FINAL REPORT

SR 95 Corridor Profile Study

Junction I-8 to Junction I-40

PREPARED FOR ADOT

MARCH 2017

ADOT WORK TASK NO.
MPD 041-15

ADOT CONTRACT NO.
11-013152

Prepared by

Kimley»Horn

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ARIZONA DEPARTMENT OF TRANSPORTATION

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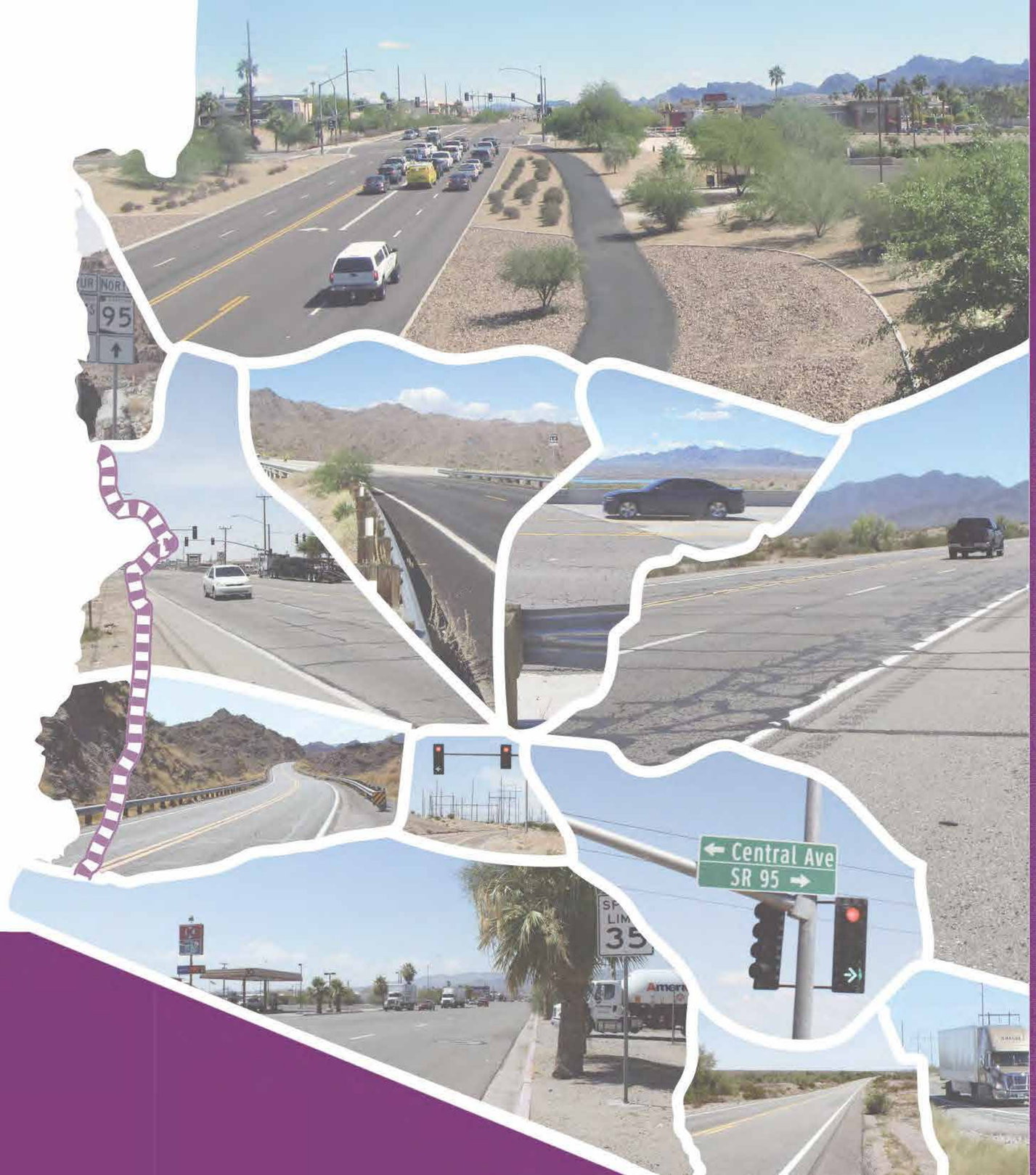
ACRONYMS & ABBREVIATIONS

AADT	Average Annual Daily Traffic
ABISS	Arizona Bridge Information and Storage System
ADOT	Arizona Department of Transportation
ASLD	Arizona State Land Department
AZTDM	Arizona Statewide Travel Demand Model
BLM	Bureau of Land Management
BQAZ	Building a Quality Arizona
CCTV	Closed Circuit Television
CR	Cracking Rating
DCR	Design Concept Report
DMS	Dynamic Message Sign
FHWA	Federal Highway Administration
FY	Fiscal Year
HCRS	Highway Condition Reporting System
HERE	Real time traffic conditions database produced by American Digital Cartography Inc.
HPMS	Highway Performance Monitoring System
I	Interstate
IRI	International Roughness Index
ITS	Intelligent Transportation System
LCCA	Life-Cycle Cost Analysis
LOS	Level of Service
LHMPO	Lake Havasu Metropolitan Planning Organization
LRTP	Long-Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century
MP	Milepost
MPD	Multimodal Planning Division
NB	Northbound
NPV	Net Present Value
OP	Overpass
P2P	Planning-to-Programming
PA	Project Assessment
PARA	Planning Assistance for Rural Areas
PDI	Pavement Distress Index
PES	Performance Effectiveness Score
POE	Port of Entry
PSR	Pavement Serviceability Rating
PTI	Planning Time Index
RTP	Regional Transportation Plan
RWIS	Road Weather Information System
SATS	Small Area Transportation Study
SB	Southbound
SHCG	Species and Habitat Conservation Guide
SHSP	Strategic Highway Safety Plan
SOV	Single Occupancy Vehicle
SR	State Route
TI	Traffic Interchange
TIP	Transportation Improvement Plan
TPTI	Truck Planning Time Index
TTI	Travel Time Index
TTTI	Truck Travel Time Index
UP	Underpass
USDOT	United States Department of Transportation
V/C	Volume-to-capacity Ratio
VMT	Vehicle-Miles Travelled
WACOG	Western Arizona Council of Governments
WIM	Weigh-in-Motion
YMPO	Yuma Metropolitan Planning Organization



Executive Summary

EXECUTIVE SUMMARY

INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this Corridor Profile Study (CPS) of State Route 95 (SR 95) between Junction Interstate 8 (I-8) and Junction Interstate 40 (I-40). This study examines key performance measures relative to the SR 95 corridor, and the results of this performance evaluation are used to identify potential strategic improvements. The intent of the corridor profile program, and of ADOT's Planning-to-Programming (P2P) process, is to conduct performance-based planning to identify areas of need and make the most efficient use of available funding to provide an efficient transportation network.

ADOT is conducting eleven CPS within three separate groupings. The SR 95 corridor, depicted in **Figure ES-1**, is one of the strategic statewide corridors identified and the subject of this CPS.

Corridor Study Purpose, Goals, and Objectives

The purpose of the CPS is to measure corridor performance to inform the development of strategic solutions that are cost-effective and account for potential risks. This purpose can be accomplished by following the process described below:

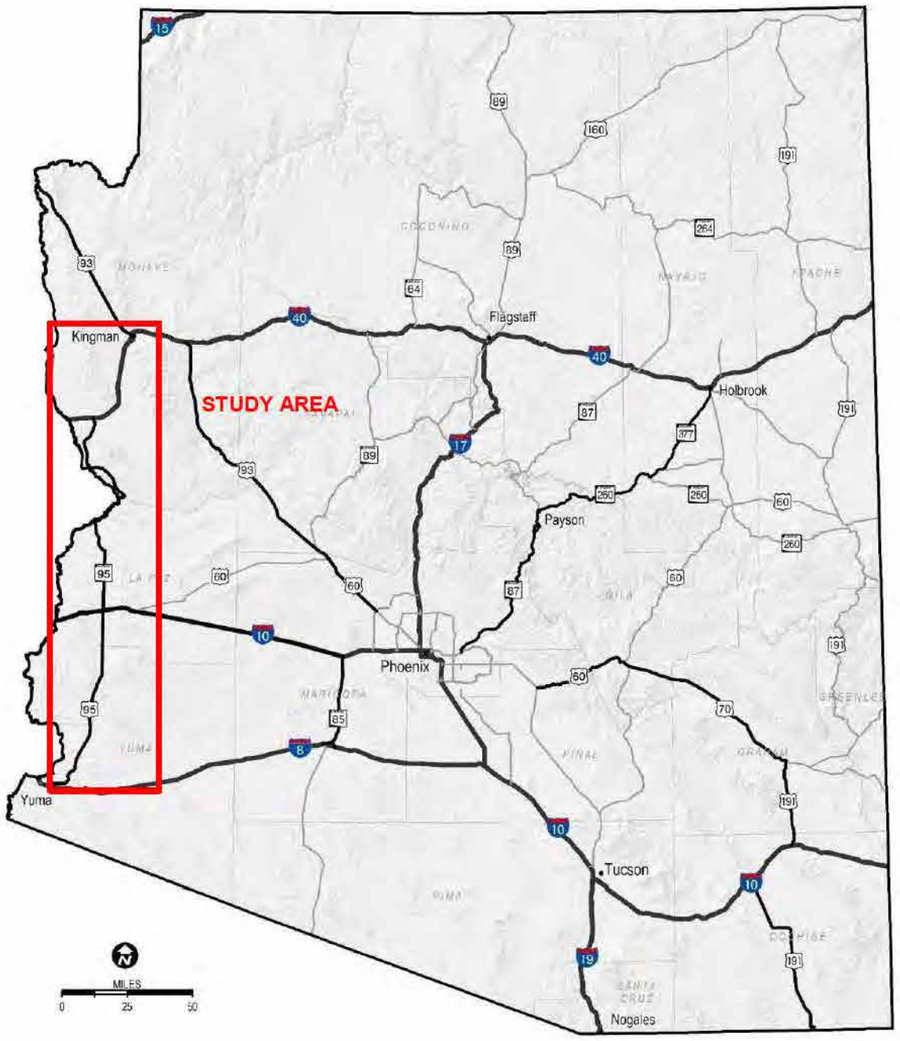
- Inventory past improvement recommendations
- Define corridor goals and objectives
- Assess existing performance based on quantifiable performance measures
- Propose various solutions to improve corridor performance
- Identify specific solutions that can provide quantifiable benefits relative to the performance measures
- Prioritize solutions for future implementation, accounting for performance effectiveness and risk analysis findings

The objective of this study is to identify a recommended set of prioritized potential solutions for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The SR 95 CPS defines solutions and improvements for the corridor that are evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance.

The following goals are identified as the outcome of this study:

- Link project decision-making and investments on key corridors to strategic goals
- Develop solutions that address identified corridor needs based on measured performance
- Prioritize improvements that cost-effectively preserve, modernize, and expand transportation infrastructure

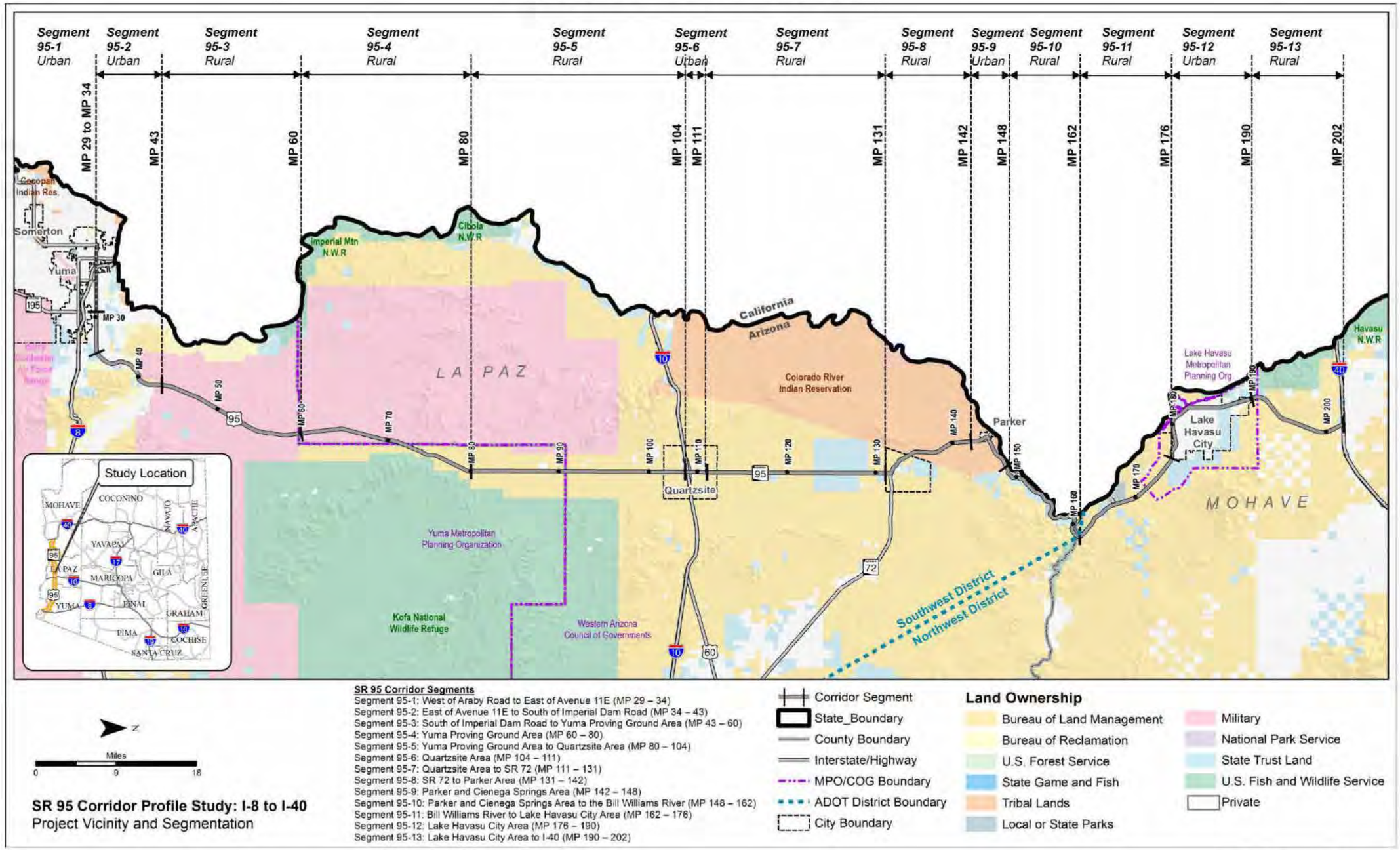
Figure ES-1: Corridor Study Area



Study Location and Corridor Segments

The SR 95 corridor is divided into 13 planning segments for analysis and evaluation. The corridor is segmented at logical breaks where the context changes due to differences in characteristics such as terrain, daily traffic volumes, or roadway typical sections. Corridor segments are shown in **Figure ES-2**.

Figure ES-2: Corridor Location and Segments



SR 95 Corridor Profile Study: I-8 to I-40
Project Vicinity and Segmentation

SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

- Corridor Segment
- State_Boundary
- County Boundary
- Interstate/Highway
- MPO/COG Boundary
- ADOT District Boundary
- City Boundary

Land Ownership
- Bureau of Land Management
- Bureau of Reclamation
- U.S. Forest Service
- State Game and Fish
- Tribal Lands
- Local or State Parks
- Military
- National Park Service
- State Trust Land
- U.S. Fish and Wildlife Service
- Private

CORRIDOR PERFORMANCE

A series of performance measures is used to assess the SR 95 corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

Corridor Performance Framework

This study uses a performance-based process to define baseline corridor performance, diagnose corridor needs, develop corridor solutions, and prioritize strategic corridor investments. In support of this objective, a framework for the performance-based process was developed through a collaborative process involving ADOT and the CPS consultant teams.

Figure ES-3 illustrates the performance framework, which includes a two-tiered system of performance measures (primary and secondary) to evaluate baseline performance.

Figure ES-3: Corridor Profile Performance Framework

The following five performance areas guide the performance-based corridor analyses:

- Pavement
- Bridge
- Mobility
- Safety
- Freight

The performance measures include five primary measures: Pavement Index, Bridge Index, Mobility Index, Safety Index, and Freight Index. Additionally, a set of secondary performance measures provides for a more detailed analysis of corridor performance. **Table ES-1** provides the complete list of primary and secondary performance measures for each of the five performance areas.

Table ES-1: Corridor Performance Measures

Performance Area	Primary Measure	Secondary Measures
Pavement	**Pavement Index** Based on a combination of International Roughness Index and cracking	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** Based on lowest of deck, substructure, superstructure and structural evaluation rating	• Bridge Sufficiency • Functionally Obsolete Bridges • Bridge Rating • Bridge Hot Spots
Mobility	**Mobility Index** Based on combination of existing and future daily volume-to-capacity ratios	• Future Congestion • Peak Congestion • Travel Time Reliability • Multimodal Opportunities
Safety	**Safety Index** Based on frequency of fatal and incapacitating injury crashes	• Directional Safety Index • Strategic Highway Safety Plan Emphasis Areas • Crash Unit Types • Safety Hot Spots
Freight	**Freight Index** Based on bi-directional truck planning time index	• Recurring Delay • Non-Recurring Delay • Closure Duration • Bridge Vertical Clearance • Bridge Vertical Clearance Hot Spots

Each of the primary and secondary performance measures identified in the table above is comprised of one or more quantifiable indicators. A three-level scale was developed to standardize the performance scale across the five performance areas, with numerical thresholds specific to each performance measure:

Good/Above Average Performance – Rating is above the identified desirable/average range

Fair/Average Performance – Rating is within the identified desirable/average range

Poor/Below Average Performance – Rating is below the identified desirable/average range

The terms “good”, “fair”, and “poor” apply to the Pavement, Bridge, Mobility, and Freight performance measures, which have defined thresholds. The terms “above average”, “average”, and “below average” apply to the Safety performance measures, which have thresholds referenced to statewide averages.

Corridor Performance Summary

Table ES-2 shows a summary of corridor performance for all primary measures and secondary measure indicators for the SR 95 corridor. A weighted corridor average rating (based on the length of the segment) was calculated for each primary and secondary measure as shown in **Table ES-2**.

The following general observations were made related to the performance of the SR 95 corridor:

- **Overall Performance:** Within the five performance areas, the weighted average index for Pavement, Bridge, Mobility, and Safety show "good" or "fair" performance; Freight shows "poor" performance; Safety and Freight performance areas each show individual segments with "poor" ratings
- **Pavement Performance:** 157 of the 169 miles of the SR 95 corridor have "good" or "fair" performance for the overall Pavement Index; due to the significant area of pavement cracking, 3 of the 13 segments show "poor" performance for % Area Failure
- **Bridge Performance:** 14 bridges were evaluated; two bridges were identified as Bridge hot spots; these include Bouse Wash Bridge and Mockingbird Wash Bridge in Segments 95-8 and 95-12, respectively
- **Mobility Performance:** SR 95 is considered to have two operating environments for evaluating mobility performance: 2 or 3 Lane Undivided Highway and 4 or 5 Lane Undivided Highway; the Mobility Index weighted average indicates "good" overall mobility performance for the SR 95 corridor
- **Safety Performance:** Safety also utilizes the two operating environments for this analysis; the Safety Index weighted average indicates "above average" (good) overall safety performance for the SR 95 corridor; examining a five-year time-period, the were 24 fatal crashes and 135 incapacitating injury crashes
- **Freight Performance:** The Freight Index weighted average indicates "poor" performance for the SR 95 corridor, meaning the corridor has "poor" travel time reliability due to non-recurring congestion; there are no locations with vertical clearance less than 16.25 feet
- **Poorest Performing Segments:** Several segments show "poor" performance in multiple performance areas; these segments are 95-2 (Safety and Freight), 95-4 (Safety and Freight), 95-12 (Safety and Freight), and 95-13 (Pavement and Freight)
- **Highest Performing Segments:** Segments 95-3, 95-5, 95-6, 95-7 and 95-10 show "good" or "fair" performance for several performance measures

Table ES-2: Corridor Performance Summary by Segment and Performance Measure

Segment #	Segment Length (miles)	Pavement Performance Area				Bridge Performance Area				Mobility Performance Area											
		Pavement Index	Directional PSR		% Area Failure	Bridge Index	Sufficiency Rating	% of Deck Area on Functionally Obsolete Bridges	Lowest Bridge Rating	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent (instances/ milepost/year/mile)		Directional TTI (all vehicles)		Directional PTI (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
			NB	SB								NB	SB	NB	SB	NB	SB	NB	SB		
95-1*b1	5	3.54	3.64		0.0%	6.00	80.87	0.0%	6	0.35	0.41	0.30	0.29	0.37	0.12	1.08	1.15	2.96	3.90	62%	18.6%
95-2^a2	9	3.86	3.78		0.0%	6.00	78.12	8.5%	6	0.42	0.50	0.41	0.41	0.16	0.02	1.05	1.00	2.21	1.14	56%	19.8%
95-3^a2	17	3.63	3.51		35.3%	5.00	68.22	0.0%	5	0.09	0.11	0.12	0.11	0.07	0.00	1.02	1.00	1.19	1.16	8%	19.8%
95-4^a2	20	4.41	4.28		0.0%	No Bridges				0.12	0.15	0.17	0.17	0.03	0.01	1.19	1.04	5.36	1.40	0%	5.0%
95-5^a2	24	4.14	4.12		0.0%	No Bridges				0.10	0.12	0.14	0.14	0.01	0.06	1.00	1.06	1.13	1.55	2%	23.0%
95-6*b1	2.5	3.27	3.23		33.3%	6.00	76.00	0.0%	6	0.13	0.17	0.15	0.15	0.00	0.08	1.48	1.31	7.75	5.42	87%	24.6%
95-7^a2	20	3.69	3.76		5.0%	6.00	79.00	0.0%	6	0.21	0.29	0.24	0.25	0.37	0.08	1.06	1.04	1.32	1.43	0%	14.6%
95-8^a2	11	3.49	3.27		9.1%	5.00	67.00	0.0%	5	0.45	0.61	0.36	0.36	0.04	0.27	1.00	1.00	1.71	1.37	25%	9.1%
95-9*b1	6	3.59	3.84		14.3%	6.76	80.86	0.0%	6	0.32	0.35	0.32	0.36	0.51	0.03	1.31	1.29	7.35	4.58	61%	11.4%
95-10^a2	14	3.66	3.59		0.0%	6.25	78.25	0.0%	6	0.36	0.40	0.33	0.33	0.18	0.16	1.06	1.00	1.28	1.15	2%	2.2%
95-11^a2	14	4.13	4.13		0.0%	No Bridges				0.27	0.30	0.24	0.23	0.17	0.29	1.08	1.05	1.36	1.61	0%	8.3%
95-12*b1	14	3.77	3.51	4.15	14.3%	5.46	76.82	20.2%	5	0.64	0.83	0.42	0.40	0.46	0.09	1.24	1.20	4.71	3.78	9%	18.1%
95-13^a2	12	2.77	3.77		24.7%	No Bridges				0.36	0.42	0.29	0.28	0.15	0.13	1.06	2.01	3.95	7.29	71%	14.3%
Weighted Corridor Average		3.79	3.80	3.86	8.7%	5.72	75.44	3.7%	5.57	0.27	0.33	0.25	0.25	0.17	0.10	1.09	1.13	2.66	2.24	17%	14.0%

SCALES

Performance Level	Non-Interstate			All				Urban and Fringe Urban	All	Uninterrupted		All	
Good/Above Average	> 3.50	> 3.50	< 5%	> 6.5	> 80	< 12%	> 6	< 0.71	< 0.22	< 1.15	< 1.3	> 90%	> 17%
Fair/Average	2.90 - 3.50	2.90 - 3.50	5% - 20%	5.0 - 6.5	50 - 80	12% - 40%	5 - 6	0.71 - 0.89	0.22 - 0.62	1.15 - 1.33	1.3 - 1.5	60% - 90%	11% - 17%
Poor/Below Average	< 2.90	< 2.90	> 20%	< 5.0	< 50	> 40%	< 5	> 0.89	> 0.62	> 1.33	> 1.5	< 60%	< 11%

Performance Level	Rural	Interrupted	
Good/Above Average	< 0.56	< 1.3	< 3.0
Fair/Average	0.56 - 0.76	1.3 - 2.0	3.0 - 6.0
Poor/Below Average	> 0.76	> 2.0	> 6.0

^Uninterrupted Flow Facility
*Interrupted Flow Facility
*2 or 3 Lane Undivided Highway
ᵇ4 or 5 Lane Undivided Highway
[1]Urban Operating Environment
[2]Rural Operating Environment

Table ES-2: Corridor Performance Summary by Segment and Performance Measure (continued)

Segment #	Segment Length (miles)	Safety Performance Area							Freight Performance Area							
		Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Freight Index	Directional TTTI		Directional TPTI		Closure Duration (minutes/milepost/year/mile)		Bridge Vertical Clearance (feet)
			NB	SB						NB	SB	NB	SB	NB	SB	
95-1*b1	5	1.30	1.29	1.31	17%	Insufficient Data	Insufficient Data	Insufficient Data	0.29	1.12	1.19	3.58	3.32	117.61	14.88	No UP
95-2^a2	8	1.29	2.42	0.16	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.62	1.08	1.00	2.03	1.17	27.89	3.62	No UP
95-3^a2	18	0.07	Insufficient Data	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.79	1.03	1.03	1.25	1.28	28.05	0.00	No UP
95-4^a2	20	1.48	2.00	0.95	20%	Insufficient Data	Insufficient Data	Insufficient Data	0.13	1.28	1.11	13.66	1.52	10.18	2.19	No UP
95-5^a2	24	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.72	1.04	1.11	1.13	1.65	2.68	7.13	No UP
95-6*b1	2.5	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.29	1.62	1.44	3.23	3.62	0.00	46.96	No UP
95-7^a2	20	0.00	0.00	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.68	1.10	1.09	1.46	1.50	133.60	7.49	No UP
95-8^a2	11	0.14	0.28	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.55	1.04	1.02	2.22	1.44	10.13	166.29	No UP
95-9*b1	6	1.10	2.13	0.07	17%	Insufficient Data	Insufficient Data	Insufficient Data	0.18	1.41	1.33	7.04	4.27	106.46	22.77	27.83
95-10^a2	14	0.62	0.28	0.96	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.79	1.10	1.00	1.41	1.13	39.55	33.24	No UP
95-11^a2	14	1.91	1.89	1.93	64%	Insufficient Data	Insufficient Data	Insufficient Data	0.64	1.18	1.10	1.56	1.55	27.94	53.85	No UP
95-12*b1	14	1.77	1.63	1.91	45%	Insufficient Data	Insufficient Data	Insufficient Data	0.22	1.32	1.28	5.29	3.96	67.30	11.80	16.41
95-13^a2	12	1.06	1.88	0.24	44%	Insufficient Data	Insufficient Data	Insufficient Data	0.19	1.31	2.74	3.09	7.66	18.23	20.92	No UP
Weighted Corridor Average		0.91	1.28	0.69	37%	Insufficient Data	Insufficient Data	Insufficient Data	0.52	1.16	1.22	3.65	2.28	42.21	24.87	22.12

SCALES

Performance Level	2 or 3 Lane Undivided Highway					Uninterrupted			All	
Good/Above Average	< 0.94	< 51%	< 4%	< 16%	< 2%	> 0.77	< 1.15	< 1.3	< 44.18	> 16.5
Fair/Average	0.94 - 1.06	51% - 57%	4% - 7%	16% - 25%	2% - 4%	0.67 - 0.77	1.15 - 1.33	1.3 - 1.5	44.18 - 124.86	16.0-16.5
Poor/Below Average	> 1.06	> 57%	> 7%	> 25%	> 4%	< 0.67	> 1.33	> 1.5	> 124.86	< 16.0
Performance Level	**4 or 5 Lane Undivided Highway**					**Interrupted**				
Good/Above Average	< 0.80	< 42%	< 6%	< 6%	< 5%	> 0.33	< 1.3	< 3.0		
Fair/Average	0.80 - 1.20	42% - 51%	6% - 10%	6% - 9%	5% - 8%	0.17 - 0.33	1.3 - 2.0	3.0 - 6.0		
Poor/Below Average	> 1.20	> 51%	> 10%	> 9%	> 8%	< 0.17	> 2.0	> 6.0		

^Uninterrupted Flow Facility *Interrupted Flow Facility [a]2 or 3 Lane Undivided Highway [b]4 or 5 Lane Undivided Highway [1]Urban Operating Environment [2]Rural Operating Environment

Notes: "Insufficient Data" indicates there was not enough data available to generate reliable performance ratings

"No UP" indicates no underpasses are present in the segment

NEEDS ASSESSMENT

Corridor Description

The SR 95 corridor is an important north-south travel corridor linking western Arizona communities. The corridor, which serves agricultural, military, recreational, tourist, and regional traffic, provides critical connections between communities and to regional and interstate highways.

The critical nature of the facility is magnified when crashes or rainfall events close the road for any length of time as alternate routes are limited.

Corridor Objectives

The ADOT Long-Range Transportation Plan (LRTP), 2010-2035 established Statewide performance goals. These goals were reviewed, and those relevant to SR 95 performance areas were identified. SR 95 corridor goals were then formulated for each of the five performance areas. Based on stakeholder input and performance results, three "emphasis areas" were identified for the SR 95 corridor: Mobility, Safety, and Freight.

Performance objectives were developed that identify the desired level of performance, based on the performance scale levels, for the overall corridor and for each corridor segment. For each performance "emphasis areas", the corridor-wide weighted average performance objectives are identified with a higher standard than for the other performance areas; that is, for the three areas designated as corridor emphasis areas, the performance areas had a higher performance goal.

Achieving corridor and segment performance objectives will require investments to be targeted toward improvements that support the safe and efficient movement of travelers on the corridor.

Needs Assessment Process

The performance-based needs assessment process is illustrated in **Figure ES-4**.

Corridor needs represent the gap between baseline performance and the established performance objectives. Corridor needs are identified by mathematically comparing corridor baseline corridor performance against corridor and segment objectives for each of the five performance areas used to characterize the health of the corridor: Pavement, Bridge, Mobility, Safety, and Freight.

The comparison provides a starting point for the identification of performance needs. This mathematical comparison results in an initial need rating of None, Low, Medium, or High for each primary and secondary performance measure. An illustrative example of this process is shown in **Figure ES-5**.

The initial level of need for each segment is refined to account for hot spots and recently completed or under construction projects, resulting in a final level of need for each segment. The final levels of need for each primary and secondary performance measure are combined to produce a weighted final need rating for each segment. A detailed review of available data helps identify contributing factors to the need and if there is a high level of historical investment.

Figure ES-4: Needs Assessment Process

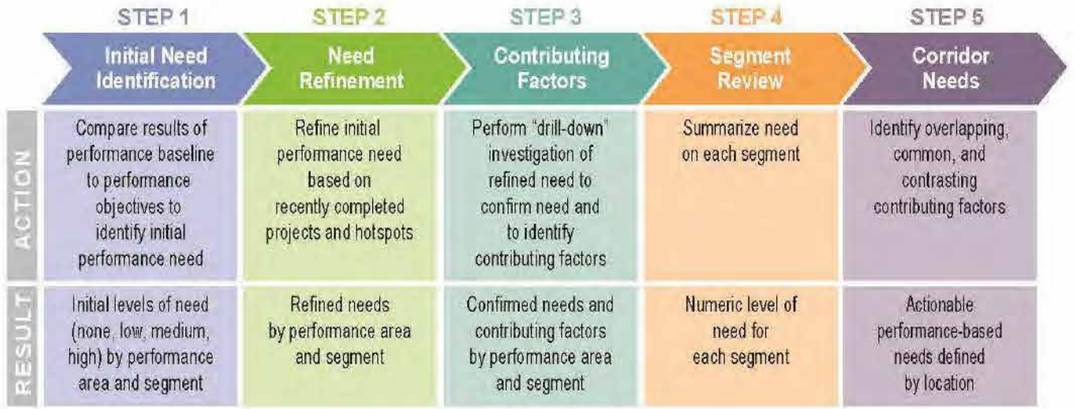


Figure ES-5: Initial Need Ratings in Relation to Baseline Performance (Bridge Example)

Performance Thresholds	Performance Level	Initial Level of Need	Description
6.5	Good	None*	All levels of Good and top 1/3 of Fair (>6.0)
	Good		
	Good		
	Fair		
	Fair	Low	Middle 1/3 of Fair (5.5-6.0)
5.0	Fair	Medium	Lower 1/3 of Fair and top 1/3 of Poor (4.5-5.5)
	Poor		
	Poor	High	Lower 2/3 of Poor (<4.5)
	Poor		

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Summary of Needs

Table ES-3 provides a summary of needs for each segment across all performance areas, with the average need score for each segment presented in the last row of the table. A weighting factor of 1.5 is applied to the need scores of the performance areas identified as emphasis areas (Mobility, Safety, and Freight for the SR 95 corridor).

On SR 95, there are no segments with a High average need; eight segments resulted in a Medium average need, and five segments resulted in a Low average need. More information on the identified final needs in each performance area is provided below.

Pavement Needs

- Seven segments (95-3, 6, 7, 8, 9, 12, and 13) contain Pavement hot spots, but two of these segments had recent paving projects that addressed the needs
- Segments 95-6, 7, 8, 9, and 12 have final needs of Low; all other segments of the corridor have a final Pavement need of None
- Segments 95-7, 9, 12, and 13 show a high level of historical investment, meaning that some previous projects have proven to provide only temporary improvements and require frequent attention

Bridge Needs

- Three segments have a Medium Bridge final level of need (95-3, 8, and 12)
- Segment 95-8 and 95-12 have bridges that have Medium needs as well as being identified in the historical review, meaning the bridges may have a repetitive investment issue
- Bridge needs exist at three of the thirteen bridges present on the corridor

Mobility Needs

- Low Mobility needs exist on all thirteen segments of the corridor
- A majority of the Mobility needs are related to future travel demand, directional TTI and PTI issues, and the frequency of closures along the corridor
- Bicycle accommodation needs are High on eight of the thirteen segments of the corridor

Safety Needs

- High Safety needs exist on four of the thirteen corridor segments
- Safety hot spots exist only in Segment 95-12 at MP 179-190
- At the overall corridor level, 70% of the fatal and incapacitating crashes involve a collision with motor vehicle, 24% involve single vehicles, and 20% involve disregarded traffic signal
- A High level of need exists on Segments 95-2, 4, 11, and 12; there are no programmed projects expected to address the identified Safety needs
- A Medium level of need exists on Segments 95-1 and 95-9; there are no programmed projects expected to address the identified Safety needs
- Two of the segments of the corridor (95-5 and 95-6) contain insufficient data (insufficient number of crashes to draw statistical conclusions) to determine a level of need, so a need value is not available (N/A)

Freight Needs

- Twelve of 13 segments of the SR 95 corridor exhibit needs in Freight Performance; bridge needs exist at three of the nine bridges; segment 95-3 did not exhibit a freight need
- The following 8 segments exhibit Medium or High levels of need: 95-2, 4, 7, 8, 9, 11, 12, and 13

Overlapping Needs

Corridor segments with overlapping performance needs on SR 95 were identified to inform identification of strategic solutions that address more than one performance area with elevated levels of need. Implementing projects that address multiple needs more effectively improves overall segment and corridor performance. Locations with elevated levels of overlapping need are:

- MP 131-148 (Segments 95-8 and 9) and MP 176-190 (Segment 95-12) have overlapping needs in at least four performance areas; these segments include the Bouse Wash Bridge, Mockingbird Wash Bridge, and McCulloch Boulevard Underpass; low travel time reliability and road closures impact Mobility and Freight performance; Safety needs are attributable to angled and left-turn crashes, especially within MP 142-148 (Segment 95-9)
- MP 104-131 (Segments 95-6 and 7) have overlapping needs in the Pavement, Mobility, and Freight performance areas; Mobility and Freight performance areas are impacted by roadway closures and low travel time reliability
- MP 29-43 (Segment 95-1 and 2), MP 60-80 (Segment 95-4), MP 162-176 (Segment 95-11), and MP 190-202 (Segment 95-13) have overlapping needs in the Mobility, Safety, and Freight performance areas; Safety needs are attributable to access/intersection incidents; Mobility and Freight performance areas are impacted by roadway closures and low travel time reliability
- MP 80-104 (Segment 95-5) and MP 148-162 (MP 95-10) have overlapping needs in the Mobility and Freight performance areas; Mobility and Freight are impacted by roadway closures and low travel time reliability

Table ES-3: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts (MP)												
	95-1 MP 29-34	95-2 MP 34-43	95-3 MP 43-60	95-4 MP 60-80	95-5 MP 80-104	95-6 MP 104-111	95-7 MP 111-131	95-8 MP 131-142	95-9 MP 142-148	95-10 MP 148-162	95-11 MP 162-176	95-12 MP 176-190	95-13 MP 190-202
Pavement	None	None	None	None	None	Low	Low	Low	Low	None	None	Low	None
Bridge	None	None	Medium	None	None	None	None	Medium	None	None	None	Medium	None
Mobility+	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Safety+	Medium	High	None	High	N/A#	N/A	None	None	Medium	None	High	High	Low
Freight+	Low	High	None	High	Low	Low	High	High	High	Low	Medium	Medium	High
Average Need	**0.92**	**1.62**	**0.54**	**1.62**	**0.60**	**0.80**	**1.08**	**1.38**	**1.54**	**0.46**	**1.38**	**1.85**	**1.15**

** A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study*

+ Identified as an emphasis area for the SR 95 corridor

 # N/A indicates insufficient or no data available to determine level of need

Average Need Scale	
None*	< 0.1
Low	0.1 - 1.0
Medium	1.0 - 2.0
High	> 2.0

STRATEGIC SOLUTIONS

The principal objective of the CPS is to identify strategic solutions (investments) that are performance-based to ensure that available funding resources are used to maximize the performance of the State's key transportation corridors. A first step in the development of strategic solutions is to identify areas of elevated levels of need, as addressing these needs will have the greatest effect on corridor performance. Segments with Medium or High needs and specific locations of hot spots are considered strategic investment areas for which strategic solutions should be developed. Segments with lower levels of need or without identified hot spots are not considered candidates for strategic investment and are expected to be addressed through other ADOT programming processes. The SR 95 strategic investment areas (resulting from the elevated needs) are shown in **Figure ES-6**.

Screening Process

In some cases, needs that are identified do not advance to solutions development and are screened from further consideration because they have been or will be addressed through other measures including:

- A project is programmed to address this need
- The need is a result of a Pavement or Bridge hot spot that does not show historical investment or rating issues; these hot spots will likely be addressed through other ADOT programming means
- A bridge is not a hot spot but is located within a segment with a Medium or High level of need; this bridge will likely be addressed through current ADOT bridge maintenance and preservation programming processes
- The need is determined to be non-actionable (i.e., cannot be addressed through an ADOT project)
- The conditions/characteristics of the location have changed since the performance data was collected that was used to identify the need

Candidate Solutions

Documented performance needs serve as the foundation for developing candidate solutions for corridor preservation, modernization, and expansion. For each elevated need within a strategic investment area that is not screened out, a candidate solution is developed to address the identified need. Each candidate solution is assigned to one of the following three P2P investment categories based on the scope of the solution:

- Preservation
- Modernization
- Expansion

Candidate solutions are not intended to be a substitute or replacement for traditional ADOT project development processes where various ADOT technical groups and districts develop candidate projects for consideration in the performance-based programming in the P2P process. Rather, these candidate solutions are intended to complement ADOT's traditional project development processes through a performance-based process to address needs in one or more of the five performance areas of Pavement, Bridge, Mobility, Safety, and Freight. Candidate solutions developed for the SR 95 corridor will be considered along with other candidate projects in the ADOT statewide programming process.

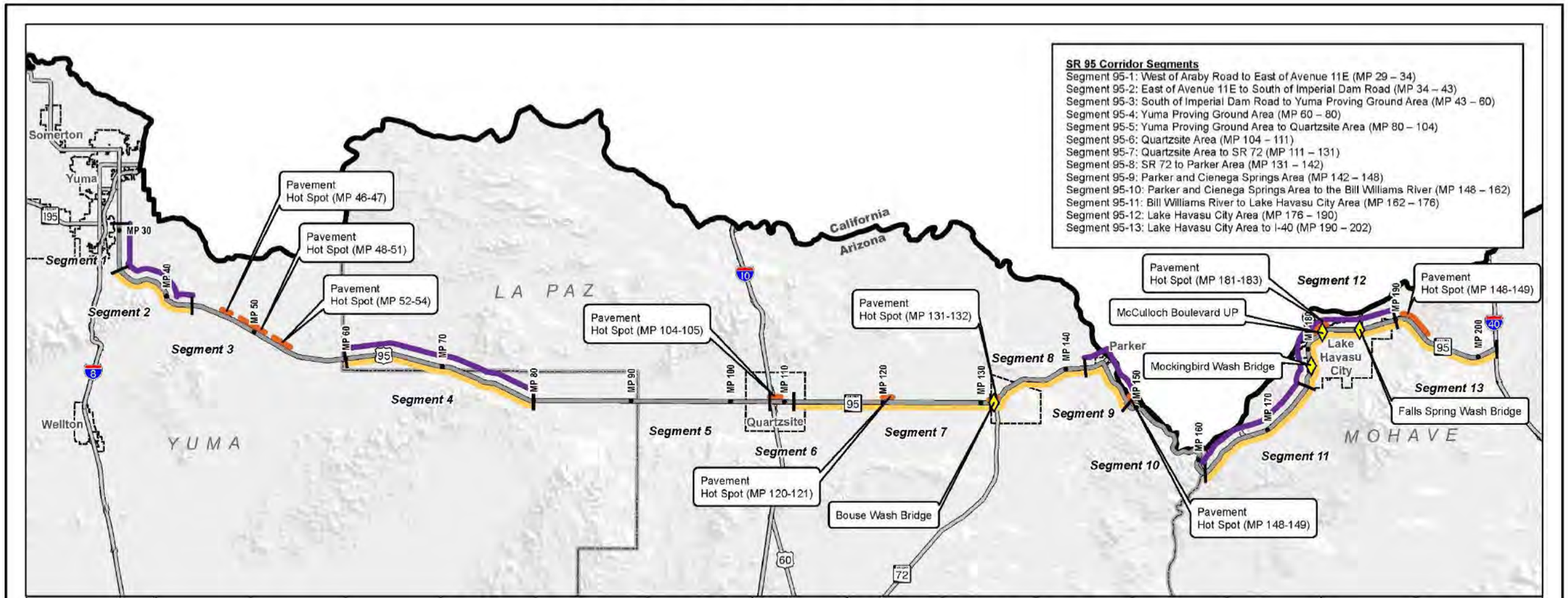
Candidate solutions should include some or all of the following characteristics:

- Do not recreate or replace results from normal programming processes
- May include programs or initiatives, areas for further study, and infrastructure projects
- Address elevated levels of need (High or Medium) and hot spots
- Focus on investments in modernization projects (to optimize current infrastructure)
- Address overlapping needs
- Reduce costly repetitive maintenance
- Extend operational life of system and delay expansion
- Leverage programmed projects that can be expanded to address other strategic elements
- Provide measurable benefit

Candidate solutions developed to address an elevated need in the Pavement or Bridge performance areas include two options; rehabilitation or full replacement. These solutions are initially evaluated through a Life-Cycle Cost Analysis (LCCA) to provide insights into the cost-effectiveness of these options so a recommended approach can be identified. Candidate solutions developed to address an elevated need in the Mobility, Safety, or Freight performance areas are advanced directly to the Performance Effectiveness Evaluation. In some cases, there may be multiple solutions identified to address the same area of need.

Candidate solutions that are recommended to expand or modify the scope of an already programmed project are noted and are not advanced to solution evaluation and prioritization. These solutions are directly recommended for programming.

Figure ES-6: Strategic Investment Areas



Performance Areas	95-1	95-2	95-3	95-4	95-5	95-6	95-7	95-8	95-9	95-10	95-11	95-12	95-13	Performance Areas
	MP 29-34	MP 34-43	MP 43-60	MP 60-80	MP 80-104	MP 104-111	MP 111-131	MP 131-142	MP 142-148	MP 148-162	MP 162-176	MP 176-190	MP 190-202	
Pavement	-	-	Hot Spot	-	-	Hot Spot	Hot Spot	Hot Spot	Hot Spot	-	-	Hot Spot	Hot Spot	Pavement
Bridge	-	-	Medium	-	-	-	-	Medium	-	-	-	Medium	-	Bridge
Mobility*	-	-	-	-	-	-	-	-	-	-	-	-	-	Mobility*
Safety*	Medium	High	-	High	-	-	-	-	Medium	-	High	High	-	Safety*
Freight*	-	High	-	High	-	-	High	High	High	-	Medium	Medium	High	Freight*

* Identified as emphasis area for SR-95 Corridor
Note:Figure shows strategic investment areas, which are segments with Medium and High levels of need an locations of hot spots. A "-" symbol indicates a segment level of need of Low or None, which is not considered strategic.

SR 95 Corridor Profile Study: I-8 to I-40
Strategic Investment Areas

Performance Area Needs
Corridor Segment
County Boundary
Interstate/Highway
City Boundary
Pavement
Mobility
Safety
Freight
Bridge

Level of Need
Low
Medium
High

SOLUTION EVALUATION AND PRIORITIZATION

Candidate solutions are evaluated using the following steps: LCCA (where applicable), Performance Effectiveness Evaluation, Solution Risk Analysis, and Candidate Solution Prioritization. The methodology and approach to this evaluation are shown in **Figure ES-7** and described more fully below.

Life-Cycle Cost Analysis

All Pavement and Bridge candidate solutions have two options: rehabilitation/repair or reconstruction. These options are evaluated through an LCCA to determine the best approach for each location where a Pavement or Bridge solution is recommended. The LCCA can eliminate options from further consideration and identify which options should be carried forward for further evaluation.

All Mobility, Safety, and Freight strategic investment areas that result in multiple independent candidate solutions are advanced directly to the Performance Effectiveness Evaluation.

Performance Effectiveness Evaluation

After completing the LCCA process, all remaining candidate solutions are evaluated based on their performance effectiveness. This process includes determining a Performance Effectiveness Score (PES) based on how much each solution impacts the existing performance and needs scores for each segment. This evaluation also includes a Performance Area Risk Analysis to help differentiate between similar solutions based on factors that are not directly addressed in the performance system.

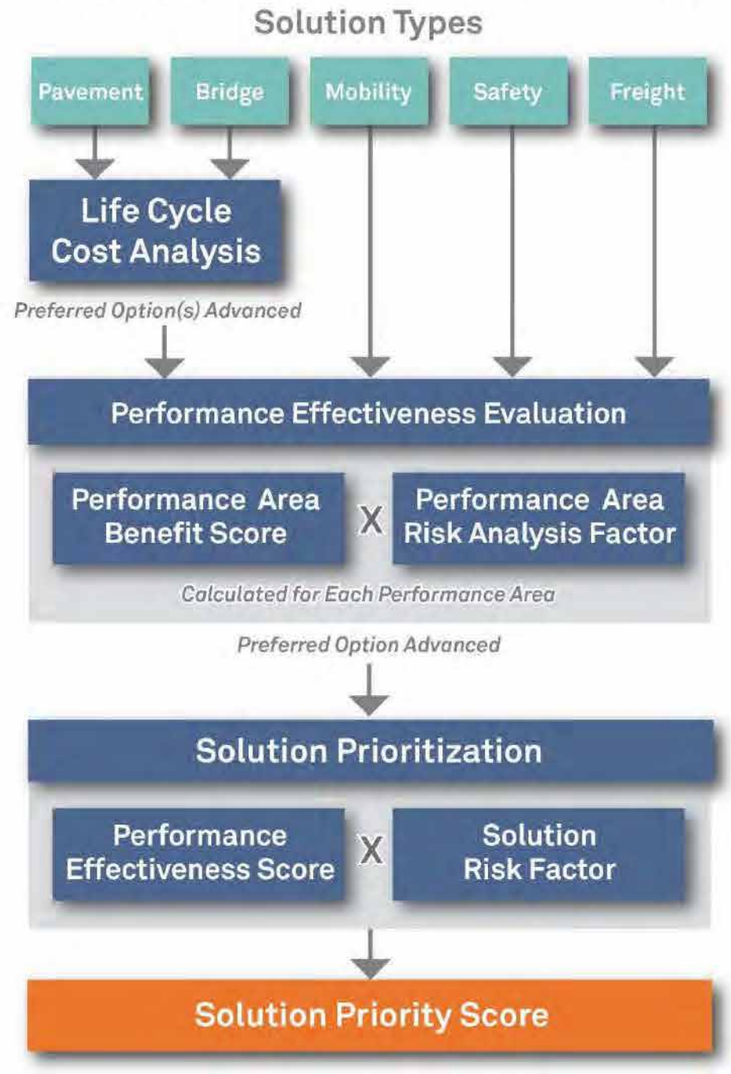
Solution Risk Analysis

All candidate solutions advanced through the Performance Effectiveness Evaluation are also evaluated through a Solution Risk Analysis process. A solution risk probability and consequence analysis is conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of performance failure.

Candidate Solution Prioritization

The PES, weighted risk factor, and segment average need score are combined to create a prioritization score. The candidate solutions are ranked by prioritization score from highest to lowest. The highest prioritization score indicates the candidate solution that is recommended as the highest priority. Solutions that address multiple performance areas tend to score higher in this process.

Figure ES-7: Candidate Solution Evaluation Process



SUMMARY OF CORRIDOR RECOMMENDATIONS

Prioritized Candidate Solution Recommendations

Table ES-4 and **Figure ES-8** show the prioritized candidate solutions recommended for the SR 95 corridor. The purpose of these solutions is to improve performance of the SR 95 corridor, primarily in the Mobility, Safety, and Freight performance areas. The highest priority solutions address needs in the Lake Havasu City area (MP 177-186) and Dome Valley area (MP 39-42).

Other Corridor Recommendations

As part of the investigation of strategic investment areas and candidate solutions, other corridor recommendations were also identified. These recommendations identify areas for further study, and other corridor-specific recommendations that are not related to construction or policy. The SR 95 other corridor recommendations are:

- Conduct a feasibility study for installing automated flood warning system in areas prone to flooding
- Coordinate with the Lake Havasu Strategic Transportation Safety Plan to identify safety improvements and programs to reduce crashes on SR 95 in Lake Havasu City
- Coordinate with the Western Arizona Council of Governments (WACOG) Strategic Transportation Safety Plan to identify safety improvements and programs to reduce crashes on SR 95 in Mohave County and La Paz County
- Investigate feasibility of advanced warning and alternate routing system during roadway closure events such as flash flooding and other incidents to improve resiliency and emergency response

Policy and Initiative Recommendations

In addition to location-specific needs, general corridor and system-wide needs were identified through the CPS process. While these needs are overarching, and cannot be individually evaluated through the CPS process, it is important to document them. A list of recommended policies and initiatives was developed for consideration when programming future projects not only on SR 95, but across the entire state highway system where conditions are applicable. The following list, which is in no order of priority, was derived from the Round 1, Round 2, and Round 3 CPS:

- Install Intelligent Transportation System (ITS) conduit with all new infrastructure projects
- Prepare strategic plans for Closed Circuit Television (CCTV) camera and Road Weather Information System (RWIS) locations statewide
- Leverage power and communication at existing weigh-in-motion (WIM), dynamic messaging signs (DMS), and call box locations to expand ITS applications across the state
- Consider solar power for lighting and ITS where applicable
- Investigate ice formation prediction technology where applicable
- Conduct highway safety manual evaluation for all future programmed projects
- Develop infrastructure maintenance and preservation plans (including schedule and funding) for all pavement and bridge infrastructure replacement or expansion projects
- Develop standardized bridge maintenance procedures so districts can do routine maintenance work
- Review historical ratings and level of previous investment during scoping of pavement and bridge projects; in pavement locations that warrant further investigation, conduct subsurface investigations during project scoping to determine if full replacement is warranted
- For pavement rehabilitation projects, enhance the amount/level of geotechnical investigations to address issues specific to the varying conditions along the project
- Expand programmed and future pavement projects as necessary to include shoulders
- Expand median cable barrier guidelines to account for safety performance
- Install CCTV cameras with all DMS
- In locations with limited communications, use CCTV cameras to provide still images rather than streaming video
- Develop statewide program for pavement replacement
- Install additional continuous permanent count stations along strategic corridors to enhance traffic count data
- When reconstruction or rehabilitation activities will affect existing bridge vertical clearance, the dimension of the new bridge vertical clearance should be a minimum of 16.25 feet where feasible
- All new or reconstructed roadway/shoulder edges adjacent to an unpaved surface should be constructed with a Safety Edge
- Collision data on tribal lands may be incomplete or inconsistent; additional coordination for data on tribal lands is recommended to ensure adequate reflection of safety issues
- Expand data collection devices statewide to measure freight delay
- Evaluate and accommodate potential changes in freight and goods movement trends that may result from improvements and expansions to the state roadway network

Next Steps

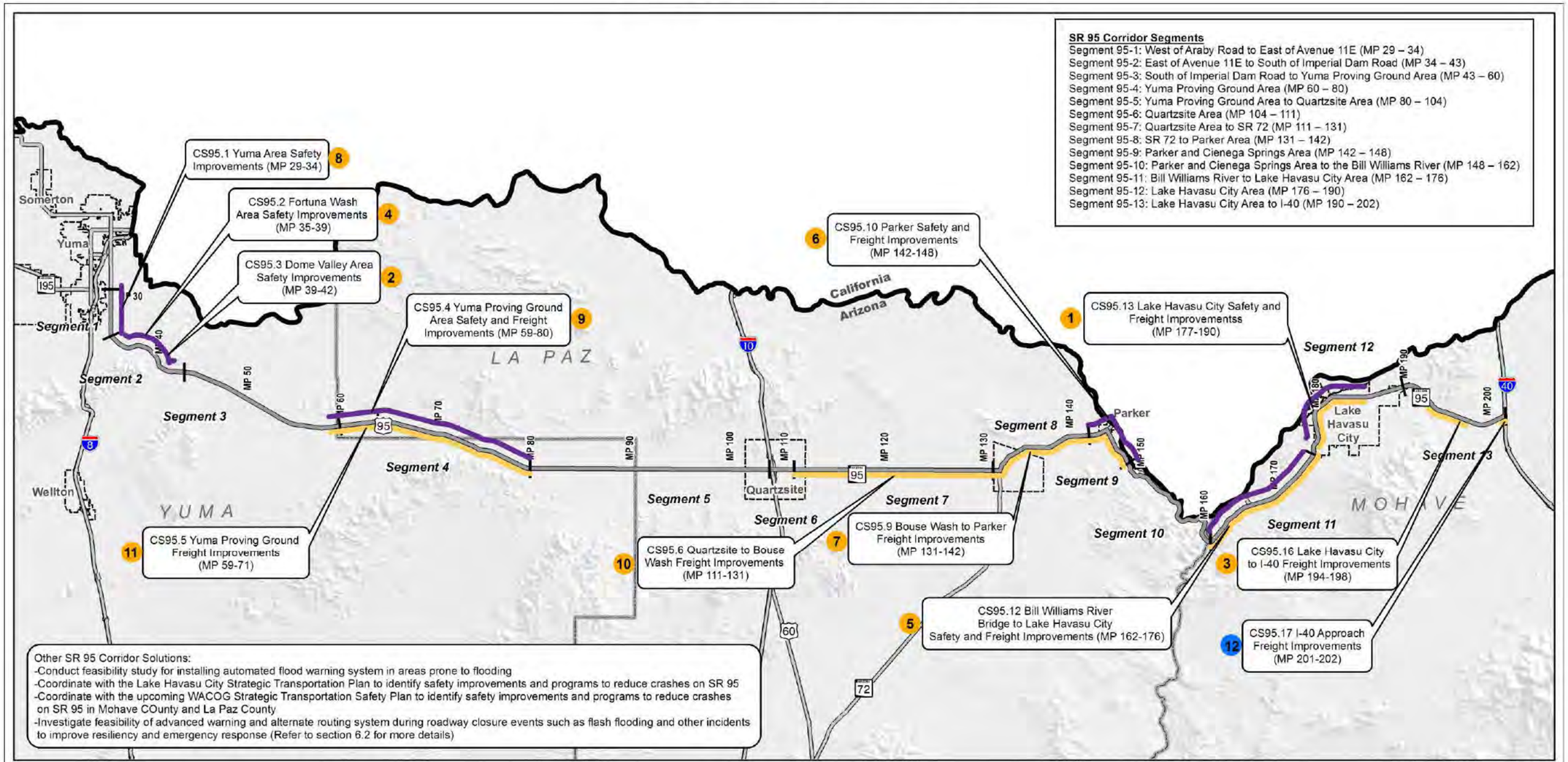
Candidate solutions developed for the SR 95 corridor will be considered along with other candidate projects in the ADOT statewide programming process. It is important to note that candidate solutions are intended to represent strategic solutions to address existing performance needs related to the Pavement, Bridge, Mobility, Safety, and Freight performance areas. Therefore, the strategic solutions are not intended to preclude recommendations related to the ultimate vision for the corridor that may have been defined in the context of prior planning studies and/or design concept reports. Recommendations from such studies are still relevant to addressing the ultimate corridor objectives. Upon completion of all three CPS rounds, the results will be incorporated into a summary document comparing all corridors that is expected to provide a performance-based review of statewide needs and candidate solutions.

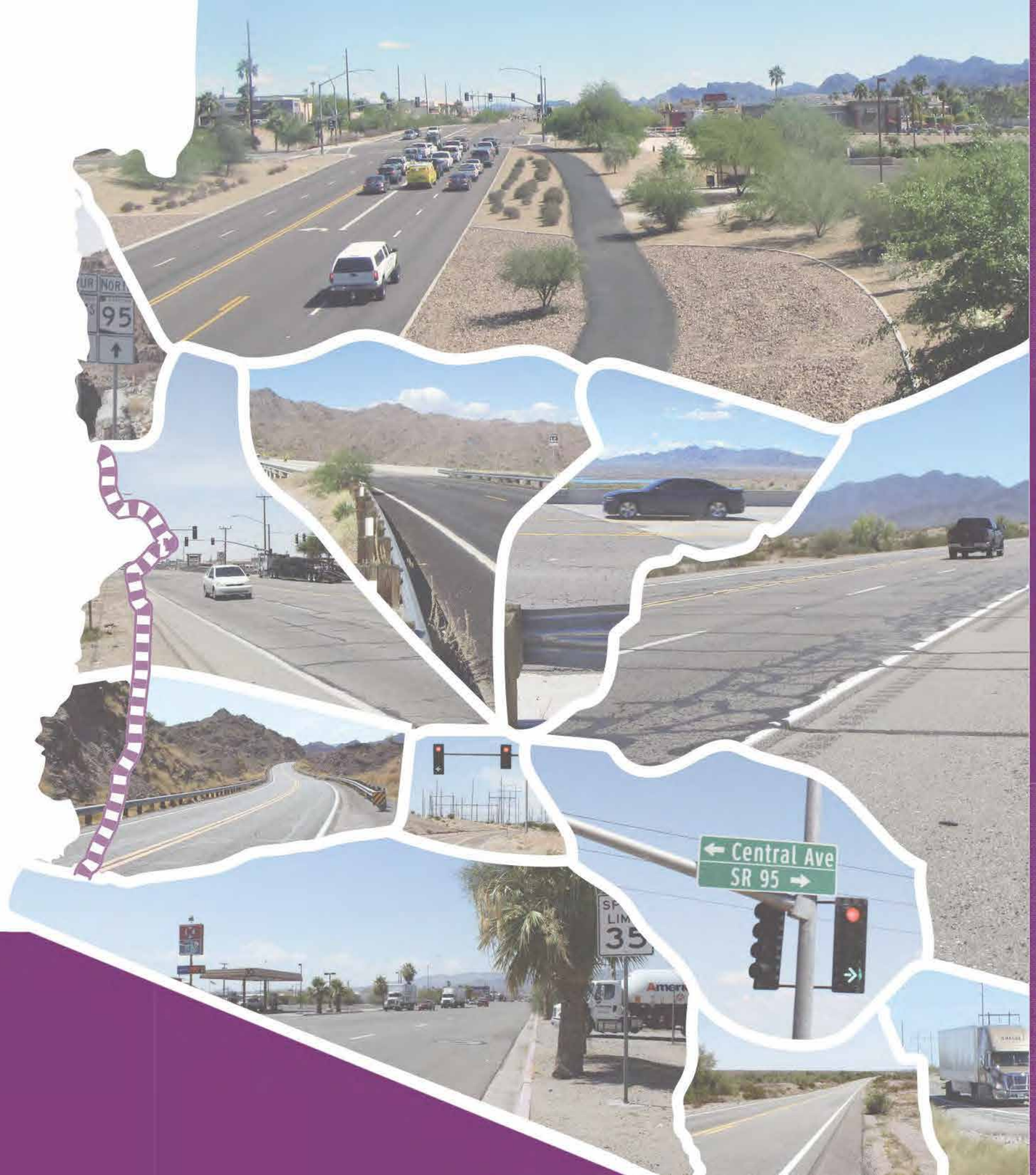
Table ES-4: Prioritized Recommended Solutions

Rank	Candidate Solution #	Option	Solution Name and Location	Description / Scope	Estimated Cost (in millions)	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Prioritization Score
1	CS95.13	B	Lake Havasu City Safety and Freight Improvements (MP 177-190)	Construct southbound right turn lanes at Smoketree Ave, Swanson Ave, W Acoma Blvd, Lake Dry; install raised median throughout City limits (MP 177 – MP 186); implement signal coordination/adjust timing; mitigate differential settling on Falls Spring Wash Bridge (MP 186.2)	$13.45	M	98
		A	*Lake Havasu City Safety and Freight Improvements (MP 177-190)*	*Reconstruct 9 signalized intersections as double lane roundabouts (Mulberry Ave, Smoketree Ave, Swanson Ave, Mesquite Ave, Palo Verde Blvd S, Industrial Blvd, W Acoma Blvd, Kiowa Blvd N, Palo Verde Blvd N); install raised median throughout City limits (MP 177 – MP 186); mitigate differential settling on Falls Spring Wash Bridge (MP 186.2)*	*$51.33*	*M*	*62*
2	CS95.3	-	Dome Valley Area Safety Improvements (MP 39-42)	Widen shoulders (NB/SB); install chevrons at horizontal curve from MP 40.1 to 40.4; install warning signs for intersections with Adair Park Rd (MP 39.7) and County 3rd St (MP 40.5)	$3.34	M	79
3	CS95.16	-	Lake Havasu City to I-40 Freight Improvements (MP 194-198)	Widen shoulders (NB/SB) MP 194.5 – MP 196.0; construct alternating passing lanes MP 196 – MP 198	$9.63	M	78
4	CS95.2	-	Fortuna Wash Area Safety Improvements (MP 35-39)	Install two-way center turn lane (expand from a 2-lane undivided highway to a 5-lane highway); widen bridge over canal Welton Mohawk Canal Bridge (MP 38.0)	$17.17	M/E	75
5	CS95.12	-	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements (MP 162-176)	Widen shoulders in both the northbound and southbound direction(NB/SB); construct alternating passing lanes at MP 172.8 – MP 177 and MP 164 – MP 169.8; install curve warning signs, advisory speed sign and chevrons at MP 162.3	$54.35	M	71
6	CS95.10	-	Parker Safety and Freight Improvements (MP 142-150)	Construct right turn lanes at Riverside Drive (MP 148.3, NB and SB), Cove Avenue (MP 148.2, NB and SB), Ironwood Road (MP 147.5, SB), and Mesquite Drive (MP 147.3, SB); Improve signal visibility and install warning signs and transverse rumble strips north of Resort Drive to alert southbound traffic	$2.85	M	61
7	CS95.9	A	Bouse Wash to Parker Freight Improvements (MP 131-142)	Widen shoulders (NB/SB); construct drainage structure and re-profile roadway at MP 134.4	$14.76	M	59
8	CS95.1	-	Yuma Area Safety Improvements (MP 29-34)	Install two-way center turn lane (MP 29 – 32 expands from a 4-lane undivided highway to a 5-lane undivided highway, MP 32 – 34 expands from a 2-lane undivided highway to a 5-lane undivided highway); install raised medians at signalized intersection approaches (approximately 250' on each approach); improve signal visibility and install warning signs at the following intersections: Araby Road (MP 29.4), Avenue 7E (MP 29.9), Avenue 8E (MP 30.9), Avenue 11E (MP 33.7); widen Gila Canal Bridge (MP 33.55)	$15.41	M/E	54
9	CS95.4	A	Yuma Proving Ground Area Safety and Freight Improvements (MP 59-80)	Widen shoulders (NB/SB)	$30.39	M	52
		B	*Yuma Proving Ground Area Safety and Freight Improvements (MP 59-80)*	*Construct alternating passing lanes*	*$78.31*	*M*	*24*
10	CS95.6	-	Quartzsite to Bouse Wash Freight Improvements (MP 111-131)	Widen shoulders (NB/SB); Construct drainage structures and re-profile roadway at 19 locations with flooding potential: MP 110.8, 112.8, 113.1, 114.9, 115.1, 116.2, 116.6 are higher priority with upstream channelization concentrating flows; MP 117.1, 117.7, 118.9, 119.6, 119.8, 120.1, 120.6, 120.8, 121.4, 122.1, 122.3, 122.6 are additional locations	$51.85	M	29
11	CS95.5	-	Yuma Proving Ground Freight Improvements (MP 59-71)	Construct drainage structures and re-profile roadway at 10 locations where flows are concentrated by upstream channelization (MP 59 – MP 60 three crossings, MP 61.0, MP 62.4, MP 66.0, MP 66.8, MP 69.1-69.3 two crossings, MP 71.3)	$10.74	M	12
12	CS95.17	-	I-40 Approach Freight Improvements (MP 201-202)	Construct auxiliary lanes to create a 5-lane section through activity center (MP 201.3 – MP 202); install signs prohibiting left turns in/out of the northern Wendy's/Pilot driveway	$3.16	E	8

"-" no options for the candidate solution

Figure ES-8: Prioritized Recommended Solutions





Final Report

1.0 INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this Corridor Profile Study (CPS) of State Route 95 (SR 95) between Junction Interstate 8 (I-8) and Junction Interstate 40 (I-40). The study examines key performance measures for the SR 95 corridor, and the results of this performance evaluation are used to identify potential strategic improvements. The intent of the corridor profile program, and of ADOT's Planning-to-Programming (P2P) process, is to conduct performance-based planning to identify areas of need and make the most efficient use of available funding to provide an efficient transportation network.

ADOT is conducting eleven CPS within three separate groupings.

The first three studies (Round 1) began in Spring 2014, and encompass:

- I-17: SR 101L to I-40
- I-19: Nogales to I-10
- I-40: California State Line to I-17

The second round (Round 2) of studies, initiated in Spring 2015, includes:

- I-8: California State Line to I-10
- I-40: I-17 to the New Mexico State Line
- SR 95: I-8 to I-40

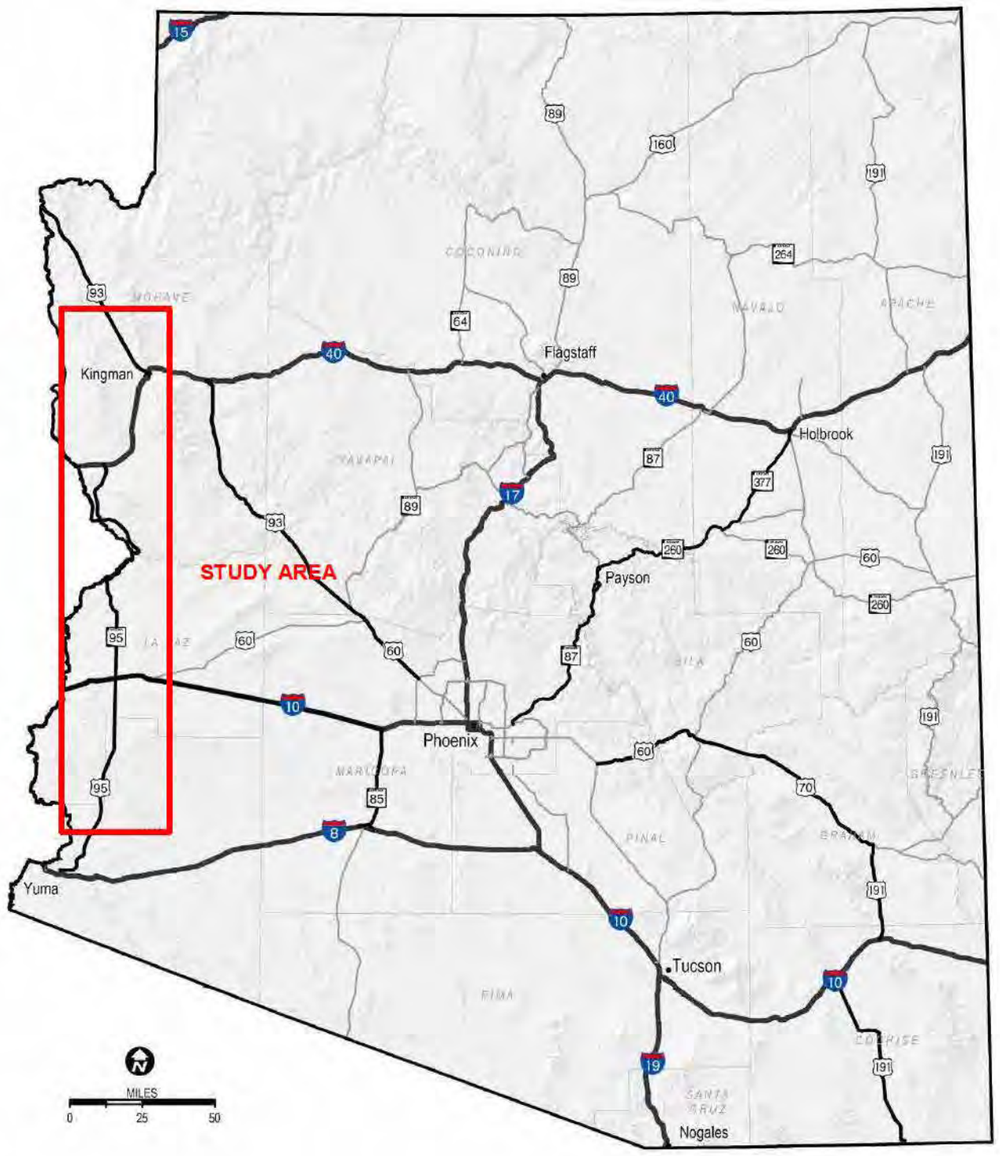
The third round (Round 3) of studies, initiated in Fall 2015, includes:

- I-10: California State Line to SR 85 and SR 85: I-10 to I-8
- I-10: SR 202L to the New Mexico State Line
- SR 87/SR 260/SR 377: SR 202L to I-40
- US 60/US 70: SR 79 to US 191 and US 191: US 70 to SR 80
- US 93/US 60: Nevada State Line to SR 303L

The studies under this program assess the overall health, or performance, of the state's strategic highways. The CPS will identify candidate solutions for consideration in the Multimodal Planning Division's (MPD) P2P project prioritization process, providing information to guide corridor-specific project selection and programming decisions.

The SR 95 corridor, depicted in **Figure 1,** is one of the strategic statewide corridors identified and the subject of this Round 2 CPS.

Figure 1: Corridor Study Area



1.1 Corridor Study Purpose

The purpose of the CPS is to measure corridor performance to inform the development of strategic solutions that are cost-effective and account for potential risks. This purpose can be accomplished by following the process described below:

- Inventory past improvement recommendations
- Define corridor goals and objectives
- Assess existing performance based on quantifiable performance measures
- Propose various solutions to improve corridor performance
- Identify specific solutions that can provide quantifiable benefits relative to the performance measures
- Prioritize solutions for future implementation, accounting for performance effectiveness and risk analysis findings

1.2 Study Goals and Objectives

The objective of this study is to identify a recommended set of prioritized potential solutions for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The SR 95 CPS defines solutions and improvements for the corridor that are evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance. Corridor benefits can be categorized by the following three investment types:

- Preservation: Activities that protect transportation infrastructure by sustaining asset condition or extending asset service life
- Modernization: Highway improvements that upgrade efficiency, functionality, and safety without adding capacity
- Expansion: Improvements that add transportation capacity through the addition of new facilities and/or services

This study identifies potential actions to improve the performance of the SR 95 corridor. Proposed actions are compared based on their likelihood of achieving desired performance levels, life-cycle costs, cost-effectiveness, and risk analysis to produce a prioritized list of solutions that help achieve corridor goals.

The following goals are identified as the desired outcome of this study:

- Link project decision-making and investments on key corridors to strategic goals
- Develop solutions that address identified corridor needs based on measured performance
- Prioritize improvements that cost-effectively preserve, modernize, and expand transportation infrastructure

1.3 Corridor Overview and Location

The SR 95 corridor consists of segments of both SR 95 and US 95; however, for the purposes of this study, the study corridor is generally referred to as SR 95, except where noted.

The SR 95 corridor is a vital road link in the western part of the state, providing the only north-south connection between I-8, Interstate 10 (I-10), and I-40. The US 95 portion of the SR 95 corridor runs between I-8 and I-10, and connects the cities of Yuma and Quartzsite while also providing a strategic connection to the U.S. Army Yuma Proving Ground (YPG) and General Motors Desert Proving Ground – Yuma. Note that ADOT does not maintain or own US 95 between I-8 and Araby Road, MP 24-29. Analysis documented in the SR 95 Corridor Profile Study excludes US 95 between I-8 and Araby Road.

North of I-10, SR 95 provides connectivity between I-10 and I-40, and the cities of Quartzsite, Parker, and Lake Havasu City. This corridor also serves and passes through the Colorado River Indian Reservation. The SR 95 corridor between I-8 and I-40 is approximately 170 miles in length.

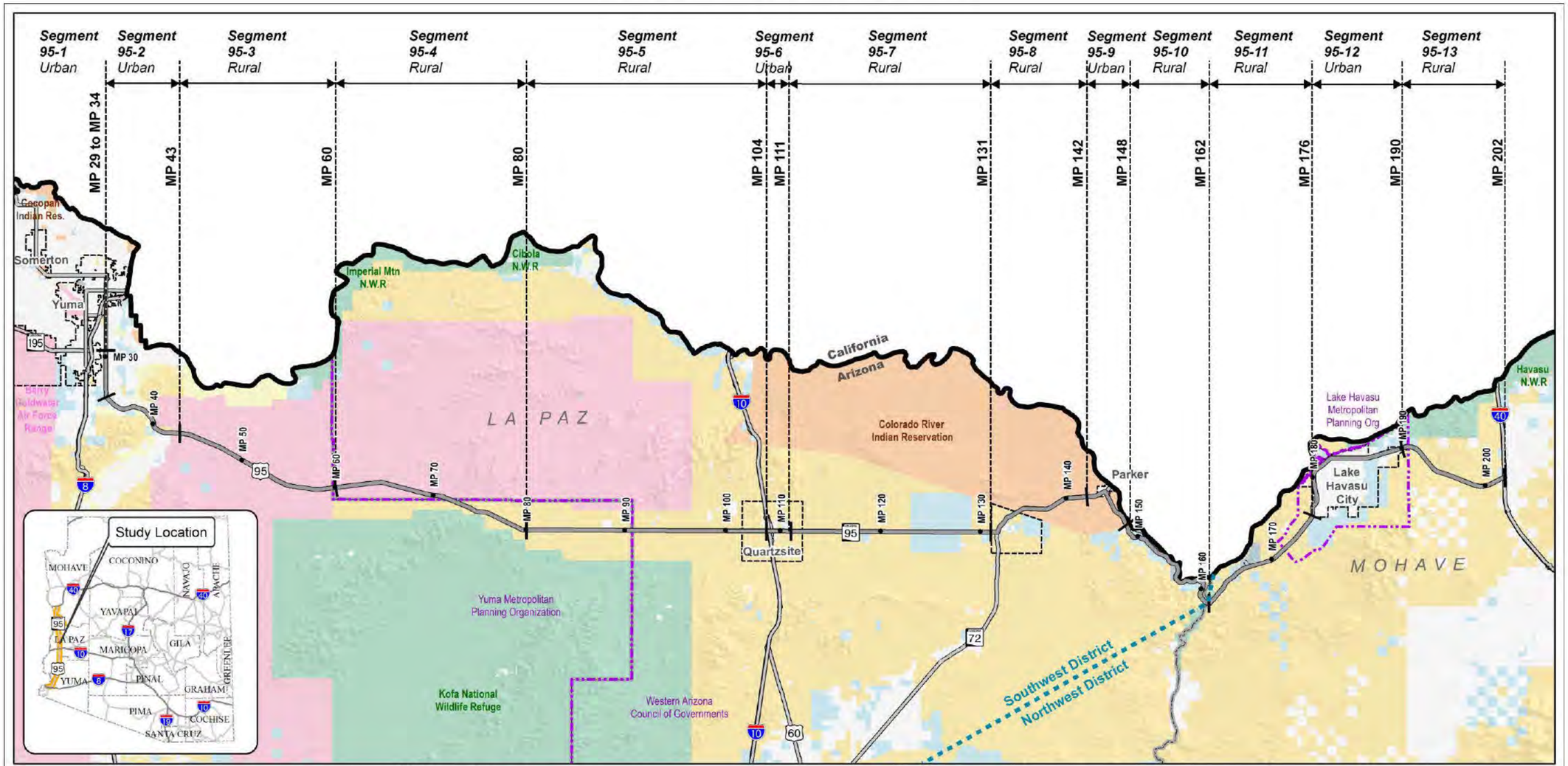
1.4 Corridor Segments

The SR 95 corridor is divided into 13 planning segments to allow for an appropriate level of detailed needs analysis, performance evaluation, and comparison between different segments of the corridor. The corridor is segmented at logical breaks where the context changes due to differences in characteristics such as terrain, daily traffic volumes, or roadway typical sections. Corridor segments are described in **Table 1** and shown in **Figure 2**.

Table 1: SR 95 Corridor Segments

Segment #	Route	Begin	End	Approx. Begin Milepost	Approx. End Milepost	Approx. Length (miles)	Typical Through Lanes (NB, SB)	2014/2035 Average Annual Daily Traffic Volume (vpd)	Character Description
95-1	US 95	West of Araby Road	East of Avenue 11E	29	34	5	2, 2	9,500/13,800	Beginning-point of ADOT facility, interrupted flow facility with four-lane cross-section, relatively flat terrain, transitioning urban/rural area, junction with Araby Road and Fortuna Road, private land ownership
95-2	US 95	East of Avenue 11E	South of Imperial Dam Road	34	43	9	1, 1	7,800/11,300	Uninterrupted flow facility with a two-lane cross-section, rolling terrain, rural, Bureau of Land Management (BLM), Bureau of Reclamation (BOR)
95-3	US 95	South of Imperial Dam Road	Yuma Proving Ground Area	43	60	17	1, 1	2,300/3,400	Uninterrupted flow facility with two-lane cross-section, flat terrain, rural, military land ownership (Laguna Army Airfield, YPG), General Motors Desert Proving Ground Yuma, junction with Imperial Dam Road
95-4	US 95	Yuma Proving Ground Area	Yuma Proving Ground Area	60	80	20	1, 1	1,600/2,400	Uninterrupted flow facility with two-lane cross-section, relatively flat terrain, rural, BLM, Kofa National Wildlife Refuge, military land ownership
95-5	US 95	Yuma Proving Ground Area	Quartzsite Area	80	104	24	1, 1	1,700/2,400	Uninterrupted flow facility with two-lane cross-section, flat terrain, BLM, Kofa National Wildlife Refuge
95-6	SR 95	Quartzsite Area	Quartzsite Area	104	111	3	2, 2	3,000/5,500	Interrupted flow with five-lane cross-section, urban area type within Quartzsite, private land ownership, BLM, State Trust land, junction with I-10, transition from US 95 to SR 95
95-7	SR 95	Quartzsite Area	SR 72	111	131	20	1, 1	2,600/5,600	Uninterrupted flow facility with two-lane cross-section, flat terrain, rural, BLM, State Trust Land
95-8	SR 95	SR 72	Parker Area	131	142	11	1, 1	4,600/9,600	Uninterrupted flow facility with two-lane cross-section, flat, rural, BLM, State Trust land, Tribal land, junction with SR 72
95-9	SR 95	Parker Area	Parker and Cienega Springs Area	142	148	6	2, 2	9,300/11,100	Interrupted flow with five-lane cross-section, relatively flat with some grade variation, urban area type within Parker to Cienega Springs, private land ownership, Tribal land
95-10	SR 95	Parker and Cienega Springs Area	Bill Williams Area	148	162	14	1, 1	5,300/6,500	Uninterrupted flow facility with cross-sections varying from two lanes to four lanes, mountainous terrain, rural with some communities within the vicinity of the corridor, State Trust land
95-11	SR 95	Bill Williams River	Lake Havasu City Area	162	176	14	1, 1	5,600/7,200	Uninterrupted flow facility with two-lane cross-section, mountainous terrain, rural, BLM, U.S. Fish and Wildlife Service, State Trust land
95-12	SR 95	Lake Havasu City Area	Lake Havasu City Area	176	190	14	2, 2	14,400/27,000	Interrupted flow facility with five-lane cross-section, flat terrain, urban area type within Lake Havasu City and Desert Hills, private land ownership, State Trust land
95-13	SR 95	Lake Havasu City Area	I-40	190	202	12	1, 1	7,900/11,200	Uninterrupted flow facility with cross-sections varying from two lanes to four lanes, rolling hills terrain, rural, BLM, junction with I-40

Figure 2: Corridor Location and Segments



SR 95 Corridor Profile Study: I-8 to I-40
Project Vicinity and Segmentation

SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

- Corridor Segment
- State_Boundary
- County Boundary
- Interstate/Highway
- MPO/COG Boundary
- ADOT District Boundary
- City Boundary

Land Ownership
- Bureau of Land Management
- Bureau of Reclamation
- U.S. Forest Service
- State Game and Fish
- Tribal Lands
- Local or State Parks
- Military
- National Park Service
- State Trust Land
- U.S. Fish and Wildlife Service
- Private

1.5 Corridor Characteristics

The SR 95 corridor is an important travel corridor in the western part of the state. The corridor functions as a route for agricultural, military, recreational, tourist, and regional traffic. The corridor provides critical connections between the communities it serves and the rest of the regional and interstate network. The critical nature of the facility is magnified when crashes or rainfall events close the road for any length of time as alternate routes are limited.

National Context

The SR 95 corridor is the only continuous north-south state highway corridor that connects the three Arizona east-west interstate routes of I-8, I-10, and I-40. It is a strategic transportation link across western Arizona for freight and intercity travel.

Regional Connectivity

SR 95 is Arizona's westernmost north/south transportation corridor. The SR 95 corridor is in two ADOT Districts (Southwest and Northwest); three planning areas (Yuma Metropolitan Planning Organization (YMPO), Lake Havasu Metropolitan Planning Organization (LHMPO), and Western Arizona Council of Governments (WACOG)); and three counties (Yuma, La Paz, and Mohave). Within the corridor study limits, SR 95 offers connections to several major roadways, including I-40, I-8, I-10, SR 72, and SR 195. This highway provides access to tourist attractions, passes through the Colorado River Indian Reservation, and serves Arizona cities including Yuma, Quartzsite, Parker, and Lake Havasu City. Smaller communities that are linked by SR 95 include Fortuna, Blaisdell, Kinter, Cienega Springs, Parker Dam, and Desert Hills.

Commercial Truck Traffic

Communities along the SR 95 corridor are dependent on SR 95 to access the state economy through freight deliveries and travel to other locations. SR 95 is experiencing increasing freight flows from both domestic and international sources. Freight traffic (trucks) comprise from 15% to approximately 34% of the total traffic flow on SR 95, with the highest truck percentages at the northern end of the corridor. The SR 95 corridor is relatively close to state ports of entry (POE) on I-8 and on 4th Avenue in Yuma, on I-10 near Ehrenberg, and on I-40 near Topock, as well as the federal POE at San Luis. There is also a closed state POE in Parker near SR 95 that ADOT is planning on refurbishing and reopening in the future.

The San Luis International Border Crossing is located less than 25 miles south of the City of Yuma via US 95. In 2014, this was the third busiest entry in terms of total number of loaded truck containers processed, accounting for approximately 8% of all international truck crossings within the State. The San Luis International Border Crossing was also the second busiest crossing for personal vehicles and total pedestrians and accounted for 36% of all personal vehicle crossings (Bureau of Transportation Statistics, 2015). The San Luis POE services US 95, I-8, SR 195 and Mexico Federal Highway 2. The POE consists of two facilities. The primary check point facility includes six general lanes and two SENTRI[1] Lanes. A second 80-acre commercial vehicle check point facility was recently constructed five miles east of the original POE and is designed to process 150 trucks per day with the potential to expand to 650 trucks by 2030.

There is a significant amount of military-related truck traffic in the Yuma region and along the SR 95 corridor with SR 95 bisecting YPG.

Commuter Traffic

Most commuter traffic on SR 95 occurs within the urbanized areas of Yuma and Lake Havasu City. These areas are economic centers along what is considered mostly a rural state route. According to the most recent traffic volume data maintained by ADOT, traffic volumes range from approximately 1,600 vehicles per day in the YPG area to approximately 18,000 vehicles per day in the Lake Havasu City area.

According to the 2013 American Community Survey data from the US Census Bureau, 77% of the workforce in both the Yuma region and the Lake Havasu City region relies on a private vehicle to get to work.

Recreation and Tourism

SR 95 provides access to many Arizona attractions such as state parks, environmental preserves, and other recreational activities.

SR 95 provides access to the Colorado River and Parker Dam area, which have an abundance of recreational activities, such as fishing, camping, swimming, boating, and wildlife viewing. SR 95 provides direct access to three state parks: River Island, Buckskin Mountain State Park, and Lake Havasu State Park. It provides access to SARA (Special Activities and Recreation Area) Park, which is an 1,100-acre regional park in Lake Havasu City that includes hiking trails, mountain bike trails, dog park, BMX and Motocross track, baseball and softball fields, Havasu 95 Speedway, a remote-control plane field, and a shooting and archery range. SR 95 also provides access to the La Paz County Park.

SR 95 provides access to the Kofa National Wildlife Refuge, the second largest wilderness area in Arizona. Other recreational destinations accessible from SR 95 are Lake Havasu, Las Vegas (via US 93), and Quartzsite, which has numerous gem and mineral shows that attract over a million visitors per year during the months of January and February.

Multimodal Uses

Freight Rail

The Union Pacific Railroad (UPRR) Sunset Route crosses east-west in the vicinity of SR 95 in the Yuma area. The UPRR system carries significant amounts of freight between Southern California

[1] Secure Electronic Network for Travelers Rapid Inspection

and El Paso, Texas. The Sunset Route crosses southern Arizona in an east-west direction through Yuma, Wellton, Gila Bend, Maricopa, Casa Grande, Eloy, Marana, Tucson, Benson and Willcox. In the Yuma area, two spurs serve the Yuma Proving Grounds and Yuma International Airport, which includes the Marine Corps Air Station – Yuma. UPRR ships metallic ores from Arizona and carries ten million tons of coal per year to power plants in the state[2].

Passenger Rail
The Amtrak train station in Yuma is served by the Sunset Limited and Texas Eagle Routes.

Bicycles/Pedestrians
Bicycle traffic is permitted on the SR 95 mainline shoulder; however, shoulder widths are relatively narrow and generally less than the preferred 4-foot minimum.

Bus/Transit
Fixed-route and demand-responsive transit services are provided in Yuma, through the Yuma County Area Transit (YCAT) service. Quartzsite Transit Service provides local and regional transit service for elderly and persons with disabilities in the Quartzsite area. La Paz County Transit provides service to seniors and disabled throughout La Paz County. Havasu Area Transit provides demand-responsive transit for elderly and disabled people in the Lake Havasu City area. Greyhound provides intercity passenger bus services in Yuma and Quartzsite with connections to Phoenix and Southern California. A Greyhound bus terminal is located approximately 2.5 miles away from SR 95 in Yuma.

Aviation
Airports located in proximity to the SR 95 corridor include the Yuma International Airport, Avi Suquilla Airport, which is operated by the Colorado River Indian Tribes, and the Lake Havasu City Airport.

Land Ownership, Land Uses and Jurisdictions
As shown in the previously referenced **Figure 2**, the SR 95 corridor traverses multiple jurisdictions and land holdings located in three Arizona counties: Mohave, La Paz, and Yuma. The western terminus of SR 95 is within the City of Yuma, and ownership is primarily private. The land ownership between approximately milepost (MP) 40 and MP 130 is primarily owned by BLM.

North of Yuma, a large area of the corridor is surrounded by YPG, BLM land, and the Kofa National Wildlife Refuge, which is located to the east of the corridor. In the Quartzsite area, there is private land ownership, and north of Quartzsite there is a mix of primarily BLM land as well as State Trust Land.

Between Parker and Lake Havasu City, there is a mix of State Trust land, BLM land, and some State Park land. In the Lake Havasu area, there is primarily land under private ownership. Between Lake Havasu City and I-40, the land is primarily owned by BLM with some State Trust land and some limited private lands.

Population Centers
Population centers of various sizes exist along the SR 95 corridor. **Table 2** provides a summary of the 2010 U.S. Census populations for communities along SR 95. In comparison to 2000 population estimates, Lake Havasu City and the City of Yuma have recorded the highest 2000-2010 growth in population with increases of 25% and 16.5%, respectively.

Strong growth in population is expected to continue in Yuma, Quartzsite, and Lake Havasu City. According to the Arizona State Demographer's Office, the Yuma population is forecasted to reach 133,431 in 2035, which represents 43% growth compared to the 2010 population, while the Lake Havasu City population is forecasted to reach 65,626 in 2035, which represents 25% growth compared to the 2010 population. Quartzsite is also expected to grow from a population of 3,677 persons to 5,532 persons in 2035, or a growth of 50%.

Table 2: Current and Future Population

Area	2010 Population	2015 Population	2040 Population	% Change 2010 – 2040	Total Growth
Yuma County	195,751	214,991	307,708	36%	111,957
Yuma	93,064	97,950	132,518	30%	39,454
La Paz County	20,489	21,183	22,351	8%	1,862
Quartzsite	3,677	3,798	5,564	34%	1,887
Parker	3,083	3,187	3,056	-1%	-27
Colorado River Indian Reservation	7,077	7,267	6,698	-6%	-379
Mohave County	200,186	205,716	280,765	29%	80,579
Lake Havasu City	52,527	53,583	58,246	10%	5,719

Source: U.S. Census, Arizona Department of Administration – Employment and Population Statistics

Major Traffic Generators
The cities of Yuma and Lake Havasu City are major traffic generators in the region. Yuma is a regional center with connections to Arizona and California via SR 95 and I-8. SR 95 also provides access to SR 195, a limited access state highway that enhances the movement of goods and freight between the San Luis POE and I-8 for commercial vehicles.

Tribes
Near Parker, the Colorado River Indian Tribes have Reservation lands on both sides of SR 95.

[2] Source: Arizona State Rail Plan (2011), page A-11.

Wildlife Linkages

The Arizona State Wildlife Action Plan (SWAP) provides a 10-year vision for the entire state, identifying wildlife and habitats in need of conservation, insight regarding the stressors to those resources, and actions that can be taken to alleviate those stressors. Using the Habimap Tool that creates an interactive database of the information included in the SWAP, the following were identified in relation to the SR 95 corridor:

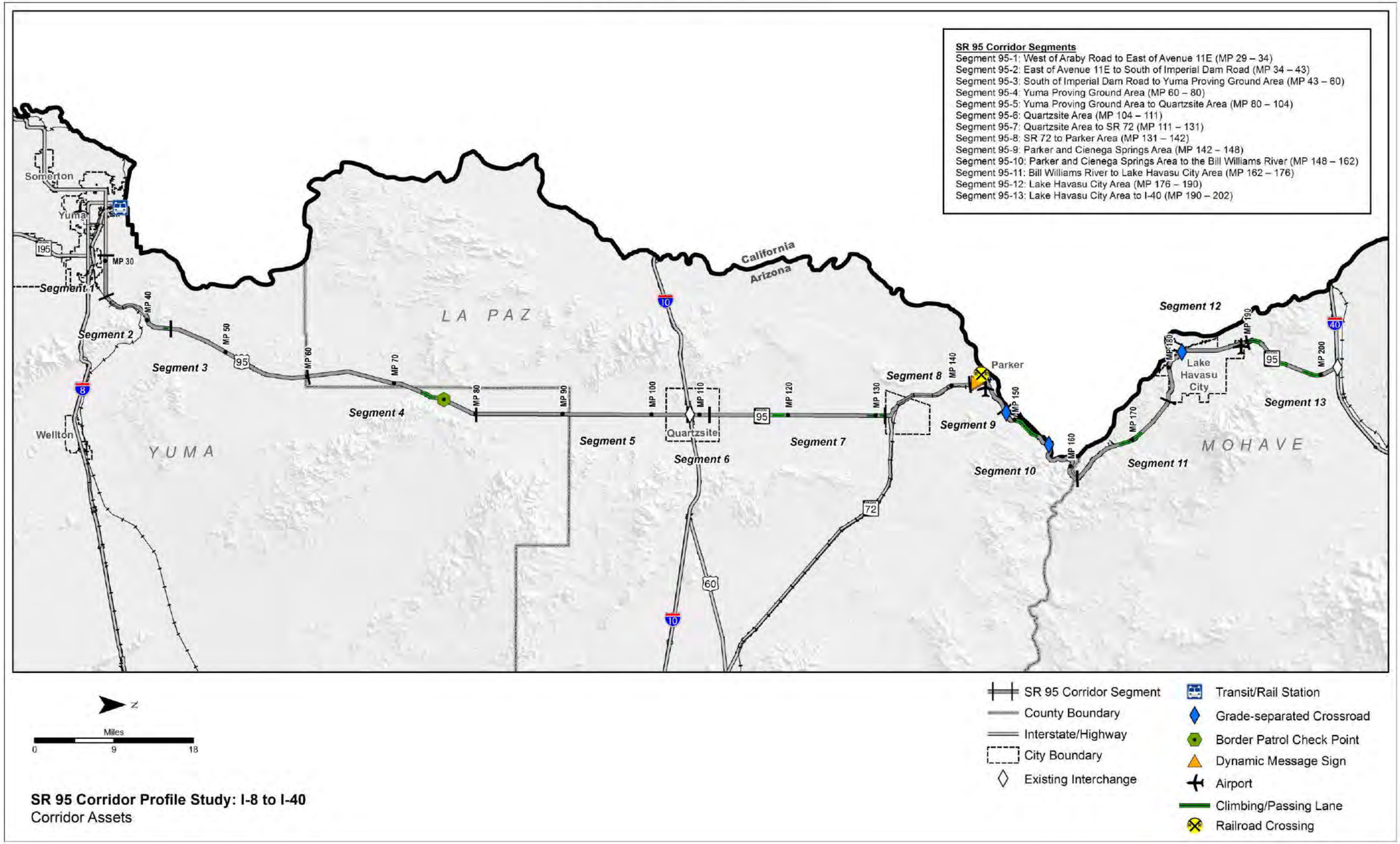
- Wildlife waters exist to the east and west of the SR 95 corridor south of I-10; other wildlife waters are scattered near SR 95 north of Parker to I-40
- The SR 95 corridor travels through allotments controlled by the Arizona State Land Department (ASLD) and BLM
- Potential Arizona Wildlife Linkage Zones exist along SR 95 in six areas that include MP 36-43, MP 71-100, MP 118-124, MP 133-138, MP 169-173, and MP 186-198
- According to the Species and Habitat Conservation Guide (SHCG), sensitive habitats that have moderate conservation potential exist along the SR 95 corridor; these areas are located within the vicinity of the Gila River, south of I-10 both east and west of SR 95, north of Parker around Buckskin Mountain State Park, and east of SR 95 from Lake Havasu to I-10
- Areas where Species of Greatest Conservation are moderately vulnerable are similar to the areas identified in the SHCG (see above)
- Identified areas of moderate level of Species of Economic and Recreational Importance are in the vicinity of the Gila River, Buckskin Mountain State Park, Lake Havasu, and east of SR 95 from Lake Havasu City to I-10

Corridor Assets

Corridor transportation assets are summarized in **Figure 3**. Climbing/passing lanes are located primarily in the northern area of the corridor, between Parker and I-40. In this area, there are five passing lane areas. Between Yuma and Parker, there are four passing lane areas. There is a Border Patrol Check Point located at approximately MP 76.

