)	Open (27’-30’)	H
	2.	Santa Ana River Lt & Rt Bridges		Open (approx 30’)	Open (23’-25’)	H
310.2 Minimum Outer Separation Width	1.	WB I-10 and 2nd St alley (near Rancho)	26’	41’	14’-26’	H
	2.	WB I-10 and J (near Rancho)	26’	17’-26’	24’-26’	H
	3.	WB I-10 and Valley (near Mt Vernon)	26’	16’-26’	17’-26’	H
403.3 Interior Angle of Intersection	1.	Ford St WB on-ramp	75° min	65°25’32”	65°25’32”	H
504.2(2) Design of Freeway Entrances & Exits	1.	Riverside WB on-ramp	14’ @ nose	23.94’ @ nose	13.86’ @ nose	H
	2.	E210-E10 EB Connector entrance	14’ @ nose	37.87’ @ nose	25.80’@ nose	H
504.2(5)(a) Vertical	1.	9th EB off-ramp	430’	242’	313’	M

HDM		Location and Description	HDM Standard	Existing	Proposed	(1)
Curve beyond Exit Nose SSD						
504.3(3) Crossroad Grade at Ramp Terminal	1.	Rancho WB off-ramp terminal	4% max	6.51%	6.51%	M
504.3(5) Single-Lane Ramps	1.	Mt Vernon EB hook off-ramp	1000' max w/o passing lane	1100', single lane	1360', single-lane	H
504.3(9) Successive On-Ramps	1.	Tennessee EB on-ramp and E210-E10 merge	1000'	600'	600'	H
504.4(2) Freeway Connector Design Speed	1.	S215-W10 Connector	50 mph	47 mph	47 mph	H
504.4(5) Single-lane Connection	1. 2.	E10-S15 Connector N215-W10 Connector	L>1000', add a passing lane	L=1713', single-lane L=1874', single-lane	L=1694', single-lane L=1837', single-lane	H H
504.4(6) Branch Connection No. of Lanes	1.	E10-S15 Connector	V>1500 vph, Multilane	Single lane V>1500	Single lane V>1500	H
504.4(6) Branch Connection Merge/ Diverge	1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11.	N15-W10 Connector (merge) N15-E10 Connector (merge) S15-E10 Connector (merge) S215-W10 Connector (merge) S215-E10 Connector (merge) E210-E10 Connector (merge) E10-N15 Connector (diverge – Case 1) E10-S15 Connector (diverge – Case 1) E10-N/S215 Connector (diverge – Case 2) W10-W210 Connector (diverge – Case 2) W10-N/S215 Connector (diverge – Case 3) (LD) = lane drop taper near merge point	2500' aux & lane drop taper beyond merge point 2500' aux & 2-lane exit 4000'/2500' aux & 2-lane exit 4000'/2500' aux & 3-lane exit	1880' (LD) >2500' (LD) 0' (LD) 1940' (LD) 1300' (LD) >2500' (LD) 1220', 2-lane exit >2500', 1-lane exit 2320'/600', 3-lane exit 3290'/0', 2-lane exit 1990'/0', 2-lane exit	1860' (LD) >2500' (LD) 0' (LD) 2470' (LD) 1300' (LD) >2500' (LD) 1434', 2-lane exit >2500', 1-lane exit 2300'/500', 3-lane exit 3290'/0', 2-lane exit 2250'/0', 2-lane exit	H H H H H H H H H H H
504.8 Access Control	1.	Rancho WB (on-ramp near Valley Blvd)	100'	76'	76'	H

(1) Probability of design exception approval: H=High, M=Medium, L=Low
(2) For HDM 203.5 Compound Curves, curves are listed in the direction of travel

Several design exception features have been discussed with Caltrans throughout the course of the study and are documented in the project's Decision Documents (DD) as included in **Attachment N** and 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 California Highway Patrol (CHP) enforcement/observation areas
- DD A-7 regarding vertical clearance at UC structures
- DD B-1 regarding reduced cross sections between Orange Street and Ford Street

In addition, a number of overhead signs would be placed along the I-10 median, resulting in 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 will 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 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.3. Alternative 3: Two Express Lanes in Each Direction or Express Lanes

Alternative 3 was identified as the LPA for the I-10 Corridor Project at the SANBAG Board meeting in July 2014 after comparing the benefits and impacts of the project alternatives under consideration. An LPA may be designated when the project sponsor, as in this case, has determined that one of the project alternatives under consideration best satisfies the project need and purpose. By designating an LPA, SANBAG, as the project sponsor, makes public disclosure of its preference to other agencies and the general public. Designation of the LPA does not constitute the identification of the preferred alternative for the project. The preferred alternative identification will occur after the circulation of the draft environmental document and agency and public comments have been received and considered.

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; east of Haven Avenue all Express Lanes would be constructed by the project. Both SOVs and HOVs not meeting the occupancy requirement would 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 60G where appropriate. Median lighting would be provided at access points to and from the Express Lanes, at CHP enforcement/observation areas, and at selected locations to improve headlight sight distance in sag vertical curves. Existing auxiliary lanes would be re-established 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 3.0, 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
- 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

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 5.16** summarizes ramp improvements proposed under Alternative 3.

Table 5.16 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	
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 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	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	

Interchange	No.	Ramps	Alternative 3 Ramp Improvement			
			None	Gore	Partial	Full
	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
Haven	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		
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

Interchange	No.	Ramps	Alternative 3 Ramp Improvement			
			None	Gore	Partial	Full
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	
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

Nine arterial streets crossing under or over I-10 would be reconstructed to accommodate the I-10 improvements. Eight overcrossing structures would need to be replaced with longer-span structures to accommodate the widen freeway. Monte Vista Avenue undercrossing would also need to be replaced to accommodate the proposed widening of the local street.

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

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

1. Palo Verde Street between Mills Avenue and Monte Vista Avenue (reduced landscaped parkway along north side)
2. J Street between 3rd Street and Pennsylvania Avenue (pavement widening on the north side, reduced pavement width on the south side)

Alternative 3 Railroad Involvement

Five 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 12 structures and modification of 59 structures. **Table 5.17** summarizes the proposed structure improvements under Alternative 3.

Table 5.17 Alternative 3 Structure Improvements

	Post	Structure Name	Bridge No.	Proposed Work
1	47.74	Indian Hill Blvd UC (LA County)	53-0860	No work
2	48.00	College Ave Box Culvert (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	Widen
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	No work
31	9.94	Route 15/10 Separation (Rt)	54-0909R	No work
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
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

	Post	Structure Name	Bridge No.	Proposed Work
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
74	R24.23	S215-E10 Connector OC	54-0824F	No work
75	R24.23	Route 215/10 Separation (Lt)	54-0479L	No work
76	R24.25	Route 215/10 Separation (Rt)	54-0479R	No work
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	Widen
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

	Post	Structure Name	Bridge No.	Proposed Work
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	New York St/Colton Ave 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 2016 for new structures 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 5.18**.

Table 5.18 Alternative 3 Major Drainage Improvements

No.	Drainage Facility	Approximate Station	Approximate Location	Proposed Work
Crossing System				
1	College Ave RCB	"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 Creek	"A" 1580+50	East of I-15	Widen I-10 bridges
10	Etiwanda-San Sevaine Wash	"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
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 serviced 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 occupancy requirement to use the Express Lanes free of charge. HOVs not meeting the occupancy requirement would have the option to pay a toll 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.

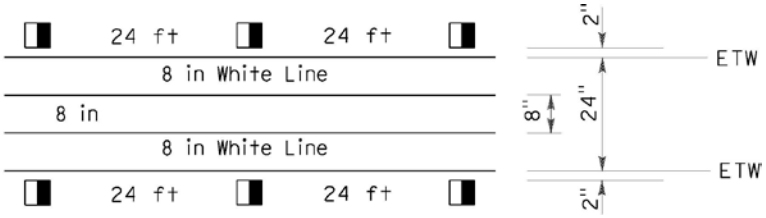
At the eastern end of the project, transition areas between the proposed Express Lanes and the existing cross sections would be provided near Ford Street. Under the existing condition, there are 5 lanes in the EB direction including 4 general purpose lanes and a truck climbing lane that begins at the 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 and its addendum (see **Attachment N**). Where feasible, 3 or 4 feet wide buffer will be provided to help reduce the maintenance associated with channelizer replacement and facilitate the maintenance of adjacent striping lines. For 3 and 4 feet wide buffers, the striping details will adhere to applicable CAMUTCD guidelines. 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 miles 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.**

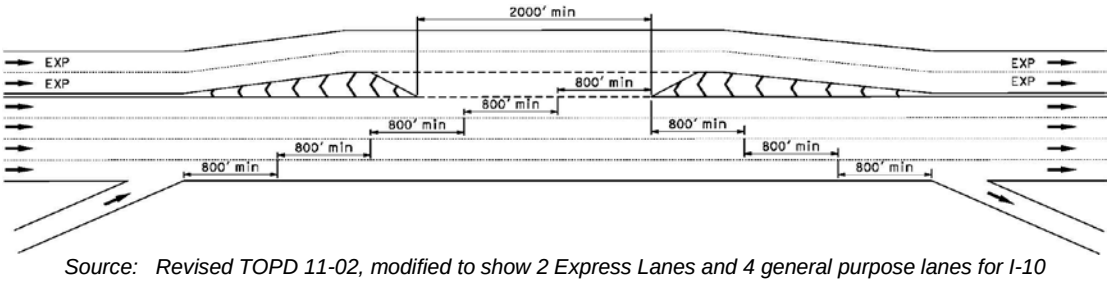
1. Mountain Avenue
2. 6th Street
3. Haven Avenue
4. Etiwanda Avenue
5. Citrus Avenue
6. Cedar Avenue
7. Pepper Avenue
8. Tippecanoe Avenue
9. California Street (transition from 2 to 1 Express Lane)
10. Orange Street

Except for California Street I/E and 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 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 up 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 of the 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 Express Lanes Preliminary Concept of Operations Report* was prepared by CDM Smith in October 2014 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 and SOVs and HOVs not meeting the occupancy requirement will be allowed to use the Express Lanes for a toll.
- Motorcycles, marked para-transit vehicles, emergency response vehicles, and other exempted vehicles are permitted in the Express Lanes by statute.
- Additional study will be conducted to determine whether Clean Air Vehicles will be considered toll-paying traffic required to pay a normal toll rate.

- Vehicles are anticipated to use switchable transponders or License Plate Recognition (LPR) for toll collection except that HOV 3+ must have a valid switchable transponder (declaring HOV 3+) to be eligible for the free or discounted travel.
- Tolling is anticipated to be dynamic pricing.

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 SANBAG. 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. However, because the Express Lanes will be dynamically managed to maintain performance above a pre-defined threshold, higher priority or additional FSP services dedicated to the Express Lanes may be necessary to provide quick and effective incident management and clearance. Pending further study as part of the development of the *I-10 and I-15 Express Lanes Preliminary Concept of Operations Report*, it may be determined necessary to have dedicated roving FSP patrolling the Express Lanes during hours of peak congestion in order 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 5.19 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 5.19 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 5.20 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 5.21 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 of the 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 5.22 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 horizontal 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 5.23 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 5.24,** 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 5.25** shows that the average corridor travel times along the corridor are projected to improve during the peak hours compared to the No Build.

Table 5.20 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 5.21 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 5.22 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	-	-	-	-	-	-	3,410	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). Under Alternative 3 in the EB direction, transition areas are proposed west of Monte Vista Avenue and east of Cypress Avenue to Ford Street.

Table 5.23 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.
-HOV lanes exist only west of Haven Avenue under Alternative 1 (No Build). Under Alternative 3 in the WB direction, transition areas are proposed west of Monte Vista Avenue to Indian Hill Boulevard and east of Ford Street to Wabash Avenue.

Table 5.24 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 5.25 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 5.26 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 5.27 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 5.26 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 5.27 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 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/W215 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 5.28**.

Table 5.28 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	21.3	C	24.7	C
Monte Vista/EB off-ramp/Palo	46.1	D	74.6	E	39.5	D	46.7	D
Palo Verde/EB on-ramp	10.3	B	13.1	B	12.1	B	16.3	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	8.7	A
Vineyard/WB ramps	20.8	C	44.3	D	25.8	C	40.2	D
Vineyard/EB ramps	61.9	E	41.5	D	70.1	E	72.3	E
Vineyard/G	18.2	B	12.2	B	19.7	B	10.5	B
Vineyard/D	20.0	C	31.5	C	19.7	B	39.2	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	13.3	B	24.8	C	14.6	B	26.4	D
9th/EB ramps	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	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	20.6	C	14.6	B	21.2	C	14.6	B

[1]Intersection is unsignalized in the existing condition.
[2]Delay is shown in seconds
[3]Unsignalized intersection

5.A.3.3 Alternative 3 Design Exception Features

Tables 5.29 and 5.30 summarize the nonstandard mandatory and advisory design features that have been identified to date for the project under Alternative 3. Additional design exceptions may be discovered during the final design. The detailed design standards risk assessment tables are included as **Attachment H.**