The corridor includes two traffic interchanges: one interchange is with I-10 at Quartzsite while the other interchange is located at I-40 at the northern terminus of the corridor. There are three grade-separated crossroads: one located in the Lake Havasu area (McCulloch Boulevard at MP 182.4) and two located northeast of Parker, at approximately MP 148.5 (Rio Vista Road) and MP 154.1 (Buckskin Trail).

Figure 3: Corridor Assets



SR 95 Corridor Profile Study: I-8 to I-40
Corridor Assets

1.6 Corridor Stakeholders and Input Process

A Technical Advisory Committee (TAC) was created that was comprised of representatives from key stakeholders. TAC meetings were held at key milestones to present results and obtain feedback. In addition, several meetings were conducted with key stakeholders between October 2015 and October 2016 to present the results and obtain feedback.

Key stakeholders identified for this study included:

- WACOG
- LHMPO
- YMPO
- ADOT Northwest District
- ADOT Southwest District
- ADOT Technical Groups
- AGFD
- ASLD
- Federal Highway Administration (FHWA)

Several Working Papers were developed during the CPS. The Working Papers were provided to the TAC for review and comment.

1.7 Prior Studies and Recommendations

This study identified recommendations from previous studies, plans, and preliminary design documents. Studies, plans, and programs pertinent to the SR 95 corridor were reviewed to understand the full context of future planning and design efforts within and around the study area. These studies are organized below into four categories: Framework and Statewide Studies, Regional Planning Studies, Planning Assistance for Rural Areas (PARAs) and Small Area Transportation Studies (SATS), and Design Concept Reports (DCRs) and Project Assessments (PAs).

Framework and Statewide Studies

- ADOT 2016-2020 Five-Year Transportation Facilities and Construction Program
- ADOT Statewide Bicycle and Pedestrian Plan Update
- ADOT Climbing and Passing Lane Prioritization Study
- Arizona Key Commerce Corridors
- Arizona Multimodal Freight Analysis Study
- Arizona Roadway Departure Safety Implementation Plan
- Arizona State Rail Plan
- Arizona Statewide Rail Framework Study
- Freight Analysis Framework
- NCHRP Report 10: Performance Measures for Freight Transportation
- Statewide Transportation Planning Framework Western Arizona Regional Framework Study
- 2010 Statewide Transportation Framework North Havasu Area Transportation Study
- Arizona Statewide Travel Demand Model (AZTDM)
- Arizona Wildlife Action Plan/Arizona Wildlife Linkages Assessment
- Building a Quality Arizona (BQAZ)
- What Moves You Arizona, Long-Range Transportation Plan 2010-2035
- 2015-2019 State Transportation Improvement Program (STIP)

Regional Planning Studies

- Yuma Regional Transit Study
- Western Arizona Regional Transportation Three Year Coordination Plan Update, 2014-2015
- Yuma Metropolitan Planning Organization 2014-2037 Regional Transportation Plan (RTP)
- ADOT Kingman District Recommended Shoulder Improvement Priorities
- Lake Havasu Metropolitan Planning Organization 2040 Regional Transportation Plan

Planning Assistance for Rural Areas and Small Area Transportation Studies

- City of Yuma Transportation Master Plan

Design Concept Reports and Project Assessments

- BLM Yuma Field Office Approved Resource Management Plan / Record of Decision
- BLM Lake Havasu Field Office Approved Resource Management Plan / Record of Decision
- US 95, Avenue 9E to Aberdeen Road, DCR (2007)
- Final DCR, US 95, MP 42 to Cibola Lake Road (MP 82) (2012)
- SR 95 Realignment, Lake Havasu Area, Final Location Report and Environmental Overview (MP 175 to MP 191) (2009)
- Location/DCR and Environmental Impact Statement, SR 95 Realignment Study (I-40 to SR 68) (2010)

Summary of Prior Recommendations

Various studies and plans, including several DCRs, have recommended improvements to the SR 95 corridor as shown in **Table 3** and **Figure 4**. They include, but are not limited to:

- Widening of numerous sections of SR 95, some of which will require right-of-way acquisition. Many other proposed improvements are associated with the recommended widening:
  - Adding one general purpose lane in each direction from Avenue 9E to Fortuna Road
  - Adding one general purpose lane in each direction from Fortuna Road to Gila River
  - Adding one general purpose lane in each direction from MP 31.8 to MP 38.8
  - Adding one general purpose lane in each direction from Imperial Dam Road to Aberdeen Road

- Climbing and passing lanes have been recommended throughout the SR 95 corridor based on the Climbing and Passing Lane Prioritization Study.

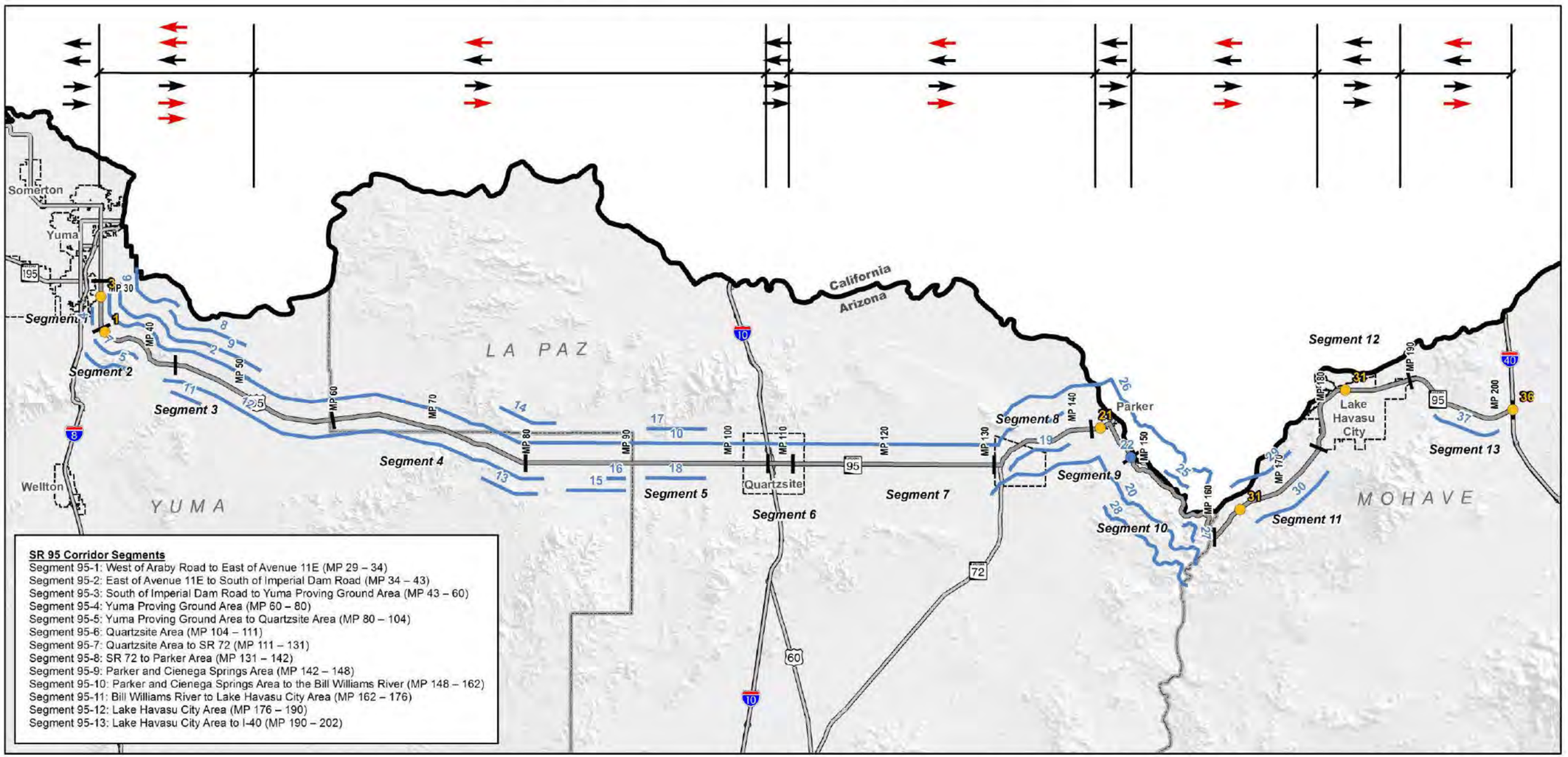
Table 3: Corridor Recommendations from Previous Studies

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization [M], Expansion [E])			Status of Recommendation			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N)?	
1	34	N/A	N/A	Construct Fortuna Wash Bridge		√		FY 2015	N/A	N	State Transportation Improvement Program, FY 2015-FY 2019
2	31.85	50.35	18.5	US 95, Avenue 9E to 18.5 miles north, widen from 2 to 6 lanes			√		N/A	N	Western Arizona Regional Framework Study, Working Paper 3
3	30.9	N/A	N/A	US 95 / Avenue 8E safety improvements		√			N/A	N	Yuma Metropolitan Planning Organization Regional Transportation Plan
4	31.9	33.7	1.8	Avenue 9E to Fortuna Road, widen from 2 to 4 lanes			√		N/A	N	Yuma Metropolitan Planning Organization Regional Transportation Plan
5	33.7	38.9	5.2	Fortuna Road to Gila River, widen from 2 to 4 lanes			√		N/A	N	Yuma Metropolitan Planning Organization Regional Transportation Plan
6	31.8	38.8	7	US 95, MP 31.8 to MP 38.8, widen from a 2 lane to a 4 lane highway with a continuous left turn lane			√		N/A	N	US 95, Avenue 9E to Aberdeen Road, Final Design Concept Report
7	33.7	38.9	5.2	US 95, Fortuna Road to Gila River, widen from 2 to 4 lanes			√		N/A	N	Yuma Metropolitan Planning Organization Regional Transportation Plan
8	38.8	47.7	8.9	US 95, MP 31.8 to MP 38.8, widen from a 2 lane to a 4 lane highway with a 50-foot graded median			√		N/A	N	US 95, Avenue 9E to Aberdeen Road, Final Design Concept Report
9	31.85	50.35	18.5	US 95, Avenue 9E to 18.5 miles north, widen from 2 to 6 lanes			√		N/A	N	Western Arizona Regional Framework Study, Working Paper 3
10	50.35	139.47	N/A	US 95/SR 95, 18.5 miles north of Avenue 9E to SR 68, widen from 2 to 4 lanes			√		N/A	N	Western Arizona Regional Framework Study, Working Paper 3
11	44.1	47.3	3.2	US 95, Imperial Dam Road to Aberdeen Road, widen from 2 to 4 lanes			√		N/A	N	Yuma Metropolitan Planning Organization Regional Transportation Plan
12	42	82	40	US 95, MP 42 to Cibola Lake Road, widen to four lanes			√		N/A	CE initiated, not completed, as no funding source identified	Final Design Concept Report, US 95, MP 42 to Cibola Lake Road
13	76	82	6	Southbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
14	76	82	6	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
15	84	90	6	Southbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
16	88	90	2	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
17	92	98	6	Southbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
18	92	98	6	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
19	132	139	7	Southbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
20	132	161	29	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study

Table 3: Corridor Recommendations from Previous Studies (continued)

Map Key Ref. #	Begin MP	End MP	Length (miles)	Project Description	Investment Category (Preservation [P], Modernization [M], Expansion [E])			Status of Recommendation			Name of Study
					P	M	E	Program Year	Project No.	Environmental Documentation (Y/N)?	
21	143	N/A	N/A	Intersection improvement at SR 95/ Mohave Road		√		FY 2017	N/A	N	State Transportation Improvement Program, FY 2015-FY 2019
22	148	N/A	N/A	SB Left turn Lane at Cienega Springs Road			√	FY 2015	N/A	N	State Transportation Improvement Program, FY 2015-FY 2019
23	N/A	N/A	N/A	Sidewalk opportunities identified on SR 95 within Lake Havasu and Parker.		√			N/A	N	Statewide Bicycle and Pedestrian Plan Update
24	N/A	N/A	N/A	Paved shoulder opportunity identified on SR 95 from Parker to Lake Havasu.		√			N/A	N	Statewide Bicycle and Pedestrian Plan Update
25	152	155	3	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
26	132	161	29	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
27	158	161	3	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
28	148	162	14	Passing Lanes			√		N/A	N	Yuma District Discussion, 6/29/2015
29	166	173	7	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
30	166	175	9	Southbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
31	165.8 and 183.6	N/A	N/A	Construct drainage improvements		√		FY 2017	N/A	N	2016-2020 Five – Year Transportation Facilities Construction Program
32	N/A	N/A	N/A	Bus transit service between Kingman and Lake Havasu City			√		N/A	N	Western Arizona Regional Framework Study, Working Paper 3
33	N/A	N/A	N/A	Sidewalk opportunities identified on SR 95 within Lake Havasu and Parker.		√			N/A	N	Statewide Bicycle and Pedestrian Plan Update
34	N/A	N/A	N/A	Paved shoulder opportunity identified on SR 95 from Parker to Lake Havasu.		√			N/A	N	Statewide Bicycle and Pedestrian Plan Update
35	162	176	N/A	Bicycle Accommodation / Widen Shoulders			√		N/A	N	Kingman District Discussion, 6/30/2015
36	N/A	N/A	N/A	Construct SR 95 / I-40 System Interchange		√	√		N/A	N	Western Arizona Regional Framework Study, Working Paper 3
37	194	201	7	Northbound passing lane			√		N/A	N	Climbing and Passing Lane Prioritization Study
38	186	202	N/A	SR 95, Widen to 4 lanes			√		N/A	N	Kingman District Discussion, 6/30/2015

Figure 4: Corridor Recommendations from Previous Studies



SR 95 Corridor Profile Study: I-8 to I-40
Corridor Recommendations from Previous Studies

2.0 CORRIDOR PERFORMANCE

This chapter describes the evaluation of the existing performance of the SR 95 corridor. A series of performance measures is used to assess the corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

2.1 Corridor Performance Framework

This study uses a performance-based process to define baseline corridor performance, diagnose corridor needs, develop corridor solutions, and prioritize strategic corridor investments. In support of this objective, a framework for the performance-based process was developed through a collaborative process involving ADOT and the CPS consultant teams.

Figure 5 illustrates the performance framework, which includes a two-tiered system of performance measures (primary and secondary) to evaluate baseline performance. The primary measures in each of five performance areas are used to define the overall health of the corridor, while the secondary measures identify locations that warrant further diagnostic investigation to delineate needs. Needs are defined as the difference between baseline corridor performance and established performance objectives.

Figure 5: Corridor Profile Performance Framework

The following five performance areas guide the performance-based corridor analyses:

- Pavement
- Bridge
- Mobility
- Safety
- Freight

These performance areas reflect national performance goals stated in *Moving Ahead for Progress in the 21st Century* (MAP-21):

- Safety: To achieve a significant reduction in traffic fatalities and serious injuries on all public roads
- Infrastructure Condition: To maintain the highway infrastructure asset system in a state of good repair
- Congestion Reduction: To achieve a significant reduction in congestion on the National Highway System
- System Reliability: To improve the efficiency of the surface transportation system
- Freight Movement and Economic Vitality: To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development
- Environmental Sustainability: To enhance the performance of the transportation system while protecting and enhancing the natural environment
- Reduced Project Delivery Delays: To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion

The MAP-21 performance goals were considered in the development of ADOT's P2P process, which integrates transportation planning with capital improvement programming and project delivery. Because the P2P program requires the preparation of annual transportation system performance reports using the five performance areas adopted for the CPS, consistency is achieved in the performance measures used for various ADOT analysis processes.

The performance measures include five primary measures: Pavement Index, Bridge Index, Mobility Index, Safety Index, and Freight Index. Additionally, a set of secondary performance measures provides for a more detailed analysis of corridor performance.

Each of the primary and secondary performance measures is comprised of one or more quantifiable indicators. A three-level scale was developed to standardize the performance scale across the five performance areas, with numerical thresholds specific to each performance measure:

Good/Above Average Performance – Rating is above the identified desirable/average range

Fair/Average Performance – Rating is within the identified desirable/average range

Poor/Below Average Performance – Rating is below the identified desirable/average range

Table 4 provides the complete list of primary and secondary performance measures for each of the five performance areas.

Table 4: Corridor Performance Measures

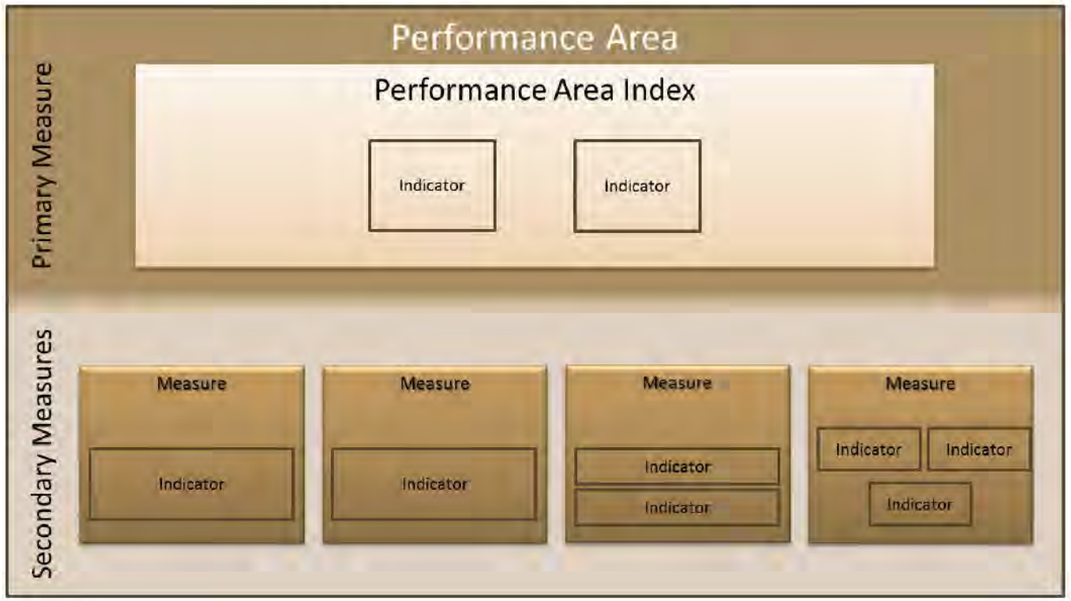
Performance Area	Primary Measure	Secondary Measures
Pavement	**Pavement Index** Based on a combination of International Roughness Index and cracking	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** Based on lowest of deck, substructure, superstructure and structural evaluation rating	• Bridge Sufficiency • Functionally Obsolete Bridges • Bridge Rating • Bridge Hot Spots
Mobility	**Mobility Index** Based on combination of existing and future daily volume-to-capacity ratios	• Future Congestion • Peak Congestion • Travel Time Reliability • Multimodal Opportunities
Safety	**Safety Index** Based on frequency of fatal and incapacitating injury crashes	• Directional Safety Index • Strategic Highway Safety Plan Emphasis Areas • Crash Unit Types • Safety Hot Spots
Freight	**Freight Index** Based on bi-directional truck planning time index	• Recurring Delay • Non-Recurring Delay • Closure Duration • Bridge Vertical Clearance • Bridge Vertical Clearance Hot Spots

The general template for each performance area is illustrated in **Figure 6**.

The guidelines for performance measure development are:

- Indicators and performance measures for each performance area should be developed for relatively homogeneous corridor segments
- Performance measures for each performance area should be tiered, consisting of primary measure(s) and secondary measure(s)
- Primary and secondary measures should assist in identifying those corridor segments that warrant in-depth diagnostic analyses to identify performance-based needs and a range of corrective actions known as solution sets
- One or more primary performance measures should be used to develop a Performance Index to communicate the overall health of a corridor and its segments for each performance area; the Performance Index should be a single numerical index that is quantifiable, repeatable, scalable, and capable of being mapped; primary performance measures should be transformed into a Performance Index using mathematical or statistical methods to combine one or more data fields from an available ADOT database
- One or more secondary performance measure indicators should be used to provide additional details to define corridor locations that warrant further diagnostic analysis; secondary performance measures may include the individual indicators used to calculate the Performance Index and/or "hot spot" features

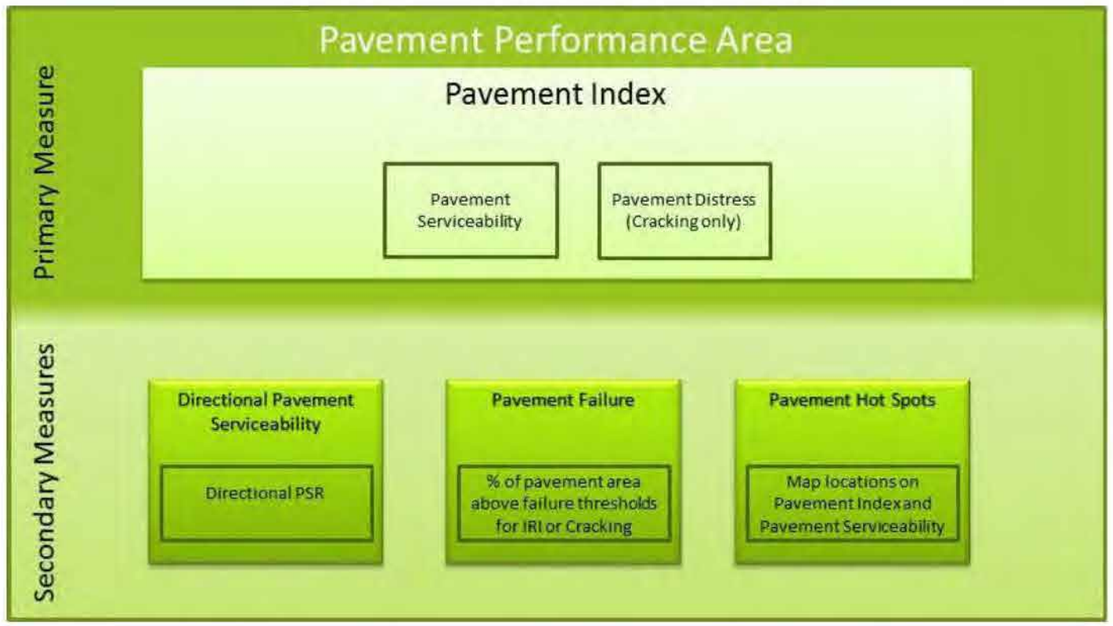
Figure 6: Performance Area Template



2.2 Pavement Performance Area

The Pavement performance area consists of a primary measure (Pavement Index) and three secondary measures, as shown in **Figure 7**. These measures assess the condition of the existing pavement along the SR 95 corridor. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C**.

Figure 7: Pavement Performance Measures



Primary Pavement Index

The Pavement Index is calculated using two pavement condition ratings: the Pavement Serviceability Rating (PSR) and the Pavement Distress Index (PDI).

The PSR is extracted from the International Roughness Index (IRI), a measurement of pavement roughness based on field-measured longitudinal roadway profiles. The PDI is extracted from the Cracking Rating (CR), a field-measured sample from each mile of highway.

Both the PSR and PDI use a 0 to 5 scale with 0 representing the lowest performance and 5 representing the highest. The Pavement Index for each segment is a weighted average of the directional ratings based on the number of travel lanes. Therefore, the condition of a section with more travel lanes will have a greater influence on the resulting segment Pavement Index than the condition of a section with fewer travel lanes.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the Pavement performance area, the relevant operating environments are designated as interstate and non-interstate segments. For the SR 95 corridor, the following operating environment was identified:

- Non-interstate: all segments

Secondary Pavement Measures

Three secondary measures provide an in-depth evaluation of the different characteristics of pavement performance:

Directional Pavement Serviceability

- Weighted average (based on number of lanes) of the PSR for the pavement in each direction of travel

Pavement Failure

- Percentage of pavement area rated above failure thresholds for IRI or Cracking

Pavement Hot Spots

- A Pavement "hot spot" exists where a given one-mile section of roadway rates as being in "poor" condition
- Highlights problem areas that may be under-represented in a segment average; this measure is recorded and mapped, but not included in the Pavement performance area rating calculations

Pavement Performance Results

The Pavement Index provides a high-level assessment of the pavement condition for the corridor and for each segment. The three secondary measures provide more detailed information to assess pavement performance.

Based on the results of this analysis, the following observations were made:

- The weighted average of the Pavement Index indicates "good" overall pavement performance for the SR 95 corridor
- Segment 95-13 has "poor" Pavement Index and % Area Failure performance with ratings of 2.77 and 24.7%, respectively
- Segment 95-6 and Segment 95-8 have "fair" Pavement Index and Directional PSR performance
- Segment 95-3 and Segment 95-6 both have "poor" % Area Failure performance with ratings of more than 30%
- Segments 95-7, 8, 9, and 13 have fair % Area Failure performance
- Pavement hot spots include:
  - Segment 95-3 northbound (NB)/southbound (SB) MP 46-47, 48-51, and 52-54
  - Segment 95-6 NB/SB MP 104-105

- Segment 95-7 NB/SB MP 120-121
- Segment 95-8 NB/SB MP 131-132
- Segment 95-9 NB/SB MP 148-149
- Segment 95-12 NB/SB MP 181-183
- Segment 95-13 NB/SB MP 191-194

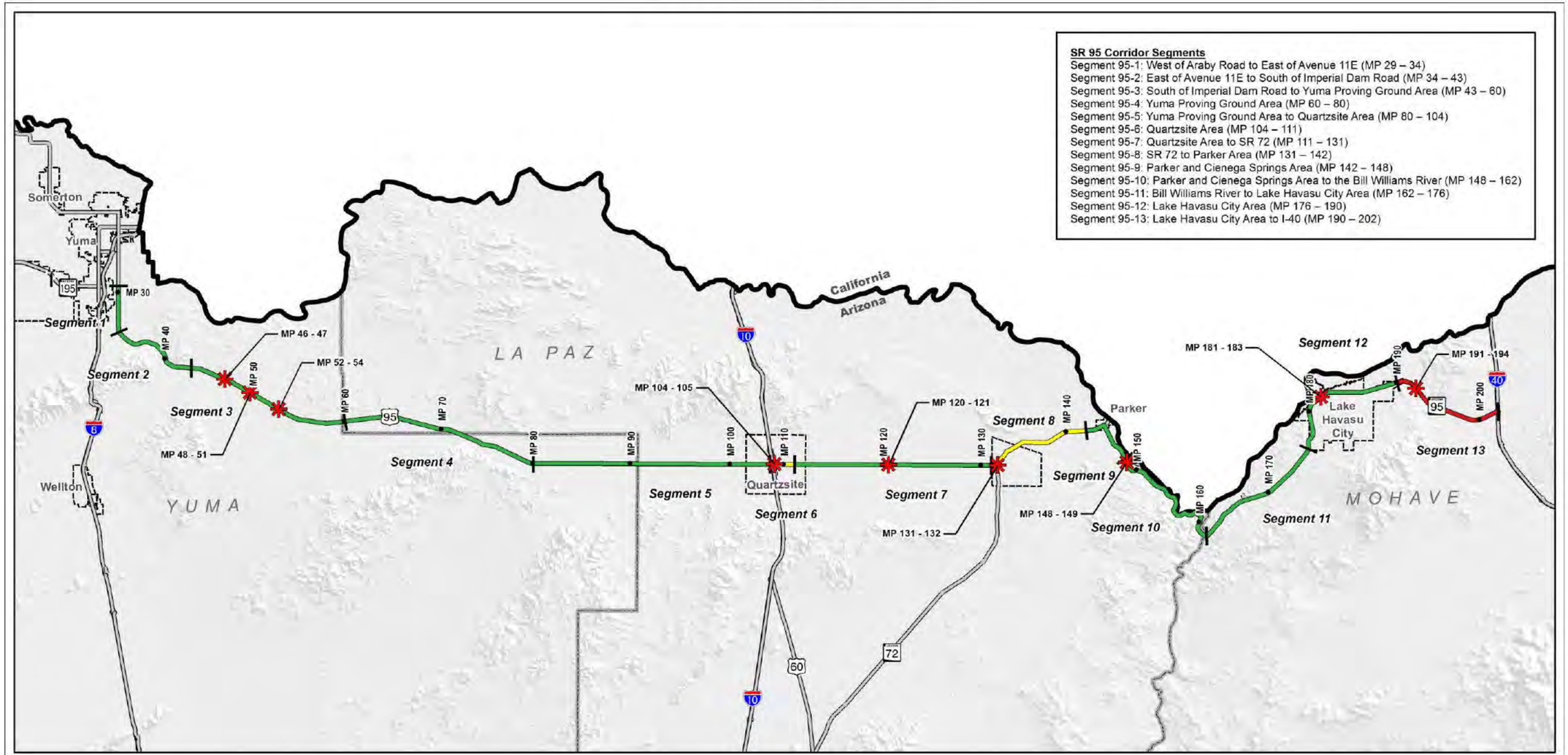
Table 5 summarizes the Pavement performance results for the SR 95 corridor. **Figure 8** illustrates the primary Pavement Index performance and locations of Pavement hot spots along the SR 95 corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 5: Pavement Performance

Segment #	Segment Length (miles)	Pavement Index	Directional PSR		% Area Failure
			NB	SB	
95-1	5	3.54	3.64		0.0%
95-2	9	3.86	3.78		0.0%
95-3	17	3.63	3.51		35.3%
95-4	20	4.41	4.28		0.0%
95-5	24	4.14	4.12		0.0%
95-6	3	3.27	3.23		33.3%
95-7	20	3.69	3.76		5.0%
95-8	11	3.49	3.27		9.1%
95-9	6	3.59	3.84		14.3%
95-10	14	3.66	3.59		0.0%
95-11	14	4.13	4.13		0.0%
95-12	14	3.77	3.51	4.15	14.3%
95-13	12	2.77	3.77		24.7%
Weighted Corridor Average		3.79	3.80	3.86	8.7%

SCALES		
Performance Level	**Non-Interstate**	
Good	> 3.50	< 5%
Fair	2.90 - 3.50	5% - 20%
Poor	< 2.90	> 20%

Figure 8: Pavement Performance

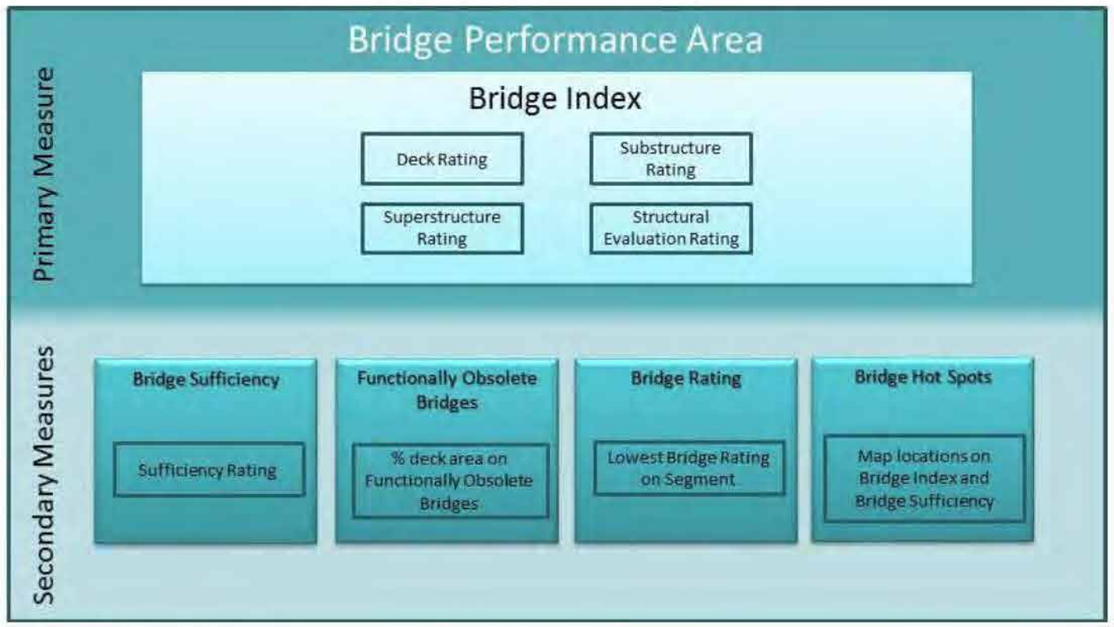


SR 95 Corridor Profile Study: I-8 to I-40
Pavement Index and Hot Spots
2014 Data

2.3 Bridge Performance Area

The Bridge performance area consists of a primary measure (Bridge Index) and four secondary measures, as shown in **Figure 9**. These measures assess the condition of the existing bridges along the SR 95 corridor. Only bridges that carry mainline traffic or bridges that cross the mainline are included in the calculation. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C**.

Figure 9: Bridge Performance Measures



Primary Bridge Index

The Bridge Index is calculated based on the use of four different bridge condition ratings from the ADOT Bridge Database, also known as the Arizona Bridge Information and Storage System (ABISS). The four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating. These ratings are based on inspection reports and establish the structural adequacy of each bridge. The performance of each individual bridge is established by using the lowest of these four ratings. The use of these ratings, and the use of the lowest rating, is consistent with the approach used by the ADOT Bridge Group to assess the need for bridge rehabilitation. The Bridge Index is calculated as a weighted average for each segment based on deck area.

Secondary Bridge Measures

Four secondary measures provide an in-depth evaluation of the characteristics of each bridge:

Bridge Sufficiency

- Multipart rating includes structural adequacy and safety factors as well as functional aspects such as traffic volume and length of detour
- Rates the structural and functional sufficiency of each bridge on a 100-point scale

Functionally Obsolete Bridges

- Percentage of total deck area in a segment that is on functionally obsolete bridges
- Identifies bridges that no longer meet standards for current traffic volumes, lane width, shoulder width, or bridge rails
- A bridge that is functionally obsolete may still be structurally sound

Bridge Rating

- The lowest rating of the four bridge condition ratings (substructure, superstructure, deck, and structural evaluation) on each segment
- Identifies lowest performing evaluation factor on each bridge

Bridge Hot Spots

- A Bridge "hot spot" is identified where a given bridge has a bridge rating of 4 or lower or multiple ratings of 5 between the deck, superstructure, or substructure ratings
- Identifies particularly low-performing bridges or those that may decline to low performance in the immediate future

Bridge Performance Results

The Bridge Index provides a high-level assessment of the structural condition of bridges for the corridor and for each segment. The four secondary measures provide more detailed information to assess bridge performance.

Based on the results of this analysis, the following observations were made:

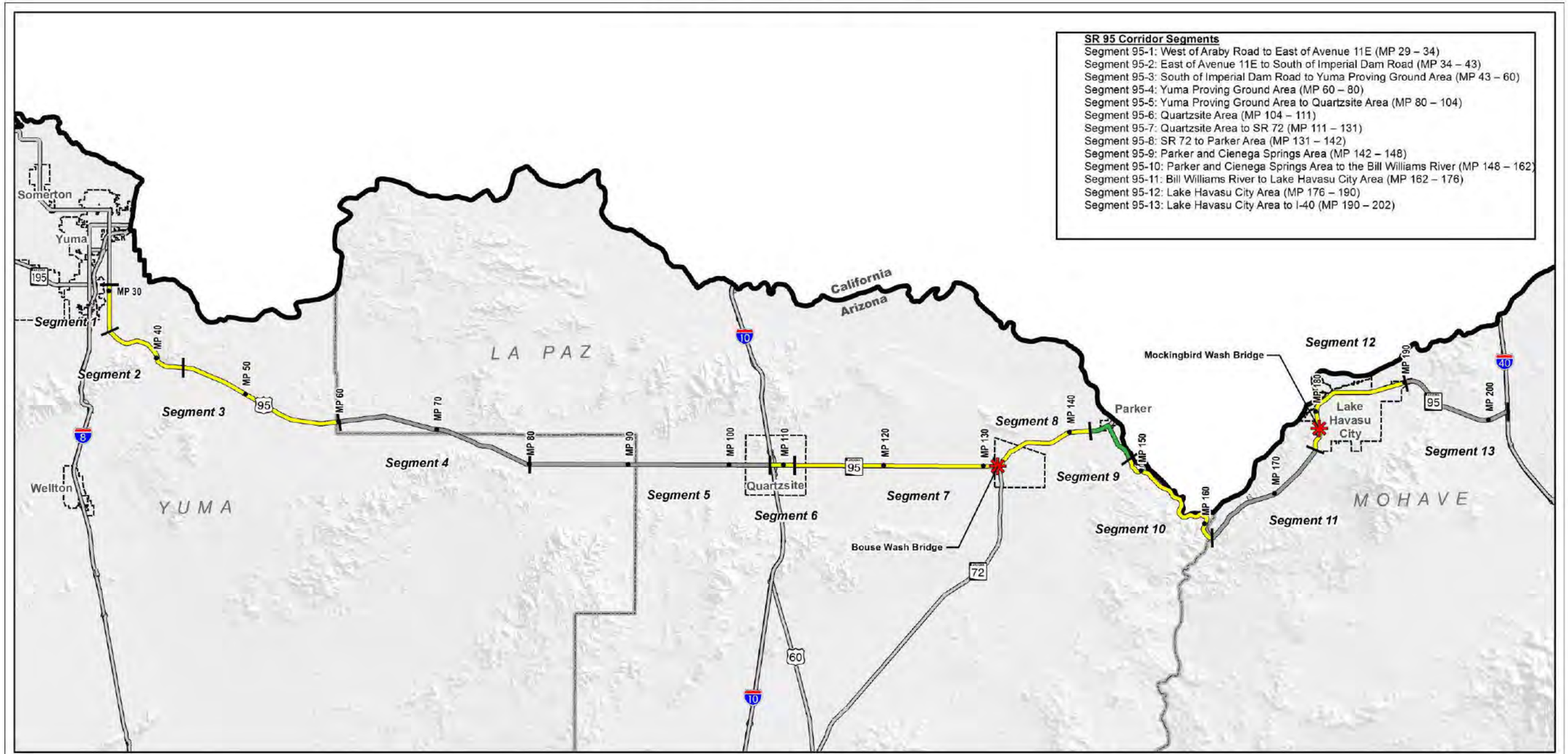
- The weighted average of the Bridge Index indicates "fair" overall bridge performance
- All segments that contain bridges have "fair" Bridge Index performance except Segment 95-9, which has "good" Bridge Index performance
- All segments that contain bridges have "fair" Bridge Sufficiency performance except Segments 95-1 and 95-9, which have "good" Bridge Sufficiency performance
- There are two functionally obsolete bridges (in Segment 95-2 and Segment 95-12)
- All segments that contain bridges have "fair" Lowest Bridge Rating performance
- Bridge hot spots include:
  - Segment 95-8, Bouse Wash Bridge (#1321) MP 131.33
  - Segment 95-12, Mockingbird Wash Bridge (#1915) MP 178.26

Table 6 summarizes the Bridge performance results for the SR 95 corridor. **Figure 10** illustrates the primary Bridge Index performance and locations of Bridge hot spots along the SR 95 corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 6: Bridge Performance

Segment #	Segment Length (miles)	# of Bridges	Bridge Index	Sufficiency Rating	% of Deck Area on Functionally Obsolete Bridges	Lowest Bridge Rating
95-1	5	1	6.00	80.87	0.0%	6
95-2	9	2	6.00	78.12	8.5%	6
95-3	17	1	5.00	68.22	0.0%	5
95-4	20	No Bridges				
95-5	24	No Bridges				
95-6	3	1	6.00	76.00	0.0%	6
95-7	20	1	6.00	79.00	0.0%	6
95-8	11	1	5.00	67.00	0.0%	5
95-9	6	2	6.76	80.86	0.0%	6
95-10	14	2	6.25	78.25	0.0%	6
95-11	14	No Bridges				
95-12	14	3	5.46	76.82	20.2%	5
95-13	12	No Bridges				
Weighted Corridor Average			5.72	75.44	3.7%	5.57
SCALES						
Performance Level			**All**			
Good			> 6.5	> 80	< 12%	> 6
Fair			5.0 - 6.5	50 - 80	12% - 40%	5 – 6
Poor			< 5.0	< 50	> 40 %	< 5

Figure 10: Bridge Performance

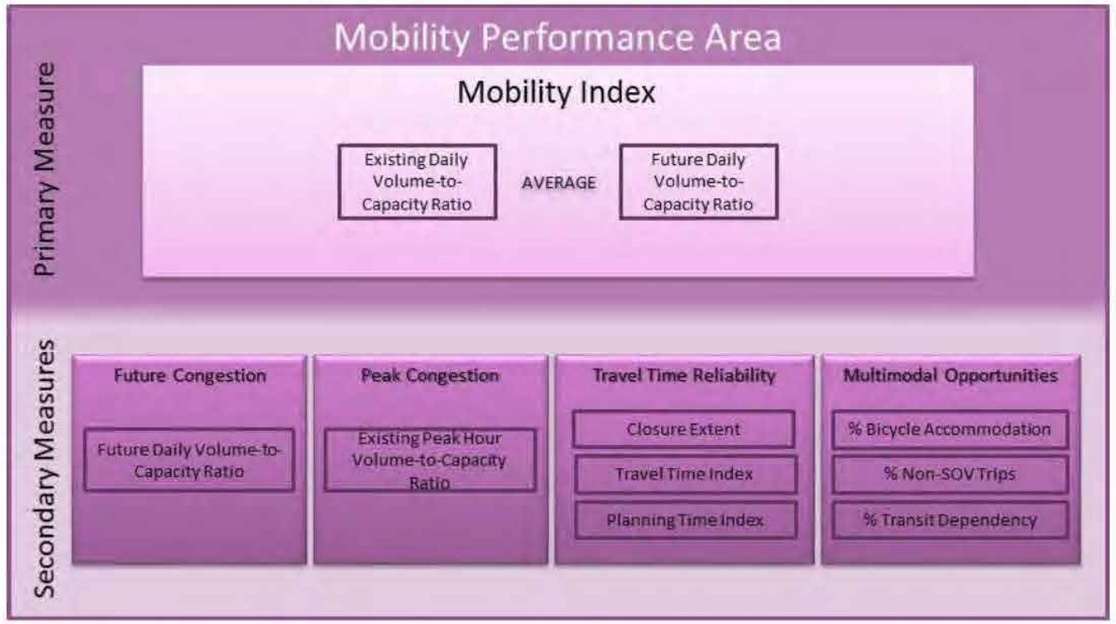


SR 95 Corridor Profile Study: I-8 to I-40
Bridge Index and Hot Spots
2012 - 2014 Data

2.4 Mobility Performance Area

The Mobility performance area consists of a primary measure (Mobility Index) and four secondary measures, as shown in **Figure 11**. These measures assess the condition of existing mobility along the SR 95 corridor. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C**.

Figure 11: Mobility Performance Measures



Primary Mobility Index

The Mobility Index is an average of the existing (2014) daily volume-to-capacity (V/C) ratio and the future (2035 AZTDM) daily V/C ratio for each segment of the corridor. The V/C ratio is an indicator of the level of congestion. This measure compares the average annual daily traffic (AADT) volume to the capacity of the corridor segment as defined by the service volume for level of service (LOS) E. By using the average of the existing and future year daily volumes, this index measures the level of daily congestion projected to occur in approximately ten years (2025) if no capacity improvements are made to the corridor.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the Mobility performance area, the relevant operating environments are urban vs. rural setting and interrupted flow (e.g., signalized at-grade intersections are present) vs. uninterrupted flow (e.g., controlled access grade-separated conditions such as a freeway or interstate highway). For the SR 95 corridor, the following operating environments were identified:

- Urban Interrupted Flow: Segments 95-1, 6, 9, and 12
- Rural Uninterrupted Flow: Segments 95-2, 3, 4, 5, 7, 8, 10, 11, and 13

Secondary Mobility Measures

Four secondary measures provide an in-depth evaluation of operational characteristics of the corridor:

Future Congestion – Future Daily V/C

- The future (2035 AZTDM) daily V/C ratio. This measure is the same value used in the calculation of the Mobility Index
- Provides a measure of future congestion if no capacity improvements are made to the corridor

Peak Congestion – Existing Peak Hour V/C

- The peak hour V/C ratio for each direction of travel
- Provides a measure of existing peak hour congestion during typical weekdays

Travel Time Reliability – Three separate travel time reliability indicators together provide a comprehensive picture of how much time may be required to travel within the corridor:

- Closure Extent:
  - The average number of instances a milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel; a weighted average is applied to each closure that considers the distance over which the closure occurs
  - Closures related to crashes, weather, or other incidents are a significant contributor to non-recurring delays; construction-related closures are excluded from the analysis
- Directional Travel Time Index (TTI):
  - The ratio of the average peak period travel time to the free-flow travel time (based on the posted speed limit) in a given direction
  - The TTI recognizes the delay potential from recurring congestion during peak periods; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics
- Directional Planning Time Index (PTI):
  - The ratio of the 95th percentile travel time to the free-flow travel time (based on the posted speed limit) in a given direction
  - The PTI recognizes the delay potential from non-recurring delays such as traffic crashes, weather, or other incidents; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics
  - The PTI indicates the amount of time in addition to the typical travel time that should be allocated to make an on-time trip 95% of the time in a given direction

Multimodal Opportunities – Three multimodal opportunity indicators reflect the characteristics of the corridor that promote alternate modes to the single occupancy vehicle (SOV) for trips along the corridor:

- % Bicycle Accommodation:
  - Percentage of a segment that accommodates bicycle travel; bicycle accommodation on the roadway or on shoulders varies depending on traffic volumes, speed limits, and surface type
  - Encouraging bicycle travel has the potential to reduce automobile travel, especially on non-interstate highways
- % Non-SOV Trips:
  - The percentage of trips (less than 50 miles in length) by non-SOVs
  - The percentage of non-SOV trips in a corridor gives an indication of travel patterns along a section of roadway that could benefit from additional multimodal options
- % Transit Dependency:
  - The percentage of households that have zero or one automobile and households where the total income level is below the federally defined poverty level
  - Used to track the level of need among those who are considered transit dependent and more likely to utilize transit if it is available

Mobility Performance Results

The Mobility Index provides a high-level assessment of mobility conditions for the corridor and for each segment. The four secondary measures provide more detailed information to assess mobility performance.

Based on the results of this analysis, the following observations were made:

- The weighted average of the Mobility Index indicates "good" overall mobility performance for all segment on the SR 95 corridor
- During the existing peak hour, traffic operations are "good" for all segments
- Segment 95-8 and 12 are anticipated to have "fair" performance in the future, according to the Future Daily V/C performance indicator
- The TTI performance indicator shows that the SR 95 corridor segments generally have "good" performance; Segment 95-13 has the highest TTI performance indicator
- The PTI performance indicator shows many of the SR 95 segments, both NB and SB, have "fair" or "poor" performance in terms of reliability; Segments 95-4, 6, 9, 12, and 13 have the least reliable travel time
- More than half of the SR 95 corridor segments show "poor" or "fair" performance for % Non-SOV Trips, indicating single-occupant trips are more common; overall, the corridor's weighted average performance regarding % Non-SOV Trips is "fair"
- All segments show "good" or "fair" performance in the Closure Extent performance indicator; the overall weighted average for closures show "good" performance for the corridor
- Overall, the SR 95 corridor has "poor" performance for % Bicycle Accommodation

Table 7 summarizes the Mobility performance results for the SR 95 corridor. **Figure 12** illustrates the primary Mobility Index performance along the SR 95 corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 7: Mobility Performance

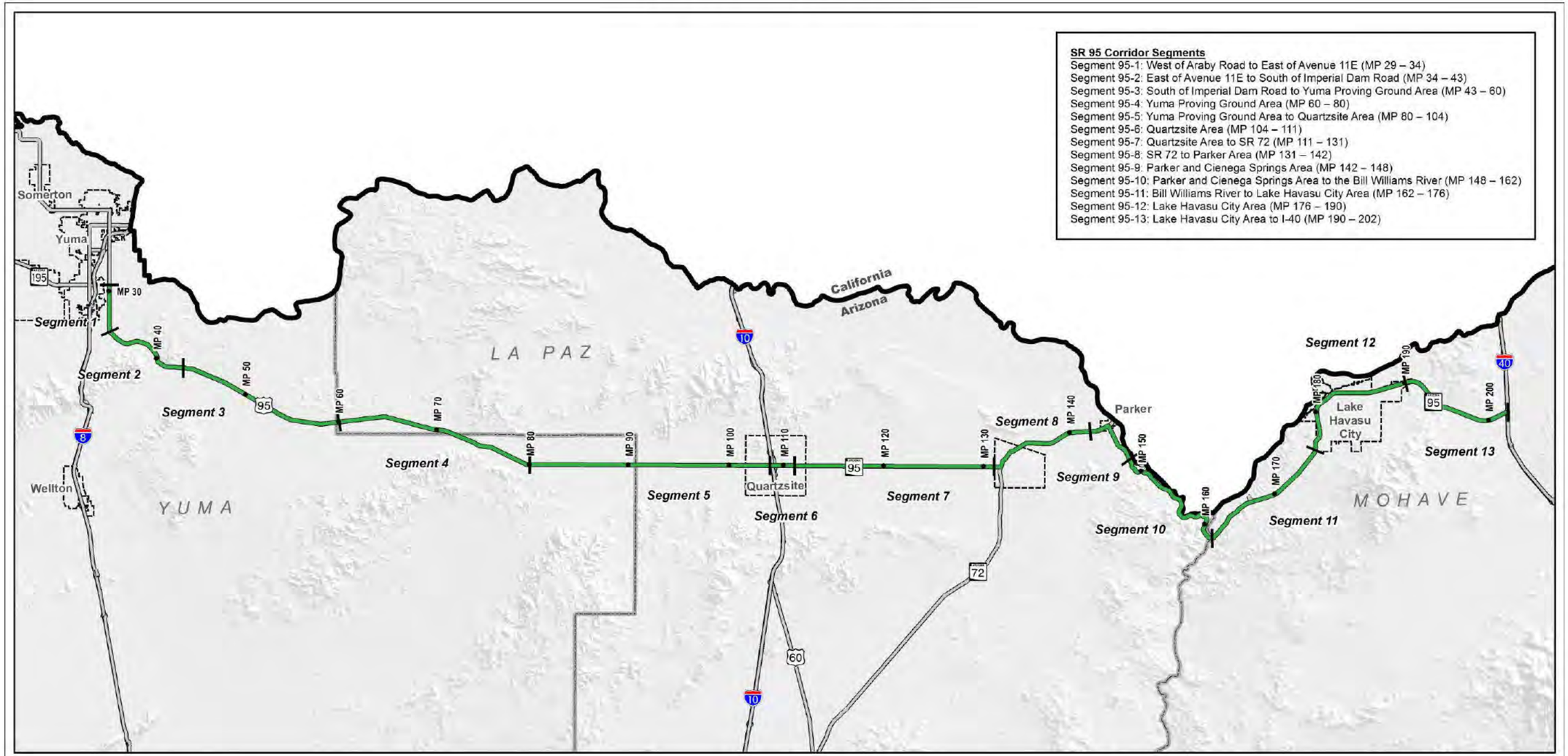
Segment #	Segment Length (miles)	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent (instances/ milepost/year/mile)		Directional TTI (all vehicles)		Directional PTI (all vehicles)		% Bicycle Accommodation.	% Non-Single Occupancy Vehicle (SOV) Trips
				NB	SB	NB	SB	NB	SB	NB	SB		
95-1*[1]	5	0.35	0.41	0.30	0.29	0.37	0.12	1.08	1.15	2.96	3.90	62%	18.6%
95-2^[2]	9	0.42	0.50	0.41	0.41	0.16	0.02	1.05	1.00	2.21	1.14	56%	19.8%
95-3^[2]	17	0.09	0.11	0.12	0.11	0.07	0.00	1.02	1.00	1.19	1.16	8%	19.8%
95-4^[2]	20	0.12	0.15	0.17	0.17	0.03	0.01	1.19	1.04	5.36	1.40	0%	5.0%
95-5^[2]	24	0.10	0.12	0.14	0.14	0.01	0.06	1.00	1.06	1.13	1.55	2%	23.0%
95-6*[1]	3	0.13	0.17	0.15	0.15	0.00	0.08	1.48	1.31	7.75	5.42	87%	24.6%
95-7^[2]	20	0.21	0.29	0.24	0.25	0.37	0.08	1.06	1.04	1.32	1.43	0%	14.6%
95-8^[2]	11	0.45	0.61	0.36	0.36	0.04	0.27	1.00	1.00	1.71	1.37	25%	9.1%
95-9*[1]	6	0.32	0.35	0.32	0.36	0.51	0.03	1.31	1.29	7.35	4.58	61%	11.4%
95-10^[2]	14	0.36	0.40	0.33	0.33	0.18	0.16	1.06	1.00	1.28	1.15	2%	2.2%
95-11^[2]	14	0.27	0.30	0.24	0.23	0.17	0.29	1.08	1.05	1.36	1.61	0%	8.3%
95-12*[1]	14	0.64	0.83	0.42	0.40	0.46	0.09	1.24	1.20	4.71	3.78	9%	18.1%
95-13^[2]	12	0.36	0.42	0.29	0.28	0.15	0.13	1.06	2.01	3.95	7.29	71%	14.3%
Weighted Corridor Average		0.27	0.33	0.25	0.25	0.17	0.10	1.09	1.13	2.66	2.24	17%	14.0%

SCALES

Performance Level	Urban Rural	All	Uninterrupted	Interrupted	All	
Good	< 0.71[1] < 0.56[2]	< 0.22	< 1.15^ < 1.30*	< 1.30^ < 3.00*	> 90%	> 17%
Fair	0.71 - 0.89[1] 0.56 - 0.76[2]	0.22 – 0.62	1.15 - 1.33^ 1.30 - 2.00*	1.30 - 1.50^ 3.00 - 6.00*	60% - 90%	11% - 17%
Poor	> 0.89[1] > 0.76[2]	> 0.62	> 1.33^ > 2.00*	> 1.50^ > 6.00*	< 60%	< 11%

[1]Urban Operating Environment
[2]Rural Operating Environment
^Uninterrupted Flow Facility
*Interrupted Flow Facility

Figure 12: Mobility Performance



2.5 Safety Performance Area

The Safety performance area consists of a primary measure (Safety Index) and four secondary measures, as illustrated in **Figure 13**. All measures relate to crashes that result in fatal and incapacitating injuries, as these types of crashes are the emphasis of the ADOT Strategic Highway Safety Plan (SHSP), FHWA, and MAP-21. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C**.

Figure 13: Safety Performance Measures

Primary Safety Index

The Safety Index is based on the bi-directional frequency and rate of fatal and incapacitating injury crashes, the relative cost of those types of crashes, and crash occurrences on similar roadways in Arizona. According to ADOT's 2010 Highway Safety Improvement Program Manual, fatal crashes have an estimated cost that is 14.5 times the estimated cost of incapacitating injury crashes ($5.8 million compared to $400,000).

Each corridor segment is rated on a scale by comparing the segment score with the average statewide score for similar operating environments. Because crash frequencies and rates vary depending on the operating environment of a particular roadway, statewide values were developed for similar operating environments defined by functional classification, urban vs. rural setting, number of travel lanes, and traffic volumes. For the SR 95 corridor, the following operating environments were identified:

- 2 or 3 Lane Undivided Highway: Segments 95-2, 3, 4, 5, 7, 8, 10, 11, and 13
- 4 or 5 Lane Undivided Highway: Segments 95-1, 6, 9, and 12

Secondary Safety Measures

Four secondary measures provide an in-depth evaluation of the different characteristics of safety performance:

Directional Safety Index

- This measure is based on the directional frequency and rate of fatal and incapacitating injury crashes

SHSP Emphasis Areas

ADOT's 2014 SHSP identified several emphasis areas for reducing fatal and incapacitating injury crashes. This measure compares rates of crashes in the top five SHSP emphasis areas to other corridors with a similar operating environment. The top five SHSP emphasis areas relate to the following driver behaviors:

- Speeding and aggressive driving
- Impaired driving
- Lack of restraint usage
- Lack of motorcycle helmet usage
- Distracted driving

Crash Unit Types

- The percentage of total fatal and incapacitating injury crashes that involves crash unit types of motorcycles, trucks, or non-motorized travelers is compared to the statewide average on roads with similar operating environments

Safety Hot Spots

- The hot spot analysis identifies abnormally high concentrations of fatal and incapacitating injury crashes along the study corridor by direction of travel

For the Safety Index and the secondary safety measures, any segment that has too small of a sample size to generate statistically reliable performance ratings for a particular performance measure is considered to have "insufficient data" and is excluded from the safety performance evaluation for that particular performance measure.

Safety Performance Results

The Safety Index provides a high-level assessment of safety performance for the corridor and for each segment. The four secondary measures provide more detailed information to assess safety performance.

Based on the results of this analysis, the following observations were made:

- The crash unit type performance measures for crashes involving trucks, motorcycles, and non-motorized travelers had insufficient data to generate reliable performance ratings for the SR 95 corridor
- Several segments had insufficient data to generate reliable performance ratings for crashes involving behaviors associated with the SHSP Top 5 Emphasis Areas
- A total of 159 fatal and incapacitating injury crashes occurred along the SR 95 corridor from 2010-2014; of these crashes, 24 were fatal and 135 involved incapacitating injuries
- The weighted average of the Safety Index indicates "above average" performance compared to other segments statewide that have similar operating environments, meaning the corridor generally performs well as it relates to safety
- The Safety Index value for Segments 95-1, 2, 4, 11, and 12 indicates "below average" performance, meaning these segments have more crashes than is typical statewide
- The Directional Safety Index for Segments 95-1, 2, 4, 9, 11, 12, and 13 indicates "below average" performance, meaning these segments have more crashes than is typical statewide
- The percentage of crashes related to the SHSP Top 5 Emphasis Areas is higher in Segment 95-11 than the statewide average for similar operating environments
- Crashes have occurred more frequently NB than SB
- Safety hot spots include:
    - Segment 95-12: NB/SB MP 179-190

Table 8 summarizes the Safety performance results for the SR 95 corridor. **Figure 14** illustrates the primary Safety Index performance and locations of Safety hot spots along the SR 95 corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 8: Safety Performance

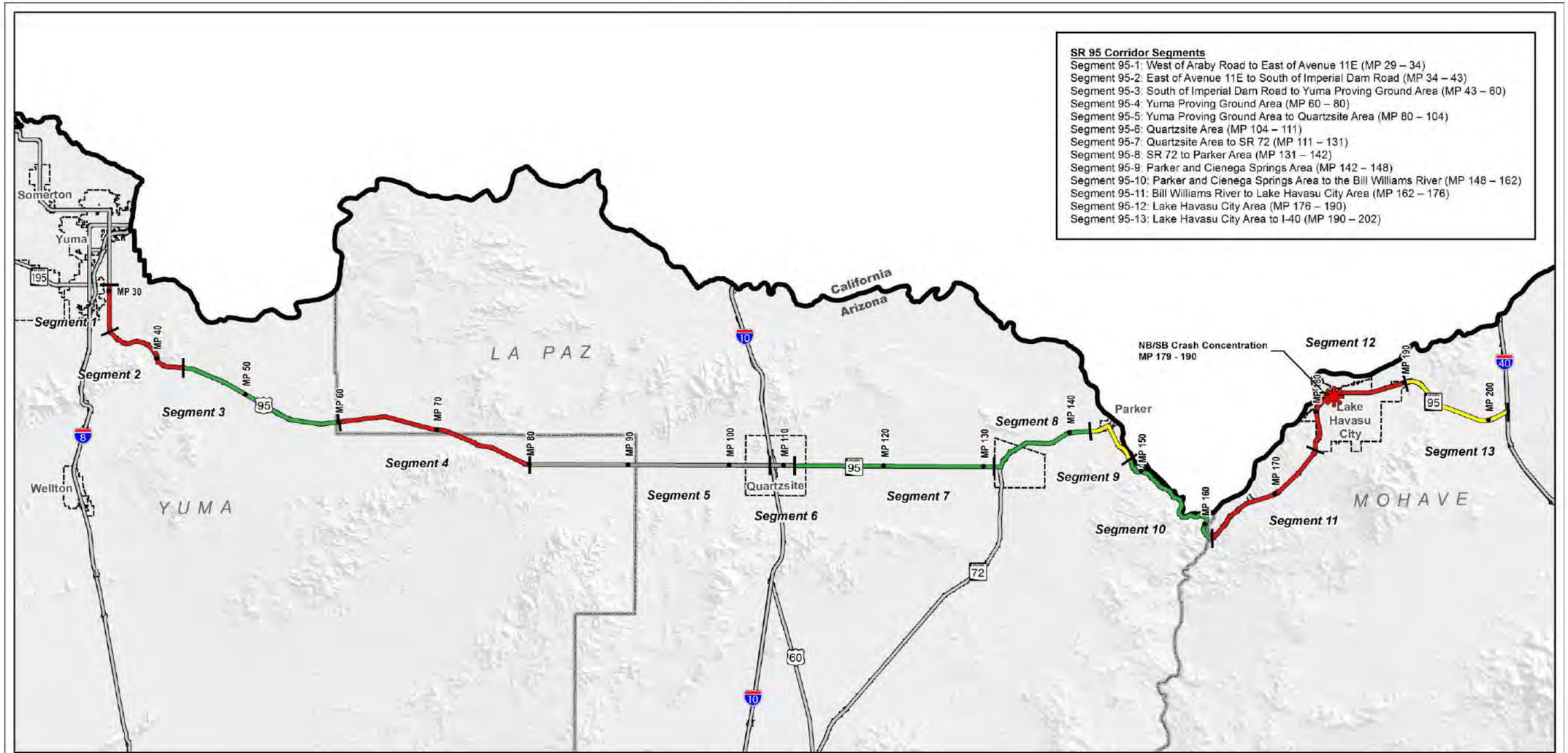
Segment #	Segment Length (miles)	Total Fatal & Incapacitating Injury Crashes (F/I)	Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers
				NB	SB				
95-1[b]	5	2/4	1.30	1.29	1.31	17%	Insufficient Data	Insufficient Data	Insufficient Data
95-2[a]	9	2/3	1.29	2.42	0.16	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
95-3[a]	17	0/2	0.07	Insufficient Data	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
95-4[a]	20	3/2	1.48	2.00	0.95	20%	Insufficient Data	Insufficient Data	Insufficient Data
95-5[a]	24	2/0	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
95-6[b]	3	1/0	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
95-7[a]	20	0/0	0.00	0.00	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
95-8[a]	11	0/4	0.14	0.28	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
95-9[b]	6	2/4	1.10	2.13	0.07	17%	Insufficient Data	Insufficient Data	Insufficient Data
95-10[a]	14	1/7	0.62	0.28	0.96	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
95-11[a]	14	4/10	1.91	1.89	1.93	64%	Insufficient Data	Insufficient Data	Insufficient Data
95-12[b]	14	5/92	1.77	1.63	1.91	45%	Insufficient Data	Insufficient Data	Insufficient Data
95-13[a]	12	2/7	1.06	1.88	0.24	44%	Insufficient Data	Insufficient Data	Insufficient Data
Weighted Corridor Average			0.91	1.28	0.69	37%	Insufficient Data	Insufficient Data	Insufficient Data
SCALES									
Performance Level			**2 or 3 Lane Undivided Highway 4 or 5 Lane Undivided Highway**						
Above Average			< 0.94[a] < 0.80[b]			< 51%[a] < 42%[b]	< 6%[a] < 6%[b]	< 19%[a] < 6%[b]	< 5%[a] < 5%[b]
Average			0.94 - 1.06[a] 0.80 – 1.20[b]			51% - 57%[a] 42% - 51%[b]	6% - 10%[a] 6% - 10%[b]	19% - 27%[a] 6% - 9%[b]	5% - 8%[a] 5% - 8%[b]
Below Average			> 1.06[a] > 1.20[b]			> 57%[a] > 51%[b]	> 10%[a] > 10%[b]	> 27%[a] > 9%[b]	> 8%[a] > 8%[b]

[a]2 or 3 Lane Undivided Highway

[b]4 or 5 Lane Undivided Highway

Note: "Insufficient Data" indicates there was not enough data available to generate reliable performance ratings

Figure 14: Safety Performance



2.6 Freight Performance Area

The Freight performance area consists of a single primary measure (Freight Index) and five secondary measures, as illustrated in **Figure 15**. All measures relate to the reliability of truck travel as measured by observed truck travel time speed and delays to truck travel from freeway closures or physical restrictions to truck travel. The detailed calculations and equations developed for each measure are available in **Appendix B** and the performance data for this corridor is contained in **Appendix C**.

Figure 15: Freight Performance Measures

Primary Freight Index

The Freight Index is a reliability performance measure based on the PTI for truck travel. The Truck Planning Time Index (TPTI) is the ratio of the 95th percentile truck travel time to the free-flow truck travel time. The TPTI reflects the extra buffer time needed for on-time delivery while accounting for non-recurring delay. Non-recurring delay refers to unexpected or abnormal delay due to closures or restrictions resulting from circumstances such as crashes, inclement weather, and construction activities.

Each corridor segment is rated on a scale with other segments in similar operating environments. Within the Freight performance area, the relevant operating environments are interrupted flow (e.g., signalized at-grade intersections are present) and uninterrupted flow (e.g., controlled access grade-separated conditions such as a freeway or interstate highway).

For the SR 95 corridor, the following operating environments were identified:

- Interrupted Flow: Segments 95-1, 6, 9, and 12
- Uninterrupted Flow: Segments 95-2, 3, 4, 5, 7, 8, 10, 11, and 13

Secondary Freight Measures

The Freight performance area includes five secondary measures that provide an in-depth evaluation of the different characteristics of freight performance:

Recurring Delay (Directional Truck Travel Time Index [TTTI])

- The ratio of the average peak period truck travel time to the free-flow truck travel time (based on the posted speed limit up to a maximum of 65 miles per hour) in a given direction
- The TTTI recognizes the delay potential from recurring congestion during peak periods; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics

Non-Recurring Delay (Directional TPTI)

- The ratio of the 95th percentile truck travel time to the free-flow truck travel time (based on the posted speed limit up to a maximum of 65 miles per hour) in a given direction
- The TPTI recognizes the delay potential from non-recurring delays such as traffic crashes, weather, or other incidents; different thresholds are applied to uninterrupted flow (freeways) and interrupted flow (non-freeways) to account for flow characteristics
- The TPTI indicates the amount of time in addition to the typical travel time that should be allocated to make an on-time trip 95% of the time in a given direction

Closure Duration

- The average time (in minutes) a milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel; a weighted average is applied to each closure that considers the distance over which the closure occurs

Bridge Vertical Clearance

- The minimum vertical clearance (in feet) over the travel lanes for underpass structures on each segment

Bridge Vertical Clearance Hot Spots

- A Bridge vertical clearance "hot spot" exists where the underpass vertical clearance over the mainline travel lanes is less than 16.25 feet and no exit/entrance ramps exist to allow vehicles to bypass the low clearance location
- If a location with a vertical clearance less than 16.25 feet can be avoided by using immediately adjacent exit/entrance ramps rather than the mainline, it is not considered a hot spot

Freight Performance Results

The Freight Index provides a high-level assessment of freight mobility for the corridor and for each segment. The five secondary measures provide more detailed information to assess freight performance.

Based on the results of this analysis, the following observations were made:

- The weighted average of the Freight Index indicates "poor" overall freight mobility performance for the SR 95 corridor; all but two SR 95 corridor segments show either "poor" or "fair" performance
- The weighted average directional TTTI performance indicator shows "good" performance for the NB direction and "fair" performance for the SB direction
- The weighted average directional TPTI performance indicator shows that the corridor has "poor" travel time reliability performance in the NB direction and "fair" travel time reliability performance in the SB direction due to non-recurring congestion
- The TPTI performance indicator shows that Segments 95-2, 4, 8, 11, and 13 have "poor" travel time reliability performance
- Segment 95-4 NB has the highest directional TPTI performance indicator of the corridor and corresponds to where a border patrol checkpoint exists
- Segment 95-1, 6, 9, 11, and 12 have "fair" performance in the Closure Duration performance indicator; Segment 95-7 (NB) and Segment 95-8 (SB) have "poor" performance
- The overall weighted average shows "good" performance for the SR 95 corridor in the Closure Duration performance indicator
- No bridge vertical clearance hot spots exist along the SR 95 corridor

Table 9 summarizes the Freight performance results for the SR 95 corridor. **Figure 16** illustrates the primary Freight Index performance along the SR 95 corridor. Maps for each secondary measure can be found in **Appendix A**.

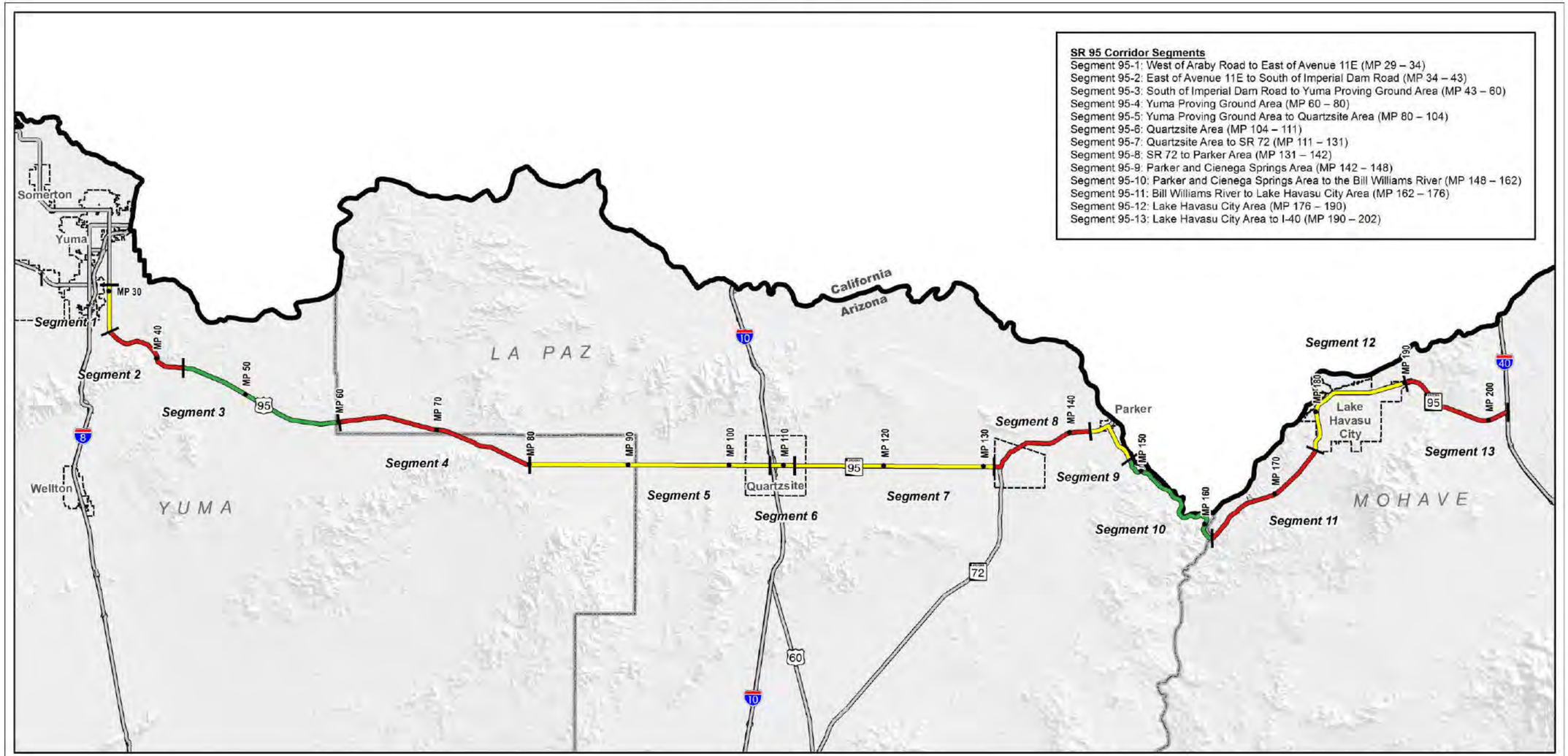
Table 9: Freight Performance

Segment #	Segment Length (miles)	Freight Index	Directional Truck TTI		Directional Truck PTI		Closure Duration (minutes/milepost /year/mile)		Vertical Bridge Clearance (feet)
			NB	SB	NB	SB	NB	SB	
95-1	5	0.29	1.12	1.19	3.58	3.32	117.61	14.88	No UP
95-2	9	0.62	1.08	1.00	2.03	1.17	27.89	3.62	No UP
95-3	17	0.79	1.03	1.03	1.25	1.28	28.05	0.00	No UP
95-4	20	0.13	1.28	1.11	13.66	1.52	10.18	2.19	No UP
95-5	24	0.72	1.04	1.11	1.13	1.65	2.68	7.13	No UP
95-6	3	0.29	1.62	1.44	3.23	3.62	0.00	46.96	No UP
95-7	20	0.68	1.10	1.09	1.46	1.50	133.60	7.49	No UP
95-8	11	0.55	1.04	1.02	2.22	1.44	10.13	166.29	No UP
95-9	6	0.18	1.41	1.33	7.04	4.27	106.46	22.77	27.83
95-10	14	0.79	1.10	1.00	1.41	1.13	39.55	33.24	No UP
95-11	14	0.64	1.18	1.10	1.56	1.55	27.94	53.85	No UP
95-12	14	0.22	1.32	1.28	5.29	3.96	67.30	11.80	16.41
95-13	12	0.19	1.31	2.74	3.09	7.66	18.23	20.92	No UP
Weighted Corridor Average		0.52	1.16	1.22	3.65	2.28	42.21	24.87	22.12

SCALES					
Performance Level	**Uninterrupted Interrupted**			**All**	
Good	> 0.77^ > 0.33*	< 1.15^ < 1.30*	< 1.30^ < 3.00*	< 44.18	> 16.5
Fair	0.67 - 0.77^ 0.17 - 0.33*	1.15 -1.33^ 1.30 - 2.00*	1.30 - 1.50^ 3.00-6.00*	44.18 -124.86	16.0 - 16.5
Poor	< 0.67^ < 0.17*	> 1.33^ > 2.00*	> 1.50^ > 6.00*	> 124.86	< 16.0

^Uninterrupted Flow Facility
*Interrupted Flow Facility

Figure 16: Freight Performance



SR 95 Corridor Profile Study: I-8 to I-40
Freight Index and Hot Spots
2014 Data

2.7 Corridor Performance Summary

Based on the results presented in the preceding sections, the following general observations were made related to the performance of the SR 95 corridor:

- **Overall Performance:** Within the five performance areas, the weighted average index for Pavement, Bridge, Mobility, and Safety show "good" or "fair" performance; Freight shows "poor" performance; Safety and Freight performance areas each show individual segments with "poor" ratings
- **Pavement Performance:** 157 of the 169 miles of the SR 95 corridor have "good" or "fair" performance for the overall Pavement Index; due to the significant area of pavement cracking, 3 of the 13 segments show "poor" performance for % Area Failure
- **Bridge Performance:** 14 bridges were evaluated; two bridges were identified as Bridge hot spots; these include Bouse Wash Bridge and Mockingbird Wash Bridge in Segments 95-8 and 95-12, respectively
- **Mobility Performance:** SR 95 is considered to have two operating environments for evaluating mobility performance: 2 or 3 Lane Undivided Highway and 4 or 5 Lane Undivided Highway; the Mobility Index weighted average indicates "good" overall mobility performance for the SR 95 corridor
- **Safety Performance:** Safety also utilizes the two operating environments for this analysis; the Safety Index weighted average indicates "above average" (good) overall safety performance for the SR 95 corridor; examining a five-year time-period, the were 24 fatal crashes and 135 incapacitating injury crashes
- **Freight Performance:** The Freight Index weighted average indicates "poor" performance for the SR 95 corridor, meaning the corridor has "poor" travel time reliability due to non-recurring congestion; there are no locations with vertical clearance less than 16.25 feet
- **Poorest Performing Segments:** Several segments show "poor" performance in multiple performance areas; these segments are 95-2 (Safety and Freight), 95-4 (Safety and Freight), 95-12 (Safety and Freight), and 95-13 (Pavement and Freight)
- **Highest Performing Segments:** Segments 95-3, 95-5, 95-6, 95-7 and 95-10 show "good" or "fair" performance for several performance measures

Figure 17 shows the percentage of the SR 95 corridor that rates either "good/above average" performance, "fair/average" performance, or "poor/below average" performance in each primary measure.

The lowest performance along the SR 95 corridor generally occurs in the Safety and Freight performance areas with the Pavement and Mobility performance areas showing the highest performance.

Table 10 shows a summary of corridor performance for all primary measures and secondary measure indicators for the SR 95 corridor. A weighted corridor average rating (based on the length of the segment) was calculated for each primary and secondary measure. The weighted average ratings are summarized in **Figure 18**, which also provides a brief description of each performance measure. **Figure 18** represents the average for the entire corridor and any given segment or location could have a higher or lower rating than the corridor average.

Figure 17: Performance Summary by Primary Measure

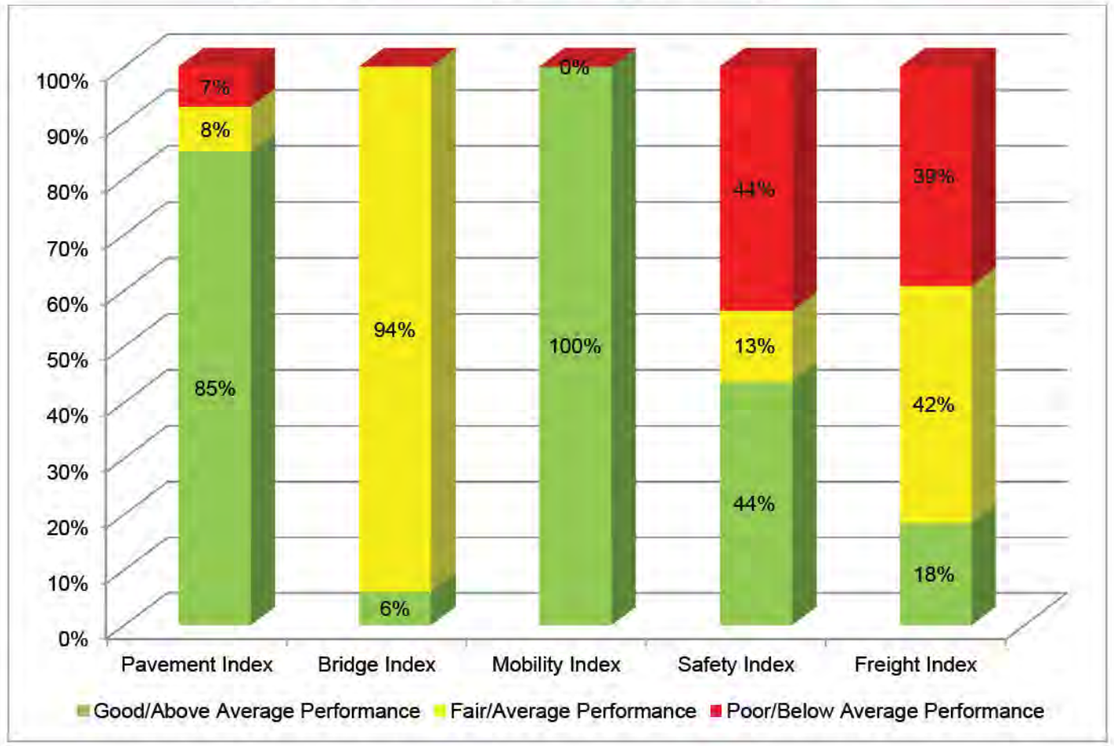


Figure 18: Corridor Performance Summary by Performance Measure

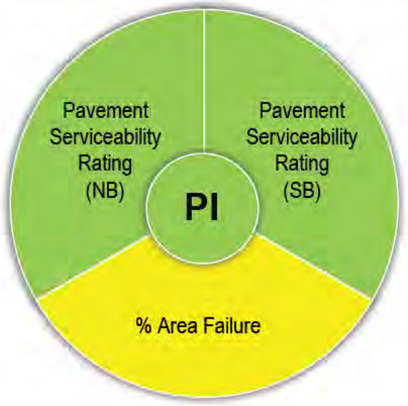
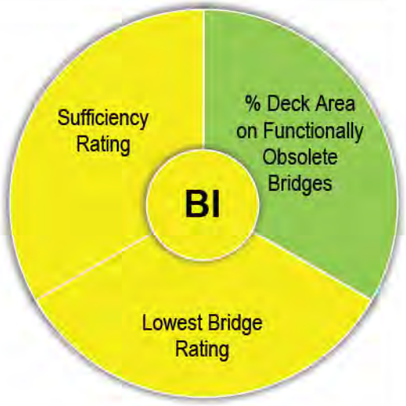
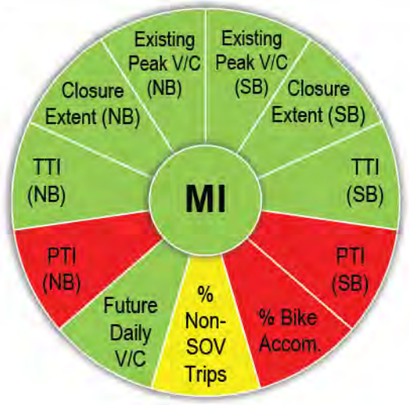
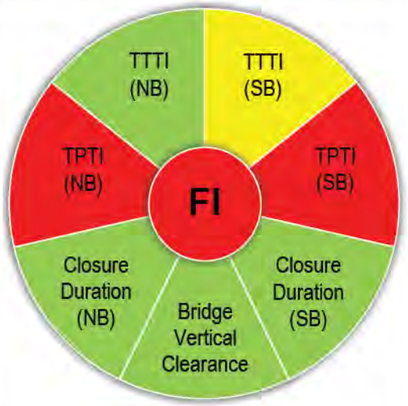
Pavement	Bridge	Mobility	Safety	Freight
				
Pavement Index (PI): based on two pavement condition ratings from the ADOT Pavement Database; the two ratings are the International Roughness Index (IRI) and the Cracking Rating	**Bridge Index (BI):** based on four bridge condition ratings from the ADOT Bridge Database; the four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating	**Mobility Index (MI):** an average of the existing daily volume-to-capacity (V/C) ratio and the projected 2035 daily V/C ratio	**Safety Index (SI):** combines the bi-directional frequency and rate of fatal and incapacitating injury crashes, compared to crash occurrences on similar roadways in Arizona	**Freight Index (FI):** a reliability performance measure based on the bi-directional planning time index for truck travel
➢ **Directional Pavement Serviceability Rating (PSR)** – the weighted average (based on number of lanes) of the PSR for the pavement in each direction of travel ➢ **% Area Failure** – the percentage of pavement area rated above failure thresholds for IRI or Cracking	➢ **Sufficiency Rating** – Multipart rating includes structural adequacy and safety factors as well as functional aspects such as traffic volume and length of detour ➢ **% of Deck Area on Functionally Obsolete Bridges** – the percentage of deck area in a segment that is on functionally obsolete bridges; identifies bridges that no longer meet standards for current traffic volumes, lane width, shoulder width, or bridge rails; a bridge that is functionally obsolete may still be structurally sound ➢ **Lowest Bridge Rating** – the lowest rating of the four bridge condition ratings on each segment	➢ **Future Daily V/C** – the future 2035 V/C ratio provides a measure of future congestion if no capacity improvements are made to the corridor ➢ **Existing Peak Hour V/C** – the existing peak hour V/C ratio for each direction of travel provides a measure of existing peak hour congestion during typical weekdays ➢ **Closure Extent** – the average number of instances a milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel ➢ **Directional Travel Time Index (TTI)** – the ratio of the average peak period travel time to the free-flow travel time; the TTI represents recurring delay along the corridor ➢ **Directional Planning Time Index (PTI)** – the ratio of the 95th percentile travel time to the free-flow travel time; the PTI represents non-recurring delay along the corridor ➢ **% Bicycle Accommodation** – the percentage of a segment that accommodates bicycle travel ➢ **% Non-single Occupancy Vehicle (Non-SOV) Trips** – the percentage of trips that are taken by vehicles carrying more than one occupant	➢ **Directional Safety Index** – the combination of the directional frequency and rate of fatal and incapacitating injury crashes, compared to crash occurrences on similar roadways in Arizona ➢ **% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors** – the percentage of fatal and incapacitating crashes that involve at least one of the five Strategic Highway Safety Plan (SHSP) emphasis areas on a given segment compared to the statewide average percentage on roads with similar operating environments ➢ **% of Fatal + Incapacitating Injury Crashes Involving SHSP Crash Unit Types** – the percentage of total fatal and incapacitating injury crashes that involves a given crash unit type (motorcycle, truck, non-motorized traveler) compared to the statewide average percentage on roads with similar operating environments	➢ **Directional Truck Travel Time Index (TTTI)** – the ratio of the average peak period truck travel time to the free-flow truck travel time; the TTTI represents recurring delay along the corridor ➢ **Directional Truck Planning Time Index (TPTI)** – the ratio of the 95th percentile truck travel time to the free-flow truck travel time; the TPTI represents non-recurring delay along the corridor ➢ **Closure Duration** – the average time a milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel ➢ **Bridge Vertical Clearance** – the minimum vertical clearance over the travel lanes for underpass structures on each segment

Table 10: Corridor Performance Summary by Segment and Performance Measure

Segment #	Segment Length (miles)	Pavement Performance Area				Bridge Performance Area				Mobility Performance Area											
		Pavement Index	Directional PSR		% Area Failure	Bridge Index	Sufficiency Rating	% of Deck Area on Functionally Obsolete Bridges	Lowest Bridge Rating	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent (instances/ milepost/year/mile)		Directional TTI (all vehicles)		Directional PTI (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
			NB	SB								NB	SB	NB	SB	NB	SB	NB	SB		
95-1*b1	5	3.54	3.64		0.0%	6.00	80.87	0.0%	6	0.35	0.41	0.30	0.29	0.37	0.12	1.08	1.15	2.96	3.90	62%	18.6%
95-2^a2	9	3.86	3.78		0.0%	6.00	78.12	8.5%	6	0.42	0.50	0.41	0.41	0.16	0.02	1.05	1.00	2.21	1.14	56%	19.8%
95-3^a2	17	3.63	3.51		35.3%	5.00	68.22	0.0%	5	0.09	0.11	0.12	0.11	0.07	0.00	1.02	1.00	1.19	1.16	8%	19.8%
95-4^a2	20	4.41	4.28		0.0%	No Bridges				0.12	0.15	0.17	0.17	0.03	0.01	1.19	1.04	5.36	1.40	0%	5.0%
95-5^a2	24	4.14	4.12		0.0%	No Bridges				0.10	0.12	0.14	0.14	0.01	0.06	1.00	1.06	1.13	1.55	2%	23.0%
95-6*b1	2.5	3.27	3.23		33.3%	6.00	76.00	0.0%	6	0.13	0.17	0.15	0.15	0.00	0.08	1.48	1.31	7.75	5.42	87%	24.6%
95-7^a2	20	3.69	3.76		5.0%	6.00	79.00	0.0%	6	0.21	0.29	0.24	0.25	0.37	0.08	1.06	1.04	1.32	1.43	0%	14.6%
95-8^a2	11	3.49	3.27		9.1%	5.00	67.00	0.0%	5	0.45	0.61	0.36	0.36	0.04	0.27	1.00	1.00	1.71	1.37	25%	9.1%
95-9*b1	6	3.59	3.84		14.3%	6.76	80.86	0.0%	6	0.32	0.35	0.32	0.36	0.51	0.03	1.31	1.29	7.35	4.58	61%	11.4%
95-10^a2	14	3.66	3.59		0.0%	6.25	78.25	0.0%	6	0.36	0.40	0.33	0.33	0.18	0.16	1.06	1.00	1.28	1.15	2%	2.2%
95-11^a2	14	4.13	4.13		0.0%	No Bridges				0.27	0.30	0.24	0.23	0.17	0.29	1.08	1.05	1.36	1.61	0%	8.3%
95-12*b1	14	3.77	3.51	4.15	14.3%	5.46	76.82	20.2%	5	0.64	0.83	0.42	0.40	0.46	0.09	1.24	1.20	4.71	3.78	9%	18.1%
95-13^a2	12	2.77	3.77		24.7%	No Bridges				0.36	0.42	0.29	0.28	0.15	0.13	1.06	2.01	3.95	7.29	71%	14.3%
Weighted Corridor Average		3.79	3.80	3.86	8.7%	5.72	75.44	3.7%	5.57	0.27	0.33	0.25	0.25	0.17	0.10	1.09	1.13	2.66	2.24	17%	14.0%

SCALES

Performance Level	Non-Interstate			All				Urban and Fringe Urban	All	Uninterrupted		All	
Good/Above Average	> 3.50	> 3.50	< 5%	> 6.5	> 80	< 12%	> 6	< 0.71	< 0.22	< 1.15	< 1.3	> 90%	> 17%
Fair/Average	2.90 - 3.50	2.90 - 3.50	5% - 20%	5.0 - 6.5	50 - 80	12% - 40%	5 - 6	0.71 - 0.89	0.22 - 0.62	1.15 - 1.33	1.3 - 1.5	60% - 90%	11% - 17%
Poor/Below Average	< 2.90	< 2.90	> 20%	< 5.0	< 50	> 40%	< 5	> 0.89	> 0.62	> 1.33	> 1.5	< 60%	< 11%

Performance Level	Rural	Interrupted	
Good/Above Average	< 0.56	< 1.3	< 3.0
Fair/Average	0.56 - 0.76	1.3 - 2.0	3.0 - 6.0
Poor/Below Average	> 0.76	> 2.0	> 6.0

^Uninterrupted Flow Facility
*Interrupted Flow Facility
[a]2 or 3 Lane Undivided Highway
[b]4 or 5 Lane Undivided Highway
[1]Urban Operating Environment
[2]Rural Operating Environment

Table 10: Corridor Performance Summary by Segment and Performance Measure (continued)

Segment #	Segment Length (miles)	Safety Performance Area							Freight Performance Area							
		Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Freight Index	Directional TTTI		Directional TPTI		Closure Duration (minutes/milepost/year/mile)		Bridge Vertical Clearance (feet)
			NB	SB						NB	SB	NB	SB	NB	SB	
95-1*b1	5	1.30	1.29	1.31	17%	Insufficient Data	Insufficient Data	Insufficient Data	0.29	1.12	1.19	3.58	3.32	117.61	14.88	No UP
95-2^a2	8	1.29	2.42	0.16	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.62	1.08	1.00	2.03	1.17	27.89	3.62	No UP
95-3^a2	18	0.07	Insufficient Data	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.79	1.03	1.03	1.25	1.28	28.05	0.00	No UP
95-4^a2	20	1.48	2.00	0.95	20%	Insufficient Data	Insufficient Data	Insufficient Data	0.13	1.28	1.11	13.66	1.52	10.18	2.19	No UP
95-5^a2	24	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.72	1.04	1.11	1.13	1.65	2.68	7.13	No UP
95-6*b1	2.5	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.29	1.62	1.44	3.23	3.62	0.00	46.96	No UP
95-7^a2	20	0.00	0.00	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.68	1.10	1.09	1.46	1.50	133.60	7.49	No UP
95-8^a2	11	0.14	0.28	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.55	1.04	1.02	2.22	1.44	10.13	166.29	No UP
95-9*b1	6	1.10	2.13	0.07	17%	Insufficient Data	Insufficient Data	Insufficient Data	0.18	1.41	1.33	7.04	4.27	106.46	22.77	27.83
95-10^a2	14	0.62	0.28	0.96	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.79	1.10	1.00	1.41	1.13	39.55	33.24	No UP
95-11^a2	14	1.91	1.89	1.93	64%	Insufficient Data	Insufficient Data	Insufficient Data	0.64	1.18	1.10	1.56	1.55	27.94	53.85	No UP
95-12*b1	14	1.77	1.63	1.91	45%	Insufficient Data	Insufficient Data	Insufficient Data	0.22	1.32	1.28	5.29	3.96	67.30	11.80	16.41
95-13^a2	12	1.06	1.88	0.24	44%	Insufficient Data	Insufficient Data	Insufficient Data	0.19	1.31	2.74	3.09	7.66	18.23	20.92	No UP
Weighted Corridor Average		0.91	1.28	0.69	37%	Insufficient Data	Insufficient Data	Insufficient Data	0.52	1.16	1.22	3.65	2.28	42.21	24.87	22.12

SCALES

Performance Level	2 or 3 Lane Undivided Highway					Uninterrupted			All	
Good/Above Average	< 0.94	< 51%	< 4%	< 16%	< 2%	> 0.77	< 1.15	< 1.3	< 44.18	> 16.5
Fair/Average	0.94 - 1.06	51% - 57%	4% - 7%	16% - 25%	2% - 4%	0.67 - 0.77	1.15 - 1.33	1.3 - 1.5	44.18 - 124.86	16.0-16.5
Poor/Below Average	> 1.06	> 57%	> 7%	> 25%	> 4%	< 0.67	> 1.33	> 1.5	> 124.86	< 16.0
Performance Level	**4 or 5 Lane Undivided Highway**					**Interrupted**				
Good/Above Average	< 0.80	< 42%	< 6%	< 6%	< 5%	> 0.33	< 1.3	< 3.0		
Fair/Average	0.80 - 1.20	42% - 51%	6% - 10%	6% - 9%	5% - 8%	0.17 - 0.33	1.3 - 2.0	3.0 - 6.0		
Poor/Below Average	> 1.20	> 51%	> 10%	> 9%	> 8%	< 0.17	> 2.0	> 6.0		

^Uninterrupted Flow Facility *Interrupted Flow Facility
[a]2 or 3 Lane Undivided Highway [b]4 or 5 Lane Undivided Highway
[1]Urban Operating Environment [2]Rural Operating Environment

Notes: "Insufficient Data" indicates there was not enough data available to generate reliable performance ratings
"No UP" indicates no underpasses are present in the segment

3.0 NEEDS ASSESSMENT

3.1 Corridor Objectives

Statewide goals and performance measures were established by the ADOT Long-Range Transportation Plan (LRTP), 2010-2035. Statewide performance goals that are relevant to SR 95 performance areas were identified and corridor goals were then formulated for each of the five performance areas that aligned with the overall statewide goals established by the LRTP. Based on stakeholder input, corridor goals, corridor objectives, and performance, three "emphasis areas" were identified for the SR 95 corridor: Mobility, Safety, and Freight.

Considering the corridor goals and identified emphasis areas, performance objectives were developed for each quantifiable performance measure that identify the desired level of performance based on the performance scale levels for the overall corridor and for each segment of the corridor.

For the performance emphasis areas, the corridor-wide weighted average performance objectives are identified with a higher standard than for the other performance areas. **Table 11** shows the SR 95 corridor goals, corridor objectives, and performance objectives, and how they align with the statewide goals.

It is not reasonable within a financially constrained environment to expect that every performance measure will always be at the highest levels on every corridor segment. Therefore, individual corridor segment objectives have been set as "fair/average" or better and should not fall below that standard.

Achieving corridor and segment performance objectives will help ensure that investments are targeted toward improvements that support the safe and efficient movement of travelers on the corridor. Addressing current and future congestion, thereby improving mobility on congested segments, will also help the corridor fulfill its potential as a significant contributor to the region's economy.

Corridor performance is measured against corridor and segment objectives to determine needs – the gap between observed performance and performance objectives.

Goal achievement will improve or reduce current and future congestion, increase travel time reliability, and reduce fatalities and incapacitating injuries resulting from vehicle crashes. Where performance is currently rated "good", the goal is always to maintain that standard, regardless of whether the performance is in an emphasis area.

Table 11: Corridor Performance Goals and Objectives

ADOT Statewide LRTP Goals	SR 95 Corridor Goals	SR 95 Corridor Objectives	Performance Area	Primary Measure	Performance Objective	
				Secondary Measure Indicators	Corridor Average	Segment
Improve Mobility and Accessibility **Support Economic Growth**	Improve mobility through additional capacity and improved roadway geometry Provide a safe and reliable route for recreational and tourist travel to/from Mexico, Southern California, and Southern Arizona destinations Provide safe, reliable and efficient connection to all communities along the corridor to permit efficient regional travel	Reduce current congestion and plan to facilitate future congestion that accounts for anticipated growth and land use changes Reduce delays from recurring and non-recurring events to improve reliability Improve bicycle and pedestrian accommodations	Mobility (*Emphasis Area*)	Mobility Index	Good	Fair or better
				Future Daily V/C		
				Existing Peak Hour V/C		
				Closure Extent		
				Directional Travel Time Index		
				Directional Planning Time Index		
				% Bicycle Accommodation		
				% Non-SOV Trips		
	Provide a safe, reliable and efficient freight route between Arizona, California and Mexico	Reduce delays and restrictions to freight movement to improve reliability Improve travel time reliability (including impacts to motorists due to freight traffic)	Freight *(Emphasis Area)*	Freight Index	Good	Fair or better
				Directional Truck Travel Time Index		
				Directional Truck Planning Time Index		
				Closure Duration		
				Bridge Vertical Clearance		
Preserve and Maintain the State Transportation System	Preserve and modernize highway infrastructure	Maintain structural integrity of bridges	Bridge	Bridge Index	Fair or better	Fair or better
				Sufficiency Rating		
				% of Deck Area on Functionally Obsolete Bridges		
				Lowest Bridge Rating		
		Improve pavement ride quality for all corridor users Reduce long-term pavement maintenance costs	Pavement	Pavement Index	Fair or better	Fair or better
				Directional Pavement Serviceability Rating		
				% Area Failure		
Enhance Safety and Security	Provide a safe, reliable, and efficient connection for the communities along the corridor Promote safety by implementing appropriate countermeasures	Reduce fatal and incapacitating injury crashes for all roadway users	Safety *(Emphasis Area)*	Safety Index	Above Average	Average or better
				Directional Safety Index		
				% of Crashes Involving SHSP Top 5 Emphasis Areas Behaviors		
				% of Crashes Involving Crash Unit Types		

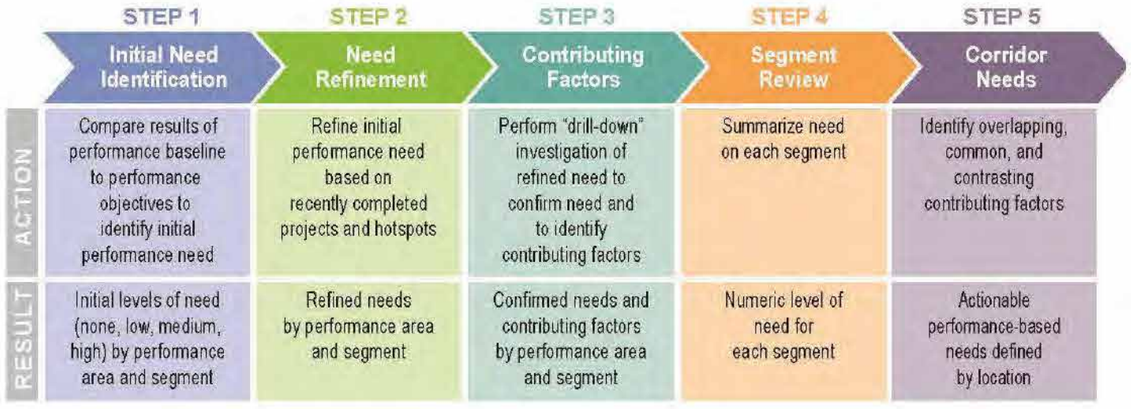
3.2 Needs Assessment Process

The following guiding principles were used as an initial step in developing a framework for the performance-based needs assessment process:

- Corridor needs are defined as the difference between the corridor performance and the performance objectives
- The needs assessment process should be systematic, progressive, and repeatable, but also allow for engineering judgment where needed
- The process should consider all primary and secondary performance measures developed for the study
- The process should develop multiple need levels including programmatic needs for the entire length of the corridor, performance area-specific needs, segment-specific needs, and location-specific needs (defined by MP limits)
- The process should produce actionable needs that can be addressed through strategic investments in corridor preservation, modernization, and expansion

The performance-based needs assessment process is illustrated in **Figure 19** and described in the following sections.

Figure 19: Needs Assessment Process



Step 1: Initial Needs Identification

The first step in the needs assessment process links baseline (existing) corridor performance with performance objectives. In this step, the baseline corridor performance is compared to the performance objectives to provide a starting point for the identification of performance needs. This mathematical comparison results in an initial need rating of None, Low, Medium, or High for each primary and secondary performance measure. An illustrative example of this process is shown below in **Figure 20**.

Figure 20: Initial Need Ratings in Relation to Baseline Performance (Bridge Example)

Performance Thresholds	Performance Level	Initial Level of Need	Description
6.5	Good	None*	All levels of Good and top 1/3 of Fair (>6.0)
	Good		
	Good		
	Fair		
	Fair	Low	Middle 1/3 of Fair (5.5-6.0)
5.0	Fair	Medium	Lower 1/3 of Fair and top 1/3 of Poor (4.5-5.5)
	Poor		
	Poor	High	Lower 2/3 of Poor (<4.5)
	Poor		

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

The initial level of need for each segment is refined to account for hot spots and recently completed or under construction projects, resulting in a final level of need for each segment. The final levels of need for each primary and secondary performance measure are combined to produce a weighted final need rating for each segment. Values of 0, 1, 2, and 3 are assigned to the initial need levels of None, Low, Medium, and High, respectively. A weight of 1.0 is applied to the Performance Index need and equal weights of 0.20 are applied to each need for each secondary performance measure. For directional secondary performance measures, each direction of travel receives a weight of 0.10.

Step 2: Need Refinement

In Step 2, the initial level of need for each segment is refined using the following information and engineering judgment:

- For segments with an initial need of None that contain hot spots, the level of need should be increased from None to Low
- For segments with an initial level of need where recently completed projects or projects under construction are anticipated to partially or fully address the identified need, the level of need should be reduced or eliminated as appropriate
- Programmed projects that are expected to partially or fully address an identified need are not justification to lower the initial need because the programmed projects may not be

implemented as planned; in addition, further investigations may suggest that changes in the scope of a programmed project may be warranted

The resulting final needs are carried forward for further evaluation in Step 3.

Step 3: Contributing Factors

In Step 3, a more detailed review of the condition and performance data available from ADOT is conducted to identify contributing factors to the need. Typically, the same databases used to develop the baseline performance serve as the principal sources for the more detailed analysis. However, other supplemental databases may also be useful sources of information. The databases used for diagnostic analysis are listed below:

Pavement Performance Area

- Pavement Rating Database

Bridge Performance Area

- ABISS

Mobility Performance Area

- Highway Performance Monitoring System (HPMS) Database
- AZTDM
- Real-time traffic conditions data produced by American Digital Cartography, Inc. (HERE) Database
- Highway Conditions Reporting System (HCRS) Database

Safety Performance Area

- Crash Database

Freight Performance Area

- HERE Database
- HCRS Database

In addition, other sources considered helpful in identifying contributing factors are:

- Maintenance history (from ADOT PeCoS database for pavement), the level of past investments, or trends in historical data that provide context for pavement and bridge history
- Field observations from ADOT district personnel can be used to provide additional information regarding a need that has been identified
- Previous studies can provide additional information regarding a need that has been identified

Step 3 results in the identification of performance-based needs and contributing factors by segment (and MP locations, if appropriate) that can be addressed through investments in preservation, modernization, and expansion projects to improve corridor performance. See **Appendix D** for more information.

Step 4: Segment Review

In this step, the needs identified in Step 2 and refined in Step 3 are quantified for each segment to numerically estimate the level of need for each segment. Values of 0 to 3 are assigned to the final need levels (from Step 3) of None, Low, Medium, and High, respectively. A weighting factor is applied to the performance areas identified as emphasis areas and a weighted average need is calculated for each segment. The resulting average need score can be used to compare levels of need between segments within a corridor and between segments in different corridors.

Step 5: Corridor Needs

In this step, the needs and contributing factors for each performance area are reviewed on a segment-by-segment basis to identify actionable needs and to facilitate the formation of solution sets that address multiple performance areas and contributing factors. The intent of this process is to identify overlapping, common, and contrasting needs to help develop strategic solutions. This step results in the identification of corridor needs by specific location.

3.3 Corridor Needs Assessment

This section documents the results of the needs assessment process described in the prior section. The needs in each performance area were classified as either None, Low, Medium, or High based on how well each segment performed in the existing performance analysis. The needs for each segment were numerically combined to estimate the average level of need for each segment of the corridor.

The final needs assessments for each performance measure, along with the scales used in analysis, are shown in **Table 12** through **Table 16**.

Pavement Needs Refinement and Contributing Factors

- The level of need in Segment 95-3 was reduced from Low to None due to several recently completed projects in the area
- The level of need in Segment 95-6 was reduced from Medium to Low due to recently completed projects in the area and from feedback from the ADOT Southwest District
- The level of need in Segment 95-13 was reduced from Medium to None due to a recently completed project in the area
- See **Appendix D** for detailed information on contributing factors

Table 12: Final Pavement Needs

Segment #	Performance Score and Level of Need				Initial Segment Need	Hot Spots	Recently Completed Projects	Final Segment Need
	Pavement Index	Directional PSR		% Area Failure				
		NB	SB					
95-1	3.54	3.64	3.64	0.00%	0.00	None	None	None
95-2	3.86	3.78	3.78	0.00%	0.00	None	None	None
95-3	3.63	3.51	3.51	35.29%	0.60	MP 46-47, 48-51, and 52-54	According to the ADOT Southwest District, 2009 chip seal project should have addressed hot spots within MP 44 - 54 Pavement preservation project at MP 54 - 63 (2013) Fog seal project at MP 54 - 63 (2015)	None
95-4	4.41	4.28	4.28	0.00%	0.00	None	A recent fog seal was performed at MP 63 - 80 (2016)	None
95-5	4.14	4.12	4.12	0.00%	0.00	None	None	None
95-6	3.27	3.23	3.23	33.33%	1.80	MP 104-105	A micro/slurry seal was recently performed within MP 104-111 where some cracking was observed (2015)	Low
95-7	3.69	3.76	3.76	5.00%	0.00	MP 120-121	None	Low
95-8	3.49	3.27	3.27	9.09%	0.20	MP 131-132	Fog seal project in process (2016), MP 142 - 161	Low
95-9	3.59	3.84	3.84	14.29%	0.20	MP 148-149	Fog seal project in process (2016), MP 142 - 161	Low
95-10	3.66	3.59	3.59	0.00%	0.00	None	Fog seal project in process (2016), MP 142 - 161	None
95-11	4.13	4.13	4.13	0.00%	0.00	None	None	None
95-12	3.77	3.51	4.15	14.29%	0.20	MP 181-183	None	Low
95-13	2.77	3.77	3.77	24.69%	2.40	MP 191-194	Passing Lane at MP 190 - 195 (NB)	None

Level of Need (Score)	Performance Score Need Scale		Segment Level Need Scale
None* (0)	> 3.30	< 10%	0
Low (1)	3.10 – 3.30	10% - 15%	< 1.5
Medium (2)	2.70 – 3.10	15% - 25%	1.5 – 2.5
High (3)	< 2.70	> 25%	> 2.5

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Bridge Needs Refinement and Contributing Factors

- Two bridges (Bouse Wash Bridge and Mockingbird Wash Bridge) have multiple bridge condition ratings of 5 and potential repetitive investment issues and are considered hot spots; these bridges are in segments having Medium needs
- There were no recently completed bridge projects along the corridor
- See **Appendix D** for detailed information on contributing factors

Table 13: Final Bridge Needs

Segment #	Performance Score and Level of Need				Initial Segment Need	Hot Spots	Recently Completed Projects	Final Segment Need
	Bridge Index	Sufficiency Rating	% of Deck on Functionally Obsolete Bridges	Lowest Bridge Rating				
95-1	6.00	80.9	0.0%	6	0.0	None	None	None
95-2	6.00	78.1	8.5%	6	0.0	None	None	None
95-3	5.00	68.2	0.0%	5	2.4	None	None	Medium
95-4	No Bridges within Segment				None	None	None	None
95-5	No Bridges within Segment				None	None	None	None
95-6	6.00	76.0	0.0%	6	0.0	None	None	None
95-7	6.00	79.0	0.0%	6	0.0	None	None	None
95-8	5.00	67.0	0.0%	5	2.4	Bouse Wash Bridge (#1321) (MP 131.33)	None	Medium
95-9	6.76	80.9	0.0%	6	0.0	None	None	None
95-10	6.25	78.3	0.0%	6	0.0	None	None	None
95-11	No Bridges within Segment				None	None	None	None
95-12	5.46	76.8	20.2%	5	2.2	Mockingbird Wash Bridge (#1915) (MP 178.26)	None	Medium
95-13	No Bridges within Segment				None	None	None	None

Level of Need (Score)	Performance Score Need Scale				Segment Level Need Scale
None* (0)	> 6.0	> 70	< 21.0%	> 5.0	0
Low (1)	5.5 – 6.0	60 – 70	21.0% - 31.0%	5.0	< 1.5
Medium (2)	4.5 – 5.5	40 – 60	31.0% - 49.0%	4.0	1.5 – 2.5
High (3)	< 4.5	< 40	> 49.0%	< 4.0	> 2.5

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Mobility Needs Refinement and Contributing Factors

- Segment 95-13 contains the only recently completed project: passing lane at MP 190-195, NB direction only; this project did not address all of the Mobility needs in the area, so the segment need level was not eliminated
- See **Appendix D** for detailed information on contributing factors

Table 14: Final Mobility Needs

Segment #	Performance Score and Level of Need											Initial Segment Need	Recently Completed Projects	Final Segment Need
	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closure Extent		Directional TTI		Directional PTI		% Bicycle Accommodation			
			NB	SB	NB	SB	NB	SB	NB	SB				
95-1 [b 1]	0.35	0.41	0.30	0.29	0.37	0.12	1.08	1.15	2.96	3.90	62%	0.5	None	Low
95-2 [a 2]	0.43	0.50	0.41	0.41	0.16	0.02	1.05	1.00	2.21	1.14	56%	0.7	None	Low
95-3 [a 2]	0.09	0.11	0.12	0.11	0.07	0.00	1.02	1.00	1.19	1.16	8%	0.6	None	Low
95-4 [a 2]	0.13	0.15	0.17	0.17	0.03	0.01	1.19	1.04	5.36	1.40	0%	1.0	None	Low
95-5 [a 2]	0.11	0.12	0.14	0.14	0.01	0.06	1.00	1.06	1.13	1.55	2%	0.8	None	Low
95-6 [b 1]	0.14	0.17	0.15	0.15	0.00	0.08	1.48	1.31	7.75	5.42	87%	0.5	None	Low
95-7 [a 2]	0.22	0.29	0.24	0.25	0.37	0.08	1.06	1.04	1.32	1.43	0%	0.8	None	Low
95-8 [a 2]	0.47	0.61	0.36	0.36	0.04	0.27	1.00	1.00	1.71	1.37	25%	1.0	None	Low
95-9 [b 1]	0.32	0.35	0.32	0.36	0.51	0.03	1.31	1.29	7.35	4.58	61%	1.0	None	Low
95-10 [a 2]	0.37	0.40	0.33	0.33	0.18	0.16	1.06	1.00	1.28	1.15	2%	0.6	None	Low
95-11 [a 2]	0.27	0.30	0.24	0.23	0.17	0.29	1.08	1.05	1.36	1.61	0%	0.9	None	Low
95-12 [b 1]	0.65	0.83	0.42	0.40	0.46	0.09	1.24	1.20	4.71	3.78	9%	1.0	None	Low
95-13 [a 2]	0.37	0.42	0.29	0.28	0.15	0.13	1.06	2.01	3.95	7.29	71%	1.1	Passing Lane MP 190 - MP 195 (NB)	Low

Level of Need (Score)	Performance Score Need Scale					Segment Level Need Scale
None* (0)	≤ 0.77 [1] ≤ 0.63 [2]	< 0.35	< 1.21 [a] < 1.53 [b]	< 1.37 [a] < 4.00 [b]	> 80%	0
Low (1)	0.77 - 0.83 [1] 0.63 - 0.69 [2]	0.35 – 0.49	1.21 – 1.27 [a] 1.53 – 1.77 [b]	1.37 – 1.43 [a] 4.00 – 5.00 [b]	70% - 80%	< 1.5
Medium (2)	0.83 - 0.95 [1] 0.69 - 0.83 [2]	0.49 – 0.75	1.27 – 1.39 [a] 1.77 – 2.23 [b]	1.43 – 1.57 [a] 5.00 – 7.00 [b]	50% - 70%	1.5 - 2.5
High (3)	≥ 0.95 [1] ≥ 0.83 [2]	> 0.75	> 1.39 [a] > 2.23 [b]	> 1.57 [a] > 7.00 [b]	< 50%	> 2.5

1: Urban or Fringe Urban
2: Rural
a: Uninterrupted
b: Interrupted

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Safety Needs Refinement and Contributing Factors

- The recent passing lane project in Segment 95-13 addressed an area where crashes had occurred in the past, so the need level was reduced from Medium to Low for this segment
- A Safety hot spot is present in Segment 95-12, which already has a High safety segment need
- See **Appendix D** for detailed information on contributing factors

Table 15: Final Safety Needs

Segment #	Performance Score and Level of Need							Initial Segment Need	Hot Spots	Recently Completed Projects	Final Segment Need
	Safety Index	Directional Safety Index		% of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Area Behaviors	% of Fatal + Incapacitating Injury Crashes Involving Trucks	% of Fatal + Incapacitating Injury Crashes Involving Motorcycles	% of Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers				
		NB	SB								
95-1[b]	1.30	1.29	1.31	17%	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	2.4	None	None	Medium
95-2[a]	1.29	2.42	0.16	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	3.3	None	None	High
95-3[a]	0.07	*Insufficient Data*	0.00	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	0.0	None	None	None
95-4[a]	1.48	2.00	0.95	20%	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	3.3	None	None	High
95-5[a]	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	N/A	None	None	N/A
95-6[b]	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	N/A	None	None	N/A
95-7[a]	0.00	0.00	0.00	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	0.0	None	None	None
95-8[a]	0.14	0.28	0.00	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	0.0	None	None	None
95-9[b]	1.10	2.13	0.07	17%	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	2.3	None	None	Medium
95-10[a]	0.62	0.28	0.96	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	0.0	None	None	None
95-11[a]	1.91	1.89	1.93	64%	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	4.2	None	None	High
95-12[b]	1.77	1.63	1.91	45%	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	3.8	Large NB/SB crash concentration in Lake Havasu City area (MP 179 - 190)	None	High
95-13[a]	1.06	1.88	0.24	44%	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*	2.3	None	Passing Lane at MP 190 - MP 195 (NB). Passing Lane has crash modification factor of 0.75. Applying this reduction to the number of NB crashes changes the performance score, and the corresponding need level is now Low instead of Medium.	Low

Level of Need (Score)		Performance Score Need Scale				Segment Level of Need Scale
None* (0)	a	≤ 0.98	≤ 53%	≤ 6%	≤ 22%	0
	b	≤ 0.93	≤ 45%	≤ 7%	≤ 7%	
Low (1)	a	0.98 - 1.02	53% - 55%	6% - 7%	22% - 25%	≤ 1.5
	b	0.93 - 1.06	45% - 48%	7% - 8%	7% - 8%	
Medium (2)	a	1.02 – 1.10	55% - 59%	7% - 8%	25% - 30%	1.5 - 2.5
	b	1.06 - 1.33	48% - 54%	8% - 11%	8% - 10%	
High (3)	a	≥ 1.10	≥ 59%	≥ 8%	≥ 30%	≥ 2.5
	b	≥ 1.33	≥ 54%	≥ 11%	≥ 10%	

a: 2 or 3 Lane Undivided Highway
b: 4 or 5 Lane Undivided Highway
**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Freight Needs Refinement and Contributing Factors

- Segment 95-13 contains the only recently completed project: passing lane at MP 190-195, NB direction only; this project did not address all of the Freight needs in the area, so the segment need level remained High
- There are no vertical bridge clearance hot spots on the corridor
- See **Appendix D** for detailed information on contributing factors

Table 16: Final Freight Needs

Segment #	Performance Score and Level of Need								Initial Segment Need	Hot Spots	Recently Completed Projects	Final Segment Need
	Freight Index	Directional TTTI		Directional TPTI		Closure Duration		Bridge Vertical Clearance				
		NB	SB	NB	SB	NB	SB					
95-1 [b]	0.29	1.12	1.19	3.58	3.32	117.61	14.88	*No UP*	0.2	None	None	Low
95-2 [a]	0.62	1.08	1.00	2.03	1.17	27.89	3.62	*No UP*	3.3	None	None	High
95-3 [a]	0.79	1.03	1.03	1.25	1.28	28.05	0.00	*No UP*	0.0	None	None	None
95-4 [a]	0.13	1.28	1.11	13.66	1.52	10.18	2.19	*No UP*	3.7	None	None	High
95-5 [a]	0.72	1.04	1.11	1.13	1.65	2.68	7.13	*No UP*	1.3	None	None	Low
95-6 [b]	0.29	1.62	1.44	3.23	3.62	0.00	46.96	*No UP*	0.1	None	None	Low
95-7 [a]	0.68	1.10	1.09	1.46	1.50	133.60	7.49	*No UP*	2.6	None	None	High
95-8 [a]	0.55	1.04	1.02	2.22	1.44	10.13	166.29	*No UP*	3.8	None	None	High
95-9 [b]	0.18	1.41	1.33	7.04	4.27	106.46	22.77	27.83	2.6	None	None	High
95-10 [a]	0.79	1.10	1.00	1.41	1.13	39.55	33.24	*No UP*	0.1	None	None	Low
95-11 [a]	0.64	1.18	1.10	1.56	1.55	27.94	53.85	*No UP*	2.4	None	None	Medium
95-12 [b]	0.22	1.32	1.28	5.29	3.96	67.30	11.80	16.41	2.2	None	None	Medium
95-13 [a]	0.19	1.31	2.74	3.09	7.66	18.23	20.92	*No UP*	4.1	None	Passing Lane at MP 190 - MP 195 (NB)	High

Level of Need (Score)		Performance Score Need Scale					Segment Level Need Scale
None* (0)	a	≥ 0.74	≤ 1.21	≤ 1.37	≤ 71.09	≥ 16.25	0
	b	≥ 0.28	≤ 1.53	≤ 4.00			
Low (1)	a	0.70 - 0.74	1.21 - 1.27	1.37 - 1.43	71.09 - 97.97	16.00 - 16.25	≤ 1.5
	b	0.22 – 0.28	1.53 – 1.77	4.00 – 5.00			
Medium (2)	a	0.64 - 0.70	1.27 - 1.39	1.43 - 1.57	97.97 - 151.75	15.50 - 16.00	1.5 - 2.5
	b	0.12 – 0.22	1.77 – 2.23	5.00 – 7.00			
High (3)	a	≤ 0.64	≥ 1.39	≥ 1.57	≥ 151.75	≤ 15.50	≥ 2.5
	b	≤ 0.12	≥ 2.23	≥ 7.00			

a: Uninterrupted
b: Interrupted

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

Segment Review

The needs for each segment were combined to numerically estimate the average level of need for each segment of the corridor. **Table 17** provides a summary of needs for each segment across all performance areas, with the average need score for each segment presented in the last row of the table. A weighting factor of 1.5 is applied to the need scores of the performance areas identified as emphasis areas (Mobility, Safety, and Freight for the SR 95 corridor). There are no segments with a High average need, eight segments with a Medium average need, and five segments with a Low average need.

Table 17: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts (MP)												
	95-1	95-2	95-3	95-4	95-5	95-6	95-7	95-8	95-9	95-10	95-11	95-12	95-13
	MP 29-34	MP 34-43	MP 43-60	MP 60-80	MP 80-104	MP 104-111	MP 111-131	MP 131-142	MP 142-148	MP 148-162	MP 162-176	MP 176-190	MP 190-202
Pavement	None	None	None	None	None	Low	Low	Low	Low	None	None	Low	None
Bridge	None	None	Medium	None	None	None	None	Medium	None	None	None	Medium	None
Mobility+	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Safety+	Medium	High	None	High	N/A#	N/A	None	None	Medium	None	High	High	Low
Freight+	Low	High	None	High	Low	Low	High	High	High	Low	Medium	Medium	High
Average Need	**0.92**	**1.62**	**0.54**	**1.62**	**0.60**	**0.80**	**1.08**	**1.38**	**1.54**	**0.46**	**1.38**	**1.85**	**1.15**

**A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.*

+Identified as an emphasis area for the SR 95 corridor.

 # N/A indicates insufficient or no data available to determine level of need

Average Need Scale	
None*	< 0.1
Low	0.1 - 1.0
Medium	1.0 - 2.0
High	> 2.0

Summary of Corridor Needs

On SR 95, there are no segments with a High average need; eight segments resulted in a Medium average need, and five segments resulted in a Low average need. More information on the identified final needs in each performance area is provided below.

The needs in each performance area are shown in **Figure 21** and summarized below:

Pavement Needs

- Seven segments (95-3, 6, 7, 8, 9, 12, and 13) contain Pavement hot spots, but two of these segments had recent paving projects that addressed the needs
- Segments 95-6, 7, 8, 9, and 12 have final needs of Low; all other segments of the corridor have a final Pavement need of None
- Segments 95-7, 9, 12, and 13 show a high level of historical investment, meaning that some previous projects have proven to provide only temporary improvements and require frequent attention

Bridge Needs

- Three segments have a Medium Bridge final level of need (95-3, 8, and 12)
- Segment 95-8 and 95-12 have bridges that have Medium needs as well as being identified in the historical review, meaning the bridges may have a repetitive investment issue
- Bridge needs exist at three of the thirteen bridges present on the corridor

Mobility Needs

- Low Mobility needs exist on all thirteen segments of the corridor
- A majority of the Mobility needs are related to future travel demand, directional TTI and PTI issues, and the frequency of closures along the corridor
- Bicycle accommodation needs are High on eight of the thirteen segments of the corridor

Safety Needs

- High Safety needs exist on four of the thirteen corridor segments
- Safety hot spots exist only in Segment 95-12 at MP 179-190
- At the overall corridor level, 70% of the fatal and incapacitating crashes involve a collision with motor vehicle, 24% involve single vehicles, and 20% involve disregarded traffic signal
- A High level of need exists on Segments 95-2, 4, 11, and 12; there are no programmed projects expected to address the identified Safety needs
- A Medium level of need exists on Segments 95-1 and 95-9; there are no programmed projects expected to address the identified Safety needs
- Two of the segments of the corridor (95-5 and 95-6) contain insufficient data (insufficient number of crashes to draw statistical conclusions) to determine a level of need, so a need value is not available (N/A)

Freight Needs

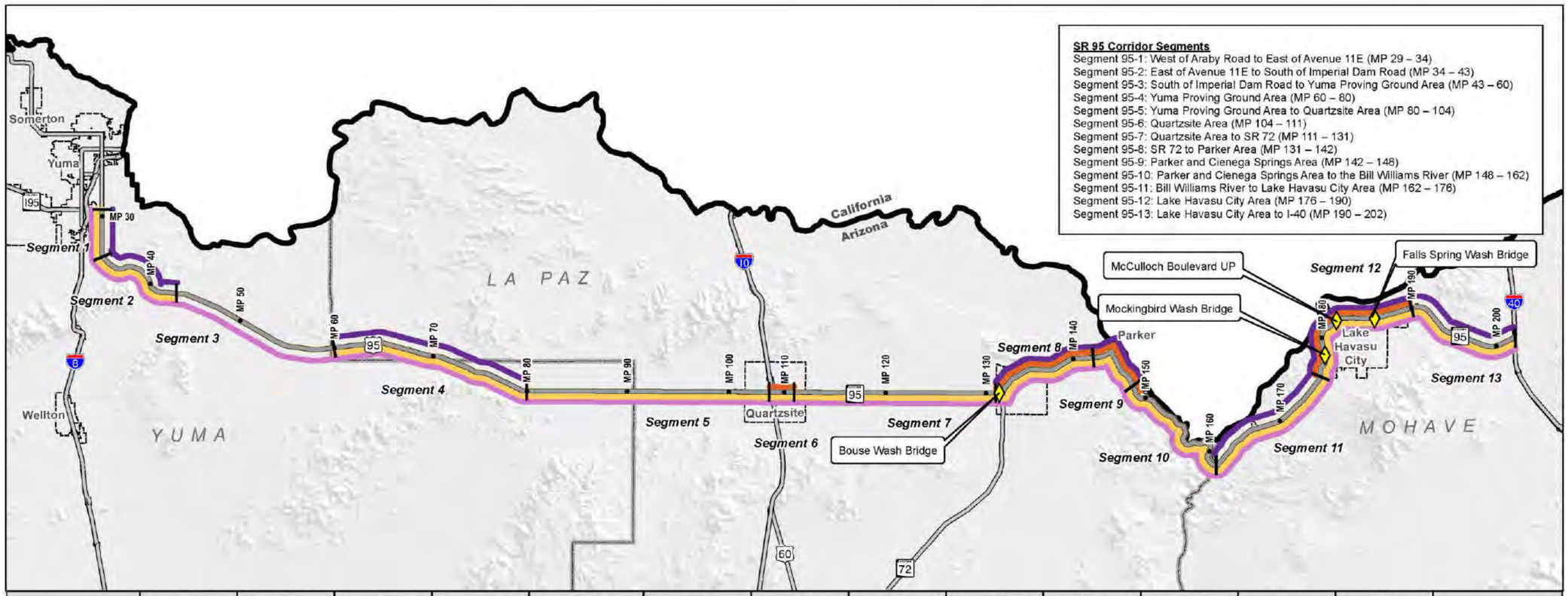
- Twelve of 13 segments of the SR 95 corridor exhibit needs in Freight Performance; bridge needs exist at three of the nine bridges; segment 95-3 did not exhibit a freight need
- The following 8 segments exhibit Medium or High levels of need: 95-2, 4, 7, 8, 9, 11, 12, and 13

Overlapping Needs

Corridor segments with overlapping performance needs on SR 95 were identified to inform identification of strategic solutions that address more than one performance area with elevated levels of need. Implementing projects that address multiple needs more effectively improves overall segment and corridor performance. Locations with elevated levels of overlapping need are:

- MP 131-148 (Segments 95-8 and 9) and MP 176-190 (Segment 95-12) have overlapping needs in at least four performance areas; these segments include the Bouse Wash Bridge, Mockingbird Wash Bridge, and McCulloch Boulevard Underpass; low travel time reliability and road closures impact Mobility and Freight performance; Safety needs are attributable to angled and left-turn crashes, especially within MP 142-148 (Segment 95-9)
- MP 104-131 (Segments 95-6 and 7) have overlapping needs in the Pavement, Mobility, and Freight performance areas; Mobility and Freight performance areas are impacted by roadway closures and low travel time reliability
- MP 29-43 (Segment 95-1 and 2), MP 60-80 (Segment 95-4), MP 162-176 (Segment 95-11), and MP 190-202 (Segment 95-13) have overlapping needs in the Mobility, Safety, and Freight performance areas; Safety needs are attributable to access/intersection incidents; Mobility and Freight performance areas are impacted by roadway closures and low travel time reliability
- MP 80-104 (Segment 95-5) and MP 148-162 (MP 95-10) have overlapping needs in the Mobility and Freight performance areas; Mobility and Freight are impacted by roadway closures and low travel time reliability

Figure 21: Corridor Needs Summary



Performance Areas	95-1 MP 29-34	95-2 MP 34-43	95-3 MP 43-60	95-4 MP 60-80	95-5 MP 80-104	95-6 MP 104-111	95-7 MP 111-131	95-8 MP 131-142	95-9 MP 142-148	95-10 MP 148-162	95-11 MP 162-176	95-12 MP 176-190	95-13 MP 190-202	Performance Areas
Pavement	None	None	None	None	None	Low	Low	Low	Low	None	None	Low	None	Pavement
Bridge	None	None	Medium	None	None	None	None	Medium	None	None	None	Medium	None	Bridge
Mobility*	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Mobility*
Safety*	Medium	High	None	High	Insufficient Data	Insufficient Data	None	None	Medium	None	High	High	Low	Safety*
Freight*	Low	High	None	High	Low	Low	High	High	High	Low	Medium	Medium	High	Freight*
Average Need	0.92	1.62	0.54	1.62	0.60	0.80	1.08	1.38	1.54	0.46	1.38	1.85	1.15	Average Need

*A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.

SR 95 Corridor Profile Study: I-8 to I-40
Corridor Needs Summary

Level of Need	Average Need Range
None*	<0.1
Low	0.1 - 1.0
Medium	1.0 - 2.0
High	> 2.0

4.0 STRATEGIC SOLUTIONS

The principal objective of the CPS is to identify strategic solutions (investments) that are performance-based to ensure that available funding resources are used to maximize the performance of the State's key transportation corridors. One of the first steps in the development of strategic solutions is to identify areas of elevated levels of need (i.e., Medium or High). Addressing areas of Medium or High need will have the greatest effect on corridor performance and are the focus of the strategic solutions. Segments with Medium or High needs and specific locations of hot spots are considered strategic investment areas for which strategic solutions should be developed. Segments with lower levels of need or without identified hot spots are not considered candidates for strategic investment and are expected to be addressed through other ADOT programming processes. The SR 95 strategic investment areas (resulting from the elevated needs) are shown in **Figure 22**.

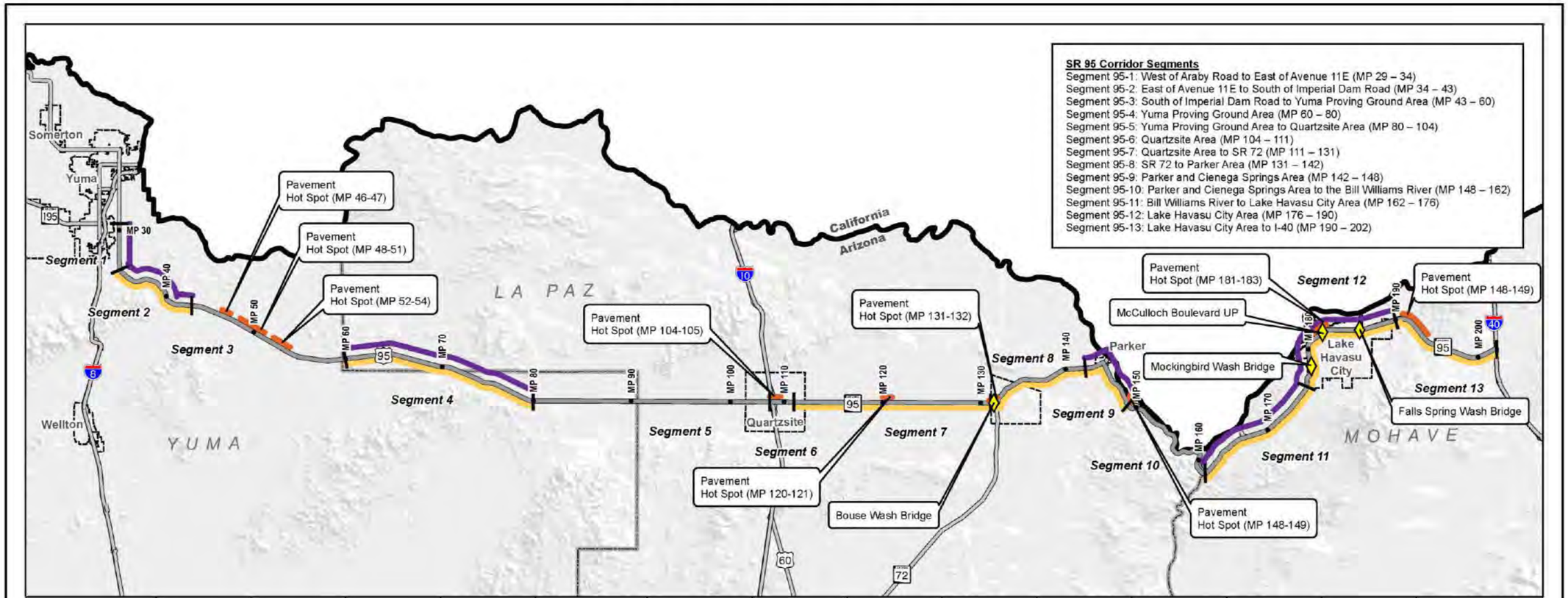
4.1 Screening Process

This section examines qualifying strategic needs and determines if the needs in those locations require action. In some cases, needs that are identified do not advance to solutions development and are screened out from further consideration because they have been or will be addressed through other measures including:

- A project is programmed to address this need
- The need is a result of a Pavement or Bridge hot spot that does not show historical investment or rating issues; these hot spots will likely be addressed through other ADOT programming means
- A bridge is not a hot spot but is located within a segment with a Medium or High level of need; this bridge will likely be addressed through current ADOT bridge maintenance and preservation programming processes
- The need is determined to be non-actionable (i.e., cannot be addressed through an ADOT project)
- The conditions/characteristics of the location have changed since the performance data was collected that was used to identify the need

Table 18 notes if each potential strategic need advanced to solution development, and if not, the reason for screening the potential strategic need out of the process. Locations advancing to solutions development are marked with Yes (Y); locations not advancing are marked with No (N) and highlighted. This screening table provides specific information about the needs in each segment that will be considered for strategic investment. The table identifies the level of need – either Medium or High segment needs, or segments without Medium or High level of need that have a hot spot. Each area of need is assigned a location number in the screening table to help document and track locations considered for strategic investment.

Figure 22: Strategic Investment Areas



Performance Areas	95-1	95-2	95-3	95-4	95-5	95-6	95-7	95-8	95-9	95-10	95-11	95-12	95-13	Performance Areas
	MP 29-34	MP 34-43	MP 43-60	MP 60-80	MP 80-104	MP 104-111	MP 111-131	MP 131-142	MP 142-148	MP 148-162	MP 162-176	MP 176-190	MP 190-202	
Pavement	-	-	Hot Spot	-	-	Hot Spot	Hot Spot	Hot Spot	Hot Spot	-	-	Hot Spot	Hot Spot	Pavement
Bridge	-	-	Medium	-	-	-	-	Medium	-	-	-	Medium	-	Bridge
Mobility*	-	-	-	-	-	-	-	-	-	-	-	-	-	Mobility*
Safety*	Medium	High	-	High	-	-	-	-	Medium	-	High	High	-	Safety*
Freight*	-	High	-	High	-	-	High	High	High	-	Medium	Medium	High	Freight*

** Identified as emphasis area for SR-95 Corridor*
Note:Figure shows strategic investment areas, which are segments with Medium and High levels of need an locations of hot spots. A "-" symbol indicates a segment level of need of Low or None, which is not considered strategic.

SR 95 Corridor Profile Study: I-8 to I-40
Strategic Investment Areas

Table 18: Strategic Investment Area Screening

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
95-1 MP 29-34				Medium		L1	Safety	MP 29-34 has above average left-turn and pedestrian crashes; likely contributing factors include limited or restricted sight distance at intersections, high approach speed, misjudging speed of on-coming traffic, lack of crossing opportunity for pedestrians, drivers running red light or stop sign, and failure to yield the right-of-way	Y	Programmed project in FY 2017 of traffic signal at US 95/Avenue 8E at MP 31 expected to address part but not all of Safety need
						L2	Safety	MP 29-30 has above average left-turn and pedestrian crashes; likely contributing factors include failure to yield the right-of-way and disregarding traffic signal	Y	No programmed project to address Safety need
95-2 MP 34-43				High	High	L3	Freight	MP 34-43 exhibits low trip reliability in the northbound direction; % of closures due to obstructions/hazards is above the statewide average; all three obstruction/hazard closures were due to flooding near MP 34 (location of proposed Fortuna Wash Bridge), which is consistent with the ADOT Southwest district's observation related to low water crossings	N	Programmed project in FY 2016 of Fortuna Wash Bridge at MP 34 expected to address Freight need because flooding at the Fortuna Wash low-water crossing was identified as a primary contributor to non-recurring truck delays in this location
						L4	Safety	MP 34-43 has above average run off the road (left), equipment failure, rear end, nighttime, and roadside object-related crashes; likely contributing factors include driver inattention, large number of turning vehicles, drivers running red light or stop sign, poor nighttime visibility or lighting, obstructions in or near roadway, inadequate signs, delineators, or guardrail, and roadside design issues (inadequate clear distance); district representatives indicated animal-related crashes are common, and low water crossings have the potential to be a safety issue	Y	No programmed project to address Safety need
						L5	Safety	MP 37-38 has above average run off the road (left) and collision with fixed object crashes; likely contributing factors include inattention/distraction, failure to yield the right-of-way, and dark-unlighted conditions	Y	No programmed project to address Safety need
95-3 MP 43-60	Hot Spot	Medium				L6	Pavement	Failure hot spot at MP 46-47	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes
						L7	Pavement	Failure hot spot at MP 48-51	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes
						L8	Pavement	Failure hot spot at MP 52-54	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes
						L9	Bridge	Castle Dome Wash Bridge (#583) (MP 53.28) has evaluation rating of 5; not identified in historical review	N	Bridge does not have a rating of 4 or multiple ratings of 5 so it is not a hot spot and is not considered a strategic investment; not identified in historical review; will likely be addressed by current ADOT processes
95-4 MP 60-80				High	High	L10	Freight	MP 60-80 exhibits low trip reliability; % of closures due to incidents/crashes is above the statewide average; note that a border patrol check point is located at MP 75.5 (non-actionable condition)	Y	No programmed project to address Freight need
						L11	Safety	MP 60-80 has above average single-vehicle, overturning, equipment failure, and low-light (dusk) crashes; likely contributing factors include roadside design issues (non-traversable side slops), inadequate shoulder widths, driver inattention, and poor delineation; district representatives indicated low water crossings have the potential to be a safety issue	Y	No programmed project to address Safety need
						L12	Safety	MP 62-64 has above average single-vehicle and overturning/rollover crashes; likely contributing factor includes driver inattention/distraction	Y	No programmed project to address Safety need

Legend: Strategic investment area screened out from further consideration

Table 18: Strategic Investment Area Screening (continued)

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
95-6 MP 104-111	Hot Spot					L13	Pavement	Failure hot spot at MP 104-105	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes
95-7 MP 111-131	Hot Spot				High	L15	Freight	MP 111 -131 exhibits low trip reliability in the southbound direction; % of closures due to incidents/crashes and obstructions/hazards are above the statewide average; two of three obstruction/hazard closures were due to flooding (MP 113.5 and MP 116)	Y	No programmed project to address Freight need
						L16	Pavement	Failure hot spot at MP 120-121	Y	No programmed project to address Pavement hot spot; high historical investment
95-8 MP 131-142	Hot Spot	Medium			High	L17	Pavement	Failure hot spot at MP 131-132	N	No high historical investment so not considered a strategic investment; will likely be addressed by current ADOT processes
						L18	Bridge	Bouse Wash Bridge (#1321) (MP 131.33) has deck rating of 5 and substructure rating of 5; identified in historical review	Y	No programmed project to address Bridge hot spot; structure meets criteria for historical review as repetitive investment issues were identified
						L19	Freight	MP 131-142 exhibits low trip reliability in the northbound direction; % of closures due to incidents/crashes and obstructions/hazards are above the statewide average; one obstruction/hazard closure due to flooding (MP 131-132)	Y	No programmed project to address Freight need
95-9 MP 142-148	Hot Spot			Medium	High	L20	Safety	MP 142-149 has above average angle, left-turn, pedestrian, centerline crossover, and low-light (dawn) crashes; likely contributing factors include inadequate sight distance, drivers running red light or stop sign, excessive speeds, poor nighttime visibility or lighting, inadequate roadway geometry, and inadequate pavement markings; crash locations include Mohave Road, 4th Street, and Bluewater Dr	Y	Programmed project in FY 2017 of traffic signal at SR 95 / Mohave Road at MP 142.9 expected to address part but not all of Safety need
						L21	Freight	MP 142-149 exhibits low trip reliability in the northbound direction; % of closures due to incidents/crashes and obstructions/hazards are above the statewide average	Y	No programmed project to address Freight need
						L22	Pavement	Failure hot spot at MP 148-149	Y	No programmed project to address Pavement hot spot; high historical investment; Fog seal project in process (2016), MP 142-161

Legend: Strategic investment area screened out from further consideration

Table 18: Strategic Investment Area Screening (continued)

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
95-11 MP 162-176				High	Medium	L23	Safety	MP 162-176 has above average rear end, head on, weather-related, and nighttime crashes; likely contributing factors include poor nighttime visibility or lighting, inadequate pavement markings, inadequate roadway shoulders, roadside design issues (non-traversable side slopes), and driver inattention	Y	No programmed project to address Safety need; crash types align with ADOT Strategic Highway Safety Plan (SHSP) behavior emphasis areas
						L24	Freight	MP 162-176 exhibits low trip reliability; % of closures due to incidents/crashes is above the statewide average	Y	No programmed project to address Freight need
95-12 MP 176-190	Hot Spot	Medium		High	Medium	L25	Safety	MP 176-190 has above average overturning, rear-end, and angle crashes; likely contributing factors include drivers running red light or stop sign, driver inattention, inadequate signal timing, poor visibility of signals, unexpected stops on approach, excessive speeds, and misjudging speed of on-coming traffic	Y	No programmed project to address Safety need
						L26	Freight	MP 176-190 exhibits low trip reliability in the northbound direction; % of closures due to incidents/crashes is above the statewide average	Y	No programmed project to address Freight need
						L27	Bridge	Mockingbird Wash Bridge (#1824) (MP 178.26) has deck rating of 5 and substructure rating of 5; identified in historical review	Y	No programmed project to address Bridge hot spot; structure meets criteria for historical review as repetitive investment issues were identified
						L28	Safety	MP 179-190 is a Safety hot spot within the Lake Havasu City limits in both directions; district representatives indicated the lack of access control measures as a contributing factor, and a higher concentration of crashes due to vehicles making left-turns; differential settling of the approaches to the Falls Spring Wash Bridge (#2265) (MP 186.2) may also be contributing to safety issues	Y	No programmed project to address Safety need
						L29	Pavement	Failure hot spot at MP 181 – 183	Y	No programmed project to address Pavement hot spot; high historical investment
						L30	Bridge	McCulloch Boulevard UP (#1824) (MP 182.38) has deck rating of 5; identified in historical review	N	Bridge does not have a rating of 4 or multiple ratings of 5 so it is not a hot spot and is not considered a strategic investment; identified in historical review; will likely be addressed by current ADOT processes
						L31	Bridge	Northwest ADOT district recommended that the Falls Spring Wash Bridge (#2265) (MP 186.2) be considered as a Bridge hot spot (pending field review)	N	Bridge does not have a rating of 4 or multiple ratings of 5 so it is not a hot spot and is not considered a strategic investment; not identified in historical review
95-13 MP 190-202	Hot Spot				High	L32	Freight	MP 190-202 exhibits low trip reliability; % of closures due to incidents/crashes and obstructions/hazards are above the statewide average	Y	No programmed project to address Freight need;
						L33	Pavement	Failure hot spot at MP 191-194	N	Repaving as part of the construction of the passing lane at MP 190-195 (NB) addressed the Pavement needs

Legend: Strategic investment area screened out from further consideration

4.2 Candidate Solutions

For each elevated need within a strategic investment area that is not screened out, a candidate solution is developed to address the identified need. Each candidate solution is assigned to one of the following three P2P investment categories based on the scope of the solution:

- Preservation
- Modernization
- Expansion

Documented performance needs serve as the foundation for developing candidate solutions for corridor preservation, modernization, and expansion. Candidate solutions are not intended to be a substitute or replacement for traditional ADOT project development processes where various ADOT technical groups and districts develop candidate projects for consideration in the performance-based programming in the P2P process. Rather, these candidate solutions are intended to complement ADOT's traditional project development processes through a performance-based process to address needs in one or more of the five performance areas of Pavement, Bridge, Mobility, Safety, and Freight. Candidate solutions developed for the SR 95 corridor will be considered along with other candidate projects in the ADOT statewide programming process.

Characteristics of Candidate Solutions

Candidate solutions should include some or all of the following characteristics:

- Do not recreate or replace results from normal programming processes
- May include programs or initiatives, areas for further study, and infrastructure projects
- Address elevated levels of need (High or Medium) and hot spots
- Focus on investments in modernization projects (to optimize current infrastructure)
- Address overlapping needs
- Reduce costly repetitive maintenance
- Extend operational life of system and delay expansion
- Leverage programmed projects that can be expanded to address other strategic elements
- Provide measurable benefit

Candidate Solutions

A set of 17 candidate solutions are proposed to address the identified needs on the SR 95 corridor.

Table 19 identifies each strategic location that has been assigned a candidate solution with a number (e.g., CS95.1, CS95.2, etc.). Each candidate solution is comprised of one or more components to address the identified needs. The assigned candidate solution numbers are linked to the location number and provide tracking capability through the rest of the process. The locations of proposed solutions are shown on the map in **Figure 23**.

Candidate solutions developed to address an elevated need in the Pavement or Bridge performance area include two options: rehabilitation or full replacement. These solutions are initially evaluated through a Life-Cycle Cost Analysis (LCCA) to provide insights into the cost-effectiveness of these options so a recommended approach can be identified. Candidate solutions developed to address an elevated need in the Mobility, Safety, or Freight performance areas are advanced directly to the Performance Effectiveness Evaluation. In some cases, multiple solutions may be identified to address the same area of need.

Candidate solutions that are recommended to expand or modify the scope of an already programmed project are noted and are not advanced to solution evaluation and prioritization. These solutions are directly recommended for programming.

Table 19: Candidate Solutions

Candidate Solution #	Segment #	Location #	Beginning Milepost	Ending Milepost	Candidate Solution Name	Option*	Scope	Investment Category (Preservation [P], Modernization [M], Expansion [E])
CS95.1	95-1	L1/L2	29	34	Yuma Area Safety Improvements	-	Install two-way center turn lane (MP 29 – 32 expands from a 4-lane undivided highway to a 5-lane undivided highway, MP 32 – 34 expands from a 2-lane undivided highway to a 5-lane undivided highway); install raised medians at signalized intersection approaches (approximately 250' on each approach); improve signal visibility and install warning signs at the following intersections: Araby Road (MP 29.4), Avenue 7E (MP 29.9), Avenue 8E (MP 30.9), Avenue 11E (MP 33.7); widen Gila Canal Bridge (MP 33.55)	M/E
CS95.2	95-2	L4/L5	35	39	Fortuna Wash Area Safety Improvements	-	Install two-way center turn lane (expand from a 2-lane undivided highway to a 5-lane highway); widen Welton Mohawk Canal Bridge (MP 38.0)	M/E
CS95.3	95-2	L4	39	42	Dome Valley Area Safety Improvements	-	Widen shoulders (NB/SB); install chevrons at horizontal curve from MP 40.1 to 40.4; install warning signs for intersections with Adair Park Rd (MP 39.7) and County 3rd St (MP 40.5)	M
CS95.4	95-4	L10/L11/ L12	59	80	Yuma Proving Ground Area Safety and Freight Improvements	A	Widen shoulders (NB/SB)	M
						B	Construct alternating passing lanes	M
CS95.5	95-4	L11	59	71	Yuma Proving Ground Freight Improvements	-	Construct drainage structures and re-profile roadway at 10 locations where flows are concentrated by upstream channelization (MP 59 – MP 60 three crossings, MP 61.0, MP 62.4, MP 66.0, MP 66.8, MP 69.1-69.3 two crossings, MP 71.3)	M
CS95.6	95-7	L15	111	131	Quartzsite to Bouse Wash Freight Improvements	-	Widen shoulders (NB/SB); Construct drainage structures and re-profile roadway at 19 locations with flooding potential: MP 110.8, 112.8, 113.1, 114.9, 115.1, 116.2, 116.6 are higher priority with upstream channelization concentrating flows; MP 117.1, 117.7, 118.9, 119.6, 119.8, 120.1, 120.6, 120.8, 121.4, 122.1, 122.3, 122.6 are additional locations	M
CS95.7	95-7	L16	116	121	Pavement Improvements	A	Rehabilitate pavement	P
						B	Replace pavement	M
CS95.8	95-7	L18	131	131	Bouse Wash Bridge Improvements	A	Rehabilitate bridge	P
						B	Replace bridge	M
CS95.9	95-8	L19	131	142	Bouse Wash to Parker Freight Improvements	A	Widen shoulders (NB/SB); construct drainage structure and re-profile roadway at MP 134.4	M
						B	Construct alternating passing lanes; construct drainage structure and re-profile roadway at MP 134.4	M
CS95.10	95-9	L20/L21	142	148	Parker Safety and Freight Improvements	-	Construct right turn lanes at Riverside Drive (MP 148.3, NB and SB), Cove Avenue (MP 148.2, NB and SB), Ironwood Road (MP 147.5, SB), and Mesquite Drive (MP 147.3, SB); Improve signal visibility and install warning signs and transverse rumble strips north of Resort Drive to alert southbound traffic	M
CS95.11	95-10	L22	148	149	Parker Pavement Improvements	A	Rehabilitate pavement	P
						B	Replace pavement	M
CS95.12	95-11	L23/L24	162	176	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	-	Widen shoulders (NB/SB); construct alternating passing lanes at MP 172.8 – MP 177 and MP 164 – MP 169.8; install curve warning signs, advisory speed sign and chevrons at MP 162.3	M

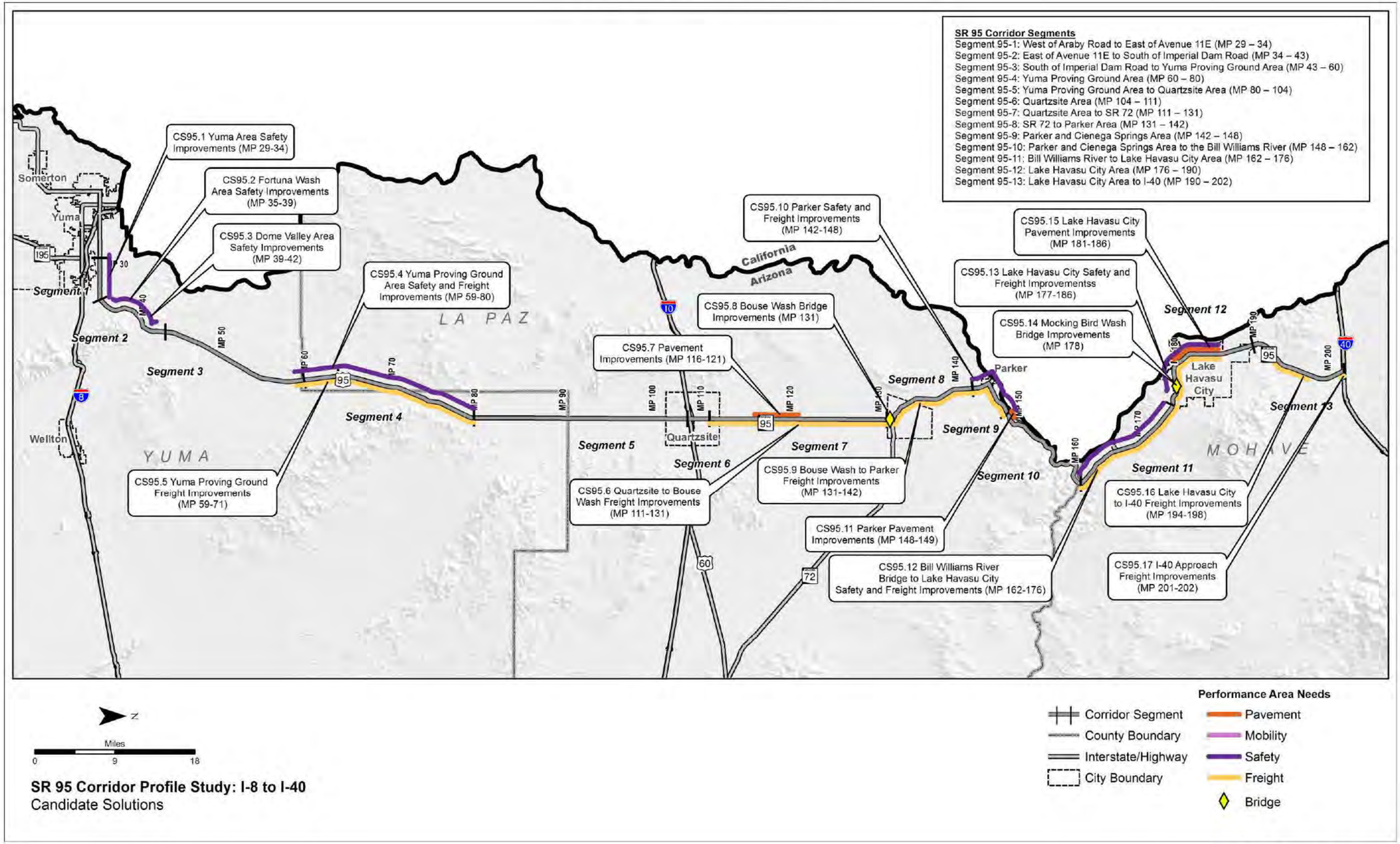
* '-': Indicates only one solution is being proposed and no options are being considered

Table 19: Candidate Solutions (continued)

Candidate Solution #	Segment #	Location #	Beginning Milepost	Ending Milepost	Candidate Solution Name	Option*	Scope	Investment Category (Preservation [P], Modernization [M], Expansion [E])
CS95.13	95-12	L25/L26/L28	177	186	Lake Havasu City Safety and Freight Improvements	A	Reconstruct 9 signalized intersections as double lane roundabouts (Mulberry Ave, Smoketree Ave, Swanson Ave, Mesquite Ave, Palo Verde Blvd S, Industrial Blvd, W Acoma Blvd, Kiowa Blvd N, Palo Verde Blvd N); install raised median throughout City limits (MP 177 – MP 186); mitigate differential settling on Falls Spring Wash Bridge (MP 186.2)	M
						B	Construct southbound right turn lanes at Smoketree Ave, Swanson Ave, W Acoma Blvd, Lake Dr; install raised median throughout City limits (MP 177 – MP 186); implement signal coordination/adjust timing; mitigate differential settling on Falls Spring Wash Bridge (MP 186.2)	M
CS95.14	95-12	L27	178	178	Mockingbird Wash Bridge Improvements	A	Rehabilitate bridge	P
						B	Replace bridge	M
CS95.15	95-12	L29	181	186	Lake Havasu City Pavement Improvements	A	Rehabilitate pavement	P
						B	Replace pavement	M
CS95.16	95-13	L32	194	198	Lake Havasu City to I-40 Freight Improvements	-	Widen shoulders (NB/SB) MP 194.5 – MP 196.0; construct alternating passing lanes MP 196 – MP 198	M
CS95.17	95-13	L32	201	202	I-40 Approach Freight Improvements	-	Construct auxiliary lanes to create a 5-lane section through activity center (MP 201.3 – MP 202); install signs prohibiting left turns in/out of the northern Wendy's/Pilot driveway	E

* '-': Indicates only one solution is being proposed and no options are being considered

Figure 23: Candidate Solutions



5.0 SOLUTION EVALUATION AND PRIORITIZATION

Candidate solutions are evaluated using the following steps: LCCA (where applicable), Performance Effectiveness Evaluation, Solution Risk Analysis, and Candidate Solution Prioritization. The methodology and approach to this evaluation are shown in **Figure 24** and described more fully below.

Life-Cycle Cost Analysis

All Pavement and Bridge candidate solutions have two options: rehabilitation/repair or reconstruction. These options are evaluated through an LCCA to determine the best approach for each location where a Pavement or Bridge solution is recommended. The LCCA can eliminate options from further consideration and identify which options should be carried forward for further evaluation.

When multiple independent candidate solutions are developed for Mobility, Safety, or Freight strategic investment areas, these candidate solution options advance directly to the Performance Effectiveness Evaluation without an LCCA.

Performance Effectiveness Evaluation

After completing the LCCA process, all remaining candidate solutions are evaluated based on their performance effectiveness. This process includes determining a Performance Effectiveness Score (PES) based on how much each solution impacts the existing performance and needs scores for each segment. This evaluation also includes a Performance Area Risk Analysis to help differentiate between similar solutions based on factors that are not directly addressed in the performance system.

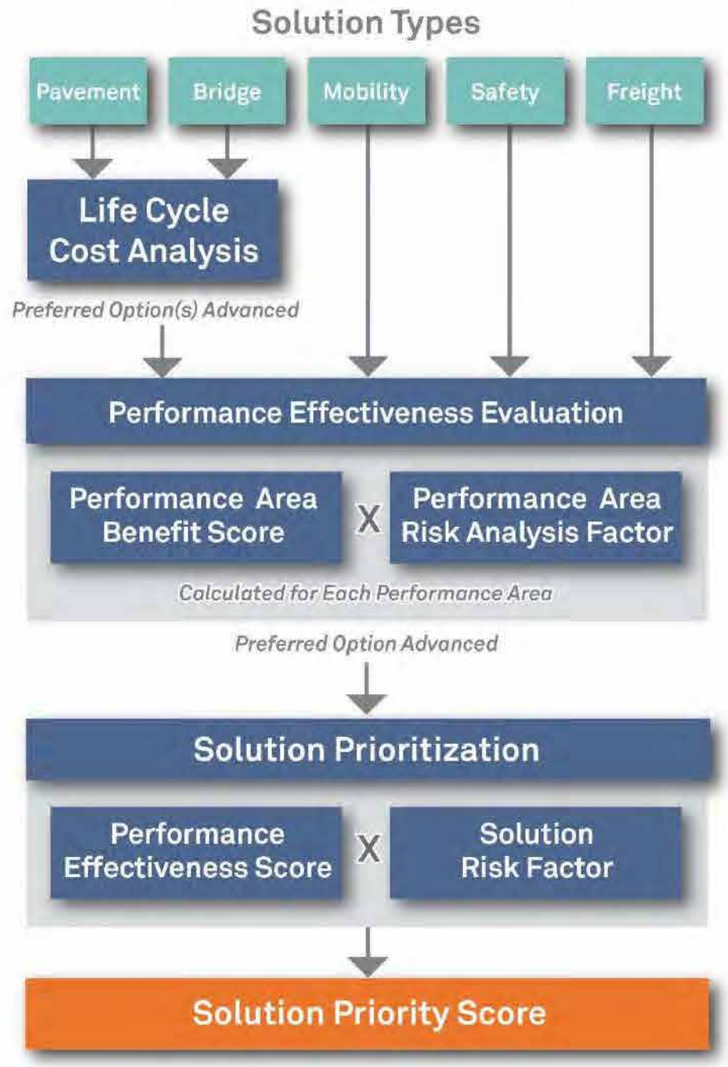
Solution Risk Analysis

All candidate solutions advanced through the Performance Effectiveness Evaluation are also evaluated through a Solution Risk Analysis process. A solution risk probability and consequence analysis is conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of performance failure.

Candidate Solution Prioritization

The PES, weighted risk factor, and segment average need score are combined to create a prioritization score. The candidate solutions are ranked by prioritization score from highest to lowest. The highest prioritization score indicates the candidate solution that is recommended as the highest priority. Solutions that address multiple performance areas tend to score higher in this process.

Figure 24: Candidate Solution Evaluation Process



5.1 Life-Cycle Cost Analysis

LCCA is conducted for any candidate solution that is developed as a result of a need in the Pavement or Bridge performance area. The intent of the LCCA is to determine which options warrant further investigation and eliminate options that would not be considered strategic.

LCCA is an economic analysis that compares cost streams over time and presents the results in a common measure: the present value of all future costs. The cost stream occurs over an analysis period that is long enough to provide a reasonably fair comparison among alternatives that may differ significantly in scale of improvement actions over shorter time periods. For both bridge and pavement LCCA, the costs are focused on agency (ADOT) costs for corrective actions to meet the objective of keeping the bridge or pavement serviceable over a long period of time.

LCCA is performed to provide a more complete holistic perspective on asset performance and agency costs over the life of an investment stream. This approach helps ADOT look beyond initial and short-term costs, which often dominate the considerations in transportation investment decision making and programming.

Bridge LCCA

For the bridge LCCA, three basic strategies are analyzed that differ in timing and scale of improvement actions to maintain the selected bridges, as described below:

- Bridge replacement (large upfront cost but small ongoing costs afterwards)
- Bridge rehabilitation until replacement (moderate upfront costs then small to moderate ongoing costs until replacement)
- On-going repairs until replacement (low upfront and ongoing costs until replacement)

The bridge LCCA model developed for the CPS reviews the characteristics of the candidate bridges including bridge ratings and deterioration rates to develop the three improvement strategies (full replacement, rehabilitation until replacement, and repair until replacement). Each strategy consists of a set of corrective actions that contribute to keeping the bridge serviceable over the analysis period. Cost and effect of these improvement actions on the bridge condition are essential parts of the model. Other considerations in the model include bridge age, elevation, pier height, length-to-span ratio, skew angle, and substandard characteristics such as shoulders and vehicle clearance. The following assumptions are included in the bridge LCCA model:

- The bridge LCCA only addresses the structural condition of the bridge and does not address other issues or costs
- The bridge will require replacement at the end of its 75-year service life regardless of current condition
- The bridge elevation, pier height, skew angle, and length-to-span ratio can affect the replacement and rehabilitation costs
- The current and historical ratings are used to estimate a rate of deterioration for each candidate bridge
- Following bridge replacement, repairs will be needed every 20 years
- Different bridge repair and rehabilitation strategies have different costs, expected service life, and benefit to the bridge rating
- The net present value of future costs is discounted at 3% and all dollar amounts are in 2015 dollars
- If the LCCA evaluation recommends rehabilitation or repair, the solution is not considered strategic and the rehabilitation or repair will be addressed by normal programming processes
- Because this LCCA is conducted at a planning level, and due to the variabilities in costs and improvement strategies, the LCCA net present value results that are within 15% should be considered equally; in such a case, the solution should be carried forward as a strategic replacement project – more detailed scoping will confirm if replacement or rehabilitation is needed

Based on the candidate solutions presented in **Table 19**, LCCA was conducted for two bridges on the SR 95 corridor. A summary of this analysis is shown in **Table 20**. Additional information regarding the bridge LCCA is included in **Appendix E**.

Pavement LCCA

The LCCA approach to pavement is very similar to the process used for bridges. For the pavement LCCA, three basic strategies are analyzed that differ in timing and scale of improvement actions to maintain the selected pavement, as described below:

- Pavement replacement (large upfront cost but small ongoing costs afterwards – could be replacement with asphalt or concrete pavement)
- Pavement major rehabilitation until replacement (moderate upfront costs then small to moderate ongoing costs until replacement)
- Pavement minor rehabilitation until replacement (low upfront and ongoing costs until replacement)

The pavement LCCA model developed for the CPS reviews the characteristics of the candidate paving locations including the historical rehabilitation frequency to develop potential improvement strategies (full replacement, major rehabilitation until replacement, and minor rehabilitation until replacement, for either concrete or asphalt, as applicable). Each strategy consists of a set of corrective actions that contribute to keeping the pavement serviceable over the analysis period. The following assumptions are included in the pavement LCCA model:

- The pavement LCCA only addresses the condition of the pavement and does not address other issues or costs
- The historical pavement rehabilitation frequencies at each location are used to estimate future rehabilitation frequencies
- Different pavement replacement and rehabilitation strategies have different costs and expected service life

- The net present value of future costs is discounted at 3% and all dollar amounts are in 2015 dollars
- If the LCCA evaluation recommends rehabilitation or repair, the solution is not considered strategic and the rehabilitation will be addressed by normal programming processes
- Because this LCCA is conducted at a planning level, and due to the variabilities in costs and improvement strategies, the LCCA net present value results that are within 15% should be considered equally; in such a case, the solution should be carried forward as a strategic replacement project – more detailed scoping will confirm if replacement or rehabilitation is needed

Based on the candidate solutions presented in **Table 19**, LCCA was conducted for three pavement sections on the SR 95 corridor. A summary of this analysis is shown in **Table 21**. Additional information regarding the pavement LCCA is included in **Appendix E**.

As shown in **Table 20** and **Table 21**, the following conclusions were determined based on the LCCA:

- Rehabilitation or repair was determined to be the most effective approach for the candidate solutions listed below; these locations do not have other needs so it is assumed that these identified needs will be addressed by normal programming processes so these solutions were not carried forward to the Performance Effectiveness Evaluation:
  - Bouse Wash Bridge #1321 (CS95.8, MP 131.3)
  - Mockingbird Wash Bridge (CS95.14, MP 178)
  - Pavement Improvements (CS95.7, MP 116-121)
  - Parker Pavement Improvements (CS95.11, MP 148-149)
  - Lake Havasu City Pavement Improvements (CS95.15, MP 181-186)

Table 20: Bridge Life-Cycle Cost Analysis Results

Candidate Solution	Present Value at 3% Discount Rate ($)			Ratio of Present Value Compared to Lowest Present Value			Other Needs	Results
	Replace	Rehab	Repair	Replace	Rehab	Repair		
Bouse Wash Bridge #1321 (CS95.8, MP 131.3)	$7,562,929	**$5,692,468**	$5,987,017	1.33	1.00	1.05	-	Not strategic solution alone - Rehabilitation is recommended
Mockingbird Wash Bridge (CS95.14, MP 178)	$3,496,779	$3,188,062	**$2,154,715**	1.62	1.48	1.00	-	Not strategic solution alone - Repair is recommended

Table 21: Pavement Life-Cycle Cost Analysis Results

Candidate Solution	Present Value at 3% Discount Rate ($)				Ratio of Present Value Compared to Lowest Present Value				Other Needs	Results
	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehabilitation	Asphalt Light Rehabilitation	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehabilitation	Asphalt Light Rehabilitation		
Pavement Improvements (CS95.7, MP 116-121)	$18,516,655	$16,952,400	**$13,277,916**	$14,809,295	1.39	1.28	1.00	1.12	-	Reconstruction is not within 15% of lowest cost - Rehabilitation is recommended
Parker Pavement Improvements (CS95.11, MP 148-149)	$8,332,495	$7,628,580	**$5,975,062**	$6,664,183	1.39	1.28	1.00	1.12	-	Reconstruction is not within 15% of lowest cost - Rehabilitation is recommended
Lake Havasu City Pavement Improvements (CS95.15, MP 181-186)	$34,718,729	$31,785,751	**$24,896,093**	$27,767,428	1.39	1.28	1.00	1.12	-	Reconstruction is not within 15% of lowest cost - Rehabilitation is recommended

5.2 Performance Effectiveness Evaluation

The results of the Performance Effectiveness Evaluation are combined with the results of a Performance Area Risk Analysis to determine a Performance Effectiveness Score (PES). The objectives of the Performance Effectiveness Evaluation include:

- Measure the benefit to the performance system versus the cost of the solution
- Include risk factors to help differentiate between similar solutions
- Apply to each performance area that is affected by the candidate solution
- Account for emphasis areas identified for the corridor

The Performance Effectiveness Evaluation includes the following steps:

- Estimate the post-solution performance for each of the five performance areas (Pavement, Bridge, Mobility, Safety, and Freight)
- Use the post-solution performance scores to calculate a post-solution level of need for each of the five performance areas
- Compare the pre-solution level of need to the post-solution level of need to determine the reduction in level of need (potential solution benefit) for each of the five performance areas
- Calculate performance area risk weighting factors for each of the five performance areas
- Use the reduction in level of need (benefit) and risk weighting factors to calculate the PES

Post-Solution Performance Estimation

For each performance area, a slightly different approach is used to estimate the post-solution performance. This process is based on the following assumptions:

- Pavement:
  - The IRI rating would decrease (to 30 for replacement or 45 for rehabilitation)
  - The Cracking rating would decrease (to 0 for replacement or rehabilitation)
- Bridge:
  - The structural ratings would increase (+1 for repair, +2 for rehabilitation, or increase to 8 for replacement)
  - The Sufficiency Rating would increase (+10 for repair, +20 for rehabilitation, or increase to 98 for replacement)
- Mobility:
  - Additional lanes would increase the capacity and therefore affect the Mobility Index and associated secondary measures
  - Other improvements (e.g., ramp metering, parallel ramps, variable speed limits) would also increase the capacity (to a lesser extent than additional lanes) and therefore would affect the Mobility Index and associated secondary measures
  - Changes in the Mobility Index (due to increased capacity) would have a direct effect on the TTI secondary measure
  - Changes in the Mobility Index (due to increased capacity) and Safety Index (due to crash reductions) would have a direct effect on the PTI secondary measure
  - Changes in the Safety Index (due to crash reductions) would have a direct effect on the Closure Extent secondary measure
- Safety:
  - Crash modification factors were developed that would be applied to estimate the reduction in crashes (for additional information see **Appendix F**)
- Freight:
  - Changes in the Mobility Index (due to increased capacity) and Safety Index (due to crash reductions) would have a direct effect on the Freight Index and the TPTI secondary measure
  - Changes in the Mobility Index (due to increased capacity) would have a direct effect on the TTTI secondary measure
  - Changes in the Safety Index (due to crash reductions) would have a direct effect on the Closure Duration secondary measure

Performance Area Risk Analysis

The Performance Area Risk Analysis is intended to develop a numeric risk weighting factor for each of the five performance areas (Pavement, Bridge, Mobility, Safety, and Freight). This risk analysis addresses other considerations for each performance area that are not directly included in the performance system. A risk weighting factor is calculated for each candidate solution based on the specific characteristics at the solution location. For example, the Pavement Risk Factor is based on factors such as the elevation, daily traffic volumes, and amount of truck traffic. Additional information regarding the Performance Area Risk Factors is included in **Appendix G**.

Following the calculation of the reduction in level of need (benefit) and the Performance Area Risk Factors, these values are used to calculate the PES. In addition, the reduction in level of need in each emphasis area is also included in the PES.

Net Present Value Factor

The benefit (reduction in need) is measured as a one-time benefit. However, different types of solutions will have varying service lives during which the benefits will be obtained. For example, a preservation solution would likely have a shorter stream of benefits over time when compared to a modernization or expansion solution. To address the varying lengths of benefit streams, each solution is classified as a 10-year, 20-year, 30-year, or 75-year benefit stream, or the net present value (NPV) factor (F_{NPV}). A 3% discount rate is used to calculate F_{NPV} for each classification of solution. The service lives and respective factors are described below:

- A 10-year service life is generally reflective of preservation solutions such as pavement and bridge preservation; these solutions would likely have a 10-year stream of benefits; for these solutions, a F_{NPV} of 8.8 is used in the PES calculation

- A 20-year service life is generally reflective of modernization solutions that do not include new infrastructure; these solutions would likely have a 20-year stream of benefits; for these solutions, a F_{NPV} of 15.3 is used in the PES calculation
- A 30-year service life is generally reflective of expansion solutions or modernization solutions that include new infrastructure; these solutions would likely have a 30-year stream of benefits; for these solutions, a F_{NPV} of 20.2 is used in the PES calculation
- A 75-year service life is used for bridge replacement solutions; these solutions would likely have a 75-year stream of benefits; for these solutions, a F_{NPV} of 30.6 is used in the PES calculation

Vehicle-Miles Travelled Factor

Another factor in assessing benefits is the number of travelers who would benefit from the implementation of the candidate solution. This factor varies between candidate solutions depending on the length of the solution and the magnitude of daily traffic volumes. Multiplying the solution length by the daily traffic volume results in vehicle-miles travelled (VMT), which provides a measure of the amount of traffic exposure that would receive the benefit of the proposed solution. The VMT is converted to a VMT factor (known as F_{VMT}), which is on a scale between 0 and 5, using the equation below:

$$F_{VMT} = 5 - (5 \times e^{VMT \times -0.0000139})$$

Performance Effectiveness Score

The PES is calculated using the following equation:

PES = ((Sum of all Risk Factored Benefit Scores + Sum of all Risk Factored Emphasis Area Scores) / Cost) x F_{VMT} x F_{NPV}

Where:

Risk Factored Benefit Score = Reduction in Segment-Level Need (benefit) x Performance Area Risk Weighting Factor (calculated for each performance area)

Risk Factored Emphasis Area Score = Reduction in Corridor-Level Need x Performance Area Risk Factors x Emphasis Area Factor (calculated for each emphasis area)

*Cost = estimated cost of candidate solution in millions of dollars (see **Appendix H**)*

F_{VMT} = Factor between 0 and 5 to account for VMT at location of candidate solution based on existing (2014) daily volume and length of solution

F_{NPV} = Factor (ranging from 8.8 to 30.6 as described previously) to address anticipated longevity of service life (and duration of benefits) for each candidate solution

The resulting PES values are shown in **Table 22**. Additional information regarding the calculation of the PES is contained in **Appendix I**.

For candidate solutions with multiple options to address Mobility, Safety, or Freight needs, the PES should be compared to help identify the best performing option. If one option clearly performs better than the other options (e.g., more than twice the PES value and a difference in magnitude of at least 20 points), the other options can be eliminated from further consideration. If multiple options have similar PES values, or there are other factors not accounted for in the performance system that could significantly influence the ultimate selection of an option (e.g., potential environmental concerns, potential adverse economic impacts), those options should all be advanced to the prioritization process. On the SR 95 corridor, the following candidate solutions have options to address Mobility, Safety, or Freight needs:

- CS95.4 (A and B) - Yuma Proving Ground Area Safety and Freight Improvements
- CS95.9 (A and B) - Bouse Wash to Parker Freight Improvements
- CS95.13 (A and B) - Lake Havasu City Safety and Freight Improvements

Based on a review of the PES values for the solutions with options, both Option A and Option B for CS95.4 and CS95.13 and just Option A for CS95.9 were advanced to the candidate solution prioritization process.

As was previously mentioned, rehabilitation or repair (option A) was determined to be the most effective approach for the candidate solutions listed below that were subjected to LCCA so these candidate solutions were dropped from further consideration; no PES values were calculated for these solutions and they do not appear in **Table 22**:

- Bouse Wash Bridge #1321 (CS95.8, MP 131.3)
- Mockingbird Wash Bridge #1915 (CS95.14, MP 178)
- Pavement Improvements (CS95.7, MP 116-121)
- Parker Pavement Improvements (CS95.11, MP 148-149)
- Lake Havasu City Pavement Improvements (CS95.15, MP 181-186)

Table 22: Performance Effectiveness Scores

Candidate Solution #	Segment #	Option	Candidate Solution Name	Milepost Location	Estimated Cost* (in millions)	Risk Factored Benefit Score					Risk Factored Emphasis Area Scores			Total Factored Benefit Score	F_{VMT}	F_{NPV}	Performance Effectiveness Score
						Pavement	Bridge	Mobility	Safety	Freight	Mobility	Safety	Freight				
CS95.1	95-1	-	Yuma Area Safety Improvements	29-34	$15.41	-	-	0.95	9.41	0.18	0.00	0.04	0.00	10.59	2.41	20.2	33.5
CS95.2	95-2	-	Fortuna Wash Area Safety Improvements	35-39	$17.17	-	-	7.40	1.83	6.52	0.16	0.02	0.06	15.99	1.76	20.2	33.0
CS95.3	95-2	-	Dome Valley Area Safety Improvements	39-42	$3.34	-	-	2.48	2.04	0.47	0.00	0.02	0.02	5.03	1.39	15.3	31.9
CS95.4	95-4	A	Yuma Proving Ground Area Safety and Freight Improvements (widen shoulders)	59-80	$30.39	-	-	10.30	7.33	5.73	0.01	0.12	0.02	23.52	1.82	15.3	21.6
		B	Yuma Proving Ground Area Safety and Freight Improvements (passing lanes)	59-80	$78.31	-	-	5.89	7.36	7.93	0.04	0.13	0.03	21.37	1.82	20.2	10.1
CS95.5	95-4	-	Yuma Proving Ground Freight Improvements	59-71	$10.74	-	-	3.15	1.13	9.30	0.00	0.03	0.03	13.65	0.20	20.2	5.1
CS95.6	95-7	-	Quartzsite to Bouse Wash Freight Improvements	111-123	$51.85	-	-	6.02	0.00	14.04	0.01	0.00	0.16	20.24	2.55	20.2	20.1
CS95.9	95-8	A	Bouse Wash to Parker Freight Improvements (widen shoulders)	131-142	$14.76	-	-	6.79	0.07	2.21	0.02	0.01	0.04	9.13	2.51	20.2	31.3
		B	Bouse Wash to Parker Freight Improvements (passing lanes)	131-142	$42.37	-	-	3.31	0.07	2.78	0.11	0.01	0.06	6.33	2.51	20.2	7.6
CS95.10	95-9	-	Parker Safety and Freight Improvements	142-148	$2.85	-	-	0.47	5.80	0.56	0.00	0.03	0.00	6.87	0.62	15.3	23.0
CS95.12	95-11	-	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	162-176	$54.35	-	-	8.85	9.58	7.76	0.04	0.16	0.09	26.48	3.45	20.2	34.0
CS95.13	95-12	A	Lake Havasu City Safety and Freight Improvements (roundabouts)	177-186	$51.33	-	-	1.12	9.41	1.45	0.01	0.19	0.02	12.20	4.17	20.2	20.0
		B	Lake Havasu City Safety and Freight Improvements (turn lanes)	177-186	$13.45	-	-	0.75	5.48	0.17	0.01	0.11	0.00	6.52	4.17	15.3	30.9
CS95.16	95-13	-	Lake Havasu City to I-40 Freight Improvements	194-198	$9.63	-	-	6.84	4.17	2.48	0.02	0.03	0.01	13.55	1.60	20.2	45.4
CS95.17	95-13	-	I-40 Approach Freight Improvements	201-202	$3.16			1.17	0.17	0.66	0.01	0.00	0.00	2.02	0.37	20.2	4.8

*: See Table 24 for total construction costs

5.3 Solution Risk Analysis

Following the calculation of the PES, an additional step is taken to develop the prioritized list of solutions. A solution risk probability and consequence analysis is conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of performance failure. **Figure 25** shows the risk matrix used to develop the risk weighting factors.

Figure 25: Risk Matrix

		Severity/Consequence				
		Insignificant	**Minor**	**Significant**	**Major**	**Catastrophic**
Frequency/ Likelihood	**Very Rare**	Low	Low	Low	Moderate	Major
	Rare	Low	Low	Moderate	Major	Major
	Seldom	Low	Moderate	Moderate	Major	Severe
	Common	Moderate	Moderate	Major	Severe	Severe
	Frequent	Moderate	Major	Severe	Severe	Severe

Using the risk matrix in **Figure 25**, numeric values were assigned to each category of frequency and severity. The higher the risk, the higher the numeric factor that was assigned. The risk weight for each area of the matrix was calculated by multiplying the severity factor times the frequency factor. These numeric factors are shown in **Figure 26**.

Figure 26: Numeric Risk Matrix

			Severity/Consequence				
			Insignificant	**Minor**	**Significant**	**Major**	**Catastrophic**
		Weight	1.00	1.10	1.20	1.30	1.40
Frequency/ Likelihood	**Very Rare**	1.00	1.00	1.10	1.20	1.30	1.40
	Rare	1.10	1.10	1.21	1.32	1.43	1.54
	Seldom	1.20	1.20	1.32	1.44	1.56	1.68
	Common	1.30	1.30	1.43	1.56	1.69	1.82
	Frequent	1.40	1.40	1.54	1.68	1.82	1.96

Using the values in **Figure 26**, risk weighting factors were calculated for each of the following four risk categories: low, moderate, major, and severe. These values are simply the average of the values in **Figure 26** that fall within each category. The resulting average risk weighting factors are:

Low	Moderate	Major	Severe
1.14	1.36	1.51	1.78

The risk weighting factors listed above are assigned to the five performance areas as follows:

- Safety = 1.78
  - The Safety performance area quantifies the likelihood of fatal or incapacitating injury crashes; therefore, it is assigned the Severe (1.78) risk weighting factor
- Bridge = 1.51
  - The Bridge performance area focuses on the structural adequacy of bridges; a bridge failure may result in crashes or traffic being detoured for long periods of time resulting in significant travel time increases; therefore, it is assigned the Major (1.51) risk weighting factor
- Mobility and Freight = 1.36
  - The Mobility and Freight performance areas focus on capacity and congestion; failure in either of these performance areas would result in increased travel times but would not have significant effect on safety (crashes) that would not already be addressed in the Safety performance area; therefore, they are assigned the Moderate (1.36) risk weighing factor
- Pavement = 1.14
  - The Pavement performance area focuses on the ride quality of the pavement; failure in this performance area would likely be a spot location that would not dramatically affect drivers beyond what is already captured in the Safety performance area; therefore, it is assigned the Low (1.14) risk weighting factor

The benefit in each performance area is calculated for each candidate solution as part of the Performance Effectiveness Evaluation. Using this information on benefits and the risk factors listed above, a weighted (based on benefit) solution-level numeric risk factor is calculated for each candidate solution. For example, a solution that has 50% of its benefit in Safety and 50% of its benefit in Mobility has a weighted risk factor of 1.57 (0.50 x 1.36 + 0.50 x 1.78 = 1.57).

5.4 Candidate Solution Prioritization

The PES, weighted risk factor, and segment average need score are combined to create a prioritization score as follows:

Prioritization Score = PES x Weighted Risk Factor x Segment Average Need Score

Where:

PES = Performance Effectiveness Score as shown in ***Table 22***

Weighted Risk Factor = Weighted factor to address risk of not implementing a solution based on the likelihood and severity of the performance failure

Segment Average Need Score = Segment average need score as shown in ***Table 17***

Table 23 shows the prioritization scores for the candidate solutions subjected to the solution evaluation and prioritization process. Solutions that address multiple performance areas tend to score higher in this process. The prioritized list of candidate solutions is provided in the subsequent section. See **Appendix J** for additional information on the prioritization process.