Table 5.29 Alternative 3 Proposed Mandatory Design Exception Features

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
201.1 Horizontal Stopping Sight Distance (2)	1. EB I-10 1022+75 – 1048+33 (5000' Lt) to median barrier	750'	736'	736'	H
	2. WB I-10 1070+28 – 1087+18 (3500' Rt) to median barrier	750'	616'	616'	H
	3. WB I-10 1200+20 – 1221+43 (5000' Rt) (3) to median barrier	750'	736'	736'	H
	4. WB I-10 1221+43 – 1230+40 (4800' Rt) to median barrier	750'	736'	721'	H
	5. WB I-10 2050+60 – 2057+71 (5042' Rt)(3) to median barrier	750'	667'	620'	H
	6. WB I-10 2146+39 – 2156+73 (3400' Rt) to median barrier	750'	730'	651'	H
	7. EB I-10 2179+07 – 2185+17 (2600' Lt) to median barrier	750'	597'	664'	H
	8. WB I-10 2186+37 – 2192+06 (2600' Rt) to median barrier	750'	583'	664'	H
	9. EB I-10 2224+62 – 2232+77 (4600' Rt) (3) to median barrier	750'	902'	576'	H
	10. WB I-10 2331+25 – 2340+84 (3003' Rt) to median barrier	750'	696'	651'	H
	11. EB I-10 2344+48 – 2356+26 (5400' Rt) to median barrier	750'	941'	641'	H
	12. WB I-10 2557+88 – 2576+37 (3000' Rt) (3) to median barrier	750'	746'	622'	H
	13. EB I-10 2587+65 – 2606+25 (3000' Lt) to median barrier	750'	746'	650'	H
	14. WB I-10 2635+46 – 2657+08 (4000' Rt) to median barrier	750'	861'	706'	H
	15. WB I-10 2687+09 – 2703+30 (3599.75' Rt) to median barrier	750'	750'	670'	H
	16. WB I-10 2718+13 – 2727+70 (3999.72' Rt) to median barrier	750'	861'	706'	H
	17. EB I-10 2747+15 – 2766+07 (3199.23' Lt) to median barrier	750'	771'	642'	H
	18. WB I-10 2227+25 – 2227+92 (4600' Rt) @ outside wall-Mt Vernon	750'	750'	713'	H
	19. WB I-10 2603+46 – 2605+50 (3000' Lt) @ outside Br rail-Texas	750'	612'	612'	H
	20. EB I-10 2637+28 – 2638+77 (4000' Rt) @ outside Br rail-6th ST	750'	710'	710'	H
	21. EB I-10 2687+09 – 2697+21 (3599.75' Rt) @ outside Br rail/SW	750'	673'	673'	H
	22. EB I-10 2718+13 – 2727+70 (3999.72' Rt) @ outside Br rail/SW	750'	710'	710'	H
	23. WB I-10 2747+15 – 2766+07 (3199.23' Lt) @ outside Br rail-Ford	750'	644'	672'	H
	24. WB I-10 1211+59 – 1213+36 (5000' Rt) @ Campus Ave OC	750'	694'	708'	H
	25. WB I-10 1227+40 – 1229+15 (4800' Rt) @ 6th St OC	750'	665'	665'	H
	26. WB I-10 1693+79 – 1696+48 (5041.77 Rt) @ Cherry Ave OC	750'	569'	725'	H
	27. WB I-10 2053+89 – 2056+04 (5042' Rt) @ Riverside Ave OC	750'	586'	586'	H
	28. N215-E10 23+50 – 23+60 @ S215-E10 column	430'	430'	358'	H
	29. EB I-10 2227+36 – 2228+57 (4600' Rt) @ Mt. Vernon Ave OC	750'	892'	543'	M
	30. WB I-10 2414+39 – 2416+08 (4000' Rt) @ Richardson St OC	750'	538'	728'	H
	31. WB I-10 2565+83 – 2567+41 (3000' Rt) @ E10-W210 Connector	750'	678'	610'	H
	32. WB I-10 2571+86 – 2575+40 (3000' Rt) @ E210-E10 Connector	750'	662'	592'	H
	33. WB I-10 2572+00 – 2576+00 (3000' Rt) @ Tennessee Ave OC	750'	678'	641'	H
201.1 Vertical Stopping Sight Distance (2)	1. WB & EB I-10 725+35 – 1003+46 (800' crest)	750'	483'	483'	H
	2. WB & EB I-10 1015+00 – 1019+00 (400' crest)	750'	600'	600'	H
	3. WB & EB I-10 1021+07 – 1029+07 (800' sag)	750'	701'	701'	H
	4. WB & EB I-10 1030+85 – 1040+35 (950' crest)	750'	458'	458'	H
	5. WB & EB I-10 1041+35 – 1047+35 (600' sag)	750'	671'	671'	H
	6. WB & EB I-10 1060+33 – 1069+83 (950' crest)	750'	460'	460'	H
	7. WB & EB I-10 1088+33 – 1097+33 (900' crest)	750'	459'	459'	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	8. WB & EB I-10 1120+08 – 1129+08 (900’ crest)	750’	505’	505’	H
	9. WB & EB I-10 1252+83 – 1262+83 (1000’ crest)	750’	723’	723’	H
	10. WB & EB I-10 1273+08 – 1282+58 (950’ crest)	750’	487’	487’	H
	11. EB I-10 1357+25 – 1363+25 (600’ crest)	750’	433’	433’	H
	12. WB & EB I-10 1531+95 – 1534+95 (300’ crest)	750’	573’	573’	H
	13. WB I-10 1614+59 – 1624+59 (1000’ crest)	750’	479’	479’	H
	14. WB I-10 1619+66 – 1624+66 (500’ crest)	750’	477’	477’	H
	15. WB I-10 1959+05 – 1964+05 (500’ crest)	750’	496’	496’	H
	16. EB I-10 1959+05 – 1964+05 (500’ crest)	750’	486’	486’	H
	17. WB I-10 2179+03 – 2184+03 (500’ crest)	750’	590’	590’	H
	18. EB I-10 2177+03 – 2184+03 (700’ crest)	750’	613’	613’	H
	19. EB I-10 2200+52 – 2207+52 (700’ crest)	750’	583’	583’	H
	20. WB I-10 2201+01 – 2206+01 (500’ crest)	750’	515’	515’	H
	21. WB & EB I-10 2224+04 – 2231+04 (700’ sag)	750’	485’	485’	H
	22. WB & EB I-10 2231+04 – 2236+04 (500’ crest)	750’	412’	412’	H
	23. WB I-10 2296+79 – 2299+79 (300’ sag)	750’	567’	567’	H
	24. WB I-10 2301+11 – 2314+61 (1350’ crest)	750’	567’	567’	H
	25. EB I-10 2303+52 – 2311+52 (800’ crest)	750’	482’	482’	H
	26. WB I-10 2314+61 – 2322+61 (800’ sag)	750’	687’	687’	H
	27. WB & EB I-10 2329+32 – 2339+32 (1000’ crest)	750’	618’	618’	H
	28. WB & EB I-10 2385+43 – 2396+93 (1150’ crest)	750’	583’	583’	H
	29. WB & EB I-10 2434+58 – 2440+58 (600’ crest)	750’	583’	583’	H
	30. WB & EB I-10 2457+58 – 2467+58 (1000’ crest)	750’	640’	640’	H
	31. WB & EB I-10 2492+83 – 2499+83 (700’ crest)	750’	625’	625’	H
	32. WB & EB I-10 2518+83 – 2525+83 (700’ crest)	750’	610’	610’	H
	33. WB & EB I-10 2589+34 – 2593+34 (400’ crest)	750’	571’	571’	H
	34. WB & EB I-10 2663+84 – 2671+34 (750’ crest)	750’	728’	728’	H
	35. 6th Street (130’ sag)	250’	209’	152’	H
	36. 6th Street (200’ crest)	250’	261’	226’	H
	37. 6th Street (200’ crest)	250’	221’	241’	H
	38. Vineyard Ave (1000’ crest)	360’	316’	316’	H
	39. N15-E10 Connector (900’ crest)	430’	391’	391’	H
	40. S215-W10 Connector (500’ crest)	430’	389’	340’	H
	41. Richardson Street (200’ sag)	200’	200’	163’	H
202.2(1) Super-elevation Rate (2)	1. WB & EB I-10 2161+02 – 2168+60 (4535’ Lt)	3%	4%	4%	H
	2. EB I-10 2179+90 – 2183+30 (2624’ Lt)	5%	6%	6%	H
	3. WB I-10 2186+39 – 2192+03 (2600’ Lt)	5%	6%	6%	H
	4. WB & EB I-10 2290+27 – 2304+31 (5500’ Lt)	2%	4%	4%	H
	5. Central WB on-ramp (800’ Rt)	11%	3%	3%	H
	6. Central WB off-ramp (600’ Lt)	12%	4%	2%	H
	7. Central EB on-ramp (550’ Lt)	12%	7%	3%	H
	8. 4th WB on-ramp (180’ Rt)	12%	4%	2%	H
	9. 4th WB off-ramp (300’ Lt)	12%	4%	6%	H
	10. 4th EB off-ramp (650’ Rt)	11%	5%	2%	H
	11. 4th EB on-ramp (4700’ Lt)	2%	4%	-2%	H
	12. Vineyard (3000’ Rt)	2%	-2%	-2%	H
	13. Vineyard WB off-ramp (300’ Rt)	12%	2%	8%	H
	14. Vineyard EB off-ramp (625’ Rt)	11%	5%	-2%	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	15. Vineyard EB on-ramp (1100' Rt)	9%	4%	-2%	H
	16. Archibald EB on-ramp (5000' Lt)	2%	6%	-2%	H
	17. Cherry WB loop on-ramp (170' Lt)	12%	8%	8%	H
	18. Sierra WB off-ramp (4100' Rt)	3%	6%	-2%	H
	19. Cedar WB off-ramp (4000' Rt)	3%	4%	-2%	H
	20. Riverside WB off-ramp (3500' Lt)	3%	4%	-2%	H
	21. Riverside WB off-ramp (3500' Rt)	3%	4%	2%	H
	22. Sperry WB off-ramp (29,924' Lt)	2%	4%	-2%	H
	23. N215-W10 Connector (3000' Lt)	4%	8%	3%	H
	24. W10-N/S215 Connector (2700' Lt)	4%	1.5%	1.5%	H
	25. Carnegie WB on-ramp (300' Lt)	12%	4.5%	4.5%	H
	26. Carnegie WB off-ramp (500' Lt)	12%	4.0%	4%	H
	27. Mountain View EB on-ramp (10,000'Lt)	2%	4%	-2%	H
	28. California EB off-ramp (4500' Lt)	2%	4%	-2%	H
	29. California EB on-ramp (2700' Lt)	4%	4%	-2%	H
	30. Ford WB on-ramp (4500' Rt)	2%	5%	-2%	H
	31. Ford EB off-ramp (500' Rt)	12%	8%	6%	H
204.3 Maximum Grade	1. WB & EB I-10 1027+05 – 1032+01	3%	3.95%	3.95%	H
	2. WB & EB I-10 1056+44 – 1062+65	3%	4.46%	4.46%	H
	3. WB & EB I-10 1280+08 – 1286+36	3%	4.40%	4.40%	H
301.1 Traveled Way Width[(2)]	1. WB I-10 HOV/Trans 704+25 – 729+87	12'	11'	11'-12'	H
	2. WB I-10 Express Lanes 1000+00 –1256+23	12'	11'	11'-12'	H
	3. WB I-10 Express Lanes 1284+08 –1332+66	12'	11'	11'-12'	H
	4. WB I-10 Express Lanes 1363+52 –1591+85	12'	11'	11'-12'	H
	5. WB I-10 Express Lanes 1864+11 –1940+65	12'	None	11'-12'	H
	6. WB I-10 Express Lanes 2041+98 – 2105+75	12'	None	11'-12'	H
	7. WB I-10 Express Lanes 2135+75 – 2165+95	12'	None	11'-12'	H
	8. WB I-10 Express Lanes 2206+09 – 2243+14	12'	None	11'-12'	H
	9. WB I-10 Express Lanes 2281+07 –2405+09	12'	None	11'-12'	H
	10. WB I-10 Express Lanes 2576+36 – 2627+55	12'	None	11'-12'	H
	11. WB I-10 Express Lanes 2648+66 – 2735+74	12'	None	11'-12'	H
	12. EB I-10 HOV/Trans 706+75 – 717+99	12'	12'	11'-12'	H
	13. EB I-10 Express Lanes 1000+00 – 1326+75	12'	11' (HOV)	11'-12'	H
	14. EB I-10 Express Lanes 1366+58 – 1591+85	12'	11' (HOV)	11'-12'	H
	15. EB I-10 Express Lanes 1777+76 – 1952+65	12'	None	11'-12'	H
	16. EB I-10 Express Lanes 2042+00 – 2069+19	12'	None	11'-12'	H
	17. EB I-10 Express Lanes 2213+10 – 2272+77	12'	None	11'-12'	H
	18. EB I-10 Express Lanes 2283+37 – 2419+09	12'	None	11'-12'	H
	19. EB I-10 Express Lanes 2570+03 – 2706+72	12'	None	11'-12'	H
	20. WB I-10 GP Lanes 704+25 – 729+87 (GP No.1 & No.2)	12'	12'	11'	H
	21. WB I-10 GP Lanes 713+01-729+87 (GP No.3)	12'	12'	11'	H
	22. WB I-10 GP Lanes 1000+00 – 1213+41 (No.1 & No.2)	12'	12'	11'	H
	23. WB I-10 GP Lanes 1000+00 – 1408+33 (No.3)	12'	12'	11'-12'	H
	24. WB I-10 GP Lanes 1284+08 – 1332+66 (No.1 & No.2)	12'	12'	11'-12'	H
	25. WB I-10 GP Lanes 1476+95 – 1496+76 (No.1 thru No.3 +aux)	12'	12'	11'-12'	H
	26. WB I-10 GP Lanes 1864+11 – 1940+65 (No.1 & No.2)	12'	12'	11'-12'	H
	27. WB I-10 GP Lanes 2041+98 – 2105+75 (No.1 & No.2)	12'	12'	11'-12'	H
	28. WB I-10 GP Lanes 2135+75 – 2165+95 (No.1 & No.2)	12'	12'	11'-12'	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	29. WB I-10 GP Lanes 2206+09 – 2243+14 (No.1 & No.2)	12’	12’	11’-12’	H
	30. WB I-10 GP Lanes 2278+77 – 2406+24 (No.1 & No.2)	12’	12’	11’-12’	H
	31. WB I-10 GP Lanes 2633+31 – 2735+74 (No.1 & No.2)	12’	12’	11’-12’	H
	32. WB I-10 GP Lanes 2685+94 – 2704+45 (No.3)	12’	12’	11’-12’	H
	33. EB I-10 GP Lanes 1000+00 – 1219+47 (No.1 & No.2)	12’	12’	11’-12’	H
	34. EB I-10 GP Lanes 1262+23 – 1326+75 (No.1 & No.2)	12’	12’	11’-12’	H
	35. EB I-10 GP Lanes 1813+59 – 1952+65 (No.1 & No.2)	12’	12’	11’-12’	H
	36. EB I-10 GP Lanes 2039+63 – 2069+19 (No.1 & No.2)	12’	12’	11’-12’	H
	37. EB I-10 GP Lanes 2213+10 – 2272+77 (No.1 & No.2)	12’	12’	11’-12’	H
	38. EB I-10 GP Lanes 2283+37 – 2419+09 (No.1 & No.2)	12’	12’	11’-12’	H
	39. EB I-10 GP Lanes 2585+35 – 2733+44 (No.1 & No.2)	12’	12’	11’-12’	H
301.3 Cross Slopes	1. WB & EB I-10 outside lane widening	2%	1.5% (typ)	3%	H
302.1 & 309.1(3)(a) Shld Width & Minimum Horizontal Clearance[(2)]	1. WB I-10 704+25 – 729+87 – Med Shld	10’	8’	4’-8’	H
	2. WB I-10 1000+00 – 1070+12 – Med Shld	10’	8’	4’-8’	H
	3. WB I-10 1070+12 – 1087+18 – Med Shld	10’	8’	8’-10’	H
	4. WB I-10 1104+37 – 1112+83 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-4’	H
	5. WB I-10 1112+83 – 1146+73 – Med Shld	10’	8’	4’-10’	H
	6. WB I-10 1167+72 – 1181+29 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	7. WB I-10 1188+03 – 1230+82 – Med Shld	10’	8’	8’-10’	H
	8. WB I-10 1230+82 – 1256+23 – Med Shld	10’	8’	4’-10’	H
	9. WB I-10 1284+08 – 1332+66 – Med Shld	10’	8’	4’-10’	H
	10. WB I-10 1354+89 – 1360+04 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’	H
	11. WB I-10 1363+52 – 1405+12 – Med Shld	10’	8’	8’-10’	H
	12. WB I-10 1405+12 – 1476+95 – Med Shld	10’	8’	4’-8’	H
	13. WB I-10 1476+95 – 1521+12 – Med Shld	10’	8’	3’-8’	H
	14. WB I-10 1527+70 – 1597+70 – Med Shld	10’	8’	4’-10’	H
	15. WB I-10 1730+14 – 1746+71 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	16. WB I-10 1864+11 – 1875+45 – Med Shld	10’	8’	8’-10’	H
	17. WB I-10 1875+45 – 1898+70 – Med Shld @ Uni-CHP (EB)	10’	8’	2’-8’	H
	18. WB I-10 1898+70 – 1940+65 – Med Shld	10’	8’	8’-10’	H
	19. WB I-10 1958+26 – 1963+34 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’	H
	20. WB I-10 2001+41 – 2021+99 – Med Shld @ Uni-CHP (EB)	10’	8’	2’-10’	H
	21. WB I-10 2039+63 – 2062+29 – Med Shld	10’	8’	4’-10’	H
	22. WB I-10 2062+29 – 2072+96– Med Shld	10’	8’	8’-10’	H
	23. WB I-10 2088+39 – 2093+54 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’	H
	24. WB I-10 2204+95 – 2220+80 – Med Shld @ Bi-CHP	10’	8’	2’-8’	H
	25. WB I-10 2220+80 – 2243+14 – Med Shld	10’	8’	2.5’-10’	H
	26. WB I-10 2283+37 – 2331+63 – Med Shld	10’	8’	4’-10’	H
	27. WB I-10 2341+34 – 2412+19 – Med Shld	10’	8’	4’-10’	H
	28. WB I-10 2450+76 – 2467+33 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	29. WB I-10 2523+54 – 2542+33 – Med Shld @ Bi-CHP	10’	8’	2’-3’	H
	30. WB I-10 2542+33 – 2556+55 – Med Shld	10’	8’	3’-10’	H
	31. WB I-10 2576+36 – 2635+59 – Med Shld	10’	8’	4’-10’	H
	32. WB I-10 2635+59 – 2735+74 – Med Shld	10’	8’	8’-10’	H
	33. EB I-10 699+29 – 718+00 – Med Shld	10’	8’	8’-10’	H
	34. EB I-10 1003+56 – 1022+74 – Med Shld	10’	8’	4’-10’	H