Table 23: Prioritization Scores

Candidate Solution #	Segment #	Option	Candidate Solution Name	Milepost Location	Estimated Cost (in millions)	Performance Effectiveness Score	Weighted Risk Factor	Segment Average Need Score	Prioritization Score	Percentage by which Solution Reduces Performance Area Segment Needs				
										Pavement	Bridge	Mobility	Safety	Freight
CS95.1	95-1	-	Yuma Area Safety Improvements	29-34	$15.41	33.5	1.73	0.92	**54**	0%	0%	48%	79%	18%
CS95.2	95-2	-	Fortuna Wash Area Safety Improvements	35-39	$17.17	33.0	1.41	1.62	**75**	0%	0%	52%	23%	27%
CS95.3	95-2	-	Dome Valley Area Safety Improvements	39-42	$3.34	31.9	1.53	1.62	**79**	0%	0%	18%	26%	2%
CS95.4	95-4	A	Yuma Proving Ground Area Safety and Freight Improvements (widen shoulders)	59-80	$30.39	21.6	1.49	1.62	**52**	0%	0%	30%	81%	6%
	95-4	B	Yuma Proving Ground Area Safety and Freight Improvements (passing lanes)	59-80	$78.31	10.1	1.51	1.62	**24**	0%	0%	17%	81%	8%
CS95.5	95-4	-	Yuma Proving Ground Freight Improvements	59-71	$10.74	5.1	1.40	1.62	**12**	0%	0%	10%	13%	9%
CS95.6	95-7	-	Quartzsite to Bouse Wash Freight Improvements	111-123	$51.85	20.1	1.36	1.08	**29**	0%	0%	63%	0%	76%
CS95.9	95-8	A	Bouse Wash to Parker Freight Improvements (widen shoulders)	131-142	$14.76	31.3	1.36	1.38	**59**	0%	0%	47%	36%	7%
CS95.10	95-9	-	Parker Safety and Freight Improvements	142-148	$2.85	23.0	1.72	1.54	**61**	0%	0%	8%	59%	5%
CS95.12	95-11	-	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	162-176	$54.35	34.0	1.51	1.38	**71**	0%	0%	68%	61%	34%
CS95.13	95-12	A	Lake Havasu City Safety and Freight Improvements (roundabouts)	177-186	$51.33	20.0	1.69	1.85	**62**	0%	0%	19%	41%	35%
	95-12	B	Lake Havasu City Safety and Freight Improvements (turn lanes)	177-186	$13.45	30.9	1.72	1.85	**98**	0%	0%	13%	24%	4%
CS95.16	95-13	-	Lake Havasu City to I-40 Freight Improvements	194-198	$9.63	45.4	1.49	1.15	**78**	0%	0%	10%	66%	3%
CS95.17	95-13	-	I-40 Approach Freight Improvements	201-202	$3.16	4.8	1.40	1.15	**8**	0%	0%	2%	3%	1%

6.0 SUMMARY OF CORRIDOR RECOMMENDATIONS

6.1 Prioritized Candidate Solution Recommendations

Table 24 and **Figure 27** show the prioritized candidate solutions recommended for the SR 95 corridor in ranked order of priority. The highest prioritization score indicates the candidate solution that is recommended as the highest priority. Implementation of these solutions is anticipated to improve performance of the SR 95 corridor. The following observations were noted about the prioritized solutions:

- Most of the anticipated improvements in performance are in the Mobility, Safety, and Freight performance areas
- The highest-ranking solutions tend to have overlapping benefits in the Mobility, Safety, and Freight performance areas
- The highest priority solutions address needs in the Lake Havasu City area (MP 177-186) and Dome Valley area (MP 39-42)

6.2 Other Corridor Recommendations

As part of the investigation of strategic investment areas and candidate solutions, other corridor recommendations can also be identified. These recommendations could include modifications to the existing Statewide Construction Program, areas for further study, or other corridor specific recommendations that are not related to construction or policy. The list below identifies other corridor recommendations for the SR 95 corridor:

- Conduct feasibility study for installing automated flood warning system in areas prone to flooding
- Coordinate with the Lake Havasu City Strategic Transportation Safety Plan to identify safety improvements and programs to reduce crashes on SR 95 in Lake Havasu City
- Coordinate with the upcoming WACOG Strategic Transportation Safety Plan to identify safety improvements and programs to reduce crashes on SR 95 in Mohave County and La Paz County
- Investigate feasibility of advanced warning and alternate routing system during roadway closure events such as flash flooding and other incidents to improve resiliency and emergency response; possible examples include:
    - An alternate route between Parker and I-40 using California Highway 62 and US 95 would require dynamic message sign (DMS) coordination with Caltrans near Needles, CA, and south of Parker
    - DMS near Quartzite and Parker could provide alternate routing between via I-10, US 60, and SR 72
    - Coordinated DMS with Caltrans could also provide information on an alternate route between Yuma I-10 via California Highway 78

6.3 Policy and Initiative Recommendations

In addition to location-specific needs, general corridor and system-wide needs have also been identified through the CPS process. While these needs are more overarching and cannot be individually evaluated through the CPS process, it is important to document them. A list of recommended policies and initiatives was developed for consideration when programming future projects not only on SR 95, but across the entire state highway system where conditions are applicable. The following list, which is in no order of priority, was derived from the Round 1, Round 2, and Round 3 CPS:

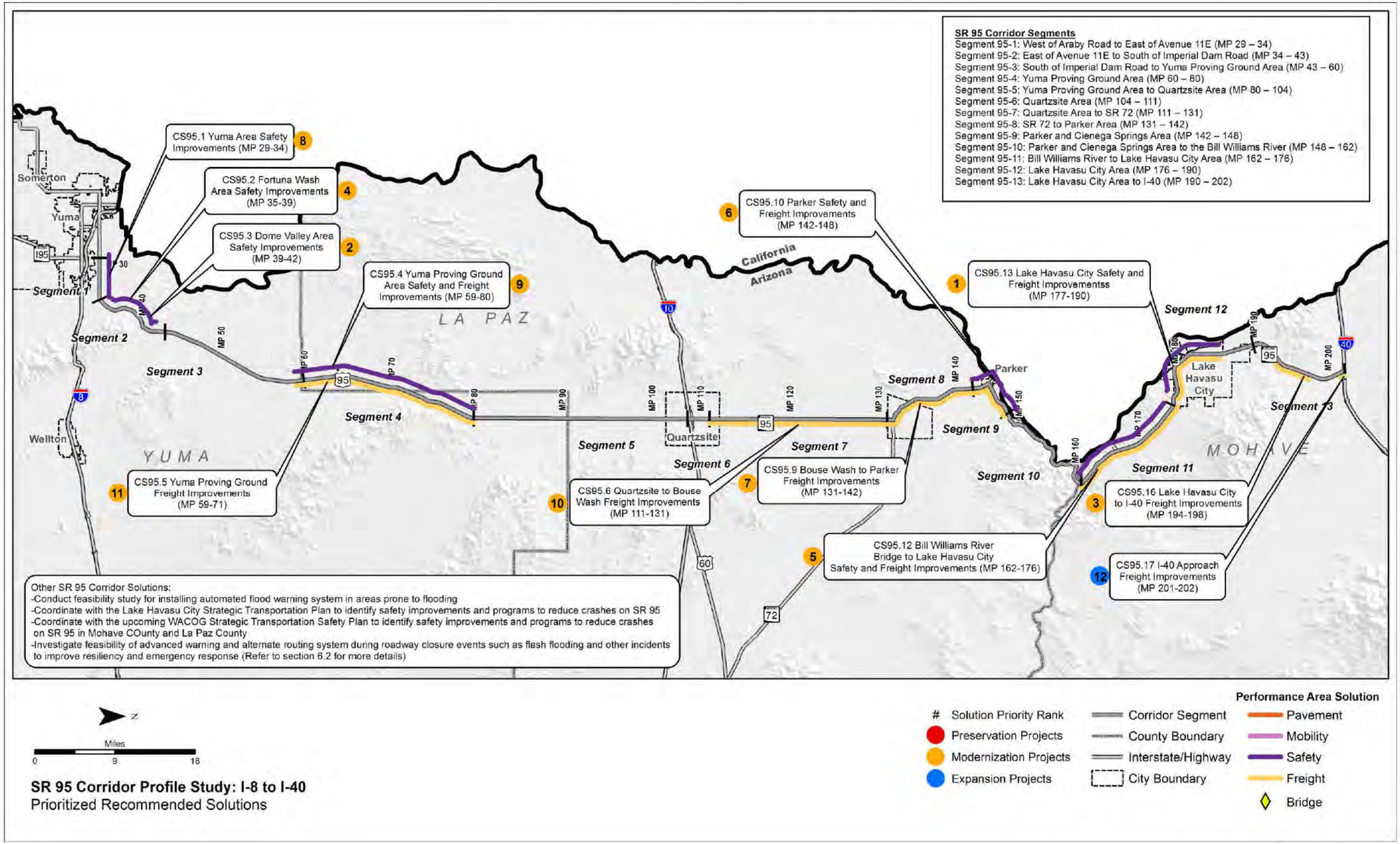
- Install Intelligent Transportation System (ITS) conduit with all new infrastructure projects
- Prepare strategic plans for Closed Circuit Television (CCTV) camera and Road Weather Information System (RWIS) locations statewide
- Leverage power and communication at existing weigh-in-motion (WIM), DMS, and call box locations to expand ITS applications across the state
- Consider solar power for lighting and ITS where applicable
- Investigate ice formation prediction technology where applicable
- Conduct highway safety manual evaluation for all future programmed projects
- Develop infrastructure maintenance and preservation plans (including schedule and funding) for all pavement and bridge infrastructure replacement or expansion projects
- Develop standardized bridge maintenance procedures so districts can do routine maintenance work
- Review historical ratings and level of previous investment during scoping of pavement and bridge projects; in pavement locations that warrant further investigation, conduct subsurface investigations during project scoping to determine if full replacement is warranted
- For pavement rehabilitation projects, enhance the amount/level of geotechnical investigations to address issues specific to the varying conditions along the project
- Expand programmed and future pavement projects as necessary to include shoulders
- Expand median cable barrier guidelines to account for safety performance
- Install CCTV cameras with all DMS
- In locations with limited communications, use CCTV cameras to provide still images rather than streaming video
- Develop statewide program for pavement replacement
- Install additional continuous permanent count stations along strategic corridors to enhance traffic count data
- When reconstruction or rehabilitation activities will affect existing bridge vertical clearance, the dimension of the new bridge vertical clearance should be a minimum of 16.25 feet where feasible
- All new or reconstructed roadway/shoulder edges adjacent to an unpaved surface should be constructed with a Safety Edge

- Collision data on tribal lands may be incomplete or inconsistent; additional coordination for data on tribal lands is recommended to ensure adequate reflection of safety issues
- Expand data collection devices statewide to measure freight delay
- Evaluate and accommodate potential changes in freight and goods movement trends that may result from improvements and expansions to the state roadway network

Table 24: Prioritized Recommended Solutions

Rank	Candidate Solution #	Option	Candidate Solution Name	Candidate Solution Scope	Estimated Cost (in millions)	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Prioritization Score
1	CS95.13	B	Lake Havasu City Safety and Freight Improvements (MP 177-190)	Construct southbound right turn lanes at Smoketree Ave, Swanson Ave, W Acoma Blvd, Lake Dry; install raised median throughout City limits (MP 177 – MP 186); implement signal coordination/adjust timing; mitigate differential settling on Falls Spring Wash Bridge (MP 186.2)	$13.45	M	98
		A	*Lake Havasu City Safety and Freight Improvements (MP 177-190)*	*Reconstruct 9 signalized intersections as double lane roundabouts (Mulberry Ave, Smoketree Ave, Swanson Ave, Mesquite Ave, Palo Verde Blvd S, Industrial Blvd, W Acoma Blvd, Kiowa Blvd N, Palo Verde Blvd N); install raised median throughout City limits (MP 177 – MP 186); mitigate differential settling on Falls Spring Wash Bridge (MP 186.2)*	*$51.33*	*M*	*62*
2	CS95.3	-	Dome Valley Area Safety Improvements (MP 39-42)	Widen shoulders (NB/SB); install chevrons at horizontal curve from MP 40.1 to 40.4; install warning signs for intersections with Adair Park Rd (MP 39.7) and County 3rd St (MP 40.5)	$3.34	M	79
3	CS95.16	-	Lake Havasu City to I-40 Freight Improvements (MP 194-198)	Widen shoulders (NB/SB) MP 194.5 – MP 196.0; construct alternating passing lanes MP 196 – MP 198	$9.63	M	78
4	CS95.2	-	Fortuna Wash Area Safety Improvements (MP 35-39)	Install two-way center turn lane (expand from a 2-lane undivided highway to a 5-lane highway); widen bridge over canal Welton Mohawk Canal Bridge (MP 38.0)	$17.17	M/E	75
5	CS95.12	-	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements (MP 162-176)	Widen shoulders in both the northbound and southbound direction(NB/SB); construct alternating passing lanes at MP 172.8 – MP 177 and MP 164 – MP 169.8; install curve warning signs, advisory speed sign and chevrons at MP 162.3	$54.35	M	71
6	CS95.10	-	Parker Safety and Freight Improvements (MP 142-148)	Construct right turn lanes at Riverside Drive (MP 148.3, NB and SB), Cove Avenue (MP 148.2, NB and SB), Ironwood Road (MP 147.5, SB), and Mesquite Drive (MP 147.3, SB); Improve signal visibility and install warning signs and transverse rumble strips north of Resort Drive to alert southbound traffic	$2.85	M	61
7	CS95.9	A	Bouse Wash to Parker Freight Improvements (MP 131-142)	Widen shoulders (NB/SB); construct drainage structure and re-profile roadway at MP 134.4	$14.76	M	59
8	CS95.1	-	Yuma Area Safety Improvements (MP 29-34)	Install two-way center turn lane (MP 29 – 32 expands from a 4-lane undivided highway to a 5-lane undivided highway, MP 32 – 34 expands from a 2-lane undivided highway to a 5-lane undivided highway); install raised medians at signalized intersection approaches (approximately 250' on each approach); improve signal visibility and install warning signs at the following intersections: Araby Road (MP 29.4), Avenue 7E (MP 29.9), Avenue 8E (MP 30.9), Avenue 11E (MP 33.7); widen Gila Canal Bridge (MP 33.55)	$15.41	M/E	54
9	CS95.4	A	Yuma Proving Ground Area Safety and Freight Improvements (MP 59-80)	Widen shoulders (NB/SB)	$30.39	M	52
		B	*Yuma Proving Ground Area Safety and Freight Improvements (MP 59-80)*	*Construct alternating passing lanes*	*$78.31*	*M*	*24*
10	CS95.6	-	Quartzsite to Bouse Wash Freight Improvements (MP 111-131)	Widen shoulders (NB/SB); Construct drainage structures and re-profile roadway at 19 locations with flooding potential: MP 110.8, 112.8, 113.1, 114.9, 115.1, 116.2, 116.6 are higher priority with upstream channelization concentrating flows; MP 117.1, 117.7, 118.9, 119.6, 119.8, 120.1, 120.6, 120.8, 121.4, 122.1, 122.3, 122.6 are additional locations	$51.85	M	29
11	CS95.5	-	Yuma Proving Ground Freight Improvements (MP 59-71)	Construct drainage structures and re-profile roadway at 10 locations where flows are concentrated by upstream channelization (MP 59 – MP 60 three crossings, MP 61.0, MP 62.4, MP 66.0, MP 66.8, MP 69.1-69.3 two crossings, MP 71.3)	$10.74	M	12
12	CS95.17	-	I-40 Approach Freight Improvements (MP 201-202)	Construct auxiliary lanes to create a 5-lane section through activity center (MP 201.3 – MP 202); install signs prohibiting left turns in/out of the northern Wendy's/Pilot driveway	$3.16	E	8

Figure 27: Prioritized Recommended Solutions



SR 95 Corridor Profile Study: I-8 to I-40
Prioritized Recommended Solutions

6.4 Next Steps

The candidate solutions recommended in this study are not intended to be a substitute or replacement for traditional ADOT project development processes where various ADOT technical groups and districts develop candidate projects for consideration in the performance-based programming in the P2P process. Rather, these candidate solutions are intended to complement ADOT's traditional project development processes through a performance-based process to address needs in one or more of the five performance areas of Pavement, Bridge, Mobility, Safety, and Freight. Candidate solutions developed for the SR 95 corridor will be considered along with other candidate projects in the ADOT statewide programming process.

It is important to note that candidate solutions are intended to represent strategic solutions to address existing performance needs related to the Pavement, Bridge, Mobility, Safety, and Freight performance areas. Therefore, the strategic solutions are not intended to preclude recommendations related to the ultimate vision for the corridor that may have been defined in the context of prior planning studies and/or design concept reports. Recommendations from such studies are still relevant to addressing the ultimate corridor objectives.

Upon completion of all three CPS rounds, the results will be incorporated into a summary document comparing all corridors that is expected to provide a performance-based review of statewide needs and candidate solutions.

Appendices

Appendix A: Corridor Performance Maps

This appendix contains maps of each primary and secondary measure associated with the five performance areas for the SR 95 corridor. The following are the areas and maps included:

Pavement Performance Area:

- Pavement Index and Hot Spots
- Pavement Serviceability (directional)
- Percentage of Pavement Area Failure

Bridge Performance Area:

- Bridge Index and Hot Spots
- Bridge Sufficiency
- Percent of Deck Area on Functionally Obsolete Bridges
- Lowest Bridge Rating

Mobility Performance Area:

- Mobility Index
- Future Daily V/C
- Existing Peak V/C (directional)
- Average Instances Per Year a Given Milepost is Closed Per Segment Mile
- All Vehicles Travel Time Index
- All Vehicles Planning Time Index
- Multimodal Opportunities
- Percentage of Bicycle Accommodation

Safety Performance Area:

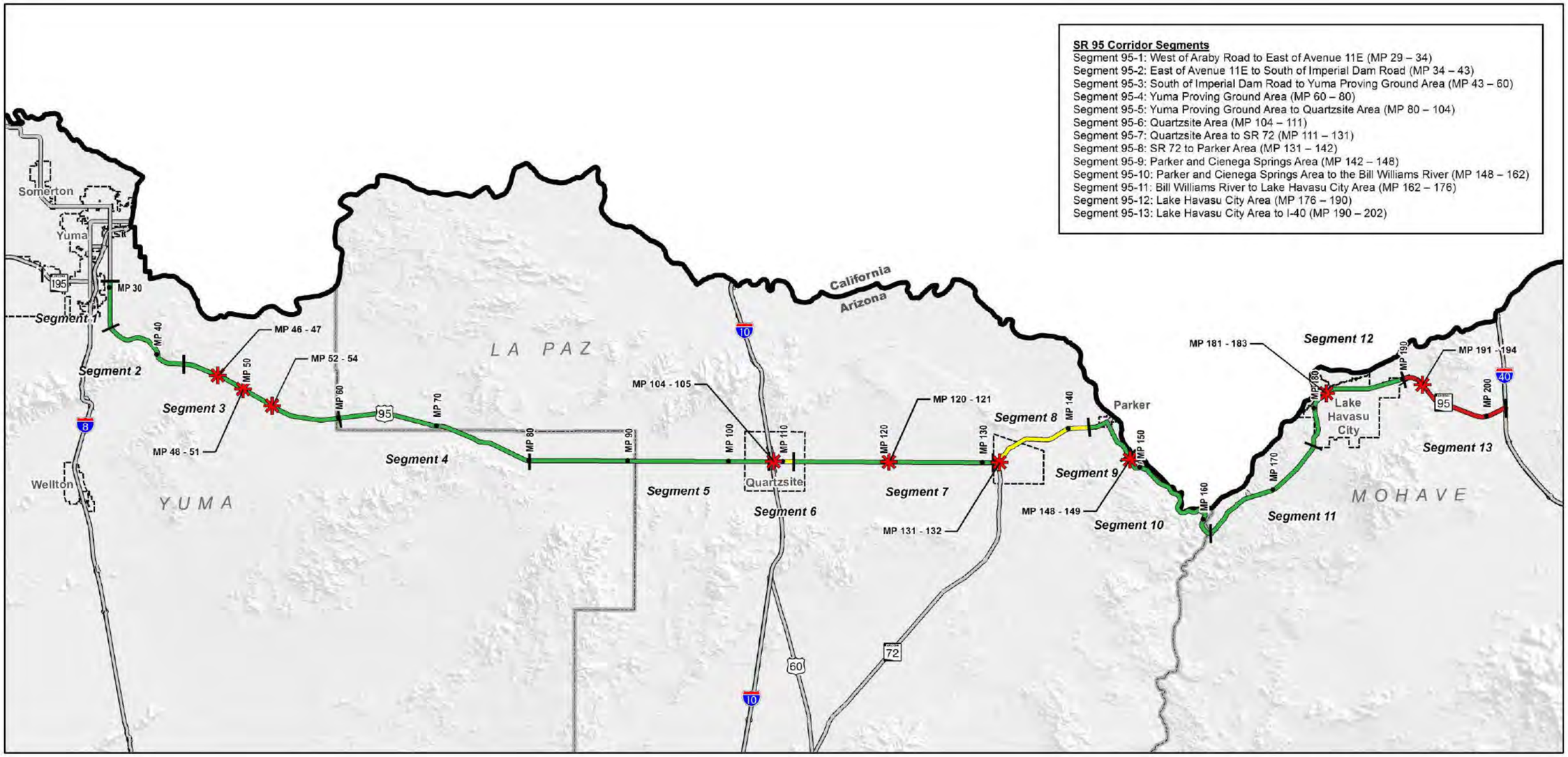
- Safety Index and Hot Spots
- Safety Index (directional)
- Relative Frequency of Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors Compared to the Statewide Average for Similar Segments

Freight Performance Area:

- Freight Index
- Truck Travel Time Index
- Truck Planning Time Index
- Average Minutes Per Year Given Milepost is Closed Per Segment Mile
- Bridge Vertical Clearance

SR 95 Corridor Segments

Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)



Corridor Segment
County Boundary
Interstate/Highway
City Boundary

PAVEMENT INDEX
GOOD (>3.5)
FAIR (2.9 - 3.5)
POOR (<2.9)

PAVEMENT HOT SPOT
LOCATIONS OF PAVEMENT FAILURE

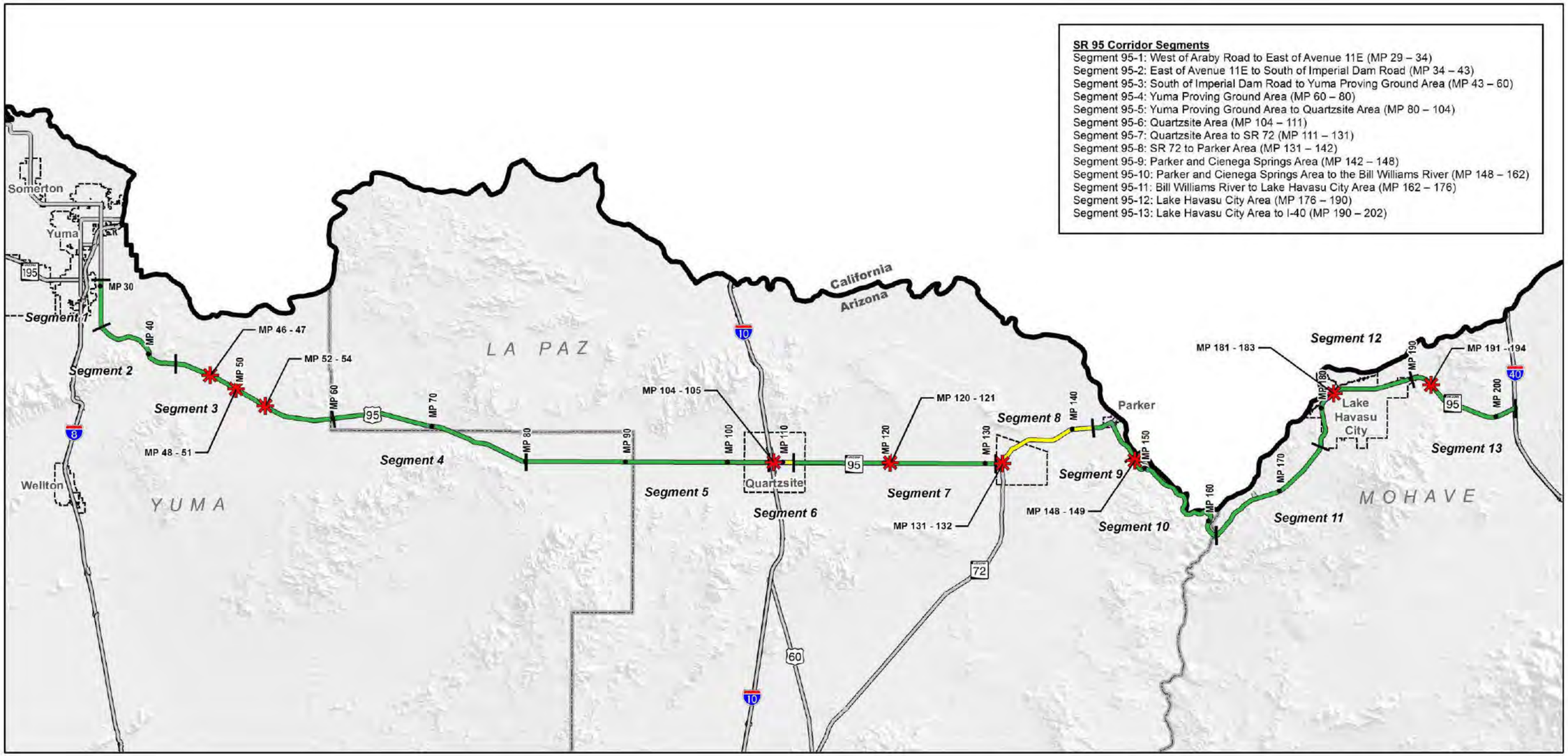
N

Miles
0 9 18

SR 95 Corridor Profile Study: I-8 to I-40
Pavement Index and Hot Spots
2014 Data

SR 95 Corridor Segments

Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)



N

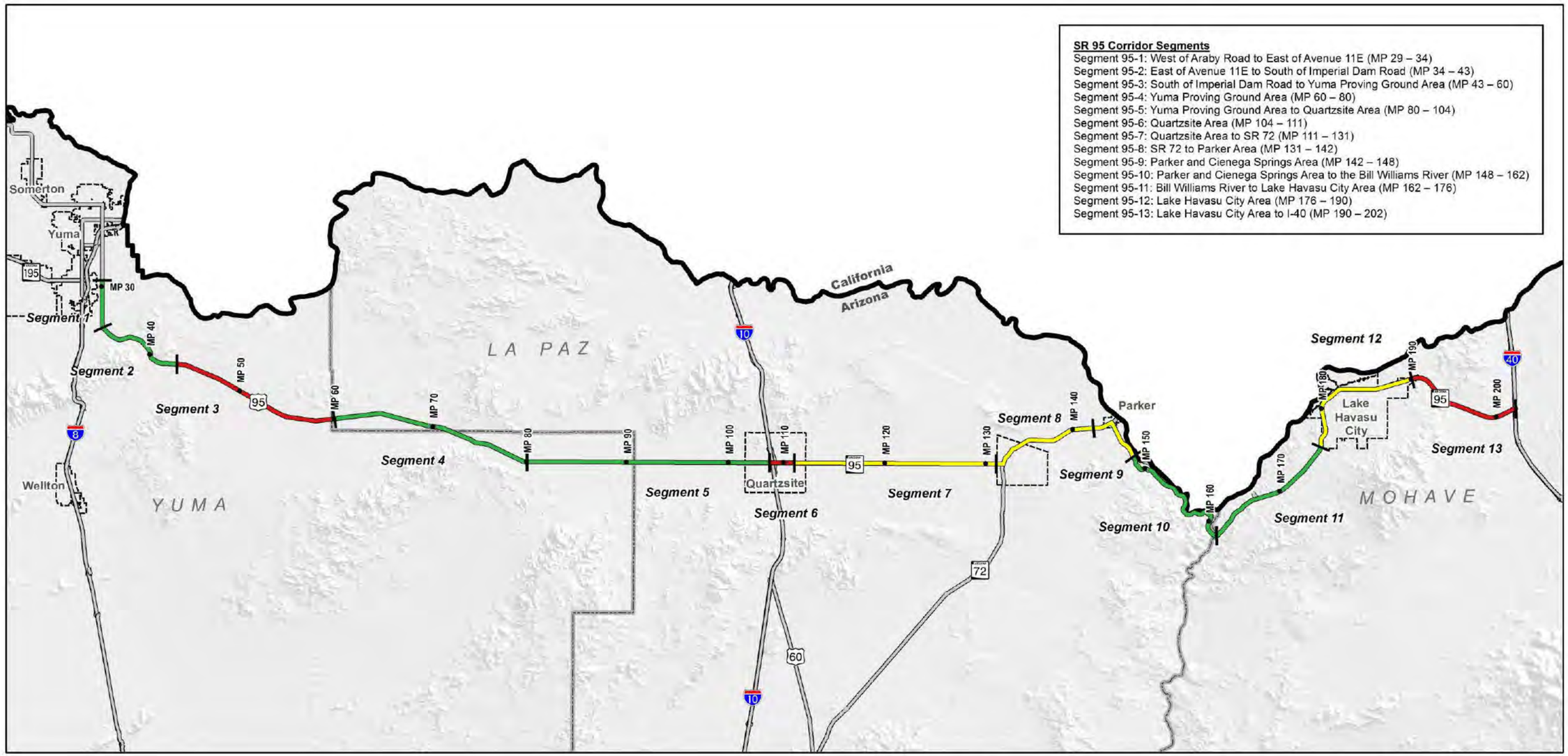
Miles
0 9 18

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

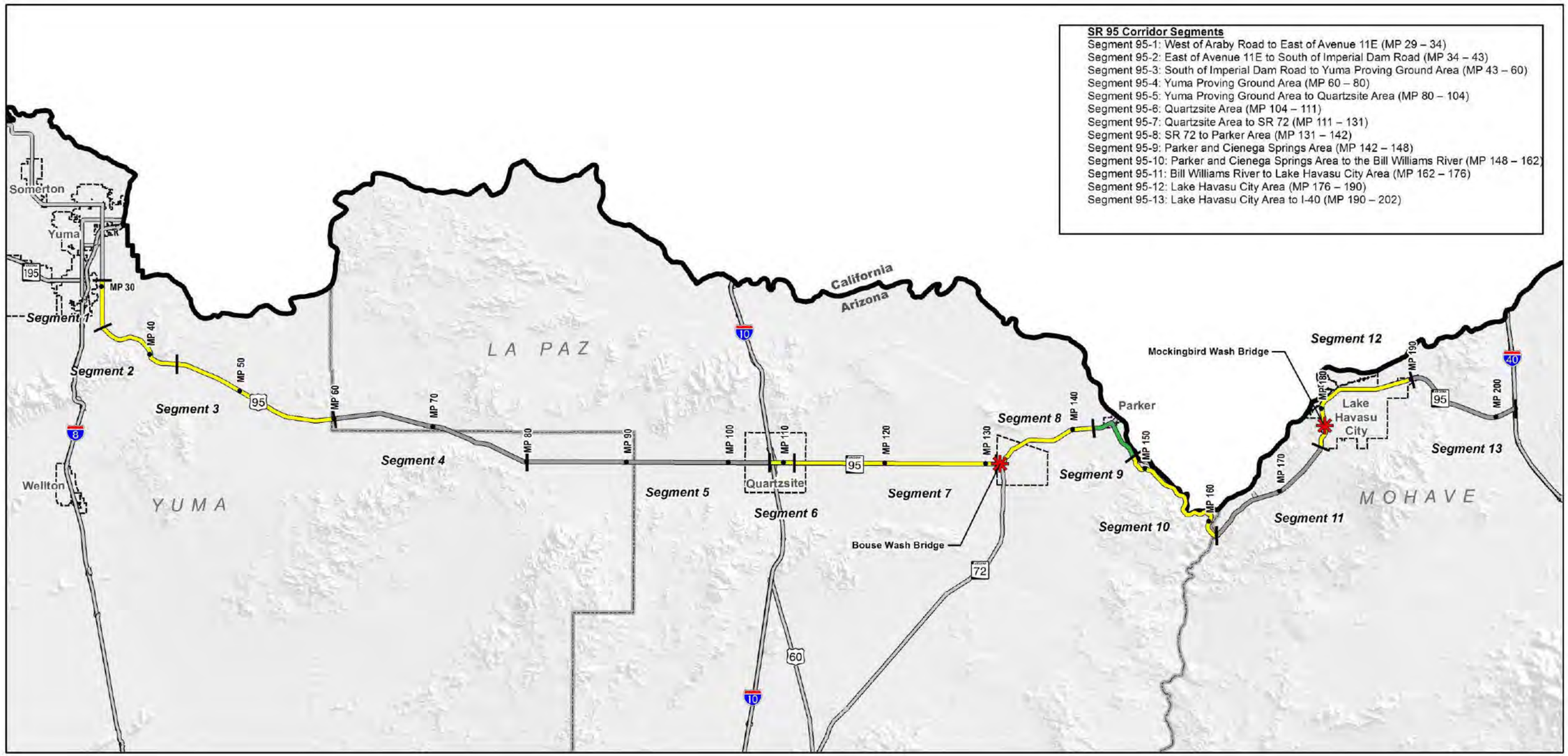
PAVEMENT SERVICEABILITY
GOOD (>3.5)
FAIR (2.9 - 3.5)
POOR (<2.9)

PAVEMENT HOT SPOT
LOCATIONS OF PAVEMENT FAILURE

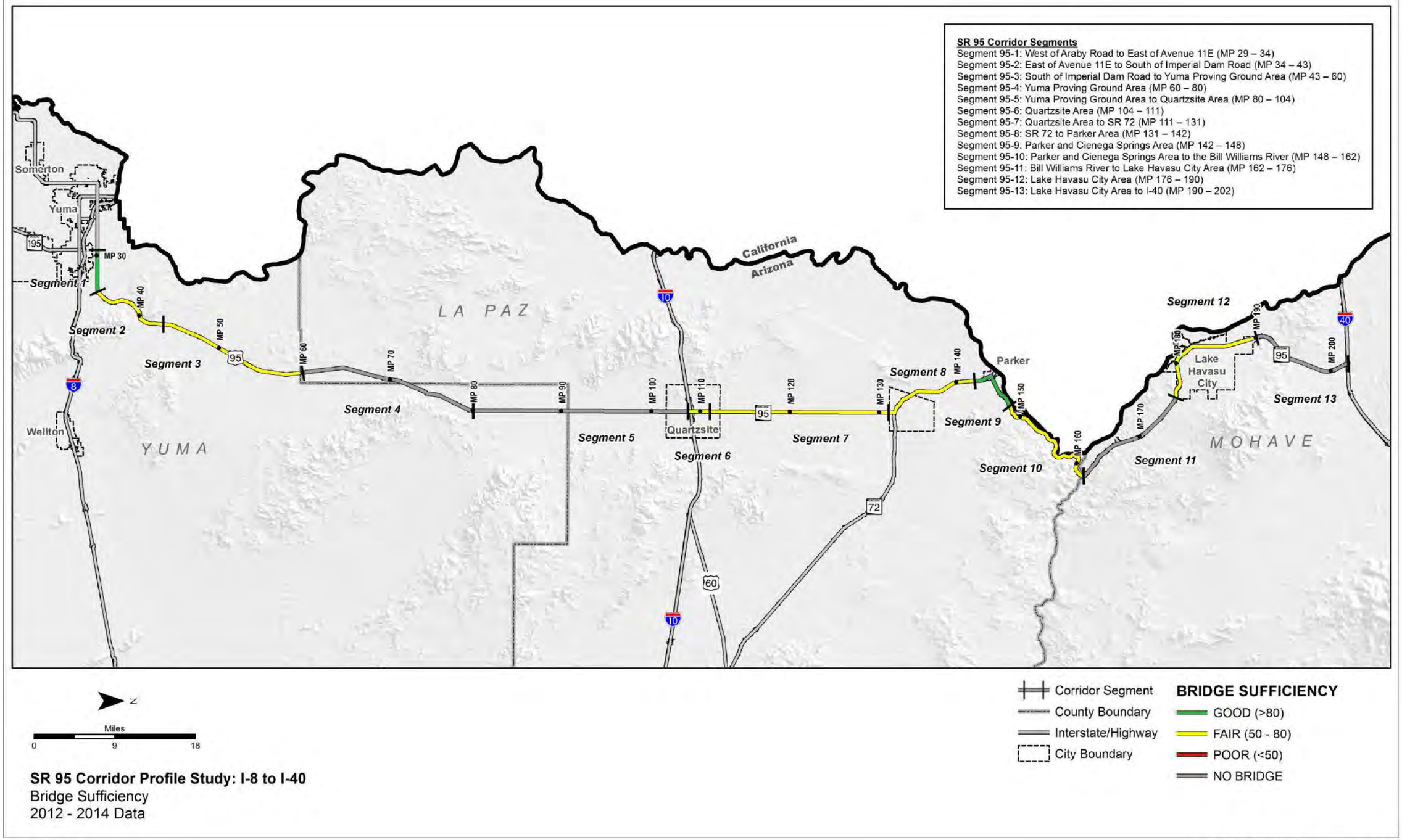
SR 95 Corridor Profile Study: I-8 to I-40
Pavement Serviceability and Hot Spots
2014 Data



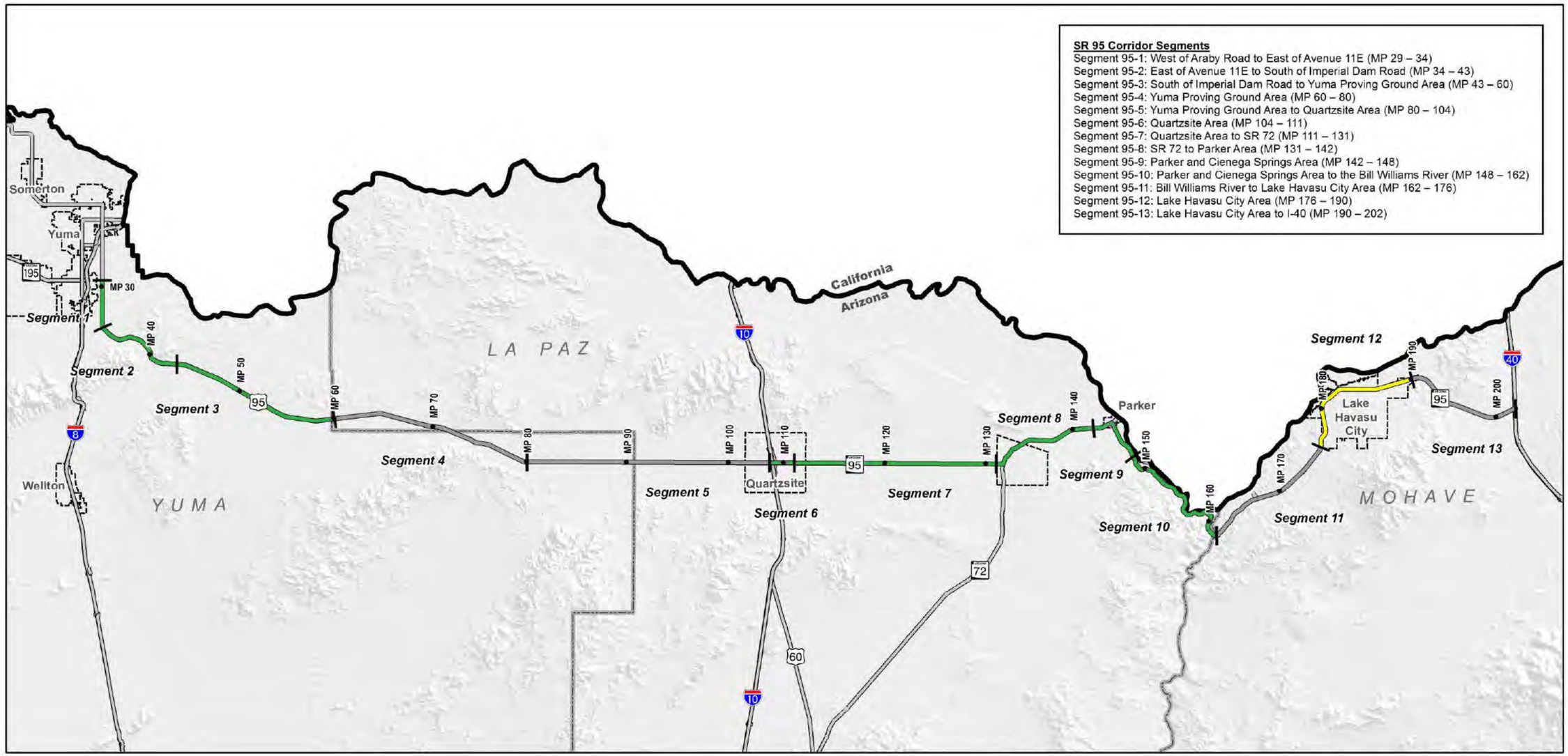
SR 95 Corridor Profile Study: I-8 to I-40
Percentage of Pavement Area Failure
2014 Data



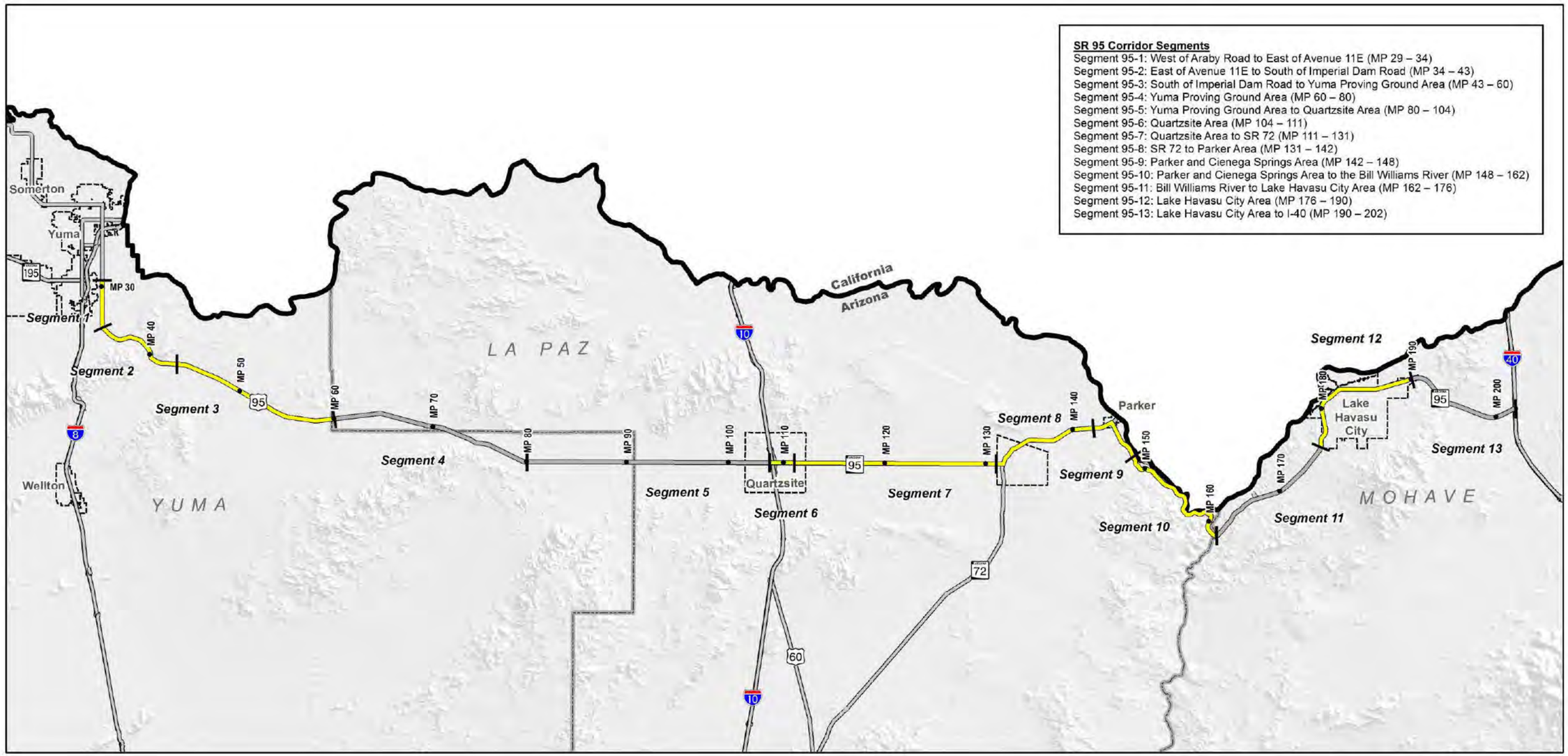
SR 95 Corridor Profile Study: I-8 to I-40
Bridge Index and Hot Spots
2012 - 2014 Data



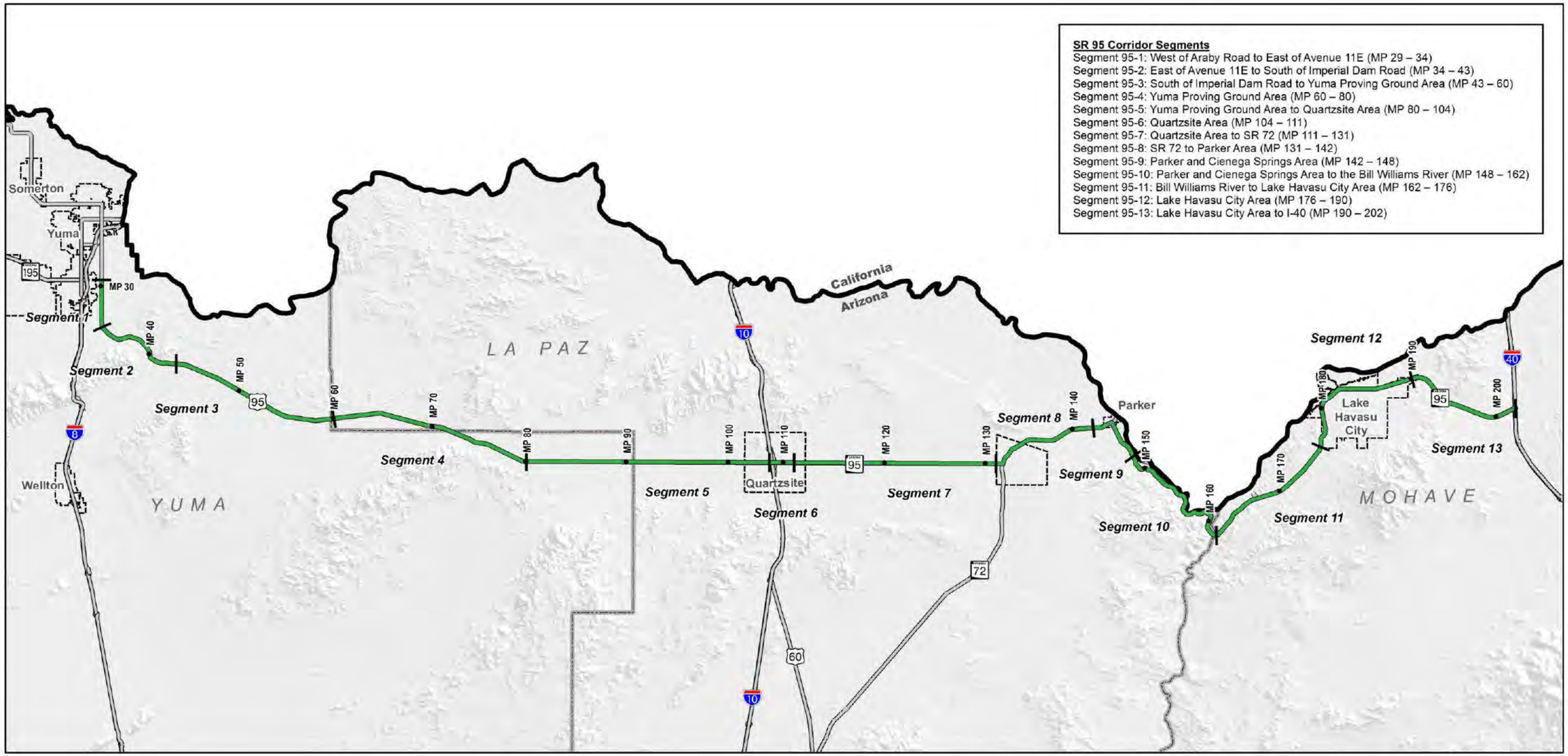
SR 95 Corridor Profile Study: I-8 to I-40
Bridge Sufficiency
2012 - 2014 Data



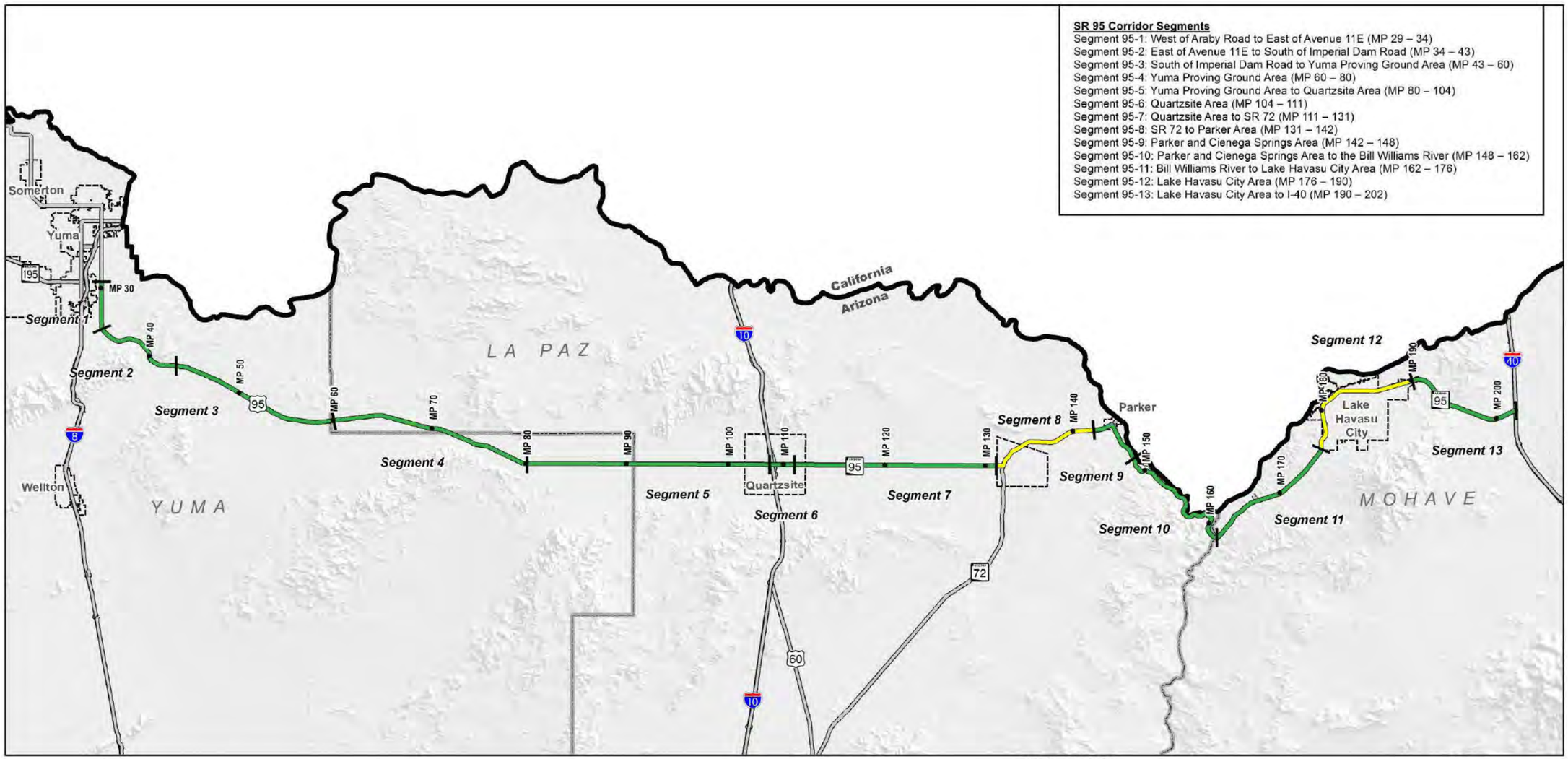
SR 95 Corridor Profile Study: I-8 to I-40
Percentage of Deck Area on Functionally Obsolete Bridges
2012 - 2014 Data



SR 95 Corridor Profile Study: I-8 to I-40
Lowest Bridge Rating
2012 - 2014 Data


SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)
Somerton
Yuma
195
MP 30
Segment 1
MP 40
Segment 2
MP 50
Segment 3
95
MP 60
MP 70
Segment 4
MP 80
MP 90
Segment 5
MP 100
MP 110
Quartzsite
Segment 6
95
MP 120
Segment 7
MP 130
Segment 8
MP 140
Parker
MP 150
Segment 9
MP 160
Segment 10
MP 170
MP 180
Lake Havasu City
Segment 11
Segment 12
MP 190
95
MP 200
Segment 13
40
8
Wellton
YUMA
LA PAZ
MOHAVE
California
Arizona
10
72
60
10
N
Miles
0
9
18
SR 95 Corridor Profile Study: I-8 to I-40
Mobility Index
2014 and 2035 Data
Corridor Segment
County Boundary
Interstate/Highway
City Boundary
MOBILITY INDEX
URBAN
(SEGMENTS 95-1, 95-6, 95-9, & 95-12)
GOOD (<0.71)
FAIR (0.71 - 0.89)
POOR (>0.89)
RURAL
(SEGMENTS 95-2 to 95-5,
95-7 to 95-8, 95-10 to 95-11, & 13)
GOOD (<0.56)
FAIR (0.56 - 0.76)
POOR (>0.76)

SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)



N

Miles
0 9 18

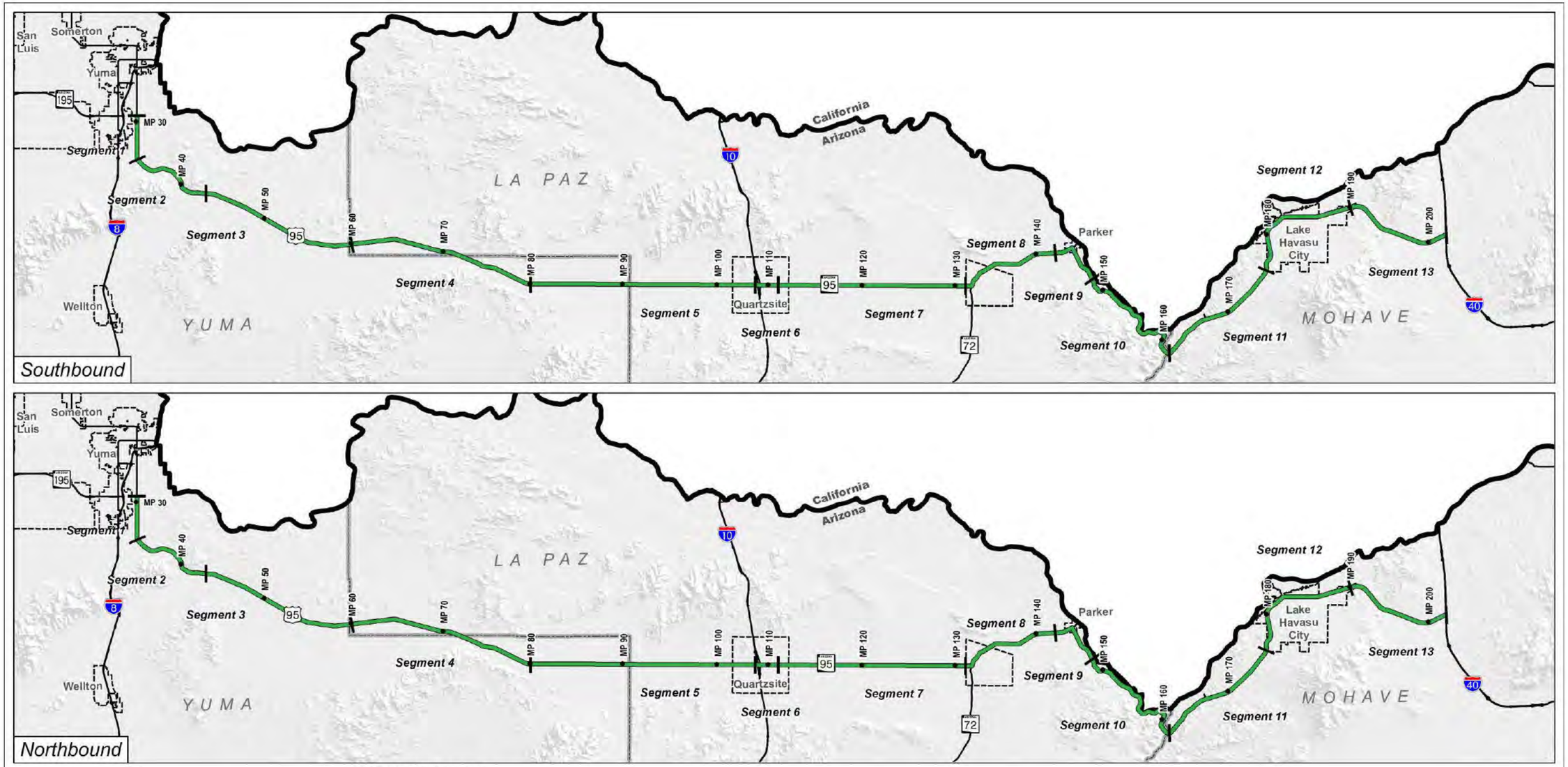
Corridor Segment
County Boundary
Interstate/Highway
City Boundary

FUTURE V/C

URBAN (SEGMENTS 95-1, 95-6, 95-9, & 95-12)
GOOD (<0.71)
FAIR (0.71 - 0.89)
POOR (>0.89)

RURAL (SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
GOOD (<0.56)
FAIR (0.56 - 0.76)
POOR (>0.76)

SR 95 Corridor Profile Study: I-8 to I-40
Future Daily Volume/Capacity (V/C) Ratio
2035 Data



N

Miles
0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
Existing Peak Hour V/C
2014 Data

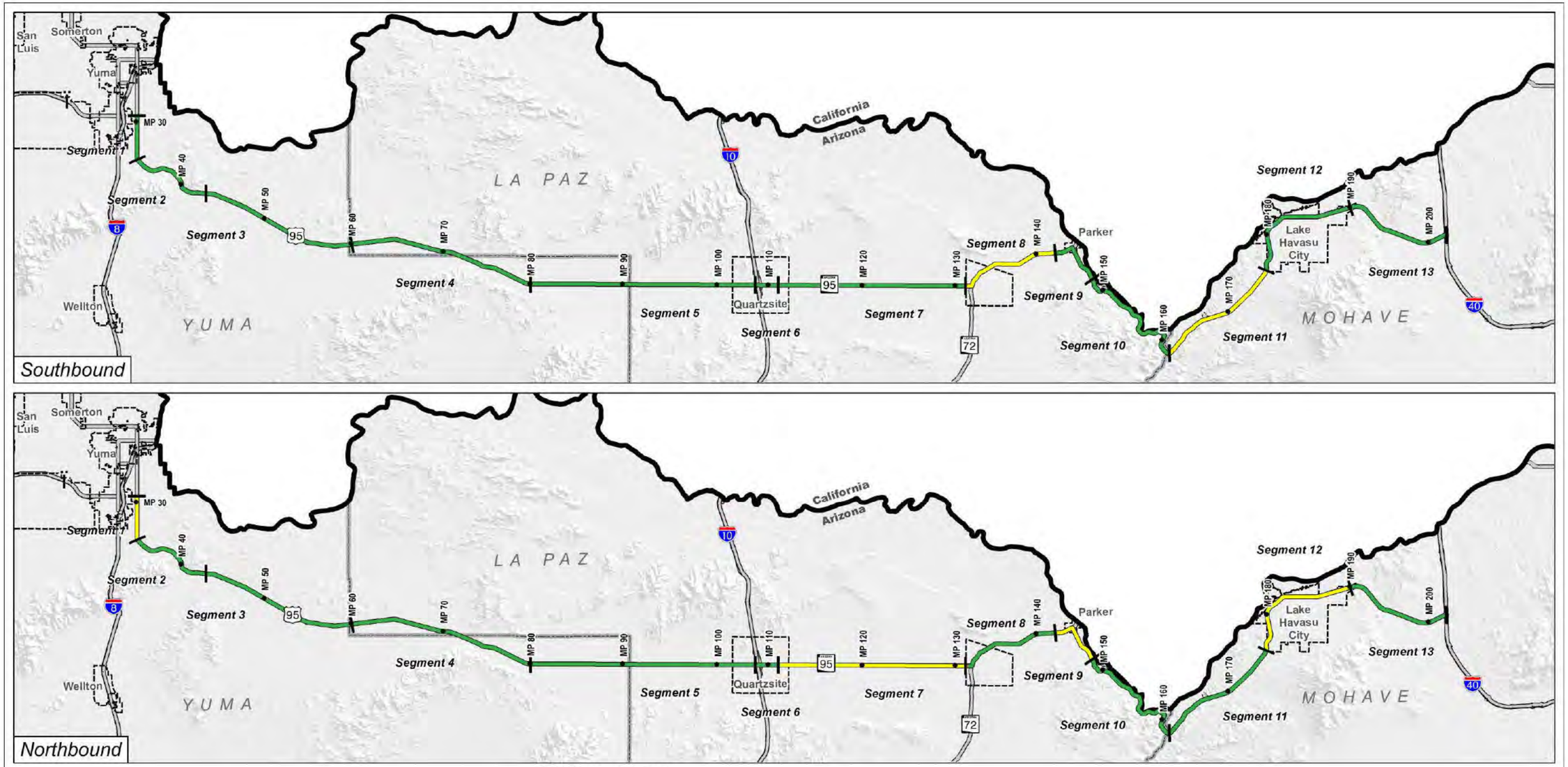
SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

PEAK V/C

URBAN
(SEGMENTS 95-1, 95-6, 95-9, & 95-12)
GOOD (<0.71)
FAIR (0.71 - 0.89)
POOR (>0.89)

RURAL
(SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
GOOD (<0.56)
FAIR (0.56 - 0.76)
POOR (>0.76)



N

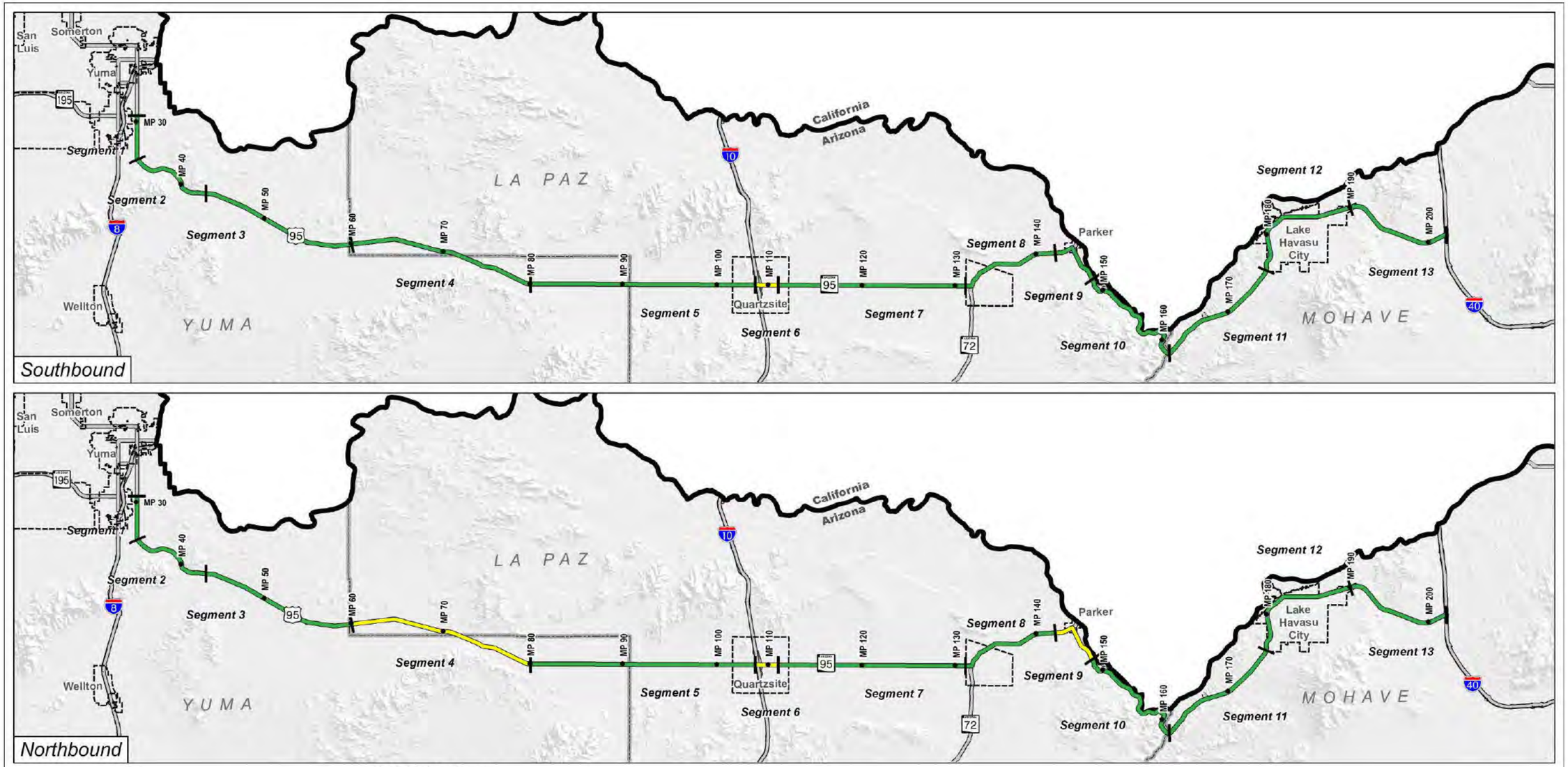
Miles
0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
Average Instances Per Year
Given Milepost Is Closed Per Segment Mile
2010 - 2014 Data

SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
Segment 95-2: East of Avenue 11E to South of Imperial Dam Road (MP 34 – 43)
Segment 95-3: South of Imperial Dam Road to Yuma Proving Ground Area (MP 43 – 60)
Segment 95-4: Yuma Proving Ground Area (MP 60 – 80)
Segment 95-5: Yuma Proving Ground Area to Quartzsite Area (MP 80 – 104)
Segment 95-6: Quartzsite Area (MP 104 – 111)
Segment 95-7: Quartzsite Area to SR 72 (MP 111 – 131)
Segment 95-8: SR 72 to Parker Area (MP 131 – 142)
Segment 95-9: Parker and Cienega Springs Area (MP 142 – 148)
Segment 95-10: Parker and Cienega Springs Area to the Bill Williams River (MP 148 – 162)
Segment 95-11: Bill Williams River to Lake Havasu City Area (MP 162 – 176)
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
Interstate/Highway
County Boundary
City Boundary

CLOSURES PER MILE PER YEAR
GOOD (<0.22)
FAIR (0.22 - 0.62)
POOR (>0.62)



N

Miles

0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
All Vehicles Travel Time Index
2014 Data

SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
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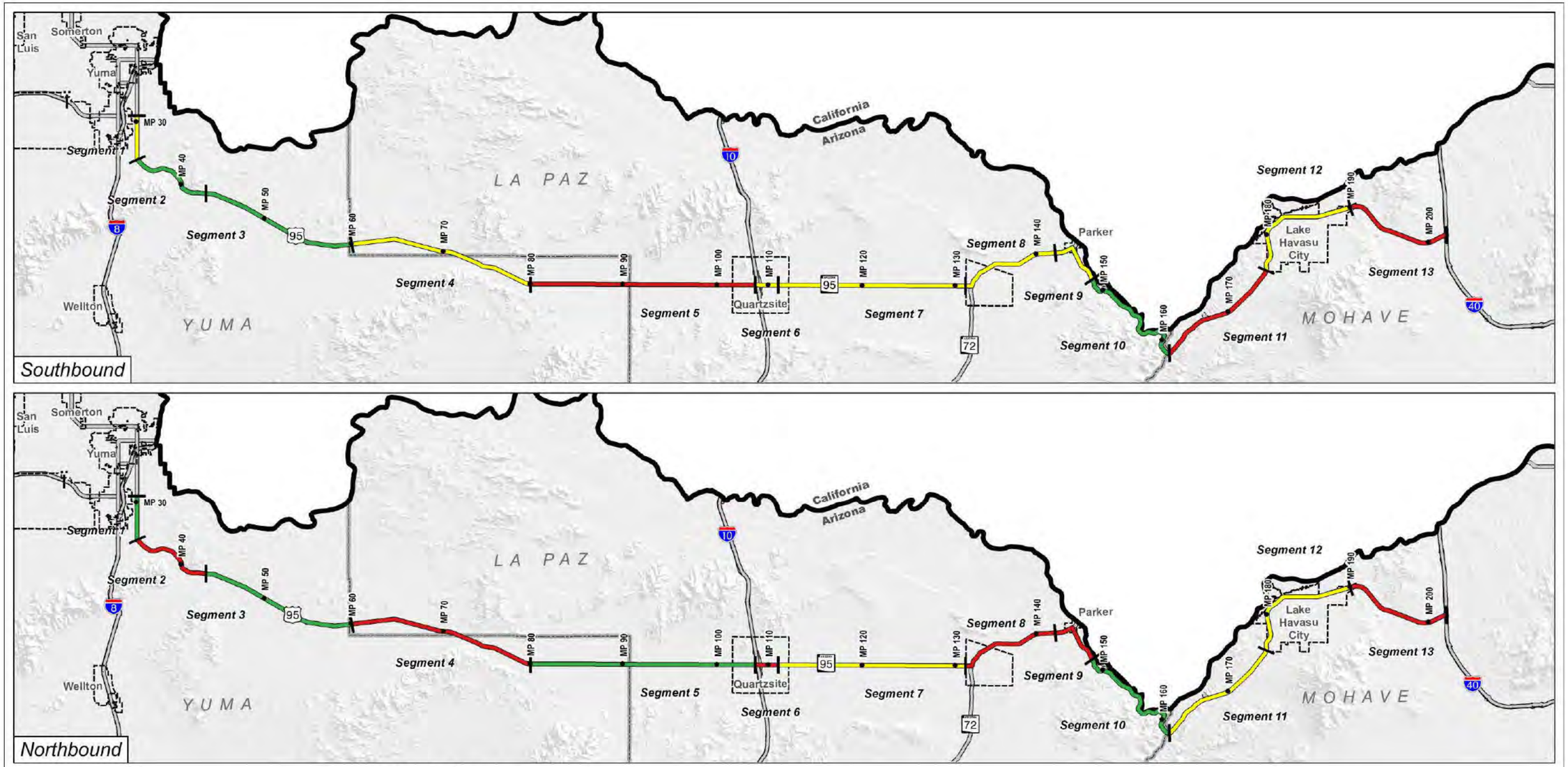
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

ALL VEHICLES TRAVEL TIME INDEX

UNINTERRUPTED (SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
- GOOD (<1.15)
- FAIR (1.15 - 1.33)
- POOR (>1.33)

INTERRUPTED (SEGMENTS 95-1, 95-6, 95-9, & 95-12)
- GOOD (<1.3)
- FAIR (1.3 - 2.0)
- POOR (>2.0)



N

Miles
0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
All Vehicles Planning Time Index
2014 Data

SR 95 Corridor Segments
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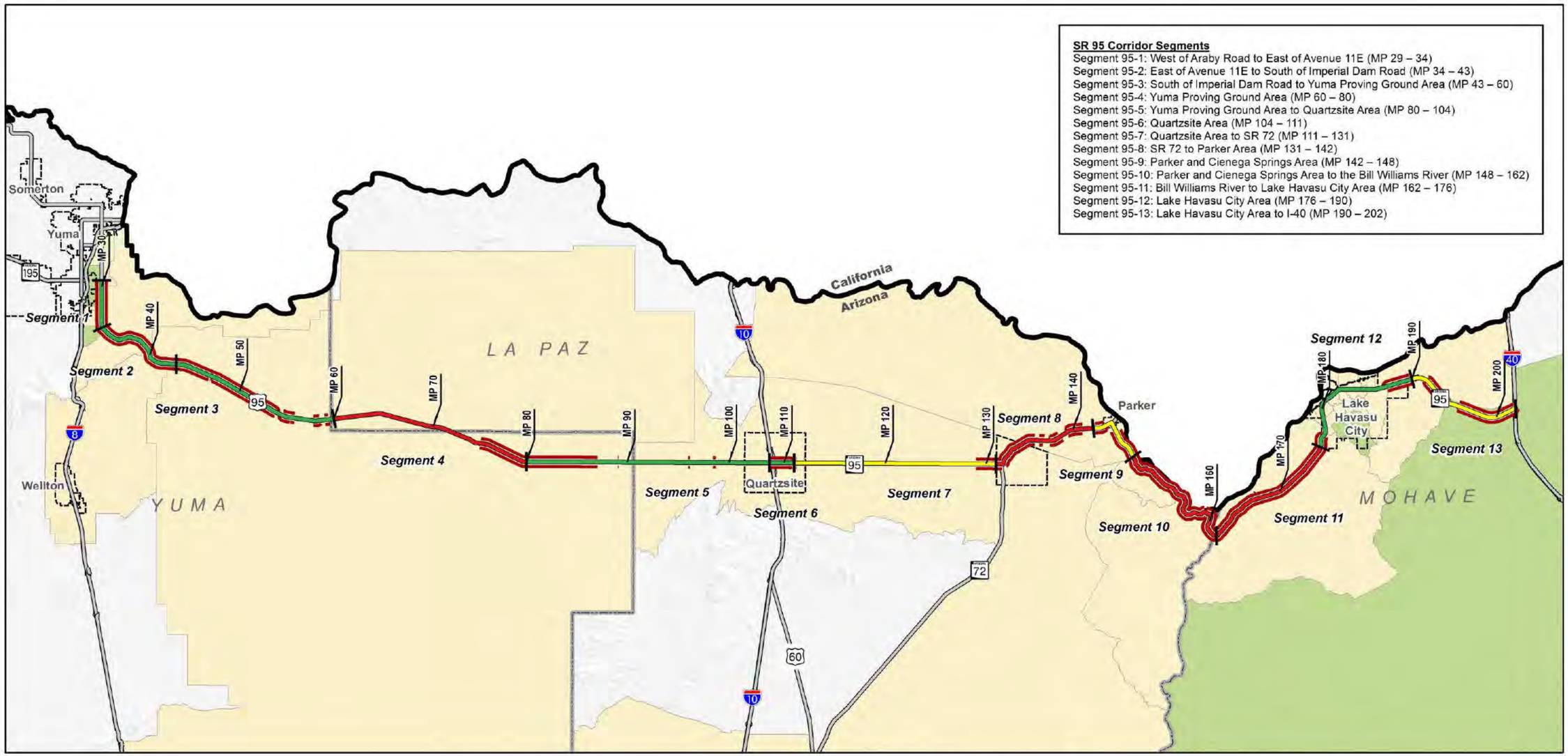
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

ALL VEHICLES PLANNING TIME INDEX

UNINTERRUPTED (SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
- GOOD (<1.3)
- FAIR (1.3 - 1.5)
- POOR (>1.5)

INTERRUPTED (SEGMENTS 95-1, 95-6, 95-9, & 95-12)
- GOOD (<3.0)
- FAIR (3.0 - 6.0)
- POOR (>6.0)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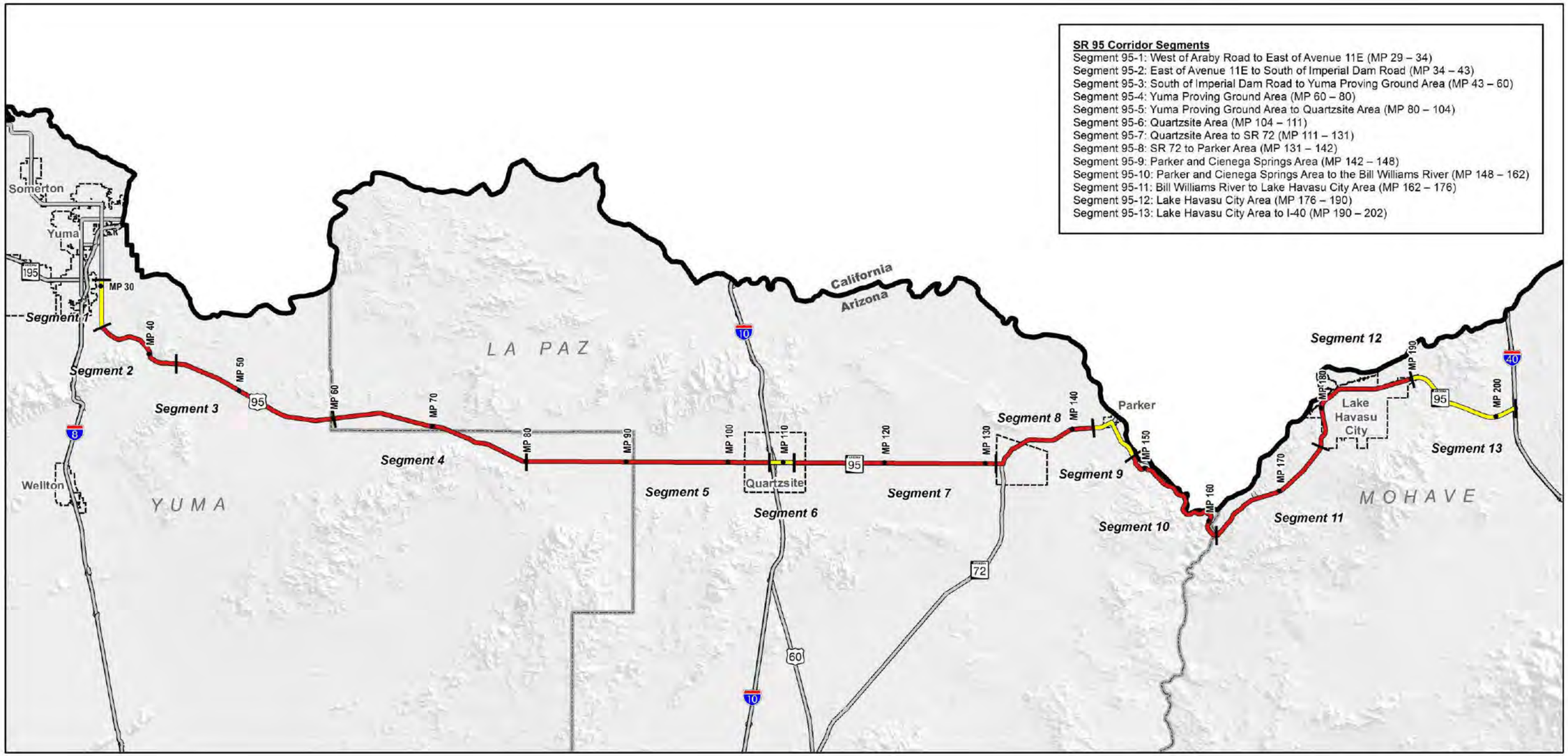
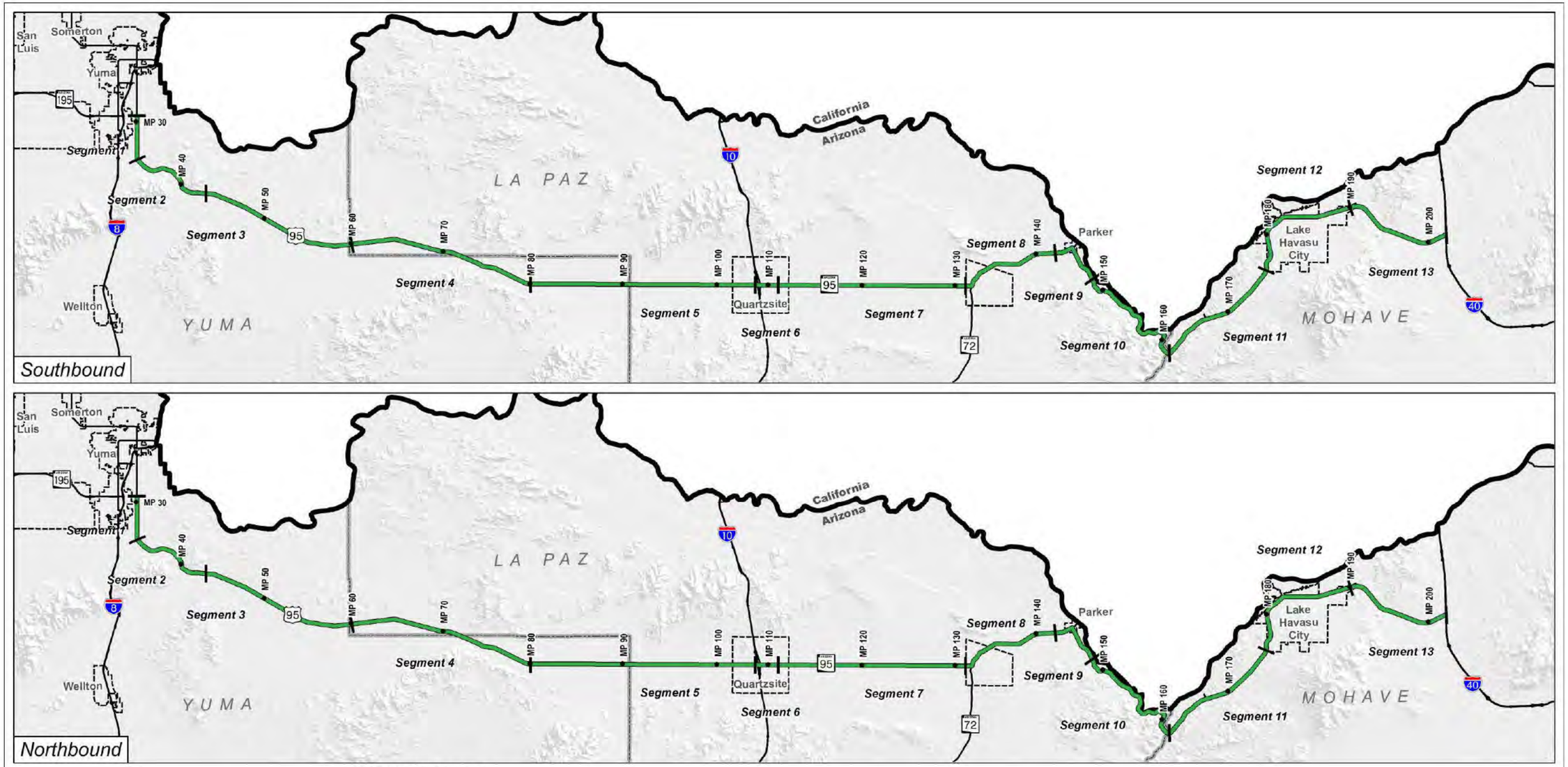
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)
Somerton
Yuma
MP 30
195
Segment 1
MP 40
Segment 2
MP 50
Segment 3
95
MP 60
MP 70
MP 80
MP 90
Segment 4
Wellton
8
YUMA
LA PAZ
Segment 5
Quartzsite
MP 100
MP 110
10
Segment 6
MP 120
95
Segment 7
MP 130
Segment 8
MP 140
Parker
Segment 9
72
60
10
California
Arizona
MP 160
MP 170
Segment 10
Segment 11
MP 180
Segment 12
MP 190
Lake Havasu City
95
Segment 13
MP 200
40
MOHAVE
N
Miles
0
9
18
SR 95 Corridor Profile Study: I-8 to I-40
Multimodal Opportunities
2014 Data
Corridor Segment
County Boundary
Interstate/Highway
City Boundary
Shoulder ≥ 4 Feet
Average Non-Single Occupancy Vehicle Trips by Corridor Segment:
Segments ABOVE the state wide average for Non-Single Occupancy Vehicle Trips
Segments WITHIN the state wide average for Non-Single Occupancy Vehicle Trips
Segments BELOW the state wide average for Non-Single Occupancy Vehicle Trips
Census Tracts of Zero/One Vehicle Households and Population in Poverty
Tracts ABOVE the Arizona statewide average range
Tracts WITHIN the Arizona statewide average range
Tracts BELOW the Arizona statewide average range



SR 95 Corridor Profile Study: I-8 to I-40
Percentage of Bicycle Accommodation
2014 Data



N

Miles
0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
Existing Peak Hour V/C
2014 Data

SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
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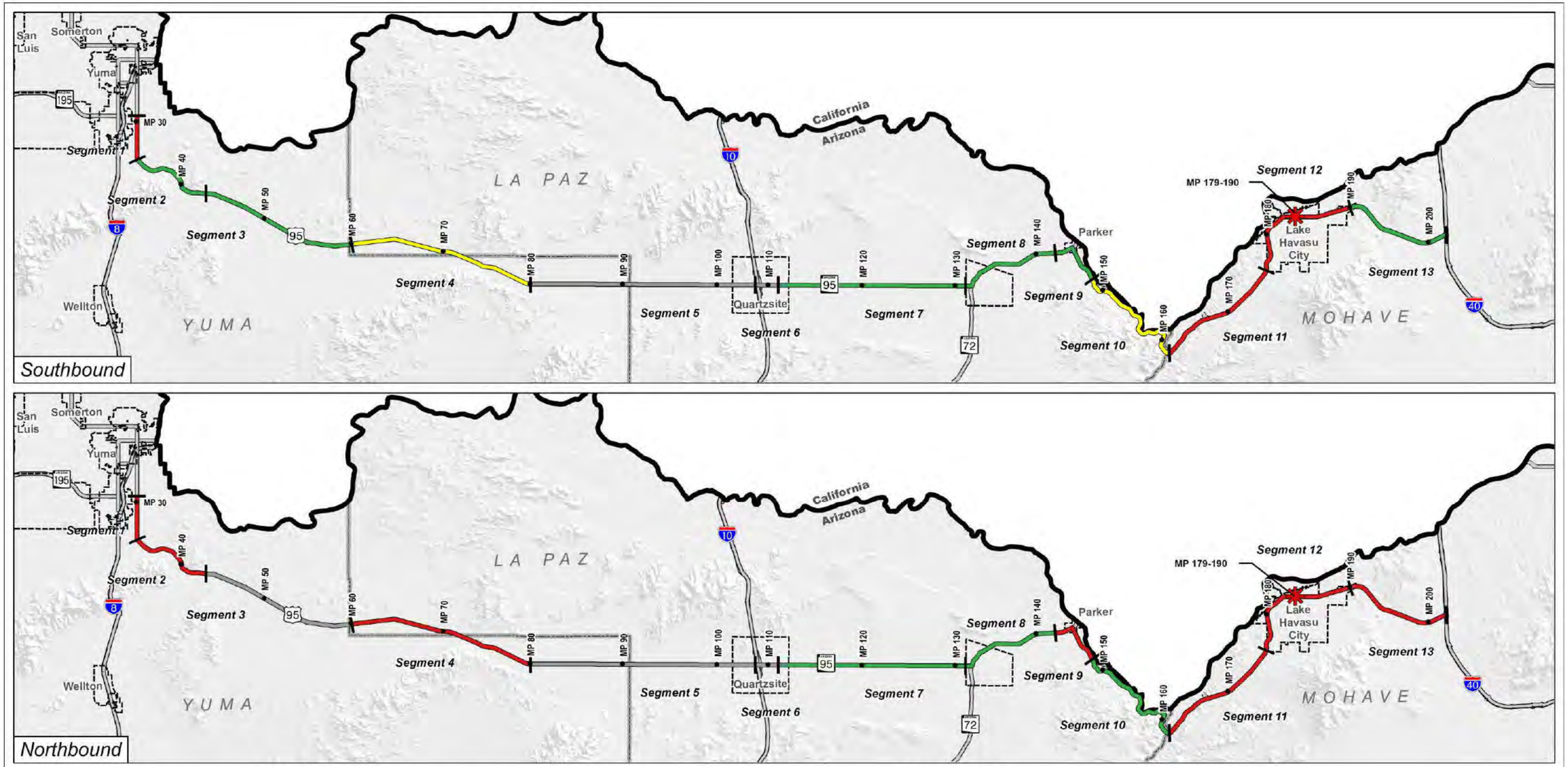
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

PEAK V/C

URBAN
(SEGMENTS 95-1, 95-6, 95-9, & 95-12)
GOOD (<0.71)
FAIR (0.71 - 0.89)
POOR (>0.89)

RURAL
(SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
GOOD (<0.56)
FAIR (0.56 - 0.76)
POOR (>0.76)



N

Miles
0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
Directional Safety Index and Hot Spots
2010 - 2014 Data

SR 95 Corridor Segments
Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
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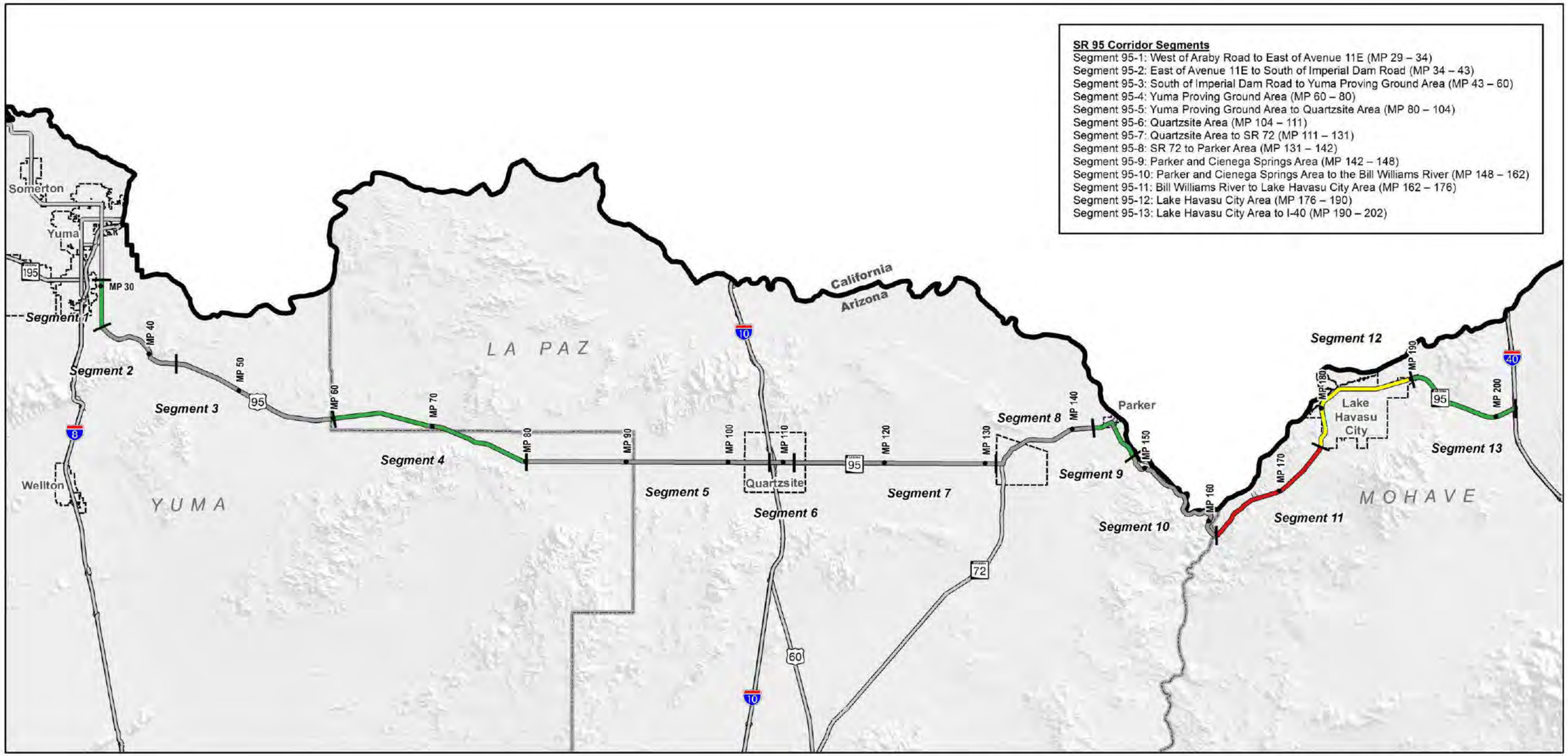
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary
SAFETY HOT SPOT

SAFETY INDEX

2 OR 3 LANE UNDIVIDED HIGHWAY (SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
- ABOVE AVERAGE PERFORMANCE (< 0.94)
- AVERAGE PERFORMANCE (0.94 - 1.06)
- BELOW AVERAGE PERFORMANCE (>1.06)
- INSUFFICIENT DATA

4 OR 5 LANE UNDIVIDED HIGHWAY (SEGMENTS 95-1, 95-6, 95-9, & 95-12)
- ABOVE AVERAGE PERFORMANCE (< 0.80)
- AVERAGE PERFORMANCE (0.80 - 1.20)
- BELOW AVERAGE PERFORMANCE (>1.20)
- INSUFFICIENT DATA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Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)
Somerton
Yuma
195
MP 30
Segment 1
MP 40
Segment 2
MP 50
Segment 3
95
MP 60
MP 70
Segment 4
MP 80
MP 90
Segment 5
MP 100
MP 110
Quartzsite
Segment 6
MP 120
Segment 7
MP 130
Segment 8
MP 140
Parker
MP 150
Segment 9
MP 160
Segment 10
MP 170
Segment 11
MP 180
Lake Havasu City
MP 190
Segment 12
95
MP 200
Segment 13
40
10
72
60
Wellton
YUMA
LA PAZ
MOHAVE
California
Arizona
N
Miles
0
9
18
SR 95 Corridor Profile Study: I-8 to I-40
Relative Frequency of 2009-2013 Fatal + Incapacitating
Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors
Compared to the Statewide Average for Similar Segments
2010-2014 Data
Corridor Segment
County Boundary
Interstate/Highway
City Boundary
CRASHES INVOLVING SHSP TOP 5 EMPHASIS AREAS BEHAVIORS
2 OR 3 LANE UNDIVIDED HIGHWAY (SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
ABOVE AVERAGE PERFORMANCE (<51%)
AVERAGE PERFORMANCE (51% - 57%)
BELOW AVERAGE PERFORMANCE (>57%)
INSUFFICIENT DATA
4 OR 5 LANE UNDIVIDED HIGHWAY (SEGMENTS 95-1, 95-6, 95-9, & 95-12)
ABOVE AVERAGE PERFORMANCE (<42%)
AVERAGE PERFORMANCE (42% - 51%)
BELOW AVERAGE PERFORMANCE (>51%)
INSUFFICIENT DATA

SR 95 Corridor Segments

Segment 95-1: West of Araby Road to East of Avenue 11E (MP 29 – 34)
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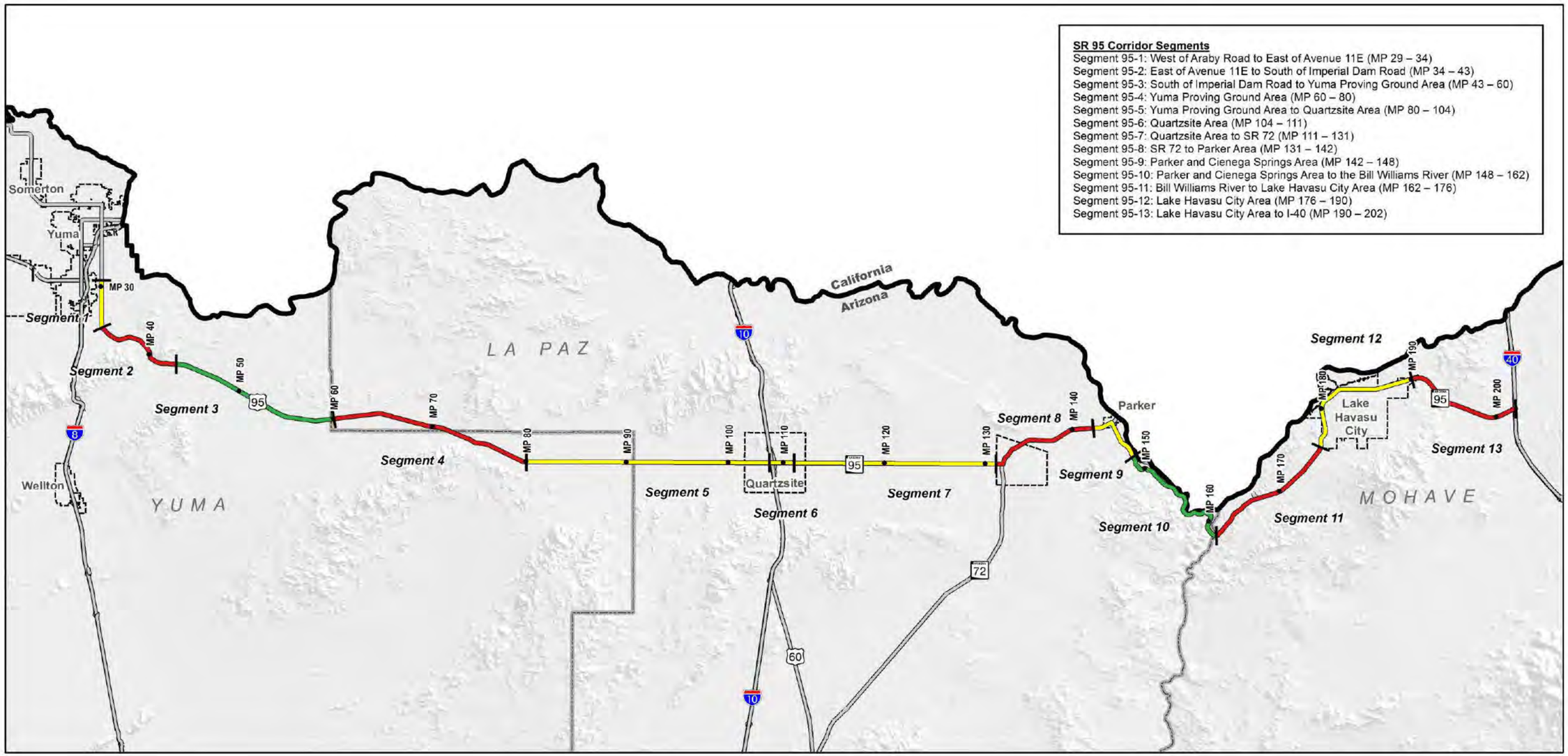


N

Miles
0 9 18

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

FREIGHT INDEX

UNINTERRUPTED (SEGMENTS 95-2 TO 95-5, 95-7 TO 95-8, 95-10 TO 95-11, & 13)

GOOD (>0.77)
FAIR (0.67 - 0.77)
POOR (<0.67)

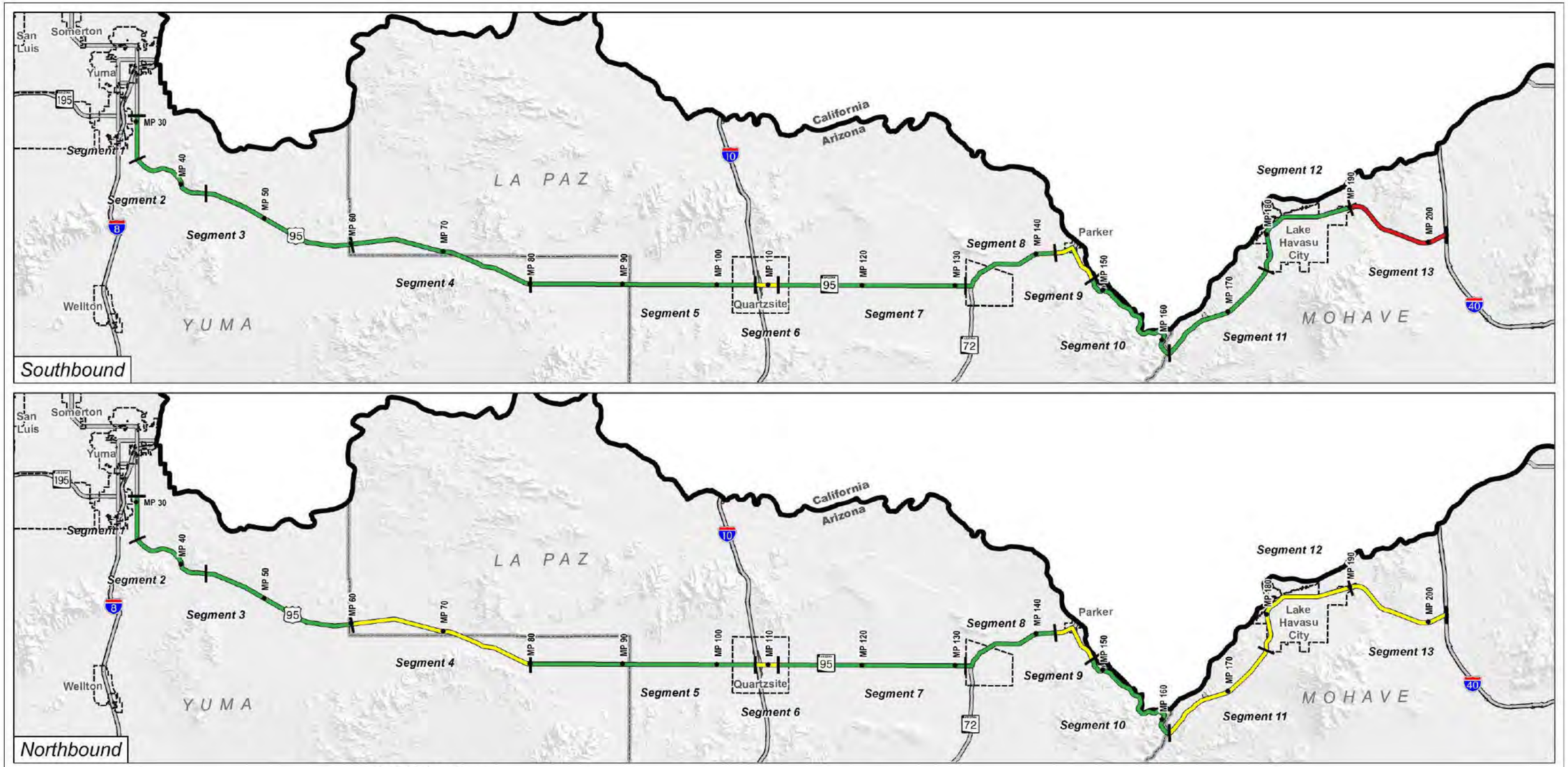
INTERRUPTED (SEGMENTS 95-1, 95- 6, 95-9, & 95-12)

GOOD (>0.33)
FAIR (0.17 - 0.33)
POOR (<0.17)

FREIGHT HOT SPOT

BRIDGE VERTICAL CLEARANCE LESS THAN 16.25 FEET AND NO RAMP AROUND

SR 95 Corridor Profile Study: I-8 to I-40
Freight Index and Hot Spots
2014 Data



N

Miles
0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
Truck Travel Time Index
2014 Data

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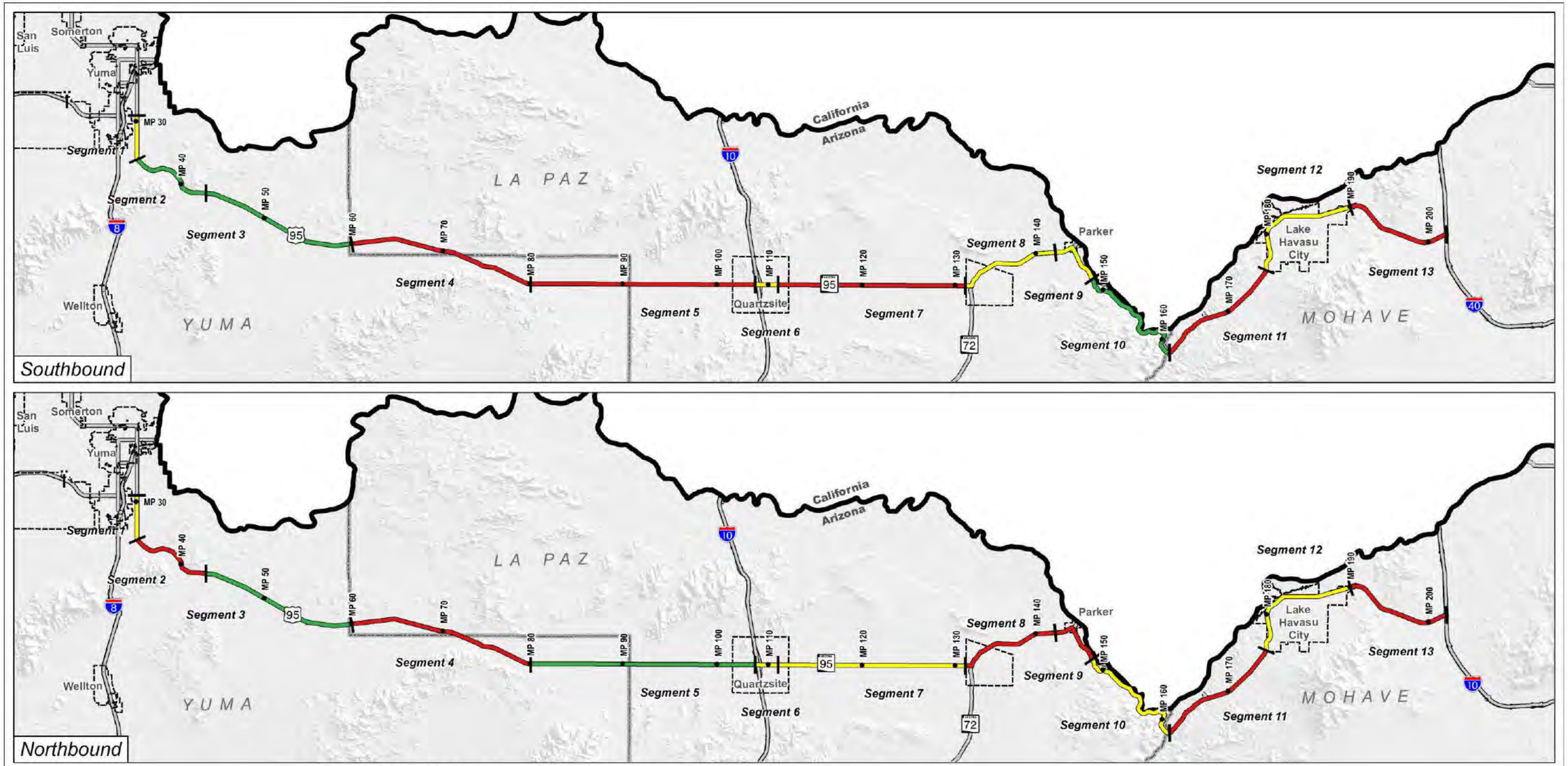
Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

TRUCK TRAVEL TIME INDEX

UNINTERRUPTED (SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
GOOD (<1.15)
FAIR (1.15 - 1.33)
POOR (>1.33)

INTERRUPTED (SEGMENTS 95-1, 95-6, 95-9, & 95-12)
GOOD (<1.3)
FAIR (1.3 - 2.0)
POOR (>2.0)



N

Miles
0 10 20

SR 95 Corridor Profile Study: I-8 to I-40
Truck Planning Time Index
2014 Data

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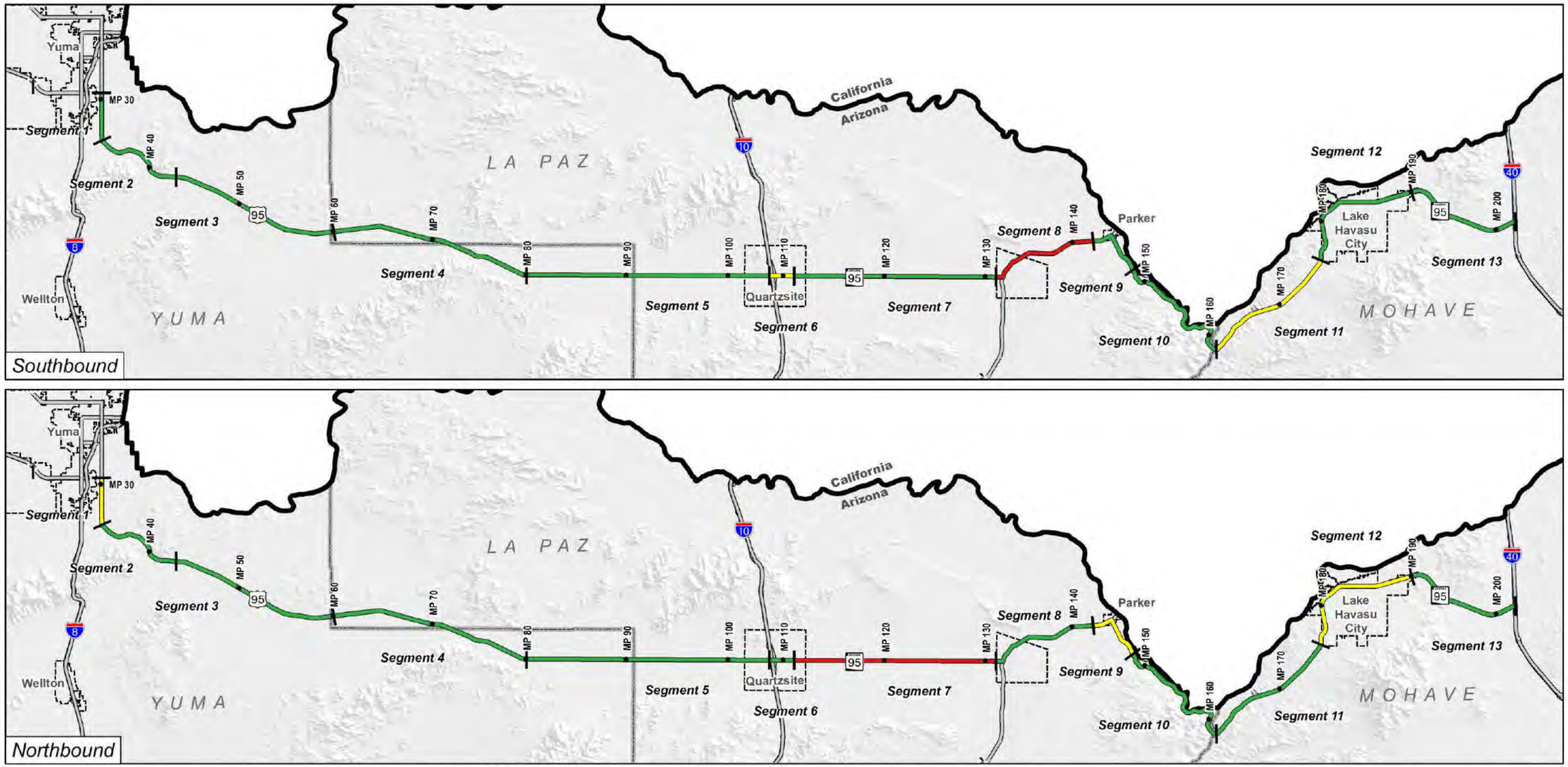
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

TRUCK PLANNING TIME INDEX

UNINTERRUPTED (SEGMENTS 95-2-5, 95-7-8, 95-10-11, & 95-13)
GOOD (<1.3)
FAIR (1.3 - 1.5)
POOR (>1.5)

INTERRUPTED (SEGMENTS 95-1, 95-6, 95-9, & 95-12)
GOOD (<3.0)
FAIR (3.0 - 6.0)
POOR (>6.0)



N

Miles
0 9 18

SR 95 Corridor Profile Study: I-8 to I-40
Average Minutes Per Year A Given Milepost Is Closed Per Segment Mile
2010-2014 Data

SR 95 Corridor Segments
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Segment 95-12: Lake Havasu City Area (MP 176 – 190)
Segment 95-13: Lake Havasu City Area to I-40 (MP 190 – 202)

Corridor Segment
County Boundary
Interstate/Highway
City Boundary

HOURS OF CLOSURE DURATION
GOOD (<44.18)
FAIR (44.18 - 124.86)
POOR (>124.86)

SR 95 Corridor Segments
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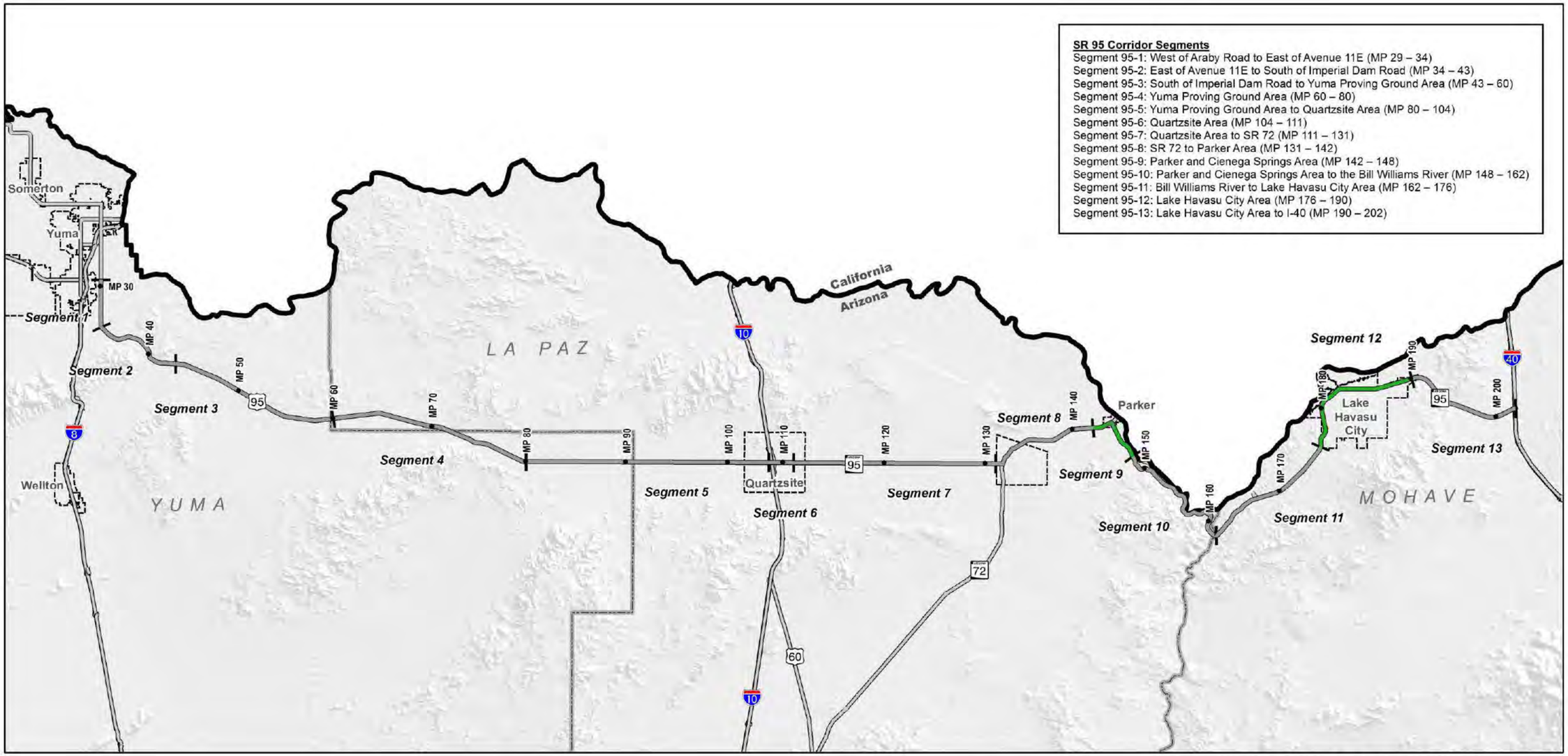


N

Miles
0 9 18

SR 95 Corridor Profile Study: I-8 to I-40
Bridge Vertical Clearance
2012-2014 Data

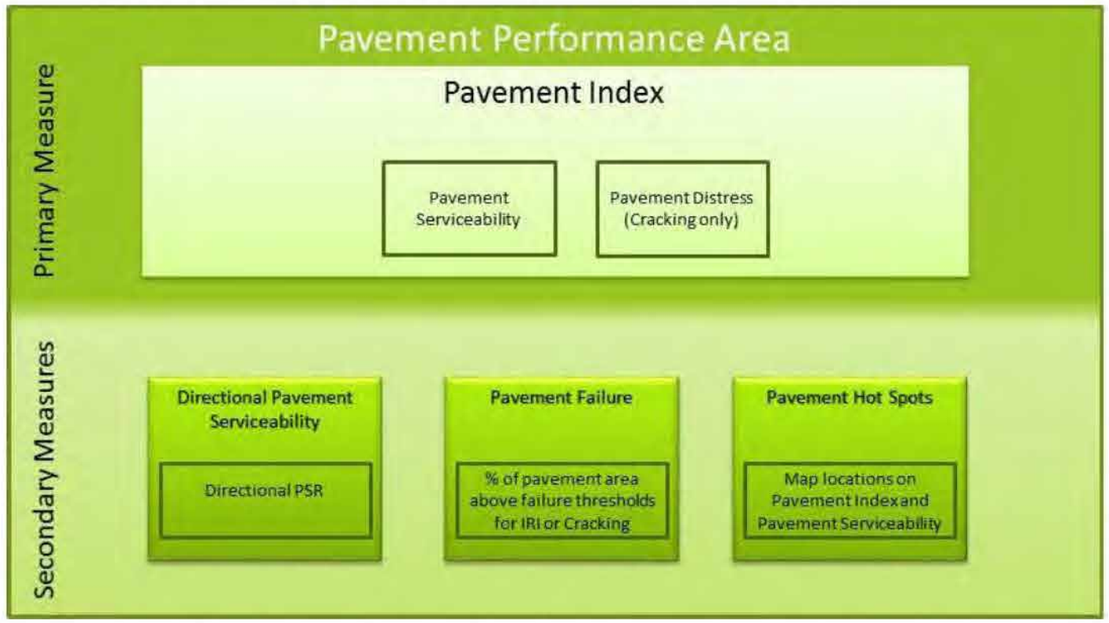
Corridor Segment
County Boundary
Interstate/Highway
City Boundary

BRIDGE VERTICAL CLEARANCE
ABOVE AVERAGE PERFORMANCE (>16.5)
AVERAGE PERFORMANCE (16.0-16.5)
BELOW AVERAGE PERFORMANCE (<16.0)
NO UP

Appendix B: Performance Area Detailed Calculation Methodologies

Pavement Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Pavement performance area as shown in the following graphic:



This performance area is used to evaluate mainline pavement condition. Pavement condition data for ramps, frontage roads, crossroads, etc. was not included in the evaluation.

Primary Pavement Index

The Pavement Index is calculated based on the use of two pavement condition ratings from the ADOT Pavement Database. The two ratings are the International Roughness Index (IRI) and the Cracking rating. The calculation of the Pavement Index uses a combination of these two ratings.

The IRI is a measurement of the pavement roughness based on field-measured longitudinal roadway profiles. To facilitate the calculation of the index, the IRI rating was converted to a Pavement Serviceability Rating (PSR) using the following equation:

$$PSR = 5 * e^{-0.0038*IRI}$$

The Cracking Rating is a measurement of the amount of surface cracking based on a field-measured area of 1,000 square feet that serves as a sample for each mile. To facilitate the calculation of the index, the Cracking Rating was converted to a Pavement Distress Index (PDI) using the following equation:

$$PDI = 5 - (0.345 * C^{0.66})$$

Both the PSR and PDI use a 0 to 5 scale with 0 representing the lowest performance and 5 representing the highest performance. The performance thresholds for interstates and non-interstates shown in the tables below were used for the PSR and PDI.

Performance Level for Interstates	IRI (PSR)	Cracking (PDI)
Good	<75 (>3.75)	<7 (>3.75)
Fair	75 - 117 (3.20 - 3.75)	7 - 12 (3.22 - 3.75)
Poor	>117 (<3.20)	>12 (<3.22)

Performance Level for Non-Interstates	IRI (PSR)	Cracking (PDI)
Good	<94 (>3.5)	<9 (>3.5)
Fair	94 - 142 (2.9 - 3.5)	9 - 15 (2.9 - 3.5)
Poor	>142 (<2.9)	>15 (<2.9)

The PSR and PDI are calculated for each 1-mile section of roadway. If PSR or PDI falls into a poor rating (<3.2 for interstates, for example) for a 1-mile section, then the score for that 1-mile section is entirely (100%) based on the lower score (either PSR or PDI). If neither PSR or PDI fall into a poor rating for a 1-mile section, then the score for that 1-mile section is based on a combination of the lower rating (70% weight) and the higher rating (30% weight). The result is a score between 0 and 5 for each direction of travel of each mile of roadway based on a combination of both the PSR and the PDI.

The project corridor has been divided into segments. The Pavement Index for each segment is a weighted average of the directional ratings based on the number of travel lanes. Therefore, the condition of a section with more travel lanes will have a greater influence on the resulting segment Pavement Index than a section with fewer travel lanes.

Secondary Pavement Measures

Three secondary measures are evaluated:

- Directional Pavement Serviceability
- Pavement Failure
- Pavement Hot Spots

Directional Pavement Serviceability: Similar to the Pavement Index, the Directional Pavement Serviceability is calculated as a weighted average (based on number of lanes) for each segment. However, this rating only utilizes the PSR and is calculated separately for each direction of travel. The PSR uses a 0 to 5 scale with 0 representing the lowest performance and 5 representing the highest performance.

Pavement Failure: The percentage of pavement area rated above the failure thresholds for IRI or Cracking is calculated for each segment. In addition, the Standard score (z-score) is calculated for each segment.

The Standard score (z-score) is the number of standard deviations above or below the mean. Therefore, a Standard score between -0.5 and +0.5 is "average", less than -0.5 is lower (better) than average, and higher than +0.5 is above (worse) than average.

Pavement Hot Spots: The Pavement Index map identifies locations that have an IRI rating or Cracking rating that fall above the failure threshold as identified by ADOT Pavement Group. For interstates, an IRI rating above 105 or a Cracking rating above 15 will be used as the thresholds which are slightly different than the ratings shown previously. For non-interstates, an IRI rating above 142 or a Cracking rating above 15 will be used as the thresholds.

Scoring

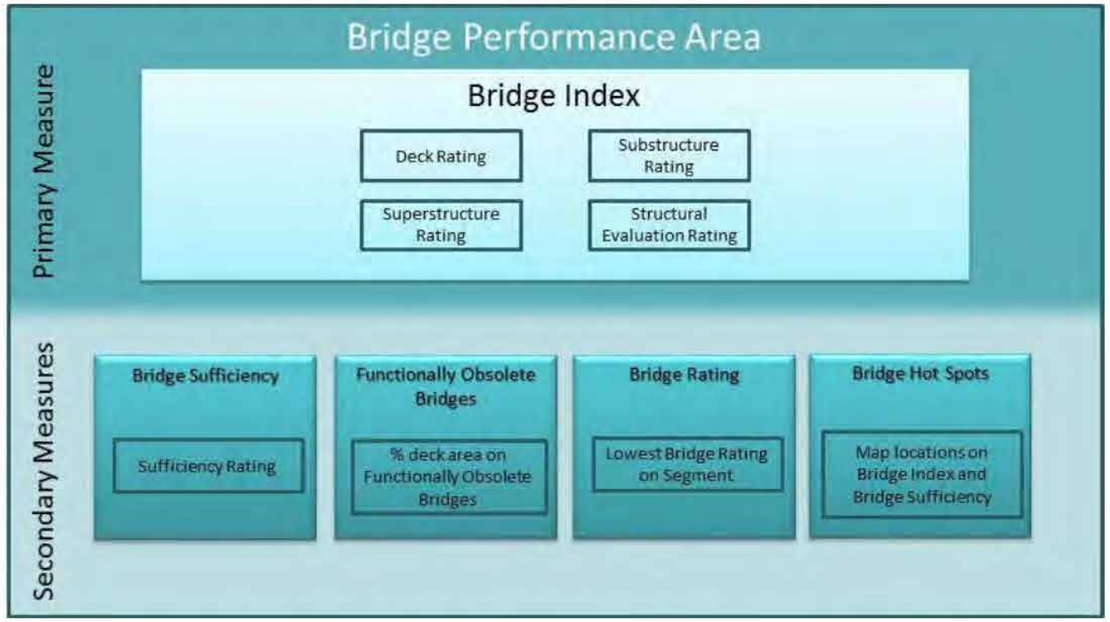
Performance Level	Pavement Index	
	Interstates	Non-Interstates
Good	>3.75	>3.5
Fair	3.2 - 3.75	2.9 - 3.5
Poor	<3.2	<2.9

Performance Level	Directional Pavement Serviceability	
	Interstates	Non-Interstates
Good	>3.75	>3.5
Fair	3.2 - 3.75	2.9 - 3.5
Poor	<3.2	<2.9

Performance Level	% Pavement Failure
Good	< 5%
Fair	5% – 20%
Poor	>20%

Bridge Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Bridge performance area as shown in the following graphic:



This performance area is used to evaluate mainline bridges. Bridges on ramps (that do not cross the mainline), frontage roads, etc. should not be included in the evaluation. Basically, any bridge that carries mainline traffic or carries traffic over the mainline should be included and bridges that do not carry mainline traffic, run parallel to the mainline (frontage roads), or do not cross the mainline should not be included.

Primary Bridge Index

The Bridge Index is calculated based on the use of four bridge condition ratings from the ADOT Bridge Database, also known as the Arizona Bridge Information and Storage System (ABISS). The four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating. The calculation of the Bridge Index uses the lowest of these four ratings.

Each of the four condition ratings use a 0 to 9 scale with 0 representing the lowest performance and 9 representing the highest performance.

The project corridor has been divided into segments and the bridges are grouped together according to the segment definitions. In order to report the Bridge Index for each corridor segment, the Bridge Index for each segment is a weighted average based on the deck area for each bridge. Therefore, the condition of a larger bridge will have a greater influence on the resulting segment Bridge Index than a smaller bridge.

Secondary Bridge Measures

Four secondary measures will be evaluated:

- Bridge Sufficiency
- Functionally Obsolete Bridges
- Bridge Rating
- Bridge Hot Spots

Bridge Sufficiency: Similar to the Bridge Index, the Bridge Sufficiency rating is calculated as a weighted average (based on deck area) for each segment. The Bridge Sufficiency rating is a scale of 0 to 100 with 0 representing the lowest performance and 100 representing the highest performance. A rating of 80 or above represents "good" performance, a rating between 50 and 80 represents "fair" performance, and a rating below 50 represents "poor" performance.

Functionally Obsolete Bridges: The percentage of total deck area in a segment that is on functionally obsolete bridges is calculated for each segment. The deck area for each bridge within each segment that has been identified as functionally obsolete is totaled and divided by the total deck area for the segment to calculate the percentage of deck area on functionally obsolete bridges for each segment.

The thresholds for this performance measure are determined based on the Standard score (z-score). The Standard score (z-score) is the number of standard deviations above or below the mean. Therefore, a Standard score between -0.5 and +0.5 is "average", less than -0.5 is lower (better) than average, and higher than +0.5 is above (worse) average.

Bridge Rating: The Bridge Rating simply identifies the lowest bridge rating on each segment. This performance measure is not an average and therefore is not weighted based on the deck area. The Bridge Index identifies the lowest rating for each bridge, as described above. Each of the four condition ratings use a 0 to 9 scale with 0 representing the lowest performance and 9 representing the highest performance.

Bridge Hot Spots: The Bridge Index map identifies individual bridge locations that are identified as hot spots. Hot spots are bridges that have a single rating of 4 in any of the four ratings, or multiple ratings of 5 in the deck, substructure or superstructure ratings.

Scoring:

Performance Level	Bridge Index
Good	>6.5
Fair	5.0-6.5
Poor	<5.0

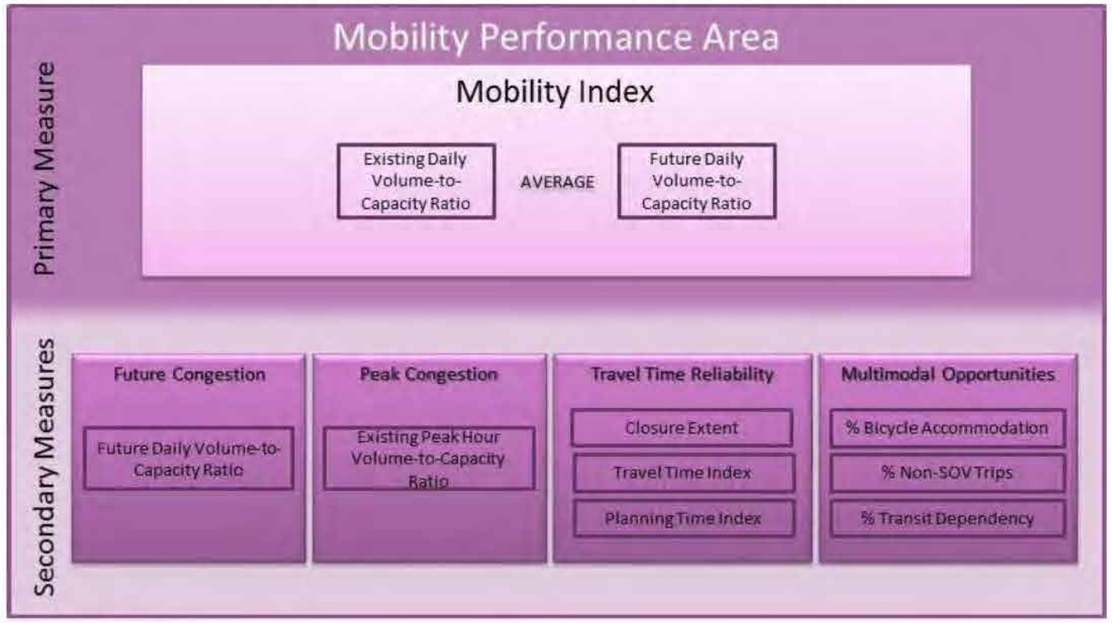
Performance Level	Sufficiency Rating
Good	>80
Fair	50-80
Poor	<50

Performance Level	Bridge Rating
Good	>6
Fair	5-6
Poor	<5

Performance Level	% Functionally Obsolete
Good	< 12%
Fair	12%-40%
Poor	>40%

Mobility Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Mobility performance area as shown in the following graphic:



Primary Mobility Index

The primary Mobility Index is an average of the existing daily volume-to-capacity (V/C) ratio and the future daily V/C ratio for each segment of the corridor.

Existing Daily V/C: The existing daily V/C ratio for each segment is calculated by dividing the 2014 Annual Average Daily Traffic (AADT) volume for each segment by the total Level of Service (LOS) E capacity volume for that segment

The capacity is calculated using the HERS Procedures for Estimating Highway Capacity[1]. The HERS procedure incorporates HCM 2010 methodologies. The methodology includes capacity estimation procedures for multiple facility types including freeways, rural two-lane highways, multilane highways, and signalized and non-signalized urban sections.

The segment capacity is defined as a function of the number of mainline lanes, shoulder width, interrupted or uninterrupted flow facilities, terrain type, percent of truck traffic, and the designated urban or rural environment.

The AADT for each segment is calculated by applying a weighted average across the length of the segment based on the individual 24-hour volumes and distances associated with each HPMS count station within each segment.

The following example equation is used to determine the weighted average of a segment with two HPMS count locations within the corridor

((HPMS 1 Distance x HPMS 1 Volume) + (HPMS 2 Distance x HPMS 2 Volume))/Total Segment Length

For specific details regarding the HERS methodology used, refer to the *Procedures for Estimating Highway Capacity, draft Technical Memorandum.*

Future Daily V/C: The future daily V/C ratio for each segment is calculated by dividing the 2035 AADT volume for each segment by the 2014 LOS E capacity. The capacity volume used in this calculation is the same as is utilized in the existing daily V/C equation.

The future AADT daily volumes are generated by applying an average annual compound growth rate (ACGR) to each 2014 AADT segment volume. The following equation is used to apply the average annual compound growth rate:

2035 AADT = 2014 AADT x ((1+ACGR)^(2035-2014))

The ACGR for each segment is defined by comparing the total volumes in the 2010 Arizona Travel Demand Model (AZTDM2) to the 2035 AZTDM2 traffic volumes at each existing HPMS count station location throughout the corridor. Each 2010 and 2035 segment volume is defined using the same weighted average equation described in the *Existing Daily V/C* section above and then summing the directional volumes for each location. The following equation is used to determine the ACGR for each segment:

ACGR = ((2035 Volume/2010 Volume)^(1/(2035-2010))))-1

Secondary Mobility Measures

Four secondary measures are evaluated:

- Future Congestion
- Peak Congestion
- Travel Time Reliability
  - Closure Extent
  - Directional Travel Time Index

[1] HERS Support – 2011, Task 6: Procedures for Estimating Highway Capacity, draft Technical Memorandum. Cambridge Systematics. Prepared for the Federal Highway Administration. March 2013.

    - Directional Planning Time Index
- Multimodal Opportunities
    - % Bicycle Accommodation
    - % Non-Single Occupancy Vehicle (SOV) Trips
    - % Transit Dependency

Future Congestion: The future daily V/C ratios for each segment in the corridor that are calculated and used in the Mobility Index as part of the overall average between Existing Daily V/C and Future Daily V/C are applied independently as a secondary measure. The methods to calculate the Future Daily V/C can be referenced in the Mobility Index section.

Peak Congestion: Peak Congestion has been defined as the peak hour V/C ratio in both directions of the corridor. The peak hour V/C ratio is calculated using the HERS method as described previously. The peak hour volume utilizes the directional AADT for each segment, which is calculated by applying a weighted average across the length of the segment based on the individual directional 24-hour volumes and distances associated with each HPMS count station within each segment. The segment capacity is defined based on the characteristics of each segment including number of lanes, terrain type, and environment, similar to the 24-hour volumes using the HERS method.

Travel Time Reliability: Travel time reliability is a secondary measure that includes three indicators. The three indicators are the number of times a piece of a corridor is closed for any specific reason, the directional Travel Time Index (TTI), and the directional Planning Time Index (PTI).

Closure Extent: The number of times a roadway is closed is documented through the HCRS dataset. Closure Extent is defined as the average number of times a particular milepost of the corridor is closed per year per mile in a specific direction of travel. The weighted average of each occurrence takes into account the distance over which a specific occurrence spans.

Thresholds that determine levels of good, fair, and poor are based on the average number of closures per mile per year within each of the identified statewide significant corridors by ADOT. The thresholds shown at the end of this section represent statewide averages across those corridors.

Directional Travel Time and Planning Time Index: In terms of overall mobility, the TTI is the relationship of the mean peak period travel time in a specific section of the corridor to the free-flow travel time in the same location. The PTI is the relationship of the 95th percentile highest travel time to the free-flow travel time (based on the posted speed limit) in a specific section of the corridor. The TTI and PTI can be converted into speed-based indices by recognizing that speed is equal to distance traveled divided by travel time. The inverse relationship between travel time and speed means that the 95th percentile highest travel time corresponds to the 5th percentile lowest speed.

Using HERE data provided by ADOT, four time periods for each data point were collected throughout the day (AM peak, mid-day, PM peak, and off-peak). Using the mean speeds and 5th percentile lowest mean speeds collected over 2014 for these time periods for each data location, four TTI and PTI calculations were made using the following formulas:

TTI = Posted Speed Limit/Mean Peak Hour Speed

PTI = Posted Speed Limit/5th Percentile Lowest Speed

The highest value of the four time periods calculation is defined as the TTI for that data point. The average TTI is calculated within each segment based on the number of data points collected. The value of the average TTI across each entry is used as the TTI for each respective segment within the corridor.

Multimodal Opportunities: Three multimodal opportunity indicators reflect the characteristics of the corridor that promote alternate modes to a single occupancy vehicle (SOV) for trips along the corridor. The three indicators include the percent bicycle accommodation, non-SOV trips, and transit dependency along the corridor.

Percent Bicycle Accommodation: For this secondary performance evaluation, outside shoulder widths are evaluated considering the roadway's context and conditions. This requires use of the roadway data that includes right shoulder widths, shoulder surface types, and speed limits, all of which are available in the following ADOT geographic information system (GIS) data sets:

- Right Shoulder Widths
- Left Shoulder Widths (for undivided roadways)
- Shoulder Surface Type (Both Left/Right)
- Speed Limit

Additionally, each segment's average AADT, estimated earlier in the Mobility performance area methodology, is used for the criteria to determine if the existing shoulder width meets the effective width.

The criteria for screening if a shoulder segment meets the recommended width criteria are as followed:

(1) If AADT <= 1500 OR Speed Limit <= 25 miles per hour (mph):
The segment's general purpose lane can be shared with bicyclists (no effective shoulder width required)

(2) If AADT > 1500 AND Speed Limit between (25 - 50 mph) AND Pavement Surface is Paved:
Effective shoulder width required is 4 feet or greater

(3) If AADT > 1500 AND Speed Limit >= 50 mph and Pavement Surface is Paved:
Effective shoulder width required is 6 feet or greater

The summation of the length of the shoulder sections that meet the defined effective width criteria, based on criteria above, is divided by the segment's total length to estimate the percent of the segment that accommodates bicycles as illustrated at the end of this section. If shoulder data is not available or appears erroneous, field measurements can substitute for the shoulder data.

Percent Non-SOV Trips: The percentage of non-SOV trips over distances less than 50 miles gives an indication of travel patterns along a section of the corridor that could benefit from additional multimodal options in the future.

Thresholds that determine levels of good, fair, and poor are based on the percent non-SOV trips within each of the identified statewide significant corridors by ADOT. The thresholds shown at the end of this section represent statewide averages across those corridors.

Percent Transit Dependency: 2008-2012 U.S. Census American Community Survey tract and state level geographic data and attributes from the tables B08201 (Number of Vehicles Available by Household Size) and B17001 (Population in Poverty within the Last 12 Months) were downloaded with margins of error included from the Census data retrieval application Data Ferret. Population ranges for each tract were determined by adding and subtracting the margin of error to each estimate in excel. The tract level attribute data was then joined to geographic tract data in GIS. Only tracts within a one mile buffer of each corridor are considered for this evaluation.

Tracts that have a statistically significantly larger number of either people in poverty or households with only one or no vehicles available than the state average are considered potentially transit dependent.

Example: The state average for zero or one vehicles households (HHs) is between 44.1% and 45.0%. Tracts which have the lower bound of their range above the upper bound of the state range have a greater percentage of zero/one vehicle HHs than the state average. Tracts that have their upper bound beneath the lower bound of the state range have a lesser percentage of zero/one vehicles HHs than the state average. All other tracts that have one of their bounds overlapping with the state average cannot be considered statistically significantly different because there is a chance the value is actually the same.

In addition to transit dependency, the following attributes are added to the Multimodal Opportunities map based on available data.

- Shoulder width throughout the corridor based on 'Shoulder Width' GIS dataset provided by ADOT
- Intercity bus routes
- Multiuse paths within the corridor right-of-way, if applicable

Scoring:

Volume-to-Capacity Ratios		
Urban and Fringe Urban		
Good - LOS A-C	V/C ≤ 0.71	*Note - ADOT Roadway Design Standards indicate Urban and Fringe Urban roadways should be designed to level of service C or better
Fair - LOS D	V/C > 0.71 & ≤ 0.89	
Poor - LOS E or less	V/C > 0.89	
Rural		
Good - LOS A-B	V/C ≤ 0.56	*Note - ADOT Roadway Design Standards indicate Rural roadways should be designed to level of service B or better
Fair - LOS C	V/C > 0.56 & ≤ 0.76	
Poor - LOS D or less	V/C > 0.76	

Performance Level	Closure Extent
Good	≤ 0.22
Fair	> 0.22 & ≤ 0.62
Poor	V/C > 0.62

Performance Level	TTI on Uninterrupted Flow Facilities
Good	< 1.15
Fair	≥ 1.15 & < 1.33
Poor	≥ 1.33

Performance Level	TTI on Interrupted Flow Facilities
Good	< 1.30
Fair	≥ 1.30 & < 1.2.00
Poor	≥ 2.00

Performance Level	PTI on Uninterrupted Flow Facilities
Good	< 1.30
Fair	≥ 1.30 & < 1.50
Poor	≥ 1.50

Performance Level	PTI Interrupted Flow Facilities
Good	< 3.00
Fair	≥ 3.00 & < 6.00
Poor	≥ 6.00

Performance Level	Percent Bicycle Accommodation
Good	≥ 90%
Fair	> 60% & ≤ 90%
Poor	< 60%

Performance Level	Percent Non-SOV Trips
Good	≥ 17%
Fair	> 11% & ≤ 17%
Poor	< 11%

Performance Level	Percent Transit Dependency
Good	Tracts with both zero and one vehicle household population in poverty percentages below the statewide average
Fair	Tracts with either zero and one vehicle household or population in poverty percentages below the statewide average
Poor	Tracts with both zero and one vehicle household and population in poverty percentages above the statewide average

Safety Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Safety performance area as shown in the following graphic:

Primary Safety Index

The Safety Index is a safety performance measure based on the bi-directional (i.e., both directions combined) frequency and rate of fatal and incapacitating injury crashes, the relative cost of those types of crashes, and crash occurrences on similar roadways in Arizona. According to ADOT's 2010 Highway Safety Improvement Program Manual, fatal crashes have an estimated cost that is 14.5 times the estimated cost of incapacitating injury crashes ($5.8 million compared to $400,000).

The Combined Safety Score (CSS) is an interim measure that combines fatal and incapacitating injury crashes into a single value. The CSS is calculated using the following generalized formula:

*CSS = 14.5 * (Normalized Fatal Crash Rate + Frequency) + (Normalized Incapacitating Injury Crash Rate + Frequency)*

Because crashes vary depending on the operating environment of a particular roadway, statewide CSS values were developed for similar operating environments defined by functional classification, urban vs. rural setting, number of travel lanes, and traffic volumes. To determine the Safety Index of a particular segment, the segment CSS is compared to the average statewide CSS for the similar statewide operating environment.

The Safety Index is calculated using the following formula:

Safety Index = Segment CSS / Statewide Similar Operating Environment CSS

The average annual Safety Index for a segment is compared to the statewide similar operating environment annual average, with one standard deviation from the statewide average forming the scale break points.

The more a particular segment's Safety Index value is below the statewide similar operating environment average, the better the safety performance is for that particular segment as a lower value represents fewer crashes.

Scoring:

The scale for rating the Safety Index depends on the operating environments selected, as shown in the table below.

Similar Operating Environment	Safety Index (Overall & Directional)	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	0.94	1.06
2 or 3 or 4 Lane Divided Highway	0.77	1.23
4 or 5 Lane Undivided Highway	0.80	1.20
6 Lane Highway	0.56	1.44
Rural 4 Lane Freeway with Daily Volume < 25,000	0.73	1.27
Rural 4 Lane Freeway with Daily Volume > 25,000	0.68	1.32
Urban 4 Lane Freeway	0.79	1.21
Urban or Rural 6 Lane Freeway	0.82	1.18
Urban > 6 Lane Freeway	0.80	1.20

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

Some corridor segments may have a very low number of total fatal and incapacitating injury crashes. Low crash frequencies (i.e., a small sample size) can translate into performance ratings that can be unstable. In some cases, a change in crash frequency of one crash (one additional crash or one less crash) could result in a change in segment performance of two levels. To avoid reliance on performance ratings where small changes in crash frequency result in large changes in performance, the following two criteria were developed to identify segments with "insufficient data" for assessing performance for the Safety Index. Both of these criteria must be met for a segment to have "insufficient data" to reliably rate the Safety Index performance:

- If the crash sample size (total fatal plus incapacitating injury crashes) for a given segment is less than five crashes over the five-year analysis period; AND
- If a change in one crash results in a change in segment performance by two levels (i.e., a change from below average to above average performance or a change from above average

to below average frequency), the segment has "insufficient data" and Safety Index performance ratings are unreliable.

Secondary Safety Measures

The Safety performance area has four secondary measures related to fatal and incapacitating injury crashes:

- Directional Safety Index
- Strategic Highway Safety Plan (SHSP) Behavior Emphasis Areas
- Crash Unit Types
- Safety Hot Spots

Directional Safety Index: The Direction Safety Index shares the same calculation procedure and thresholds as the Safety Index. However, the measure is based on the directional frequency and rate of fatal and incapacitating injury crashes.

Similar to the Safety Index, the segment CSS is compared to the average statewide CSS for the similar statewide operating environment. The Directional Safety Index follows the lead of the Safety Index in terms of "insufficient data" status. If the Safety Index meets both criteria for "insufficient data", the Directional Safety Index should also be changed to "insufficient data". If the Safety Index does not meet both criteria for "insufficient data", the Directional Safety Index would also not change to say "insufficient data"

SHSP Behavior Emphasis Areas: ADOT's 2014 SHSP identifies several emphasis areas for reducing fatal and incapacitating injury crashes. The top five SHSP emphasis areas relate to the following driver behaviors:

- Speeding and aggressive driving
- Impaired driving
- Lack of restraint usage
- Lack of motorcycle helmet usage
- Distracted driving

To develop a performance measure that reflects these five emphasis areas, the percentage of total fatal and incapacitating injury crashes that involves at least one of the emphasis area driver behaviors on a particular segment is compared to the statewide average percentage of crashes involving at least one of the emphasis area driver behaviors on roads with similar operating environments in a process similar to how the Safety Index is developed.

To increase the crash sample size for this performance measure, the five behavior emphasis areas are combined to identify fatal and incapacitating injury crashes that exhibit one or more of the behavior emphasis areas.

The SHSP behavior emphasis areas performance is calculated using the following formula:

% Crashes Involving SHSP Behavior Emphasis Areas = Segment Crashes Involving SHSP Behavior Emphasis Areas / Total Segment Crashes

The percentage of total crashes involving SHSP behavior emphasis areas for a segment is compared to the statewide percentages on roads with similar operating environments. One standard deviation from the statewide average percentage forms the scale break points.

When assessing the performance of the SHSP behavior emphasis areas, the more the frequency of crashes involving SHSP behavior emphasis areas is below the statewide average implies better levels of segment performance. Thus, lower values are better, similar to the Safety Index.

Scoring:

The scale for rating the SHSP behavior emphasis areas performance depends on the crash history on similar statewide operating environments, as shown in the table below:

Similar Operating Environment	Crashes in SHSP Top 5 Emphasis Areas	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	51.2%	57.5%
2 or 3 or 4 Lane Divided Highway	44.4%	54.4%
4 or 5 Lane Undivided Highway	42.4%	51.1%
6 Lane Highway	35.3%	46.5%
Rural 4 Lane Freeway with Daily Volume < 25,000	42.8%	52.9%
Rural 4 Lane Freeway with Daily Volume > 25,000	40.8%	57.1%
Urban 4 Lane Freeway	49.1%	59.4%
Urban or Rural 6 Lane Freeway	33.5%	57.2%
Urban > 6 Lane Freeway	42.6%	54.8%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

The SHSP behavior emphasis areas secondary safety performance measure for the Safety performance area includes proportions of specific types of crashes within the total fatal and incapacitating injury crash frequencies. This more detailed categorization of fatal and incapacitating injury crashes can result in low crash frequencies (i.e., a small sample size) that translate into performance ratings that can be unstable. In some cases, a change in crash frequency of one crash (one additional crash or one less crash) could result in a change in segment performance of two levels. To avoid reliance on performance ratings where small changes in crash frequency result in large changes in performance, the following criteria were developed to identify segments with "insufficient data" for assessing performance for the SHSP behavior emphasis areas secondary safety performance measure. If any of these criteria are met for a segment, that segment has "insufficient data" to reliably rate the SHSP behavior emphasis areas performance:

- If the crash sample size (total fatal plus incapacitating injury crashes) for a given segment is less than five crashes over the five-year analysis period, the segment has "insufficient data" and performance ratings are unreliable. OR
- If a change in one crash results in a change in segment performance by two levels (i.e., a change from below average to above average performance or a change from above average to below average frequency), the segment has "insufficient data" and performance ratings are unreliable. OR
- If the corridor average segment crash frequency for the SHSP behavior emphasis areas performance measure is less than two crashes over the five-year analysis period, the entire SHSP behavior emphasis areas performance measure has "insufficient data" and performance ratings are unreliable.

Crash Unit Type Emphasis Areas: ADOT's SHSP also identifies emphasis areas that relate to the following "unit-involved" crashes:

- Heavy vehicle (trucks)-involved crashes
- Motorcycle-involved crashes
- Non-motorized traveler (pedestrians and bicyclists)-involved crashes

To develop a performance measure that reflects the aforementioned crash unit type emphasis areas, the percentage of total fatal and incapacitating injury crashes that involves a given crash unit type emphasis area on a particular segment is compared to the statewide average percentage of crashes involving that same crash unit type emphasis area on roads with similar operating environments in a process similar to how the Safety Index is developed.

The SHSP crash unit type emphasis areas performance is calculated using the following formula:

% Crashes Involving Crash Unit Type = Segment Crashes Involving Crash Unit Type / Total Segment Crashes

The percentage of total crashes involving crash unit types for a segment is compared to the statewide percentages on roads with similar operating environments. One standard deviation from the statewide average percentage forms the scale break points.

When assessing the performance of the crash unit types, the more the frequency of crashes involving crash unit types is below the statewide average implies better levels of segment performance. Thus, lower values are better, similar to the Safety Index. The scale for rating the unit-involved crash performance depends on the crash history on similar statewide operating environments, as shown in the following tables.

Scoring:

Similar Operating Environment	Crashes Involving Trucks	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	5.2%	7.1%
2 or 3 or 4 Lane Divided Highway	3.5%	7.3%
4 or 5 Lane Undivided Highway	6.1%	9.6%
6 Lane Highway	0.3%	8.7%
Rural 4 Lane Freeway with Daily Volume < 25,000	13.2%	17.0%
Rural 4 Lane Freeway with Daily Volume > 25,000	7.2%	12.9%
Urban 4 Lane Freeway	6.8%	10.9%
Urban or Rural 6 Lane Freeway	6.2%	11.0%
Urban > 6 Lane Freeway	2.5%	6.0%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

Similar Operating Environment	Crashes Involving Motorcycles	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	18.5%	26.5%
2 or 3 or 4 Lane Divided Highway	16.3%	26.3%
4 or 5 Lane Undivided Highway	6.4%	9.4%
6 Lane Highway	0.0%	20.0%
Rural 4 Lane Freeway with Daily Volume < 25,000	5.0%	8.5%
Rural 4 Lane Freeway with Daily Volume > 25,000	7.7%	17.1%
Urban 4 Lane Freeway	9.3%	11.5%
Urban or Rural 6 Lane Freeway	6.7%	12.9%
Urban > 6 Lane Freeway	12.6%	20.5%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

Similar Operating Environment	Crashes Involving Non-Motorized Travelers	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	2.2%	4.2%
2 or 3 or 4 Lane Divided Highway	2.4%	4.5%
4 or 5 Lane Undivided Highway	4.7%	7.9%
6 Lane Highway	8.4%	17.4%
Rural 4 Lane Freeway with Daily Volume < 25,000	1.7%	2.5%
Rural 4 Lane Freeway with Daily Volume > 25,000	0.0%	0.0%
Urban 4 Lane Freeway	4.8%	10.3%
Urban or Rural 6 Lane Freeway	0.9%	6.7%
Urban > 6 Lane Freeway	0.5%	1.5%

** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

The crash unit types have the same "insufficient data" criteria as the SHSP behavior emphasis areas.

Safety Hot Spots: A hot spot analysis was conducted that identified abnormally high concentrations of fatal and incapacitating injury crashes along the study corridor by direction of travel. The identification of crash concentrations involves a GIS-based function known as "kernel density analysis". This measure is mapped for graphical display purposes with the Directional Safety Index but is not included in the Safety performance area rating calculations.

Freight Performance Area Calculation Methodologies

This section summarizes the approach for developing the primary and secondary performance measures in the Freight performance area as shown in the following graphic:

Primary Freight Index

The Freight Index is a reliability performance measure based on the planning time index for truck travel. The industry standard definition for the Truck Planning Time Index (TPTI) is the ratio of total travel time needed for 95% on-time arrival to free-flow travel time. The TPTI reflects the extra buffer time needed for on-time delivery while accounting for non-recurring delay. Non-recurring delay refers to unexpected or abnormal delay due to closures or restrictions resulting from circumstances such as crashes, inclement weather, and construction activities.

The TPTI can be converted into a speed-based index by recognizing that speed is equal to distance traveled divided by travel time. The inverse relationship between travel time and speed means that the 95th percentile highest travel time corresponds to the 5th percentile lowest speed. The speed-based TPTI is calculated using the following formula:

TPTI = Free-Flow Truck Speed / Observed 5th Percentile Lowest Truck Speed

Observed 5th percentile lowest truck speeds are available in the 2014 American Digital Cartography, Inc. HERE (formerly NAVTEQ) database to which ADOT has access. The free-flow truck speed is assumed to be 65 miles per hour or the posted speed, whichever is less. This upper limit of 65 mph accounts for governors that trucks often have that restrict truck speeds to no more than 65 mph, even when the speed limit may be higher.

For each corridor segment, the TPTI is calculated for each direction of travel and then averaged to create a bi-directional TPTI. When assessing performance using TPTI, the higher the TPTI value is above 1.0, the more buffer time is needed to ensure on-time delivery.

The Freight Index is calculated using the following formula to invert the overall TPTI:

Freight Index = 1 / Bi-directional TPTI

Inversion of the TPTI allows the Freight Index to have a scale where the higher the value, the better the performance, which is similar to the directionality of the scales of most of the other primary measures. This Freight Index scale is based on inverted versions of TPTI scales created previously by ADOT. The scale for rating the Freight Index differs between uninterrupted and interrupted flow facilities.

Secondary Freight Measures

The Freight performance area includes five secondary measures that provide an in-depth evaluation of the different characteristics of freight performance:

- Recurring Delay (Directional TTTI)
- Non-Recurring Delay (Directional TPTI)
- Closure Duration
- Bridge Vertical Clearance
- Bridge Vertical Clearance Hot Spots

Recurring Delay (Directional TTTI): The performance measure for recurring delay is the Directional Truck Travel Time Index (TTTI). The industry standard definition for TTTI is the ratio of average peak period travel time to free-flow travel time. The TTTI reflects the extra time spent in traffic during peak times due to recurring delay. Recurring delay refers to expected or normal delay due to roadway capacity constraints or traffic control devices.

Similar to the TPTI, the TTTI can be converted into a speed-based index by recognizing that speed is equal to distance traveled divided by travel time. The speed-based TTTI can be calculated using the following formula:

TTTI = Free-Flow Truck Speed / Observed Average Peak Period Truck Speed

Observed average peak period truck speeds are available in the 2014 American Digital Cartography, Inc. HERE (formerly NAVTEQ) database to which ADOT has access. The free-flow truck speed is assumed to be 65 mph or the posted speed, whichever is less.

For each corridor segment, the TTTI is calculated for each direction of travel. With the TTTI, the higher the TTTI value is above 1.0, the more time is spent in traffic during peak times. TTTI values

are generally lower than TPTI values. The Directional TTTI scale is based on TTTI scales created previously by ADOT.

Non-Recurring Delay (Directional TPTI): The performance measure for non-recurring delay is the Directional TPTI. Directional TPTI is calculated as described previously as an interim step in the development of the Freight Index.

For each corridor segment, the TPTI is calculated for each direction of travel. With the TPTI, the higher the TPTI value is above 1.0, the more buffer time is needed to ensure on-time delivery.

Closure Duration: This performance measure related to road closures is average roadway closure (i.e., full lane closure) duration time in minutes. There are three main components to full closures that affect reliability – frequency, duration, and extent. In the freight industry, closure duration is the most important component because trucks want to minimize travel time and delay.

Data on the frequency, duration, and extent of full roadway closures on the ADOT State Highway System is available for 2010-2014 in the HCRS database that is managed and updated by ADOT.

The average closure duration in a segment – in terms of the average time a milepost is closed per mile per year on a given segment – is calculated using the following formula:

*Closure Duration = Sum of Segment (Closure Clearance Time * Closure Extent) / Segment Length*

The segment closure duration time in minutes can then be compared to statewide averages for closure duration in minutes, with one-half standard deviation from the average forming the scale break points. The scale for rating closure duration in minutes is found at the end of this section.

Bridge Vertical Clearance: This performance measure uses the vertical clearance information from the ADOT Bridge Database to identify locations with low vertical clearance. The minimum vertical clearance for all underpass structures (i.e., structures under which mainline traffic passes) is determined for each segment.

Bridge Vertical Clearance Hot Spots: This performance measure related to truck restrictions is the locations, or hot spots, where bridge vertical clearance issues restrict truck travel. Sixteen feet three inches (16.25') is the minimum standard vertical clearance value for state highway bridges over travel lanes.

Locations with lower vertical clearance values than the minimum standard are categorized by the ADOT Intermodal Transportation Department Engineering Permits Section as either locations where ramps exist that allow the restriction to be avoided or locations where ramps do not exist and the restriction cannot be avoided. The locations with vertical clearances below the minimum standard that cannot be ramped around are considered hot spots. This measure is mapped for graphical display purposes with the bridge vertical clearance map but is not included in the Freight performance area rating calculations.

Scoring:

Performance Level	Freight Index	
	Uninterrupted Flow Facilities	Interrupted Flow Facilities
Good	> 0.77	> 0.33
Fair	0.67 – 0.77	0.17 – 0.33
Poor	< 0.67	< 0.17

Performance Level	TTTI	
	Uninterrupted Flow Facilities	Interrupted Flow Facilities
Good	< 1.15	< 1.30
Fair	1.15 – 1.33	1.30 – 2.00
Poor	> 1.33	> 2.00

Performance Level	TPTI	
	Uninterrupted Flow Facilities	Interrupted Flow Facilities
Good	< 1.30	< 3.00
Fair	1.30 – 1.50	3.00 – 6.00
Poor	> 1.50	> 6.00

Performance Level	Closure Duration (minutes)
Good	< 44.18
Fair	44.18 – 124.86
Poor	> 124.86

Performance Level	Bridge Vertical Clearance
Good	> 16.5'
Fair	16.0' – 16.5'
Poor	< 16.0'

Appendix C: Performance Area Data

Pavement Performance Area Data

				Northbound			Southbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Segment 1		*Interstate?*	**No**															
Mile 1	29	to	30	2	78.96	12				3.70	3.2	5.00	5.0	3.37	5.00		0	0
Mile 2	30	to	31	2	85.55	9				3.61	3.5	5.00	5.0	3.55	5.00		0	0
Mile 3	31	to	32	2	85.68	7				3.61	3.8	5.00	5.0	3.65	5.00		0	0
Mile 4	32	to	33	1	74.12	8				3.77	3.6	5.00	5.0	3.68	5.00		0	0
Mile 5	33	to	34	1	95.62	8				3.48	3.6	5.00	5.0	3.53	5.00		0	0
			Total	8			0											0
			Weighted Average							3.64	3.54	#DIV/0!	#DIV/0!	3.54	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.64**		**#DIV/0!**						**0.0%**
			Pavement Index													**3.54**		
Segment 2		*Interstate?*	**No**															
Mile 1	34	to	35	2	41.00	5				4.28	4.0	5.00	5.0	4.08	5.00		0	0
Mile 2	35	to	36	2	39.92	6				4.30	3.9	5.00	5.0	4.00	5.00		0	0
Mile 3	36	to	37	2	41.28	3				4.27	4.3	5.00	5.0	4.28	5.00		0	0
Mile 4	37	to	38	2	61.53	1				3.96	4.7	5.00	5.0	4.17	5.00		0	0
Mile 5	38	to	39	2	87.18	9				3.59	3.5	5.00	5.0	3.55	5.00		0	0
Mile 6	39	to	40	2	107.83	3				3.32	4.3	5.00	5.0	3.61	5.00		0	0
Mile 7	40	to	41	2	132.66	4				3.02	4.1	5.00	5.0	3.36	5.00		0	0
Mile 8	41	to	42	2	115.18	6				3.23	3.9	5.00	5.0	3.42	5.00		0	0
Mile 9	42	to	43	2	50.07	0				4.13	5.0	5.00	5.0	4.39	5.00		0	0
			Total	18			0											0
			Weighted Average							3.78	4.18	#DIV/0!	#DIV/0!	3.86	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.78**		**#DIV/0!**						**0.0%**
			Pavement Index													**3.86**		
Segment 3		*Interstate?*	**No**															
Mile 1	43	to	44	2	50.73	3				4.12	4.3	5.00	5.0	4.17	5.00		0	0
Mile 2	44	to	45	2	110.53	0				3.29	5.0	5.00	5.0	3.80	5.00		0	0
Mile 3	45	to	46	2	118.54	9				3.19	3.5	5.00	5.0	3.29	5.00		0	0
Mile 4	46	to	47	2	144.15	7				2.89	3.8	5.00	5.0	2.89	5.00		2	0
Mile 5	47	to	48	2	129.94	10				3.05	3.4	5.00	5.0	3.16	5.00		0	0
Mile 6	48	to	49	2	150.56	12				2.82	3.2	5.00	5.0	2.82	5.00		2	0
Mile 7	49	to	50	2	149.31	10				2.84	3.4	5.00	5.0	2.84	5.00		2	0
Mile 8	50	to	51	2	145.10	8				2.88	3.6	5.00	5.0	2.88	5.00		2	0
Mile 9	51	to	52	2	133.89	7				3.01	3.8	5.00	5.0	3.23	5.00		0	0
Mile 10	52	to	53	2	160.95	4				2.71	4.1	5.00	5.0	2.71	5.00		2	0
Mile 11	53	to	54	2	151.45	1				2.81	4.7	5.00	5.0	2.81	5.00		2	0

				Northbound			Southbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 12	54	to	55	2	37.36	0				4.34	5.0	5.00	5.0	4.54	5.00		0	0
Mile 13	55	to	56	2	38.93	0				4.31	5.0	5.00	5.0	4.52	5.00		0	0
Mile 14	56	to	57	2	35.73	0				4.37	5.0	5.00	5.0	4.56	5.00		0	0
Mile 15	57	to	58	2	34.38	0				4.39	5.0	5.00	5.0	4.57	5.00		0	0
Mile 16	58	to	59	2	36.94	0				4.35	5.0	5.00	5.0	4.54	5.00		0	0
Mile 17	59	to	60	2	43.91	0				4.23	5.0	5.00	5.0	4.46	5.00		0	0
			Total	34			0											12
			Weighted Average							3.51	4.28	#DIV/0!	#DIV/0!	3.63	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.51**		**#DIV/0!**						**35.3%**
			Pavement Index													**3.63**		
Segment 4			***Interstate?***	**No**														
Mile 1	60	to	61	2	36.97	0				4.34	5.0	5.00	5.0	4.54	5.00		0	0
Mile 2	61	to	62	2	33.97	0				4.39	5.0	5.00	5.0	4.58	5.00		0	0
Mile 3	62	to	63	2	37.24	0				4.34	5.0	5.00	5.0	4.54	5.00		0	0
Mile 4	63	to	64	2	38.16	0				4.33	5.0	5.00	5.0	4.53	5.00		0	0
Mile 5	64	to	65	2	38.88	1				4.31	4.7	5.00	5.0	4.42	5.00		0	0
Mile 6	65	to	66	2	34.51	0				4.39	5.0	5.00	5.0	4.57	5.00		0	0
Mile 7	66	to	67	2	35.05	1				4.38	4.7	5.00	5.0	4.46	5.00		0	0
Mile 8	67	to	68	2	39.89	1				4.30	4.7	5.00	5.0	4.40	5.00		0	0
Mile 9	68	to	69	2	42.79	1				4.25	4.7	5.00	5.0	4.37	5.00		0	0
Mile 10	69	to	70	2	43.18	1				4.24	4.7	5.00	5.0	4.37	5.00		0	0
Mile 11	70	to	71	2	37.35	0				4.34	5.0	5.00	5.0	4.54	5.00		0	0
Mile 12	71	to	72	2	41.46	3				4.27	4.3	5.00	5.0	4.28	5.00		0	0
Mile 13	72	to	73	2	45.38	0				4.21	5.0	5.00	5.0	4.45	5.00		0	0
Mile 14	73	to	74	2	45.99	2				4.20	4.5	5.00	5.0	4.28	5.00		0	0
Mile 15	74	to	75	2	43.27	2				4.24	4.5	5.00	5.0	4.31	5.00		0	0
Mile 16	75	to	76	2	49.66	0				4.14	5.0	5.00	5.0	4.40	5.00		0	0
Mile 17	76	to	77	2	64.04	0				3.92	5.0	5.00	5.0	4.24	5.00		0	0
Mile 18	77	to	78	2	36.36	1				4.35	4.7	5.00	5.0	4.44	5.00		0	0
Mile 19	78	to	79	2	37.33	1				4.34	4.7	5.00	5.0	4.43	5.00		0	0
Mile 20	79	to	80	2	44.68	4				4.22	4.1	5.00	5.0	4.16	5.00		0	0
			Total	40			0											0
			Weighted Average							4.28	4.75	#DIV/0!	#DIV/0!	4.41	0.00			
			Factor							1.00		1.00						
			Indicator Score							**4.28**		**#DIV/0!**						**0.0%**
			Pavement Index													**4.41**		
Segment 5			***Interstate?***	**No**														
Mile 1	80	to	81	2	57.53	9				4.02	3.5	5.00	5.0	3.68	5.00		0	0

				Northbound			Southbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 2	81	to	82	2	46.65	5				4.19	4.0	5.00	5.0	4.06	5.00		0	0
Mile 3	82	to	83	2	48.29	3				4.16	4.3	5.00	5.0	4.20	5.00		0	0
Mile 4	83	to	84	2	52.53	4				4.10	4.1	5.00	5.0	4.11	5.00		0	0
Mile 5	84	to	85	2	52.60	4				4.09	4.1	5.00	5.0	4.11	5.00		0	0
Mile 6	85	to	86	2	50.78	6				4.12	3.9	5.00	5.0	3.95	5.00		0	0
Mile 7	86	to	87	2	52.41	5				4.10	4.0	5.00	5.0	4.03	5.00		0	0
Mile 8	87	to	88	2	67.61	5				3.87	4.0	5.00	5.0	3.91	5.00		0	0
Mile 9	88	to	89	2	62.69	12				3.94	3.2	5.00	5.0	3.44	5.00		0	0
Mile 10	89	to	90	2	58.35	4				4.01	4.1	5.00	5.0	4.05	5.00		0	0
Mile 11	90	to	91	2	64.19	8				3.92	3.6	5.00	5.0	3.72	5.00		0	0
Mile 12	91	to	92	2	63.70	4				3.93	4.1	5.00	5.0	3.99	5.00		0	0
Mile 13	92	to	93	2	80.89	4				3.68	4.1	5.00	5.0	3.82	5.00		0	0
Mile 14	93	to	94	2	58.40	5				4.00	4.0	5.00	5.0	4.00	5.00		0	0
Mile 15	94	to	95	2	55.67	4				4.05	4.1	5.00	5.0	4.07	5.00		0	0
Mile 16	95	to	96	2	61.36	4				3.96	4.1	5.00	5.0	4.01	5.00		0	0
Mile 17	96	to	97	2	39.53	0				4.30	5.0	5.00	5.0	4.51	5.00		0	0
Mile 18	97	to	98	2	35.74	0				4.37	5.0	5.00	5.0	4.56	5.00		0	0
Mile 19	98	to	99	2	38.38	0				4.32	5.0	5.00	5.0	4.53	5.00		0	0
Mile 20	99	to	100	2	31.43	0				4.44	5.0	5.00	5.0	4.61	5.00		0	0
Mile 21	100	to	101	2	35.78	0				4.36	5.0	5.00	5.0	4.56	5.00		0	0
Mile 22	101	to	102	2	38.15	0				4.33	5.0	5.00	5.0	4.53	5.00		0	0
Mile 23	102	to	103	2	36.14	0				4.36	5.0	5.00	5.0	4.55	5.00		0	0
Mile 24	103	to	104	2	47.48	0				4.17	5.0	5.00	5.0	4.42	5.00		0	0
			Total	48			0											0
			Weighted Average							4.12	4.31	#DIV/0!	#DIV/0!	4.14	0.00			
			Factor							1.00		1.00						
			Indicator Score							**4.12**		**#DIV/0!**						**0.0%**
			Pavement Index													**4.14**		
Segment 6			***Interstate?***	**No**														
Mile 1	104	to	105	4	150.44	0				2.82	5.0	5.00	5.0	2.82	5.00		4	0
Mile 2	109	to	110	4	89.42	4				3.56	4.1	5.00	5.0	3.73	5.00		0	0
Mile 3	110	to	111	4	108.65	12				3.31	3.2	5.00	5.0	3.25	5.00		0	0
			Total	12			0											4
			Weighted Average							3.23	4.12	#DIV/0!	#DIV/0!	3.27	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.23**		**#DIV/0!**						**33.3%**
			Pavement Index													**3.27**		
Segment 7			***Interstate?***	**No**														
Mile 1	111	to	112	2	136.86	5				2.97	4.0	5.00	5.0	3.28	5.00		0	0
Mile 2	112	to	113	2	87.68	9				3.58	3.5	5.00	5.0	3.55	5.00		0	0

				Northbound			Southbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 3	113	to	114	2	88.72	2				3.57	4.5	5.00	5.0	3.83	5.00		0	0
Mile 4	114	to	115	2	105.36	12				3.35	3.2	5.00	5.0	3.26	5.00		0	0
Mile 5	115	to	116	2	87.31	7				3.59	3.8	5.00	5.0	3.64	5.00		0	0
Mile 6	116	to	117	2	77.81	5				3.72	4.0	5.00	5.0	3.80	5.00		0	0
Mile 7	117	to	118	2	76.77	3				3.73	4.3	5.00	5.0	3.90	5.00		0	0
Mile 8	118	to	119	2	77.02	9				3.73	3.5	5.00	5.0	3.59	5.00		0	0
Mile 9	119	to	120	2	74.47	12				3.77	3.2	5.00	5.0	3.39	5.00		0	0
Mile 10	120	to	121	2	69.76	20				3.84	2.5	5.00	5.0	2.51	5.00		2	0
Mile 11	121	to	122	2	69.20	6				3.84	3.9	5.00	5.0	3.85	5.00		0	0
Mile 12	122	to	123	2	57.37	5				4.02	4.0	5.00	5.0	4.01	5.00		0	0
Mile 13	123	to	124	2	67.34	3				3.87	4.3	5.00	5.0	4.00	5.00		0	0
Mile 14	124	to	125	2	63.88	4				3.92	4.1	5.00	5.0	3.99	5.00		0	0
Mile 15	125	to	126	2	67.67	3				3.87	4.3	5.00	5.0	3.99	5.00		0	0
Mile 16	126	to	127	2	68.09	6				3.86	3.9	5.00	5.0	3.86	5.00		0	0
Mile 17	127	to	128	2	58.60	12				4.00	3.2	5.00	5.0	3.46	5.00		0	0
Mile 18	128	to	129	2	66.16	2				3.89	4.5	5.00	5.0	4.06	5.00		0	0
Mile 19	129	to	130	2	53.79	5				4.08	4.0	5.00	5.0	4.02	5.00		0	0
Mile 20	130	to	131	2	54.05	7				4.07	3.8	5.00	5.0	3.85	5.00		0	0
			Total	40			0											2
			Weighted Average							3.76	3.82	#DIV/0!	#DIV/0!	3.69	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.76**		**#DIV/0!**						**5.0%**
			Pavement Index													**3.69**		
Segment 8			***Interstate?***	**No**														
Mile 1	131	to	132	2	165.81	5				2.66	4.0	5.00	5.0	2.66	5.00		2	0
Mile 2	132	to	133	2	92.42	2				3.52	4.5	5.00	5.0	3.80	5.00		0	0
Mile 3	133	to	134	2	123.47	3				3.13	4.3	5.00	5.0	3.48	5.00		0	0
Mile 4	134	to	135	2	126.20	6				3.10	3.9	5.00	5.0	3.33	5.00		0	0
Mile 5	135	to	136	2	93.44	5				3.51	4.0	5.00	5.0	3.65	5.00		0	0
Mile 6	136	to	137	2	89.46	5				3.56	4.0	5.00	5.0	3.69	5.00		0	0
Mile 7	137	to	138	2	120.05	5				3.17	4.0	5.00	5.0	3.42	5.00		0	0
Mile 8	138	to	139	2	132.87	5				3.02	4.0	5.00	5.0	3.31	5.00		0	0
Mile 9	139	to	140	2	114.43	6				3.24	3.9	5.00	5.0	3.43	5.00		0	0
Mile 10	140	to	141	2	87.50	2				3.59	4.5	5.00	5.0	3.85	5.00		0	0
Mile 11	141	to	142	2	93.20	3				3.51	4.3	5.00	5.0	3.74	5.00		0	0
			Total	22			0											2
			Weighted Average							3.27	4.11	#DIV/0!	#DIV/0!	3.49	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.27**		**#DIV/0!**						**9.1%**
			Pavement Index													**3.49**		

				Northbound			Southbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Segment 9		***Interstate?***	**No**															
Mile 1	142	to	143	4	107.67	3				3.32	4.3	5.00	5.0	3.61	5.00		0	0
Mile 2	143	to	144	4	67.45	8				3.87	3.6	5.00	5.0	3.71	5.00		0	0
Mile 3	144	to	145	4	72.71	6				3.79	3.9	5.00	5.0	3.82	5.00		0	0
Mile 4	145	to	146	4	37.27	3				4.34	4.3	5.00	5.0	4.30	5.00		0	0
Mile 5	146	to	147	4	44.53	4				4.22	4.1	5.00	5.0	4.16	5.00		0	0
Mile 6	147	to	148	4	81.12	4				3.67	4.1	5.00	5.0	3.81	5.00		0	0
Mile 7	148	to	149	4	80.86	30				3.68	1.7	5.00	5.0	1.74	5.00		4	0
			Total	28			0											4
			Weighted Average							3.84	3.73	#DIV/0!	#DIV/0!	3.59	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.84**		**#DIV/0!**						**14.3%**
			Pavement Index													**3.59**		
Segment 10		***Interstate?***	**No**															
Mile 1	149	to	150	2	139.02	5				2.95	4.0	5.00	5.0	3.26	5.00		0	0
Mile 2	150	to	151	2	83.91	9				3.63	3.5	5.00	5.0	3.56	5.00		0	0
Mile 3	151	to	152	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 4	152	to	153	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 5	153	to	154	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 6	154	to	155	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 7	155	to	156	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 8	156	to	157	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 9	157	to	158	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 10	158	to	159	2	76.62	6				3.74	3.9	5.00	5.0	3.78	5.00		0	0
Mile 11	159	to	160	2	112.05	6				3.27	3.9	5.00	5.0	3.45	5.00		0	0
Mile 12	160	to	161	2	121.91	6				3.15	3.9	5.00	5.0	3.36	5.00		0	0
Mile 13	161	to	162	2	70.93	7				3.82	3.8	5.00	5.0	3.77	5.00		0	0
			Total	26			0											0
			Weighted Average							3.59	3.85	#DIV/0!	#DIV/0!	3.66	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.59**		**#DIV/0!**						**0.0%**
			Pavement Index													**3.66**		
Segment 11		***Interstate?***	**No**															
Mile 1	162	to	163	2	43.05	3				4.25	4.3	5.00	5.0	4.26	5.00		0	0
Mile 2	163	to	164	2	39.59	2				4.30	4.5	5.00	5.0	4.35	5.00		0	0
Mile 3	164	to	165	2	47.10	1				4.18	4.7	5.00	5.0	4.32	5.00		0	0
Mile 4	165	to	166	2	47.47	5				4.17	4.0	5.00	5.0	4.05	5.00		0	0
Mile 5	166	to	167	2	39.02	4				4.31	4.1	5.00	5.0	4.19	5.00		0	0
Mile 6	167	to	168	2	47.91	4				4.17	4.1	5.00	5.0	4.15	5.00		0	0
Mile 7	168	to	169	2	72.13	8				3.80	3.6	5.00	5.0	3.69	5.00		0	0

				Northbound			Southbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 8	169	to	170	2	60.20	4				3.98	4.1	5.00	5.0	4.03	5.00		0	0
Mile 9	170	to	171	2	60.38	1				3.97	4.7	5.00	5.0	4.18	5.00		0	0
Mile 10	171	to	172	2	51.96	7				4.10	3.8	5.00	5.0	3.86	5.00		0	0
Mile 11	172	to	173	2	60.60	2				3.97	4.5	5.00	5.0	4.12	5.00		0	0
Mile 12	173	to	174	2	50.26	1				4.13	4.7	5.00	5.0	4.29	5.00		0	0
Mile 13	174	to	175	2	44.91	3				4.22	4.3	5.00	5.0	4.24	5.00		0	0
Mile 14	175	to	176	2	44.42	5				4.22	4.0	5.00	5.0	4.07	5.00		0	0
			Total	28			0											0
			Weighted Average							4.13	4.23	#DIV/0!	#DIV/0!	4.13	0.00			
			Factor							1.00		1.00						
			Indicator Score							**4.13**		**#DIV/0!**						**0.0%**
			Pavement Index													**4.13**		
Segment 12			***Interstate?***	**No**														
Mile 1	176	to	177	4	67.60	3				3.87	4.3	5.00	5.0	3.99	5.00		0	0
Mile 2	177	to	178	4	107.02	4				3.33	4.1	5.00	5.0	3.57	5.00		0	0
Mile 3	178	to	179	4	100.84	2				3.41	4.5	5.00	5.0	3.72	5.00		0	0
Mile 4	179	to	180	4	82.62	5				3.65	4.0	5.00	5.0	3.76	5.00		0	0
Mile 5	180	to	181	4	77.49	6				3.72	3.9	5.00	5.0	3.77	5.00		0	0
Mile 6	181	to	182	4	200.46	1				2.33	4.7	5.00	5.0	2.33	5.00		4	0
Mile 7	182	to	183	4	184.91	2				2.48	4.5	5.00	5.0	2.48	5.00		4	0
Mile 8	183	to	184	4	113.17	3				3.25	4.3	5.00	5.0	3.56	5.00		0	0
Mile 9	184	to	185	4	60.01	0				3.98	5.0	5.00	5.0	4.29	5.00		0	0
Mile 10	185	to	186	4	47.32	0				4.18	5.0	5.00	5.0	4.42	5.00		0	0
Mile 11	186	to	187	4	62.23	0				3.95	5.0	5.00	5.0	4.26	5.00		0	0
Mile 12	187	to	188	2	66.28	3	2	52.00	1	3.89	4.3	4.10	4.7	4.01	4.27		0	0
Mile 13	188	to	189	2	51.84	0	2	43.24	0	4.11	5.0	4.24	5.0	4.37	4.47		0	0
Mile 14	189	to	190	2	101.36	4	2	51.83	0	3.40	4.1	4.11	5.0	3.62	4.37		0	0
			Total	50			6											8
			Weighted Average							3.51	4.47	4.15	4.89	3.69	4.37			
			Factor							1.00		1.00						
			Indicator Score							**3.51**		**4.15**						**14.3%**
			Pavement Index													**3.77**		
Segment 13			***Interstate?***	**No**														
Mile 1	190	to	191	2	53.93	4				4.07	4.1	5.00	5.0	4.09	5.00		0	0
Mile 2	191	to	192	2	115.78	60				3.22	-0.1	5.00	5.0	-0.15	5.00		2	0
Mile 3	192	to	193	2	111.26	65				3.28	-0.4	5.00	5.0	-0.42	5.00		2	0
Mile 4	193	to	194	2	107.09	60				3.33	-0.1	5.00	5.0	-0.15	5.00		2	0
Mile 5	194	to	195	2	66.14	10				3.89	3.4	5.00	5.0	3.56	5.00		0	0

				Northbound			Southbound			NB		SB		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	# of Lanes	IRI	Cracking	PSR	PDI	PSR	PDI	NB	SB		NB	SB
Mile 6	195	to	196	2	57.96	9				4.01	3.5	5.00	5.0	3.67	5.00		0	0
Mile 7	196	to	197	2	57.15	12				4.02	3.2	5.00	5.0	3.46	5.00		0	0
Mile 8	197	to	198	2	51.90	4				4.11	4.1	5.00	5.0	4.12	5.00		0	0
Mile 9	198	to	199	2	50.56	7				4.13	3.8	5.00	5.0	3.87	5.00		0	0
Mile 10	199	to	200	2	55.09	3				4.06	4.3	5.00	5.0	4.13	5.00		0	0
Mile 11	200	to	201	2	59.93	12				3.98	3.2	5.00	5.0	3.45	5.00		0	0
Mile 12	201	to	202	2	112.75	5				3.26	4.0	5.00	5.0	3.48	5.00		0	0
			Total	24			0											6
			Weighted Average							3.77	2.77	#DIV/0!	#DIV/0!	2.77	0.00			
			Factor							1.00		1.00						
			Indicator Score							**3.77**		**#DIV/0!**						**24.7%**
			Pavement Index													**2.77**		

Bridge Performance Area Data

Structure Name (A209)	Structure # (N8)	Milepost (A232)	Area (A225)	Bridge Sufficiency	Bridge Index					Functionally Obsolete Bridges	Bridge Rating	Hot Spots on Bridge Index map
				Sufficiency Rating	Deck (N58)	Sub (N59)	Super (N60)	Eval (N67)	Lowest	Deck Area on Func Obsolete		
Segment 1												
Gila Canal Br	504	33.55	4,950	80.87	7	7	6	7	6.0	0		
Total			4,950									
Weighted Average				80.87					6.00	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**80.87**						**0.00%**	**6**	
Bridge Index									**6.00**			
Segment 2												
Welton Mohawk Canal Bridge	343	38.00	3,074	58.00	7	6	6	6	6.0	3,074		
Gila River Br	583	53.28	32,880	80.00	6	7	7	7	6.0	0		
Total			35,954									
Weighted Average				78.12					6.00	8.55%		
Factor				1.00					1.00	1.00		
Indicator Score				**78.12**						**8.55%**	**6**	
Bridge Index									**6.00**			
Segment 3												
Castle Dome Wash Br	583	53.28	6,019	68.22	6	6	6	5	5.0	0		
Total			6,019									
Weighted Average				68.22					5.00	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**68.22**						**0.00%**	**5**	
Bridge Index									**5.00**			
Segment 6												
Plomosa Wash Bridge	2046	109.67	5,542	76.00	6	6	7	6	6.0	0		
Total			5,542									
Weighted Average				76.00					6.00	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**76.00**						**0.00%**	**6**	
Bridge Index									**6.00**			
Segment 7												
Climax Was Bridge	1917	114.55	7,993	79.00	6	6	7	6	6.0	0		
Total			7,993									
Weighted Average				79.00					6.00	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**79.00**						**0.00%**	**6**	

	Bridge Index								**6.00**			
Segment 8												
Bouse Wash Bridge	1321	131.33	21,491	67.00	5	5	7	5	5.0	0		
	Total			21,491								
	Weighted Average			67.00					5.00	0.00%		
	Factor			1.00					1.00	1.00		
	Indicator Score			**67.00**						**0.00%**	**5**	
	Bridge Index								**5.00**			
Segment 9												
Osborne Wash Bridge	1522	147.16	22,327	77.78	7	7	7	7	7.0	0		
Rio Vista Rd UP	2029	148.50	7,097	90.55	6	7	7	7	6.0	0		
	Total			29,424								
	Weighted Average			80.86					6.76	0.00%		
	Factor			1.00					1.00	1.00		
	Indicator Score			**80.86**						**0.00%**	**6**	
	Bridge Index								**6.76**			
Segment 10												
CAP Canal Intake Br	1407	160.86	13,802	79.00	7	7	7	7	7.0	0		
Bill Williams Riv Br	1272	161.73	40,649	78.00	7	6	7	6	6.0	0		
	Total			54,451								
	Weighted Average			78.25					6.25	0.00%		
	Factor			1.00					1.00	1.00		
	Indicator Score			**78.25**						**0.00%**	**6**	
	Bridge Index								**6.25**			
Segment 12												
Mockingbird Was Br	1915	178.26	11,573	68.00	5	5	6	5	5.0	0		
McCulloch Blvd UP	1824	182.38	6,976	56.78	5	7	7	7	5.0	6,976		
Falls Spring Wash Bridge	2665	186.19	16,000	91.94	6	7	7	7	6.0	0		
	Total			34,549								
	Weighted Average			76.82					5.46	20.19%		
	Factor			1.00					1.00	1.00		
	Indicator Score			**76.82**						**20.19%**	**5**	
	Bridge Index								**5.46**			

Mobility Performance Area Data

Segment	Begin MP	End MP	Length (mi)	Facility Type	Flow Type	Terrain	No. of Lanes	Capacity Environment Type	Lane Width (feet)	Posted Speed Limit (mph)	Divided or Undivided	Access Points (per mile)	% No-Passing Zone	Street Parking
95-1	29	34	5	Fringe Urban	Interrupted	Level	4	Urban/Rural Single or Multilane Signalized	12.00	55	Undivided	N/A	0%	N/A
95-2	34	43	9	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	1	27%	N/A
95-3	43	60	17	Rural	Uninterrupted	Level	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	1	19%	N/A
95-4	60	80	20	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	1	34%	N/A
95-5	80	104	24	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	1	2%	N/A
95-6	104	111	2.5	Urban	Interrupted	Rolling	4	Urban/Rural Single or Multilane Signalized	12.00	35	Undivided	N/A	0%	N/A
95-7	111	131	20	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	1	57%	N/A
95-8	131	142	11	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	1	67%	N/A
95-9	142	149	7	Urban	Interrupted	Rolling	4	Urban/Rural Single or Multilane Signalized	12.00	55	Undivided	N/A	0%	N/A
95-10	149	162	13	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	55	Undivided	1	92%	N/A
95-11	162	176	14	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	1	53%	N/A
95-12	176	190	14	Urban	Interrupted	Rolling	4	Urban/Rural Single or Multilane Signalized	12.00	55	Undivided	N/A	0%	N/A
95-13	190	202	12	Rural	Uninterrupted	Rolling	2	Rural Two-Lane, Non-Signalized	12.00	65	Undivided	1	56%	N/A

Car TTI and PTI/Truck TTTI and TPTI – Northbound/Eastbound

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
1	115P06511	1 AM Peak	Weekday	US-95	Northbound	50.5	43.3	29.8	12.4	45	45	45	1.00	1.04	1.51	3.62	1.00	1.04	1.90	3.62
1	115P06511	2 Mid Day	Weekday	US-95	Northbound	49.7	48.0	24.9	20.5	45	45	45	1.00	1.00	1.81	2.19				
1	115P06511	3 PM Peak	Weekday	US-95	Northbound	50.1	47.4	23.6	22.4	45	45	45	1.00	1.00	1.90	2.01				
1	115P06511	4 Evening	Weekday	US-95	Northbound	51.8	46.8	32.2	15.2	45	45	45	1.00	1.00	1.40	2.95				
1	115P06512	1 AM Peak	Weekday	US-95	Northbound	48.5	47.5	23.0	21.1	55	55	55	1.14	1.16	2.39	2.60	1.17	1.20	4.02	3.54
1	115P06512	2 Mid Day	Weekday	US-95	Northbound	47.5	45.9	17.4	15.5	55	55	55	1.16	1.20	3.16	3.54				
1	115P06512	3 PM Peak	Weekday	US-95	Northbound	47.1	46.3	13.7	17.4	55	55	55	1.17	1.19	4.02	3.16				
1	115P06512	4 Evening	Weekday	US-95	Northbound	50.4	47.5	25.1	16.8	55	55	55	1.09	1.16	2.19	3.28				
2	115P06513	1 AM Peak	Weekday	US-95	Northbound	53.2	50.8	38.5	27.0	55	55	55	1.03	1.08	1.43	2.03	1.05	1.08	2.21	2.03
2	115P06513	2 Mid Day	Weekday	US-95	Northbound	52.6	52.5	31.1	30.5	55	55	55	1.05	1.05	1.77	1.81				
2	115P06513	3 PM Peak	Weekday	US-95	Northbound	52.7	52.9	24.9	32.6	55	55	55	1.04	1.04	2.21	1.68				
2	115P06513	4 Evening	Weekday	US-95	Northbound	54.1	53.0	37.0	34.8	55	55	55	1.02	1.04	1.49	1.58				
3	115P06514	1 AM Peak	Weekday	US-95	Northbound	59.3	56.8	49.0	43.4	55	55	55	1.00	1.00	1.12	1.27	1.00	1.00	1.12	1.27
3	115P06514	2 Mid Day	Weekday	US-95	Northbound	60.1	58.0	49.8	48.5	55	55	55	1.00	1.00	1.11	1.13				
3	115P06514	3 PM Peak	Weekday	US-95	Northbound	59.7	58.1	50.6	52.2	55	55	55	1.00	1.00	1.09	1.05				
3	115P06514	4 Evening	Weekday	US-95	Northbound	59.8	58.2	52.2	50.5	55	55	55	1.00	1.00	1.05	1.09				
3	115P06515	1 AM Peak	Weekday	US-95	Northbound	62.2	59.0	52.1	44.7	55	55	55	1.00	1.00	1.06	1.23	1.00	1.00	1.11	1.23
3	115P06515	2 Mid Day	Weekday	US-95	Northbound	61.8	60.5	49.6	53.6	55	55	55	1.00	1.00	1.11	1.03				
3	115P06515	3 PM Peak	Weekday	US-95	Northbound	61.6	60.2	49.9	51.8	55	55	55	1.00	1.00	1.10	1.06				
3	115P06515	4 Evening	Weekday	US-95	Northbound	61.9	59.8	52.1	47.9	55	55	55	1.00	1.00	1.06	1.15				
3	115P06516	1 AM Peak	Weekday	US-95	Northbound	62.4	60.6	50.3	48.5	65	65	65	1.04	1.07	1.29	1.34	1.04	1.07	1.29	1.34
3	115P06516	2 Mid Day	Weekday	US-95	Northbound	62.9	61.1	50.3	52.5	65	65	65	1.03	1.06	1.29	1.24				
3	115P06516	3 PM Peak	Weekday	US-95	Northbound	63.6	61.1	55.3	55.0	65	65	65	1.02	1.06	1.17	1.18				
3	115P06516	4 Evening	Weekday	US-95	Northbound	62.8	60.9	52.8	53.5	65	65	65	1.03	1.07	1.23	1.22				
3	115P06517	1 AM Peak	Weekday	US-95	Northbound	63.8	63.2	52.2	59.2	65	65	65	1.02	1.03	1.25	1.10	1.02	1.05	1.25	1.17
3	115P06517	2 Mid Day	Weekday	US-95	Northbound	64.6	62.2	54.4	55.5	65	65	65	1.01	1.04	1.20	1.17				
3	115P06517	3 PM Peak	Weekday	US-95	Northbound	65.2	62.2	56.2	56.6	65	65	65	1.00	1.05	1.16	1.15				
3	115P06517	4 Evening	Weekday	US-95	Northbound	64.7	62.4	55.3	56.4	65	65	65	1.00	1.04	1.18	1.15				
4	115P06518	1 AM Peak	Weekday	US-95	Northbound	63.4	62.8	53.3	58.1	65	65	65	1.03	1.04	1.22	1.12	1.03	1.05	1.22	1.17
4	115P06518	2 Mid Day	Weekday	US-95	Northbound	64.6	61.9	55.3	55.3	65	65	65	1.01	1.05	1.17	1.17				
4	115P06518	3 PM Peak	Weekday	US-95	Northbound	65.0	61.7	57.7	55.9	65	65	65	1.00	1.05	1.13	1.16				
4	115P06518	4 Evening	Weekday	US-95	Northbound	64.7	62.2	56.6	56.6	65	65	65	1.01	1.04	1.15	1.15				
4	115P06519	1 AM Peak	Weekday	US-95	Northbound	48.3	42.8	15.9	2.5	65	65	65	1.34	1.52	4.10	26.15	1.34	1.52	9.51	26.15
4	115P06519	2 Mid Day	Weekday	US-95	Northbound	50.3	45.3	11.2	11.8	65	65	65	1.29	1.43	5.81	5.50				
4	115P06519	3 PM Peak	Weekday	US-95	Northbound	48.5	45.3	6.8	11.8	65	65	65	1.34	1.43	9.51	5.50				
4	115P06519	4 Evening	Weekday	US-95	Northbound	47.1	44.9	5.6	13.7		0	0	1.00	1.00	1.00	1.00				