	35. EB I-10 1022+74 – 1048+33 – Med Shld	10’	8’	8’	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	36. EB I-10 1048+33 – 1087+18 – Med Shld	10’	8’	4’-8’	H
	37. EB I-10 1087+18 – 1113+13– Med Shld @ Uni-CHP (WB)	10’	8’	4’	H
	38. EB I-10 1113+13 – 1155+00 – Med Shld	10’	8’	4’-8’	H
	39. EB I-10 1155+00 – 1168+86 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	40. EB I-10 1181+29 – 1211+38 – Med Shld	10’	8’	8’-10’	H
	41. EB I-10 1211+38 – 1317+45 – Med Shld	10’	8’	4’-8’	H
	42. EB I-10 1317+45 – 1326+75 – Med Shld	10’	8’	4’-10’	H
	43. EB I-10 1339+09 – 1344+23 – Med Shld @ Uni-CHP (EB)	10’	8’	2’-10’	H
	44. EB I-10 1374+56 – 1410+67 – Med Shld	10’	8’	8’-10’	H
	45. EB I-10 1410+67 – 1521+12 – Med Shld	10’	10’	4’- 8’	H
	46. EB I-10 1527+70 – 1597+70 – Med Shld	10’	8’	4’- 10’	H
	47. EB I-10 1714+71 – 1731+28 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	48. EB I-10 1777+76 – 1829+60 – Med Shld	10’	8’	4’-10’	H
	49. EB I-10 1829+60 – 1875+45 – Med Shld	10’	8’	8’	H
	50. EB I-10 1875+45 – 1881+67 – Med Shld @ Uni-CHP (EB)	10’	8’	2’-8’	H
	51. EB I-10 1897+55 – 1943+50 – Med Shld	10’	8’	8’-10’	H
	52. EB I-10 1943+50 – 1963+34 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’	H
	53. EB I-10 2001+41 – 2006+56 – Med Shld @ Uni-CHP (EB)	10’	8’	2’- 10’	H
	54. EB I-10 2039+63 – 2069+19 – Med Shld	10’	8’	4’-10’	H
	55. EB I-10 2072+96 – 2093+54 – Med Shld @ Uni-CHP (WB)	10’	8’	2’-10’	H
	56. EB I-10 2191+94 – 2206+09 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	57. EB I-10 2220+09 – 2236+15 – Med Shld	10’	8’	2’-10’	H
	58. EB I-10 2236+15 – 2272+77 – Med Shld	10’	8’	8’-10’	H
	59. EB I-10 2283+37 – 2304+31 – Med Shld	10’	8’	8’-10’	H
	60. EB I-10 2304+31 – 2419+09 – Med Shld	10’	8’	4’-10’	H
	61. EB I-10 2435+34 – 2451+90 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	62. EB I-10 2511+11 – 2524+68 – Med Shld @ Bi-CHP	10’	8’	2’-10’	H
	63. EB I-10 2541+66 – 2555+45 – Med Shld	10’	8’	5’-10’	H
	64. EB I-10 2609+70 – 2733+44 – Med Shld	10’	8’	4’-10’	H
	65. WB I-10 1376+61 – 1380+84 – Outside Shld @ Archibald OC	10’	10’	9’-10’	H
	66. WB I-10 1481+06 – 1485+90 – Outside Shld @ Milliken OC	10’	10’	7’-10’	H
	67. WB I-10 2224+61 – 2232+40 – Outside Shld @ Mt. Vernon OC	10’	10’	8’-10’	H
	68. WB I-10 2312+86 – 2314+60 – Outside Shld near Hunts Ln[(4)]	10’	10’	4’-10’	H
	69. EB I-10 1375+75 – 1380+84 – Outside Shld @ Archibald OC	10’	10’	9’-10’	H
	70. EB I-10 2227+32 – 2229+30 – Outside Shld @ Mt. Vernon OC	10’	10’	8.7’	H
	71. N15-W10 Connector 32+71 – 33+43 – Right Shld [(4)]	10’	5’	5’-10’	H
	72. N15-E10 Connector 41+24 – 41+92 – Right Shld [(4)]	10’	5’	5’-10’	H
	73. S15-E10 Connector 6+05 – 7+25 – Right Shld [(4)]	10’	5’	5’-10’	H
	74. W10-S15 Connector 160+44 – 160+87 – Right Shld [(4)]	10’	5’	5’-10’	H
	75. Sierra Ave EB on-ramp – Right Shld	8’	4’-8’	4’-8’	H
	76. La Cadena Dr WB on-ramp – Right Shld	8’	4’-8’	4’-8’	H
	77. E10-W210 Connector 16+85 – 17+85 – Right Shld [(4)]	10’	5’	5’-10’	H
	78. NB Euclid Ave (SR-83) – Right Shld (next to right-turn lane)	5’	6’	0’	H
	79. WB & EB I-10 1152+98 – 1154+97 – Med Shld @ San Antonio OC	10’	1.5’/1.5’-3’	7.5’/5.5’-10’	H
	80. WB & EB I-10 1181+71 – 1184+59 – Med Shld @ Euclid OC	10’	0’/2’	7’-10’	H
	81. WB & EB I-10 1197+21 – 1198+96 – Med Shld @ Sultana OC	10’	6.5’/5’-8’	5.5’-8’	H
	82. WB & EB I-10 1211+59 – 1213+36 – Med Shld @ Campus OC	10’	6.5’-8’	6’-8’	H
	83. WB & EB I-10 1228+04 – 1229+04 – Med Shld @ 6th OC	10’	2.5’-7’	2’-8’	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	84. WB & EB I-10 1321+17 – 1323+79 – Med Shld @ Vineyard OC	10’	2’-3.5’	2.25’-7’	H
	85. WB & EB I-10 1376+57 – 1379+41 – Med Shld @ Archibald OC	10’	5.25’-8’	4.75’-8’	H
	86. WB & EB I-10 1429+77 – 1432+23 – Med Shld @ Haven OC	10’	4.25’/5.25’-8’	2.25’-4’	H
	87. WB & EB I-10 1483+23 – 1485+72 – Med Shld @ Milliken OC	10’	8.5’/9’-10.5’	2’/3’-4’	H
	88. WB & EB I-10 1521+12 – 1527+70 – Med Shld @ 15/10 OC	10’	7.5’-10’	3.5’-8’	H
	89. WB & EB I-10 1586+53 – 1589+03 – Med Shld @ Etiwanda OC	10’	23’/24’	1.5’/2’-2.5’	H
	90. WB & EB I-10 1693+79 – 1696+48 – Med Shld @ Cherry OC	10’	2’-5’	7’-10’	H
	91. WB & EB I-10 1800+90 – 1803+40 – Med Shld @ Citrus OC	10’	11’	8’/2’-10’	H
	92. WB & EB I-10 1829+16 – 1831+46 – Med Shld @ Cypress OC	10’	15’/13’	8.5’/4’-10’	H
	93. WB & EB I-10 1855+00 – 1858+30 – Med Shld @ Sierra OC	10’	2.75’-4.5’	8.25’-10’	H
	94. WB & EB I-10 1975+58 – 1978+25 – Med Shld @ Cedar OC	10’	16’	8’-10’	H
	95. WB & EB I-10 2053+89 – 2056+04 – Med Shld @ Riverside OC	10’	2.5’/1.5’-5’	3’-4’	H
	96. WB & EB I-10 2106+16 – 2107+97 – Med Shld @ Pepper OC	10’	22’	8.25’-10’	H
	97. WB & EB I-10 2133+42 – 2134+97 – Med Shld @ Slover Mt UP	10’	15’	7.5’-10’	H
	98. WB & EB I-10 2159+00 – 2160+92 – Med Shld @ Rancho OC	10’	15’	9’-10’	H
	99. WB & EB I-10 2227+36 – 2228+57 – Med Shld @ Mt Vernon OC	10’	15’	2’-2.5’	H
	100. WB & EB I-10 2275+96 – 2284+77 – Med Shld @ 215/10 OC	10’	17’	2’/3’-10’	H
	101. WB & EB I-10 2414+39 – 2416+08 – Med Shld @ Richardson OC	10’	3’/3’-5’	9’/3’-10’	H
	102. WB & EB I-10 2546+70 – 2548+57 – Med Shld @ Alabama OC	10’	15’	2.25’/6.25’-7’	H
	103. WB & EB I-10 2565+83 – 2567+41 – Med Shld @ E10-W210 OC	10’	13’	9.4’/7.4’-10’	H
	104. WB & EB I-10 2571+86 – 2575+40 – Med Shld @ E210-E10/Tenn	10’	12’	8.5’/6.5’-10’	H
305.1(3)(a) Median Width	1. I-10 696+94 – 729+87 Indian Hill to LA/SBd County Line	22’	18’	16’–18’	H
	2. I-10 1000+00 – 1022+74 LA/SBd County Line to Monte Vista	22’	18’	10’-16’	H
	3. I-10 1022+74 – 1048+33 curve at Monte Vista	22’	18’	14’	H
	4. I-10 1048+33 – 1070+12 at Central Ave	22’	18’	10’-14’	H
	5. I-10 1070+12 – 1091+78 curve east of Benson	22’	16’-18’	14’-22’	H
	6. I-10 1103+63 – 1155+93 I/E at Mountain to Euclid CHP	22’	8’-18’	10’-22’	H
	7. I-10 1184+18 – 1200+78 trans to curve at Campus	22’	6’-18’	18’-22’	H
	8. I-10 1200+78 – 1235+23 curve at Campus	22’	6’-18’	10’-18’	H
	9. I-10 1235+23 – 1256+23 I/E at 6th St	22’	6’-18’	10’-16’	H
	10. I-10 1256+23 – 1284+08 near 4th St	22’	6’-18’	16’	H
	11. I-10 1284+08 – 1317+45 4th St to Vineyard	22’	10’-18’	10’-16’	H
	12. I-10 1317+45 – 1332+66 curve at Vineyard	22’	10’-18’	10’-22’	H
	13. I-10 1371+76 – 1405+16 Archibald to I/E at Haven	22’	18’-24’	18’-22’	H
	14. I-10 1405+16 – 1521+72 I/E at Haven to I-15	22’	18’-24’	10’-18’	H
	15. I-10 1521+72 – 1597+31 between I-15 and Etiwanda	22’	22’-72’	10’-22’	H
	16. I-10 1777+76 – 1829+60 I/E at Citrus (on curve)	22’	11’-28’	16’-22’	H
	17. I-10 1829+60 – 1880+05 near Sierra (on curve)	22’	11’-36’	20’-22’	H
	18. I-10 1894+10 – 1940+65 Sierra to CHP west of Cedar	22’	36’	18’-20’	H
	19. I-10 1940+65 – 1963+34 CHP west of Cedar	22’	36’	20’-22’	H
	20. I-10 2039+63 – 2092+90 near Riverside	22’	10’-36’	10’-22’	H
	21. I-10 2206+09 – 2272+77 near Mount Vernon	22’	36’-40’	7.1’-22’	H
	22. I-10 2283+37 – 2328+17 near Redlands Blvd	22’	15’-46’	10’-22’	H
	23. I-10 2328+17 – 2344+25 curve at Waterman	22’	34’	10’-18’	H
	24. I-10 2344+25 – 2405+22 I/E at Tippecanoe	22’	34’	10’	H
	25. I-10 2405+22 – 2419+09 curve at Richardson	22’	15’	10’-22’	H
	26. I-10 2531+37 – 2556+55 at Alabama	22’	15’-36’	10’-22’	H
	27. I-10 2576+36 – 2606+25 curve New York to Texas	22’	36’	18’-22’	H
	28. I-10 2606+25 – 2635+59 I/E at Orange/Rt 38	22’	36’	10’-14’	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	29. I-10 2635+59 – 2735+74 curves at Church and Citrus/Cypress	22’	36’	14’-22’	H
309.2(1)(c) Vertical Clearance(2)	1. Mills UC	15’	14’-8”	14’-8”	H
	2. 4th UC	15’	14’-6”	14’-6”	H
	3. Rancho Ave OC	16’-6”	16’-7”	16’-1”	H
	4. Mt Vernon OC	16’-6”	16’-1”	16’-1”	H
	5. Alabama St OC	16’-6”	16’-4”	16’-3”	H
	6. Eureka UC	15’	14’-10”	14’-10”	H
	7. Ford UC	15’	14’-7”	14’-7”	H
309.4 Lateral Clearance for Elevated Structure	1. Colton OH (EB I-10) and Colton Grade Separation	15’	16’	9’	H
404.4(1)(b) Design Vehicle	1. Mt. Vernon WB on-ramp (right turn from EB Valley)	CA Legal	Cannot accommodate CA Legal	Cannot accommodate CA Legal	H
405.1(2)(b) Corner Sight Distance	1. WB Palo Verde looking at SB Mills (Lt turn)	300’	180’	180’	H
	2. WB 5th looking at NB Grove (Rt turn)	360’	351’	351’	H
	3. Rancho WB off-ramp looking at NB Rancho (Lt & Rt turn)	250’ (S)	183’ (S)	183’ (S)	H
	4. Rancho EB off-ramp looking at SB Rancho (Lt & Rt turn)	360’ (S)	96’ (S)	96’ (S)	H
	5. Rancho EB off-ramp looking at NB Rancho (Lt &Rt turn)	250’ (S)	138’ (S)	138’ (S)	H
	6. Tippecanoe EB off-ramp looking at SB Tippecanoe (Lt & Rt turn)	300’ (S)	155’ (S)	155’ (S)	H
	7. California WB off-ramp looking at NB California (Lt & Rt turn)	300’ (S)	224’ (S)	224’ (S)	H
	8. California EB off-ramp looking at SB California (Lt & Rt turn)	300’ (S)	200’ (S)	200’ (S)	H
	(S) - Signalized				
501.3 Interchange Spacing	1. I-10 between Monte Vista Ave & Central	1 mile	0.55 miles	0.55 miles	H
	2. I-10 between 4th and Vineyard	1 mile	0.86 miles	0.86 miles	H
	3. I-10 between Haven and I-15	2 miles	1.78 miles	1.78 miles	H
	4. I-10 between Milliken and I-15	2 miles	0.77 miles	0.77 miles	H
	5. I-10 between I-15 and Etiwanda	2 miles	1.19 miles	1.19 miles	H
	6. I-10 between Rancho and La Cadena/9th	1 mile	0.66 miles	0.66 miles	H
	7. I-10 between La Cadena/9th and Mount Vernon	1 mile	0.54 miles	0.54 miles	H
	8. I-10 between La Cadena/9th and I-215	2 miles	1.53 miles	1.53 miles	H
	9. I-10 between Mount Vernon and I-215	2 miles	0.99 miles	0.99 miles	H
	10. I-10 between I-215 and Waterman	2 miles	1.02 miles	1.02 miles	H
	11. I-10 between Alabama and Tennessee	1 mile	0.52 miles	0.52 miles	H
	12. I-10 between Alabama and SR-210	2 miles	0.52 miles	0.52 miles	H
	13. I-10 between SR-210 and Tennessee	2 miles	0 mile	0 mile	H
	14. I-10 between SR-210 and Eureka/Orange/6th	2 miles	0.83 miles	0.83 miles	H
	15. I-10 between Tennessee and Eureka/Orange/6th St	1 mile	0.83 miles	0.83 miles	H
	16. I-10 between Eureka/Orange/6th and University/Cypress	1 mile	0.88 miles	0.88 miles	H
502.2 Partial Interchange and Isolated Off-ramp	1. Monte Vista EB off-ramp	Not used	Isolated off	Isolated off	H
	2. Euclid WB hook off-ramp	Not used	Isolated off	Isolated off	H
	3. Holt EB on-ramp/WB off-ramp	Not used	Partial IC	Partial IC	H
	4. La Cadena WB on-ramp	Not used	Partial IC	Partial IC	H
	5. 9th WB off-ramp	Not used	Isolated off	Isolated off	H
	6. Sperry WB off-ramp	Not used	Isolated off	Isolated off	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	7. E/Sunwest WB on-ramp	Not used	Partial IC	Partial IC	H
504.3(1)(b) Ramp Lane Width	1. N215-W10 Connector (175' R)	16'	12'	12'	H
504.7 Weaving Length	1. EB I-10 between Monte Vista & Central	2000'	1146'	1172'	H
	2. WB I-10 between Monte Vista & Central	2000'	1142'	1215'	H
	3. EB I-10 between Milliken and I-15	5000'	1687'	1737'	H
	4. WB I-10 between Milliken and I-15	5000'	1359'	1520'	H
	5. EB I-10 between I-15 and Etiwanda	5000'	2423'	2628'	H
	6. WB I-10 between I-15 and Etiwanda	5000'	2525'	2672'	H
	7. WB I-10 between Rancho and La Cadena	2000'	1603'	1611'	H
	8. WB I-10 between La Cadena/9th and Mount Vernon	2000'	954'	969'	H
	9. EB I-10 between La Cadena/9th and Mount Vernon	2000'	1523'	1562'	H
	10. WB I-10 between Mount Vernon and I-215	5000'	2207'	1981'	M
	11. EB I-10 between Mount Vernon and I-215	5000'	1404'	1396'	H
	12. WB I-10 between I-215 and Carnegie	5000'	2503'	2595'	H
	13. EB I-10 between I-215 and Redlands	5000'	1458'	1458'	H
	14. WB I-10 between SR-210 and Orange	5000'	2208'	2179'	H
	15. EB I-10 between SR-210 and Eureka	5000'	1612'	1680'	H
504.8 Access Control	1. Euclid WB loop on-ramp near E 7th	50'	175'	21'	H
	2. 4th EB off-ramp near driveway	50'	24'	10'	H
	3. Mountain View WB on-ramp (south driveway)	50'	0'	0'	M
	4. Ford EB off-ramp near Parkford	50'	32'	16'	H
	5. Ford EB on-ramp opposite Oak	50'	26'	15'	H
504.8 Access Rights Opposite Ramp Terminal	1. Monte Vista EB off-ramp – Palo Verde St opposite ramp	Obtain access rights opposite ramp terminal	local road	local road	H
	2. Euclid WB hook off-ramp –2nd Ave opposite ramp		local road	local road	H
	3. Sperry WB off-ramp – driveway opposite ramp		driveway	driveway	H
	4. E/Sunwest WB on-ramp – Sunwest Ln opposite ramp		local road	local road	H
	5. Carnegie WB on-ramp – Carnegie Dr opposite ramp		local road	local road	H
	6. Ford WB on-ramp – Reservoir Rd opposite ramp		local road	local road	H
	7. Ford WB off-ramp/EB on-ramp – Redlands Blvd opposite ramp		local road	local road	H