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
5	115P05970	1 AM Peak	Weekday	US-95	Northbound	66.4	63.6	58.5	60.3	65	65	65	1.00	1.02	1.11	1.08	1.00	1.04	1.12	1.14
5	115P05970	2 Mid Day	Weekday	US-95	Northbound	66.9	62.9	58.0	57.2	65	65	65	1.00	1.03	1.12	1.14				
5	115P05970	3 PM Peak	Weekday	US-95	Northbound	67.0	62.8	57.8	58.5	65	65	65	1.00	1.04	1.12	1.11				
5	115P05970	4 Evening	Weekday	US-95	Northbound	65.8	62.8	58.5	57.2	65	65	65	1.00	1.04	1.11	1.14				
5	115P06520	1 AM Peak	Weekday	US-95	Northbound	65.5	63.3	57.7	59.9	65	65	65	1.00	1.03	1.13	1.08	1.00	1.04	1.15	1.15
5	115P06520	2 Mid Day	Weekday	US-95	Northbound	66.7	63.2	57.7	58.5	65	65	65	1.00	1.03	1.13	1.11				
5	115P06520	3 PM Peak	Weekday	US-95	Northbound	66.0	62.4	56.6	56.6	65	65	65	1.00	1.04	1.15	1.15				
5	115P06520	4 Evening	Weekday	US-95	Northbound	65.9	62.4	57.6	56.7	65	65	65	1.00	1.04	1.13	1.15				
5	115P06521	1 AM Peak	Weekday	US-95	Northbound	66.8	63.7	58.4	60.1	65	65	65	1.00	1.02	1.11	1.08	1.00	1.03	1.11	1.11
5	115P06521	2 Mid Day	Weekday	US-95	Northbound	67.7	63.3	58.4	58.4	65	65	65	1.00	1.03	1.11	1.11				
5	115P06521	3 PM Peak	Weekday	US-95	Northbound	67.5	63.1	58.4	59.0	65	65	65	1.00	1.03	1.11	1.10				
5	115P06521	4 Evening	Weekday	US-95	Northbound	67.1	63.0	59.9	58.4	65	65	65	1.00	1.03	1.09	1.11				
6	115P05971	1 AM Peak	Weekday	US-95	Northbound	57.4	55.2	33.5	28.7	35	35	35	1.00	1.00	1.04	1.22	1.00	1.00	1.94	1.91
6	115P05971	2 Mid Day	Weekday	US-95	Northbound	54.2	52.2	18.0	18.3	35	35	35	1.00	1.00	1.94	1.91				
6	115P05971	3 PM Peak	Weekday	US-95	Northbound	53.8	51.8	20.5	22.4	35	35	35	1.00	1.00	1.71	1.56				
6	115P05971	4 Evening	Weekday	US-95	Northbound	55.8	52.5	28.9	24.9	35	35	35	1.00	1.00	1.21	1.41				
6	115P06434	1 AM Peak	Weekday	AZ-95	Northbound	16.6	13.3	5.1	7.3	35	35	35	2.11	2.63	6.90	4.80	2.27	2.63	18.91	5.10
6	115P06434	2 Mid Day	Weekday	AZ-95	Northbound	16.7	15.2	5.6	7.3	35	35	35	2.09	2.30	6.30	4.80				
6	115P06434	3 PM Peak	Weekday	AZ-95	Northbound	15.5	14.6	1.9	9.7	35	35	35	2.26	2.40	18.91	3.60				
6	115P06434	4 Evening	Weekday	AZ-95	Northbound	15.4	14.4	5.1	6.9	35	35	35	2.27	2.43	6.90	5.10				
6	115P06435	1 AM Peak	Weekday	AZ-95	Northbound	39.4	37.7	21.8	20.5	45	45	45	1.14	1.19	2.07	2.20	1.18	1.22	2.41	2.68
6	115P06435	2 Mid Day	Weekday	AZ-95	Northbound	39.0	39.0	18.7	23.6	45	45	45	1.15	1.16	2.41	1.90				
6	115P06435	3 PM Peak	Weekday	AZ-95	Northbound	40.1	38.0	24.9	20.5	45	45	45	1.12	1.18	1.81	2.20				
6	115P06435	4 Evening	Weekday	AZ-95	Northbound	38.3	36.9	20.5	16.8	45	45	45	1.18	1.22	2.20	2.68				
7	115P06436	1 AM Peak	Weekday	AZ-95	Northbound	59.8	56.8	48.4	37.3	65	65	65	1.09	1.15	1.34	1.74	1.11	1.15	1.47	1.74
7	115P06436	2 Mid Day	Weekday	AZ-95	Northbound	59.0	57.3	46.6	45.4	65	65	65	1.10	1.13	1.40	1.43				
7	115P06436	3 PM Peak	Weekday	AZ-95	Northbound	59.0	57.7	47.8	46.1	65	65	65	1.10	1.13	1.36	1.41				
7	115P06436	4 Evening	Weekday	AZ-95	Northbound	58.4	57.7	44.1	46.6	65	65	65	1.11	1.13	1.47	1.40				
7	115P06437	1 AM Peak	Weekday	AZ-95	Northbound	64.5	62.4	56.3	56.0	65	65	65	1.01	1.04	1.16	1.16	1.01	1.05	1.16	1.17
7	115P06437	2 Mid Day	Weekday	AZ-95	Northbound	64.7	61.9	56.5	55.4	65	65	65	1.00	1.05	1.15	1.17				
7	115P06437	3 PM Peak	Weekday	AZ-95	Northbound	65.2	62.0	58.0	55.4	65	65	65	1.00	1.05	1.12	1.17				
7	115P06437	4 Evening	Weekday	AZ-95	Northbound	64.5	62.4	56.5	55.4	65	65	65	1.01	1.04	1.15	1.17				
8	115P05929	1 AM Peak	Weekday	AZ-95	Northbound	62.3	59.0	41.6	33.3	55	55	55	1.00	1.00	1.32	1.65	1.00	1.00	1.62	1.67
8	115P05929	2 Mid Day	Weekday	AZ-95	Northbound	62.0	58.3	39.8	36.4	55	55	55	1.00	1.00	1.38	1.51				
8	115P05929	3 PM Peak	Weekday	AZ-95	Northbound	61.5	58.5	33.9	33.3	55	55	55	1.00	1.00	1.62	1.65				
8	115P05929	4 Evening	Weekday	AZ-95	Northbound	61.1	58.8	35.4	33.0	55	55	55	1.00	1.00	1.55	1.67				
8	115P06658	1 AM Peak	Weekday	AZ-95	Northbound	54.7	52.0	31.7	21.7	55	55	55	1.00	1.06	1.74	2.53	1.00	1.08	1.80	2.76

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
8	115P06658	2 Mid Day	Weekday	AZ-95	Northbound	55.3	52.5	36.6	27.3	55	55	55	1.00	1.05	1.50	2.01				
8	115P06658	3 PM Peak	Weekday	AZ-95	Northbound	55.5	52.6	37.9	25.3	55	55	55	1.00	1.05	1.45	2.17				
8	115P06658	4 Evening	Weekday	AZ-95	Northbound	54.8	50.8	30.5	19.9	55	55	55	1.00	1.08	1.80	2.76				
9	115P05930	1 AM Peak	Weekday	AZ-95	Northbound	20.0	20.5	1.9	2.5	35	35	35	1.75	1.71	18.77	14.07	1.85	2.07	18.77	18.77
9	115P05930	2 Mid Day	Weekday	AZ-95	Northbound	18.9	17.1	2.1	1.9	35	35	35	1.85	2.05	16.57	18.77				
9	115P05930	3 PM Peak	Weekday	AZ-95	Northbound	20.8	16.9	2.3	1.9	35	35	35	1.68	2.07	15.02	18.77				
9	115P05930	4 Evening	Weekday	AZ-95	Northbound	22.7	22.0	2.0	3.7	35	35	35	1.54	1.59	17.52	9.36				
9	115P06438	1 AM Peak	Weekday	AZ-95	Northbound	58.2	56.9	47.8	47.4	55	55	55	1.00	1.00	1.15	1.16	1.00	1.00	1.20	1.21
9	115P06438	2 Mid Day	Weekday	AZ-95	Northbound	57.3	56.0	46.0	45.3	55	55	55	1.00	1.00	1.20	1.21				
9	115P06438	3 PM Peak	Weekday	AZ-95	Northbound	58.4	56.9	48.7	48.7	55	55	55	1.00	1.00	1.13	1.13				
9	115P06438	4 Evening	Weekday	AZ-95	Northbound	59.1	57.0	49.7	48.6	55	55	55	1.00	1.00	1.11	1.13				
9	115P06440	1 AM Peak	Weekday	AZ-95	Northbound	33.6	32.3	7.5	12.4	35	35	35	1.04	1.08	4.69	2.82	1.07	1.14	4.69	2.82
9	115P06440	2 Mid Day	Weekday	AZ-95	Northbound	33.8	33.2	10.6	16.0	35	35	35	1.04	1.05	3.31	2.19				
9	115P06440	3 PM Peak	Weekday	AZ-95	Northbound	34.8	33.1	13.6	15.6	35	35	35	1.01	1.06	2.57	2.25				
9	115P06440	4 Evening	Weekday	AZ-95	Northbound	32.6	30.8	8.7	12.4	35	35	35	1.07	1.14	4.02	2.82				
9	115P06441	1 AM Peak	Weekday	AZ-95	Northbound	42.5	38.7	12.4	10.3	55	55	55	1.30	1.42	4.42	5.36	1.31	1.42	4.74	5.36
9	115P06441	2 Mid Day	Weekday	AZ-95	Northbound	42.4	39.3	14.9	10.6	55	55	55	1.30	1.40	3.69	5.21				
9	115P06441	3 PM Peak	Weekday	AZ-95	Northbound	43.9	39.4	15.5	10.6	55	55	55	1.25	1.40	3.54	5.21				
9	115P06441	4 Evening	Weekday	AZ-95	Northbound	42.1	39.4	11.6	10.6	55	55	55	1.31	1.40	4.74	5.21				
10	115P06442	1 AM Peak	Weekday	AZ-95	Northbound	56.1	53.3	41.3	41.5	45	45	45	1.00	1.00	1.09	1.08	1.00	1.00	1.11	1.13
10	115P06442	2 Mid Day	Weekday	AZ-95	Northbound	55.8	53.4	40.7	41.0	45	45	45	1.00	1.00	1.11	1.10				
10	115P06442	3 PM Peak	Weekday	AZ-95	Northbound	57.2	53.2	46.0	39.8	45	45	45	1.00	1.00	1.00	1.13				
10	115P06442	4 Evening	Weekday	AZ-95	Northbound	55.9	53.1	43.2	41.6	45	45	45	1.00	1.00	1.04	1.08				
10	115P06443	1 AM Peak	Weekday	AZ-95	Northbound	51.5	47.4	40.1	37.3	55	55	55	1.07	1.16	1.37	1.47	1.12	1.20	1.45	1.68
10	115P06443	2 Mid Day	Weekday	AZ-95	Northbound	49.3	47.0	37.9	36.4	55	55	55	1.12	1.17	1.45	1.51				
10	115P06443	3 PM Peak	Weekday	AZ-95	Northbound	51.6	47.0	40.4	36.1	55	55	55	1.07	1.17	1.36	1.52				
10	115P06443	4 Evening	Weekday	AZ-95	Northbound	50.0	45.7	38.6	32.6	55	55	55	1.10	1.20	1.43	1.68				
11	115P06444	1 AM Peak	Weekday	AZ-95	Northbound	62.3	56.1	50.3	44.7	65	65	65	1.04	1.16	1.29	1.45	1.08	1.18	1.36	1.56
11	115P06444	2 Mid Day	Weekday	AZ-95	Northbound	60.0	56.2	47.9	43.7	65	65	65	1.08	1.16	1.36	1.49				
11	115P06444	3 PM Peak	Weekday	AZ-95	Northbound	61.7	56.2	50.3	43.5	65	65	65	1.05	1.16	1.29	1.49				
11	115P06444	4 Evening	Weekday	AZ-95	Northbound	60.8	54.9	47.9	41.7	65	65	65	1.07	1.18	1.36	1.56				
12	115P06445	1 AM Peak	Weekday	AZ-95	Northbound	62.5	57.5	43.7	43.5	55	55	55	1.00	1.00	1.26	1.26	1.00	1.00	1.56	1.39
12	115P06445	2 Mid Day	Weekday	AZ-95	Northbound	60.4	57.2	41.6	40.2	55	55	55	1.00	1.00	1.32	1.37				
12	115P06445	3 PM Peak	Weekday	AZ-95	Northbound	62.7	56.7	47.6	39.5	55	55	55	1.00	1.00	1.16	1.39				
12	115P06445	4 Evening	Weekday	AZ-95	Northbound	59.6	57.9	35.2	46.6	55	55	55	1.00	1.00	1.56	1.18				
12	115P06446	1 AM Peak	Weekday	AZ-95	Northbound	45.9	40.2	18.6	16.8	55	55	55	1.20	1.37	2.95	3.28	1.30	1.39	4.43	3.28
12	115P06446	2 Mid Day	Weekday	AZ-95	Northbound	42.2	39.7	12.4	16.8	55	55	55	1.30	1.39	4.43	3.28				

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
12	115P06446	3 PM Peak	Weekday	AZ-95	Northbound	44.1	39.7	13.7	19.9	55	55	55	1.25	1.38	4.03	2.77				
12	115P06446	4 Evening	Weekday	AZ-95	Northbound	45.2	45.3	16.8	25.1	55	55	55	1.22	1.21	3.28	2.19				
12	115P06447	1 AM Peak	Weekday	AZ-95	Northbound	46.1	42.5	15.5	20.5	55	55	55	1.19	1.29	3.54	2.68	1.23	1.34	3.54	2.86
12	115P06447	2 Mid Day	Weekday	AZ-95	Northbound	44.7	41.3	18.7	19.2	55	55	55	1.23	1.33	2.95	2.86				
12	115P06447	3 PM Peak	Weekday	AZ-95	Northbound	46.1	41.0	18.7	19.9	55	55	55	1.19	1.34	2.95	2.77				
12	115P06447	4 Evening	Weekday	AZ-95	Northbound	45.7	46.0	19.9	25.5	55	55	55	1.20	1.20	2.77	2.16				
12	115P06448	1 AM Peak	Weekday	AZ-95	Northbound	52.7	50.0	29.8	35.5	55	55	55	1.04	1.10	1.85	1.55	1.08	1.11	1.85	1.64
12	115P06448	2 Mid Day	Weekday	AZ-95	Northbound	51.0	49.6	30.0	33.5	55	55	55	1.08	1.11	1.84	1.64				
12	115P06448	3 PM Peak	Weekday	AZ-95	Northbound	51.9	49.5	31.6	35.2	55	55	55	1.06	1.11	1.74	1.56				
12	115P06448	4 Evening	Weekday	AZ-95	Northbound	53.0	52.2	33.5	39.6	55	55	55	1.04	1.05	1.64	1.39				
12	115P06449	1 AM Peak	Weekday	AZ-95	Northbound	45.6	40.3	5.6	7.5	45	45	45	1.00	1.12	8.04	6.03	1.06	1.13	8.04	8.04
12	115P06449	2 Mid Day	Weekday	AZ-95	Northbound	43.2	39.8	9.9	5.6	45	45	45	1.04	1.13	4.53	8.04				
12	115P06449	3 PM Peak	Weekday	AZ-95	Northbound	42.6	40.1	6.2	8.3	45	45	45	1.06	1.12	7.24	5.44				
12	115P06449	4 Evening	Weekday	AZ-95	Northbound	47.7	45.9	16.8	22.4	45	45	45	1.00	1.00	2.68	2.01				
12	115P06450	1 AM Peak	Weekday	AZ-95	Northbound	34.4	29.1	8.7	7.5	45	45	45	1.31	1.55	5.18	6.03	1.55	1.68	8.04	8.04
12	115P06450	2 Mid Day	Weekday	AZ-95	Northbound	29.1	27.6	6.5	6.8	45	45	45	1.55	1.63	6.89	6.58				
12	115P06450	3 PM Peak	Weekday	AZ-95	Northbound	30.1	26.8	5.6	5.6	45	45	45	1.49	1.68	8.04	8.04				
12	115P06450	4 Evening	Weekday	AZ-95	Northbound	35.6	33.5	8.7	11.8	45	45	45	1.26	1.34	5.18	3.81				
12	115P06451	1 AM Peak	Weekday	AZ-95	Northbound	38.0	33.5	11.8	9.9	45	45	45	1.18	1.34	3.81	4.53	1.37	1.43	6.03	4.82
12	115P06451	2 Mid Day	Weekday	AZ-95	Northbound	32.9	31.5	8.7	10.5	45	45	45	1.37	1.43	5.17	4.27				
12	115P06451	3 PM Peak	Weekday	AZ-95	Northbound	33.9	31.9	7.5	9.3	45	45	45	1.33	1.41	6.03	4.82				
12	115P06451	4 Evening	Weekday	AZ-95	Northbound	36.3	36.7	9.9	16.1	45	45	45	1.24	1.23	4.53	2.79				
12	115P06452	1 AM Peak	Weekday	AZ-95	Northbound	37.7	35.3	11.8	15.4	45	45	45	1.19	1.27	3.81	2.93	1.30	1.34	4.26	3.95
12	115P06452	2 Mid Day	Weekday	AZ-95	Northbound	34.7	33.5	11.8	11.4	45	45	45	1.30	1.34	3.81	3.95				
12	115P06452	3 PM Peak	Weekday	AZ-95	Northbound	35.9	33.9	10.6	11.8	45	45	45	1.25	1.33	4.26	3.81				
12	115P06452	4 Evening	Weekday	AZ-95	Northbound	39.7	37.9	18.7	16.8	45	45	45	1.13	1.19	2.41	2.68				
12	115P06453	1 AM Peak	Weekday	AZ-95	Northbound	34.7	32.1	7.5	5.6	45	45	45	1.30	1.40	6.03	8.04	1.42	1.60	8.04	18.11
12	115P06453	2 Mid Day	Weekday	AZ-95	Northbound	31.7	28.4	5.6	3.7	45	45	45	1.42	1.58	8.04	12.05				
12	115P06453	3 PM Peak	Weekday	AZ-95	Northbound	32.0	28.1	5.6	2.5	45	45	45	1.41	1.60	8.04	18.11				
12	115P06453	4 Evening	Weekday	AZ-95	Northbound	39.0	37.3	12.4	10.0	45	45	45	1.15	1.21	3.62	4.52				
12	115P06454	1 AM Peak	Weekday	AZ-95	Northbound	41.9	36.6	15.5	13.9	45	45	45	1.07	1.23	2.90	3.24	1.16	1.26	3.29	3.29
12	115P06454	2 Mid Day	Weekday	AZ-95	Northbound	38.9	36.2	14.9	15.5	45	45	45	1.16	1.24	3.01	2.90				
12	115P06454	3 PM Peak	Weekday	AZ-95	Northbound	39.2	35.8	13.7	13.7	45	45	45	1.15	1.26	3.29	3.29				
12	115P06454	4 Evening	Weekday	AZ-95	Northbound	43.4	41.2	23.0	23.7	45	45	45	1.04	1.09	1.95	1.90				
12	115P06455	1 AM Peak	Weekday	AZ-95	Northbound	50.1	45.2	28.6	19.9	55	55	55	1.10	1.22	1.92	2.77	1.18	1.24	2.68	2.77
12	115P06455	2 Mid Day	Weekday	AZ-95	Northbound	46.5	44.3	24.9	21.5	55	55	55	1.18	1.24	2.21	2.56				
12	115P06455	3 PM Peak	Weekday	AZ-95	Northbound	47.9	45.2	23.6	22.4	55	55	55	1.15	1.22	2.33	2.46				

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
12	115P06455	4 Evening	Weekday	AZ-95	Northbound	48.6	48.8	20.5	26.7	55	55	55	1.13	1.13	2.68	2.06				
13	115P05931	1 AM Peak	Weekday	AZ-95	Northbound	45.1	24.5	9.9	8.3	35	35	35	1.00	1.43	3.52	4.23	1.05	1.44	6.26	4.66
13	115P05931	2 Mid Day	Weekday	AZ-95	Northbound	46.6	28.5	9.9	9.6	35	35	35	1.00	1.23	3.52	3.63				
13	115P05931	3 PM Peak	Weekday	AZ-95	Northbound	43.5	28.3	8.7	8.7	35	35	35	1.00	1.24	4.02	4.02				
13	115P05931	4 Evening	Weekday	AZ-95	Northbound	33.5	24.3	5.6	7.5	35	35	35	1.05	1.44	6.26	4.66				
13	115P06456	1 AM Peak	Weekday	AZ-95	Northbound	64.0	56.9	52.4	45.7	65	65	65	1.02	1.14	1.24	1.42	1.07	1.17	1.63	1.52
13	115P06456	2 Mid Day	Weekday	AZ-95	Northbound	62.5	57.4	49.1	46.0	65	65	65	1.04	1.13	1.32	1.41				
13	115P06456	3 PM Peak	Weekday	AZ-95	Northbound	62.8	58.0	49.1	46.9	65	65	65	1.03	1.12	1.32	1.39				
13	115P06456	4 Evening	Weekday	AZ-95	Northbound	61.0	55.6	39.8	42.8	65	65	65	1.07	1.17	1.63	1.52				

Car TTI and PTI/Truck TTTI and TPTI – Southbound/Westbound

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
1	115N06511	1 AM Peak	Weekday	US-95	Southbound	45.4	47.2	10.6	21.8	55	55	55	1.21	1.16	5.21	2.53	1.21	1.29	5.21	4.42
1	115N06511	2 Mid Day	Weekday	US-95	Southbound	46.4	44.9	16.8	12.4	55	55	55	1.18	1.23	3.28	4.42				
1	115N06511	3 PM Peak	Weekday	US-95	Southbound	47.8	45.1	15.5	14.3	55	55	55	1.15	1.22	3.54	3.85				
1	115N06511	4 Evening	Weekday	US-95	Southbound	48.1	42.5	15.5	13.7	55	55	55	1.14	1.29	3.54	4.02				
1	115N06512	1 AM Peak	Weekday	US-95	Southbound	50.1	50.8	21.1	24.9	55	55	55	1.10	1.08	2.60	2.21	1.10	1.08	2.60	2.21
1	115N06512	2 Mid Day	Weekday	US-95	Southbound	51.5	51.6	24.9	29.0	55	55	55	1.07	1.07	2.21	1.90				
1	115N06512	3 PM Peak	Weekday	US-95	Southbound	52.2	52.0	28.8	30.5	55	55	55	1.05	1.06	1.91	1.81				
1	115N06512	4 Evening	Weekday	US-95	Southbound	52.2	52.2	25.3	31.7	55	55	55	1.05	1.05	2.18	1.73				
2	115N06513	1 AM Peak	Weekday	US-95	Southbound	60.7	58.8	48.5	47.1	55	55	55	1.00	1.00	1.13	1.17	1.00	1.00	1.14	1.17
2	115N06513	2 Mid Day	Weekday	US-95	Southbound	60.6	58.6	50.0	47.2	55	55	55	1.00	1.00	1.10	1.16				
2	115N06513	3 PM Peak	Weekday	US-95	Southbound	60.6	58.9	48.1	49.8	55	55	55	1.00	1.00	1.14	1.11				
2	115N06513	4 Evening	Weekday	US-95	Southbound	62.5	59.0	50.9	49.8	55	55	55	1.00	1.00	1.08	1.11				
3	115N06514	1 AM Peak	Weekday	US-95	Southbound	63.1	59.5	48.4	46.7	55	55	55	1.00	1.00	1.14	1.18	1.00	1.00	1.14	1.18
3	115N06514	2 Mid Day	Weekday	US-95	Southbound	62.8	59.3	51.0	47.9	55	55	55	1.00	1.00	1.08	1.15				
3	115N06514	3 PM Peak	Weekday	US-95	Southbound	63.9	61.2	53.6	55.5	55	55	55	1.00	1.00	1.03	1.00				
3	115N06514	4 Evening	Weekday	US-95	Southbound	64.8	60.9	53.6	52.1	55	55	55	1.00	1.00	1.03	1.06				
3	115N06515	1 AM Peak	Weekday	US-95	Southbound	65.3	58.7	52.2	35.4	55	55	55	1.00	1.00	1.05	1.55	1.00	1.00	1.12	1.55
3	115N06515	2 Mid Day	Weekday	US-95	Southbound	63.8	59.9	49.1	41.6	55	55	55	1.00	1.00	1.12	1.32				
3	115N06515	3 PM Peak	Weekday	US-95	Southbound	65.3	61.7	53.5	56.0	55	55	55	1.00	1.00	1.03	1.00				
3	115N06515	4 Evening	Weekday	US-95	Southbound	65.7	60.6	56.7	49.7	55	55	55	1.00	1.00	1.00	1.11				
3	115N06516	1 AM Peak	Weekday	US-95	Southbound	66.2	61.4	57.7	54.7	65	65	65	1.00	1.06	1.13	1.19	1.01	1.06	1.23	1.21
3	115N06516	2 Mid Day	Weekday	US-95	Southbound	64.2	61.2	52.8	53.5	65	65	65	1.01	1.06	1.23	1.21				
3	115N06516	3 PM Peak	Weekday	US-95	Southbound	65.4	62.4	53.2	57.1	65	65	65	1.00	1.04	1.22	1.14				
3	115N06516	4 Evening	Weekday	US-95	Southbound	66.0	62.2	56.6	56.6	65	65	65	1.00	1.05	1.15	1.15				
3	115N06517	1 AM Peak	Weekday	US-95	Southbound	66.7	62.2	59.7	55.1	65	65	65	1.00	1.05	1.09	1.18	1.00	1.06	1.14	1.19
3	115N06517	2 Mid Day	Weekday	US-95	Southbound	65.5	61.7	57.0	55.4	65	65	65	1.00	1.05	1.14	1.17				
3	115N06517	3 PM Peak	Weekday	US-95	Southbound	66.7	61.1	59.7	55.0	65	65	65	1.00	1.06	1.09	1.18				
3	115N06517	4 Evening	Weekday	US-95	Southbound	65.9	61.9	57.2	54.7	65	65	65	1.00	1.05	1.14	1.19				
4	115N06518	1 AM Peak	Weekday	US-95	Southbound	60.6	55.6	41.7	34.8	65	65	65	1.07	1.17	1.56	1.87	1.08	1.17	1.63	1.87
4	115N06518	2 Mid Day	Weekday	US-95	Southbound	60.3	56.6	39.8	36.7	65	65	65	1.08	1.15	1.63	1.77				
4	115N06518	3 PM Peak	Weekday	US-95	Southbound	61.7	57.2	41.7	40.6	65	65	65	1.05	1.14	1.56	1.60				
4	115N06518	4 Evening	Weekday	US-95	Southbound	60.6	56.7	40.4	37.3	65	65	65	1.07	1.15	1.61	1.74				
4	115N06519	1 AM Peak	Weekday	US-95	Southbound	66.0	62.2	56.6	55.2	65	65	65	1.00	1.04	1.15	1.18	1.00	1.05	1.17	1.18
4	115N06519	2 Mid Day	Weekday	US-95	Southbound	65.5	62.3	56.6	56.6	65	65	65	1.00	1.04	1.15	1.15				
4	115N06519	3 PM Peak	Weekday	US-95	Southbound	66.5	62.4	57.6	57.2	65	65	65	1.00	1.04	1.13	1.14				
4	115N06519	4 Evening	Weekday	US-95	Southbound	65.7	62.1	55.6	56.6	65	65	65	1.00	1.05	1.17	1.15				

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
5	115N05970	1 AM Peak	Weekday	US-95	Southbound	55.5	53.4	30.4	26.7	65	65	65	1.17	1.22	2.13	2.43	1.18	1.23	2.28	2.58
5	115N05970	2 Mid Day	Weekday	US-95	Southbound	55.2	53.7	28.5	25.2	65	65	65	1.18	1.21	2.28	2.58				
5	115N05970	3 PM Peak	Weekday	US-95	Southbound	56.4	53.3	32.9	26.3	65	65	65	1.15	1.22	1.97	2.47				
5	115N05970	4 Evening	Weekday	US-95	Southbound	55.1	53.0	30.1	29.8	65	65	65	1.18	1.23	2.16	2.18				
5	115N06520	1 AM Peak	Weekday	US-95	Southbound	66.6	62.0	58.4	55.2	65	65	65	1.00	1.05	1.11	1.18	1.00	1.05	1.15	1.18
5	115N06520	2 Mid Day	Weekday	US-95	Southbound	65.7	62.3	57.8	56.5	65	65	65	1.00	1.04	1.12	1.15				
5	115N06520	3 PM Peak	Weekday	US-95	Southbound	66.7	61.9	57.8	56.5	65	65	65	1.00	1.05	1.12	1.15				
5	115N06520	4 Evening	Weekday	US-95	Southbound	66.0	61.8	56.5	55.2	65	65	65	1.00	1.05	1.15	1.18				
5	115N06521	1 AM Peak	Weekday	US-95	Southbound	65.1	61.5	56.6	55.2	65	65	65	1.00	1.06	1.15	1.18	1.01	1.06	1.21	1.19
5	115N06521	2 Mid Day	Weekday	US-95	Southbound	65.0	61.9	56.9	55.5	65	65	65	1.00	1.05	1.14	1.17				
5	115N06521	3 PM Peak	Weekday	US-95	Southbound	65.8	61.8	56.6	56.6	65	65	65	1.00	1.05	1.15	1.15				
5	115N06521	4 Evening	Weekday	US-95	Southbound	64.4	61.4	53.6	54.7	65	65	65	1.01	1.06	1.21	1.19				
6	115N05971	1 AM Peak	Weekday	US-95	Southbound	19.9	17.1	5.5	6.8	35	35	35	1.76	2.05	6.33	5.18	1.93	2.33	11.23	6.33
6	115N05971	2 Mid Day	Weekday	US-95	Southbound	18.1	16.2	3.1	5.5	35	35	35	1.93	2.15	11.23	6.33				
6	115N05971	3 PM Peak	Weekday	US-95	Southbound	20.4	15.0	5.1	7.6	35	35	35	1.72	2.33	6.91	4.61				
6	115N05971	4 Evening	Weekday	US-95	Southbound	21.1	15.6	6.8	6.8	35	35	35	1.66	2.25	5.18	5.18				
6	115N06434	1 AM Peak	Weekday	AZ-95	Southbound	38.3	37.3	9.9	16.4	35	35	35	1.00	1.00	3.52	2.14	1.00	1.00	4.02	3.52
6	115N06434	2 Mid Day	Weekday	AZ-95	Southbound	36.6	36.3	9.4	12.4	35	35	35	1.00	1.00	3.71	2.82				
6	115N06434	3 PM Peak	Weekday	AZ-95	Southbound	37.5	35.7	8.7	9.9	35	35	35	1.00	1.00	4.02	3.52				
6	115N06434	4 Evening	Weekday	AZ-95	Southbound	36.5	35.6	13.7	11.8	35	35	35	1.00	1.00	2.56	2.96				
6	115N06435	1 AM Peak	Weekday	AZ-95	Southbound	60.5	59.6	48.1	51.6	45	45	45	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	115N06435	2 Mid Day	Weekday	AZ-95	Southbound	59.8	58.4	48.4	49.7	45	45	45	1.00	1.00	1.00	1.00				
6	115N06435	3 PM Peak	Weekday	AZ-95	Southbound	60.2	58.8	48.7	50.4	45	45	45	1.00	1.00	1.00	1.00				
6	115N06435	4 Evening	Weekday	AZ-95	Southbound	59.3	57.9	46.6	47.2	45	45	45	1.00	1.00	1.00	1.00				
7	115N06436	1 AM Peak	Weekday	AZ-95	Southbound	64.5	61.5	55.1	52.4	65	65	65	1.01	1.06	1.18	1.24	1.01	1.06	1.18	1.24
7	115N06436	2 Mid Day	Weekday	AZ-95	Southbound	64.7	62.1	56.5	55.6	65	65	65	1.00	1.05	1.15	1.17				
7	115N06436	3 PM Peak	Weekday	AZ-95	Southbound	65.0	62.2	57.8	56.5	65	65	65	1.00	1.04	1.12	1.15				
7	115N06436	4 Evening	Weekday	AZ-95	Southbound	64.6	62.2	56.0	54.6	65	65	65	1.01	1.04	1.16	1.19				
7	115N06437	1 AM Peak	Weekday	AZ-95	Southbound	61.1	58.4	41.6	37.6	65	65	65	1.06	1.11	1.56	1.73	1.08	1.12	1.67	1.76
7	115N06437	2 Mid Day	Weekday	AZ-95	Southbound	61.1	58.3	41.6	37.3	65	65	65	1.06	1.11	1.56	1.74				
7	115N06437	3 PM Peak	Weekday	AZ-95	Southbound	61.3	57.8	42.9	36.9	65	65	65	1.06	1.12	1.51	1.76				
7	115N06437	4 Evening	Weekday	AZ-95	Southbound	60.2	58.7	38.9	38.5	65	65	65	1.08	1.11	1.67	1.69				
8	115N05929	1 AM Peak	Weekday	AZ-95	Southbound	55.4	54.1	36.6	34.8	55	55	55	1.00	1.02	1.50	1.58	1.00	1.04	1.50	1.58
8	115N05929	2 Mid Day	Weekday	AZ-95	Southbound	55.0	53.1	39.8	36.6	55	55	55	1.00	1.04	1.38	1.50				
8	115N05929	3 PM Peak	Weekday	AZ-95	Southbound	55.5	54.0	39.8	38.5	55	55	55	1.00	1.02	1.38	1.43				
8	115N05929	4 Evening	Weekday	AZ-95	Southbound	55.5	54.2	36.7	39.3	55	55	55	1.00	1.01	1.50	1.40				
8	115N06658	1 AM Peak	Weekday	AZ-95	Southbound	57.8	57.0	46.4	47.3	55	55	55	1.00	1.00	1.19	1.16	1.00	1.00	1.25	1.29
8	115N06658	2 Mid Day	Weekday	AZ-95	Southbound	56.8	55.9	44.1	42.6	55	55	55	1.00	1.00	1.25	1.29				

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
8	115N06658	3 PM Peak	Weekday	AZ-95	Southbound	57.8	56.6	47.8	46.6	55	55	55	1.00	1.00	1.15	1.18				
8	115N06658	4 Evening	Weekday	AZ-95	Southbound	58.2	57.5	48.5	49.6	55	55	55	1.00	1.00	1.13	1.11				
9	115N05930	1 AM Peak	Weekday	AZ-95	Southbound	43.7	37.1	15.5	5.6	35	35	35	1.00	1.00	2.25	6.26	1.00	1.00	3.31	7.04
9	115N05930	2 Mid Day	Weekday	AZ-95	Southbound	41.2	36.4	11.8	7.5	35	35	35	1.00	1.00	2.96	4.69				
9	115N05930	3 PM Peak	Weekday	AZ-95	Southbound	41.9	35.7	14.3	8.1	35	35	35	1.00	1.00	2.45	4.33				
9	115N05930	4 Evening	Weekday	AZ-95	Southbound	42.4	36.4	10.6	5.0	35	35	35	1.00	1.00	3.31	7.04				
9	115N06439	1 AM Peak	Weekday	AZ-95	Southbound	32.4	32.1	7.5	12.4	55	55	55	1.70	1.71	7.37	4.43	1.71	1.73	7.37	4.66
9	115N06439	2 Mid Day	Weekday	AZ-95	Southbound	32.2	33.8	8.7	16.7	55	55	55	1.71	1.63	6.32	3.29				
9	115N06439	3 PM Peak	Weekday	AZ-95	Southbound	35.2	34.1	15.6	17.4	55	55	55	1.56	1.61	3.53	3.15				
9	115N06439	4 Evening	Weekday	AZ-95	Southbound	33.1	31.7	10.6	11.8	55	55	55	1.66	1.73	5.20	4.66				
9	115N06440	1 AM Peak	Weekday	AZ-95	Southbound	24.9	24.1	5.6	11.8	35	35	35	1.41	1.45	6.26	2.98	1.47	1.54	6.26	4.01
9	115N06440	2 Mid Day	Weekday	AZ-95	Southbound	24.1	23.2	5.6	8.7	35	35	35	1.45	1.51	6.26	4.01				
9	115N06440	3 PM Peak	Weekday	AZ-95	Southbound	23.8	22.8	5.6	8.7	35	35	35	1.47	1.54	6.26	4.01				
9	115N06440	4 Evening	Weekday	AZ-95	Southbound	25.2	23.7	7.4	11.4	35	35	35	1.39	1.48	4.70	3.06				
9	115N06441	1 AM Peak	Weekday	AZ-95	Southbound	56.9	54.9	43.5	42.3	55	55	55	1.00	1.00	1.26	1.30	1.00	1.03	1.36	1.37
9	115N06441	2 Mid Day	Weekday	AZ-95	Southbound	56.2	54.0	40.4	40.2	55	55	55	1.00	1.02	1.36	1.37				
9	115N06441	3 PM Peak	Weekday	AZ-95	Southbound	56.6	53.4	44.1	40.4	55	55	55	1.00	1.03	1.25	1.36				
9	115N06441	4 Evening	Weekday	AZ-95	Southbound	57.1	54.7	46.0	43.8	55	55	55	1.00	1.00	1.20	1.26				
10	115N06442	1 AM Peak	Weekday	AZ-95	Southbound	51.9	49.8	40.4	40.7	45	45	45	1.00	1.00	1.11	1.11	1.00	1.00	1.23	1.14
10	115N06442	2 Mid Day	Weekday	AZ-95	Southbound	49.7	47.7	36.7	39.3	45	45	45	1.00	1.00	1.23	1.14				
10	115N06442	3 PM Peak	Weekday	AZ-95	Southbound	50.9	47.5	40.4	39.8	45	45	45	1.00	1.00	1.11	1.13				
10	115N06442	4 Evening	Weekday	AZ-95	Southbound	52.5	48.6	40.4	39.8	45	45	45	1.00	1.00	1.11	1.13				
10	115N06443	1 AM Peak	Weekday	AZ-95	Southbound	63.8	59.8	54.4	50.3	55	55	55	1.00	1.00	1.01	1.09	1.00	1.00	1.07	1.11
10	115N06443	2 Mid Day	Weekday	AZ-95	Southbound	62.6	58.9	51.6	49.4	55	55	55	1.00	1.00	1.07	1.11				
10	115N06443	3 PM Peak	Weekday	AZ-95	Southbound	63.5	59.0	52.8	49.7	55	55	55	1.00	1.00	1.04	1.11				
10	115N06443	4 Evening	Weekday	AZ-95	Southbound	63.7	60.3	52.8	50.3	55	55	55	1.00	1.00	1.04	1.09				
11	115N06444	1 AM Peak	Weekday	AZ-95	Southbound	63.3	59.5	48.2	45.4	65	65	65	1.03	1.09	1.35	1.43	1.05	1.10	1.61	1.55
11	115N06444	2 Mid Day	Weekday	AZ-95	Southbound	62.4	59.0	46.0	43.5	65	65	65	1.04	1.10	1.41	1.49				
11	115N06444	3 PM Peak	Weekday	AZ-95	Southbound	63.2	58.9	48.2	41.9	65	65	65	1.03	1.10	1.35	1.55				
11	115N06444	4 Evening	Weekday	AZ-95	Southbound	61.8	60.5	40.4	48.4	65	65	65	1.05	1.07	1.61	1.34				
12	115N06445	1 AM Peak	Weekday	AZ-95	Southbound	47.4	44.2	20.5	17.4	55	55	55	1.16	1.24	2.69	3.17	1.20	1.29	3.68	3.17
12	115N06445	2 Mid Day	Weekday	AZ-95	Southbound	46.3	42.9	18.3	20.7	55	55	55	1.19	1.28	3.00	2.65				
12	115N06445	3 PM Peak	Weekday	AZ-95	Southbound	45.9	42.6	14.9	22.4	55	55	55	1.20	1.29	3.68	2.45				
12	115N06445	4 Evening	Weekday	AZ-95	Southbound	48.8	47.3	23.0	27.4	55	55	55	1.13	1.16	2.39	2.01				
12	115N06446	1 AM Peak	Weekday	AZ-95	Southbound	47.4	43.3	19.3	22.4	55	55	55	1.16	1.27	2.86	2.45	1.19	1.31	3.69	2.95
12	115N06446	2 Mid Day	Weekday	AZ-95	Southbound	46.4	41.9	19.9	18.7	55	55	55	1.18	1.31	2.77	2.95				
12	115N06446	3 PM Peak	Weekday	AZ-95	Southbound	46.2	42.7	14.9	22.7	55	55	55	1.19	1.29	3.69	2.42				
12	115N06446	4 Evening	Weekday	AZ-95	Southbound	47.4	45.3	20.5	28.7	55	55	55	1.16	1.21	2.68	1.92				

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
12	115N06447	1 AM Peak	Weekday	AZ-95	Southbound	51.9	48.8	30.9	30.1	55	55	55	1.06	1.13	1.78	1.83	1.07	1.14	1.85	1.83
12	115N06447	2 Mid Day	Weekday	AZ-95	Southbound	51.9	48.9	30.9	31.6	55	55	55	1.06	1.13	1.78	1.74				
12	115N06447	3 PM Peak	Weekday	AZ-95	Southbound	51.6	48.4	29.8	30.1	55	55	55	1.07	1.14	1.85	1.83				
12	115N06447	4 Evening	Weekday	AZ-95	Southbound	51.5	50.4	30.5	38.4	55	55	55	1.07	1.09	1.80	1.43				
12	115N06448	1 AM Peak	Weekday	AZ-95	Southbound	48.9	48.9	25.4	29.8	55	55	55	1.13	1.12	2.16	1.84	1.16	1.16	2.42	2.21
12	115N06448	2 Mid Day	Weekday	AZ-95	Southbound	47.2	48.5	22.7	28.9	55	55	55	1.16	1.13	2.42	1.90				
12	115N06448	3 PM Peak	Weekday	AZ-95	Southbound	48.7	47.4	23.0	24.9	55	55	55	1.13	1.16	2.39	2.21				
12	115N06448	4 Evening	Weekday	AZ-95	Southbound	50.0	49.8	28.6	30.8	55	55	55	1.10	1.10	1.92	1.78				
12	115N06449	1 AM Peak	Weekday	AZ-95	Southbound	33.8	30.9	8.7	8.7	45	45	45	1.33	1.46	5.18	5.18	1.50	1.62	7.24	6.03
12	115N06449	2 Mid Day	Weekday	AZ-95	Southbound	30.0	28.3	6.8	7.5	45	45	45	1.50	1.59	6.58	6.03				
12	115N06449	3 PM Peak	Weekday	AZ-95	Southbound	30.2	27.8	6.2	8.7	45	45	45	1.49	1.62	7.24	5.18				
12	115N06449	4 Evening	Weekday	AZ-95	Southbound	35.4	35.3	10.0	12.4	45	45	45	1.27	1.28	4.52	3.62				
12	115N06450	1 AM Peak	Weekday	AZ-95	Southbound	38.5	35.9	11.8	10.5	45	45	45	1.17	1.25	3.81	4.27	1.28	1.37	6.03	6.58
12	115N06450	2 Mid Day	Weekday	AZ-95	Southbound	35.2	32.8	8.7	6.8	45	45	45	1.28	1.37	5.17	6.58				
12	115N06450	3 PM Peak	Weekday	AZ-95	Southbound	36.0	34.3	7.5	6.8	45	45	45	1.25	1.31	6.03	6.58				
12	115N06450	4 Evening	Weekday	AZ-95	Southbound	41.0	38.9	12.4	11.2	45	45	45	1.10	1.16	3.63	4.02				
12	115N06451	1 AM Peak	Weekday	AZ-95	Southbound	37.6	36.2	13.6	12.0	45	45	45	1.20	1.24	3.30	3.75	1.29	1.34	4.26	4.52
12	115N06451	2 Mid Day	Weekday	AZ-95	Southbound	34.9	33.5	11.4	9.9	45	45	45	1.29	1.34	3.96	4.52				
12	115N06451	3 PM Peak	Weekday	AZ-95	Southbound	35.4	33.5	10.6	12.4	45	45	45	1.27	1.34	4.26	3.62				
12	115N06451	4 Evening	Weekday	AZ-95	Southbound	41.7	39.9	17.4	18.0	45	45	45	1.08	1.13	2.59	2.51				
12	115N06452	1 AM Peak	Weekday	AZ-95	Southbound	36.9	33.0	14.3	10.6	45	45	45	1.22	1.36	3.15	4.26	1.34	1.48	4.52	6.03
12	115N06452	2 Mid Day	Weekday	AZ-95	Southbound	33.6	30.5	10.0	7.6	45	45	45	1.34	1.48	4.52	5.95				
12	115N06452	3 PM Peak	Weekday	AZ-95	Southbound	36.5	30.6	10.6	7.5	45	45	45	1.23	1.47	4.26	6.03				
12	115N06452	4 Evening	Weekday	AZ-95	Southbound	41.7	36.0	18.7	14.9	45	45	45	1.08	1.25	2.41	3.01				
12	115N06453	1 AM Peak	Weekday	AZ-95	Southbound	42.5	38.3	12.4	9.8	45	45	45	1.06	1.18	3.62	4.57	1.15	1.26	4.53	6.04
12	115N06453	2 Mid Day	Weekday	AZ-95	Southbound	39.0	35.8	9.9	7.5	45	45	45	1.15	1.26	4.53	6.04				
12	115N06453	3 PM Peak	Weekday	AZ-95	Southbound	41.1	36.8	11.5	11.8	45	45	45	1.10	1.22	3.92	3.82				
12	115N06453	4 Evening	Weekday	AZ-95	Southbound	45.9	42.4	18.0	17.4	45	45	45	1.00	1.06	2.50	2.59				
12	115N06454	1 AM Peak	Weekday	AZ-95	Southbound	47.5	43.6	22.7	17.4	45	45	45	1.00	1.03	1.98	2.59	1.01	1.12	2.07	3.20
12	115N06454	2 Mid Day	Weekday	AZ-95	Southbound	44.4	40.1	23.0	14.3	45	45	45	1.01	1.12	1.96	3.15				
12	115N06454	3 PM Peak	Weekday	AZ-95	Southbound	46.7	41.5	24.8	14.1	45	45	45	1.00	1.08	1.82	3.20				
12	115N06454	4 Evening	Weekday	AZ-95	Southbound	48.2	46.1	21.7	16.5	45	45	45	1.00	1.00	2.07	2.73				
12	115N06455	1 AM Peak	Weekday	AZ-95	Southbound	65.2	61.1	54.6	52.7	55	55	55	1.00	1.00	1.01	1.04	1.00	1.00	1.32	1.05
12	115N06455	2 Mid Day	Weekday	AZ-95	Southbound	64.1	60.7	53.4	52.2	55	55	55	1.00	1.00	1.03	1.05				
12	115N06455	3 PM Peak	Weekday	AZ-95	Southbound	65.1	61.0	54.0	53.4	55	55	55	1.00	1.00	1.02	1.03				
12	115N06455	4 Evening	Weekday	AZ-95	Southbound	63.5	61.5	41.6	52.6	55	55	55	1.00	1.00	1.32	1.05				
13	115N05931	1 AM Peak	Weekday	AZ-95	Southbound	20.8	15.9	7.5	7.5	35	35	35	1.68	2.20	4.70	4.70	2.18	2.43	5.07	5.81
13	115N05931	2 Mid Day	Weekday	AZ-95	Southbound	20.3	15.7	6.9	7.5	35	35	35	1.73	2.24	5.07	4.70				

Segment	TMC	timeperiod	week type	road number	road direction	cars mean	trucks mean	cars P05	trucks P05	Posted Speed limit	Assumed car free-flow speed	Assumed truck free-flow speed	cars TTI	Trucks TTI	cars PTI	Trucks PTI	Cars Peak TTI	Trucks Peak TTI	Cars Peak PTI	Trucks Peak PTI
13	115N05931	3 PM Peak	Weekday	AZ-95	Southbound	18.5	15.0	7.5	6.9	35	35	35	1.90	2.33	4.70	5.07				
13	115N05931	4 Evening	Weekday	AZ-95	Southbound	16.1	14.4	6.9	6.0	35	35	35	2.18	2.43	5.07	5.81				
13	115N06456	1 AM Peak	Weekday	AZ-95	Southbound	47.0	28.1	10.6	7.5	65	65	65	1.38	2.31	6.15	8.71	1.83	3.05	9.51	9.51
13	115N06456	2 Mid Day	Weekday	AZ-95	Southbound	48.0	27.8	10.6	7.4	65	65	65	1.35	2.34	6.15	8.79				
13	115N06456	3 PM Peak	Weekday	AZ-95	Southbound	48.1	26.1	9.9	7.5	65	65	65	1.35	2.49	6.54	8.71				
13	115N06456	4 Evening	Weekday	AZ-95	Southbound	35.4	21.3	6.8	6.8	65	65	65	1.83	3.05	9.51	9.51				

Closure Data

Segment	Length (miles)	# of closures	Total miles of closures		Average Occurrences/Mile/Year	
			NB	SB	NB	SB
95-1	5	10	9.2	3.0	0.37	0.12
95-2	9	8	7.0	1.0	0.16	0.02
95-3	17	2	6.0	0.0	0.07	0.00
95-4	20	4	3.0	1.0	0.03	0.01
95-5	24	7	1.0	7.0	0.01	0.06
95-6	2.5	1	0.0	1.0	0.00	0.08
95-7	20	15	37.0	8.0	0.37	0.08
95-8	11	7	2.0	15.0	0.04	0.27
95-9	7	19	18.0	1.0	0.51	0.03
95-10	13	18	11.5	10.2	0.18	0.16
95-11	14	28	12.0	20.6	0.17	0.29
95-12	14	35	32.0	6.4	0.46	0.09
95-13	12	17	9.0	8.0	0.15	0.13

	ITIS Category Description											
	Closures		Incidents/Accidents		Incidents/Crashes		Obstruction Hazards		Winds		Winter Storm Codes	
Segment	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
95-1	0	0	6	2	0	0	1	1	0	0	0	0
95-2	0	0	4	1	0	0	3	0	0	0	0	0
95-3	0	0	0	0	0	0	2	0	0	0	0	0
95-4	0	0	3	1	0	0	0	0	0	0	0	0
95-5	0	0	1	5	0	0	0	1	0	0	0	0
95-6	0	0	0	1	0	0	0	0	0	0	0	0
95-7	0	0	4	8	0	0	3	0	0	0	0	0
95-8	0	0	1	5	0	0	1	0	0	0	0	0
95-9	0	0	17	1	0	0	1	0	0	0	0	0
95-10	0	0	9	8	0	0	1	0	0	0	0	0
95-11	0	0	12	16	0	0	0	0	0	0	0	0
95-12	0	0	29	6	0	0	0	0	0	0	0	0
95-13	0	0	8	8	0	0	1	0	0	0	0	0

HPMS Data

Segment	Begin MP	End MP	NB/EB AADT	SB/WB AADT	2014 AADT	K Factor	D Factor	T Factor
95-1	29	34	4763	4717	9480	11%	50%	7%
95-2	34	43	3898	3883	7782	12%	50%	8%
95-3	43	60	1163	1143	2307	17%	51%	17%
95-4	60	80	788	765	1554	18%	51%	20%
95-5	80	104	849	827	1676	18%	51%	21%
95-6	104	111	1505	1453	2959	17%	52%	13%
95-7	111	131	1260	1302	2564	19%	51%	15%
95-8	131	142	2274	2274	4549	13%	50%	15%
95-9	142	149	4386	4934	9321	12%	52%	13%
95-10	149	162	2651	2634	5285	11%	50%	15%
95-11	162	176	2900	2727	5627	11%	52%	15%
95-12	176	190	7340	7018	14357	10%	51%	10%
95-13	190	202	4039	3882	7921	10%	51%	18%

SEGMENT	Loc ID	BMP	EMP	Length	Pos Dir AADT	Neg Dir AADT	Corrected Pos Dir AADT	Corrected Neg Dir AADT	2014 AADT	K Factor	D-Factor	D-Factor Adjusted	T-Factor
95-1	102156	29.38	29.85	0.47	6920	7701	6920	7701	14621	9	61	53	7
	102158	29.85	30.87	1.02	7443	7011	7443	7011	14454	8	60	51	7
	102160	30.87	31.87	1.00	6441	6005	6441	6005	12446	9	64	52	7
	102162	31.87	33.71	1.84	0	0	5355	5355	10710	10	67	50	7
	102163	33.71	40.51	6.80	0	0	3805	3805	7610	12	65	50	8
95-2	102163	33.71	40.51	6.80	0	0	3805	3805	7610	12	65	50	8
	102164	40.51	44.11	3.60	4074	4031	4074	4031	8106	13	62	50	8
95-3	102164	40.51	44.11	3.60	4074	4031	4074	4031	8106	13	62	50	8
	102165	44.11	46.72	2.61	3760	3824	2776	2776	5552	14	54	50	8
	102166	46.72	54.93	8.21	1367	1367	1367	1367	2734	15	50	50	6
	102167	54.93	98.57	43.64	788	765	788	765	1554	18	52	51	20
95-4	102167	54.93	98.57	43.64	788	765	788	765	1554	18	52	51	20
95-5	102167	54.93	98.57	43.64	788	765	788	765	1554	18	52	51	20
	102168	98.57	104.06	5.49	1333	1316	1333	1316	2650	19	52	50	25
95-6	102169	104.06	104.51	0.45	1938	0	1938	1938	3876	13	54	50	22
	101111	104.51	110.62	6.11	2318	1937	2318	1937	4255	10	57	54	8
	101113	110.62	131.69	21.07	1260	1302	1260	1302	2564	19	50	51	15
95-7	101113	110.62	131.69	21.07	1260	1302	1260	1302	2564	19	50	51	15
95-8	101114	131.69	139.78	8.09	0	0	1988	1988	3976	14	50	50	15
	101115	139.78	142.90	3.12	0	0	3016	3016	6032	10	51	50	15

SEGMENT	Loc ID	BMP	EMP	Length	Pos Dir AADT	Neg Dir AADT	Corrected Pos Dir AADT	Corrected Neg Dir AADT	2014 AADT	K Factor	D-Factor	D-Factor Adjusted	T-Factor
95-9	101116	142.90	143.93	1.03	5774	6664	5774	6664	12438	10	51	54	8
	101118	143.93	144.48	0.55	7949	9916	7949	9916	17865	10	51	56	8
	101120	144.48	145.58	1.10	5885	5815	5885	5815	11702	11	60	50	8
	101122	145.58	148.34	2.76	4773	5790	4773	5790	10563	14	60	55	15
	101124	148.34	151.52	3.18	0	0	2466	2466	4931	12	65	50	15
95-10	101124	148.34	151.52	3.18	0	0	2466	2466	4931	12	65	50	15
	101126	151.52	153.54	2.02	0	0	1655	1655	3309	9	61	50	15
	101127	153.54	154.73	1.19	3019	2737	3019	2737	5757	8	59	52	15
	101128	154.73	158.78	4.05	0	0	2923	2923	5846	10	59	50	15
	101129	158.78	167.68	8.90	0	0	2771	2771	5541	11	58	50	15
95-11	101129	158.78	167.68	8.90	0	0	2771	2771	5541	11	58	50	15
	101130	167.68	171.38	3.70	3011	2379	3011	2379	5390	11	65	56	15
	101131	171.38	175.71	4.33	0	0	2874	2874	5748	10	55	50	15
	101132	175.71	177.03	1.32	3552	2926	3552	2926	6477	9	55	55	15
95-12	101133	177.03	177.95	0.92	0	0	4679	4679	9357	9	59	50	6
	101135	177.95	178.99	1.04	6981	6524	6981	6524	13504	9	59	52	6
	101137	178.99	180.76	1.77	8277	7923	8277	7923	16200	9	52	51	6
	101139	180.76	182.26	1.50	9366	8613	9366	8613	17979	9	55	52	6
	101141	182.26	182.48	0.22	7239	0	7239	7239	14478	9	56	50	6
	101143	182.48	183.09	0.61	10701	10399	10701	10399	21100	9	54	51	6
	101145	183.09	183.84	0.75	11593	12322	11593	12322	23914	9	50	52	6
	101147	183.84	184.49	0.65	11140	12151	11140	12151	23290	9	50	52	6
	101149	184.49	185.46	0.97	10123	10047	10123	10047	20170	10	51	50	6
	101151	185.46	187.64	2.18	9826	8262	9826	8262	18087	10	51	54	6
	101153	187.64	189.87	2.23	9748	8298	8377	8377	16754	11	51	50	8
	101154	189.87	197.00	7.13	4535	4292	4535	4292	8827	10	52	51	18
95-13	101154	189.87	197.00	7.13	4535	4292	4535	4292	8827	10	52	51	18
	101155	197.00	202.01	5.01	3333	3299	3333	3299	6632	10	57	50	18

Bicycle Accommodation Data

Segment	BMP	EMP	Divided or Non	NB/EB Right Shoulder Width	SB/WB Right Shoulder Width	NB/EB Left Shoulder Width	SB/WB Left Shoulder Width	NB/EB Effective Length of Shoulder	SB/WB Effective Length of Shoulder	% Bicycle Accommodation
95-1	29	34	Undivided	7.9	4.0	N/A	N/A	10.0	0.0	62%
95-2	34	43	Undivided	6.0		N/A	N/A	7.3	0.0	56%
95-3	43	60	Undivided	4.2	5.0	N/A	N/A	4.0	0.0	8%
95-4	60	80	Undivided	1.4		N/A	N/A	0.0	0.0	0%
95-5	80	104	Undivided	2.5	6.2	N/A	N/A	13.7	0.0	2%
95-6	104	111	Undivided	3.9	3.0	N/A	N/A	14.8	0.0	87%
95-7	111	131	Undivided	2.1	2.0	N/A	N/A	0.2	0.0	0%
95-8	131	142	Undivided	3.4	5.5	N/A	N/A	2.1	0.0	25%
95-9	142	148	Undivided	3.1	1.7	N/A	N/A	8.2	0.0	61%
95-10	148	162	Undivided	6.5	6.2	N/A	N/A	34.5	0.0	2%
95-11	162	176	Undivided	5.0		N/A	N/A	0.0	0.0	0%
95-12	176	190	Undivided	0.4	0.0	N/A	N/A	4.8	0.0	9%
95-13	190	202	Undivided	7.5	4.5	N/A	N/A	51.9	0.0	71%

AZTDM Data

Segment	Growth Rate	% Non-SOV
95-1	1.80%	18.6%
95-2	1.78%	19.8%
95-3	1.89%	19.8%
95-4	2.00%	5.0%
95-5	1.81%	23.0%
95-6	3.00%	24.6%
95-7	3.75%	14.6%
95-8	3.61%	9.1%
95-9	0.86%	11.4%
95-10	0.96%	2.2%
95-11	1.19%	8.3%
95-12	3.06%	18.1%
95-13	1.64%	14%

HERS Capacity Calculation Data

Segment	Capacity Environment Type	Facility Type	Terrain	Lane Width (Rounded, feet)	NB/EB Rt. Shoulder	SB/WB Rt. Shoulder	F_{lw} or f_w or f_{LS}	NB/EB F_{lc}	SB/WB F_{lc}	Total Ramp Density[1]	PHF	E_T	f_{HV}	f_M	f_A	g/C^2	f_G	f_{NP}	Nm	f_p	NB/EB FFS	SB/WB FFS	NB/EB Peak-Hour Capacity	SB/WB Peak-Hour Capacity	Major Direction Peak-Hour Capacity	Daily Capacity[3]
95-1	3	Fringe Urban	Level	12.00	7.88	4.00	1.0	N/A	N/A	N/A	0.9	2	0.931	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1751.14	33,355
95-2	4	Rural	Rolling	12.00	5.99	-	0.0	N/A	N/A	N/A	0.88	1.8	0.941	N/A	0.25	N/A	0.95	1.45	N/A	N/A	64.75	64.75	N/A	N/A	1180.81	22,492
95-3	4	Rural	Level	12.00	4.25	5.01	0.0	N/A	N/A	N/A	0.88	1.5	0.923	N/A	0.25	N/A	1	2.20	N/A	N/A	74.75	74.75	N/A	N/A	1702.91	32,436
95-4	4	Rural	Rolling	12.00	1.36	-	4.2	N/A	N/A	N/A	0.88	2.7	0.746	N/A	0.25	N/A	0.67	1.65	N/A	N/A	70.55	70.55	N/A	N/A	818.53	15,591
95-5	4	Rural	Rolling	12.00	2.45	6.21	1.3	N/A	N/A	N/A	0.88	2.3	0.788	N/A	0.25	N/A	0.75	1.10	N/A	N/A	73.45	73.45	N/A	N/A	1084.46	20,656
95-6	3	Urban	Rolling	12.00	3.95	3.00	1.0	N/A	N/A	N/A	0.9	2	0.882	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1658.47	31,590
95-7	4	Rural	Rolling	12.00	2.11	2.00	2.6	N/A	N/A	N/A	0.88	2.3	0.837	N/A	0.25	N/A	0.75	3.90	N/A	N/A	72.15	72.15	N/A	N/A	1006.00	19,162
95-8	4	Rural	Rolling	12.00	3.41	5.53	1.3	N/A	N/A	N/A	0.88	2.1	0.859	N/A	0.25	N/A	0.83	3.23	N/A	N/A	63.45	63.45	N/A	N/A	817.49	15,571
95-9	3	Urban	Rolling	12.00	3.08	1.75	1.0	N/A	N/A	N/A	0.9	2	0.888	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1670.23	31,814
95-10	4	Rural	Rolling	12.00	6.54	6.16	0.0	N/A	N/A	N/A	0.88	2.1	0.859	N/A	0.25	N/A	0.83	3.70	N/A	N/A	64.75	64.75	N/A	N/A	850.94	16,208
95-11	4	Rural	Rolling	12.00	5.00	-	0.0	N/A	N/A	N/A	0.88	2.1	0.859	N/A	0.25	N/A	0.83	3.05	N/A	N/A	74.75	74.75	N/A	N/A	1281.46	24,409
95-12	3	Urban	Rolling	12.00	0.37	0.00	1.0	N/A	N/A	N/A	0.9	2	0.906	N/A	N/A	0.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1704.87	32,474
95-13	4	Rural	Rolling	12.00	7.47	4.50	0.0	N/A	N/A	N/A	0.88	2	0.849	N/A	0.25	N/A	0.9	2.70	N/A	N/A	74.75	74.75	N/A	N/A	1388.92	26,456

Safety Performance Area Data

Segment	Operating Environment	Segment Length (miles)	NB/EB Fatal Crashes 2010-2014	SB/WB Fatal Crashes 2010-2014	NB/EB Incapacitating Injury Crashes	SB/WB Incapacitating Injury Crashes	Fatal + Incapacitating Injury Crashes Involving SHSP Top 5 Emphasis Areas Behaviors
95-1	4 or 5 Lane Undivided Highway	5	1	1	2	2	1
95-2	2 or 3 Lane Undivided Highway	9	2	0	1	2	2
95-3	2 or 3 Lane Undivided Highway	17	0	0	2	0	1
95-4	2 or 3 Lane Undivided Highway	20	2	1	2	0	1
95-5	2 or 3 Lane Undivided Highway	24	0	2	0	0	1
95-6	4 or 5 Lane Undivided Highway	2.5	1	0	0	0	1
95-7	2 or 3 Lane Undivided Highway	20	0	0	0	0	0
95-8	2 or 3 Lane Undivided Highway	11	0	0	4	0	3
95-9	4 or 5 Lane Undivided Highway	6	2	0	3	1	1
95-10	2 or 3 Lane Undivided Highway	14	0	1	5	2	4
95-11	2 or 3 Lane Undivided Highway	14	2	2	5	5	9
95-12	4 or 5 Lane Undivided Highway	14	2	3	47	45	44
95-13	2 or 3 Lane Undivided Highway	12	2	0	3	4	4

Segment	Operating Environment	Fatal + Incapacitating Injury Crashes Involving Trucks	Fatal + Incapacitating Injury Crashes Involving Motorcycles	Fatal + Incapacitating Injury Crashes Involving Non-Motorized Travelers	Weighted 5-Year (2010-2014) Average NB/EB AADT	Weighted 5-Year (2010-2014) Average SB/WB AADT	Weighted 5-Year (2010-2014) Average Total AADT
95-1	4 or 5 Lane Undivided Highway	1	0	1	4534	4431	8964
95-2	2 or 3 Lane Undivided Highway	3	1	0	3663	3676	7339
95-3	2 or 3 Lane Undivided Highway	0	0	0	1211	1194	2405
95-4	2 or 3 Lane Undivided Highway	1	4	0	912	888	1801
95-5	2 or 3 Lane Undivided Highway	0	0	0	1024	995	2020
95-6	4 or 5 Lane Undivided Highway	1	0	1	1768	1735	3504
95-7	2 or 3 Lane Undivided Highway	0	0	0	1310	1271	2581
95-8	2 or 3 Lane Undivided Highway	1	0	0	2810	2810	5619
95-9	4 or 5 Lane Undivided Highway	2	0	1	4410	4377	8788
95-10	2 or 3 Lane Undivided Highway	0	1	1	2716	2529	5245
95-11	2 or 3 Lane Undivided Highway	0	4	2	2883	2677	5560
95-12	4 or 5 Lane Undivided Highway	5	12	2	7334	7217	14552
95-13	2 or 3 Lane Undivided Highway	1	1	1	4135	4041	8176

HPMS Data

2010-2014 Weighted Average						2014			2013			2012			2011			2010		
SEGMENT	MP_FROM	MP_TO	WEIGHTED AVERAGE NB/EB AADT	WEIGHTED AVERAGE SB/WB AADT	WEIGHTED AVERAGE AADT	NB/EB AADT	SB/WB AADT	2014 AADT	NB/EB AADT	SB/WB AADT	2013 AADT	NB/EB AADT	SB/WB AADT	2012 AADT	NB/EB AADT	SB/WB AADT	2011 AADT	NB/EB AADT	SB/WB AADT	2010 AADT
95-1	29	34	4534	4431	8964	4763	4717	9480	4588	4293	8881	4288	4258	8547	5273	5129	10402	3756	3756	7511
95-2	34	43	3663	3676	7339	3898	3883	7782	3677	3674	7350	3299	3299	6597	4509	4588	9097	2935	2935	5869
95-3	43	60	1211	1194	2405	1163	1143	2307	1145	1129	2275	1127	1106	2233	1190	1162	2353	1430	1430	2860
95-4	60	80	912	888	1801	788	765	1554	802	781	1584	830	802	1633	839	793	1633	1300	1300	2600
95-5	80	104	1024	995	2020	849	827	1676	843	821	1665	933	864	1797	1140	1108	2250	1356	1356	2712
95-6	104	111	1768	1735	3504	1505	1453	2959	2117	2138	4256	1499	1421	2921	1867	1818	3686	1854	1844	3699
95-7	111	131	1310	1271	2581	1260	1302	2564	1189	1167	2357	1321	1270	2592	1378	1314	2693	1400	1300	2700
95-8	131	142	2810	2810	5619	2274	2274	4549	2864	2864	5727	3119	3119	6237	3391	3391	6783	2400	2400	4800
95-9	142	149	4410	4377	8788	4386	4934	9321	5004	4177	9181	4271	4362	8633	3948	4002	7951	4443	4410	8853
95-10	149	162	2716	2529	5245	2651	2634	5285	3017	2322	5339	2571	2541	5112	2640	2465	5105	2701	2685	5385
95-11	162	176	2883	2677	5560	2900	2727	5627	2759	2512	5271	2894	2793	5686	2948	2460	5409	2915	2893	5807
95-12	176	190	7334	7217	14552	7340	7018	14357	7307	7205	14511	6815	6815	13631	7503	7373	14876	7706	7676	15382
95-13	190	202	4135	4041	8176	4039	3882	7921	4015	3878	7892	4135	4135	8270	4250	4072	8322	4238	4238	8476

Freight Performance Area Data

Segment	Length (miles)	# of closures	Total minutes of closures		Average Minutes/Mile/Year	
			NB	SB	NB	SB
95-1	5	10	2940.4	372.0	117.61	14.88
95-2	9	8	1255.0	163.0	27.89	3.62
95-3	17	2	2384.0	0.0	28.05	0.00
95-4	20	4	1018.0	219.0	10.18	2.19
95-5	24	7	322.0	855.0	2.68	7.13
95-6	2.5	1	0.0	587.0	0.00	46.96
95-7	20	15	13360.0	749.0	133.60	7.49
95-8	11	7	557.0	9146.0	10.13	166.29
95-9	7	19	3726.0	797.0	106.46	22.77
95-10	13	18	2570.5	2160.8	39.55	33.24
95-11	14	28	1956.0	3769.4	27.94	53.85
95-12	14	35	4711.0	825.8	67.30	11.80
95-13	12	17	1094.0	1255.0	18.23	20.92

	ITIS Category Description											
	Closures		Incidents/Accidents		Incidents/Crashes		Obstruction Hazards		Winds		Winter Storm Codes	
Segment	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
95-1	0	0	6	2	0	0	1	1	0	0	0	0
95-2	0	0	4	1	0	0	3	0	0	0	0	0
95-3	0	0	0	0	0	0	2	0	0	0	0	0
95-4	0	0	3	1	0	0	0	0	0	0	0	0
95-5	0	0	1	5	0	0	0	1	0	0	0	0
95-6	0	0	0	1	0	0	0	0	0	0	0	0
95-7	0	0	4	8	0	0	3	0	0	0	0	0
95-8	0	0	1	5	0	0	1	0	0	0	0	0
95-9	0	0	17	1	0	0	1	0	0	0	0	0
95-10	0	0	9	8	0	0	1	0	0	0	0	0
95-11	0	0	12	16	0	0	0	0	0	0	0	0
95-12	0	0	29	6	0	0	0	0	0	0	0	0
95-13	0	0	8	8	0	0	1	0	0	0	0	0

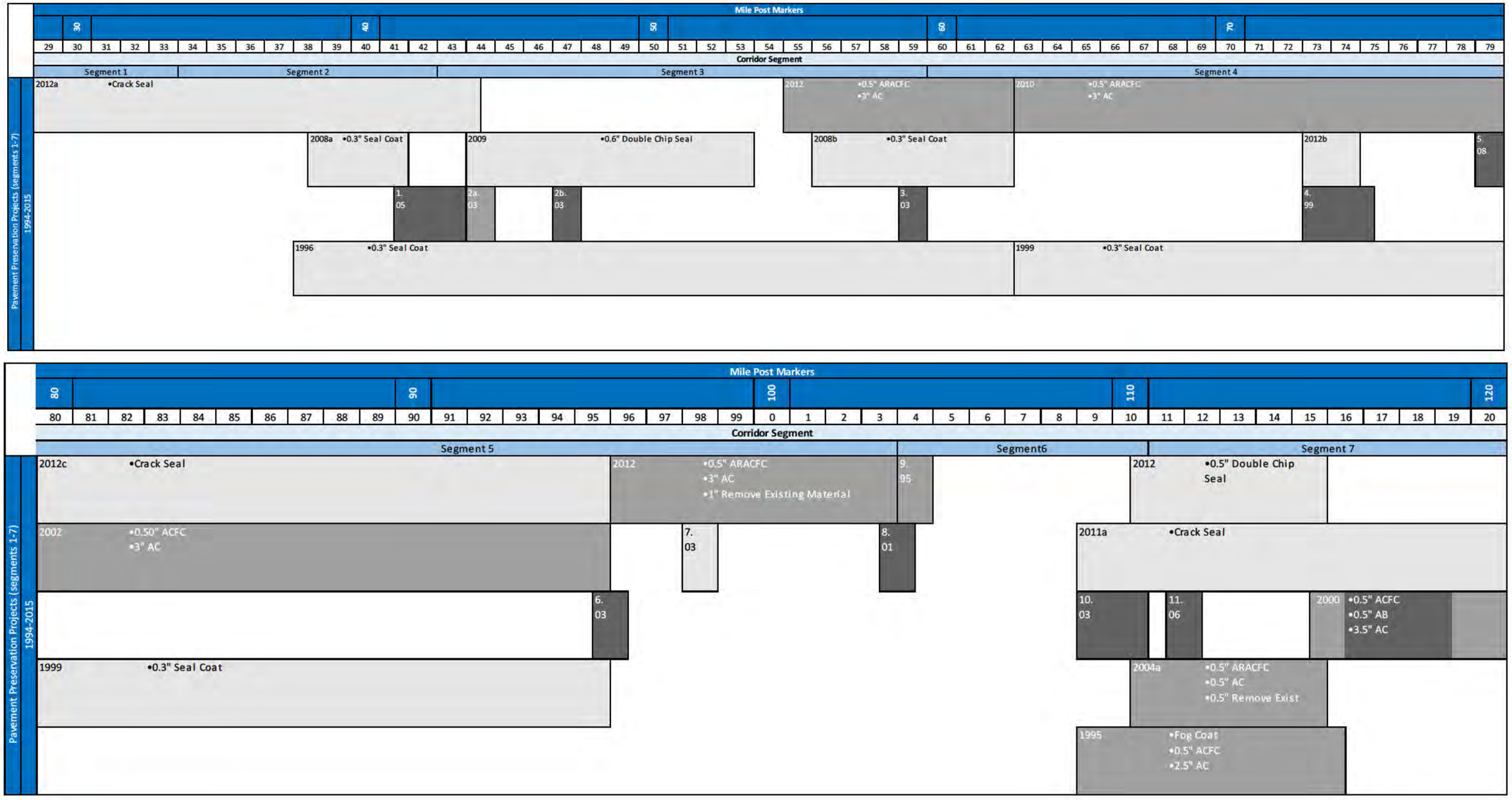
See the **Mobility Performance Area Data** section for other Freight Performance Area related data.

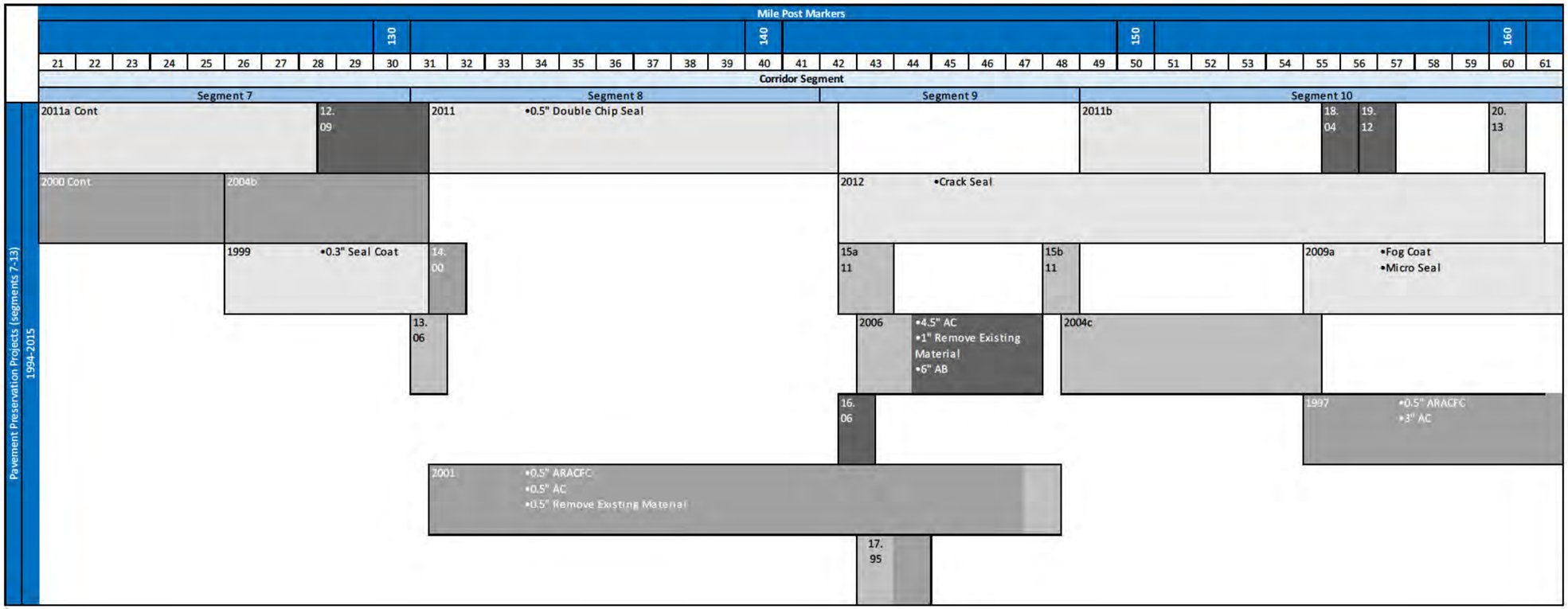
Appendix D: Needs Analysis Contributing Factors and Scores

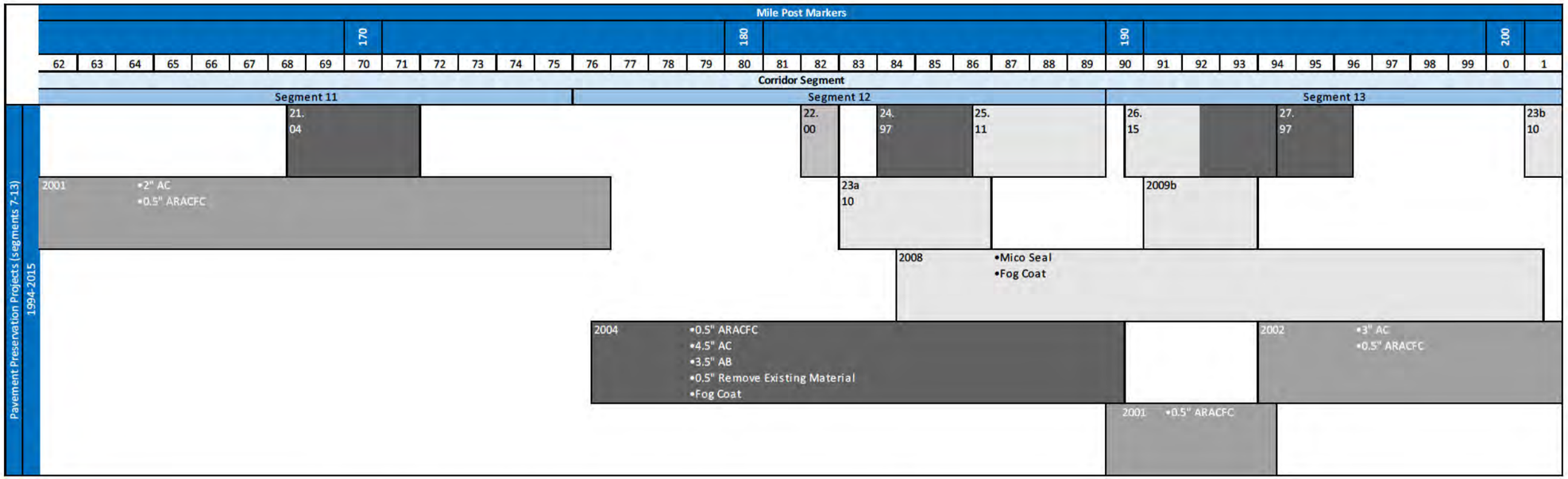
Pavement Performance Needs Analysis

Segment	Segment Length (miles)	Segment Mileposts (MP)	Final Need	Bid History Investment	PeCos History Investment	Resulting Historical Investment	Contributing Factors and Comments
95-1	5	29-34	None	Low	Low	Low	No contributing factors identified
95-2	9	34-43	None	Medium	Low	Medium	No contributing factors identified
95-3	17	43-60	None	Low	Low	Low	Multiple projects lowered the level of need to “None”
95-4	20	60-80	None	Medium	Low	Medium	No contributing factors identified
95-5	24	80-104	None	Medium	Low	Medium	No contributing factors identified
95-6	2.5	104-111	Low	Low	Low	Low	Recent projects and feedback from the Southwest district drops the level of need from a “Medium” to “Low
95-7	20	111-131	Low	High	Low	High	No contributing factors identified
95-8	11	131-142	Low	Medium	Low	Medium	No contributing factors identified
95-9	6	142-148	Low	High	Low	High	No contributing factors identified
95-10	14	148-162	None	Medium	Medium	Medium	No contributing factors identified
95-11	14	162-176	None	Medium	Low	Medium	No contributing factors identified
95-12	14	176-190	Low	High	High	High	A pavement preservation project recommended by the Northwest district (MP 187 – 176)
95-13	12	190-202	None	High	Low	High	Passing lane construction within the hot spot addressed the pavement issues

Pavement History




Mile Post Markers
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61
130
140
150
160
Corridor Segment
Segment 7
Segment 8
Segment 9
Segment 10
Pavement Preservation Projects (segments 7-13)
1994-2015
2011a Cont
12. 09
2011 •0.5" Double Chip Seal
2011b
18. 04
19. 12
20. 13
2000 Cont
2004b
2012 •Crack Seal
1999 •0.3" Seal Coat
14. 00
15a 11
15b 11
2009a •Fog Coat •Micro Seal
13. 06
2006 •4.5" AC •1" Remove Existing Material •6" AB
2004c
16. 06
1997 •0.5" ARACFC •3" AC
2001 •0.5" ARACFC •0.5" AC •0.5" Remove Existing Material
17. 95



Pavement Treatment Reference Numbers	
1. 2005 (NB/SB): 0.50" ACFC, 2.5" AC, 1.5" AB	**15a & 15b. 2011 (NB/SB)**: 0.5" ACFC, 2.5" AC, 3" Remove Existing Material
2a & 2b. 2003 (NB/SB): 0.5" ACFC, 2" AB, 2" AC	**16. 2006 (NB/SB)**: 0.5 ARACFC, 3" AB, 2.5" AC, 0.5" Remove Existing Material
3. 2003 (NB/SB): 0.5" ACFC, 2" AB, 1.5" AC	**17. 1995 (NB/SB)**: Fog Coat, 0.5" ARACFC, 1" AC, 1" Remove Existing Material
4. 1999 (NB/SB): 0.3" Seal Coat, 2.5" AB, 1.5" AC	**18. 2004 (NB/SB)**: 0.5" ACFC, 0.5" Remove Existing Material, 5" AB, 2.5" AC
5. 2008 (NB/SB): 0.5" ACFC, 6" AB, 4" AC	**19. 2012 (NB/SB)**: 0.5" ACFC, 0.5" Remove Existing Material, 2" AB, 2" AC
6. 2003 (NB/SB): 0.5 ACFC, 4" AB, 2" AC	**20. 2013: (NB/SB)**: 3" AC, 3.5" Remove Existing Material, 0.5" ACFC
7. 2003 (NB/SB): 0.5" ACFC	**21. 2004 (NB/SB)**: 1.5" AC, 2" AB, 0.5" ACFC
8. 2001 (NB/SB): 8" AB, 5.5" AC	**22. 2000 (NB/SB)**: 2" AC, 0.5" ACFC, 2.5" Remove Existing Material
9. 1995 (NB/SB): 2.5" AC, Fog Coat	**23a & 23b. 2010 (NB/SB)**: Micro Seal
10.2003 (NB/SB): 8" AB, 5.5" AC	**24. 1997 (NB/SB)**: 1.5" AC, Fog Coat
11. 2006 (NB/SB): 0.5" FCAC, 5" AB, 4" AC	**25. 2011 (NB/SB)**: Micro Seal
12. 2009 (NB/SB): 0.5" ACFC, 4.5" AB, 3.5" AC	**26. 2015 (NB/SB)**: 1" AB, 1" AC, 0.5" ARACFC
13. 2006 (NB/SB): 0.5" ARACFC, 0.5" Remove Existing Material	**27. 1997 (NB/SB)**: 0.3" Seal Coat, 2" AB, 1" AC
14. 2000 (NB/SB): 2" AC, 0.5" ACFC	

Legend

- New Paving or Reconstruction
- Mill and Overlay (Adding Structural Thickness)
- Mill and Replace (No Change Structural Thickness)
- Fog Coat or Thin Overlay Treatments
- PCCP Pavement Border
- AC Pavement Border

		Segment Number																									
		1		2		3		4		5		6		7		8		9		10		11		12		13	
Value	Level	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir	Uni-Dir	Bi-Dir
1	L1		100%		100%		10%		15%		70%		10%		25%		95%		10%		25%				25%		20%
1					35%		60%		10%		70%		30%		90%				95%		95%				30%		10%
1					55%		100%		15%						25%						55%				20%		25%
1							40%		85%																		80%
3	L2																		20%		45%						
3																			20%								
3																			5%								
3																			10%								
3																			20%								
3																			15%								
4	L3						30%		15%		70%		5%		25%		5%		70%		55%		100%				70%
4									85%		35%		10%		25%		5%		15%								40%
4													30%		40%		90%										
4															25%												
6	L4				55%		5%		10%				30%		15%		5%		50%		5%		25%		20%		20%
6															15%				10%		5%				95%		20%
6																											5%
Sub-Total		0	1	0	5.2	0	3.6	0	5.85	0	5.6	0	4	0	7.8	0	5.25	0	10.75	0	5.9	0	5.5	0	7.65	0	8.45
Total		**1**		**5.2**		**3.6**		**5.85**		**5.6**		**4**		**7.8**		**5.25**		**10.75**		**5.9**		**5.5**		**7.65**		**8.45**	

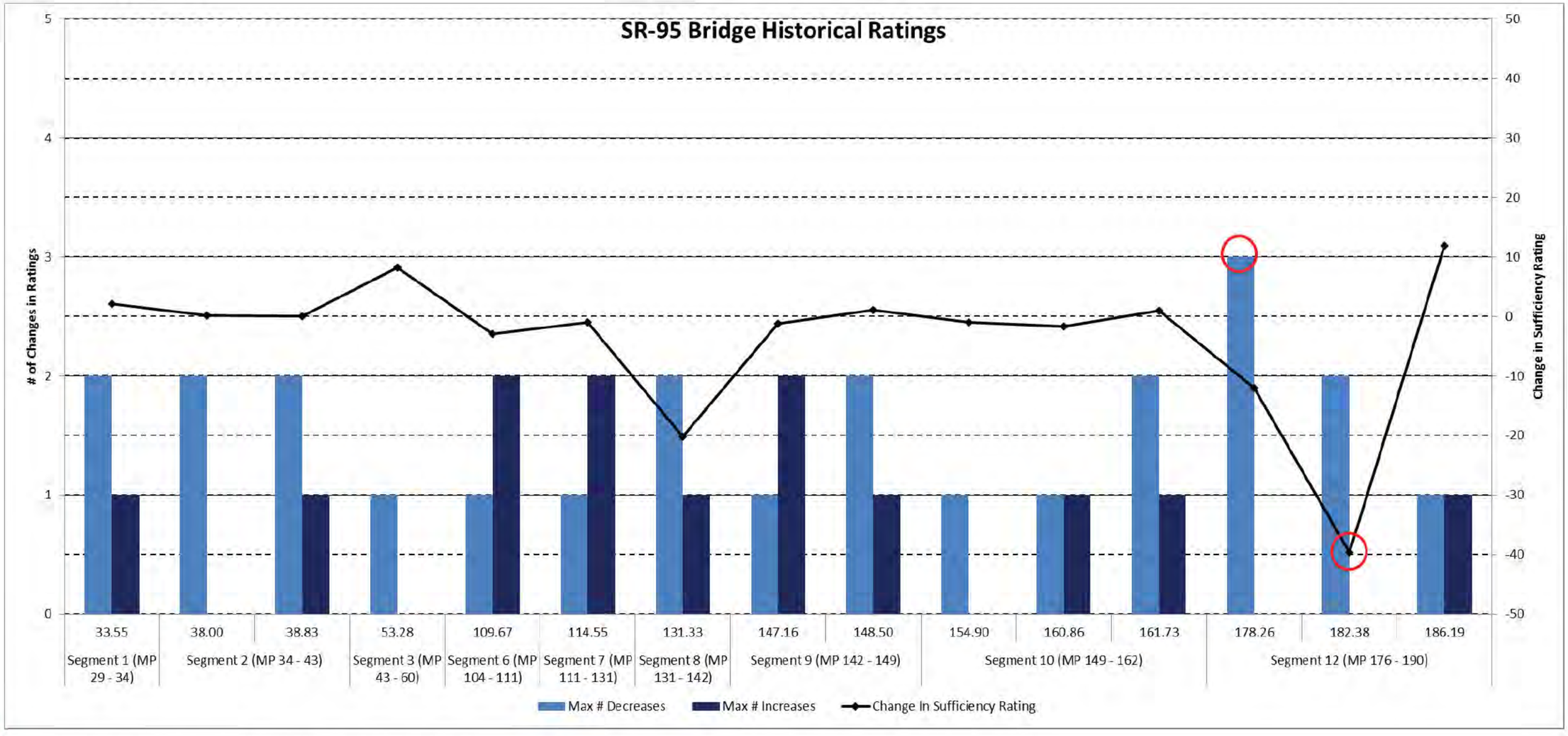
Pavement Historical Investment

Segment	Segment Length (miles)	Segment Mileposts (MP)	Pavement History Value (bid projects)	Pavement History Score (bid projects)	Pavement History (bid projects)	PeCos ($/mile/yr)	PeCos Score	PeCos	Resulting Historical Investment
95-1	5	29-34	1.00	-2.43	Low	$22.36	-0.90	Low	Low
95-2	9	34-43	5.20	-0.31	Medium	$241.30	-0.84	Low	Medium
95-3	17	43-60	3.60	-1.12	Low	$38.72	-0.89	Low	Low
95-4	20	60-80	5.85	0.01	Medium	$1.43	-0.90	Low	Medium
95-5	24	80-104	5.60	-0.11	Medium	$151.24	-0.87	Low	Medium
95-6	2.5	104-111	4.00	-0.92	Low	$0.00	-0.90	Low	Low
95-7	20	111-131	7.80	1.00	High	$0.00	-0.90	Low	High
95-8	11	131-142	5.25	-0.29	Medium	$30.73	-0.89	Low	Medium
95-9	6	142-148	10.75	2.48	High	$440.62	-0.80	Low	High
95-10	14	148-162	5.90	0.04	Medium	$3,459.22	-0.07	Medium	Medium
95-11	14	162-176	5.90	0.04	Medium	$65.16	-0.89	Low	Medium
95-12	14	176-190	7.65	0.92	High	$6,959.14	0.78	High	High
95-13	12	190-202	8.45	1.32	High	$524.43	-0.78	Low	High

Bridge Performance Needs Analysis

Segment	Segment Length (Miles)	Segment Mileposts (MP)	Number of Bridges in Segment	# Functionally Obsolete Bridges	Final Need	Contributing Factors			Comments
						Bridge	Current Ratings	Historical Review	
95-1	5	29-34	1	0	None	No bridges with current ratings less than 6 and no historical issues			
95-2	9	34-43	2	1	None	No bridges with current ratings less than 6 and no historical issues			
95-3	17	43-60	1	0	Medium	Castle Dome Wash Br (#583)(MP 53.28)	Current Evaluation Rating of 5	This structure was not identified in historical review	
95-4	20	60-80	0	0	None	No bridges			
95-5	24	80-104	0	0	None	No bridges			
95-6	2.5	104-111	1	0	None	No bridges with current ratings less than 6 and no historical issues			
95-7	20	111-131	1	0	None	No bridges with current ratings less than 6 and no historical issues			
95-8	11	131-142	1	0	Medium	Bouse Wash Bridge (#1321)(MP 131.33)	Current Deck and Substructure Rating of 5	Identified through the Historical Review	Could have a repetitive investment issue
95-9	6	142-148	2	0	None	No bridges with current ratings less than 6 and no historical issues			
95-10	14	148-162	2	0	None	No bridges with current ratings less than 6 and no historical issues			
95-11	14	162-176	0	0	None	No bridges			
95-12	14	176-190	3	1	Medium	Mockingbird Wash Br (#1915)(MP 178.26)	Current Deck and Substructure Rating of 5	Identified through the Historical Review	Could have a repetitive investment issue
						McCulloch Blvd UP (#1824)(MP 182.38)	Current deck rating of 5	Identified through the Historical Review	Could have a repetitive investment issue; the district recommends that Falls Spring Wash Bridge be considered as a bridge hot spot
95-13	12	190-202	0	0	None	No bridges			

Bridge Ratings History



O-identifies the bridge indicated is of concern from a historical ratings perspective

Maximum # of Decreases: Maximum number of times that the Deck Rating, Substructure Rating, or Superstructure Rating decreased from 1997 to 2014. (Higher number could indicate a more dramatic decline in the performance of the bridge)

Maximum # of Increases: Maximum number of times that the Deck Rating, Substructure Rating, or Superstructure Rating increased from 1997 to 2014. (Higher number could indicate a higher level of investment)

Change in Sufficiency Rating: Cumulative change in Sufficiency Rating from 1997 to 2014. (Bigger negative number could indicate a more dramatic decline in the performance of the bridge)

Mobility Performance Needs Analysis

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Roadway Variables								Traffic Variables					Relevant Mobility Related Existing Infrastructure
				Functional Classification	Environmental Type (Urban/Rural)	Terrain	# of Lanes/ Direction	Speed Limit	Aux Lanes	Divided/ Non-Divided	% No Passing	Existing LOS	Future 2035 LOS	% Trucks	NB Buffer Index (PTI-TTI)	SB Buffer Index (PTI-TTI)	
95-1	29-34	5	Low	State Highway	Fringe Urban	Level	2	55	No	Non-Divided	N/A	A-C	A-C	15%	1.88	2.75	None
95-2	34-43	9	Low	State Highway	Rural	Rolling	1	55	Yes	Non-Divided	27%	A-C	A-C	17%	1.17	0.14	Passing Lane at MP 42 - 43 (NB)
95-3	43-60	17	Low	State Highway	Rural	Level	1	65	No	Non-Divided	19%	A-C	A-C	20%	0.18	0.15	None
95-4	60-80	20	Low	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	34%	A-C	A-C	24%	4.18	0.36	Passing Lane at MP 73 - 75 (NB)
95-5	80-104	24	Low	State Highway	Rural	Rolling	1	65	No	Non-Divided	2%	A-C	A-C	23%	0.13	0.48	None
95-6	104-111	2.5	Low	State Highway	Urban	Rolling	2	35	No	Non-Divided	N/A	A-C	A-C	20%	6.27	4.11	None
95-7	111-131	20	Low	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	57%	A-C	A-C	18%	0.25	0.38	Passing Lane at MP 120 - 118 (SB); Passing Lane at MP 129 - 130 (NB); Passing Lane at MP 130 - 131 (SB)
95-8	131-142	11	Low	State Highway	Rural	Rolling	1	55	No	Non-Divided	67%	A-C	A-C	15%	0.71	0.37	None
95-9	142-148	6	Low	State Highway	Urban	Rolling	2	55	No	Non-Divided	N/A	A-C	A-C	14%	6.04	3.28	Dynamic Message Sign at MP 143; Parking Area at MP 162 and MP 160
95-10	148-162	14	Low	State Highway	Rural	Rolling	1	55	Yes	Non-Divided	92%	A-C	A-C	18%	0.22	0.15	Passing Lane at MP 150 - 153 (SB); Passing Lane at MP 154 - 155 (SB); Parking Area at MP 162
95-11	162-176	14	Low	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	53%	A-C	A-C	23%	0.27	0.56	Passing Lane at MP 168 - 171 (NB); Passing Lane at MP 171 - 172 (SB)
95-12	176-190	14	Low	State Highway	Urban	Rolling	2	55	No	Divided	N/A	A-C	E/F	29%	3.47	2.58	None
95-13	190-202	12	Low	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	56%	A-C	A-C	34%	2.89	5.28	Passing Lane at MP 195 - 196 (NB/SB); Passing Lane at MP 198 - 200 (SB)

Mobility Performance Needs Analysis (continued)

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final	Closure Extent							Non-Actionable Conditions	Contributing Factors
				Total Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related		
95-1	29-34	5	Low	10	8	80%	2	20%	0	0%		- Percent of closures due to Incidents/Accidents and Obstructions/Hazards above statewide average - Two closures are due to flooding
95-2	34-43	9	Low	8	5	63%	3	38%	0	0%		- Percent of closures due to obstructions/hazards above statewide average - Three Closures are due to flooding - Consistent with the Southwest ADOT District's observation with low water crossings. - Construction of the Fortuna Wash Bridge at MP 34 may reduce closures due to flooding
95-3	43-60	17	Low	2	0	0%	2	100%	0	0%		- Percent of closures due to obstructions/hazards above statewide average - Both closures are due to flooding
95-4	60-80	20	Low	4	4	100%	0	0%	0	0%	Border Patrol Check Point at MP 75.5 (NB)	- Percent of closures due to Incidents/Accidents above statewide average
95-5	80-104	24	Low	7	6	86%	1	14%	0	0%		- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average - One closure due to flooding
95-6	104-111	2.5	Low	1	1	100%	0	0%	0	0%		
95-7	111-131	20	Low	15	12	80%	3	20%	0	0%		- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average - Two closures due to flooding
95-8	131-142	11	Low	7	6	86%	1	14%	0	0%		- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average - One closure due to flooding
95-9	142-148	6	Low	19	18	95%	1	5%	0	0%		- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average
95-10	148-162	14	Low	18	17	94%	1	6%	0	0%		- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average
95-11	162-176	14	Low	28	28	100%	0	0%	0	0%		- Percent of closures due to incidents/accidents above statewide average
95-12	176-190	14	Low	35	35	100%	0	0%	0	0%		- Anticipated future growth in the urbanized Lake Havasu City area. Seasonal traffic fluctuations that includes a higher percentage of recreational vehicles during the winter months. - Interrupted flow conditions with higher signalized intersection density - Percent of closures due to incidents/accidents above statewide average
95-13	190-202	12	Low	17	16	94%	1	6%	0	0%		- Seasonal traffic fluctuations that includes a higher percentage of recreational vehicles during the winter months. - Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average

Safety Performance Needs Analysis

		95-1	95-2	95-3	95-4	95-5	95-6	95-7	95-8
Segment Number		95-1	95-2	95-3	95-4	95-5	95-6	95-7	95-8
Segment Length (miles)		5	9	17	20	24	2.5	20	11
Segment Milepost (MP)		29-34	34-43	43-60	60-80	80-104	104-111	111-131	131-142
Final Need		Medium	High	None	High	N/A	N/A	None	None
Segment Crash Overview		2 Crashes were fatal 4 Crashes had incapacitating injuries 3 Crashes involve trucks	2 Crashes were fatal 3 Crashes had incapacitating injuries 2 Crashes involve trucks	0 Crashes were fatal 2 Crashes had incapacitating injuries	3 Crashes were fatal 2 Crashes had incapacitating 1 Crashes involve trucks	2 Crashes were fatal 0 Crashes had incapacitating injuries	1 Crashes were fatal 0 Crashes had incapacitating injuries	No Crashes Reported	0 Crashes were fatal 4 Crashes had incapacitating injuries 1 Crashes involve trucks
Segment Crash Summaries (Fatal and Serious Injury Crashes)	First Harmful Event Type	83% Involve Collision with Motor Vehicle 17% Involve Collision with Pedestrian	60% Involve Collision with Motor Vehicle 20% Collision with Non-Fixed Object 20% Involve Collision with Fixed Object	N/A - Sample size too small	80% Involve Overturning 20% Involve Vehicle Fire or Explosion	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
	Collision Type	50% Involve Angle 33% Involve Left Turn 17% Involve Other	40% Involve Rear End 40% Other 20% Involve Single Vehicle	N/A - Sample size too small	100% Involve Single Vehicle	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
	Violation or Behavior	33% Disregarded Traffic Signal 33% Involve Failure to Yield Right-of-Way 17% Involve No Improper Action	40% Involve Inattention/Distraction 20% Failure to Yield Right-of-Way 20% Involve No Improper Action	N/A - Sample size too small	60% Involve No Improper Action 20% Involve Inattention/Distraction 20% Unknown	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
	Lighting Conditions	83% Occur in Daylight Conditions 17% Occur in Dark-Lighted Conditions	60% Occur in Daylight Conditions 40% Occur in Dark-Unlighted Conditions	N/A - Sample size too small	80% Occur in Daylight Conditions 20% Occur in Dusk Conditions	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
	Surface Conditions	100% Involve Dry Conditions	100% Involve Dry Conditions	N/A - Sample size too small	100% Involve Dry Conditions	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
	First Unit Event	83% Involve a first unit event of Motor Vehicle in Transport 17% Involve a first unit event of Collision with Pedestrian	60% Involve a first unit event of Motor Vehicle in Transport 20% Involve a first unit event of Equipment Failure 20% Involve a first unit event of Ran Off the Road (Left)	N/A - Sample size too small	60% Involve a first unit event of Equipment Failure 20% Other Non-Collision 20% Ran Off the Road (Right)	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
	Driver Physical Condition	50% No Apparent Influence 33% Unknown 17% Under the Influence of Drugs or Alcohol	80% No Apparent Influence 20% Unknown	N/A - Sample size too small	80% No Apparent Influence 20% Unknown	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
	Safety Device Usage	83% Shoulder And Lap Belt Used 17% Air Bag Deployed/Shoulder-Lap Belt	80% Shoulder And Lap Belt Used 20% Helmet Used	N/A - Sample size too small	100% Shoulder and Lap Belt Used	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small
Hot Spot Crash Summaries		None	None	None	None	None	None	N/A	None
Previously Completed Safety-Related Projects									
District Interviews/Discussions			-Animal related crashes common within the Southwest district of SR 95 (MP 34 - 55) -Southwest District noted that low water crossings can have the potential to be a safety issue	-Animal related crashes common within the Southwest district of SR 95 (MP 34 - 55) -Southwest District noted that low water crossings can have the potential to be a safety issue	-Include Low-water crossings input from the district that may include safety issues.				
Contributing Factors		- Limited or restricted sight distance - High approach speed - Misjudge speed of on-coming traffic - Lack of crossing opportunity for pedestrians - Drivers running red light or stop sign - Failure to yield the right-of-way Comment: Programmed traffic signal at the intersection of Avenue 8E	- Driver inattention - Large number of turning vehicles - Drivers running red light or stop sign - Poor nighttime visibility or lighting - Obstruction in or near roadway - Inadequate signs, delineators, guardrail - Roadside design (Inadequate clear distance)	N/A	- Roadside Design (non-traversable side slops) - Inadequate shoulder width - Driver inattention - Poor Delineation	N/A - Sample size too small	N/A - Sample size too small	N/A	N/A - Sample size too small

Segment Number		95-9		95-10		95-11		95-12		95-13		Corridor-Wide Crash Characteristics	
Segment Length (miles)		6		14		14		14		12			
Segment Milepost (MP)		142-149		149-162		162-176		176-190		190-202			
Final Need		Medium		None		High		High		Low			
Segment Crash Overview		2	Crashes were fatal	1	Crashes were fatal	4	Crashes were fatal	5	Crashes were fatal	2	Crashes were fatal	24	Crashes were fatal
		4	Crashes had incapacitating injuries	7	Crashes had incapacitating injuries	10	Crashes had incapacitating injuries	92	Crashes had incapacitating injuries	7	Crashes had incapacitating injuries	135	Crashes had incapacitating injuries
		2	Crashes involve trucks	0	Crashes involve trucks	0	Crashes involve trucks	5	Crashes involve trucks	1	Crashes involve trucks	15	Crashes involve trucks
Segment Crash Summaries (Fatal and Serious Injury Crashes)	First Harmful Event Type	83%	Involve Collision with Motor Vehicle	63%	Involve Collision with Fixed Object	43%	Involve Collision with Motor Vehicle	86%	Involve Collision with Motor Vehicle	33%	Involve Collision with Motor Vehicle	70%	Involve Collision with Motor Vehicle
		17%	Involve Collision with Pedestrian	25%	Involve Collision with Motor Vehicle	21%	Involve Other Non-Collision	9%	Involve Overturning	22%	Involve Collision with Fixed Object	12%	Involve Overturning
				13%	Involve Collision with Pedestrian	14%	Involve Overturning	2%	Involve Other Non-Collision	11%	Involve Overturning	7%	Involve Collision with Fixed Object
	Collision Type	50%	Involve Angle	50%	Involve Single Vehicle	43%	Involve Single Vehicle	33%	Involve Rear End	56%	Involve Single Vehicle	24%	Involve Single Vehicle
		33%	Involve Left Turn	13%	Involve Rear End	14%	Involve Rear End	29%	Involve Angle	22%	Involve Head On Collision	23%	Involve Angle
		17%	Involve Other	13%	Involve Head On	14%	Involve Head On	13%	Involve Single Vehicle	11%	Involve Angle	22%	Involve Rear End
	Violation or Behavior	33%	Involve Disregarded Traffic Signal	25%	Failure to Keep in Proper Lane	21%	Involve Drove in Opposing Lane	28%	Involve Disregarded Traffic Signal	22%	Involve No Improper Action	20%	Involve Disregarded Traffic Signal
		17%	Involve Failure to Yield Right-of-Way	25%	Speed to Fast for Conditions	14%	Inattention/Distraction	23%	Inattention/Distraction	22%	Drove in Opposing lane	16%	Involve Inattention/Distraction
		17%	Drove in Opposing Lane	13%	Drove in Opposing Lane	14%	Ran Stop Sign	9%	Involve Speed too Fast for Conditions	22%	Other	11%	Involve No Improper Action
	Lighting Conditions	33%	Occurred in Dark-Lighted Conditions	38%	Occur in Dark-Unlighted Conditions	50%	Occur in Dark-Unlighted Conditions	80%	Occur in Daylight Conditions	89%	Occur in Daylight Conditions	70%	Occur in Daylight Conditions
		33%	Occur in Daylight Conditions	25%	Occur in Daylight Conditions	50%	Occur in Daylight Conditions	9%	Occur in Lighted Conditions	11%	Occur in Dark-Unlighted Conditions	18%	Occur in Dark-Unlighted Conditions
		17%	Occur in Dawn Conditions	25%	Occur in Dusk Conditions			9%	Occur in Dark-Lighted Conditions			9%	Occur in Dark-Lighted Conditions
	Surface Conditions	100%	Involve Dry Conditions	75%	Involve Dry Conditions	93%	Involve Dry Conditions	99%	Involve Dry Conditions	78%	Involve Dry Conditions	96%	Involve Dry Conditions
				25%	Involve Wet Conditions	7%	Involve Wet Conditions	1%	Involve Wet Conditions	22%	Involve Wet Conditions	4%	Involve Wet Conditions
	First Unit Event	67%	Involve a first unit event of Motor Vehicle in Transport	50%	Involve a first unit event of Crossed Centerline	36%	Involve a first unit event of Ran Off the Road (Right)	78%	Involve a first unit event of Motor Vehicle in Transport	33%	Involve a first unit event of Ran Off the Road (Right)	60%	Involve a first unit event of Motor Vehicle in Transport
		33%	Involve a first unit event of Crossed Centerline	25%	Involve a first unit event of Other Non-Collision	29%	Involve a first unit event of Motor Vehicle in Transport	7%	Involve a first unit event of Crossed Centerline	11%	Involve Collision with Fixed Object	14%	Involve a first unit event of Crossed Centerline
				13%	Involve a first unit event of Collision with Fixed Object	7%	Collision with Pedestrian	6%	Involve a first unit event of Overturning	11%	Equipment Failure	9%	Involve a first unit event of Ran Off the Road (Right)
	Driver Physical Condition	50%	No Apparent Influence	38%	No Apparent Influence	36%	Unknown	66%	No Apparent Influence	33%	Under the Influence of Drugs or Alcohol	57%	No Apparent Influence
		33%	Unknown	25%	Under the Influence of Drugs or	36%	No Apparent Influence	17%	Unknown	33%	No Apparent Influence	21%	Unknown
		17%	Under the Influence of Drugs or Alcohol	13%	Fatigued/Fell Asleep	14%	Under the Influence of Drugs or Alcohol	11%	Under the Influence of Drugs or	11%	Illness	14%	Under the Influence of Drugs or
	Safety Device Usage	33%	None Used	25%	Air Bag Deployed/Shoulder-Lap Belt	36%	None Used	72%	Shoulder And Lap Belt Used	33%	Shoulder And Lap Belt Used	61%	Shoulder And Lap Belt Used
		33%	Airbag Deployed/Shoulder-Lap Belt	25%	Shoulder And Lap Belt Used	29%	Helmet Used	14%	None Used	22%	Unknown	16%	None Used
		17%	Shoulder And Lap Belt Used	25%	None Used	36%	Shoulder and Lap Belt Used	3%	Unknown	11%	Air Bag Deployed	7%	Helmet Used
Hot Spot Crash Summaries		None		None		None		Hot Spot within the Lake Havasu City limits, both directions (MP 179 - 190)		None			
Previously Completed Safety-Related Projects										Passing Lane at MP 190 - MP 195 (NB)			
District Interviews/Discussions								Lack of access control measures in the northorn portion of segment 12. Higher concentration of crashes due to vehicles making left-turns					
Contributing Factors		- Unadequate sight distance - Drivers running red light or stop sign - Excessive speed - Poor nighttime visibility or lighting - Inadequate roadway geometry - Inadequate pavement markings Comment: Programmed traffic signal at SR 95 and Mohave Road		- Obstruction in or near roadway - Poor nighttime visibility or lighting - Poor sign visibility - Roadside design (Inadequate clear distance) - Unexpected stops on approach - Excessive speed - Inadequate pavement markings		- Poor nighttime visibility or lighting - Inadequate pavement markings - Inadequate roadway shoulders - Roadside design (non-traversable side slopes) - Driver inattention		- Drivers running red light or stop sign - Driver inattention - Inadequate signal timing - Poor visibiliity of signals - Unexpected stops on approach - Excessive speed - Misjudge speed of on-coming traffic		- Obstruction in or near roadway - Inadequate roadway shoulders - Inadequate pavement markings - Inadequate signs, delineators, guardrail - Roadside design (Inadequate clear distance)		- Inadequate roadway shoulders - Inadequate signs, delineators, guardrail - Driver inattention - Unexpected stops on aproach - Unexpected lane changes on approach	

Freight Performance Needs Analysis

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Roadway Variables							Traffic Variables					Relevant Freight Related Existing Infrastructure
				Functional Classification	Environmental Type (Urban/-Rural)	Terrain	# of Lanes/ Direction	Speed Limit	Aux Lanes	Divided/ Non-Divided	% No Passing	Existing LOS	Future 2035 LOS	% Trucks	NB Buffer Index (TPTI-TTTI)	SB Buffer Index (TPTI-TTTI)	
1	29-34	5	Low	State Highway	Fringe Urban	Level	2	55	No	Non-Divided	N/A	A-C	A-C	15%	2.55	2.13	Passing Lane at MP 42 - 43 (NB)
2	34-43	9	High	State Highway	Rural	Rolling	1	55	Yes	Non-Divided	27%	A-C	A-C	17%	0.95	0.17	None
3	43-60	17	None	State Highway	Rural	Level	1	65	No	Non-Divided	19%	A-C	A-C	20%	0.22	0.25	None
4	60-80	20	High	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	34%	A-C	A-C	24%	12.38	0.41	Passing Lane at MP 73 - 75 (NB)
5	80-104	24	Low	State Highway	Rural	Rolling	1	65	No	Non-Divided	2%	A-C	A-C	23%	0.10	0.54	None
6	104-111	2.5	Low	State Highway	Urban	Rolling	2	35	No	Non-Divided	N/A	A-C	A-C	20%	1.61	2.18	None
7	111-131	20	High	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	57%	A-C	A-C	18%	0.36	0.41	Passing Lane at MP 120 - 118 (SB); Passing Lane at MP 129 - 130 (NB); Passing Lane at MP 130 - 131 (SB)
8	131-142	11	High	State Highway	Rural	Rolling	1	55	No	Non-Divided	67%	A-C	A-C	15%	1.17	0.42	None
9	142-149	6	High	State Highway	Urban	Rolling	2	55	No	Non-Divided	N/A	A-C	A-C	14%	5.64	2.94	Dynamic Message Sign at MP 143; Parking Area at MP 162 and MP 160
10	149-162	14	Low	State Highway	Rural	Rolling	1	55	Yes	Non-Divided	92%	A-C	A-C	18%	0.31	0.13	Passing Lane at MP 150 - 153 (SB); Passing Lane at MP 154 - 155 (SB); Parking Area at MP 162
11	162-176	14	Medium	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	53%	A-C	A-C	23%	0.38	0.45	None
12	176-190	14	Medium	State Highway	Urban	Rolling	2	55	No	Divided	N/A	A-C	E/F	29%	3.97	2.68	Passing Lane at MP 168 - 171 (NB); Passing Lane at MP 171 - 172 (SB)
13	190-202	12	High	State Highway	Rural	Rolling	1	65	Yes	Non-Divided	56%	A-C	A-C	34%	1.78	4.92	Passing Lanes at MP 195 - 196 (NB/SB); Passing Lane at MP 198 - 200 (SB)

Freight Performance Needs Analysis (continued)

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
95-1	29-34	5	Low	10	8	80%	2	20%	0	0%		Final DCR for US-95 (MP 31.85 - 50.35), Avenue 9E to Aberdeen Road; Widen from a 2-lane to a 4-lane highway with a continuous left-turn lane	- Percent of closures due to Incidents/Accidents and Obstructions/Hazards above statewide average - Two closures are due to flooding
95-2	34-43	9	High	8	5	63%	3	38%	0	0%		Programmed: Fortuna Wash Bridge at MP 34 (2016 anticipated construction) Final DCR for US-95 (MP 31.85 - 50.35), Avenue 9E to Aberdeen Road; Widen from a 2-lane to a 4-lane highway with a continuous left-turn lane	- Percent of closures due to obstructions/hazards above statewide average - Three Closures are due to flooding - Consistent with the Yuma District observation with low water crossings.
95-3	43-60	17	None	2	0	0%	2	100%	0	0%		Final DCR for US-95 (MP 31.85 - 50.35), Avenue 9E to Aberdeen Road; Widen from a 2-lane to a 4-lane highway with a continuous left-turn lane Final DCR for US 95 (MP 42 to Cibola Lake Road); Widen to four lanes	- Percent of closures due to obstructions/hazards above statewide average - Both closures are due to flooding
95-4	60-80	20	High	4	4	100%	0	0%	0	0%	Border Patrol Check Point at MP 75.5 (NB)	Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 76 - 82 (NB/SB) - Tier 3 Low Priority Final DCR for US 95 (MP 42 to Cibola Lake Road); Widen to four lanes	- Percent of closures due to Incidents/Accidents above statewide average
95-5	80-104	24	Low	7	6	86%	1	14%	0	0%		Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 88 - 90 (NB) - Tier 3 Low Priority Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 92 - 98 (NB/SB) - Tier 3 Low Priority Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 84 - 90 (SB) - Tier 3 Low Priority	- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average - One closure due to flooding
95-6	104-111	2.5	Low	1	1	100%	0	0%	0	0%			
95-7	111-131	20	High	15	12	80%	3	20%	0	0%			- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average - Two closures due to flooding

Segment	Segment Mileposts (MP)	Segment Length (miles)	Final Need	Closure Extent							Non-Actionable Conditions	Programmed and Planned Projects or Issues from Previous Documents Relevant to Final Need	Contributing Factors
				Total Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related			
95-8	131-142	11	High	7	6	86%	1	14%	0	0%		Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 132 - 139 (NB/SB) - Tier 2 Medium Priority	- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average - One closure due to flooding
95-9	142-149	6	High	19	18	95%	1	5%	0	0%		*Programmed:* Construct Roundabout at SR 95 and Mohave Road at MP 142.9	- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average
95-10	149-162	14	Low	18	17	94%	1	6%	0	0%		Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 158 - 161 (NB) - Tier 2 Medium Priority Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 152 - 155 (NB) - Tier 3 Low Priority	- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average
95-11	162-176	14	Medium	28	28	100%	0	0%	0	0%		Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 166 - 175 (SB) - Tier 2 Medium Priority; Proposed Passing Lane at MP 166 - 173 (NB) - Tier 3 Low Priority	- Percent of closures due to incidents/accidents above statewide average
95-12	176-190	14	Medium	35	35	100%	0	0%	0	0%			- Anticipated future growth in the Lake Havasu City area. - Percent of closures due to incidents/accidents above statewide average
95-13	190-202	12	High	17	16	94%	1	6%	0	0%		Climbing and Passing Lane Prioritization Study; Proposed Passing Lane at MP 194 - 201 (SB) - Tier 2 Medium Priority	- Percent of closures due to incidents/accidents and Obstructions/Hazards above statewide average

Needs Summary Table

Performance Area	Segment Number and Mileposts (MP)												
	95-1	95-2	95-3	95-4	95-5	95-6	95-7	95-8	95-9	95-10	95-11	95-12	95-13
	MP 29-34	MP 34-43	MP 43-60	MP 60-80	MP 80-104	MP 104-111	MP 111-131	MP 131-142	MP 142-148	MP 148-162	MP 162-176	MP 176-190	MP 190-202
Pavement	None	None	None	None	None	Low	Low	Low	Low	None	None	Low	None
Bridge	None	None	Medium	None	None	None	None	Medium	None	None	None	Medium	None
Mobility+	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Safety+	Medium	High	None	High	N/A	N/A	None	None	Medium	None	High	High	Low
Freight+	Low	High	None	High	Low	Low	High	High	High	Low	Medium	Medium	High
Average Need	**0.92**	**1.62**	**0.54**	**1.62**	**0.60**	**0.80**	**1.08**	**1.38**	**1.54**	**0.46**	**1.38**	**1.85**	**1.15**

*A segment need rating of 'None' does not indicate a lack of needed improvements; rather, it indicates that the segment performance score exceeds the established performance thresholds and strategic solutions for that segment will not be developed as part of this study.
+Identified as an emphasis area for the SR 95 corridor.

Average Need Scale	
None*	<0.1
Low	0.1 - 1.0
Medium	1.0 - 2.0
High	> 2.0

Appendix E: Life-Cycle Cost Analysis

Bridge LCCA

Mockingbird Wash Bridge (#1915) / SR 95 / MP 178.26

Bridge Information	
Bridge Deck Area (A225)	11573 SF
Year Built (N27)	1982
Exp Service Life	75 YR
Total Bridge Length (N49)	163 LF
Number of Spans (N45+N46)	5
Skew Angle (N34)	13 DEG
Average Elevation	810 FT
Max Pier Height	18 FT
* Amount of Widening for Bridge	0 FT
Revised Deck Area (Bridge Replace)	11573 SF
**Scour Critical Rating (N113)	7

Deterioration Slope				
Item	Deterioration Line Equation			Year
	Slope =	Days	Years	Drop
Substr	y =	0.000300x	0.110x	-9.13
Superstr	y =	0.000500x	0.183x	-5.48
Deck	y =	0.000500x	0.183x	-5.48

Cost Multipliers		
Elevation > 4000ft	810	1.00
Pier Height > 30ft	18	1.00
Length to # span ratio	32.60	1.25
Skew > 30degrees	13.00	1.00
Project Cost Multiplier	All Options	2.20

L to # Span Multiplier	
L/ # Span Ratio	Multiplier
=>100	1.00
=>60	1.10
<60	1.25

Skew Multiplier	
Skew	Multiplier
<30	1.00
=>30	1.10

Adjusted Bridge Replace Cost	
Base Bridge Replacement Cost (Per SF)	$125.00
Bridge Replacement Cost w/ Multipliers (Per SF)	$156.25

Elevation Multiplier	
Elev	Multiplier
<4000	1.00
=>4000	1.25

Pier H Multiplier	
Pier H	Multiplier
<30	1.00
=>30	1.10

Bridge History (Inspections/As-builts)

Description	Category	Year
Bridge Inspection Report (2014): Hairline to wide transverse cracks on deck surface over bridge abutment joints, Overall deck has extensive hairline to medium cracks, Deck repair was recommended, Abutment walls have minor vertical cracks, Repair recommendation for the approach slabs		2014
Bridge Inspection Report: Similar to previous years. Recommended repairs: Repair the deck and approach slabs.		2014
Bridge Inspection Report: Similar to previous years. Recommended repairs: Repair the deck and approach slabs.		2012
Bridge Inspection Report: Similar to previous years. Recommended repairs: "based on the condition of the concrete deck wearing surface as well as the concrete approach slabs, a rehabilitation of these elements is in order."		2010
Bridge Inspection Report: Similar to previous years. Recommended repairs: repair clogged deck drains		2008
Bridge Inspection Report: Deck top has extensive fine to medium transverse and random cracks; Deck bottom has longitudinal and random cracking with efflorescence and dark leakage; barriers have minor fine vertical cracking. Superstructure: Concrete slab has random cracks and minor spalls on East fascia, partially patch. Substructure: Abutments have minor fine vertical cracking; piers have fine to medium vertical and diagonal cracking and minor spalling. AC roadway has medium cracks over abutments joints separating approach slabs from deck slabs. No recommended repairs		2006
Widened to 4 lanes		2006
Bridge Inspection Report: Deck bottom has longitudinal and random cracking with tan leakage; barriers have minor fine vertical cracking; concrete slab of superstructure has random crakcs; abutments have minor fine vertical cracking; piers have minor fine vertical and diagonal cracking; slope protection seems to be working. No recommended repairs		2004
As-built - initial construction (F-063-2-502)		1982

Replace / Rehab / Repair Information

BRIDGE DECK				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Deck)	Full Deck Replacement	$78.13	25	Rating = 8
Rehab (Deck Concrete Overlay)	Overlay (Concrete)	$10.00	15	+ 2
Rehab (Deck Epoxy Overlay)	Overlay (Epoxy)	$5.00	10	+ 1
Repair (Deck)	Patch Spalls / Seal Cracks	$3.00	See Deterioration Slope	+ 0
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 0
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 0

SUPERSTRUCTURE - STEEL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Stl)	Full SuperStr Replacement	$78.13	50	Rating = 8
Rehab (Supr - Stl)	Weld New Structural Components	$39.06	15	+ 2
Repair (Supr - Stl)	Weld Repair / Crack Relief	$5.00	See Deterioration Slope	+ 1

SUPERSTRUCTURE - CONCRETE				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Conc)	Full SuperStr Replacement	$78.13	50	Rating = 8
Rehab (Supr - Conc)	Replace Structural Component	$39.06	15	+ 2
Repair (Supr - Conc)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

SUBSTRUCTURE - STRUCTURAL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Substr)	Full SubStr Replacement	$78.13	75	Rating = 8
Rehab (Substr)	Replace Structural Component	$39.06	50	+ 2
Repair (Substr)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1

SUBSTRUCTURE - SCOUR				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Rehab (Substr - Scour)	Add scour protection slabs	$39.06	50	+ 2
Repair (Substr - Scour)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

Year	Substructure Rating	Substructure Item	Substructure Cost (Per SF)	Substructure Cost (Total)	Substructure Service Life	Substructure Rating Increase	Superstructure Rating	Superstructure Item	Superstructure Cost (Per SF)	Superstructure Cost (Total)	Superstructure Service Life	Superstructure Rating Increase	Deck Rating	Deck Item	Deck Cost (Per SF)	Deck Cost (Total)	Deck Service Life	Deck Rating Increase	Summary Minimum Rating	Summary Total Cost Per Year (2015 $ raw costs)	Summary Present Value at 3%	Summary Present Value at 7%
2015	6	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.								
2016	6						5						5									
2017	6						5						5									
2018	6						5						5									
2019	6						5						5									
2020	6						4						4									
2021	8	Replace (Bridge)	$156.25	$1,808,281.25	75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	$1,808,281.25	$1,514,407.08	$1,204,934.15
2022	8						8						8						8			
2023	8						8						8						8			
2024	8						8						8						8			
2025	8						8						8						8			
2026	8						8						8						8			
2027	8						8						8						8			
2028	8						8						8						8			
2029	8						8						8						8			
2030	8						8						8						8			
2031	7						7						7						7			
2032	7						7						7						7			
2033	7						7						7						7			
2034	7						7						7						7			
2035	7						7						7						7			
2036	7						7						7						7			
2037	7						7						7						7			
2038	7						7						7						7			
2039	7						7						7						7			
2040	6						6						6						6			
2041	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+0	7	$104,157.00	$48,297.05	$17,935.37
2042	7						7						7						7			
2043	7						7						7						7			
2044	7						7						7						7			
2045	7						7						7						7			
2046	7						7						7						7			
2047	7						7						7						7			
2048	7						7						7						7			
2049	7						7						7						7			
2050	7						7						7						7			
2051	6						6						6						6			
2052	6						6						6						6			
2053	6						6						6						6			
2054	6						6						6						6			
2055	6						6						6						6			
2056	6						6						6						6			
2057	6						6						6						6			
2058	6						6						6						6			
2059	6						6						6						6			
2060	5						5						5						5			
2061	6	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	6	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	6	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+0	6	$104,157.00	$26,740.91	$4,634.84
2062	6						6						6						6			
2063	6						6						6						6			
2064	6						6						6						6			
2065	6						6						6						6			
2066	6						6						6						6			
2067	6						6						6						6			
2068	6						6						6						6			
2069	6						6						6						6			
2070	6						6						6						6			
2071	5						5						5						5			
2072	5						5						5						5			
2073	5						5						5						5			
2074	5						5						5						5			
2075	5						5						5						5			
2076	5						5						5						5			
2077	5						5						5						5			
2078	5						5						5						5			
2079	5						5						5						5			
2080	4						4						4						4			
																			Total Cost =	$2,016,595.25	$1,589,445.04	$1,227,504.35

	Substructure						*Superstructure*						*Deck*						*Summary*			
Year	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Minimum Rating	Total Cost Per Year (2015 $ raw costs)	Present Value at 3%	Present Value at 7%
2015	6	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.								
2016	6						5						5									
2017	6						5						5									
2018	6						5						5									
2019	6						5						5									
2020	6						4						4									
2021	6						6	Rehab (Supr - Conc)	$39.06	$452,070.31	15	+2	6	Rehab (Deck Concrete Overlay)	$10.00	$115,730.00	15	+2	6	$567,800.31	$475,523.82	$378,349.32
2022	6						6						6						6			
2023	6						6						6						6			
2024	5						6						6						5			
2025	5						6						6						5			
2026	5						6						6						5			
2027	5						5						5						5			
2028	5						5						5						5			
2029	5						5						5						5			
2030	5						5						5						5			
2031	5						5						5						5			
2032	5						5						5						5			
2033	4						4						5	Repair (After Rehab)	$3.00	$34,719.00	10	+0	4	$34,719.00	$20,393.75	$10,272.10
2034	6	Rehab (Substr)	$39.06	$452,070.31	50	+2	5	Repair (After Rehab)	$3.00	$34,719.00	10	+1	5						5	$486,789.31	$277,609.14	$134,601.30
2035	6						5						5						5			
2036	6						5						5						5			
2037	6						5						5						5			
2038	6						5						5						5			
2039	6						5						7	Rehab (Deck Concrete Overlay)	$10.00	$115,730.00	15	+2	5	$115,730.00	$56,931.49	$22,815.78
2040	6						4						7						4			
2041	6						5	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	7						5	$57,865.00	$26,831.70	$9,964.09
2042	6						5						7						5			
2043	5						5						7						5			
2044	5						5						7						5			
2045	5						5						6						5			
2046	5						5						6						5			
2047	5						4						6						4			
2048	5	Repair (After Rehab)	$3.00	$34,719.00	10	+1	5	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	6						5	$92,584.00	$34,906.60	$9,928.22
2049	5						5						6						5			
2050	5						5						6						5			
2051	5						5						5						5			
2052	5						5						5						5			
2053	5						5						5						5			
2054	5						4						5						4			
2055	5						5	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	5						5	$57,865.00	$17,738.91	$3,864.25
2056	5						5						5						5			
2057	8	Replace (Bridge)	$156.25	$1,808,281.25	75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	$1,808,281.25	$522,519.55	$105,474.46
2058	8						8						8						8			
2059	8						8						8						8			
2060	8						8						8						8			
2061	8						8						8						8			
2062	8						8						8						8			
2063	8						8						8						8			
2064	8						8						8						8			
2065	8						8						8						8			
2066	8						8						8						8			
2067	7						8						8						7			
2068	7						8						8						7			
2069	7						7						7						7			
2070	7						7						7						7			
2071	7						7						7						7			
2072	7						7						7						7			
2073	7						7						7						7			
2074	7						7						7						7			
2075	7						6						6						6			
2076	6						6						6						6			
2077	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	6	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+0	6	$104,157.00	$16,664.05	$1,569.98
2078	7						7						6						6			
2079	7						7						6						6			
2080	7						7						6						6			
																		Total Cost =		$3,325,790.88	$1,449,119.01	$676,839.50

	Substructure						*Superstructure*						*Deck*							*Summary*		
Year	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Minimum Rating	Total Cost Per Year (2015 $ raw costs)	Present Value at 3%	Present Value at 7%
2015	6	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.								
2016	6						5						5									
2017	6						5						5									
2018	6						5						5									
2019	6						5						5									
2020	6						4						4									
2021	6						5	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	6	Rehab (Deck Concrete Overlay)	$10.00	$115,730.00	15	+2	5	$173,595.00	$145,383.08	$115,673.68
2022	6						5						6						5			
2023	6						5						6						5			
2024	5						5						6						5			
2025	5						5						6						5			
2026	5						5						6						5			
2027	5						4	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	5						4	$57,865.00	$40,585.35	$25,692.75
2028	5						5						5						5			
2029	5						5						5						5			
2030	5						5						5						5			
2031	5						5						5						5			
2032	5						5						5	Repair (After Rehab)	$3.00	$34,719.00	10	+0	5	$34,719.00	$21,005.57	$10,991.15
2033	4						5						5						4			
2034	5	Repair (Substr)	$5.00	$57,865.00	-9	+1	4	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	5						4	$115,730.00	$65,999.20	$32,000.31
2035	5						5						5						5			
2036	5						5						5						5			
2037	5						5						5	Repair (Deck)	$3.00	$34,719.00	-5	+0	5	$34,719.00	$18,119.59	$7,836.54
2038	5						5						5						5			
2039	5						5						5						5			
2040	5						5						5						5			
2041	5						4	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	5						4	$57,865.00	$26,831.70	$9,964.09
2042	5						5						5						5			
2043	4						5						5	Repair (Deck)	$3.00	$34,719.00	-5	+0	4	$34,719.00	$15,174.87	$5,221.81
2044	5	Repair (Substr)	$5.00	$57,865.00	-9	+1	5						5						5	$57,865.00	$24,554.80	$8,133.67
2045	5						5						5						5			
2046	5						5						5						5			
2047	5						5						5						5			
2048	5						4	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	5						4	$57,865.00	$21,816.62	$6,205.14
2049	5						5						5	Repair (Deck)	$3.00	$34,719.00	-5	+0	5	$34,719.00	$12,708.71	$3,479.52
2050	5						5						5						5			
2051	5						5						5						5			
2052	5						5						5						5			
2053	4						5	Repair (Supr - Conc)	$5.00	$57,865.00	-5	+1	5						4	$57,865.00	$18,819.21	$4,424.18
2054	5	Repair (Substr)	$5.00	$57,865.00	-9	+1	5						5	Repair (Deck)	$3.00	$34,719.00	-5	+0	5	$92,584.00	$29,233.73	$6,615.59
2055	5						5						5						5			
2056	5						5						5						5			
2057	8	Replace (Bridge)	$156.25	$1,808,281.25	75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	$1,808,281.25	$522,519.55	$105,474.46
2058	8						8						8						8			
2059	8						8						8						8			
2060	8						8						8						8			
2061	8						8						8						8			
2062	8						8						8						8			
2063	8						8						8						8			
2064	8						8						8						8			
2065	7						7						7						7			
2066	7						7						7						7			
2067	7						7						7						7			
2068	7						7						7						7			
2069	7						7						7						7			
2070	7						7						7						7			
2071	7						7						7						7			
2072	7						7						7						7			
2073	7						7						7						7			
2074	6						6						6						6			
2075	6						6						6						6			
2076	6						6						6						6			
2077	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$34,719.00	20	+0	7	$104,157.00	$16,664.05	$1,569.98
2078	7						7						7						7			
2079	7						7						7						7			
2080	7						7						7						7			
																			Total Cost =	$2,722,548.25	$979,416.02	$343,282.85

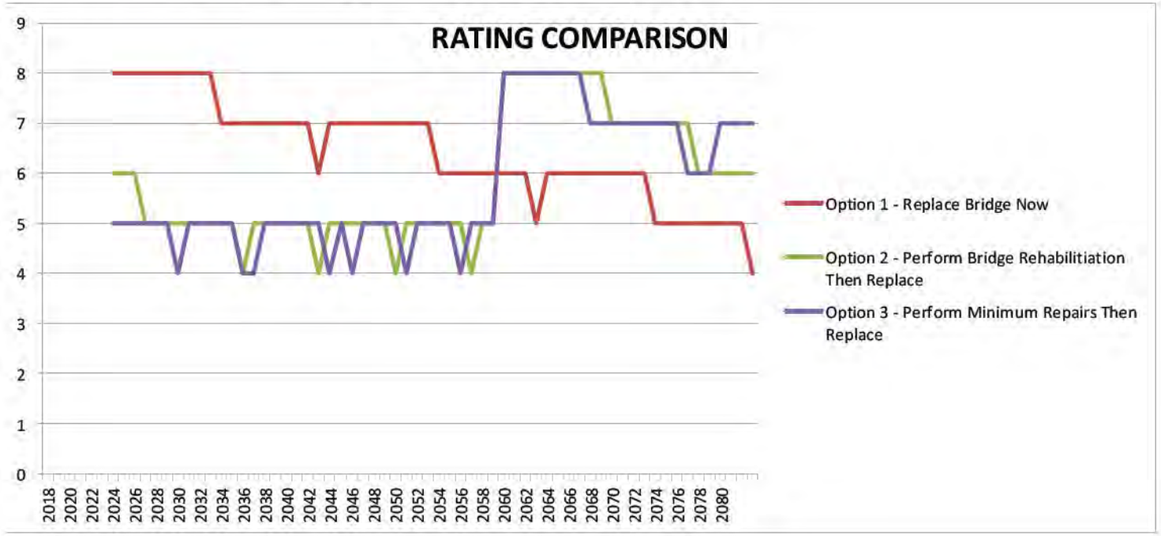
Mockingbird Wash Bridge (#1915) / SR 95 / MP 178.26

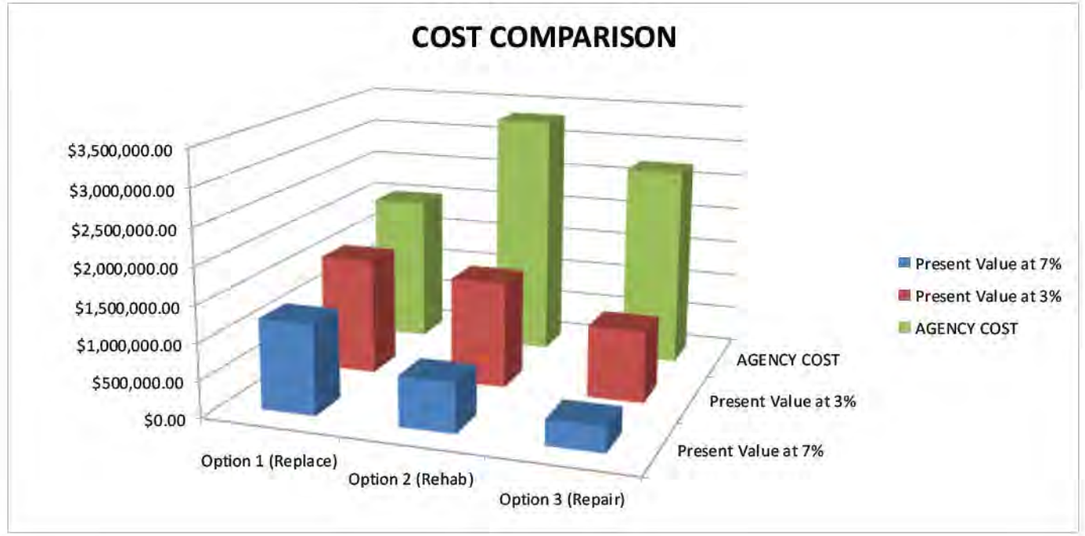
COST COMPARISON Present Value 2015 Dollars - Raw Costs			
OPTION	AGENCY COST	3%	7%
Option 1 (Replace)	$ 2,016,595.25	$1,589,445.04	$1,227,504.35
Option 2 (Rehab)	$ 3,325,790.88	$1,449,119.01	$676,839.50
Option 3 (Repair)	$ 2,722,548.25	$979,416.02	$343,282.85

Comparison to Replacement			
Option	Agency Cost	3%	7%
2 (Rehab)	60.64%	109.68%	181.36%
3 (Repair)	74.07%	162.28%	357.58%

COST COMPARISON Present Value 2015 Dollars - Fully Loaded Costs			
OPTION	AGENCY COST	3%	7%
Option 1 (Replace)	$4,436,510	$3,496,779	$2,700,510
Option 2 (Rehab)	$7,316,740	$3,188,062	$1,489,047
Option 3 (Repair)	$5,989,606	$2,154,715	$755,222

Bridge Ratings Per Option		
OPTION	AVG RATING	END RATING
Option 1 (Replace)	6.45	4
Option 2 (Rehab)	5.85	6
Option 3 (Repair)	5.77	7





Bouse Wash Bridge (#1321) / SR 95 / MP 131.33

Bridge Information	
Bridge Deck Area (A225)	21491 SF
Year Built (N27)	1970
Exp Service Life	75 YR
Total Bridge Length (N49)	584 LF
Number of Spans (N45+N46)	17
Skew Angle (N34)	0 DEG
Average Elevation	624 FT
Max Pier Height	23 FT
* Amount of Widening for Bridge	6 FT
Revised Deck Area (Bridge Replace)	24995 FT
**Scour Critical Rating (N113)	7

Deterioration Slope				
Item	Deterioration Line Equation			Year
	Slope =	Days	Years	Drop
Substr	y =	0.000300x	0.110x	-9.13
Superstr	y =	0.000400x	0.146x	-6.85
Deck	y =	0.000400x	0.146x	-6.85

Cost Multipliers		
Elevation > 4000ft	624	1.00
Pier Height > 30ft	23	1.00
Length to # span ratio	34.35	1.25
Skew > 30degrees	0.00	1.00
Project Cost Multiplier	All Options	2.20

L to # Span Multiplier	
L/ # Span Ratio	Multiplier
=>100	1.00
=>60	1.10
<60	1.25

Skew Multiplier	
Skew	Multiplier
<30	1.00
=>30	1.10

Adjusted Bridge Replace Cost	
Base Bridge Replacement Cost (Per SF)	$125.00
Bridge Replacement Cost w/ Multipliers (Per SF)	$156.25

Elevation Multiplier	
Elev	Multiplier
<4000	1.00
=>4000	1.25

Pier H Multiplier	
Pier H	Multiplier
<30	1.00
=>30	1.10

Bridge History (Inspections/As-builts)

Description	Category	Year
Bridge Inspection Report (2014): Extensive hairline to medium longitudinal cracking, Fair Deck Rating (5), Random horizontal cracking on piers		2014
Bridge Inspection Report (2012): Pier columns have small hairline horizontal and random cracks, Minor cour around the pier columns		2012
Bridge Inspection Report: The concrete deck wearing surface has extensive hairline to fine to medium sized longitudinal and map cracks. There is minor rutting of the traveled lanes.		2010
Bridge Inspection Report : Deck surface has extensive hairline to medium sized longitudinal and map cracks; Deck underside has hairline sized longitudinal and few map cracks; curbs have minor hairline sized vertical cracks; east railing at bottom near south joint has minor dent; there is debri in joints and in the shoulder area long curbe lines.		2008
Bridge Inspection Report: Deck top has extensive minor fine random cracking and debri deposited in shoulder; deck bottom has hairline longitudinal cracking; curbs have extensive minor fine vertical cracking; east railing at bottom near shout joint has minor dent; hinges are somewhat rusty on bottom.		2006
Bridge Inspection Report: Deck top has extensive minor fine random cracking; deck bottom has hairline longitudinal cracking; curbs have extensive minor fine vertical cracking.		2004
As-builts- Initial construction (S-264-505)		1969

Replace / Rehab / Repair Information

BRIDGE DECK				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Deck)	Full Deck Replacement	$78.13	25	Rating = 8
Rehab (Deck Concrete Overlay)	Overlay (Concrete)	$10.00	15	+ 2
Rehab (Deck Epoxy Overlay)	Overlay (Epoxy)	$5.00	10	+ 1
Repair (Deck)	Patch Spalls / Seal Cracks	$3.00	See Deterioration Slope	+ 0
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 0
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 0

SUPERSTRUCTURE - STEEL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Stl)	Full SuperStr Replacement	$78.13	50	Rating = 8
Rehab (Supr - Stl)	Weld New Structural Components	$39.06	15	+ 2
Repair (Supr - Stl)	Weld Repair / Crack Relief	$5.00	See Deterioration Slope	+ 1

SUPERSTRUCTURE - CONCRETE				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Supr - Conc)	Full SuperStr Replacement	$78.13	50	Rating = 8
Rehab (Supr - Conc)	Replace Structural Component	$39.06	15	+ 2
Repair (Supr - Conc)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

SUBSTRUCTURE - STRUCTURAL				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Replace (Substr)	Full SubStr Replacement	$78.13	75	Rating = 8
Rehab (Substr)	Replace Structural Component	$39.06	50	+ 2
Repair (Substr)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1

SUBSTRUCTURE - SCOUR				
ITEM	**DESCRIPTION**	**UNIT COST (Per SF)**	**LIFE (YRS)**	**RATING BENEFIT**
Rehab (Substr - Scour)	Add scour protection slabs	$39.06	50	+ 2
Repair (Substr - Scour)	Patch Spalls / Seal Cracks	$5.00	See Deterioration Slope	+ 1
Replace (Bridge)	Full Bridge Replacement	$156.25	75	Rating = 8
Repair (After Bridge Replace)	Patch Spalls / Seal Cracks	$3.00	20	+ 1
Repair (After Rehab)	Patch Spalls / Seal Cracks	$3.00	10	+ 1

	Substructure						*Superstructure*						*Deck*						*Summary*			
Year	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Minimum Rating	Total Cost Per Year (2015 $ raw costs)	Present Value at 3%	Present Value at 7%
2015	7	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.								
2016	7						5						5									
2017	7						5						5									
2018	7						5						5									
2019	7						5						5									
2020	7						5						5									
2021	8	Replace (Bridge)	$156.25	$3,905,468.75	75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	$3,905,468.75	$3,270,768.59	$2,602,378.73
2022	8						8						8						8			
2023	8						8						8						8			
2024	8						8						8						8			
2025	8						8						8						8			
2026	8						8						8						8			
2027	8						8						8						8			
2028	8						8						8						8			
2029	8						8						8						8			
2030	8						8						8						8			
2031	7						7						7						7			
2032	7						7						7						7			
2033	7						7						7						7			
2034	7						7						7						7			
2035	7						7						7						7			
2036	7						7						7						7			
2037	7						7						7						7			
2038	7						7						7						7			
2039	7						7						7						7			
2040	6	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+1	6	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+1	6	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+0	6	$224,955.00	$107,439.76	$41,447.77
2041	7						7						7						7			
2042	7						7						7						7			
2043	7						7						7						7			
2044	7						7						7						7			
2045	7						7						7						7			
2046	7						7						7						7			
2047	7						7						7						7			
2048	7						7						7						7			
2049	7						7						7						7			
2050	7						7						7						7			
2051	6						6						6						6			
2052	6						6						6						6			
2053	6						6						6						6			
2054	6						6						6						6			
2055	6						6						6						6			
2056	6						6						6						6			
2057	6						6						6						6			
2058	6						6						6						6			
2059	6						6						6						6			
2060	5	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+1	5	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+1	5	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+0	5	$224,955.00	$59,486.79	$10,710.89
2061	6						6						6						6			
2062	6						6						6						6			
2063	6						6						6						6			
2064	6						6						6						6			
2065	6						6						6						6			
2066	6						6						6						6			
2067	6						6						6						6			
2068	6						6						6						6			
2069	6						6						6						6			
2070	6						6						6						6			
2071	5						5						5						5			
2072	5						5						5						5			
2073	5						5						5						5			
2074	5						5						5						5			
2075	5						5						5						5			
2076	5						5						5						5			
2077	5						5						5						5			
2078	5						5						5						5			
2079	5						5						5						5			
2080	4						4						4						4			
																			Total Cost =	$4,355,378.75	$3,437,695.14	$2,654,537.40

	Substructure						*Superstructure*						*Deck*						*Summary*			
Year	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Minimum Rating	Total Cost Per Year (2015 $ raw costs)	Present Value at 3%	Present Value at 7%
2015	7	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.								
2016	7						5						5									
2017	7						5						5									
2018	7						5						5									
2019	7						5						5									
2020	7						5						5									
2021	8						5						5						5			
2022	8						4	Rehab (Supr - Conc)	$39.06	$839,492.19	15	+2	4	Rehab (Deck Concrete Overlay)	$10.00	$214,910.00	15	+2	4	$1,054,402.19	$857,325.47	$656,628.69
2023	8						6						6						6			
2024	8						6						6						6			
2025	8						6						6						6			
2026	8						6						6						6			
2027	8						6						6						6			
2028	8						6						6						6			
2029	8						6						6						6			
2030	8						5						5						5			
2031	7						5						5						5			
2032	7						5						5						5			
2033	7						5						5						5			
2034	7						5						5						5			
2035	7						5						5						5			
2036	7						5						5	Repair (After Rehab)	$3.00	$64,473.00	10	+0	5	$64,473.00	$34,657.41	$15,571.07
2037	7						4	Repair (After Rehab)	$3.00	$64,473.00	10	+1	5						4	$64,473.00	$33,647.98	$14,552.40
2038	7						5						5						5			
2039	6						5						5						5			
2040	6						5						5						5			
2041	6						5						5						5			
2042	6						5						5						5			
2043	6						5						5						5			
2044	6						5						4						4			
2045	8	Replace (Bridge)	$156.25	$3,905,468.75	75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	$3,905,468.75	$1,609,001.41	$513,050.17
2046	8						8						8						8			
2047	8						8						8						8			
2048	8						8						8						8			
2049	8						8						8						8			
2050	8						8						8						8			
2051	8						8						8						8			
2052	8						7						7						7			
2053	8						7						7						7			
2054	7						7						7						7			
2055	7						7						7						7			
2056	7						7						7						7			
2057	7						7						7						7			
2058	7						7						7						7			
2059	7						7						7						7			
2060	7						6						6						6			
2061	7						6						6						6			
2062	7						6						6						6			
2063	6						6						6						6			
2064	7	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+0	7	$224,955.00	$52,853.24	$8,171.29
2065	7						7						7						7			
2066	7						7						7						7			
2067	7						7						7						7			
2068	7						7						7						7			
2069	7						7						7						7			
2070	7						7						7						7			
2071	7						6						6						6			
2072	6						6						6						6			
2073	6						6						6						6			
2074	6						6						6						6			
2075	6						6						6						6			
2076	6						6						6						6			
2077	6						6						6						6			
2078	6						5						5						5			
2079	6						5						5						5			
2080	6						5						5						5			
																			Total Cost =	**$5,313,771.94**	**$2,587,485.52**	**$1,207,973.63**

	Substructure						*Superstructure*						*Deck*						*Summary*			
Year	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Rating	Item	Cost (Per SF)	Cost (Total)	Service Life	Rating Increase	Minimum Rating	Total Cost Per Year (2015 $ raw costs)	Present Value at 3%	Present Value at 7%
2015	7	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.					5	No Rehab/Repair Work Can Be Done. Not Yet In 5-Year Program.								
2016	7						5						5									
2017	7						5						5									
2018	7						5						5									
2019	7						5						5									
2020	7						5						5									
2021	8						5						5	Repair (Deck)	$3.00	$64,473.00	-7	+0	5	$64,473.00	$53,995.12	$42,961.08
2022	8						4						5						4			
2023	8						5	Repair (Supr - Conc)	$5.00	$107,455.00	-7	+1	5						5	$107,455.00	$84,825.97	$62,539.79
2024	8						5						5						5			
2025	8						5						5						5			
2026	8						5						5						5			
2027	8						5						5						5			
2028	8						5						5	Repair (Deck)	$3.00	$64,473.00	-7	+0	5	$64,473.00	$43,902.98	$26,754.00
2029	8						5						5						5			
2030	8						4	Repair (Supr - Conc)	$5.00	$107,455.00	-7	+1	5						4	$107,455.00	$68,971.28	$38,946.64
2031	7						5						5						5			
2032	7						5						5						5			
2033	7						5						5						5			
2034	7						5						5						5			
2035	7						5						5	Repair (Deck)	$3.00	$64,473.00	-7	+0	5	$64,473.00	$35,697.14	$16,661.05
2036	7						5						5						5			
2037	7						5						5						5			
2038	7						4	Repair (Supr - Conc)	$5.00	$107,455.00	-7	+1	5						4	$107,455.00	$54,446.56	$22,667.30
2039	6						5						5						5			
2040	6						5						5						5			
2041	6						5						5	Repair (Deck)	$3.00	$64,473.00	-7	+0	5	$64,473.00	$29,895.79	$11,101.96
2042	6						5						5						5			
2043	6						5						5						5			
2044	6						5						5						5			
2045	8	Replace (Bridge)	$156.25	$3,905,468.75	75	Rating = 8	8	Replace (Supr - Conc)	$78.13	$1,678,984.38	50	Rating = 8	8	Replace (Bridge)			75	Rating = 8	8	$5,584,453.13	$2,300,720.75	$733,613.51
2046	8						8						8						8			
2047	8						8						8						8			
2048	8						8						8						8			
2049	8						8						8						8			
2050	8						8						8						8			
2051	8						8						8						8			
2052	8						8						8						8			
2053	8						8						8						8			
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2055	7						7						7						7			
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2057	7						7						7						7			
2058	7						7						7						7			
2059	7						7						7						7			
2060	7						7						7						7			
2061	7						7						7						7			
2062	7						7						7						7			
2063	7						7						7						7			
2064	6						6						6						6			
2065	7	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$64,473.00	20	+1	7	Repair (After Bridge Replace)	$3.00	$74,985.00	20	+0	7	$214,443.00	$48,915.97	$7,279.86
2066	7						7						7						7			
2067	7						7						7						7			
2068	7						7						7						7			
2069	7						7						7						7			
2070	7						7						7						7			
2071	7						7						7						7			
2072	7						7						7						7			
2073	7						7						7						7			
2074	7						7						7						7			
2075	6						6						6						6			
2076	6						6						6						6			
2077	6						6						6						6			
2078	6						6						6						6			
2079	6						6						6						6			
2080	6						6						6						6			
																			Total Cost =	**$6,379,153.13**	**$2,721,371.55**	**$962,525.18**

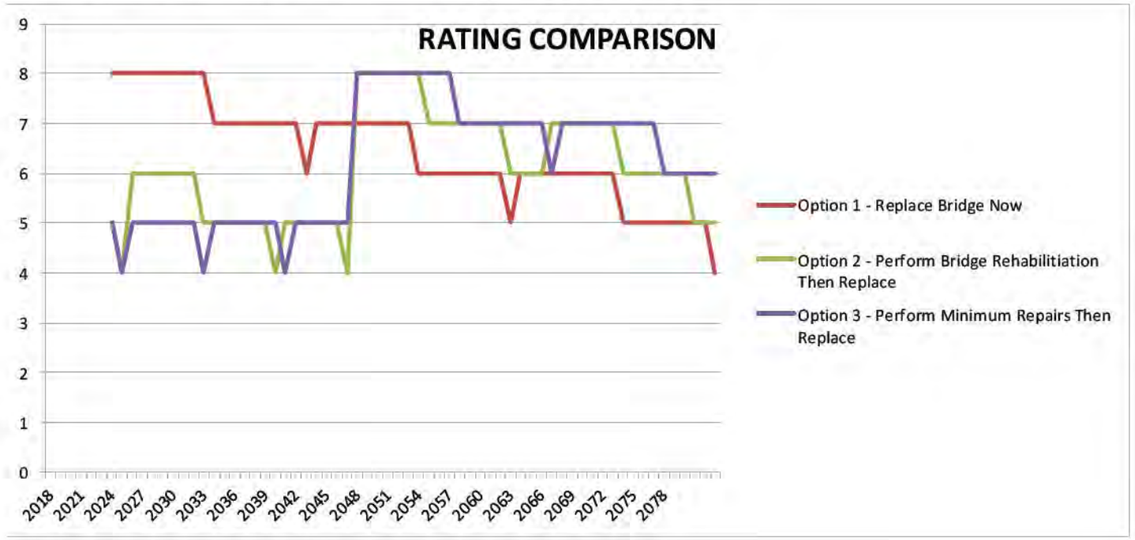
Bouse Wash Bridge (#1321) / SR 95 / MP 131.33

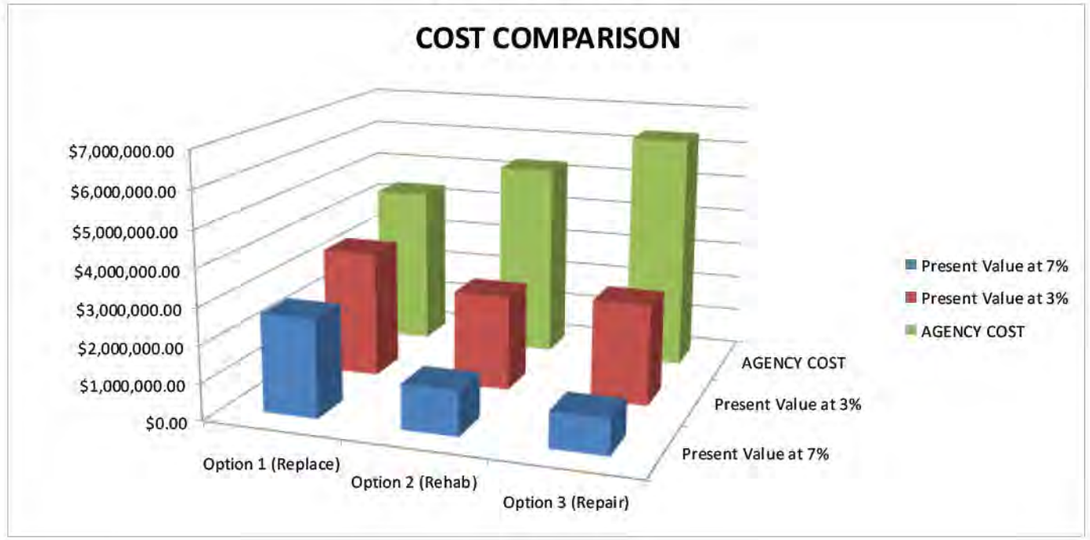
COST COMPARISON Present Value 2015 Dollars - Raw Costs			
OPTION	AGENCY COST	3%	7%
Option 1 (Replace)	$ 4,355,378.75	$3,437,695.14	$2,654,537.40
Option 2 (Rehab)	$ 5,313,771.94	$2,587,485.52	$1,207,973.63
Option 3 (Repair)	$ 6,379,153.13	$2,721,371.55	$962,525.18

Comparison to Replacement			
Option	Agency Cost	3%	7%
2 (Rehab)	81.96%	132.86%	219.75%
3 (Repair)	68.28%	126.32%	275.79%

COST COMPARISON Present Value 2015 Dollars - Fully Loaded Costs			
OPTION	AGENCY COST	3%	7%
Option 1 (Replace)	$9,581,833	$7,562,929	$5,839,982
Option 2 (Rehab)	$11,690,298	$5,692,468	$2,657,542
Option 3 (Repair)	$14,034,137	$5,987,017	$2,117,555

Bridge Ratings Per Option		
OPTION	AVG RATING	END RATING
Option 1 (Replace)	6.45	4
Option 2 (Rehab)	6.10	5
Option 3 (Repair)	6.20	6





Pavement LCCA

Project Details	
Project title	SR 95 Corridor Profile Study
Route	SR 95
Milepost begin	116
Milepost end	121

Existing Roadway Characteristics			
Surface type (Asphalt or Concrete)	=	Asphalt	<<Select from Pull-down List>>
# of directions of travel (1 = one-way; 2 = two-way)	=	2	
# of lanes (in one direction)	=	1	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	2	
Right shoulder width (ft)	=	2	
Total roadway analysis segment length (centerline miles)	=	5	
Current year	=	2016	
Elevation (> 4,000 ft or < 4,000 ft)?	=	< 4,000 ft	<<Select from Pull-down List>>
Roadway width (ft) [each direction lanes & shoulders]	=	16	
Total lane-miles [total traffic direction lanes & shoulders]	=	13.3	
Total square feet [total traffic direction lanes & shoulders]	=	844,800	
Total square yards [total traffic direction lanes & shoulders]	=	93,867	

LCCA Parameters		
Analysis period (years)	=	40
Year of net present value	=	2017
First year of improvements	=	2021
Discount rate (%) - low	=	3%
Discount rate (%) - high	=	7%

Design Alternatives (DA)

Characteristics			Pavement Material Cost ($)		
Treatment Type	*Pavement Thickness*	*Typical Service Life (years)*	*Lane-miles*	*Square Feet*	*Square Yards*
Concrete Reconstruction	8"-12"	30-34	$350,000	$5.5	$50
Asphalt Reconstruction	8"-12"	26-30	$280,000	$4.4	$40
Concrete Medium Rehab	1"-3"	24-28	$75,000	$1.2	$11
Concrete Light Rehab	<1"	18-22	$50,000	$0.8	$7
Asphalt Medium Rehab	3"-8"	20-24	$105,000	$1.7	$15
Asphalt Light Rehab	<3"	14-18	$70,000	$1.1	$10

Reconstruction: Other Materials Cost Factor
1.60

Rehab: Other Materials Cost Factor
1.20

Total Cost Factor (e.g., includes design, mobilization, traffic control, contingency, etc.)
2.44

			Total Unit Cost ($) [includes material costs and indirect costs]			Total Bi-Directional Cost ($)
Treatment Type	Pavement Thickness	Typical Service Life (years)	Lane-miles	Square Feet	Square Yards	Total Cost
Concrete Reconstruction	8"-12"	30-34	$1,366,400	$21.6	$194	$18,218,667
Asphalt Reconstruction	8"-12"	26-30	$1,093,120	$17.3	$155	$14,574,933
Concrete Medium Rehab	1"-3"	24-28	$219,600	$3.5	$31	$2,928,000
Concrete Light Rehab	<1"	18-22	$146,400	$2.3	$21	$1,952,000
Asphalt Medium Rehab	3"-8"	20-24	$307,440	$4.9	$44	$4,099,200
Asphalt Light Rehab	<3"	14-18	$204,960	$3.2	$29	$2,732,800

Pavement Service Life, Intervals, and Sequence of Improvements

SR 95 MP 116 - MP 121

Design Alternative	Typical Service Life Value	Typical Service Life Range	Average Historical Interval Value	Interval to Use in LCCA Before Reconstruction	Interval to Use in LCCA After Reconstruction
Concrete Reconstruction	32	30-34	0	-	16
Asphalt Reconstruction	28	26-30	25	-	14
Concrete Medium Rehab	26	24-28	0	13	13
Concrete Light Rehab	20	18-22	0	10	10
Asphalt Medium Rehab	22	20-24	25	11	11
Asphalt Light Rehab	16	14-18	14.5	8	8
None	0	0	-	-	-

Note: The typical service life values and ranges are determined based on the elevation of the roadway segment using the reference tables below. The typical service life values should be used as the intervals between improvements in the design alternatives except when historical frequency values are available based on the frequency and type of improvements in the past at this location. Historical frequency values should only be used if they are lower than the typical values and only up until reconstruction is implemented, after which typical service life values should be used.

Elevation Below 4000' (Desert Environment)		
Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	32	30-34
Asphalt Reconstruction	28	26-30
Concrete Medium Rehab	26	24-28
Concrete Light Rehab	20	18-22
Asphalt Medium Rehab	22	20-24
Asphalt Light Rehab	16	14-18
None	0	0

Elevation Above 4000' (Mountain Environment)		
Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	28	26-30
Asphalt Reconstruction	24	22-26
Concrete Medium Rehab	22	20-24
Concrete Light Rehab	16	14-18
Asphalt Medium Rehab	18	16-20
Asphalt Light Rehab	12	10-14
None	0	0

Assumed LCCA Sequence of Improvements Based on the Initial Design Alternative Improvement	
Concrete Reconstruction (CR):	CR, CLR, CMR, CLR, CR, CLR, CMR. . .
Asphalt Reconstruction (AR):	AR, ALR, AMR, ALR, AR, ALR, AMR. . .
Concrete Medium Rehab (CMR):	CMR, CLR, CR, CLR, CMR, CLR, CR. . .
Concrete Light Rehab (CLR):	CLR, CR, CLR, CMR, CLR, CR, CLR. . .
Asphalt Medium Rehab (AMR):	AMR, ALR, AR, ALR, AMR, ALR, AR. . .
Asphalt Light Rehab (ALR):	ALR, AR, ALR, AMR, ALR, AR, ALR. . .

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Year	Project Number	Tracs No.	Direction of Improvement	Treatment Type	Improvement Description	Thickness (inches)	Beg. MP	End MP	Length (miles)
1956			NB/SB	Asphalt Light Rehab	Bituminous Treated Surface	2.0	109.1	118.6	9.5
1957	x		NB/SB	Asphalt Light Rehab	Bituminous Treated Surface	2.0	118.6	131.02	12.42
1975	x		NB/SB	Asphalt Light Rehab	Seal Coat - Cover Material With Emulsified Asphalt [0.3]	0.3	110	134	24
1995			NB/SB	Asphalt Medium Rehab	Asphaltic Concrete	2.5	111.82	116.2	4.38
					ACFC Asphaltic Concrete Friction Course	0.5	111.82	116.2	4.38
2000	x		NB/SB	Asphalt Medium Rehab	Asphaltic Concrete	3.0	115.9	126.05	10.15
					ACFC Asphaltic Concrete Friction Course	0.5	115.9	126.05	10.15
2000	x		NB	Asphalt Reconstruction	Aggregate Base	4.0	116	117.64	1.64
					Asphaltic Concrete	5.0	116	117.64	1.64
					ACFC Asphaltic Concrete Friction Course	0.5	116	117.64	1.64
2000	x		SB	Asphalt Reconstruction	Aggregate Base	4.0	117.83	119.48	1.65
					Asphaltic Concrete	5.0	117.83	119.48	1.65
					ACFC Asphaltic Concrete Friction Course	0.5	117.83	119.48	1.65
2011	x		SB	Asphalt Light Rehab	Crack Seal (Rubberized)	0.0	109.05	128.5	19.45
2011			NB	Asphalt Light Rehab	Crack Seal (Rubberized)	0.0	116.06	117.3	1.24
2012			NB	Asphalt Light Rehab	Crack Seal (Rubberized)	0.0	118.16	119.45	1.29

Interval between Improvements in Years	
Asphalt Reconstruction	25
Asphalt Medium Rehab	25
Asphalt Light Rehab	18
Asphalt Light Rehab	11

Treatment Type Options	Estimated Historical Interval Value between Improvements in Years
Concrete Reconstruction	
Asphalt Reconstruction	25
Concrete Medium Rehab	
Concrete Light Rehab	
Asphalt Medium Rehab	25
Asphalt Light Rehab	15

Design Alternative # 1 - Concrete Reconstruction

SR 95 MP 116 - MP 121

Enter Name of Design Alternative

Number of Years	Year	Concrete Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Concrete Reconstruction	$18,218,667	$16,187,049	$13,898,934
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	Concrete Light Rehab	$1,952,000	$1,080,775	$504,434
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	Concrete Medium Rehab	$2,928,000	$1,206,297	$384,643
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	Concrete Light Rehab	$1,952,000	$547,620	$106,409
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Concrete Light Rehab	$1,854,400	$505,086	$94,475
Enter Year of Last Used DA Improvement ››		2060	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$18,516,655	$14,799,944
AGENCY COST	$23,196,267	

Design Alternative # 2 - Asphalt Reconstruction

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Enter Name of Design Alternative

Number of Years	Year	Asphalt Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Reconstruction	$14,574,933	$12,949,639	$11,119,147
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	Asphalt Light Rehab	$2,732,800	$1,605,232	$808,537
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	Asphalt Medium Rehab	$4,099,200	$1,900,777	$705,864
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Asphalt Light Rehab	$2,732,800	$915,441	$223,567
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Light Rehab	$1,537,200	$418,690	$78,315
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$16,952,400	$12,778,800
AGENCY COST	$22,602,533	

Design Alternative # 3 - Asphalt Medium Rehab

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Enter Name of Design Alternative

Number of Years	Year	Asphalt Medium Rehab Focus	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Medium Rehab	$4,099,200	$3,642,086	$3,127,260
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	Asphalt Light Rehab	$2,732,800	$1,754,080	$990,492
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	Asphalt Reconstruction	$14,574,933	$7,384,998	$3,074,537
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Asphalt Light Rehab	$2,732,800	$915,441	$223,567
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Light Rehab	$1,537,200	$418,690	$78,315
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$13,277,916	$7,337,542
AGENCY COST	$22,602,533	

Design Alternative # 4 - Asphalt Light Rehab

SR 95 MP 116 - MP 121

Enter Name of Design Alternative

Number of Years	Year	Asphalt Light Rehab Focus	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Light Rehab	$2,732,800	$2,428,057	$2,084,840
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	Asphalt Reconstruction	$14,574,933	$10,222,565	$6,471,445
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	Asphalt Light Rehab	$2,732,800	$1,267,185	$470,576
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	Asphalt Medium Rehab	$4,099,200	$1,500,491	$410,819
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Medium Rehab	$2,235,927	$609,003	$113,913
Enter Year of Last Used DA Improvement ››		2051	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$14,809,295	$9,323,767
AGENCY COST	$21,903,806	

Summary of LCCA Results

SR 95 MP 116 - MP 121

	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehab Focus	Asphalt Light Rehab Focus
Net Present Value - 3%	$18,516,655	$16,952,400	$13,277,916	$14,809,295
Net Present Value - 7%	$14,799,944	$12,778,800	$7,337,542	$9,323,767
Agency Cost	$23,196,267	$22,602,533	$22,602,533	$21,903,806

Cost Ratio at 3% Discount Rate

1.39 Ratio of Concrete Reconstruction to Lowest Cost Rehab

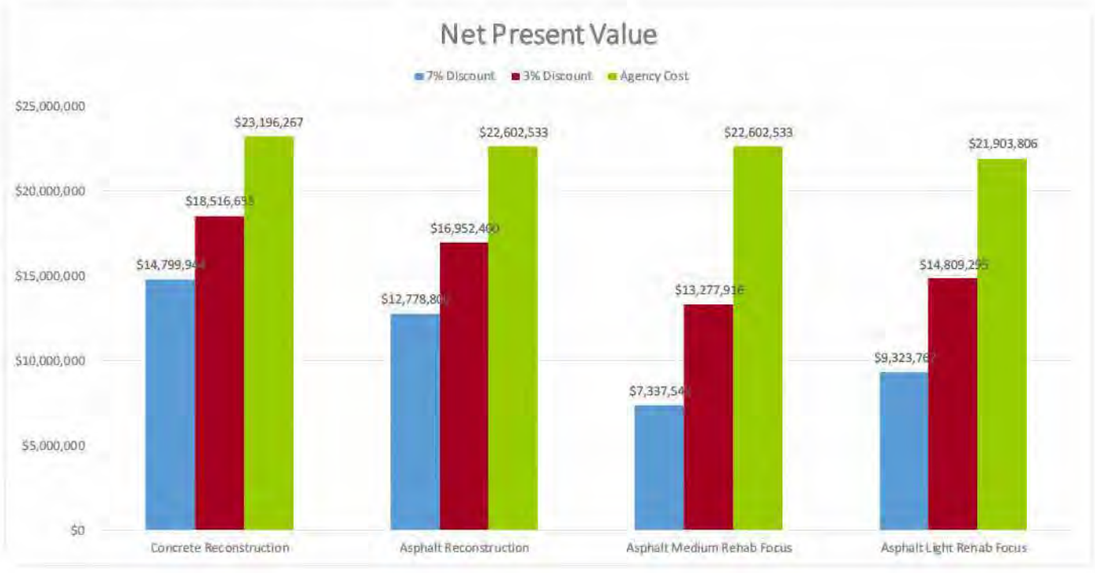
1.28 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Cost Ratio at 7% Discount Rate

2.02 Ratio of Concrete Reconstruction to Lowest Cost Rehab

1.74 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Note: A cost ratio < 1.15 means the Net Present Value (NPV) of reconstruction is within 15% of the NPV of the lowest cost rehab so reconstruction should likely be the initial improvement solution. A cost ratio > 1.15 means the NPV of reconstruction is more than 15% of the NPV of the lowest cost rehab so rehab should likely be the initial improvement solution.



Pavement Life-Cycle Cost Analysis Worksheet

Project Details			
Project title	SR 95 Corridor Profile Study		
Route	SR 95		
Milepost begin	148		
Milepost end	149		
Existing Roadway Characteristics			
Surface type (Asphalt or Concrete)	=	Asphalt	<<Select from Pull-down List>>
# of directions of travel (1 = one-way; 2 = two-way)	=	2	
# of lanes (in one direction)	=	2	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	6	
Right shoulder width (ft)	=	6	
Total roadway analysis segment length (centerline miles)	=	1	
Current year	=	2016	
Elevation (> 4,000 ft or < 4,000 ft)?	=	< 4,000 ft	<<Select from Pull-down List>>
Roadway width (ft) [each direction lanes & shoulders]	=	36	
Total lane-miles [total traffic direction lanes & shoulders]	=	6.0	
Total square feet [total traffic direction lanes & shoulders]	=	380,160	
Total square yards [total traffic direction lanes & shoulders]	=	42,240	
LCCA Parameters			
Analysis period (years)	=	40	
Year of net present value	=	2017	
First year of improvements	=	2021	
Discount rate (%) - low	=	3%	
Discount rate (%) - high	=	7%	

Design Alternatives (DA)

Characteristics			Pavement Material Cost ($)		
Treatment Type	*Pavement Thickness*	*Typical Service Life (years)*	*Lane-miles*	*Square Feet*	*Square Yards*
Concrete Reconstruction	8"-12"	30-34	$350,000	$5.5	$50
Asphalt Reconstruction	8"-12"	26-30	$280,000	$4.4	$40
Concrete Medium Rehab	1"-3"	24-28	$75,000	$1.2	$11
Concrete Light Rehab	<1"	18-22	$50,000	$0.8	$7
Asphalt Medium Rehab	3"-8"	20-24	$105,000	$1.7	$15
Asphalt Light Rehab	<3"	14-18	$70,000	$1.1	$10

Reconstruction: Other Materials Cost Factor: 1.60

Rehab: Other Materials Cost Factor: 1.20

Total Cost Factor (e.g., includes design, mobilization, traffic control, contingency, etc.): 2.44

			Total Unit Cost ($) [includes material costs and indirect costs]			Total Bi-Directional Cost ($)
Treatment Type	Pavement Thickness	Typical Service Life (years)	Lane-miles	Square Feet	Square Yards	Total Cost
Concrete Reconstruction	8"-12"	30-34	$1,366,400	$21.6	$194	$8,198,400
Asphalt Reconstruction	8"-12"	26-30	$1,093,120	$17.3	$155	$6,558,720
Concrete Medium Rehab	1"-3"	24-28	$219,600	$3.5	$31	$1,317,600
Concrete Light Rehab	<1"	18-22	$146,400	$2.3	$21	$878,400
Asphalt Medium Rehab	3"-8"	20-24	$307,440	$4.9	$44	$1,844,640
Asphalt Light Rehab	<3"	14-18	$204,960	$3.2	$29	$1,229,760

Pavement Service Life, Intervals, and Sequence of Improvements

SR 95 MP 148 - MP 149

Design Alternative	Typical Service Life Value	Typical Service Life Range	Average Historical Interval Value	Interval to Use in LCCA Before Reconstruction	Interval to Use in LCCA After Reconstruction
Concrete Reconstruction	32	30-34	-	-	16
Asphalt Reconstruction	28	26-30	16	-	14
Concrete Medium Rehab	26	24-28	-	13	13
Concrete Light Rehab	20	18-22	-	10	10
Asphalt Medium Rehab	22	20-24	-	11	11
Asphalt Light Rehab	16	14-18	10	8	8
None	0	0	-	-	-

Note: The typical service life values and ranges are determined based on the elevation of the roadway segment using the reference tables below. The typical service life values should be used as the intervals between improvements in the design alternatives except when historical frequency values are available based on the frequency and type of improvements in the past at this location. Historical frequency values should only be used if they are lower than the typical values and only up until reconstruction is implemented, after which typical service life values should be used.

Elevation Below 4000' (Desert Environment)

Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	32	30-34
Asphalt Reconstruction	28	26-30
Concrete Medium Rehab	26	24-28
Concrete Light Rehab	20	18-22
Asphalt Medium Rehab	22	20-24
Asphalt Light Rehab	16	14-18
None	0	0

Elevation Above 4000' (Mountain Environment)

Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	28	26-30
Asphalt Reconstruction	24	22-26
Concrete Medium Rehab	22	20-24
Concrete Light Rehab	16	14-18
Asphalt Medium Rehab	18	16-20
Asphalt Light Rehab	12	10-14
None	0	0

Assumed LCCA Sequence of Improvements Based on the Initial Design Alternative Improvement	
Concrete Reconstruction (CR):	CR, CLR, CMR, CLR, CR, CLR, CMR. . .
Asphalt Reconstruction (AR):	AR, ALR, AMR, ALR, AR, ALR, AMR. . .
Concrete Medium Rehab (CMR):	CMR, CLR, CR, CLR, CMR, CLR, CR. . .
Concrete Light Rehab (CLR):	CLR, CR, CLR, CMR, CLR, CR, CLR. . .
Asphalt Medium Rehab (AMR):	AMR, ALR, AR, ALR, AMR, ALR, AR. . .
Asphalt Light Rehab (ALR):	ALR, AR, ALR, AMR, ALR, AR, ALR. . .

Pavement Improvement Project History

SR 95 MP 148 - MP 149

Year	Project Number	Tracs No.	Direction of Improvement	Treatment Type	Improvement Description	Thickness (inches)	Beg. MP	End MP	Length (miles)
1956			NB/SB	Asphalt Light Rehab	Bituminous Treated Surface	2	147.27	153.69	6.42
1970			NB/SB	Asphalt Light Rehab	ACFC Asphaltic Concrete Friction Course	1	148	151.35	3.35
1982			NB/SB	Asphalt Light Rehab	Seal Coat - Cover Material With Emulsified Asphalt [0.3]	0.3	147.2	153.7	6.5
1987			NB/SB	Asphalt Reconstruction	Aggregate Base	12	147.19	150.3	3.11
					Asphaltic Concrete	3	147.19	150.3	3.11
					ACFC Asphaltic Concrete Friction Course	0.5	147.19	150.3	3.11
2001			NB/SB	Asphalt Light Rehab	Remove Existing Material	0.5	147.17	148.3	1.13
					ACFC With Asphaltic Rubber (AR-ACFC) [0.5 to 1.0]	0.5	147.17	148.3	1.13
2004			NB/SB	Asphalt Light Rehab	Remove Existing Material	0.5	148.3	155.1	6.8
					ACFC With Asphaltic Rubber (AR-ACFC) [0.5 to 1.0]	0.5	148.3	155.1	6.8
2011			NB	Asphalt Light Rehab	Crack Seal (Rubberized)	0	148.95	152.34	3.39
2011			NB/SB	Asphalt Medium Rehab	Remove Existing Material	3	148.29	148.32	0.03
					Asphaltic Concrete	2.5	148.29	148.32	0.03
					ACFC Asphaltic Concrete Friction Course	0.5	148.29	148.32	0.03
2012			NB/SB	Asphalt Light Rehab	Crack Seal (Rubberized)	0	144.84	148.32	3.48

Interval between Improvements in Years	
After Asphalt Light Rehab:	14
After Asphalt Light Rehab:	12
After Asphalt Light Rehab:	5
After Asphalt Reconstruction	16
After Asphalt Light Rehab:	9

Treatment Type Options	Estimated Historical Interval Value between Improvements in Years
Concrete Reconstruction	-
Asphalt Reconstruction	16
Concrete Medium Rehab	-
Concrete Light Rehab	-
Asphalt Medium Rehab	-
Asphalt Light Rehab	10

Design Alternative # 1 - Concrete Reconstruction

SR 95 MP 148 - MP 149

Enter Name of Design Alternative

Number of Years	Year	Concrete Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Concrete Reconstruction	$8,198,400	$7,284,172	$6,254,520
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	Concrete Light Rehab	$878,400	$486,349	$226,995
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	Concrete Medium Rehab	$1,317,600	$542,834	$173,089
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	Concrete Light Rehab	$878,400	$246,429	$47,884
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Concrete Light Rehab	$834,480	$227,289	$42,514
Enter Year of Last Used DA Improvement ››		2060	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$8,332,495	$6,659,975
AGENCY COST	$10,438,320	

Design Alternative # 2 - Asphalt Reconstruction

SR 95 MP 148 - MP 149

Enter Name of Design Alternative

Number of Years	Year	Asphalt Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Reconstruction	$6,558,720	$5,827,338	$5,003,616
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	Asphalt Light Rehab	$1,229,760	$722,354	$363,842
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	Asphalt Medium Rehab	$1,844,640	$855,350	$317,639
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Asphalt Light Rehab	$1,229,760	$411,949	$100,605
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Light Rehab	$691,740	$188,410	$35,242
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$7,628,580	$5,750,460
AGENCY COST	$10,171,140	

Design Alternative # 3 - Asphalt Medium Rehab

SR 95 MP 148 - MP 149

Enter Name of Design Alternative

Number of Years	Year	Asphalt Medium Rehab Focus	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Medium Rehab	$1,844,640	$1,638,939	$1,407,267
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	Asphalt Light Rehab	$1,229,760	$789,336	$445,722
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	Asphalt Reconstruction	$6,558,720	$3,323,249	$1,383,542
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Asphalt Light Rehab	$1,229,760	$411,949	$100,605
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Light Rehab	$691,740	$188,410	$35,242
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$5,975,062	$3,301,894
AGENCY COST	$10,171,140	

Design Alternative # 4 - Asphalt Light Rehab

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Enter Name of Design Alternative

Number of Years	Year	Asphalt Light Rehab Focus	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Light Rehab	$1,229,760	$1,092,626	$938,178
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	Asphalt Reconstruction	$6,558,720	$4,600,154	$2,912,150
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	Asphalt Light Rehab	$1,229,760	$570,233	$211,759
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	Asphalt Medium Rehab	$1,844,640	$675,221	$184,869
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Medium Rehab	$1,006,167	$274,052	$51,261
Enter Year of Last Used DA Improvement ››		2051	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$6,664,183	$4,195,695
AGENCY COST	$9,856,713	

	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehab Focus	Asphalt Light Rehab Focus
Net Present Value - 3%	$8,332,495	$7,628,580	$5,975,062	$6,664,183
Net Present Value - 7%	$6,659,975	$5,750,460	$3,301,894	$4,195,695
Agency Cost	$10,438,320	$10,171,140	$10,171,140	$9,856,713

Cost Ratio at 3% Discount Rate

1.39 Ratio of Concrete Reconstruction to Lowest Cost Rehab

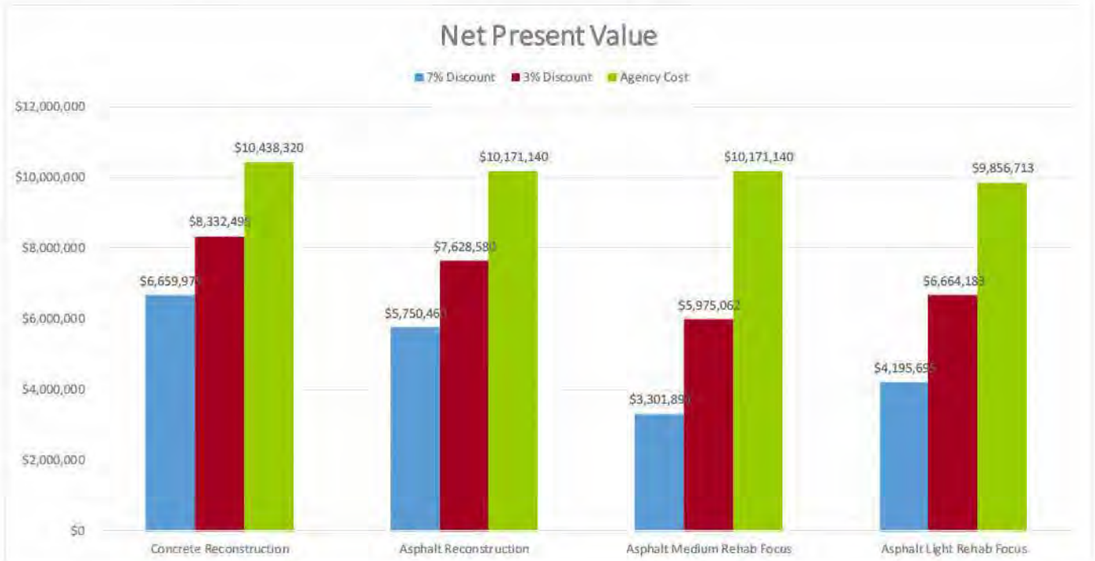
1.28 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Cost Ratio at 7% Discount Rate

2.02 Ratio of Concrete Reconstruction to Lowest Cost Rehab

1.74 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Note: A cost ratio < 1.15 means the Net Present Value (NPV) of reconstruction is within 15% of the NPV of the lowest cost rehab so reconstruction should likely be the initial improvement solution. A cost ratio > 1.15 means the NPV of reconstruction is more than 15% of the NPV of the lowest cost rehab so rehab should likely be the initial improvement solution.



Project Details	
Project title	SR 95 Corridor Profile Study
Route	SR 95
Milepost begin	181
Milepost end	186

Existing Roadway Characteristics			
Surface type (Asphalt or Concrete)	=	Asphalt	<<Select from Pull-down List>>
# of directions of travel (1 = one-way; 2 = two-way)	=	2	
# of lanes (in one direction)	=	2.5	
Width of typical lane (ft)	=	12.5	
Left shoulder width (ft)	=	0	
Right shoulder width (ft)	=	0	
Total roadway analysis segment length (centerline miles)	=	5	
Current year	=	2016	
Elevation (> 4,000 ft or < 4,000 ft)?	=	< 4,000 ft	<<Select from Pull-down List>>
Roadway width (ft) [each direction lanes & shoulders]	=	31.25	
Total lane-miles [total traffic direction lanes & shoulders]	=	25.0	
Total square feet [total traffic direction lanes & shoulders]	=	1,584,000	
Total square yards [total traffic direction lanes & shoulders]	=	176,000	

LCCA Parameters		
Analysis period (years)	=	40
Year of net present value	=	2017
First year of improvements	=	2021
Discount rate (%) - low	=	3%
Discount rate (%) - high	=	7%

Design Alternatives (DA)

Characteristics			Pavement Material Cost ($)		
Treatment Type	*Pavement Thickness*	*Typical Service Life (years)*	*Lane-miles*	*Square Feet*	*Square Yards*
Concrete Reconstruction	8"-12"	30-34	$350,000	$5.5	$50
Asphalt Reconstruction	8"-12"	26-30	$280,000	$4.4	$40
Concrete Medium Rehab	1"-3"	24-28	$75,000	$1.2	$11
Concrete Light Rehab	<1"	18-22	$50,000	$0.8	$7
Asphalt Medium Rehab	3"-8"	20-24	$105,000	$1.7	$15
Asphalt Light Rehab	<3"	14-18	$70,000	$1.1	$10

Reconstruction: Other Materials Cost Factor
1.60

Rehab: Other Materials Cost Factor
1.20

Total Cost Factor (e.g., includes design, mobilization, traffic control, contingency, etc.)
2.44

			Total Unit Cost ($) [includes material costs and indirect costs]			Total Bi-Directional Cost ($)
Treatment Type	Pavement Thickness	Typical Service Life (years)	Lane-miles	Square Feet	Square Yards	Total Cost
Concrete Reconstruction	8"-12"	30-34	$1,366,400	$21.6	$194	$34,160,000
Asphalt Reconstruction	8"-12"	26-30	$1,093,120	$17.3	$155	$27,328,000
Concrete Medium Rehab	1"-3"	24-28	$219,600	$3.5	$31	$5,490,000
Concrete Light Rehab	<1"	18-22	$146,400	$2.3	$21	$3,660,000
Asphalt Medium Rehab	3"-8"	20-24	$307,440	$4.9	$44	$7,686,000
Asphalt Light Rehab	<3"	14-18	$204,960	$3.2	$29	$5,124,000

Pavement Service Life, Intervals, and Sequence of Improvements

SR 95 MP 181 - MP 186

Design Alternative	Typical Service Life Value	Typical Service Life Range	Average Historical Interval Value	Interval to Use in LCCA Before Reconstruction	Interval to Use in LCCA After Reconstruction
Concrete Reconstruction	32	30-34	-	-	16
Asphalt Reconstruction	28	26-30	-	-	14
Concrete Medium Rehab	26	24-28	-	13	13
Concrete Light Rehab	20	18-22	-	10	10
Asphalt Medium Rehab	22	20-24	13.5	11	11
Asphalt Light Rehab	16	14-18	-	8	8
None	0	0	-	-	-

Note: The typical service life values and ranges are determined based on the elevation of the roadway segment using the reference tables below. The typical service life values should be used as the intervals between improvements in the design alternatives except when historical frequency values are available based on the frequency and type of improvements in the past at this location. Historical frequency values should only be used if they are lower than the typical values and only up until reconstruction is implemented, after which typical service life values should be used.

Elevation Below 4000' (Desert Environment)		
Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	32	30-34
Asphalt Reconstruction	28	26-30
Concrete Medium Rehab	26	24-28
Concrete Light Rehab	20	18-22
Asphalt Medium Rehab	22	20-24
Asphalt Light Rehab	16	14-18
None	0	0

Elevation Above 4000' (Mountain Environment)		
Design Alternative	Typical Service Life Value	Typical Service Life Range
Concrete Reconstruction	28	26-30
Asphalt Reconstruction	24	22-26
Concrete Medium Rehab	22	20-24
Concrete Light Rehab	16	14-18
Asphalt Medium Rehab	18	16-20
Asphalt Light Rehab	12	10-14
None	0	0

Assumed LCCA Sequence of Improvements Based on the Initial Design Alternative Improvement	
Concrete Reconstruction (CR):	CR, CLR, CMR, CLR, CR, CLR, CMR. . .
Asphalt Reconstruction (AR):	AR, ALR, AMR, ALR, AR, ALR, AMR. . .
Concrete Medium Rehab (CMR):	CMR, CLR, CR, CLR, CMR, CLR, CR. . .
Concrete Light Rehab (CLR):	CLR, CR, CLR, CMR, CLR, CR, CLR. . .
Asphalt Medium Rehab (AMR):	AMR, ALR, AR, ALR, AMR, ALR, AR. . .
Asphalt Light Rehab (ALR):	ALR, AR, ALR, AMR, ALR, AR, ALR. . .