(1) Probability of design exception approval: H=High, M=Medium, L=Low
(2) FHWA Controlling Criteria
(3) Horizontal Stopping Sight Distance reduced at bridge column(s) within station range
(4) No Horizontal Clearance exception at this location since no obstruction, only shoulder width exception is requested.

Table 5.30 Alternative 3 Proposed Advisory Design Exception Features

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
105.5(2) Curb Ramps	1. Monte Vista/WB ramps (4 corners)	2/corner	1/corner	1/corner	H
	2. Monte Vista/EB off-ramp/Palo Verde (2 corners)	2	1	1	H
	3. Palo Verde/EB on-ramp (2 corners)	2	1	1	H
	4. Central/WB ramps (2 corners)	2	1	1	H
	5. Central/EB ramps (2 corners)	2	1	1	H
	6. Mountain/WB ramps (4 corners)	2	1	1	H
	7. Mountain/EB ramps (2 corners)	2	1	1	H
	8. Euclid/WB loop on-ramp (1 corner)	2	1	1	H
	9. Euclid/EB ramps (4 corners)	2	1	1	H
	10. 4th/WB ramps (4 corners)	2	1	1	H
	11. 4th/EB ramps (4 corners)	2	1	1	H
	12. Cedar/WB on-ramp (2 corners)	2	1	1	H
	13. Sierra/WB ramps (4 corners)	2	1	1	H
	14. Sierra/EB ramps (4 corners)	2	1	1	H
	15. Pepper/WB on-ramp (2 corners)	2	1	1	H
	16. Pepper/WB off-ramp (2 corners)	2	1	0	H
	17. Pepper/EB on-ramp (east side) (2 corners)	2	0	0	H
	18. Rancho/WB on-ramp (west side) (2 corners)	2	0	0	H
	19. Rancho/EB off-ramp (west side) (2 corners)	2	0	0	H
	20. Rancho/WB off-ramp (east side) (2 corners)	2	1	1	H
	21. Rancho/EB on-ramp (east side) (2 corners)	2	1	1	H
	22. 9th/EB ramps (2 corners)	2	1	1	H
	23. Sperry/WB hook off-ramp (2 corners)	2	1	1	H
	24. E/Sunwest Ln/WB hook on-ramp (2 corners)	2	1	1	H
	25. Carnegie Ln/WB hook on-ramp (1 corner)	2	1	1	H
	26. Mountain View/WB ramps (4 corners)	2	1	1	H
	27. Mountain View/EB ramps (4 corners)	2	1	1	H
	28. California/WB ramps (4 corners)	2	1	1	H
	29. California/EB ramps (4 corners)	2	1	1	H
	30. Tennessee/WB on-ramp (west side) (2 corners)	2	0	0	H
	31. Tennessee/EB off-ramp (west side) (2 corners)	2	0	0	H
	32. Tennessee/WB off-ramp (east side) (2 corners)	2	1	1	H
	33. Tennessee/EB on-ramp (east side) (2 corners)	2	1	1	H
	34. Ford/WB on-ramp (1 corner)	2	1	1	H
	35. Ford/EB off-ramp (2 corners)	2	1	1	H
	36. Ford/EB on-ramp (2 corners)	2	1	1	H
201.7 Decision Sight Distance	1. EB I-10 at 9th EB off-ramp	1105'(70mph)	1050' (65 mph)	865' (55 mph)	M
	2. WB I-10 at Cypress WB off-ramp	1105'(70mph)	965' (59 mph)	965' (59 mph)	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
202.5(1) & 202.5(2) Super-elevation Transition	1. WB & EB I-10 west of Cherry (enter 4500' Lt)	240', 2/3-1/3	180', 2/3-1/3	180' all on tangent	H
	2. WB & EB I-10 west of Cherry (exit 4500' Lt)	240', 2/3-1/3	180', 2/3-1/3	180', 1/2-1/2	H
	3. WB & EB I-10 east of Cherry (exit 4500' Rt)	240', 2/3-1/3	180', 2/3-1/3	180'all on tangent	H
	4. WB & EB I-10 west of Citrus (exit 10,000' Lt)	240', 2/3-1/3	180', 2/3-1/3	180'all in curve	H
	5. WB & EB I-10 east of Citrus (enter 10,000' Rt)	240', 2/3-1/3	180', 2/3-1/3	180'all on tangent	H
	6. WB & EB I-10 east of Citrus (exit 10,000' Rt)	240', 2/3-1/3	180', 2/3-1/3	180'all in curve	H
	7. WB & EB I-10 west of Rancho (enter 3400' Rt)	390', 2/3-1/3	300', 2/3-1/3	300', 2/5-3/5	H
	8. WB & EB I-10 west of Rancho (exit 3400' Rt)	390', 2/3-1/3	300', 2/3-1/3	300', 2/3-1/3	H
	9. WB I-10 east of Rancho (enter 4876.78' Lt)	390', 2/3-1/3	300', 2/3-1/3	300', 3/5-2/5	H
	10. WB I-10 east of Rancho (exit 4465' Lt)	390', 2/3-1/3	300', 2/3-1/3	300'all in curve	H
	11. EB I-10 east of Rancho (enter 4535' Lt)	390', 2/3-1/3	300', 2/3-1/3	300', 3/5-2/5	H
	12. EB I-10 east of Rancho (exit 4535' Lt)	390', 2/3-1/3	300', 2/3-1/3	300'all in curve	H
	13. WB I-10 west of Colton OH (enter 2363' Lt)	480', 2/3-1/3	300', 2/3-1/3	300', 1/6-5/6	H
	14. WB I-10 west of Colton OH (exit 2363' Lt)	480', 2/3-1/3	300', 2/3-1/3	300', 1/2-1/2	H
	15. EB I-10 west of Colton OH (enter 2624' Lt)	480', 2/3-1/3	320', 2/3-1/3	320', 1/2-1/2	H
	16. EB I-10 west of Colton OH (exit 2624' Lt)	480', 2/3-1/3	230', 2/3-1/3	230', 1/2-1/2	H
	17. WB I-10 east of Colton OH (enter 2624' Rt)	480', 2/3-1/3	300', 2/3-1/3	300', 1/5-4/5	H
	18. WB I-10 east of Colton OH (exit 2624' Rt)	480', 2/3-1/3	300', 2/3-1/3	300', 1/2-1/2	H
	19. EB I-10 east of Colton OH (enter 2461' Rt)	480', 2/3-1/3	230', 2/3-1/3	230', 1/5-4/5	H
	20. EB I-10 east of Colton OH (exit 2461' Rt)	480', 2/3-1/3	300', 2/3-1/3	300', 4/5-1/5	H
	21. Central WB on-ramp (exit 4000' Lt)	150', 2/3-1/3	31', 1/5-4/5	50', all in curve	H
	22. Central WB on-ramp (enter 800' Rt)	270', 2/3-1/3	91.5', all on tangent	50', all on tangent	H
	23. Euclid WB hook off-ramp (enter 250' Lt)	300', 2/3-1/3	200', 2/3-1/3	300', 2/5-3/5	H
	24. 4th WB on-ramp (exit 4500' Lt)	150', 2/3-1/3	150', 2/3-1/3	133', 2/3-1/3	H
	25. 4th WB on-ramp (enter 180' Rt)	150', 2/3-1/3	62.5', all in curve	133', 2/3-1/3	H
	26. 4th WB on-ramp (exit 180' Rt)	150', 2/3-1/3	0', all in curve	33', all in curve	H
	27. Holt WB off-ramp (enter 2500' Lt)	150', 2/3-1/3	150', 2/3-1/3	123', 4/5-1/5	H
	28. Haven WB on-ramp (exit 700' Lt)	270', 2/3-1/3	270', 2/3-/3	270', 1/2-1/2	H
	29. Haven WB off-ramp (enter 300' Lt)	300', 2/3-1/3	250', 1/2-1/2	286', 2/5-3/5	H
	30. Haven EB off-ramp (exit 500' Rt)	300', 2/3-1/3	180', 3/5-2/5	200', 3/10-7/10	H
	31. Haven EB loop on-ramp (enter 165' Rt)	300', 2/3-1/3	260', 1/5-4/5	200', 1/4-3/4	H
	32. Milliken EB loop on-ramp (enter 142' Rt)	300', 2/3-1/3	174', 3/5-2/5	243', 1/4-3/4	H
	33. Etiwanda EB off-ramp (enter 675' Rt)	300', 2/3-1/3	354', 3/4-1/4	300',1/2-1/2	H
	34. Valley EB off-ramp (enter 1265' Lt)	180', 2/3-1/3	180', 2/3-1/3	180', all in curve	H
	35. Citrus WB loop on-ramp (enter 210' Lt)	300', 2/3-1/3	300', 2/3-1/3	200', 2/3-1/3	H
	36. Citrus WB off-ramp (enter 625'Lt)	210', 2/3-1/3	183.33', 3/4-1/4	185', 3/5-2/5	H
	37. Citrus EB off-ramp (exit 9800' Lt)	150', 2/3-1/3	150', 2/3-1/3	150', all in curve	H
	38. Sierra EB on-ramp (enter 8579'Lt)	150', 2/3-1/3	150', 2/3-1/3	50', all on tangent	H
	39. Cedar WB on-ramp (enter 4500' Rt)	150', 2/3-1/3	75', all on tangent	75', all on tangent	H
	40. Riverside EB off –ramp (exit 8081' Lt)	150', 2/3-1/3	150', 2/3-1/3	150', all in curve	H
	41. Pepper EB on-ramp (exit 1000' Lt)	240', 2/3-1/3	240', 2/3-1/3	167', 1/3-2/3	H
	42. Pepper EB on-ramp (enter 1100' Rt)	240', 2/3-1/3	240', 2/3-1/3	150', 2/5-3/5	H
	43. Rancho WB on-ramp (exit 5693.15' Rt)	150', 2/3-1/3	50', all in curve	50', all in curve	H
	44. Rancho EB on-ramp (exit 1900' Lt)	150', 2/3-1/3	Realigned	350', 6/7-1/7	H
	45. La Cadena WB on-ramp (enter 2520' Rt)	150', 2/3-1/3	150', all in curve	194', 3/4-1/4	H
	46. La Cadena WB on-ramp (exit 2520' Rt)	150', 2/3-1/3	150', all in curve	150', all in curve	H
	47. 9th EB on-ramp (enter 1500' Lt)	210', 2/3-1/3	Realigned	139', 2/3-1/3	H
	48. Mount Vernon WB on-ramp (exit 3000' Lt)	150', 2/3-1/3	150', all in curve	133', 2/3-1/3	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	49. Mount Vernon WB on-ramp (enter 3500' Rt)	150', 2/3-1/3	Realigned	100', 2/3-1/3	H
	50. Sperry Dr WB off-ramp (enter 1000' Lt)	240', 2/3-1/3	Realigned	166', 5/9-4/9	H
	51. Sperry Dr WB off-ramp (exit 1000' Lt)	240', 2/3-1/3	Realigned	166', 5/9-4/9	H
	52. Sperry Dr WB off-ramp (enter 3500' Rt)	150', 2/3-1/3	Realigned	34', 5/8-3/8	H
	53. Mount Vernon EB on-ramp (enter 300' Rt)	210', 2/3-1/3	210', 1/4-3/4	200', 1/5-4/5	H
	54. N215-E10 Connector (enter 5579' Lt)	150', 2/3-1/3	Realigned	72', 3/4-1/4	H
	55. Sunwest WB on-ramp (exit 150' Lt)	240', 2/3-1/3	240', 1/2-1/2	200', 3/4-1/4	H
	56. Waterman EB on-ramp (exit 300' Rt)	150', 2/3-1/3	133.33', 1/4-3/4	100', all in curve	H
	57. Mountain View WB on-ramp (exit 3000' Lt)	150', 2/3-1/3	150', 2/3-1/3	168', 2/3-1/3	H
	58. Mountain View WB on-ramp (enter 5000' Rt)	150', 2/3-1/3	150', 2/3-1/3	84', 2/3-1/3	H
	59. Mountain View WB off-ramp (exit 4500' Rt)	150', 2/3-1/3	Realigned	75', 2/3-1/3	H
	60. Mountain View EB off-ramp (enter 5000' Lt)	150', 2/3-1/3	Realigned	75', 2/3-1/3	H
	61. California WB on-ramp (exit 3000' Lt)	150', 2/3-1/3	Realigned	106', 2/3-1/3	H
	62. California WB on-ramp (enter 5000' Rt)	150', 2/3-1/3	150', 2/3-1/3	54', 2/3-1/3	H
	63. California WB off-ramp (exit 3500' Rt)	150', 2/3-1/3	Realigned	100', 4/5-1/5	H
	64. Alabama WB off-ramp (exit 2200' Lt)	150', 2/3-1/3	Realigned	161', all on tangent	H
	65. Alabama WB off-ramp (enter 3075' Rt)	150', 2/3-1/3	Realigned	130', 3/5-2/5	H
	66. Tennessee EB off-ramp (exit 850' Lt)	240',2/3-1/3	Realigned	167',all in curve	H
	67. Ford WB on-ramp (exit 1900' Lt)	150', 2/3-13	Realigned	126', 3/5-2/5	H
	68. Ford EB off-ramp (exit 500' Lt)	150', 2/3-1/3	Realigned	150', 2/5-3/5	H
	69. Ford EB on-ramp (exit 5000' Rt)	150', 2/3-1/3	150', 2/3-1/3	150', all on tangent	H
202.6 Super-elevation of Compound Curves	1. Monte Vista EB on-ramp (215'-0.12/850'-0.10)	Case 1	0.06@PCC/0.04@EC	0.11@PCC/0.02@EC	H
	2. Central EB on-ramp (1600'-0.07/3425'-0.03)	Case 1	0.02@PCC/0.02@EC	0.07@PCC/0.03@BC	H
	3. Vineyard WB on-ramp (3000'-0.04/212'-0.12)	Case 1	0.06@PCC/0.03@EC	0.06@PCC/0.03@BC	H
	4. Haven WB on-ramp (3000'-0.04/700'-0.11)	Case 1	0.12@PCC/0.03@EC	0.06@PCC/0.03@BC	H
	5. Haven WB loop on-ramp (3000'-0.04/180'-0.12)	Case 1	0.12@PCC/0.03@BC	0.07@PCC/0.03@BC	H
	6. Haven EB loop on-ramp (165'-0.12/3000'-0.04)	Case 1	0.12@PCC/0.03@BC	0.07@PCC/0.03@BC	H
	7. Haven EB on-ramp (630'-0.11/3000'-0.04)	Case 1	0.12@PCC/0.03@BC	0.07@PCC/0.03@EC	H
	8. Milliken WB on-ramp (3000'-0.04/850'-0.10)	Case 1	Realigned	0.06@PCC/0.03@BC	H
	9. Milliken EB loop on-ramp (142'-0.12/3000'-0.04)	Case 1	0.12@PCC/0.02@BC	0.08@PCC/0.03@BC	H
	10. N15-E10 Connector (850'-0.10/3000'-0.03)	Case 1	0.07@PCC/0.03@BC	0.04@PCC/0.03@EC	H
	11. S15-W10 Connector (3000'-0.04/875'-0.10)	Case 1	0.10@PCC/0.03@BC	0.07@PCC/0.03@BC	H
	12. N215-W10 Connector (3000'-0.04/160'-0.12)	Case 1	0.07@PCC/0.03@BC	0.07@PCC/0.03@BC	H
	13. S215-W10 Connector (3000'-0.04/800'-0.11)	Case 1	0.05@PCC/0.03@BC	0.06@PCC/0.03@BC	H
	14. E St/Sunwest WB on-ramp (5425'-0.02/150'-0.12)	Case 1	0.06@PCC/0.06@BC	0.05@PCC/0.03@BC	H
	15. Tennessee WB off-ramp (1400'-0.08/1100'- 0.09)	Case 1	Realigned	0.08@PCC/0.08@EC	H
203.5 Compound Curves[2]	1. Monte Vista EB on-ramp	Shorter R >= 2/3 longer R and/or larger R to follow smaller R	200'/1000'	215'/850'	H
	2. Euclid WB loop on-ramp		197.6'/3000'	186'/3000'	H
	3. Vineyard WB on-ramp		212'/3000'	212'/3000'	H
	4. Vineyard WB loop on-ramp		150'/149'	150'/145'	H
	5. Haven WB loop on-ramp		190'/3000'	180'/3000'	H
	6. Haven EB loop on-ramp		190'/3000'	165'/3000'	H
	7. Haven EB on-ramp		700'/630'	700'/630'	H
	8. Haven EB on-ramp		Realigned	630'/3000'	H
	9. Milliken WB on-ramp		830'/3000'	850'/3000'	H
	10. Milliken EB loop on-ramp		148'/3000'	142'/3000'	H
	11. S15-W10 Connector		950'/3000'	875'/3000'	H
	12. N15-E10 Connector		850'/3000'	850'/3000'	H
	13. Valley EB off-ramp		1265'/843'	1265'/843'	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	14. S215-W10 Connector		850'/800'	850'/800'	H
	15. S215-W10 Connector		850'/3000'	800'/3000'	H
	16. N215-W10 Connector		175'/160'	175'/160'	H
203.6 Tangent Length Between Reversing Curves	1. WB & EB I-10 west of Cherry OC (4500'/5042')	340'	400'	239'	H
	2. WB I-10 at Rancho OC (3400'/4876')	560'	468'	464'	H
	3. EB I-10 at Rancho OC (3400'/4535')	520'	468'	464'	H
	4. WB I-10 at Colton OH (2363'/2624')	640'	316'	194'	H
	5. EB I-10 at Colton OH (2624'/2461')	640'	316'	180'	H
	6. Central WB on-ramp (4000'/800')	280'	0'	0'	H
	7. Central WB off-ramp (600'/2000')	300'	113.45'	76.58'	H
	8. Central EB on-ramp (550'/4325')	300'	227.6'	0'	H
	9. 4th WB on-ramp (4500'/180')	300'	Realigned	166'	H
	10. 4th EB on-ramp (4700'/3000')	200'	276'	0'	H
	11. Sierra WB off-ramp (4100'/8415')	200'	Realigned	0'	H
	12. Cedar EB on-ramp (9455'/14095')	200'	0'	0'	H
	13. Mount Vernon WB on-ramp (3000'/3500')	200'	Realigned	156'	H
	14. Sperry WB off-ramp (1000'/3500')	260'	Realigned	111'	H
	15. N215-E10 Connector (800'/5579')	360'	Realigned	295'	H
	16. Carnegie WB hook on-ramp (3086'/300')	300'	384.9'	141'	H
	17. Mountain View WB on-ramp (3000'/5000')	200'	Realigned	169'	H
	18. Mountain View EB on-ramp (10000'/3000')	200'	Realigned	68'	H
	19. California WB on-ramp (3000'/5000')	200'	Realigned	107'	H
204.3 Minimum Grade	1. WB & EB I-10 1153+33 – 1200+33	0.30%	-0.12%	-0.12%	H
	2. WB & EB I-10 1221+33 – 1252+83	0.30%	-0.25%	-0.25%	H
	3. EB I-10 1366+80 – 1371+80	0.30%	-0.27%	-0.27%	H
	4. EB I-10 1374+80 – 1375+30	0.30%	0.20%	0.20%	H
	5. EB I-10 1375+30 – 1375+80	0.30%	0.15%	0.15%	H
	6. WB I-10 1381+46 – 1388+11	0.30%	0.17%	0.17%	H
	7. EB I-10 1382+61 – 1390+95	0.30%	0.12%	0.12%	H
	8. WB I-10 1390+11 - 1402+61	0.30%	0.23%	0.23%	H
	9. EB I-10 1395+95 – 1404+95	0.30%	0.20%	0.20%	H
	10. WB I-10 1404+61 – 1410+11	0.30%	-0.05%	-0.05%	H
	11. EB I-10 1404+95 – 1411+45	0.30%	-0.07%	-0.07%	H
	12. EB I-10 1417+45 – 1420+95	0.30%	0.18%	0.18%	H
	13. WB I-10 1418+36 – 1420+11	0.30%	0.17%	0.17%	H
	14. EB I-10 1436+11 – 1451+95	0.30%	-0.13%	-0.13%	H
	15. EB I-10 1453+95 – 1465+45	0.30%	0.29%	0.29%	H
	16. EB I-10 1467+45 – 1477+45	0.30%	-0.04%	-0.04%	H
	17. WB I-10 1479+45 – 1484+85	0.30%	0.08%	0.08%	H
	18. EB I-10 1479+45 – 1484+45	0.30%	0.02%	0.02%	H
	19. EB I-10 1542+45 – 1559+95	0.30%	0.12%	0.12%	H
	20. WB I-10 1542+45 – 1561+16	0.30%	0.12%	0.12%	H
	21. WB I-10 1569+61 – 1579+11	0.30%	-0.14%	-0.14%	H
	22. EB I-10 1570+95 – 1576+61	0.30%	-0.06%	-0.06%	H
	23. EB I-10 1578+61 – 1581+71	0.30%	0.00%	0.00%	H
	24. WB I-10 1587+09 – 1588+19	0.30%	0.16%	0.16%	H
	25. EB I-10 1633+95 – 1642+46	0.30%	0.00%	0.00%	H
	26. WB I-10 1634+30 – 1639+46	0.30%	0.12%	0.12%	H
	27. EB I-10 1651+42 – 1659+42	0.30%	0.04%	0.04%	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	28. WB I-10 1643+46 – 1652+46	0.30%	0.00%	0.00%	H
	29. WB I-10 1656+42 – 1659+42	0.30%	-0.13%	-0.13%	H
	30. WB & EB I-10 1746+46 – 1758+46	0.30%	0.27%	0.27%	H
	31. WB & EB I-10 1823+00 – 1831+50	0.30%	0.28%	0.28%	H
	32. WB & EB I-10 1835+50 – 1836+50	0.30%	-0.15%	-0.15%	H
	33. WB & EB I-10 1847+57 – 1862+57	0.30%	0.17%	0.17%	H
	34. WB & EB I-10 1866+57 – 1872+57	0.30%	0.25%	0.25%	H
	35. WB & EB I-10 1876+55 – 1885+55	0.30%	-0.15%	-0.15%	H
	36. WB & EB I-10 1916+55 – 1935+05	0.30%	-0.09%	-0.09%	H
	37. WB & EB I-10 1938+05 – 1944+55	0.30%	0.12%	0.12%	H
	38. EB I-10 1948+55 – 1959+05	0.30%	-0.19%	-0.19%	H
	39. WB I-10 1948+55 – 1959+05	0.30%	-0.24%	-0.24%	H
	40. WB & EB I-10 1974+05 – 2035+55	0.30%	-0.11%	-0.11%	H
	41. WB I-10 2163+94 – 2170+94	0.30%	-0.14%	-0.14%	H
	42. EB I-10 2163+94 – 2169+94	0.30%	-0.15%	-0.15%	H
	43. EB I-10 2190+58 – 2200+59	0.30%	0.20%	0.20%	H
	44. WB I-10 2193+01 – 2193+48	0.30%	0.21%	0.21%	H
	45. WB I-10 2193+48 – 2201+01	0.30%	0.16%	0.16%	H
	46. WB I-10 2237+13 – 2252+13	0.30%	-0.28%	-0.28%	H
	47. WB & EB I-10 2270+61 – 2280+11	0.30%	0.12%	0.12%	H
	48. Monte Vista WB on-Ramp	0.30%	0.56%	0.03%	H
	49. Monte Vista WB off-Ramp	0.30%	0.15%,0.18%	0.15%,0.18%	H
	50. Mountain WB on-ramp	0.30%	0.14%	0.14%	H
	51. Euclid EB on-ramp	0.30%	0.05%	0.05%	H
	52. Milliken WB on-ramp	0.30%	0.13%	0.13%	H
	53. E10-S15 Connector	0.30%	0.0%	0.14%	H
	54. N15-W10 Connector	0.30%	0.17%	0.17%	H
	55. S15-E10 Connector	0.30%	0.14%	0.14%	H
	56. S15-W10 Connector	0.30%	0.10%-0.30%	0.03%	H
	57. W10-S15 Connector	0.30%	0.00%	0.12%, 0.00%	H
	58. Sierra WB on-ramp	0.30%	0.14%	0.14%	H
	59. Cedar EB off-ramp	0.30%	0.11%	0.11%	H
204.4 Vertical Curve Length	1. WB & EB I-10 1004+00 – 1008+00 (sag)	700’	400’	400’	H
	2. WB & EB I-10 1041+35 – 1047+35 (sag)	700’	600’	600’	H
	3. WB & EB I-10 1070+33 – 1076+33 (sag)	700’	600’	600’	H
	4. WB & EB I-10 1097+58 – 1103+58 (sag)	700’	600’	600’	H
	5. WB & EB I-10 1114+83 – 1119+83 (sag)	700’	500’	500’	H
	6. EB I-10 1357+25 – 1363+25 (crest)	700’	600’	600’	H
	7. EB I-10 1363+80 – 1366+80 (sag)	700’	300’	300’	H
	8. WB I-10 1371+94 – 1377+44 (sag)	700’	550’	550’	H
	9. WB I-10 1608+53 – 1613+53 (sag)	700’	500’	500’	H
	10. EB I-10 1619+66 – 1624+66 (crest)	700’	500’	500’	H
	11. WB I-10 1628+00 – 1634+00 (sag)	700’	600’	600’	H
	12. WB & EB I-10 1959+05 – 1964+05 (crest)	700’	500’	500’	H
	13. WB & EB I-10 1969+05 – 1974+05 (sag)	700’	500’	500’	H
	14. WB I-10 2201+01 – 2206+01 (crest)	700’	500’	500’	H
	15. WB & EB I-10 2231+04 – 2236+04 (crest)	700’	500’	500’	H
	16. EB I-10 2293+54 – 2299+54 (sag)	700’	600’	600’	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
	17. WB I-10 2294+54 – 2299+79 (sag)	700’	300’	300’	H
	18. WB & EB I-10 2373+83 – 2377+83 (sag)	700’	400’	400’	H
	19. WB & EB I-10 2396+33 – 2400+33 (sag)	700’	400’	400’	H
	20. WB & EB I-10 2434+58 – 2440+58 (crest)	700’	600’	600’	H
	21. WB & EB I-10 2475+08 – 2480+08 (sag)	700’	500’	500’	H
	22. Central WB off-ramp (crest)	500’	300’	300’	H
	23. E10-N15 Connector (sag)	500’	400’	400’	H
	24. Pepper EB off-ramp (sag)	500’	350’	350’	H
208.3 Bridge Median	1. Colton OH Lt & Rt Bridges	Decked when less than 36’	Open (approx 30’)	Open (27’-30’)	H
	2. Santa Ana River Lt & Rt Bridges		Open (approx 2’)	Open (20’-25’)	H
310.2 Minimum Outer Separation Width	1. EB I-10 and Palo Verde (near Monte Vista)	26’	32’-38’	19’-26’	H
	2. WB I-10 and Gibralter (near Etiwanda)	26’	41’	20’-26’	H
	3. WB I-10 and 2nd alley (near Rancho)	26’	41’	14’-26’	H
	4. WB I-10 and 2nd (near Rancho)	26’	40’	25’	H
	5. WB I-10 and J (near Rancho)	26’	17’-26’	14’-26’	H
	6. WB I-10 and Valley (near Mt Vernon)	26’	16’-26’	14’-26’	H
	7. EB I-10 and Steel (near Waterman)	26’	23’-26’	13’-26’	H
	8. EB I-10 and Industrial Park (near Alabama)	26’	40’-55’	23’-26’	H
403.3 Interior Angle of Intersection	1. Central EB on-ramp	75° min	66°47’23”	66°47’23”	H
	2. Central WB on-ramp	75° min	58°42’04”	58°42’04”	H
	3. 4th EB off-ramp	75° min	40°41’18”	49°53’59”	M
	4. 4th EB on-ramp	75° min	34°34’59”	34°35’45”	M
	5. Ford WB on-ramp	75° min	65°25’32”	65°25’32”	H
404.4(1)(b) Design Vehicle	1. Mount Vernon WB off-ramp (left turn to Sperry)	STAA	Cannot accommodate STAA	Cannot accommodate STAA	H
405.3(2)(b) Right-Turn Curve Radius	1. Vineyard WB on-ramp (212’ Lt)	(130’) 20 mph	212’ (24 mph)	212’ (24 mph)	M
504.2(2) Design of Freeway Entrances & Exits	1. Indian Hill WB off-ramp	4°52’08”	Not per 504.2B	2°40’26”	H
	2. Monte Vista EB on-ramp	14’ @ nose	non-conformant	12.10’ @ nose	H
	3. Euclid EB on-ramp	14’ @ nose	non-conformant	12.59’ @ nose	H
	4. 4th EB off-ramp	4°52’08”	DL=419’/3°22’00”	DL=839.6’/2°52’17”	H
	5. Vineyard WB on-ramp	14’ @ nose	14’ @ 559’	14’ @ 504’	H
	6. Vineyard WB loop on-ramp	14’@ 467.11’ 50:1 taper	14’@ 383’ 30:1 taper	14’@ 348’ 30:1 taper	H
	7. Vineyard EB on-ramp	6’ @ 300’	6’ @ 300’	9’ @ 300’	H
	8. Citrus EB on-ramp	14’ @ nose	13.40’@ nose	10.80’@ nose	H
	9. Sierra EB on-ramp	14’ @ nose	13.90’@ nose	10.30’@ nose	H
	10. Riverside WB on-ramp	14’ @ nose	11.14’ @ nose	11.29’ @ nose	H
	11. La Cadena WB on-ramp	14’ @ nose	12.43’@ nose	13.69’@ nose	H
	12. E210-E10 EB Connector on-ramp	14’ @ nose	37.87’@ nose	26.27’@ nose	H
504.2(5)(a) Vertical Curve beyond Exit Nose SSD	1. Central WB off-ramp	430’ (50 mph)	301’ (40 mph)	283’ (38 mph)	M
	2. Central EB off-ramp	430’ (50 mph)	309’ (41 mph)	366’ (45 mph)	H
	3. Euclid Ave WB hook off-ramp	430’ (50 mph)	254’ (35 mph)	343’ (43 mph)	H
	4. 9th EB off-ramp	430’ (50 mph)	242’ (34 mph)	313’ (41 mph)	H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
504.3(3) Crossroad Grade at Ramp Terminal	1. Rancho WB off-ramp terminal	4% max	6.51%	6.51%	M
504.3(5) Single-Lane Ramps	1. Mt Vernon EB hook off-ramp	1000’ max w/o passing lane	1100’, single-lane	1360’, single-lane	H
504.3(6) Two-Lane Exit Ramps	1. Central WB off-ramp (800/1180 vph) 2. 4th WB off-ramp (730/1070 vph) 3. 4th EB off-ramp (1070/1400 vph) 4. Vineyard EB off-ramp (930/470 vph)	Provide for 1300’ aux & 2nd ramp lane when 900<V< 1500 vph	1-lane exit, no provision for aux lane	1-lane exit, no provision for aux lane	H H H H
504.3(9) Successive On-Ramps	1. Tennessee EB on-ramp and E210-E10 merge	1000’	600’	600’	H
504.4(2) Freeway Connector Design Speed	1. S215-W10 Connector 2. N215-E10 Connector	50 mph 50 mph	47 mph 50 mph	47 mph 47 mph	H H
504.4(5) Single-lane Connection	1. E10-S15 Connector 2. W10-N15 Connector 3. N215-W10 Connector	L>1000’, add a passing lane	L=1713’, single lane L=1922’, single lane L=1874’, single lane	L=1694’, single-lane L=1922’, single-lane L=1835’, single-lane	H H H
504.4(6) Branch Connection No. of Lanes	1. E10-S15 Connector	V>1500 vph, Multilane	V=1810/1780, single	V=2390/2060, single	H
504.4(6) Branch Connection Merge/ Diverge	1. N15-W10 Connector (merge) 2. N15-E10 Connector (merge) 3. S15-E10 Connector (merge) 4. S215-W10 Connector (merge) 5. N215-E10 Connector (merge) 6. S215-E10 Connector (merge) 7. E210-E10 Connector (merge) 8. E10-N15 Connector (diverge – Case 1) 9. E10-S15 Connector (diverge – Case 1) 10. W10-N/S15 Connector (diverge – Case 2) 11. E10-N/S215 Connector (diverge – Case 2) 12. W10-W210 Connector (diverge – Case 2) 13. W10-N/S215 Connector (diverge – Case 3) (LD) = lane drop taper near merge point	2500’ aux & lane drop taper beyond merge point 2500’ aux & 2-lane exit, 4000’/2500’ aux & 2-lane exit, or 4000’/2500’ aux & 3-lane exit	1880’ (LD) >2500’ (LD) 0’ (LD) 1940’ (LD) >2500’ (LD) 1300’ (LD) >2500’ (LD) 1540’ & 2-lane exit >2500’ & 1-lane exit 2818’/0’ & 2-lane 2320’/600’ & 3-lane 3290’/0’ & 2-lane 2310’/0’ & 2-lane	1800’ (LD) >2500’ (LD) 0’ (LD) 1700’ (LD) >2500’ (LD) 1150’ (LD) >2500’ (LD) 1438’ & 2-lane exit >2500’ & 1-lane exit 2846’/0’ & 2-lane exit 2290’/500’ & 3-lane 3290’/0’ & 2-lane exit 2300’/0’ & 2-lane exit	H H H H H H H H H H H H H

HDM	Location and Description	HDM Standard	Existing	Proposed	(1)
504.6 Mainline Lane Reduction	1. WB I-10 Indian Hill Off-Ramp	No lane drop through local IC	No lane drop	Lane drop at off-ramp	H
504.8 Access Control	1. Monte Vista EB on-ramp (near Palo Verde)	100’	53’	51’	H
	2. Euclid EB (off-ramp near Caroline)	100’	103’	80’	H
	3. Rancho WB (on-ramp near Valley)	100’	76’	76’	H

(1) Probability of design exception approval: H=High, M=Medium, L=Low
(2) For HDM 203.5 Compound Curves, curves are listed in the direction of travel.

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 would 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

Alternative 2 would maintain the existing HOV facility along I-10 between the LA/SBd County Line and Haven Avenue and extend the HOV lanes to Ford Street in Redlands. These HOV lanes would operate 24 hours a day and are available for use by HOVs with two or more occupants (HOV 2+) per vehicle as well as for Clean Air Vehicles, motorcycles, marked para-transit vehicles, emergency response vehicles, and other exempted vehicles. It should be noted that the traffic analysis shows that the existing EB HOV lane between Archibald Avenue and Haven Avenue is currently congested

during peak periods. Congestion in the HOV lanes is also projected in Alternative 2 in several segments. 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. The HOV lanes in Alternative 2 would have continuous access to and from the mainline lanes per Caltrans District 8 which is documented in the project's Decision Document A-1 (see **Attachment N**).

Alternative 3 would 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, would 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 or discounted travel for HOV 3+. Pending further analysis, HOV 3+ may be required to pay a discounted rate during super-peak events in order to maintain sustainable volume and trip reliability in the Express Lanes. Clean Air Vehicles will also be considered toll-paying traffic required to pay a normal toll rate. Motorcycles, marked para-transit vehicles, emergency response vehicles, and other exempted vehicles are permitted in the Express Lanes by statute.

The Express Lanes would be buffer-separated from the general purpose lanes by striping in combination with channelizers for the majority of the corridor and would have 10 intermediate ingress/egress access points. Transition areas would 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 5.31 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 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 will be formally documented in a Fact Sheet once the Preferred Alternative has been identified.

Table 5.31 Existing and Proposed HOV Preferential Lane at Interchange On-Ramps

No.	Interchange Ramps	HOV Preferential Lane		
		Existing & Alternative 1	Alternative 2	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*	x
6	Vineyard Ave EB On-Ramp	x	x*	x
7	Holt Blvd EB On-Ramp	x	x*	x
8	Archibald Ave EB On-Ramp			
9	Haven Ave EB Loop On-Ramp	x	x*	x
10	Haven Ave EB On-Ramp	x	x*	x
11	Milliken Ave EB Loop On-Ramp			
12	Etiwanda Ave EB On-Ramp	x	x	x
13	Etiwanda Ave EB Loop On-Ramp	x	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	x
19	Riverside Ave EB On-Ramp	x	x	x
20	Pepper Ave EB On-Ramp		x	x
21	Rancho Ave EB On-Ramp			
22	9th St EB On-Ramp		x	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	x
28	Mountain View Ave EB On-Ramp		x	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	x
Westbound Ramps				
1	Monte Vista Ave WB On-Ramp	x	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 & Alternative 1	Alternative 2	Alternative 3
6	4th St WB On-Ramp	x	x*	x
7	Vineyard Ave WB On-Ramp			
8	Vineyard Ave WB Loop On-Ramp			x
9	Archibald Ave WB On-Ramp	x	x*	x
10	Haven Ave WB On-Ramp	x	x*	x
11	Haven Ave WB Loop On-Ramp	x	x*	x
12	Milliken Ave WB On-Ramp	x	x	x
13	Etiwanda Ave WB On-Ramp	x	x	x
14	Etiwanda Ave WB Loop On-Ramp	x	x	x
15	Valley Blvd WB on-ramp	x	x	x
16	Cherry WB On-Ramp	x	x	x
17	Cherry WB Loop On-Ramp	x	x	x
18	Citrus WB On-Ramp	x	x	x
19	Citrus Ave WB Loop On-Ramp	x	x	x
20	Sierra Ave WB On-Ramp	x	x	x
21	Cedar Ave WB On-Ramp	x	x	x
22	Riverside Ave WB On-Ramp	x	x	x
23	Pepper Ave WB On-Ramp	x	x	x
24	Rancho Ave WB On-Ramp	x	x	x
25	La Cadena Dr WB On-Ramp			
26	Mt Vernon Ave WB On-Ramp	x	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	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	x

**This ramp is outside the limits of Alternative 2 improvements. The existing HOV preferential lane will be retained.*

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.

The majority of interchange on-ramps along the I-10 corridor are currently metered. In both build alternatives under consideration, 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 located 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)

Specific locations for CHP enforcement/observation areas are not identified for Alternative 2 at this time. The HOV facility would have continuous access in which traffic could generally enter or exit the HOV facility at any point along the corridor. Final determination regarding the location of the CHP areas will be made during the final design.

Under Alternative 3, 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 5.32** presents a summary of existing and proposed CHP enforcement areas on interchange on-ramps along the project corridor under both build alternatives.

Table 5.32 Existing and Proposed CHP Enforcement Areas at Interchange On-Ramps

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

No.	Interchange Ramps	CHP Enforcement Area		
		Existing & Alternative 1	Alternative 2	Alternative 3
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*	x
10	Haven Ave WB On-Ramp	x	x*	x
11	Haven Ave WB Loop On-Ramp	x	x*	x
12	Milliken Ave WB On-Ramp	x	x	x
13	Etiwanda Ave WB On-Ramp	x	x	x
14	Etiwanda Ave WB Loop On-Ramp	x	x	x
15	Cherry WB On-Ramp	x	x	x
16	Cherry WB Loop On-Ramp	x	x	x
17	Citrus WB On-Ramp	x	x	x
18	Citrus Ave WB Loop On-Ramp	x	x	x
19	Sierra Ave WB On-Ramp	x	x	x
20	Cedar Ave WB On-Ramp	x	x	
21	Riverside Ave WB On-Ramp	x	x	x
22	Pepper Ave WB On-Ramp	x	x	x
23	Rancho Ave WB On-Ramp	x	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		x	
27	Waterman Ave WB On-Ramp to W10-N/S215			
28	Hospitality Ln/Carnegie Dr WB On-Ramp		x	x
29	Tippecanoe Ave WB On-Ramp			x
30	Tippecanoe Ave WB Loop On-Ramp	x	x	x
31	Mountain View Ave WB On-Ramp	x	x	x
32	California St WB On-Ramp	x	x	x
33	Alabama St WB On-Ramp		x	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	x

**This ramp is outside the limits of Alternative 2 improvements. The existing CHP will be retained.*

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 SANBAG have 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 SANBAG's mobility program that promotes public transit and carpooling/van pooling throughout San Bernardino County. Caltrans and SANBAG 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 716 utilities exist within the project area 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.

For Alternative 2, approximately 68 utilities including 1 cable TV, 3 fiber optic, 7 gas, 3 gasoline, 1 petroleum, 7 power/electrical, 11 sewer, 3 telephone, and 32 water facilities have the potential to be impacted by the proposed improvements. Approximately 59 of these potentially impacted utilities 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. Approximately 9 utilities would need to be removed, reconstructed or relocated completely to accommodate the proposed project improvements.

Approximately 159 utilities have the potential to be impacted by the proposed improvements under Alternative 3, including 5 cable TV, 6 fiber optic, 16 gas, 3 gasoline, 1 petroleum, 30 power/electrical, 1 power transformer, 21 sewer, 13 telephone, 2 wastewater, 59 water, and 2 unknown utility facilities. Approximately 84 of these potentially impacted utilities 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 75 utilities 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 in both build alternatives and a potential impact to a large water pipeline in Alternative 3. 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 $11 million ($13 million in future expenditure year) in Alternative 2, and $40 million ($50 million in future expenditure year) in Alternative 3. The Utility Information Sheets and cost estimates are attached to the Right of Way Data Sheets, 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. For both build alternatives, 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 in order 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. However, it may be determined during the final design phase that lattice steel towers are preferred. 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 of 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 6 to 35 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.

At this location, the MWD pipe line is outside the limits of Alternative 2 and therefore, would not be impacted. Under Alternative 3, the I-10 freeway would be widened and encroaches onto the pipeline for about 1,200 feet. A proposed retaining wall and soundwall would 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. The retaining wall footing would be constructed over the encasement. Detailed geotechnical analyses would 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 would also be widened approximately 8 feet over the pipeline. To avoid conflict, the widening design of the San Antonio Wash bridge includes reconstructing a portion of the existing bridge (approximately 20 feet wide) along with the additional 8-foot widening on a centrally placed support column that avoids the conflict with the MWD pipeline.

In addition, there is one service connection to the MWD Chino Basin facility near Station 1011+15 and another service connection to MWD Pomona Valley facility near Station 1018+41, which are accessible from Palo Verde Street. The Chino Basin connection would be relocated south towards Palo Verde Street due to conflict with the freeway widening and new wall construction. The access to these service connection structures would be maintained from Palo Verde Street.

Initial coordination with MWD was carried out in 2014 and 2015. 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.

Location 2: MWD Crossing East of Sixth Street in Ontario

At its crossing of 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 encased with concrete. At this location, the facility is outside the limits of Alternative 2 and therefore, would not be

impacted. For Alternative 3, the I-10 Corridor Project would widen the south side of the freeway at this location. Concrete encasement would be extended under the widened pavement.

Location 3: MWD Crossing East of Cherry Avenue in Fontana

At its crossing of 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. In both build alternatives under consideration, the I-10 Corridor Project would 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 11 existing utilities in Alternative 2 and 24 existing utilities in Alternative 3 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 (Alternative 3) 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 Alternative 3, the I-10 freeway would 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 would 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 (Alternative 3) 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 (Alternative 3) 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 (Alternative 3) 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 would 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 (Alternative 3) is an overhead electric 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 would 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 (Alternative 3) is an overhead cable TV 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 would 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 (Alternative 3) 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 would 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 (Alternative 3) 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 (Alternative 3) 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 (Alternative 3) 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 (Alternative 3) 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 (Alternative 3) 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 (Alternative 3) is an electric line 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 would need to be relocated due to a conflict with the ramp reconstruction. Another portion closer to Haven Avenue would 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 (Alternatives 2 and 3) 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 (Alternative 2 and 3) 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 (Alternative 2 and 3) 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 (Alternative 2 and 3) is an overhead electric line 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 (Alternatives 2 and 3) is an overhead electric line 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 Mount 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 (Alternatives 2 and 3) 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 (Alternatives 2 and 3) 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 (Alternatives 2 and 3) 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 (Alternatives 2 and 3) 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 (Alternatives 2 and 3) 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 (Alternative 2 and 3) 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, four of which are impacted in Alternative 2 and five in Alternative 3. **Table 5.33** below provides a summary of the railroad bridge improvements required under each of the build alternatives.

Table 5.33 Railroad Improvements

No.	Facility	Type	Track	Owner	Location	Alt 2	Alt 3
1	Kaiser Spur	OH	Single	UPRR	East of Etiwanda	Widen	Widen
2	Slover Mountain	UP	Single	UPRR	East of Pepper	No work	Replace
3	Colton Crossing	OH	Three	BNSF	East of Rancho	Widen	Widen
4	Pavillion Spur	OH	Single	UPRR/private	West of Mt. Vernon	Widen or Abandon*	Widen or Abandon*
	Pavillion (9th St WB off-ramp)	OH	Single	UPRR/private	West of Mt. Vernon	No work	No work
5	West Redlands	OH	Single	BNSF/SANBAG	East of Mountain View	Widen	Widen
6	Redlands	OH	Single	BNSF/SANBAG	West of University	No work	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. In both build alternatives under consideration, the Kaiser Spur OH (concrete slab bridge) would 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 Slover Mountain is a single track over I-10. This railroad crossing will not be impacted by Alternative 2. The UPRR Slover Mountain railroad track and UP bridge would be replaced in Alternative 3. An adjacent bridge south of I-10 would 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 would 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) would be widened in both build alternatives under consideration.

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. In both build alternatives, freeway widening is required; hence, this railroad structure would 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 West Redlands OH would be widened on both sides in both build alternatives under consideration.

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. There was a single track located between the 3rd and 4th bridge piers; however, this facility is currently out of service and the tracks appear to have been removed. No freeway widening is proposed at this location and the Redlands OH will be maintained (except for median barrier reconstruction and minor bridge deck repair) in both build alternatives under consideration.

Under Alternative 2, permanent easement of one UPRR parcel is required for the widening of the West Redlands OH structure. Under Alternative 3, 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 would be needed from several UPRR parcels to accommodate the railroad structure modification/replacement. Railroad involvement is noted in the Right of Way Data Sheets (**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 for each of the build alternatives.

5.A.4.8 Highway Planting

Existing planting and irrigation systems removed during construction of the proposed improvements would be replaced wherever space is available. Generally, existing vegetation in and around the interchange areas would 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 will be provided during the final project design 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.

The landscape design will incorporate aesthetic and landscape elements recommended in the *I-10 Corridor Master Plan, 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 would be replaced if removed by the project. Quantity of replacement planting will be calculated to meet the requirements for continuous planting.

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)

It is anticipated that replacement planting, including a plant establishment period, will be included in the highway construction contract. An exception may 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 range from approximately 346 acres in Alternative 2 to approximately 661 acres in Alternative 3. 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 an *NADR Addendum* were also prepared to evaluate traffic noise impacts and abatement for impacted receivers located south of the UPRR tracks between Cherry Avenue and Cedar Avenue.

A total of 17 noise barriers were recommended in Alternative 2 and 46 in Alternative 3. 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 results of the reasonableness analysis and preliminary recommendation for noise barriers are fully discussed in Chapter 3 of the DEIR/EIS prepared for the I-10 Corridor Project and are summarized in Section 6H of this document. 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.

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 Tennessee Avenue in Alternative 2 and at Monte Vista Avenue, Euclid Avenue, Vineyard Avenue, and Tennessee Avenue in Alternative 3. 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. Under Alternative 2, the project includes reconstruction of Richardson Street which has one sidewalk along the west side of the roadway and Tennessee Street which has one sidewalk along the east side of the roadway. The project would replace the existing sidewalk on these streets in kind. Under Alternative 3, sidewalks would be provided on both sides of proposed arterial improvement locations including Monte Vista Avenue, San Antonio Avenue, Euclid Avenue, Sultana Avenue, Campus Avenue, and Sixth Street. Reconstruction of Vineyard Avenue, Richardson Street, and Tennessee Street in Alternative 3 would provide one continuous sidewalk on these streets, similar to the current condition. Pedestrian facilities on arterials being improved would 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. In either of the build alternatives, 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 are being implemented to replace concrete pavement slabs in the 3rd and 4th general purpose lanes and overlay the AC shoulders in both directions between the LA/SBd County Line and Live Oak Canyon Road. EA 0Q7604 which extends from the LA/SBd County Line to Orange Street is currently under construction. EA 0K2914 which covers pavement rehabilitation from Orange Street to Ford Street and EA 0K2924 which covers pavement rehabilitation from Ford Street to Live Oak Canyon Road, are currently in the final design phase.

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. 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

Either of the build alternatives being considered would 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 5.34** 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 5.34 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)

In both build alternatives, the Santa Ana River Bridges carrying the I-10 traffic (54-0292L and 54-0292R) would 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 would 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" CIDH piles/shafts be installed and existing grouted restrainers be replaced with pipe seat extenders at each bridge.

It is anticipated that the seismic retrofit project would 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. Coordination has been made between the two projects to minimize the potential conflict.

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 5.35** for Alternative 2 and **Table 5.36** for Alternative 3.

Table 5.35 Alternative 2 Cost Estimate

Preliminary Estimate	Alternative 2	
	Current	Escalated
Roadway Items	$392,002,000	$461,541,000
Structure Items	$53,713,000	$63,241,000
Subtotal Construction	**$445,715,000**	**$524,782,000**
R/W & Utilities	$13,493,000	$16,865,000
Total Capital Outlay	**$459,208,000**	**$541,647,000**
Support Cost	$99,892,000	$108,303,000
Establish Existing Planting (EEP)	$7,606,000	$9,244,000
Total Project Cost	**$566,706,000**	**$659,194,000**

The support cost ratio is approximately 22%.

Table 5.36 Alternative 3 Cost Estimate

Preliminary Estimate	Alternative 3 Contract 1		Alternative 3 Contract 2		Alternative 3 Total	
	Current	Escalated	Current	Escalated	Current	Escalated
Roadway Items	$376,647,000	$429,839,000	$659,698,000	$776,730,000	$1,036,347,000	$1,206,569,000
Structure Items	$52,212,000	$59,586,000	$86,007,000	$101,264,000	$138,219,000	$160,850,000
Subtotal Construction	**$428,859,000**	**$489,425,000**	**$745,705,000**	**$877,994,000**	**$1,174,566,000**	**$1,367,419,000**
R/W & Utilities	$41,325,000	$51,656,000	$45,442,000	$56,802,000	$86,767,000	$108,458,000
Total Capital Outlay	**$470,184,000**	**$541,081,000**	**$791,147,000**	**$934,796,000**	**$1,261,333,000**	**$1,475,877,000**
Support Cost	$79,046,000	$85,831,000	$140,561,000	$154,726,000	$219,607,000	$240,557,000
Establish Existing Planting (EEP)	$3,136,000	$3,692,000	$7,102,000	$8,630,000	$10,238,000	$12,322,000
Total Project Cost	**$552,366,000**	**$630,604,000**	**$938,810,000**	**$1,098,152,000**	**$1,491,178,000**	**$1,728,756,000**

The support cost ratio is approximately 17%.

5.A.4.16 Right of Way Data

The right of way costs, including utility work are presented in **Table 5.37** for Alternative 2 and **Table 5.38** for Alternative 3 improvements. The Right of Way Data Sheets which provide detailed information and right of way costs for each of the build alternatives are included in **Attachment K**.

Table 5.37 Alternative 2 Right of Way Cost

Preliminary Estimate	Alternative 2	
	Current	Escalated
Right of Way Acquisitions	$2,714,000	$3,392,000
Utility Work	$10,779,000	$13,473,000
Total Right of Way & Utility Cost	**$13,493,000**	**$16,865,000**

Table 5.38 Alternative 3 Right of Way Cost

Preliminary Estimate	Alternative 3 Contract 1		Alternative 3 Contract 2		Alternative 3 Total	
	Current	Escalated	Current	Escalated	Current	Escalated
Right of Way Acquisitions	$16,097,000	$20,121,000	$30,850,000	$38,562,000	$46,947,000	$58,683,000
Utility Work	$25,228,000	$31,535,000	$14,592,000	$18,240,000	$39,820,000	$49,775,000
Total Right of Way & Utility	**$41,325,000**	**$51,656,000**	**$45,442,000**	**$56,802,000**	**$86,767,000**	**$108,458,000**

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 HOV lane extension proposed in Alternative 2 would provide improved flow and operations east of Haven Avenue. The Express Lanes proposed in Alternative 3 would 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 would 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 SANBAG and/or other local agencies, including:

- I-15 Corridor Project from SR-60 to SR-210
- I-10/Grove Avenue Interchange Improvement Project
- I-10/Cedar Avenue Interchange Improvement Project
- I-10/Mt. Vernon Avenue Interchange Improvement Project
- I-10/Mountain View Avenue Interchange Improvement Project
- I-10/California Avenue Interchange Improvement Project
- I-10/Alabama Street Interchange Improvement Project
- I-10/University Street Interchange Improvement Project

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 if selected for implementation, 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. Additional detail of the rejected alternatives is provided in the Chapter 2 of the DEIR/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, would be incorporated into each of the build alternatives under consideration 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 either build alternative where appropriate.

6. CONSIDERATIONS REQUIRING DISCUSSION

6A. Hazardous Waste

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 in both build alternatives, 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.

Eleven (11) potential REC parcels subject to partial right of way acquisition are also identified in Alternative 2 including:

- 9 parcels within 25 feet of rail lines that should be sampled for pesticides containing arsenic;
- 1 parcel containing at least one AST; and
- 1 parcel containing at least one UST.

Fifty-three (53) potential REC parcels subject to right of way acquisitions (38 partial and 15 full acquisitions) are identified in Alternative 3 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 for either of the build alternatives being considered, as recommended below:

- Continued monitoring of remedial activities at the LUST site at 1915 Tippecanoe;
- 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.

A Hazardous Material Disclosure Document (HMDD) and a Request for Acquisition of Contaminated Property (RACP) will be prepared prior to construction to document the benefits and risks of acquired parcels with known or potential hazardous materials as well as risk reduction mechanisms considered.

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 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. These 6 accepted VA alternatives include:

- 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.
- Replace/rehabilitate two outside lanes with 40 year concrete pavement when performing widening in both directions.
- 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 costs to align with typical project bids in District 8.
- 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.

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 improvements would maintain the majority of existing pavement along the project corridor. The improvements primarily consist of freeway widening and not reconstruction of the pavement structural sections. However, there would be some pavement removal and replacement on the freeway (mainly inside shoulder), 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) removed as a result of the proposed improvements would be recycled and reused in the construction to the extent possible. Existing concrete pavement (freeway median area, bridges) to be removed would 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.) would be reused on the project wherever possible or stockpiled for future uses.

The proposed improvements in both build alternatives would promote ridesharing and fuel conservation, whether by the HOV lane in Alternative 2 or by discounting the toll for HOVs in the Alternative 3 Express Lanes.

6D. Right of Way Issues

The following paragraphs provide a summary of right of way needs for each of the build alternatives being considered. The Right of Way Data Sheets for each of the build alternatives are included in **Attachment K**.

Alternative 2

Right of way impacts associated with Alternative 2 improvements affect 122 parcels along the corridor, totaling 7.1 acres. Right of way impacts include partial acquisitions, permanent easements, and temporary construction easements (TCEs) as shown in **Table 6.1** from private residences, commercial/recreational properties and public land uses. No full right of way acquisitions are required under Alternative 2.

Table 6.1 Alternative 2 Right of Way Impacts

Type of Right of Way Impact	No. of Parcels
Full acquisition	0
Partial acquisition only	0
Partial acquisition with TCE	4
Partial acquisition with permanent easement & TCE	1
Permanent easement only	0
Permanent easement with TCE	14
TCE only	103
Total Parcels with ROW Impacts	122

Alternative 3

Right of way impacts associated with Alternative 3 improvements affect 487 parcels along the corridor, totaling 57.0 acres. Right of way impacts include full acquisition of 22 parcels including 12 single-family residences, 4 multi-family residential buildings, 1 office building, and 5 industrial/commercial properties. Partial acquisitions, permanent easements, and TCEs as shown in **Table 6.2** are also required from private residences, commercial/recreational properties, and public land uses.

Table 6.2 Alternative 3 Right of Way Impacts

Type of Right of Way Impact	No. of Parcels
Full acquisition	22
Partial acquisition only	3
Partial acquisition with TCE	90
Partial acquisition with permanent easement & TCE	62
Permanent easement only	29
Permanent easement with TCE	59
TCE only	222
Total Parcels with ROW Impacts	487

Montclair Storm Drain Right of Way

The Montclair Storm Drain is an open channel which runs along the north side of I-10 between Monte Vista Avenue and Central Avenue and would be impacted by the project under Alternative 3. The proposed freeway widening would encroach onto the existing channel and require acquisition of right of way where the channel currently lies within. The channel would be reconstructed as a reinforced concrete box and relocated outside the proposed State right of way under the parking lot pavement of the Montclair Plaza. Right of way acquisition (to be transferred to the City of Montclair) or a joint use easement would be required from the Montclair Plaza to accommodate the channel 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 surrounding surfaces. The proposed freeway widening under Alternative 3 will require extension of the existing pipes and relocation of the detention vault to the south. Since the Palmetto Storm Drain system is an off-site system, it is proposed that, when the detention vault is relocated, it would be situated under the Church's parking lot outside the proposed State right of way. An open V-ditch is proposed to convey water from the vault along the east and south sides of the church's parking lot and outlet onto Palmetto Avenue. A permanent easement would be required from the Church of Christ to accommodate the detention vault relocation and new open V-ditch around the church's parking lot.

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 in Montclair under a lease agreement with the City of Montclair. Under Alternative 3, right of way acquisition would be required along the northern edge of MacArthur Park to accommodate the I-10 widening and soundwall replacement. The cell site would 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. Under Alternative 3, the proposed widening of the I-10 freeway would 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 would 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 would need to extend approximately 25 feet underneath 2 residential and 2 commercial parcels on the north side.

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

6D.1. Relocation Impact Study

A *Draft Relocation Impact Statement (DRIS)* has been prepared for the project to address the potential displacement of 23 single-family residences, 19 multi-family residential units, and 12 non-residential properties that are subject to acquisition in Alternative 3. Relocations are required from 22 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 DRIS 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 42 residential units potentially displaced under Alternative 3. 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.

Alternative 1 and Alternative 2 would not result in any residential or non-residential relocation; and therefore, relocation resources are not required.

6E. Environmental Issues

A DEIR/EIS has been prepared for the project in accordance with Caltrans' environmental procedures, as well as State and federal environmental regulations. An 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 signature page of the DEIR/EIS is attached to this document as **Attachment L** and the entire environmental document is available at Caltrans District 8 office under Project No. 0800000040. The DEIR/EIS documents will also be available at libraries as well as on line via the Caltrans website. The SANBAG's I-10 Corridor Project website will have a link to the Caltrans website for accessing the environmental document.

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 DEIR/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 DEIR/EIS concludes that proposed improvements under both build alternatives would not result in any unavoidable significant environmental impacts, except for one Mandatory Finding of Significance due to the fact that the level of public acceptance for Alternative 3 is unknown. There would 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 the proposed avoidance, minimization and/or mitigation measures.

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

- 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)
- Draft Relocation Impact Statement (Parsons, September 2015)
- Environmentally Sensitive Area Protection Plan (Applied EarthWorks, August 2014)
- Finding of No Adverse Effect with Non-Standard Conditions (Applied EarthWorks, May 2015)
- Floodplain Evaluation Report (Parsons, December 2014)
- 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, October 2015)
- Natural Environment Study (ECORP, December 2015)
- Noise Abatement Decision Report (Parsons, July 2015)
- Noise Abatement Decision Report Addendum (Parsons, August 2015)
- Noise Study Report (Parsons, July 2015)

- Noise Study Report Addendum (Parsons, August 2015)
- Preliminary Materials Report (EMI, December 2015)
- Resources Evaluated Relative to the Requirements of Section 4(f), April 2016
- Storm Water Data Report (Parsons, September 2015)
- 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 DEIR/EIS. The following subsections summarize some of the key environmental issues discussed in the DEIR/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 wetlands 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 6.3 below summarizes the potential impacted areas to the USACE jurisdictional waters within the BSA. Alternative 2 would result in 0.07 acres of permanent impacts to USACE jurisdictional waters. Alternative 3 would result in 0.09 acres of permanent impacts to waters pursuant to USACE jurisdiction. **Table 6.4** presents the potential impacted areas to the RWQCB and CDFW jurisdictional waters. Alternative 2 would result in 0.07 acres of permanent impacts and Alternative 3 would result in 0.09 acres of permanent impacts to RWQCB and CDFW jurisdictional waters.

Table 6.3 Potential Impacts to USACE Jurisdictional Waters

Geomorphic Feature	Alternative 2 Impacts (Acres)		Alternative 3 Impacts (Acres)	
	Temporary	Permanent	Temporary	Permanent
9 (Cucamonga Creek Channel)	0.00	0.00	0.17	0.00
12 (Lower Deer Creek Channel)	0.00	0.00	0.01	0.00
16 (Day Creek Channel)	0.02	0.00	0.02	0.00
19 (Lower Etiwanda Creek Channel)	0.00	0.06	0.00	0.08
20 (San Sevaine Creek)	0.06	0.00	0.15	0.00
21 (I-10 Channel)	0.49	0.00	12.53	0.00
24 (Rialto Tributary)	2.76	0.00	5.68	0.00
35 (Warm Creek Channel)	0.38	0.00	0.71	0.00
36 (Santa Ana River Channel)	0.30	0.00	0.59	0.00
38 (San Timoteo Creek Channel)	0.08	0.00	0.08	0.00
51	0.47	0.00	0.47	0.00
52	0.00	0.01	0.00	0.01
Total	**4.56**	**0.07**	**20.41**	**0.09**

Table 6.4 Potential RWQCB and CDFW Jurisdictional Area Impacts

Geomorphic Feature Number	Alternative 2 Impacts (Acres)		Alternative 3 Impacts (Acres)	
	Temporary	Permanent	Temporary	Permanent
4	0.00	0.00	0.21	0.00
5	0.00	0.00	0.32	0.00
6	0.00	0.00	0.48	0.00
8	0.00	0.00	0.07	0.00
9 (Cucamonga Creek Channel)	0.00	0.00	0.17	0.00
11	0.00	0.00	0.05	0.00
12 (Lower Deer Creek Channel)	0.00	0.00	0.01	0.00
13	0.00	0.00	0.27	0.00
16 (Day Creek Channel)	0.02	0.00	0.02	0.00
17	0.15	0.00	0.15	0.00
19 (Lower Etiwanda Creek Channel)	0.00	0.06	0.00	0.08
20 (San Sevaine Creek)	0.06	0.00	0.15	0.00
21 (I-10 Channel)	0.49	0.00	12.53	0.00
24 (Rialto Tributary)	2.76	0.00	5.68	0.00
27	0.02	0.00	0.02	0.00
28	0.03	0.00	0.03	0.00
29	0.01	0.00	0.01	0.00
30	0.00	0.00	0.05	0.00
31	0.01	0.00	0.01	0.00
33	0.09	0.00	0.09	0.00
35 (Warm Creek Channel)	0.38	0.00	0.71	0.00
36 (Santa Ana River Channel)	0.30	0.00	0.59	0.00
38 (San Timoteo Creek Channel)	0.08	0.00	0.08	0.00
39	1.33	0.00	2.93	0.00
41	1.69	0.00	1.69	0.00
42	0.56	0.00	0.56	0.00

Geomorphic Feature Number	Alternative 2 Impacts (Acres)		Alternative 3 Impacts (Acres)	
	Temporary	Permanent	Temporary	Permanent
43	0.00	0.00	0.01	0.00
45	0.00	0.00	0.04	0.00
51	0.47	0.00	0.47	0.00
52	0.00	0.01	0.00	0.01
Total	**8.45**	**0.07**	**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 would 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 would 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 under either build alternative. With incorporation of all permit conditions and permanent BMPs, no permanent adverse effects on jurisdictional areas are anticipated in either build alternative under consideration. 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 6.5** summarizes the potentially affected floodplain/location, zone, encroachment type and risk associated with implementation of the proposed project.

Table 6.5 Potential Floodplain Encroachment

Affected Floodplain/Location	FIRM Zone	Type of Encroachment	Risk	
			Alternative 2	Alternative 3
West Cucamonga Creek	AO/A	Transverse	Low	Low
Cucamonga Creek/Deer Creek	A	Transverse	Low	Low
Lower Deer Creek	A	Transverse	Low	Low
California Commerce SD	AH	Transverse	Low	Low
East Etiwanda Creek	AH	Longitudinal & Transverse	Low	Low
San Sevaine Creek	A	Transverse	Low	Low
I-10 Channel	A	Longitudinal	Low	Low
Colton Southwest SD	AH	Longitudinal & Transverse	Low	Low
11th Street SD	AE	Transverse	Low	Low
Warm Creek Channel	AE	Longitudinal & Transverse	Low	Low
Santa Ana River	AE	Transverse	Low	Low
San Timoteo Creek	A	Transverse	Low	Low
Mission Channel	A/AO	Transverse	Low	Low
Zanja Creek	A/AO	Longitudinal & Transverse	Low	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 51 acres (6.9%) in Alternative 2 and 140 acres (14.4%) in Alternative 3. 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 would also be filed and a Waste Discharge Identification (WDID) number would 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. Under Alternative 2, a total of 7 biofiltration swales and 15 Water Quality Volume (WQV) based treatment devices, such as Detention Devices, Infiltration Devices, Media Filters, or any combination thereof, are proposed as part of the overall permanent treatment BMP strategy. For Alternative 3, a total of 8 biolfiltration swales and 22 WQV are proposed. Existing treatment BMPs along the I-10 corridor exist within or in the 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 23.2% for Alternative 2 and 20.4% for Alternative 3 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 would treat 100 percent of the net new

impervious surface area proposed by this project (51 acres or 6.7% increase in Alternative 2 and 140 acres or 14.4% increase in Alternative 3). The project would not discharge directly into unlined channels and no bridge runoff would 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 build alternatives due to removal of mature trees and the addition of urbanizing elements (e.g., new bridges, soundwalls, additional pavement, etc.). However, both build alternatives would be constructed along an existing corridor; therefore, permanent impacts to community character and cohesion within the study area are not anticipated.

Both build alternatives require 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 42 residential units and 12 non-residential properties that are required under Alternative 3. A sufficient number of comparable replacement dwelling and business units is available within the same areas. No residential or non-residential displacements are anticipated under Alternative 2.

No conversion or temporary use of designated farmlands is proposed under Alternative 2. Alternative 3 would 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. Partial right of way acquisition/footing easement and TCE are also required from 2 parcels in Redlands that are designated as prime farmland. Permanent impacts would convert existing agricultural land to transportation uses but would not significantly impact the agricultural 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.

In Alternative 2, approximately 22 parking spaces would be potentially lost. In Alternative 3, a potential loss of approximately 210 parking spaces (47 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 prepared for the project to assess and document the presence of biological resources within the BSA. The study indicates that three 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 are sensitive plant communities listed in the California Natural Diversity Database and would be considered environmentally sensitive areas.

According to the database search, 13 special-status plant species potentially occur within the region, 4 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 the 4 plant species on the threatened and endangered 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, 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 other 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 survey.

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, 2 species (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 7 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 Creek, 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 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 State or federal threatened and endangered-listed species that has a moderate potential to occur within the BSA. Based on a habitat assessment conducted in 2014, it was determined that both build alternatives could result in permanent effects to potentially suitable DSF habitat (2.13 acres in Alternative 2 and 9.70 acres in Alternative 3) which occur between the existing freeway edge of shoulder and the Caltrans right of way. However, presence/absence surveys for the DSF were conducted in 2015 in areas identified by the habitat assessment as potentially suitable habitat and found no presence of DSF. The surveys will be conducted again in 2016 between July 1 and September 20. Once the surveys are completed, Caltrans will prepare a Draft Biological Assessment and initiated formal consultation with USFWS. If this species is present, mitigation credits will be purchased at a minimum of one to one ratio for all permanent impacts to occupied suitable habitat.

The report 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 both build alternatives 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 the 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.

- Presence/absence surveys for the DSF conducted in 2015 in areas identified by the habitat assessment as potentially suitable habitat found no presence of DSF. The surveys will be conducted again in 2016 between July 1 and September 20. If presence of DSF is found, Caltrans will initiate consultation with USFWS for take of DSF. The potential impacts to DSF would be mitigated through compensatory mitigation 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 both build alternatives have the potential to moderately effect existing visual environment. In Alternative 2, removal of up to 627 trees is anticipated and in Alternative 3, removal of approximately 1,148 trees is anticipated, the majority of which are trees from Eucalyptus windrows between I-15 and the Santa Ana River. Both build alternatives would 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 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 cultural resources 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.

Recommended measures to minimize and/or avoid adverse effects to the historic properties are discussed in Section 3.1.8 of the DEIR/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, SANBAG, and the appropriate city (Ontario or Upland). Preference will be given to infilling holes in existing tree lines in the 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 the 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 under Alternatives 2 and 3 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. No paleontological resources would be affected under Alternative 1.

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.

None of the identified Section 4(f) resources would be affected under Alternative 1. Of these Section 4(f) resources, 2 properties (Santa Ana River Trail and Orange Blossom Trail) are anticipated to be impacted under Alternative 2. Under Alternative 3, Euclid Avenue (historical resource) and four properties including MacArthur Park, Edison Elementary School, Santa Ana River Trail, and Orange Blossom Trail are anticipated 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 under Alternative 3. 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 DEIR/EIS.

- MacArthur Park in the City of Ontario is subject to direct and temporary uses under Alternative 3. Approximately 0.14 acres of the park is required to accommodate the proposed improvements, which would 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 would 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 is subject to temporary use under Alternative 3. Approximately 0.07 acres of property is required as a temporary construction easement to accommodate the construction of a short retaining wall along Sultana Avenue. The area subject to temporary use is an approximately 5 to 10 feet wide strip behind the chain link fence. The temporary use of the school is not anticipated to diminish the recreational facilities or uses. The project would not result in direct or constructive use of the school.

- 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 would be subject to temporary use during construction in both build alternatives. A falsework opening would 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 (both build alternatives) would not result in direct or constructive use of the trail.

- Orange Blossom 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, would be subject to temporary use during construction in both build alternatives. During widening of the Mission Channel bridge/West Redlands OH, temporary closure of the trail is anticipated. Trail users would be detoured to nearby on-street bike routes along Lugonia Avenue and California Street. The project (both build alternatives) would not result in direct or constructive use of the trail.

The report concludes that a de minimis finding would be proposed for the 4(f) properties subject to Section 4(f) protection since none of the direct uses would diminish the historical attribute or recreational function of the properties. After circulation of the DEIR/EIS, coordination with local City and County agencies and property owners will be conducted to confirm the de minimis finding and identify appropriate mitigation measures to minimize harm to Section 4(f) 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.

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 would not require acquisition of Sylvan Park in any of the alternatives under consideration. 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 each of the build alternatives 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 construction under either Alternative 2 or Alternative 3, 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 12 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

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 2 is currently included in the 2012-2035 financially constrained RTP/SCS and was found to conform by SCAG on September 11, 2014. FHWA also made a regional conformity determination finding on December 15, 2014. The design concept and scope of Alternative 2 are consistent with the project description in the 2012-2035 RTP/SCS. Alternative 3 descriptions were submitted to the RTP Consistency Amendment in December 2014 and are anticipated to be approved as part of the 2016 RTP in June 2016 and FTIP Amendment #12 in August 2016.

An *Air Quality Report* has been prepared to address the project-level air quality conformity requirements of the Federal Clean Air Act. The report concludes that the project is consistent with the Air Quality Management Plan (AQMP), adopted in 2012. Either of the build alternatives would contribute to a slight increase in Carbon Monoxide (CO) emissions, as compared to the No Build Alternative. However, the small emission increases would not result in CO concentrations above ambient air quality standards to create a hot spot. The project is located within an attainment/maintenance area for the federal CO standard as of June 11, 2007.

The project is located in a nonattainment area for Particulate Matter of 2.5 microns in diameter or smaller ($PM_{2.5}$) and a maintenance area for Particulate Matter of 10 microns in diameter or smaller (PM_{10}). The air quality study was conducted to determine the potential project impact on $PM_{2.5}$ and PM_{10} in accordance with 40 CFR Part 93. The study concludes that the project would not cause or contribute to, or worsen, any new localized violation of $PM_{2.5}$ and PM_{10} standards. 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 16, 2016, the TCWG determined that the I-10 Corridor Project is not a project of air quality concern and does not require a $PM_{2.5}$ and PM_{10} hot spot analysis, since the project is an expanded highway project that does not result in significant increase in diesel vehicles.

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 under Alternative 2 and Alternative 3, 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. Title VI considerations would not be applicable to the project under Alternative 1, since no improvements are proposed under this alternative.

6H. Noise Abatement Decision Report

An *NSR*, supplemented by an *NSR Addendum*, has been prepared to determine the future traffic noise impacts, if any, of the proposed improvements on sensitive receptors and frequent human use areas within the project corridor. The worst case scenario for existing traffic noise conditions was modeled. The future worst case traffic noise scenario was also modeled for each of the three alternatives (the No Build Alternative and two Build Alternatives), in order to determine appropriate abatement measures, if needed, for each of the build alternatives. The *NSR and NSR Addendum* are available in the project file 0800000040 at Caltrans District 8 office.

A *NADR*, supplemented by a *NADR Addendum*, has been prepared for the project as separate documents. This section presents the noise abatement recommendations in the *NADR and NADR Addendum* which:

- is an evaluation of the reasonableness and feasibility of incorporating noise abatement measures into this project;
- constitutes the preliminary decision on noise abatement measures to be incorporated into the draft environmental document (if applicable); and
- is required for Caltrans to meet Title 23, Code of Federal Regulation, Part 772 of the Federal Highway Administration standards.

The *NADR and NADR Addendum* do not present the final decision regarding noise abatement; rather they present key information on abatement to be considered throughout the environmental review process, based on the best available information at the time the I-10 DEIR/EIS is published. The *NADR and NADR Addendum* do not address noise barriers or other noise-reducing treatments required as mitigation for significant adverse environmental effects identified under CEQA.

The Caltrans Traffic Noise Analysis Protocol establishes a process for assessing the reasonableness and feasibility of noise abatement. Noise abatement is considered to be acoustically feasible if it provides noise reduction of at least 5 A-weighted decibels (dBA) at receivers subject to noise impacts. Other non-acoustical factors relating to geometric standards (e.g., sight distances), safety, maintenance, security, geotechnical considerations, and utility relocations can also affect feasibility. Evaluation of acoustical feasibility is conducted through a noise study and is documented in the NSR.

The Protocol defines the procedure for applying an acoustical design goal to all noise abatement measures. Caltrans' acoustical design goal is that a barrier must be predicted to provide at least 7 dBA

of noise reduction at one or more benefitted receivers. For a wall to be considered reasonable, the 7dBA design goal must be achieved at one or more benefitted receivers. This design goal applies to any receiver and is not limited to impacted receivers.

The Protocol further defines the procedure for assessing reasonableness of noise barriers from a cost perspective. A cost-per-residence allowance is calculated for each benefited residence (i.e., residences that receive at least 5 dBA of noise reduction from a noise barrier). The 2015 base allowance of $71,000 is used for this project. The total allowance is calculated by multiplying the cost-per-residence by the number of benefited residences. This reasonable total allowance is then compared to the engineer's cost estimate for the abatement. If the engineer's cost estimate is less than the allowance, the preliminary determination would be that the abatement is reasonable. If the cost estimate is higher than the allowance, then the preliminary determination would be that noise abatement is not reasonable.

Table 6.6 presents the summary of preliminary soundwall recommendations for the build alternatives that resulted from the Summary of Abatement Key Information tables in the *NADR and NADR Addendum*. A total of 17 soundwalls are recommended for Alternative 2 and 46 soundwalls are recommended for Alternative 3. No soundwalls are proposed under Alternative 1. The preliminary noise abatement recommendations presented may be revised after public review of the DEIR/EIS.

Table 6.6 Preliminary Soundwall Recommendations

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Alternative 2		Alternative 3	
		WB	EB		Height (ft)	Length (ft)	Height (ft)	Length (ft)
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
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	-	-	14	452

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Alternative 2		Alternative 3	
		WB	EB		Height (ft)	Length (ft)	Height (ft)	Length (ft)
				on-ramp				
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 at the right of way line along 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 at an offset distance along the edge of shoulder of EB I-I0 between Grove Ave and 4th St	-	-	14	297
19	1266		X	New soundwall at an offset distance along the right edge of shoulder of 4th St EB off-ramp	-	-	12	484
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
23	1276		X	New soundwall at the right edge of shoulder of 4th St EB on-ramp	-	-	10	216

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Alternative 2		Alternative 3	
		WB	EB		Height (ft)	Length (ft)	Height (ft)	Length (ft)
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	1749	X		New soundwall along I-10 channel north of I-10 between Cherry Ave and Citrus Ave	10	207	-	-
30	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	2,065	18	2,055
31	1833	X		New soundwall at the right of way line along WB I-10 east of Cypress Ave	-	-	14	707
32	1834		X	New soundwall on private properties along UPRR R/W east of Cypress Ave	18	815	-	-
33	1877	X		New soundwall at the right of way line along WB I-10 between Sierra Ave and Alder Ave	16	1,502	14, 16	1502
34	1907	X		New soundwall at the right of way line along WB I-10 between Alder Ave and Cedar Ave	12, 14, 16	3,587	16	3,587
35	1969	X		New soundwall at the right of way line along Cedar Ave WB on-ramp	12	354	12	369
36	2033	X		New soundwall at the right of way line along WB I-10 between Cedar Ave and Riverside Ave	20	444	20	444
37	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	16, 20, 22	2,289	14, 16	2,388
38	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
39	2238	X		New soundwall at the right of way line along WB I-10 between Mount Vernon Ave and I-215	-	-	14, 16	1,462

No.	Sound-wall No.	Side of Freeway		Soundwall Location and Description	Alternative 2		Alternative 3	
		WB	EB		Height (ft)	Length (ft)	Height (ft)	Length (ft)
40	2435	X		New soundwall at the right of way line along Mountain Ave WB on-ramp	10	469	14	469
41	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	1,016	14	971
42	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	1,262(A) 1,200(B)	14	1,201(A) 772(B)
43	2434A		X	New soundwall at the right of way line along Mountain Ave EB off-ramp	12, 14, 16	1,418	14, 16	1,513
	2434B		X	New soundwall at the right of way line along Mountain Ave EB off-ramp	12	1,400	12, 14	1,390
44	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	2,098	14	1,957
45	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	10, 12, 14	2,301
46	2638B		X	New sound wall along the right edge of shoulder of EB I-I0 between Orange St and EB I-10 6th St on-ramp	12	419	12	419
47	2654B		X	New sound wall 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	12	1,898
48	2765	X		New soundwall along the edge of shoulder of WB I-10 between Ford St and Devonshire Dr	14	1,424	14	1,424

SW 2438 would work as one system with SW 2434; the length of SW 2438 would be dependent on the option (either option A or B) selected for SW 2434.

The preliminary noise abatement decision presented in the *NADR and NADR Addendum* is based on preliminary project alignments and profiles, which are subject to change. As such, the physical characteristics of noise abatement described herein are also subject to change. If pertinent parameters change substantially during the final project design, the preliminary noise abatement decision may be changed or noise barrier eliminated from the final project design. A final decision to construct noise abatement will be made upon completion of the public involvement process during the final project design. The *NADR and NADR Addendum* are available in the project file 0800000040 at Caltrans District 8 office.

7. OTHER CONSIDERATIONS AS APPROPRIATE

7A. Public Hearing Process

The DEIR/EIS will be circulated for a 45-day public review period. A public hearing is required to present the developed viable alternatives for a public review and comment.

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 in either of the build alternatives being considered.

Modified Access

No access modifications are proposed in either of the build alternatives being considered.

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.
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	These documents are required and will be submitted to FHWA after the approval of the Final EIR/EIS.
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.

Agency	Permits/Approval	Status
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 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.
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.
SANBAG	Maintenance, Operations, and Law Enforcement Agreements	Maintenance, toll operations, and law enforcement agreements between SANBAG, 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 Preferred Alternative.

Agency	Permits/Approval	Status
Local Jurisdiction Permits/Approvals		
Cities of Pomona, Montclair, Upland, Claremont, Ontario, Fontana, Rialto, Colton, San Bernardino, Loma Linda, and Redlands, County of San Bernardino, and Ontario-Montclair School District	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 (parks) is anticipated prior to the Preferred Alternative being identified.

7D. Cooperative Agreements

SANBAG 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 SANBA G, and outlines respective responsibilities for the PA/ED phase, has been in place. Separate Cooperative Agreements will be entered into for the design, right of way, and construction phases of the project prior to completion of the PA/ED phase.

7E. Other Agreements

Several transportation agencies will be involved in the project development and coordination, including Caltrans Districts 7 and 8, SANBAG, the Los Angeles County Metropolitan Transportation Authority (Metro), County of San Bernardino, and various Cities along 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 SANBAG, Caltrans, and numerous resource agencies along the project corridor including, but not limited to, the Montclair-Ontario School District, 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 SANBAG 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, SANBAG, and the CHP to identify enforcement responsibilities for the proposed HOV facility under Alternative 2 or the proposed Express Lanes under Alternative 3.

- Agreements with CHP for Construction Zone Enhanced Enforcement Program (COZEEP) during construction.

- Agreements for extended FSP support during construction.

For Alternative 3 additional agreements will be necessary, including:

- Agreements between SANBAG, Caltrans, and FHWA for authorization of federal funds for tolling implementation on I-10.

- Tolling operational and maintenance agreements between SANBAG 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. Transportation Management Plan for Use During Construction

The duration of construction for the build alternatives is approximately 42 months (3.5 years) for Alternative 2 and 60 months (5 years) for Alternative 3, 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.

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). In either build alternative, 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 12 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 closure 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.

7H. Stage Construction

For Alternative 2, the project is anticipated to be implemented using the design-bid-build delivery process and constructed over a period of 42 months (3.5 years). For Alternative 3, the project is anticipated to utilize a design-build delivery process and 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 for the Preferred Alternative. 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

Long-term closure lasting up to 12 months may be employed during construction of certain streets and overcrossing structures in order to facilitate faster construction time and thus, allow quicker return of the public usage of the facility. Although impacts to local commuters, residents and local businesses would be more severe during the closure, the impacts would end sooner because the improvements would be completed more quickly allowing the roadway to re-open to the public faster. Potential locations for long-term closures include the following arterial improvements and structure replacements.

Alternative 2 (HOV) – Potential Long-Term Arterial Closure

1. Richardson Street – 8 to 12 months

Alternative 3 (Express Lanes) – Potential Long-Term Arterial Closure

1. San Antonio Avenue – 8 to 12 months
2. Sultana Avenue – 8 to 12 months
3. Campus Avenue – 8 to 12 months
4. 6th Street – 8 to 12 months
5. Richardson Street – 8 to 12 months

During arterial closures, vehicular, bicycle, and pedestrian traffic would be re-directed to alternate routes. Closure of streets that are located 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, there are 4 ramps in Alternative 2 and 14 ramps in Alternative 3 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 up to 30 days of closure are identified below.

Alternative 2 (HOV) – potential prolonged ramp closure

1. La Cadena Dr EB off-ramp
2. E Street/Sunwest Lane WB on-ramp
3. Waterman Avenue EB on-ramp
4. Tennessee Street EB off-ramp

Alternative 3 (Express Lanes) – potential prolonged ramp closure

1. Monte Vista Avenue WB off-ramp
2. Monte Vista Avenue WB on-ramp
3. Monte Vista Avenue EB off-ramp
4. Monte Vista Avenue EB on-ramp
5. Central Avenue EB on-ramp
6. Central Avenue WB off-ramp
7. 4th Street EB off-ramp
8. Etiwanda Avenue EB loop on-ramp
9. Etiwanda Avenue EB on-ramp
10. 9th Street EB off-ramp
11. E Street/Sunwest Lane WB on-ramp
12. Waterman Avenue EB on-ramp
13. Alabama Street EB off-ramp
14. Tennessee Street EB off-ramp

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, ramp metering system, 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.

7I. 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 Rancho Avenue OC (proposed condition), Mt. Vernon 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 these 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.

7J. 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.

7K. Disposition of Existing Facility

Under Alternative 2 none of the existing State right of way would be disposed of and there is no relinquishment of the existing State facility being considered. All right of way acquisitions required for Alternative 2 are partial acquisitions and, therefore, no excess land is anticipated.

No disposition of existing State right of way is anticipated under Alternative 3. However, proposed right of way acquisitions for Alternative 3 improvements include full acquisitions of 22 properties, which 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 Alternative 3 limits (except for SR-83) are 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 Alternative 3 improvements would be relinquished to local agencies.

7L. 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 proposed project necessitates reconstruction of portions of the I-10 Channel. The impacted portion of the channel would be reconstructed to meet the ultimate hydraulic requirement, and transitioned back to the existing non-impacted portion. **Tables 7.2 and 7.3** summarize the I-10 channel reconstruction required for Alternative 2 and Alternative 3, respectively.

Table 7.2 I-10 Channel Improvements – Alternative 2

Loc	Approximate I-10 Station From - To		Existing Facilities	Proposed Facilities
1	1784+15	1789+30	Trap. Channel (20’-50’x4’)	Rect. Channel (24’x7.5’) & Trans Structure
2	1841+14	1843+41	Trap. Channel (12’x4.5’)	15’x7.25 RCB & Trans Structure
3	1861+39	1871+23	Trap. Channel (12’x4.5’)	15’x7.25 RCB & Trans Structure

Table 7.3 I-10 Channel Improvements – Alternative 3

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 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 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 surrounding surfaces. The proposed freeway widening under Alternative 3 will require extension of the existing pipes and relocation of the detention vault to the south. It is proposed that the detention vault be relocated under the Church's parking lot outside the proposed State right of way. An open V-ditch is proposed to convey water from the vault 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 would 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.

Proposed improvements in both build alternatives under consideration 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 would be modified by the project under Alternative 3, 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 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 under Alternative 3, 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.

7M. 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 I-10 freeway, widening of the Grove Avenue UC and the Fourth Street UC, replacement of 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.

7N. Public Boat Ramps

There are no public boat ramps within the project area.

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 7.4** below presents a summary of the LCCA analysis.

Table 7.4 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 vary depending on the traffic index (TI) and R value.*
(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 pavement thickness for the outside lanes used in the LCCA analysis varies depending on the TI for various segments of the I-10 corridor.
(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 in both build alternatives:

- 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 for Alternatives 2 and 3 are summarized in **Tables 7.5 and 7.6**, respectively.

Table 7.5 Alternative 2 Pavement Design Designation

Haven Avenue to I-15				
ADT (2025) = 302,000	D = 54%	TI_{40}	Inside lane =	12.0
ADT (2045) = 322,000	T = 11%	TI_{40}	Inside shoulder =	9.0
DHV = 24,343	V = 70 mph	TI_{40}	Outside lane =	17.5
ESAL = 369,217,856		TI_{40}	Outside shoulder =	9.0
I-15 to I-215				
ADT (2025) = 235,000	D = 50%	TI_{40}	Inside lane =	12.0
ADT (2045) = 268,000	T = 7%	TI_{40}	Inside shoulder =	9.0
DHV = 18,760	V = 70 mph	TI_{40}	Outside lane =	16.0
ESAL = 176,867,522		TI_{40}	Outside shoulder =	9.0
I-215 to SR-210				
ADT (2025) = 247,000	D = 52%	TI_{40}	Inside lane =	12.0
ADT (2045) = 283,000	T = 7%	TI_{40}	Inside shoulder =	9.0
DHV = 19,867	V = 70 mph	TI_{40}	Outside lane =	16.0
ESAL = 158,269,807		TI_{40}	Outside shoulder =	9.0
SR-210 to Ford Street				
ADT (2025) = 214,000	D = 51%	TI_{40}	Inside lane =	12.0
ADT (2045) = 254,000	T = 7%	TI_{40}	Inside shoulder =	9.0
DHV = 17,488	V = 70 mph	TI_{40}	Outside lane =	15.5
ESAL = 135,164,020		TI_{40}	Outside shoulder =	9.0

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

Table 7.6 Alternative 3 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 concludes with recommendations for SANBAG 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 SANBAG Board meetings as the PA/ED phase progresses.

8. FUNDING/PROGRAMMING

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. SANBAG, as the project sponsor, is currently seeking additional funding sources to support the project implementation.

8B. Programming

The I-10 Corridor Project is currently programmed in the SANBAG's Freeway Program of Measure I 2010-2040 for the San Bernardino Valley Subarea. The I-10 Corridor Project also includes improvements to the Monte Vista Avenue interchange, as such the programmed funding for the I-

10/Monte Vista Avenue interchange improvement in the Interchange Program of Measure I 2010-2040 ($31.7 million in current dollars or an escalated total of $36.7 million in the future expenditure year) will be contributed to the I-10 Corridor Project funding.

Alternative 2 is included in the 2012-2035 RTP/SCS and programmed for federal and State funds in the 2015 FTIP. The project information for Alternative 3 is anticipated to be approved as part of the 2016 RTP in June 2016 and added in the FTIP Amendment #12 in August 2016. **Table 8.1** presents the escalated estimate for each fiscal funding year for Alternative 2. **Tables 8.2 and 8.3** present the escalated estimates for each fiscal funding year for Alternative 3, 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.

Table 8.1 Alternative 2 Capital Outlay Support and Programmed Funds

Fund Source	Sup -port	R/W	Cons	Total	Fiscal Year Estimate in Thousands of Dollars (1,000)							
					Prior	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Total
CMAQ			46,134	46,134						46,134		46,134
Measure I	12,990		442,479	455,469	10,560			2,430		442,479		455,469
STIP Advance	1,000			1,000	1,000							1,000
RIP (State)	25,284	11,930		37,214				37,214				37,214
Total	39,274	11,930	488,613	539,817	11,560			39,644		488,613		539,817

CMAQ = Congestion Mitigation and Air Quality; STIP = State Transportation Improvement Program; RIP = Regional Improvement Program

Table 8.2 Alternative 3 (Contract 1) Capital Outlay Support and Programmed Funds

Fund Source	Sup-port	R/W	Cons	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		46,000	34,000	80,000		80,000						80,000
Measure I	7,292		188,021	195,313	7,292	16,000	172,021					195,313
RIP (State)	1,000			1,000	1,000							1,000
RIP (NH)			30,588	30,588			30,588					30,588
STP Local			30,000	30,000						15,000	15,000	30,000
Other (Toll)			306,273	306,273			306,273					306,273
Total	8,292	46,000	588,882	643,174	8,292	96,000	508,882			15,000	15,000	643,174

CMAQ = Congestion Mitigation and Air Quality; RIP = Regional Improvement Program; NH = National Highway System; STP = Surface Transportation Program

Table 8.3 Alternative 3 (Contract 2) Capital Outlay Support and Programmed Funds

Fund Source	Sup-port	R/W	Cons	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			71,112	71,112				19,374	10,216	14,450	8,937	6,045	6,045	6,045	71,112
Measure I	21,000	50,380	523,271	594,651	12,000	4,000	60,000	518,651							594,651
STP Local			47,531	47,531						506	506	15,506	15,506	15,507	47,531
Other (Toll)			533,348	533,348				533,348							533,348
Total	21,000	50,380	1,175,262	1,246,642	12,000	4,000	60,000	1,071,373	10,216	14,956	9,443	21,551	21,551	21,552	1,246,642

CMAQ = Congestion Mitigation and Air Quality; RIP = Regional Improvement Program; NH = National Highway System; STP = Surface Transportation Program

9. SCHEDULE

The project under Alternative 2 is anticipated to be implemented using the design-bid-build delivery process and be constructed over a period of 42 months (3.5 years). **Table 9.1** presents a summary of the tentative milestones for Alternative 2.

Table 9.1 Project Milestones – Alternative 2

Project Milestone		Alternative 2
PSR/PDS Approval	M010	December 2006
Supplemental PSR/PDS Approval	M010	April 2013
Notice of Preparation	M030	October 30, 2012
Notice of Intent	M035	November 5, 2012
Circulate Draft EIR/EIS	M120	March/April 2016
PA/ED Approval	M160	May 2017
ROD/NOD Approval	M200	June 2017
PS&E Completion	M380	September 2020
R/W Certification	M410	March 2021
Advertise & Award	M480/M495	May 2021
Begin Construction		June 2021
Construction Completion	M800	2024

For Alternative 3, the project is anticipated to utilize a design-build delivery process and be constructed in two phases 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 9.2** presents a summary of the tentative milestones for Alternative 3.

Table 9.2 Project Milestones – Alternative 3

Project Milestone		Alternative 3 Contract 1	Alternative 3 Contract 2
PSR/PDS Approval	M010	December 2006	
Supplemental PSR/PDS Approval	M010	April 2013	
Notice of Preparation	M030	October 30, 2012	
Notice of Intent	M035	November 5, 2012	
Circulate Draft EIR/EIS	M120	March/April 2016	
PA/ED Approval	M160	May 2017	
ROD/NOD Approval	M200	June 2017	
Issue Design-Build Request for Proposal		March 2017	May 2019
Award Design-Build Contract	M495	December 2017	February 2020
Design-Build Notice to Proceed		January 2018	March 2020
Begin Construction		March 2019	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 that are identified to include risks associated with project funding, environmental issues, design, right of way, and construction. A project risk register is developed for the project in accordance with the Caltrans' Project Risk Management Handbook. The risk register is included in this document as **Attachment Q**.

11. FHWA COORDINATION

On May 28, 2015, an updated FHWA and Caltrans Stewardship and Oversight (Stewardship/ Oversight) Agreement was signed. Under the new Stewardship/Oversight Agreement, the FHWA and Caltrans will utilize a risk-based approach to project-level management. This risk-based approach to project oversight will be conducted in two steps: 1) selecting the projects that traditionally pose a risk to the health of the Federal-aid Highway Program [Project of Division Interest (PoDI) or Project of Corporate Interest (PoCI)] and 2) within the PoDI projects, further delegating approval authorities in activities that pose a low risk to the individual projects. The I-10 Corridor Project is currently being evaluated in order to be considered as 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 is 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 will be developed for the Preferred Alternative once identified and will be submitted to FHWA for review.

12. PROJECT REVIEWS

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

Luis Betancourt, HQ Project Delivery Coordinator, July 2015
Anthony Ng, Design/FHWA Liaison, July 2015
David Liu, HQ Managed Lane Reviewer, July 2015
Jonathan den Hartog, Design Oversight, July 2015
Haissam Yahya, Traffic Operations, 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:

Brian Frazer, HQ Design Reviewer, April 2015
John Lee, Project Manager, September 2015
Dawn Helou, Chief, Traffic Operations, September 2015
Simon Kuo, Senior Design Engineer, 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	Traffic Design	909-383-8869
Rebecca Guirado	Caltrans	Senior Right of Way Agent	909-381-2975
Aaron Burton	Caltrans	Senior Planner, Environmental Studies “B”	909-383-2841
Robert Zezoff	Caltrans	HQ Structures	916-227-9881
Garry Cohoe	SANBAG	Director of Project Delivery	909-884-8276
John Meier	SANBAG	Project Director, I-10 & I-15 Corridor Projects	909-884-8276
Chad Costello	SANBAG	Project Manager	909-884-8276
Julie Beeman	SANBAG	Environmental Manager	909-884-8276
David Speirs	Parsons	Project Manager	949-333-4494
Surf Teshale	Parsons	Deputy Project Manager	949-333-4540
Neal Denno	Parsons	Traffic Lead	949-333-4478
Patti Tiberi	Parsons	Engineer Lead	949-333-4541
Ryan Todaro	Parsons	Environmental Lead	949-333-4465

14. ATTACHMENTS

Attachment A – Project Vicinity and Location Maps
Attachment B – Traffic Volume Diagrams
Attachment C – Project Category Determination
Attachment D – Conceptual Layouts (Separately Bound)
Attachment E – Structure Advance Planning Studies (Separately Bound)
Attachment F – Preliminary Feasibility Study of I-10/I-15 Express Lane Direct Connector Ramps
Attachment G – Life Cycle Cost Analysis Forms
Attachment H – Design Standards Risk Assessment Tables (Separately Bound)
Attachment I – Express Lane Access Points and CHP Locations Diagram
Attachment J – Project Cost Estimates
Attachment K – Right of Way Data Sheets
Attachment L – Draft EIR/EIS Signature Page
Attachment M – Storm Water Data Report Signature Page
Attachment N – Decision Documents
Attachment O – TMP Data Sheets and Alternative Route Maps
Attachment P – Potential Construction Staging Areas
Attachment Q – Level 3 Risk Register