Pavement Improvement Project History

SR 95 MP 181 - MP 186

Year	Project Number	Tracs No.	Direction of Improvement	Treatment Type	Improvement Description	Thickness (inches)	Beg. MP	End MP	Length (miles)
1977			NB/SB	Asphalt Medium Rehab	Aggregate Base	4	178.42	183.85	5.43
					Bituminous Treated Surface	1	178.42	183.85	5.43
1984			NB/SB	Asphalt Medium Rehab	Asphaltic Concrete	3	179	183	4
					ACFC Asphaltic Concrete Friction Course	0.5	179	183	4
2000			NB/SB	Asphalt Medium Rehab	Remove Existing Material	2.5	182.2	182.5	0.3
					Asphaltic Concrete	2	182.2	182.5	0.3
					ACFC Asphaltic Concrete Friction Course	0.5	182.2	182.5	0.3
2004			SB	Asphalt Medium Rehab	Remove Existing Material	2.5	180.48	181.03	0.55
					Asphaltic Concrete	4.5	180.48	181.03	0.55
					ACFC With Asphaltic Rubber (AR-ACFC) [0.5 to 1.0]	0.5	180.48	181.03	0.55
2004			NB	Asphalt Medium Rehab	Asphaltic Concrete	3	180.92	181.03	0.11
					ACFC With Asphaltic Rubber (AR-ACFC) [0.5 to 1.0]	0.5	180.92	181.03	0.11
2004			NB/SB	Asphalt Medium Rehab	Remove Existing Material	2	181.03	184.06	3.03
					Asphaltic Concrete	4	181.03	184.06	3.03
					ACFC With Asphaltic Rubber (AR-ACFC) [0.5 to 1.0]	0.5	181.03	184.06	3.03

Interval between Improvements in Years
After Asphalt Medium Rehab: 20
After Asphalt Medium Rehab: 7
After Asphalt Medium Rehab:
After Asphalt Medium Rehab:

Treatment Type Options	Estimated Historical Interval Value between Improvements in Years
Concrete Reconstruction	-
Asphalt Reconstruction	-
Concrete Medium Rehab	-
Concrete Light Rehab	-
Asphalt Medium Rehab	14
Asphalt Light Rehab	-

Design Alternative # 1 - Concrete Reconstruction

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Number of Years	Year	Enter Name of Design Alternative: Concrete Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Concrete Reconstruction	$34,160,000	$30,350,718	$26,060,500
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	Concrete Light Rehab	$3,660,000	$2,026,453	$945,814
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	Concrete Medium Rehab	$5,490,000	$2,261,807	$721,205
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	Concrete Light Rehab	$3,660,000	$1,026,787	$199,516
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Concrete Light Rehab	$3,477,000	$947,037	$177,141
Enter Year of Last Used DA Improvement ››		2060	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$34,718,729	$27,749,895
AGENCY COST	$43,493,000	

Design Alternative # 2 - Asphalt Reconstruction

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Number of Years	Year	Enter Name of Design Alternative: Asphalt Reconstruction	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Reconstruction	$27,328,000	$24,280,574	$20,848,400
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	Asphalt Light Rehab	$5,124,000	$3,009,810	$1,516,007
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	Asphalt Medium Rehab	$7,686,000	$3,563,958	$1,323,495
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Asphalt Light Rehab	$5,124,000	$1,716,453	$419,188
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Light Rehab	$2,882,250	$785,044	$146,840
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$31,785,751	$23,960,250
AGENCY COST	$42,379,750	

Design Alternative # 3 - Asphalt Medium Rehab

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Enter Name of Design Alternative

Number of Years	Year	Asphalt Medium Rehab Focus	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Medium Rehab	$7,686,000	$6,828,911	$5,863,613
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	None	$0	$0	$0
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	Asphalt Light Rehab	$5,124,000	$3,288,901	$1,857,173
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	Asphalt Reconstruction	$27,328,000	$13,846,872	$5,764,756
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	None	$0	$0	$0
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	None	$0	$0	$0
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	Asphalt Light Rehab	$5,124,000	$1,716,453	$419,188
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Light Rehab	$2,882,250	$785,044	$146,840
Enter Year of Last Used DA Improvement ››		2054	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$24,896,093	$13,757,891
AGENCY COST	$42,379,750	

Design Alternative # 4 - Asphalt Light Rehab

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Enter Name of Design Alternative

Number of Years	Year	Asphalt Light Rehab Focus	Agency Cost ($)	Net Present Value @ 3%	Net Present Value @ 7%
0	2016	None	$0	$0	$0
1	2017	None	$0	$0	$0
2	2018	None	$0	$0	$0
3	2019	None	$0	$0	$0
4	2020	None	$0	$0	$0
5	2021	Asphalt Light Rehab	$5,124,000	$4,552,608	$3,909,075
6	2022	None	$0	$0	$0
7	2023	None	$0	$0	$0
8	2024	None	$0	$0	$0
9	2025	None	$0	$0	$0
10	2026	None	$0	$0	$0
11	2027	None	$0	$0	$0
12	2028	None	$0	$0	$0
13	2029	Asphalt Reconstruction	$27,328,000	$19,167,309	$12,133,959
14	2030	None	$0	$0	$0
15	2031	None	$0	$0	$0
16	2032	None	$0	$0	$0
17	2033	None	$0	$0	$0
18	2034	None	$0	$0	$0
19	2035	None	$0	$0	$0
20	2036	None	$0	$0	$0
21	2037	None	$0	$0	$0
22	2038	None	$0	$0	$0
23	2039	None	$0	$0	$0
24	2040	None	$0	$0	$0
25	2041	None	$0	$0	$0
26	2042	None	$0	$0	$0
27	2043	Asphalt Light Rehab	$5,124,000	$2,375,972	$882,330
28	2044	None	$0	$0	$0
29	2045	None	$0	$0	$0
30	2046	None	$0	$0	$0
31	2047	None	$0	$0	$0
32	2048	None	$0	$0	$0
33	2049	None	$0	$0	$0
34	2050	None	$0	$0	$0
35	2051	Asphalt Medium Rehab	$7,686,000	$2,813,421	$770,286
36	2052	None	$0	$0	$0
37	2053	None	$0	$0	$0
38	2054	None	$0	$0	$0
39	2055	None	$0	$0	$0
40	2056	None	$0	$0	$0
41	2057	None	$0	$0	$0
42	2058	None	$0	$0	$0
43	2059	None	$0	$0	$0
44	2060	None	$0	$0	$0
45	2061	None	$0	$0	$0
Pick Last Used DA treatment type to calculate Remaining Service Life ››		Asphalt Medium Rehab	$4,192,364	$1,141,882	$213,586
Enter Year of Last Used DA Improvement ››		2051	Remaining Service Life Cost ^^		

	Net Present Value ($) @ 3%	Net Present Value ($) @ 7%
NET PRESENT VALUE	$27,767,428	$17,482,064
AGENCY COST	$41,069,636	

Summary of LCCA Results

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	Concrete Reconstruction	Asphalt Reconstruction	Asphalt Medium Rehab Focus	Asphalt Light Rehab Focus
Net Present Value - 3%	$34,718,729	$31,785,751	$24,896,093	$27,767,428
Net Present Value - 7%	$27,749,895	$23,960,250	$13,757,891	$17,482,064
Agency Cost	$43,493,000	$42,379,750	$42,379,750	$41,069,636

Cost Ratio at 3% Discount Rate

1.39 Ratio of Concrete Reconstruction to Lowest Cost Rehab

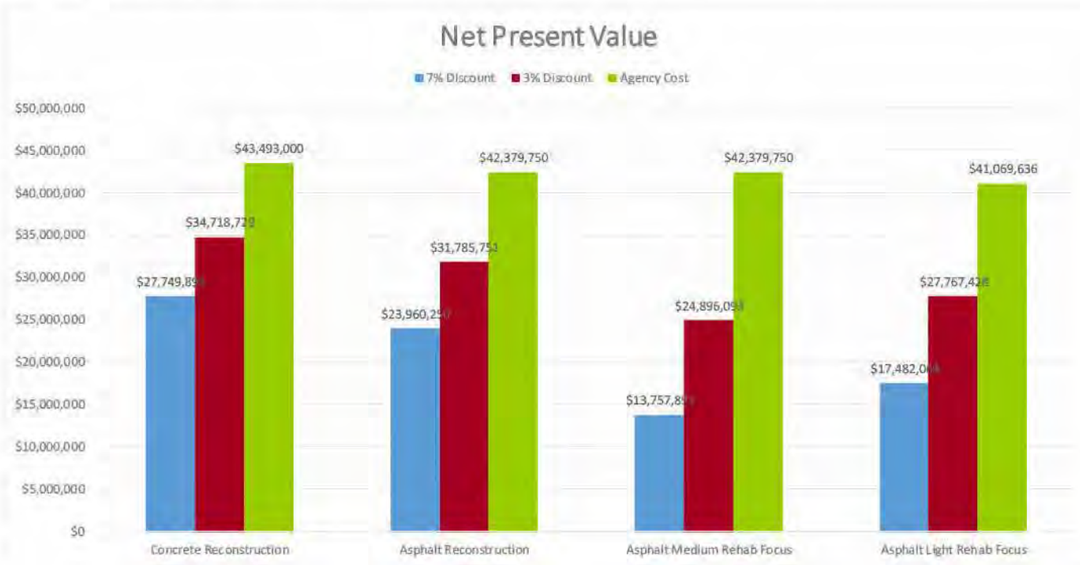
1.28 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Cost Ratio at 7% Discount Rate

2.02 Ratio of Concrete Reconstruction to Lowest Cost Rehab

1.74 Ratio of Asphalt Reconstruction to Lowest Cost Rehab

Note: A cost ratio < 1.15 means the Net Present Value (NPV) of reconstruction is within 15% of the NPV of the lowest cost rehab so reconstruction should likely be the initial improvement solution. A cost ratio > 1.15 means the NPV of reconstruction is more than 15% of the NPV of the lowest cost rehab so rehab should likely be the initial improvement solution.



Appendix F: Crash Modification Factors and Factored Unit Construction Costs

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
REHABILITATION							
Rehabilitate Pavement (AC)	$276,500	Mile	2.20	$610,000	Mill and replace 1"-3" AC pvmt; accounts for 38' width; for one direction of travel on two lane roadway; includes pavement, striping, delineators, RPMs, rumble strips	0.70	Combination of rehabilitate pavement (0.92), striping, delineators, RPMs (0.77 for combination), and rumble strips (0.89) = 0.70
Rehabilitate Bridge	$65	SF	2.20	$140	Based on deck area; bridge only - no other costs included	0.95	Assumed - should have a minor effect on crashes at the bridge
GEOMETRIC IMPROVEMENT							
Re-profile Roadway	$974,500	Mile	2.20	$2,140,000	Includes excavation of approximately 3", pavement replacement (AC), striping, delineators, RPMs, rumble strips, for one direction of travel of 2-lane roadway (38' width)	0.70	Assumed - this is similar to rehab pavement. This solution is intended to address vertical clearance at bridge, not profile issue; factor the cost as a ratio of needed depth to 3".
Realign Roadway	$2,960,000	Mile	2.20	$6,510,000	All costs per direction except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.50	Based on CalTrans and NC DOT
Improve Skid Resistance	$675,000	Mile	2.20	$1,490,000	Average cost of pvmt replacement and variable depth paving to increase super-elevation; for one direction of travel on two lane roadway; includes pavement, striping, delineators, RPMs, rumble strips	0.66	Combination of avg of 5 values from clearinghouse (0.77) and calculated value from HSM (0.87) for skid resistance; striping, delineators, RPMs (0.77 for combination), and rumble strips (0.89) = 0.66
INFRASTRUCTURE IMPROVEMENT							
Reconstruct to Urban Section	$1,000,000	Mile	2.20	$2,200,000	Includes widening by 16' total (AC = 12'+2'+2') to provide median, curb & gutter along both side of roadway, single curb for median, striping (doesn't include widening for additional travel lane).	0.88	From HSM
Construct Auxiliary Lanes (AC)	$914,000	Mile	2.20	$2,011,000	For addition of aux lane (AC) in one direction of travel; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.78	Average of 4 values from clearinghouse
Construct Climbing Lane (High)	$3,000,000	Mile	2.20	$6,600,000	In one direction; all costs except bridges; applicable to areas with large fills and cuts, retaining walls, rock blasting, steep slopes on both sides of road	0.75	From HSM
Construct Climbing Lane (Medium)	$2,250,000	Mile	2.20	$4,950,000	In one direction; all costs except bridges; applicable to areas with medium or large fills and cuts, retaining walls, rock blasting, steep slopes on one side of road	0.75	From HSM
Construct Climbing Lane (Low)	$1,500,000	Mile	2.20	$3,300,000	In one direction; all costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.75	From HSM

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Construct Reversible Lane (Low)	$2,400,000	Lane-Mile	2.20	$5,280,000	All costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.73 for uphill and 0.88 for downhill	Based on proposed conditions on I-17 with 2 reversible lanes and a conc barrier
Construct Reversible Lane (High)	$4,800,000	Lane-Mile	2.20	$10,560,000	All costs except bridges; applicable to areas with large fills and cuts, retaining walls, rock blasting, mountainous terrain	0.73 for uphill and 0.88 for downhill	Based on proposed conditions on I-17 with 2 reversible lanes and a conc barrier
Construct Passing Lane	$1,500,000	Mile	2.20	$3,300,000	In one direction; all costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.63	Average of 3 values from clearinghouse
Construct Entry/Exit Ramp	$730,000	Each	2.20	$1,610,000	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, typical earthwork & drainage; does not include any major structures or improvements on crossroad	1.09	Average of 16 values on clearinghouse; for adding a ramp not reconstructing. CMF applied to crashes 0.25 miles upstream/downstream from the gore.
Relocate Entry/Exit Ramp	$765,000	Each	2.20	$1,680,000	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, typical earthwork , drainage and demolition of existing ramp; does not include any major structures or improvements on crossroad	1.00	Assumed to not add any crashes since the ramp is simply moving and not being added. CMF applied to crashes 0.25 miles upstream/downstream from the gore.
Construct Turn Lanes	$42,500	Each	2.20	$93,500	Includes 14' roadway widening (AC) for one additional turn lane (250' long) on one leg of an intersection; includes AC pavement, curb & gutter, sidewalk, ramps, striping, and minor signal modifications	0.81	Avg of 7 values from HSM; CMF applied to intersection related crashes; this solution also applies when installing a deceleration lane
Modify Entry/Exit Ramp	$445,000	Each	2.20	$979,000	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, minor earthwork, & drainage; For converting existing ramp to parallel-type configuration	0.21	Average of 4 values from clearinghouse (for exit ramps) and equation from HSM (for entrance ramp). CMF applied to crashes within 1/8 mile upstream/downstream from the gore.
Widen & Modify Entry/Exit Ramp	$619,000	Each	2.20	$1,361,800	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, minor earthwork, & drainage; For converting 1-lane ramp to 2-lane ramp and converting to parallel-type ramp	0.21	Will be same as "Modify Ramp"
Replace Pavement (AC) (with overexcavation)	$1,446,500	Mile	2.20	$3,180,000	Accounts for 38' width; for one direction of travel on two lane roadway; includes pavement, overexcavation, striping, delineators, RPMs, rumble strips	0.70	Same as rehab
Replace Pavement (PCCP) (with overexcavation)	$1,736,500	Mile	2.20	$3,820,000	Accounts for 38' width; for one direction of travel on two lane roadway; includes pavement, overexcavation, striping, delineators, RPMs, rumble strips	0.70	Same as rehab
Replace Bridge (Short)	$125	SF	2.20	$280	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing small washes	0.95	Assumed - should have a minor effect on crashes at the bridge

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Replace Bridge (Medium)	$160	SF	2.20	$350	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing over the mainline freeway, crossroads, or large washes	0.95	Assumed - should have a minor effect on crashes at the bridge
Replace Bridge (Long)	$180	SF	2.20	$400	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing large rivers or canyons	0.95	Assumed - should have a minor effect on crashes at the bridge
Widen Bridge	$175	SF	2.20	$390	Based on deck area; bridge only - no other costs included	0.90	Assumed - should have a minor effect on crashes at the bridge
Install Pedestrian Bridge	$135	SF	2.20	$300	Includes cost to construct bridge based on linear feet of the bridge. This costs includes and assumes ramps and sidewalks leading to the structure.	0.1 (ped only)	Assumed direct access on both sides of structure
Implement Automated Bridge De-icing	$115	SF	2.20	$250	Includes cost to replace bridge deck and install system	0.72 (snow/ice)	Average of 3 values on clearinghouse for snow/ice
Install Wildlife Crossing Under Roadway	$650,000	Each	2.20	$1,430,000	Includes cost of structure for wildlife crossing under roadway and 1 mile of fencing in each direction that is centered on the wildlife crossing	0.25 (wildlife)	Assumed; CMF applies to wildlife-related crashes within 0.5 miles both upstream and downstream of the wildlife crossing in both directions
Install Wildlife Crossing Over Roadway	$1,140,000	Each	2.20	$2,508,000	Includes cost of structure for wildlife crossing over roadway and 1 mile of fencing in each direction that is centered on the wildlife crossing	0.25 (wildlife)	Assumed; CMF applies to wildlife-related crashes within 0.5 miles both upstream and downstream of the wildlife crossing in both directions
Construct Drainage Structure - Minor	$280,000	Each	2.20	$616,000	Includes 3-36" pipes and roadway reconstruction (approx. 1,000 ft) to install pipes	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Construct Drainage Structure - Intermediate	$540,000	Each	2.20	$1,188,000	Includes 5 barrel 8'x6' RCBC and roadway reconstruction (approx. 1,000 ft) to install RCBC	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Construct Drainage Structure - Major	$8,000	LF	2.20	$17,600	Includes bridge that is 40' wide and reconstruction of approx. 500' on each approach	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Install Acceleration Lane	$127,500	Each	2.20	$280,500	For addition of an acceleration lane (AC) on one leg of an intersection that is 1,000' long plus a taper; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.85	Average of 6 values from the FHWA Desktop Reference for Crash Reduction Factors
OPERATIONAL IMPROVEMENT							
Implement Variable Speed Limits (Wireless, Overhead)	$718,900	Mile	2.20	$1,580,000	In one direction; includes 1 sign assembly per mile (foundation and structure), wireless communication, detectors	0.92	From 1 value from clearinghouse
Implement Variable Speed Limits (Wireless, Ground-mount)	$169,700	Mile	2.20	$373,300	In one direction; includes 2 signs per mile (foundations and posts), wireless communication, detectors	0.92	From 1 value from clearinghouse
Implement Variable Speed Limits (Wireless, Solar, Overhead)	$502,300	Mile	2.20	$1,110,000	In one direction; includes 1 sign assembly per mile (foundation and structure), wireless communication, detectors, solar power	0.92	From 1 value from clearinghouse
Implement Variable Speed Limits (Wireless, Solar, Ground-mount)	$88,400	Mile	2.20	$194,500	In one direction; includes 2 signs per mile (foundations and posts), wireless communication, detectors, solar power	0.92	From 1 value from clearinghouse

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Implement Ramp Metering (Low)	$25,000	Each	2.20	$55,000	For each entry ramp location; urban area with existing ITS backbone infrastructure; includes signals, poles, cabinet, detectors, pull boxes, etc	0.64	From 1 value from clearinghouse; CMF applied to crashes 0.25 miles after gore
Implement Ramp Metering (High)	$150,000	Mile	2.20	$330,000	Area without existing ITS backbone infrastructure; in addition to ramp meters, also includes conduit, fiber optic lines, and power	0.64	From 1 value from clearinghouse
Implement Signal Coordination	$140,000	Mile	2.20	$308,000	Includes conduit, conductors, and controllers for 4 intersections that span a total of approximately 2 miles	0.90	Assumed
Implement Left-Turn Phasing	$7,500	Each	2.20	$16,500	Includes four new signal heads (two in each direction) and associated conductors for one intersection	0.88 (protected) 0.98 (perm/prot or prot/perm)	From HSM; CMF = 0.94 for each protected approach and 0.99 for each perm/prot or prot/perm approach. CMFs of different approaches should be multiplied together. CMF applied to crashes within intersection
ROADSIDE DESIGN							
Install Guardrail	$130,000	Mile	2.20	$286,000	One side of road	0.62 (ROR)	0.62 is avg of 2 values from clearinghouse
Install Cable Barrier	$80,000	Mile	2.20	$176,000	In median	0.81	0.81 is average of 5 values from clearinghouse
Widen Shoulder (AC)	$256,000	Mile	2.20	$563,000	Assumes 10' of existing shoulder (combined left and right), includes widening shoulder by a total of 4'; new pavement for 4' width and mill and replace existing 10' width; includes pavement, minor earthwork, striping edge lines, RPMs, high-visibility delineators, safety edge, and rumble strips	0.68 (1-4') 0.64 (>= 4')	0.86 is avg of 5 values from clearing house for widening shoulder 1-4'. 0.76 is calculated from HSM for widening shoulder >= 4'. (Cost needs to be updated if dimension of existing and widened shoulder differ from Description.)
Rehabilitate Shoulder (AC)	$113,000	Mile	2.20	$249,000	One direction of travel (14' total shldr width-4' left and 10' right); includes paving (mill and replace), striping, high-visibility delineators, RPMs, safety edge, and rumble strips for both shoulders	0.72	0.98 is average of 34 values on clearinghouse for shldr rehab/replace; include striping, delineators, RPMs (0.77 combined CMF), and rumble strips (0.89). (Cost needs to be updated if dimension of existing shoulder differs from Description.)
Replace Shoulder (AC)	$364,000	Mile	2.20	$801,000	One direction of travel (14' total shldr width-4' left and 10' right); includes paving (full reconstruction), striping, high-visibility delineators, RPMs, safety edge, and rumble strips for both shoulders	0.72	0.98 is average of 34 values on clearinghouse for shldr rehab/replace; include striping, delineators, RPMs (0.77 combined CMF), and rumble strips (0.89). (Cost needs to be updated if dimension of existing shoulder differs from Description.)
Install Rumble Strip	$5,500	Mile	2.20	$12,000	Both edges - one direction of travel; includes only rumble strip; no shoulder rehab or paving or striping	0.89	Average of 75 values on clearinghouse and consistent with HSM
Install Centerline Rumble Strip	$2,800	Mile	2.20	$6,000	Includes rumble strip only; no pavement rehab or striping	0.85	From HSM
Install Wildlife Fencing	$340,000	Mile	2.20	$748,000	Fencing only plus jump outs for 1 mile (both directions)	0.50 (wildlife)	Assumed

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Remove Tree/Vegetation	$200,000	Mile	2.20	$440,000	Intended for removing trees that shade the roadway to allow sunlight to help melt snow and ice (see Increase Clear Zone CMF for general tree/vegetation removal in clear zone)	0.72 (snow/ice)	Average of 3 values on clearinghouse for snow/ice
Increase Clear Zone	$59,000	Mile	2.20	$130,000	In one direction; includes widening the clear zone by 10' to a depth of 3'	0.71	Median of 14 values from FHWA Desktop Reference for Crash Reduction Values
Install Access Barrier Fence	$15	LF	2.20	$33	8' fencing along residential section of roadway	0.10 (ped only)	Equal to ped overpass
Install Rock-Fall Mitigation - Wire Mesh	$1,320,000	Mile	2.20	$2,904,000	Includes wire mesh and rock stabilization (one direction)	0.75 (debris)	Assumed
Install Rock-Fall Mitigation - Containment Fence & Barrier	$2,112,000	Mile	2.20	$4,646,000	Includes containment fencing, concrete barrier, and rock stabilization (one direction)	0.75 (debris)	Assumed
Install Raised Concrete Barrier in Median	$650,000	Mile	2.20	$1,430,000	Includes concrete barrier with associated striping and reflective markings; excludes lighting in barrier (one direction)	0.90 (Cross-median and head on crashes eliminated completely)	All cross median and head-on fatal or incapacitating injury crashes are eliminated completely; all remaining crashes have 0.90 applied
Formalize Pullout (Small)	$7,500	Each	2.20	$17,000	Includes paving and signage (signs, posts, and foundations) - approximately 4,200 sf	0.97	Assumed - similar to Install Other General Warning Signs; CMF applied to crashes within 0.25 miles after sign
Formalize Pullout (Medium)	$27,500	Each	2.20	$61,000	Includes paving and signage (signs, posts, and foundations) - approximately 22,500 sf	0.97	Assumed - similar to Install Other General Warning Signs; CMF applied to crashes within 0.25 miles after sign
Formalize Pullout (Large)	$80,500	Each	2.20	$177,100	Includes paving and signage (signs, posts, and foundations) - approximately 70,000 sf	0.97	Assumed - similar to Install Other General Warning Signs; CMF applied to crashes within 0.25 miles after sign
INTERSECTION IMPROVEMENTS							
Construct Traffic Signal	$150,000	Each	2.20	$330,000	4-legged intersection; includes poles, foundations, conduit, controller, heads, luminaires, mast arms, etc.	0.95	From HSM; CMF applied to crashes within intersection only
Improve Signal Visibility	$35,000	Each	2.20	$77,000	4-legged intersection; signal head size upgrade, installation of new back-plates, and installation of additional signal heads on new poles.	0.85	Avg of 7 values from clearinghouse; CMF applied to crashes within intersection only
Install Raised Median	$360,000	Mile	2.20	$792,000	Includes removal of 14' wide pavement and construction of curb & gutter; does not include cost to widen roadway to accommodate the median; if the roadway needs to be widened, include cost from New General Purpose Lane	0.83	Avg from HSM

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Install Transverse Rumble Strip/Pavement Markings	$3,000	Each	2.20	$7,000	Includes ped markings and rumble strips only across a 30' wide travelway; no pavement rehab or other striping	0.95	Avg of 17 values from clearinghouse; CMF applied to crashes within 0.5 miles after the rumble strips and markings
Construct Single-Lane Roundabout	$1,500,000	Each	2.20	$3,300,000	Removal of signal at 4-legged intersection; realignment of each leg for approx. 800 feet including paving, curbs, sidewalk, striping, lighting, signing	0.22	From HSM; CMF applied to crashes within intersection only
Construct Double-Lane Roundabout	$1,800,000	Each	2.20	$3,960,000	Removal of signal at 4-legged intersection; realignment of each leg for approx. 800 feet including paving, curbs, sidewalk, striping, lighting, signing	0.40	From HSM; CMF applied to crashes within intersection only
ROADWAY DELINEATION							
Install High-Visibility Edge Line Striping	$10,800	Mile	2.20	$23,800	2 edge lines and lane line - one direction of travel	0.77	Avg of 3 values from clearinghouse. Assumes package of striping, delineators, and RPMs. (If implemented separately, CMF will be higher.)
Install High-Visibility Delineators	$6,500	Mile	2.20	$14,300	Both edges - one direction of travel		Avg of 3 values from clearinghouse. Assumes package of striping, delineators, and RPMs. (If implemented separately, CMF will be higher.)
Install Raised Pavement Markers	$2,000	Mile	2.20	$4,400	Both edges - one direction of travel		Avg of 3 values from clearinghouse. Assumes package of striping, delineators, and RPMs. (If implemented separately, CMF will be higher.)
Install In-Lane Route Markings	$6,000	Each	2.20	$13,200	Installation of a series of three in-lane route markings in one lane	0.95	Assumed; CMF applied to crashes within 1.0 mile before the gore
IMPROVED VISIBILITY							
Cut Side Slopes	$80	LF	2.20	$200	For small grading to correct sight distance issues; not major grading	0.85	Intent of this solution is to improve sight distance. Most CMF's are associated with vehicles traveling on slope. Recommended CMF is based on FDOT and NCDOT but is more conservative.
Install Lighting (connect to existing power)	$270,000	Mile	2.20	$594,000	One side of road only; offset lighting, not high-mast; does not include power supply; includes poles, luminaire, pull boxes, conduit, conductor	0.75 (night)	Average of 3 values on clearinghouse & consistent with HSM
Install Lighting (solar powered LED)	$10,000	Pole	2.20	$22,000	Offset lighting, not high-mast; solar power LED; includes poles, luminaire, solar panel	0.75 (night)	Average of 3 values on clearinghouse & consistent with HSM
DRIVER INFORMATION/WARNING							
Install Dynamic Message Sign (DMS)	$250,000	Each	2.20	$550,000	Includes sign, overhead structure, and foundations; wireless communication; does not include power supply	1.00	Not expected to reduce crashes

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Install Dynamic Weather Warning Beacons	$40,000	Each	2.20	$88,000	Assumes solar operation and wireless communication or connection to existing power and communication; ground mounted; includes posts, foundations, solar panel, and dynamic sign	0.80 (weather related)	Avg of 3 values from FHWA Desktop Reference for Crash Reduction Factors; CMF applies to crashes within 0.25 miles after a sign
Install Dynamic Speed Feedback Signs	$25,000	Each	2.20	$55,000	Assumes solar operation and no communication; ground mounted; includes regulatory sign, posts, foundations, solar panel, and dynamic sign	0.94	Average of 2 clearinghouse values; CMF applies to crashes within 0.50 miles after a sign
Install Chevrons	$18,400	Mile	2.20	$40,500	On one side of road - includes signs, posts, and foundations	0.79	Average of 11 clearinghouse values
Install Curve Warning Signs	$2,500	Each	2.20	$5,500	Includes 2 signs, posts, and foundations	0.83	Average of 4 clearinghouse values; CMF applies to crashes within 0.25 miles after a sign
Install Traffic Control Device Warning Signs (e.g., stop sign ahead, signal ahead, etc.)	$2,500	Each	2.20	$5,500	Includes 2 signs, posts, and foundations	0.85	FHWA Desktop Reference for Crash Reduction Factors; CMF applies to crashes within 0.25 miles after a sign
Install Other General Warning Signs (e.g., intersection ahead, wildlife in area, slow vehicles, etc.)	$2,500	Each	2.20	$5,500	Includes 2 signs, posts, and foundations	0.97	Assumed; CMF applies to crashes within 0.25 miles after a sign
Install Wildlife Warning System	$162,000	Each	2.20	$356,400	Includes wildlife detection system at a designated wildlife crossing, flashing warning signs (assumes solar power), advance signing, CCTV (solar and wireless), game fencing for approximately 0.25 miles in each direction - centered on the wildlife crossing, and regular fencing for 1.0 mile in each direction - centered on the wildlife crossing.	0.50 (wildlife)	Assumed; CMF applies to wildlife-related crashes within 0.5 miles both upstream and downstream of the wildlife crossing in both directions
Install Warning Sign with Beacons	$15,000	Each	2.20	$33,000	In both directions; includes warning sign, post, and foundation, and flashing beacons (assumes solar power) at one location	0.75	FHWA Desktop Reference for Crash Reduction Factors for Installing Flashing Beacons as Advance Warning; CMF applies to crashes within 0.25 miles after a sign
Install Larger Stop Sign with Beacons	$10,000	Each	2.20	$22,000	In one direction; includes large stop sign, post, and foundation, and flashing beacons (assumes solar power) at one location	0.85/0.81	Use 0.85 for adding beacons to an existing sign; 0.81 for installing a larger sign with flashing beacons; CMF applies to intersection related crashes
DATA COLLECTION							
Install Roadside Weather Information System (RWIS)	$60,000	Each	2.20	$132,000	Assumes wireless communication and solar power, or connection to existing power and communications	1.00	Not expected to reduce crashes
Install Closed Circuit Television (CCTV) Camera	$25,000	Each	2.20	$55,000	Assumes connection to existing ITS backbone or wireless communication; does not include fiber-optic backbone infrastructure; includes pole, camera, etc	1.00	Not expected to reduce crashes
Install Vehicle Detection Stations	$15,000	Each	2.20	$33,000	Assumes wireless communication and solar power, or connection to existing power and communications	1.00	Not expected to reduce crashes

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Install Flood Sensors (Activation)	$15,000	Each	2.20	$33,000	Sensors with activation cabinet to alert through texting (agency)	1.00	Not expected to reduce crashes
Install Flood Sensors (Gates)	$100,000	Each	2.20	$220,000	Sensors with activation cabinet to alert through texting (agency) and beacons (public) plus gates	1.00	Not expected to reduce crashes
WIDEN CORRIDOR							
Construct New General Purpose Lane (PCCP)	$1,740,000	Mile	2.20	$3,830,000	For addition of 1 GP lane (PCCP) in one direction; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.90	North Carolina DOT uses 0.90 and Florida DOT uses 0.87
Construct New General Purpose Lane (AC)	$1,200,000	Mile	2.20	$2,640,000	For addition of 1 GP lane (AC) in one direction; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.90	North Carolina DOT uses 0.90 and Florida DOT uses 0.88
Convert a 2-Lane undivided highway to a 5-Lane highway	$1,576,000	Mile	2.20	$3,467,200	For expanding a 2-lane undivided highway to a 5-lane highway (4 through lanes with TWLTL), includes standard shoulder widths but no curb, gutter, or sidewalks	0.60	Assumed to be slightly lower than converting from a 4-lane to a 5-lane highway
Install Center Turn Lane	$1,053,000	Mile	2.20	$2,316,600	For adding a center turn lane (i.e., TWLTL); assumes symmetrical widening on both sides of the road; includes standard shoulder widths but no curb, gutter, or sidewalk	0.75	From FHWA Desktop Reference for Crash Reduction Factors, CMF Clearinghouse, and SR 87 CPS comparison
Construct 4-Lane Divided Highway (Using Existing 2-Lane Road for one direction)	$3,000,000	Mile	2.20	$6,600,000	In both directions; one direction uses existing 2-lane road; other direction assumes addition of 2 new lanes (AC) with standard shoulders; includes all costs except bridges	0.67	Assumed
Construct 4-Lane Divided Highway (No Use of Existing Roads)	$6,000,000	Mile	2.20	$13,200,000	In both directions; assumes addition of 2 new lanes (AC) with standard shoulders in each direction; includes all costs except bridges	0.67	Assumed
Construct Bridge over At-Grade Railroad Crossing	$10,000,000	Each	2.20	$22,000,000	Assumes bridge width of 4 lanes (AC) with standard shoulders; includes abutments and bridge approaches; assumes vertical clearance of 23'4" + 6'8" superstructure	0.72 (All train-related crashes eliminated)	Removes all train-related crashes at at-grade crossing; all other crashes CMF = 0.72
Construct Underpass at At-Grade Railroad Crossing	$15,000,000	Each	2.20	$33,000,000	Assumes underpass width of 4 lanes (AC) with standard shoulders; includes railroad bridge with abutments and underpass approaches; assumes vertical clearance of 16'6" + 6'6" superstructure	0.72 (All train-related crashes eliminated)	Removes all train-related crashes at at-grade crossing; all other crashes CMF = 0.72
Construct High-Occupancy Vehicle (HOV) Lane	$900,000	Mile	2.20	$1,980,000	For addition of 1 HOV lane (AC) in one direction with associated signage and markings; includes all costs except bridges; for generally at-grade facility with minimal walls and no major drainage improvements	0.95	Similar to general purpose lane

SOLUTION	CONSTRUCTION UNIT COST	UNIT	FACTOR^	FACTORED CONSTRUCTION UNIT COST	DESCRIPTION	CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
ALTERNATE ROUTE							
Construct Frontage Roads	$2,400,000	Mile	2.20	$5,280,000	For 2-lane AC frontage road; includes all costs except bridges; for generally at-grade facility with minimal walls	0.90	Assumed - similar to new general purpose lane
Construct 2-Lane Undivided Highway	$3,000,000	Mile	2.20	$6,600,000	In both directions; assumes addition of 2 new lanes (AC) with standard shoulders in each direction; includes all costs except bridges	0.90	Assuming new alignment for a bypass

^ Factor accounts for traffic control, erosion control, construction surveying and quality control, mobilization, construction engineering, contingencies, indirect cost allocation, and miscellaneous work

Appendix G: Performance Area Risk Factors

Pavement Performance Area

- Elevation
- Mainline Daily Traffic Volume
- Mainline Daily Truck Volume

Elevation

Variance above 4000' divided by 1000; (Elev-4000)/1000

Score	Condition
0	< 4000'
0-5	4000'- 9000'
5	> 9000'

Mainline Daily Traffic Volume

Exponential equation; score = $5-(5*e^{(ADT*-0.000039)})$

Score	Condition
0	< 6,000
0-5	6,000 – 160,000
5	>160,000

Mainline Daily Truck Volume

Exponential equation; score = $5-(5*e^{(ADT*-0.00025)})$

Score	Condition
0	<900
0-5	900-25,000
5	>25,000

Bridge Performance Area

- Mainline Daily Traffic Volume
- Elevation
- Carries Mainline Traffic
- Detour Length
- Scour Critical Rating
- Vertical Clearance

Mainline Daily Traffic Volume

Exponential equation; score = $5-(5*e^{(ADT*-0.000039)})$

Score	Condition
0	<6,000
0-5	6,000-160,000
5	>160,000

Elevation

Variance above 4000' divided by 1000; (Elev-4000)/1000

Score	Condition
0	< 4000'
0-5	4000'- 9000'
5	> 9000'

Carries Mainline Traffic

Score	Condition
0	Does not carry mainline traffic
5	Carries mainline traffic

Detour Length

Divides detour length by 10 and multiplies by 2.5

Score	Condition
0	0 miles
0-5	0-20 miles
5	> 20 miles

Scour Critical Rating

Variance below 8

Score	Condition
0	Rating > 8
0-5	Rating 8 - 3
5	Rating < 3

Vertical Clearance

Variance below 16' x 2.5; (16 –Clearance) x 2.5

Score	Condition
0	>16'
0-5	16'-14'
5	<14'

Mobility Performance Area

- Mainline VMT
- Buffer Index (PTI-TTI)
- Detour Length
- Outside Shoulder Width

Mainline VMT

Exponential equation; score = 5-(5*e(ADT*-0.0000139))

Score	Condition
0	<16,000
0-5	16,000-400,000
5	>400,000

Buffer Index

Buffer Index x 10

Score	Condition
0	Buffer Index = 0.00
0-5	Buffer Index 0.00-0.50
5	Buffer Index > 0.50

Detour Length

Score	Condition
0	Detour < 10 miles
5	Detour > 10 miles

Outside Shoulder Width

Variance below 10', if only 1 lane in each direction

Score	Condition
0	10' or above or >1 lane in each direction
0-5	10'-5' and 1 lane in each direction
5	5' or less and 1 lane in each direction

Safety Performance Area

- Mainline Daily Traffic Volume
- Interrupted Flow
- Elevation
- Outside Shoulder Width
- Vertical Grade

Mainline Daily Traffic Volume

Exponential equation; score = 5-(5*e$^{(ADT*-0.000039)}$)

Score	Condition
0	<6,000
0-5	6,000-160,000
5	>160,000

Interrupted Flow

Score	Condition
0	Not interrupted flow
5	Interrupted Flow

Elevation

Variance above 4000' divided by 1000; (Elev-4000)/1000

Score	Condition
0	< 4000'
0-5	4000'- 9000'
5	> 9000'

Outside Shoulder Width

Variance below 10'

Score	Condition
0	10' or above
0-5	10' - 5'
5	5' or less

Grade

Variance above 3% x 1.5

Score	Condition
0	< 3%
0-5	3% - 6.33%
5	>6.33%

Freight Performance Area

- Mainline Daily Truck Volume
- Detour Length
- Truck Buffer Index (TPTI-TTTI)
- Outside Shoulder Width

Mainline Daily Truck Volume

Exponential equation; score = 5-(5*e$^{(ADT*-0.00025)}$)

Score	Condition
0	<900
0-5	900-25,000
5	>25,000

Detour Length

Score	Condition
0	Detour < 10 miles
5	Detour > 10 miles

Truck Buffer Index

Truck Buffer Index x 10

Score	Condition
0	Buffer Index = 0.00
0-5	Buffer Index 0.00-0.50
5	Buffer Index > 0.50

Outside Shoulder Width

Variance below 10', if only 1 lane in each direction

Score	Condition
0	10' or above or >1 lane in each direction
0-5	10'-5' and 1 lane in each direction
5	5' or less and 1 lane in each direction

Solution Number	Mainline Traffic Vol (vpd) (2-way)	Solution Length (miles)	Bridge Detour Length (miles) (N19)	Elevation (ft)	Scour Critical Rating (0-9)	Carries Mainline Traffic (Y/N)	Bridge Vert. Clear (ft)	Mainline Truck Vol (vpd) (2-way)	Detour Length > 10 miles (Y/N)	Truck Buffer Index	Non-Truck Buffer Index	Grade (%)	Interrupted Flow (Y/N)	Outside/ Right Shoulder Width (ft)	1-lane each direction
95.1	9,480	5.0		158				703	N	2.34	2.315254	0.1	Y	6.22	N
95.2	7,782	4.0		185				612	Y	0.56	0.65479	0.2	N	6.1	Y
95.3	7,782	3.0		185				612	Y	0.56	0.65479	0.2	N	6.1	Y
95.4	1,554	21.0		1,168				312	Y	6.39	2.270721	1.2	N	3.08	Y
95.5	1,554	1.89		1,168				312	Y	6.39	2.270721	1.2	N	3.08	Y
95.6	2,564	20.0		843				383	Y	0.39	0.31871	0.7	N	3.12	Y
95.9	4,549	11.0		533				680	Y	0.80	0.542933	1.3	N	5.06	Y
95.10	9,321	1.03		443				1,176	Y	4.29	4.6627	1	Y	4.5	N
95.12	5,627	15.0		845				840	Y	0.41	0.415098	2	N	4.5	Y
95.13	14,357	9.0		674				1,483	N	3.33	3.024747	1.2	Y	1.5	N
95.16	7,921	3.5		1,173				1,407	Y	3.35	4.085617	2	N	3	Y
95.17	7,921	0.7		1,173				1,407	Y	3.35	4.085617	0.5	N	6	Y

Solution Number	Bridge	Pavement	Mobility	Safety	Freight	Risk Score (0 to 10)				
						Bridge	Pavement	Mobility	Safety	Freight
95.1	N	N	Y	Y	Y	0.00	0.00	2.10	4.13	1.31
95.2	N	N	Y	Y	Y	0.00	0.00	7.83	2.08	7.31
95.3	N	N	Y	Y	Y	0.00	0.00	7.64	2.08	7.31
95.4	N	N	Y	Y	Y	0.00	0.00	8.41	2.12	7.69
95.5	N	N	Y	Y	Y	0.00	0.00	7.60	2.12	7.69
95.6	N	N	Y	Y	Y	0.00	0.00	7.87	2.19	7.16
95.9	N	N	Y	Y	Y	0.00	0.00	8.72	2.30	7.86
95.1	N	N	Y	Y	Y	0.00	0.00	4.61	4.60	4.79
95.12	N	N	Y	Y	Y	0.00	0.00	8.80	2.39	7.53
95.13	N	N	Y	Y	Y	0.00	0.00	3.25	4.85	2.06
95.16	N	N	Y	Y	Y	0.00	0.00	8.30	2.53	8.24
95.17	N	N	Y	Y	Y	0.00	0.00	7.19	2.13	7.74

Appendix H: Candidate Solution Cost Estimates

Candidate #	Name	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost	Construction Cost	Total Cost	Notes
CS95.1	Yuma Area Safety Improvements	-	Convert a 4-Lane undivided highway to a 5-Lane highway	29	32	mi	2.62	$2,316,600	$180,000	$610,000	$0	$6,072,300	$6,862,300	
			Convert a 2-Lane undivided highway to a 5-Lane highway	32	34	mi	2.00	$3,467,200	$210,000	$690,000	$0	$6,934,400	$7,834,400	
			Install Warning Signs at Signalized Intersections	-	-	each	4	$5,500	$0	$0	$0	$22,000	$22,000	
			Install Raised Medians at Signalized Intersection Approaches	-	-	mi	0.38	$792,000	$10,000	$30,000	$0	$300,000	$340,000	8 approaches (mainline SR 95 approaches for 4 intersections)
			Improve Signal Visibility	-	-	each	4	$77,000	$10,000	$30,000	$0	$308,000	$348,000	
			Widen Gila Canal Bridge (MP 33.55)	-	-	sf	3960	$390	$50,000	$150,000	$0	$1,544,400	$1,744,400	
								Solution Total	**$410,000**	**$1,360,000**	**$0**	**$13,636,700**	**$15,406,700**	
CS95.2	Fortuna Wash Area Safety Improvements	-	Convert a 2-Lane undivided highway to a 5-Lane highway	35	39	mi	4	$3,467,200	$420,000	$1,390,000	$0	$13,868,800	$15,678,800	
			Widen Welton Mohawk Canal Bridge (MP 38.00)	-	-	sf	3,384	$390	$40,000	$130,000	$0	$1,319,760	$1,489,760	
								Solution Total	**$460,000**	**$1,520,000**	**$0**	**$15,188,560**	**$17,168,560**	
CS95.3	Dome Valley Area Safety Improvements	-	Widen Shoulders	39	42	mi	6	$488,400	$90,000	$300,000	$0	$2,930,400	$3,320,400	Existing shoulder widths were used to alter Factored Construction Unit Costs for Widening Shoulders; quantity was doubled because the Factored Construction Unit Cost was developed for only one side of the roadway
			Install Chevrons	40.1	40.4	mi	0.3	$40,500	$0	$0	$0	$12,150	$12,150	
			Install Intersection Warning Signs	-	-	each	2	$5,500	$0	$0	$0	$11,000	$11,000	
								Solution Total	**$90,000**	**$300,000**	**$0**	**$2,953,550**	**$3,343,550**	
CS95.4	Yuma Proving Ground Area Safety and Freight Improvements	A	Widen Shoulders	59	80	mi	42	$640,200	$810,000	$2,690,000	$0	$26,888,400	$30,388,400	Existing shoulder widths were used to alter Factored Construction Unit Costs for Widening Shoulders; quantity was doubled because the Factored Construction Unit Cost was developed for only one side of the roadway
								Option A: Solution Total	**$810,000**	**$2,690,000**	**$0**	**$26,888,400**	**$30,388,400**	
		B	Construct Alternating Passing Lanes	59	80	mi	21	$3,300,000	$2,080,000	$6,930,000	**$0**	$69,300,000	$78,310,000	
								Option B: Solution Total	**$2,080,000**	**$6,930,000**	**$0**	**$69,300,000**	**$78,310,000**	

Candidate #	Name	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost	Construction Cost	Total Cost	Notes
CS95.5	Yuma Proving Ground Freight Improvements	-	Construct Drainage Structures - Intermediate	-	-	each	8	$1,188,000	$290,000	$950,000	$0	$9,504,000	$10,744,000	
			Construct Drainage Structures - Minor	-	-	each	2	$616,000	$40,000	$120,000	$0	$1,232,000	$1,392,000	
								Solution Total	**$290,000**	**$950,000**	**$0**	**$9,504,000**	**$10,744,000**	
CS95.6	Quartzsite to Bouse Wash Freight Improvements	-	Widen Shoulders	111	131	mi	40	$640,200	$770,000	$2,560,000	$0	$25,608,000	$28,938,000	Existing shoulder widths were used to alter Factored Construction Unit Costs for Widening Shoulders; quantity was doubled because the Factored Construction Unit Cost was developed for only one side of the roadway
			Construct Drainage Structures - Intermediate	-	-	each	15	$1,188,000	$530,000	$1,780,000	$0	$17,820,000	$20,130,000	
			Construct Drainage Structures - Minor	-	-	each	4	$616,000	$70,000	$250,000	$0	$2,464,000	$2,784,000	
								Solution Total	**$1,370,000**	**$4,590,000**	**$0**	**$45,892,000**	**$51,852,000**	
CS95.9	Bouse Wash to Parker Freight Improvements	A	Widen Shoulders	131	142	mile	22	$539,000	$360,000	$1,190,000	$0	$11,858,000	$13,408,000	Existing shoulder widths were used to alter Factored Construction Unit Costs for Widening Shoulders; quantity was doubled because the Factored Construction Unit Cost was developed for only one side of the roadway
			Construct Drainage Structure - Intermediate	-	-	each	1	$1,188,000	$40,000	$120,000	$0	$1,188,000	$1,348,000	
								Option A: Solution Total	**$400,000**	**$1,310,000**	**$0**	**$13,046,000**	**$14,756,000**	
		B	Construct Alternating Passing Lanes	131	142	mi	11	$3,300,000	$1,090,000	$3,630,000	$0	$36,300,000	$41,020,000	
			Construct Drainage Structure - Intermediate	-	-	each	1	$1,188,000	$40,000	$120,000	$0	$1,188,000	$1,348,000	
								Option B: Solution Total	**$1,130,000**	**$3,750,000**	**$0**	**$37,488,000**	**$42,368,000**	
CS95.10	Parker Safety and Freight Improvements	-	Construct Right-Turn Lanes	-	-	each	6	$374,000	$70,000	$220,000	$220,000	$2,244,000	$2,754,000	
			Improve Signal Visibility	-	-	each	1	$77,000	$0	$10,000	$0	$77,000	$87,000	
			Install Warning Signs	-	-	each	1	$5,500	$0	$0	$0	$5,500	$5,500	
			Install Transverse Rumble Strips	-	-	each	1	$7,000	$0	$0	$0	$7,000	$7,000	
								Solution Total	**$70,000**	**$230,000**	**$220,000**	**$2,333,500**	**$2,853,500**	

Candidate #	Name	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost	Construction Cost	Total Cost	Notes
CS95.12	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	-	Widen Shoulders	162	176	mi	28	$539,000	$450,000	$1,510,000	$0	$15,092,000	$17,052,000	Existing shoulder widths were used to alter Factored Construction Unit Costs for Widening Shoulders; quantity was doubled because the Factored Construction Unit Cost was developed for only one side of the roadway
			Construct Alternating Passing Lanes	172.8	177	mi	4.2	$3,300,000	$420,000	$1,390,000	$0	$13,860,000	$15,670,000	
			Construct Alternating Passing Lanes	164	169.8	mi	5.8	$3,300,000	$570,000	$1,900,000	$0	$19,140,000	$21,610,000	
			Install curve warning signs	162.3	162.3	ach	1	$5,500	$0	$0	$0	$5,500	$5,500	
			Install advisory speed signs	162.3	162.3	each	1	$5,500	$0	$0	$0	$5,500	$5,500	
			Install Chevrons	162.3	162.3	mi	0.25	$40,500	$0	$0	$0	$10,125	$10,125	
								Solution Total	**$1,440,000**	**$4,800,000**	**$0**	**$48,113,125**	**$54,353,125**	
CS95.13	Lake Havasu City Safety and Freight Improvements	A	Construct Double-Lane Roundabouts	-	-	each	9	$3,960,000	$1,070,000	$3,560,000	$480,000	$35,640,000	$40,750,000	Assuming $12/sf for ROW cost
			Install Raised Medians	177	186	mi	9	$792,000	$210,000	$710,000	$0	$7,128,000	$8,048,000	
			Rehabilitate Bridge (Falls Spring Wash Bridge)	-	-	sf	16000	$140	$70,000	$220,000	$0	$2,240,000	$2,530,000	
								Option A: Solution Total	**$1,350,000**	**$4,490,000**	**$480,000**	**$45,008,000**	**$51,328,000**	
		B	Construct Turn Lanes	-	-	each	4	$374,000	$40,000	$150,000	$140,000	$1,496,000	$1,826,000	Assuming $12/sf for ROW cost
			Install Raised Medians	177	186	mi	9	$792,000	$210,000	$710,000	$0	$7,128,000	$8,048,000	
			Implement Signal Coordination	176	190	mi	3	$308,000	$30,000	$90,000	$0	$924,000	$1,044,000	12 intersections total over 8.5 miles; price developed based on 4 intersections so quantity of three was used to toal 12 intersections
			Rehabilitate Bridge (Falls Spring Wash Bridge)	-	-	sf	16000	$140	$70,000	$220,000	$0	$2,240,000	$2,530,000	
								Option B: Solution Total	**$350,000**	**$1,170,000**	**$140,000**	**$11,788,000**	**$13,448,000**	

Candidate #	Name	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost	Construction Cost	Total Cost	Notes
CS95.16	Lake Havasu City to I-40 Freight Improvements	-	Widen Shoulders	194.5	196	mi	3	$640,200	$60,000	$190,000	$0	$1,920,600	$2,170,600	Existing shoulder widths were used to alter Factored Construction Unit Costs for Widening Shoulders; quantity was doubled because the Factored Construction Unit Cost was developed for only one side of the roadway
			Construct Alternating Passing Lanes	196	198	mi	2	$3,300,000	$200,000	$660,000	$0	$6,600,000	$7,460,000	
								Solution Total	**$260,000**	**$850,000**	**$0**	**$8,520,600**	**$9,630,600**	
CS95.17	I-40 Approach Freight Improvements	-	Construct Auxiliary Lanes	201.3	202	mi	0.7	$2,011,000	$80,000	$280,000	$0	$2,800,000	$3,160,000	Assuming $12/sf for ROW cost
								Solution Total	**$80,000**	**$280,000**	**$0**	**$2,800,000**	**$3,160,000**	

Appendix I: Performance Effectiveness Scores

Need Reduction

			Solution #	CS95.1	CS95.2	CS95.3	CS95.4A	CS95.4B	CS95.5	CS95.6	CS95.9A	CS95.9B	CS95.10	CS95.12	CS95.13A	CS95.13B	CS95.16	CS95.17
			Description	Yuma Area Safety Improvements	Fortuna Wash Area Safety Improvements	Dome Valley Area Safety Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Freight Improvements	Quartzsite to Bouse Wash Freight Improvements	Bouse Wash to Parker Freight Improvements	Bouse Wash to Parker Freight Improvements	Parker Safety and Freight Improvements	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City to I-40 Freight Improvements	I-40 Approach Freight Improvements
LEGEND:			Project Beg MP	29	35	39	59	59	59	111	131	131	142	162	177	177	194.5	201.3
-user entered value			Project End MP	34	39	42	80	80	71	131	142	142	150	177	186	186	198	202
-calculated value for reference only			Project Length (miles)	5	4	3	21	21	1.89	20	11	11	0.78	15	9	9	3.5	0.7
-calculated value for entry/use in other spreadsheet			Segment Beg MP	29	34	34	60	60	60	111	131	131	142	162	176	176	190	190
-for input into PES spreadsheet			Segment End MP	34	43	43	80	80	80	131	142	142	148	176	190	190	202	202
-assumed values			Segment Length (miles)	5	9	9	20	20	20	20	11	11	6	14	14	14	12	12
			Segment #	1	2	2	4	4	4	7	8	8	9	11	12	12	13	13
			Current # of Lanes (both directions)	4	2	2	2	2	2	2	2	2	4	2	4	4	2	2
			Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way
			Additional Lanes (one-way)	0.25	1.25	0	0	0.5	0	0	0	0.5	0	0.36	0	0	0.083	0.5
			Pro-Rated # of Lanes	4.50	3.11	2.00	2.00	3.05	2.00	2.00	2.00	3.00	4.00	2.77	4.00	4.00	2.05	2.06
			Description															
SAFETY	DIRECTIONAL SAFETY		Orig Segment Directional Safety Index (direction 1)	1.293	2.420	2.420	2.000	2.000	2.000	0.000	0.280	0.280	2.130	1.890	1.630	1.630	1.880	1.880
			Orig Segment Directional Fatal Crashes (direction 1)	1	2	2	2	2	2	0	0	0	2	2	2	2	2	2
			Orig Segment Directional Incap Crashes (direction 1)	2	1	1	2	2	2	0	4	4	3	5	47	47	3	3
			Original Fatal Crashes in project limits (direction 1)	1	1	1	2	2	1	0	0	0	2	2	1	1	1	0
			Original Incap Crashes in project limits (direction 1)	2	1	0	2	2	0	0	4	4	0	5	37	37	2	0
			CMF 1 (direction 1) (lowest CMF)	0.83	0.7	0.64	0.64	0.63	0.7	0.64	0.64	0.63	Total CMF calculated in separate worksheet	Total CMF calculated in separate worksheet	Total CMF calculated in separate worksheet	Total CMF calculated in separate worksheet	Total CMF calculated in separate worksheet	1
			CMF 2 (direction 1)	0.85	1	1	1	1	1	1	1	1						1
			CMF 3 (direction 1)	0.85	1	1	1	1	1	1	1	1						1
			CMF 4 (direction 1)	1	1	1	1	1	1	1	1	1						1
			CMF 5 (direction 1)	1	1	1	1	1	1	1	1	1						1
			Total CMF (direction 1)	0.710	0.700	0.640	0.640	0.630	0.700	0.640	0.640	0.630	0.000	0.000	0.000	0.000	0.000	1.000
			Fatal Crash reduction (direction 1)	0.290	0.300	0.360	0.720	0.740	0.300	0.000	0.000	0.000	0.374	0.843	0.634	0.212	0.370	0.000
			Incap Crash reduction (direction 1)	0.580	0.300	0.000	0.720	0.740	0.000	0.000	1.440	1.480	0.000	2.418	12.786	8.110	0.730	0.000
			Post-Project Segment Directional Fatal Crashes (direction 1)	0.710	1.700	1.640	1.280	1.260	1.700	0.000	0.000	0.000	1.626	1.157	1.366	1.788	1.630	2.000
			Post-Project Segment Directional Incap Crashes (direction 1)	1.420	0.700	1.000	1.280	1.260	2.000	0.000	2.560	2.520	3.000	2.582	34.214	38.890	2.270	3.000
			Post-Project Segment Directional Safety Index (direction 1)	0.918	2.046	2.000	1.281	1.261	1.721	0.000	0.182	0.179	1.766	1.075	1.156	1.387	1.520	1.880
			Post-Project Segment Directional Safety Index (direction 1)	0.918	2.046	2.000	1.281	1.261	1.721	0.000	0.182	0.179	1.766	1.075	1.156	1.387	1.520	1.880
			Orig Segment Directional Safety Index (direction 2)	1.312	0.160	0.160	0.950	0.950	0.950	0	0.000	0.000	0.070	1.930	1.910	1.910	0.240	0.240
			Orig Segment Directional Fatal Crashes (direction 2)	1	0	0	1	1	1	0	0	0	0	2	3	3	0	0
			Orig Segment Directional Incap Crashes (direction 2)	2	2	2	0	0	0	0	0	0	1	5	45	45	4	4
			Original Fatal Crashes in project limits (direction 2)	1	0	0	1	1	0	0	0	0	0	2	3	3	0	0
			Original Incap Crashes in project limits (direction 2)	2	2	0	0	0	0	0	0	0	1	5	33	33	1	1
			CMF 1 (direction 2) (Lowest CMF)	0.83	Total CMF calculated in separate worksheet	0.64	0.64	0.63	0.7	0.64	0.64	0.63	0.85	Total CMF calculated in separate worksheet	Total CMF calculated in separate worksheet	Total CMF calculated in separate worksheet	0.64	0.78
			CMF 2 (direction 2)	0.85		1	1	1	1	1	1	1	0.95				1	1
			CMF 3 (direction 2)	0.85		1	1	1	1	1	1	1	0.97				1	1
			CMF 4 (direction 2)	1		1	1	1	1	1	1	1	1				1	1
			CMF 5 (direction 2)	1		1	1	1	1	1	1	1	1				1	1
			Total CMF (direction 2)	0.710	0.000	0.640	0.640	0.630	0.700	0.640	0.640	0.630	0.816	0.000	0.000	0.000	0.640	0.780
			Fatal Crash reduction (direction 2)	0.290	0.000	0.000	0.360	0.370	0.000	0.000	0.000	0.000	0.000	0.967	0.974	0.635	0.000	0.000
			Incap Crash reduction (direction 2)	0.580	0.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.184	2.294	10.250	7.169	0.360	0.220
			Post-Project Segment Directional Fatal Crashes (direction 2)	0.710	0.000	0.000	0.640	0.630	1.000	0.000	0.000	0.000	0.000	1.033	2.026	2.365	0.000	0.000
			Post-Project Segment Directional Incap Crashes (direction 2)	1.420	1.600	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.816	2.706	34.750	37.831	3.640	3.780
			Post-Project Segment Directional Safety Index (direction 2)	0.931	0.129	0.161	0.609	0.599	0.951	0.000	0.000	0.000	0.054	1.005	1.384	1.556	0.220	0.223
			Post-Project Segment Directional Safety Index (direction 2)	0.931	0.129	0.161	0.609	0.599	0.951	0.000	0.000	0.000	0.054	1.005	1.384	1.556	0.220	0.223
	SAFETY INDEX		Current Safety Index	1.303	1.290	1.290	1.475	1.475	1.475	0.000	0.140	0.140	1.100	1.910	1.770	1.770	1.060	1.060
			Post-Project Safety Index	0.925	1.088	1.081	0.945	0.930	1.336	0.000	0.091	0.090	0.910	1.040	1.270	1.472	0.870	1.052
	Needs		Original Segment Safety Need	2.877	3.787	3.787	4.283	4.283	4.283	0.000	0.087	0.087	2.141	6.590	4.771	4.771	2.489	2.489
			Post-Project Segment Safety Need	0.597	2.907	2.807	0.821	0.806	3.747	0.000	0.056	0.055	0.881	2.581	2.831	3.642	0.839	2.410

		Solution #	CS95.1	CS95.2	CS95.3	CS95.4A	CS95.4B	CS95.5	CS95.6	CS95.9A	CS95.9B	CS95.10	CS95.12	CS95.13A	CS95.13B	CS95.16	CS95.17	
		Description	Yuma Area Safety Improvements	Fortuna Wash Area Safety Improvements	Dome Valley Area Safety Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Freight Improvements	Quartzsite to Bouse Wash Freight Improvements	Bouse Wash to Parker Freight Improvements	Bouse Wash to Parker Freight Improvements	Parker Safety and Freight Improvements	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City to I-40 Freight Improvements	I-40 Approach Freight Improvements	
		Project Beg MP	29	35	39	59	59	59	111	131	131	142	162	177	177	194.5	201.3	
		Project End MP	34	39	42	80	80	71	131	142	142	150	177	186	186	198	202	
		Project Length (miles)	5	4	3	21	21	1.89	20	11	11	0.78	15	9	9	3.5	0.7	
		Segment Beg MP	29	34	34	60	60	60	111	131	131	142	162	176	176	190	190	
		Segment End MP	34	43	43	80	80	80	131	142	142	148	176	190	190	202	202	
		Segment Length (miles)	5	9	9	20	20	20	20	11	11	6	14	14	14	12	12	
		Segment #	1	2	2	4	4	4	7	8	8	9	11	12	12	13	13	
		Current # of Lanes (both directions)	4	2	2	2	2	2	2	2	2	4	2	4	4	2	2	
		Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	
		Additional Lanes (one-way)	0.25	1.25	0	0	0.5	0	0	0	0.5	0	0.36	0	0	0.083	0.5	
		Pro-Rated # of Lanes	4.50	3.11	2.00	2.00	3.05	2.00	2.00	2.00	3.00	4.00	2.77	4.00	4.00	2.05	2.06	
		Description																
MOBILITY	MOBILITY INDEX	Original Segment Mobility Index	0.350	0.420	0.420	0.120	0.120	0.120	0.210	0.450	0.450	0.320	0.270	0.640	0.640	0.360	0.360	
		Post-Project # of Lanes (both directions)	4.50	3.11	2.00	2.00	3.05	2.00	2.00	2.00	3.00	4.00	2.77	4.00	4.00	2.05	2.06	
		Post-Project Segment Mobility Index	0.31	0.15	0.42	0.11	0.09	0.12	0.20	0.43	0.32	0.30	0.23	0.61	0.61	0.34	0.34	
		Post-Project Segment Mobility Index	0.310	0.150	0.420	0.110	0.090	0.120	0.200	0.430	0.320	0.300	0.230	0.610	0.610	0.340	0.340	
	FUT V/C	Original Segment Future V/C	0.410	0.500	0.500	0.150	0.150	0.150	0.290	0.610	0.610	0.350	0.300	0.830	0.830	0.420	0.420	
		Post-Project Segment Future V/C	0.370	0.180	0.500	0.130	0.110	0.150	0.270	0.580	0.440	0.330	0.260	0.790	0.790	0.400	0.400	
		Post-Project Segment Future V/C	0.370	0.180	0.500	0.130	0.110	0.150	0.270	0.580	0.440	0.330	0.260	0.790	0.790	0.400	0.400	
	PEAK HOUR V/C	Original Segment Peak Hour V/C (direction 1)	0.300	0.410	0.410	0.170	0.170	0.170	0.240	0.360	0.360	0.320	0.240	0.420	0.420	0.290	0.290	
		Original Segment Peak Hour V/C (direction 2)	0.290	0.410	0.410	0.170	0.170	0.170	0.250	0.360	0.360	0.360	0.230	0.400	0.400	0.280	0.280	
		Adjusted total # of Lanes for use in directional peak hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		Post-Project Segement Peak Hr V/C (direction 1)	0.260	0.15	0.41	0.15	0.12	0.17	0.22	0.34	0.26	0.30	0.22	0.40	0.40	0.29	0.28	
		Post-Project Segement Peak Hr V/C (direction 2)	0.260	0.15	0.41	0.15	0.12	0.17	0.23	0.34	0.26	0.34	0.20	0.38	0.38	0.27	0.27	
		Post-Project Segment Peak Hr V/C (direction 1)	0.260	0.150	0.410	0.150	0.120	0.170	0.220	0.340	0.260	0.300	0.220	0.400	0.400	0.290	0.280	
		Post-Project Segment Peak Hr V/C (direction 2)	0.260	0.150	0.410	0.150	0.120	0.170	0.230	0.340	0.260	0.340	0.200	0.380	0.380	0.270	0.270	
	TTI AND PTI	Safety Reduction Factor	0.710	0.843	0.838	0.641	0.631	1.000	1.000	0.650	0.639	0.827	0.545	0.718	0.831	0.821	0.992	
		Safety Reduction	0.290	0.157	0.162	0.359	0.369	0.000	0.000	0.350	0.361	0.173	0.455	0.282	0.169	0.179	0.008	
		Mobility Reduction Factor	0.886	0.357	1.000	0.917	0.750	1.000	0.952	0.956	0.711	0.938	0.852	0.953	0.953	0.944	0.944	
		Mobility Reduction	0.114	0.643	0.000	0.083	0.250	0.000	0.048	0.044	0.289	0.063	0.148	0.047	0.047	0.056	0.056	Solution 13- A
		Mobility effect on TTI	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	
		Mobility effect on PTI	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	An additional 10% decrease in PTI and TTI to account for improvements to Mobility from roundabouts and 10% reduction in closures
		Safety effect on TTI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Safety effect on PTI	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	
		Original Directional Segment TTI (direction 1)	1.084	1.045	1.045	1.185	1.185	1.185	1.061	1.002	1.002	1.307	1.084	1.240	1.240	1.056	1.056	
		Original Directional Segment PTI (direction 1)	2.964	2.212	2.212	5.364	5.364	5.364	1.315	1.714	1.714	7.350	1.357	4.706	4.706	3.946	3.946	
		Original Directional Segment TTI (direction 2)	1.155	1.000	1.000	1.039	1.039	1.043	1.043	1.000	1.000	1.294	1.051	1.199	1.199	2.006	2.006	
		Original Directional Segment PTI (direction 2)	3.905	1.143	1.143	1.401	1.401	1.401	1.426	1.374	1.374	4.577	1.608	3.783	3.783	7.288	7.288	
		Reduction Factor for Segment TTI	0.034	0.193	0.000	0.025	0.075	0.000	0.014	0.013	0.087	0.019	0.044	0.014	0.014	0.017	0.017	
		Reduction Factor for Segment PTI	0.110	0.176	0.049	0.124	0.161	0.000	0.010	0.114	0.166	0.064	0.166	0.094	0.060	0.065	0.014	
		Post-Project Directional Segment TTI (direction 1)	1.046	1.023	1.045	1.155	1.096	1.185	1.046	1.001	1.001	1.282	1.036	~~1.400~~	1.223	1.038	1.038	0.990
		Post-Project Directional Segment PTI (direction 1)	2.638	1.823	2.104	4.696	4.501	5.364	1.302	1.519	1.429	6.877	1.131	~~3.837~~	4.424	3.690	3.893	3.453
		Post-Project Directional Segment TTTI (direction 2)	1.115	1.000	1.000	1.013	1.020	1.020	1.028	1.000	1.000	1.270	1.004	~~1.064~~	1.182	1.973	1.973	0.958
		Post-Project Directional Segment TPTI (direction 2)	3.476	1.072	1.087	1.227	1.176	1.201	1.213	1.218	1.146	4.283	1.34	~~3.084~~	3.556	6.815	7.189	2.776
	CLOSURE EXTENT	Orig Segment Directional Closure Extent (direction 1)	0.369	0.156	0.156	0.030	0.030	0.030	0.370	0.036	0.036	0.514	0.171	0.414	0.457	0.150	0.150	0.457
		Orig Segment Directional Closure Extent (direction 2)	0.120	0.022	0.022	0.010	0.010	0.010	0.080	0.273	0.273	0.029	0.294	0.077	0.091	0.133	0.133	0.091
		Segment Closures with fatalities/injuries	7	5	5	3	3	3	3	2	2	11	18	26	26	9	9	
		Total Segment Closures	10	8	8	4	4	4	15	7	7	19	28	35	35	17	17	
		% Closures with Fatality/Injury	0.70	0.63	0.63	0.75	0.75	0.75	0.20	0.29	0.29	0.58	0.64	0.74	0.74	0.53	0.53	
		Closure Reduction	0.203	0.098	0.102	0.269	0.277	0.000	0.000	0.100	0.103	0.100	0.293	0.210	0.125	0.095	0.004	
		Closure Reduction Factor	0.797	0.902	0.898	0.731	0.723	1.000	1.000	0.900	0.897	0.900	0.707	0.790	0.875	0.905	0.996	
		Post-Project Segment Directional Closure Extent (direction 1)	0.294	0.141	0.140	0.022	0.022	0.030	0.210	0.018	0.018	0.463	0.121	0.327	0.400	0.136	0.149	
		Post-Project Segment Directional Closure Extent (direction 2)	0.096	0.020	0.020	0.007	0.007	0.010	0.080	0.273	0.245	0.026	0.213	0.061	0.080	0.120	0.132	
	BICYCLE ACCOM	Orig Segment Bicycle Accomodation %	62.0%	56.0%	56.0%	0.0%	0.0%	0.0%	0.0%	25.0%	25.0%	61.0%	0.0%	9.0%	9.0%	71.0%	71.0%	
		Orig Segment (Project) Outside Shoulder width	6.0	6.0	6.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.5	1.5	1.5	3.0	6.4	
		Post-Project Segment Outside Shoulder width	10	8.4	8	10	No Change	No Change	10	10	No Change	No Change	10	No Change	No Change	10	No Change	
		Post-Project Segment Bicycle Accomodation (%)	100.0%	80.0%	75.0%	100.0%	No Change	No Change	100.0%	100.0%	No Change	No Change	100.0%	No Change	No Change	89.0%	No Change	
		Post-Project Segment Bicycle Accomodation (%)	100.0%	80.0%	75.0%	100.0%	No Change	No Change	100.0%	100.0%	No Change	No Change	100.0%	No Change	No Change	89.0%	No Change	
	Needs	Original Segment Mobility Need	0.937	1.805	1.805	4.093	4.093	4.093	1.213	1.651	1.651	1.312	1.485	1.821	1.821	8.102	8.102	
		Post-Project Segment Mobility Need	0.485	0.860	1.480	2.868	3.393	3.678	0.448	0.873	1.272	1.211	0.480	1.475	1.590	7.278	7.939	

LEGEND:
-user entered value
-calculated value for reference only
-calculated value for entry/use in other spreadsheet
-for input into PES spreadsheet
-assumed values

			Solution #	CS95.1	CS95.2	CS95.3	CS95.4A	CS95.4B	CS95.5	CS95.6	CS95.9A	CS95.9B	CS95.10	CS95.12	CS95.13A	CS95.13B	CS95.16	CS95.17	
			Description	Yuma Area Safety Improvements	Fortuna Wash Area Safety Improvements	Dome Valley Area Safety Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Freight Improvements	Quartzsite to Bouse Wash Freight Improvements	Bouse Wash to Parker Freight Improvements	Bouse Wash to Parker Freight Improvements	Parker Safety and Freight Improvements	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City to I-40 Freight Improvements	I-40 Approach Freight Improvements	
			Project Beg MP	29	35	39	59	59	59	111	131	131	142	162	177	177	194.5	201.3	
			Project End MP	34	39	42	80	80	71	131	142	142	150	177	186	186	198	202	
			Project Length (miles)	5	4	3	21	21	1.89	20	11	11	0.78	15	9	9	3.5	0.7	
			Segment Beg MP	29	34	34	60	60	60	111	131	131	142	162	176	176	190	190	
			Segment End MP	34	43	43	80	80	80	131	142	142	148	176	190	190	202	202	
			Segment Length (miles)	5	9	9	20	20	20	20	11	11	6	14	14	14	12	12	
			Segment #	1	2	2	4	4	4	7	8	8	9	11	12	12	13	13	
			Current # of Lanes (both directions)	4	2	2	2	2	2	2	2	2	4	2	4	4	2	2	
			Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	
			Additional Lanes (one-way)	0.25	1.25	0	0	0.5	0	0	0	0.5	0	0.36	0	0	0.083	0.5	
			Pro-Rated # of Lanes	4.50	3.11	2.00	2.00	3.05	2.00	2.00	2.00	3.00	4.00	2.77	4.00	4.00	2.05	2.06	
			Description																
FREIGHT	TTI AND TPTI		Mobility effect on TTTI	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	Solution 13- A
			Mobility effect on TPTI	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	
			Safety effect on TTTI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			Safety effect on TPTI	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
			Original Directional Segment TTTI (direction 1)	1.119	1.083	1.083	1.285	1.285	1.285	1.097	1.042	1.042	1.406	1.185	1.320	1.320	1.305	1.305	An additional 10% decrease in PTI and TTI to account for improvements to Freight from roundabouts and 10% reduction in closures
			Original Directional Segment TPTI (direction 1)	3.581	2.034	2.034	13.661	13.661	13.661	1.459	2.217	2.217	7.042	1.560	5.291	5.291	3.089	3.089	
			Original Directional Segment TTTI (direction 2)	1.188	1.000	1.000	1.108	1.108	1.108	1.091	1.018	1.018	1.325	1.103	1.281	1.281	2.741	2.741	
			Original Directional Segment TPTI (direction 2)	3.318	1.169	1.169	1.521	1.521	1.521	1.501	1.436	1.436	4.270	1.550	3.964	3.964	7.659	7.659	
			Reduction Factor for Segment TTTI (both directions)	0.017	0.096	0.000	0.013	0.038	0.000	0.007	0.007	0.043	0.009	0.022	0.007	0.007	0.008	0.008	
			Reduction Factor for Segment TPTI (both directions)	0.055	0.088	0.024	0.062	0.080	0.000	0.005	0.057	0.083	0.032	0.083	0.047	0.030	0.032	0.007	
			Post-Project Directional Segment TTTI (direction 1)	1.100	1.031	1.083	1.269	1.237	1.285	1.089	1.035	1.019	1.393	1.159	~~1.180~~	1.311	1.294	1.294	1.062
			Post-Project Directional Segment TPTI (direction 1)	3.384	1.855	1.984	12.811	12.562	12.295	1.313	2.091	2.033	6.816	1.430	~~4.538~~	5.132	2.989	3.068	4.084
			Post-Project Directional Segment TTTI (direction 2)	1.168	1.000	1.000	1.094	1.066	1.108	1.083	1.011	1.009	1.313	1.078	~~1.145~~	1.272	2.718	2.718	1.030
			Post-Project Directional Segment TPTI (direction 2)	3.135	1.066	1.141	1.426	1.399	1.369	1.351	1.354	1.317	4.133	1.421	~~3.400~~	3.845	7.411	7.607	3.060
	FREIGHT INDEX		Original Segment TPTI (direction 1)	3.581	2.034	2.034	13.661	13.661	13.661	1.459	2.217	2.217	7.042	1.560	5.291	5.291	3.089	3.089	
			Original Segment TPTI (direction 2)	3.318	1.169	1.169	1.521	1.521	1.521	1.501	1.436	1.436	4.270	1.550	3.964	3.964	7.659	7.659	
			Original Segment Freight Index	0.290	0.624	0.624	0.132	0.132	0.132	0.676	0.547	0.547	0.177	0.643	0.216	0.216	0.186	0.186	
			Post-Project Segment TPTI (direction 1)	3.384	1.855	1.984	12.811	12.562	12.295	1.313	2.091	2.033	6.816	1.430	4.538	5.132	2.989	3.068	
			Post-Project Segment TPTI (direction 2)	3.135	1.066	1.141	1.426	1.399	1.369	1.351	1.354	1.317	4.133	1.421	3.400	3.845	7.411	7.607	
			Post-Project Segment Freight Index	0.307	0.685	0.640	0.140	0.143	0.146	0.751	0.581	0.597	0.183	0.701	0.252	0.223	0.192	0.187	
	CLOSURE DURATION		Orig Segment Directional Closure Duration (dir 1)	117.614	27.889	27.889	10.180	10.180	10.180	133.600	10.127	10.127	106.457	27.943	49.729	67.300	18.233	18.233	
			Orig Segment Directional Closure Duration (dir 2)	14.880	3.622	3.622	2.190	2.190	2.190	7.490	166.291	166.291	22.771	53.849	10.054	11.797	20.917	20.917	
			Segment Closures with fatalities	7	5	5	3	3	3	3	2	2	11	18	26	26	9	9	
			Total Segment Closures	10	8	8	4	4	4	15	7	7	19	28	35	35	17	17	
			% Closures with Fatality	0.70	0.63	0.63	0.75	0.75	0.75	0.20	0.29	0.29	0.58	0.64	0.74	0.74	0.53	0.53	
			Closure Reduction	0.203	0.098	0.102	0.269	0.277	0.000	0.000	0.100	0.103	0.100	0.293	0.210	0.125	0.095	0.004	
			Closure Reduction Factor	0.797	0.902	0.898	0.731	0.723	1.000	1.000	0.900	0.897	0.900	0.707	0.790	0.875	0.905	0.996	
			Post-Project Segment Directional Closure Duration (direction 1)	93.721	25.153	25.058	7.437	7.359	10.180	68.270	9.114	9.083	95.811	19.761	39.294	58.869	16.503	18.156	
			Post-Project Segment Directional Closure Duration (direction 2)	11.857	3.267	3.254	1.600	1.583	2.190	7.490	149.662	149.153	20.494	38.081	7.944	10.319	18.932	20.828	
	VERT CLR		Original Segment Vertical Clearance	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	27.83	No UP	16.41	16.41	No UP	No UP	
			Original vertical clearance for specific bridge	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	27.83	No UP	16.41	16.41	No UP	No UP	
			Post-Project vertical clearance for specific bridge	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	27.83	No UP	16.41	16.41	No UP	No UP	
			Post-Project Segment Vertical Clearance	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	27.83	No UP	16.41	16.41	No UP	No UP	
			Post-Project Segment Vertical Clearance	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	No UP	27.83	No UP	16.41	16.41	No UP	No UP	
	Needs		Original Segment Freight Need	0.797	3.275	3.275	13.048	13.048	13.048	2.595	3.903	3.903	2.536	3.040	1.999	1.999	11.003	11.003	
			Post-Project Segment Freight Need	0.656	2.383	3.211	12.303	12.017	11.839	0.633	3.622	3.55	2.419	2.010	1.295	1.918	10.702	10.918	

LEGEND:
-user entered value
-calculated value for reference only
-calculated value for entry/use in other spreadsheet
-for input into PES spreadsheet
-assumed values

			Solution #	CS95.1	CS95.2	CS95.3	CS95.4A	CS95.4B	CS95.5	CS95.6	CS95.9A	CS95.9B	CS95.10	CS95.12	CS95.13A	CS95.13B	CS95.16	CS95.17
			Description	Yuma Area Safety Improvements	Fortuna Wash Area Safety Improvements	Dome Valley Area Safety Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Area Safety and Freight Improvements	Yuma Proving Ground Freight Improvements	Quartzsite to Bouse Wash Freight Improvements	Bouse Wash to Parker Freight Improvements	Bouse Wash to Parker Freight Improvements	Parker Safety and Freight Improvements	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City Safety and Freight Improvements	Lake Havasu City to I-40 Freight Improvements	I-40 Approach Freight Improvements
LEGEND:			Project Beg MP	29	35	39	59	59	59	111	131	131	142	162	177	177	194.5	201.3
-user entered value			Project End MP	34	39	42	80	80	71	131	142	142	150	177	186	186	198	202
-calculated value for reference only			Project Length (miles)	5	4	3	21	21	1.89	20	11	11	0.78	15	9	9	3.5	0.7
-calculated value for entry/use in other spreadsheet			Segment Beg MP	29	34	34	60	60	60	111	131	131	142	162	176	176	190	190
-for input into PES spreadsheet			Segment End MP	34	43	43	80	80	80	131	142	142	148	176	190	190	202	202
-assumed values			Segment Length (miles)	5	9	9	20	20	20	20	11	11	6	14	14	14	12	12
			Segment #	1	2	2	4	4	4	7	8	8	9	11	12	12	13	13
			Current # of Lanes (both directions)	4	2	2	2	2	2	2	2	2	4	2	4	4	2	2
			Project Type (one-way or two-way)	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way	two-way
			Additional Lanes (one-way)	0.25	1.25	0	0	0.5	0	0	0	0.5	0	0.36	0	0	0.083	0.5
			Pro-Rated # of Lanes	4.50	3.11	2.00	2.00	3.05	2.00	2.00	2.00	3.00	4.00	2.77	4.00	4.00	2.05	2.06
			Description															
BRIDGE	BRIDGE INDEX		Original Segment Bridge Index	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Original lowest rating for specific bridge	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project lowest rating for specific bridge	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project lowest rating for specific bridge	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Bridge Index	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Bridge Index	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	SUFF RATING		Original Segment Sufficiency Rating	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Original Sufficiency Rating for specific bridge	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Sufficiency Rating for specific bridge	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Sufficiency Rating for specific bridge	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Sufficiency Rating	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Sufficiency Rating	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	BR RTNG		Original Segment Bridge Rating	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Bridge Rating	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Bridge Rating	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	% FUN OB		Original Segment % Functionally Obsolete	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment % Functionally Obsolete	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment % Functionally Obsolete	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Needs		Original Segment Bridge Need	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Bridge Need	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
PAVEMENT	PAVEMENT INDEX		Original Segment Pavement Index	3.54	3.86	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Original Segment IRI in project limits	85.00	57.00	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Original Segment Cracking in project limits	8.00	4.75	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project IRI in project limits	30.00	30.00	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project IRI in project limits	30	30	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Cracking in project limits	0.00	0.00	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Cracking in project limits	0	0	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Pavement Index	4.15	4.29	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Pavement Index	4.15	4.29	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	DIRECTION PSR		Original Segment Directional PSR (direction 1)	3.64	3.78	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Original Segment Directional PSR (direction 2)	-	-	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Original Segment IRI in project limits	85	57	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project directional IRI in project limits	30	30	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Directional PSR (direction 1)	4.11	4.12	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Directional PSR (direction 2)	-	-	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Directional PSR (direction 1)	4.11	4.12	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Directional PSR (direction 2)	-	-	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	% FAIL		Original Segment % Failure	0.00	0.00	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment % Failure	0.00	0.00	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment % Failure	0.0%	0.0%	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Needs		Original Segment Pavement Need	0	0	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
			Post-Project Segment Pavement Need	0	0	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change

CMF Application

SR 95 Corridor Profile Study
CMF Application

=user input

CS95.2 (MP 35-39)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Crashes in Segment Limits Fatal	Crashes in Segment Limits Incap	Crashes in Solution Limits Fatal	Crashes in Solution Limits Incap	Post-Solution Crashes Fatal	Post-Solution Crashes Incap	Crash Reduction Fatal	Crash Reduction Incap
35	39	0.70	1	1	1	NB	0.700			1	1	0.700	0.700	0.300	0.300
35	39	0.70	1	1	1	SB	0.700			0	1	0.000	0.700	0.000	0.300
38	38	0.90	1	1	1	SB	0.900			0	1	0.000	0.900	0.000	0.100
						NB		2	1	1	1	**1.700**	**0.700**	0.300	0.300
						SB		0	2	0	2	**0.000**	**1.600**	0.000	0.400

CS95.10 (MP 142-148)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Crashes in Segment Limits Fatal	Crashes in Segment Limits Incap	Crashes in Solution Limits Fatal	Crashes in Solution Limits Incap	Post-Solution Crashes Fatal	Post-Solution Crashes Incap	Total Crash Reduction Fatal	Total Crash Reduction Incap	
Resort Drive		0.81	1	1	1	NB	0.810			1	0	0.810	0.000	0.190	0.000	
Resort Drive		0.85	0.95	0.97	1	NB	0.816			1	0	0.816	0.000	0.184	0.000	
Four Intersections		0.85	0.95	0.97	1	SB	0.816			0	1	0.000	0.816	0.000	0.184	Four intersections involving turn lanes
						NB		2	3	2	0	**1.626**	**3.000**	0.374	0.000	
						SB		0	1	0	1	**0.000**	**0.816**	0.000	0.184	

CS95.12 (MP 162-176)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Crashes in Segment Limits Fatal	Crashes in Segment Limits Incap	Crashes in Solution Limits Fatal	Crashes in Solution Limits Incap	Post-Solution Crashes Fatal	Post-Solution Crashes Incap	Total Crash Reduction Fatal	Total Crash Reduction Incap	
162.3		0.64	0.79	0.83	0.97	NB	0.516			0	4	0.000	2.065	0.000	1.935	
162.3		0.64	0.79	0.83	0.97	SB	0.516			0	1	0.000	0.516	0.000	0.484	
164 / 172.8	169.8 / 177	0.63	0.64	1	1	NB	0.517			1	1	0.517	0.517	0.483	0.483	
164 / 172.8	169.8 / 177	0.63	0.64	1	1	SB	0.517			2	3	1.033	1.550	0.967	1.450	
162 / 169.8	164 / 172.8	0.64	1	1	1	NB	0.640			1	0	0.640	0.000	0.360	0.000	Crashes near 162.3 not included
162 / 169.8	164 / 172.8	0.64	1	1	1	SB	0.640			0	1	0.000	0.640	0.000	0.360	Crashes near 162.3 not included
						NB		2	5	2	5	**1.157**	**2.582**	0.843	2.418	
						SB		2	5	2	5	**1.033**	**2.706**	0.967	2.294	

CS95.13A (MP 177-186)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Crashes in Segment Limits Fatal	Crashes in Segment Limits Incap	Crashes in Solution Limits Fatal	Crashes in Solution Limits Incap	Post-Solution Crashes Fatal	Post-Solution Crashes Incap	Crash Reduction Fatal	Crash Reduction Incap
181.4	185.5	0.40	0.83	1	1	NB	0.366			1	14	0.366	5.124	0.634	8.876
181.4	185.5	0.40	0.83	1	1	SB	0.366			1	10	0.366	3.660	0.634	6.340
177 / 185.5	181.4 / 186	0.83	1	1	1	NB	0.830			0	23	0.000	19.090	0.000	3.910
177 / 185.5	181.4 / 186	0.83	1	1	1	SB	0.830			2	23	1.660	19.090	0.340	3.910
						NB		2	47	1	37	**1.366**	**34.214**	0.634	12.786
						SB		3	45	3	33	**2.026**	**34.750**	0.974	10.250

CS95.13B (MP 177-186)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Crashes in Segment Limits Fatal	Crashes in Segment Limits Incap	Crashes in Solution Limits Fatal	Crashes in Solution Limits Incap	Post-Solution Crashes Fatal	Post-Solution Crashes Incap	Crash Reduction Fatal	Crash Reduction Incap	
Four Intersections		0.81	0.83	1	1	NB	0.741			0	6	0.000	4.447	0.000	1.553	Intersections to receive turn lanes
Four Intersections		0.81	0.83	1	1	SB	0.741			0	4	0.000	2.965	0.000	1.035	Intersections to receive turn lanes
177	186	0.83	0.9	1	1	NB	0.789			1	31	0.789	24.444	0.212	6.557	Crashes at intersections to receive turn lanes not included
177	186	0.83	0.9	1	1	SB	0.789			3	29	2.366	22.867	0.635	6.134	Crashes at intersections to receive turn lanes not included
						NB		2	47	1	37	**1.789**	**38.890**	0.212	8.110	
						SB		3	45	3	33	**2.366**	**37.831**	0.635	7.169	

CS95.16 (MP 190-202)

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Crashes in Segment Limits Fatal	Crashes in Segment Limits Incap	Crashes in Solution Limits Fatal	Crashes in Solution Limits Incap	Post-Solution Crashes Fatal	Post-Solution Crashes Incap	Crash Reduction Fatal	Crash Reduction Incap
194.5	196	0.64	1	1	1	NB	0.640			0	1	0.000	0.640	0.000	0.360
194.5	196	0.64	1	1	1	SB	0.640			0	1	0.000	0.640	0.000	0.360
196	198	0.63	1	1	1	NB	0.630			1	1	0.630	0.630	0.370	0.370
						NB		2	3	1	2	**1.630**	**2.270**	0.370	0.730
						SB		0	4	0	1	**0.000**	**3.640**	0.000	0.360

Performance Area Scoring

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Pavement					Bridge					Safety					Mobility					Freight					Total Risk Factored Performance Area Benefit
				Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	Existing Segment Need	Post-Solution Segment Need	Raw Score	Risk Factor	Factored Score	
CS95.1	Yuma Area Safety Improvements	29-34	15.41	0.000	0.000	0.000		0.000			0.000		0.000	2.877	0.597	2.280	4.13	9.406	0.937	0.485	0.452	2.10	0.949	0.797	0.656	0.141	1.31	0.185	10.540
CS95.2	Fortuna Wash Area Safety Improvements	35-39	17.17	0.000	0.000	0.000		0.000			0.000		0.000	3.787	2.907	0.880	2.08	1.830	1.805	0.860	0.945	7.83	7.397	3.275	2.383	0.892	7.31	6.517	15.744
CS95.3	Dome Valley Area Safety Improvements	39-42	3.34			0.000		0.000			0.000		0.000	3.787	2.807	0.980	2.08	2.038	1.805	1.480	0.325	7.64	2.484	3.275	3.211	0.064	7.31	0.468	4.989
CS95.4A	Yuma Proving Ground Area Safety and Freight Improvements (widen shoulders)	59-80	30.39			0.000		0.000			0.000		0.000	4.283	0.821	3.462	2.12	7.327	4.093	2.868	1.225	8.41	10.303	13.048	12.303	0.745	7.69	5.728	23.359
CS95.4B	Yuma Proving Ground Area Safety and Freight Improvements (passing lanes)	59-80	78.31			0.000		0.000			0.000		0.000	4.283	0.806	3.477	2.12	7.359	4.093	3.393	0.700	8.41	5.888	13.048	12.017	1.031	7.69	7.927	21.174
CS95.5	Yuma Proving Ground Freight Improvements	59-71	10.74			0.000		0.000			0.000		0.000	4.283	3.747	0.536	2.12	1.134	4.093	3.678	0.415	7.60	3.154	13.048	11.839	1.209	7.69	9.296	13.584
CS95.6	Quartzsite to Bouse Wash Freight Improvements	111-123	51.85			0.000		0.000			0.000		0.000	0.000	0.000	0.000	2.19	0.000	1.213	0.448	0.765	7.87	6.018	2.595	0.633	1.962	7.16	14.044	20.062
CS95.9A	Bouse Wash to Parker Freight Improvements (widen shoulders)	131-142	14.76			0.000		0.000			0.000		0.000	0.087	0.056	0.031	2.30	0.071	1.651	0.873	0.778	8.72	6.786	3.903	3.622	0.281	7.86	2.209	9.066
CS95.9B	Bouse Wash to Parker Freight Improvements (passing lanes)	131-142	42.37			0.000		0.000			0.000		0.000	0.087	0.055	0.032	2.30	0.074	1.651	1.272	0.379	8.72	3.306	3.903	3.550	0.353	7.86	2.775	6.155
CS95.10	Parker Safety and Freight Improvements	142-150	2.85			0.000		0.000			0.000		0.000	2.141	0.881	1.260	4.60	5.802	1.312	1.211	0.101	4.61	0.466	2.536	2.419	0.117	4.79	0.561	6.828
CS95.12	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	162-176	54.35			0.000		0.000			0.000		0.000	6.590	2.581	4.009	2.39	9.585	1.485	0.480	1.005	8.80	8.845	3.040	2.010	1.030	7.53	7.758	26.188
CS95.13A	Lake Havasu City Safety and Freight Improvements (roundabouts)	177-186	51.33			0.000		0.000			0.000		0.000	4.771	2.831	1.940	4.85	9.412	1.821	1.475	0.346	3.25	1.124	1.999	1.295	0.704	2.06	1.449	11.985
CS95.13B	Lake Havasu City Safety and Freight Improvements (turn lanes)	177-186	13.45			0.000		0.000			0.000		0.000	4.771	3.642	1.129	4.85	5.477	1.821	1.590	0.231	3.25	0.750	1.999	1.918	0.081	2.06	0.167	6.395
CS95.16	Lake Havasu City to I-40 Freight Improvements	194-198	9.63			0.000		0.000			0.000		0.000	2.489	0.839	1.650	2.53	4.170	8.102	7.278	0.824	8.30	6.838	11.003	10.702	0.301	8.24	2.482	13.490
CS95.17	I-40 Approach Freight Improvements	201-202	3.16			0.000		0.000			0.000		0.000	2.489	2.410	0.079	2.13	0.168	8.102	7.939	0.163	7.19	1.171	11.003	10.918	0.085	7.74	0.658	1.998

Emphasis Area Scoring

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Safety Emphasis Area						Mobility Emphasis Area						Freight Emphasis Area					
				Existing Corridor Need	Post-Solution Corridor Need	Raw Score	Risk Factor	Emphasis Factor	Factored Score	Existing Corridor Need	Post-Solution Corridor Need	Raw Score	Risk Factor	Emphasis Factor	Factored Score	Existing Corridor Need	Post-Solution Corridor Need	Raw Score	Risk Factor	Emphasis Factor	Factored Score
CS95.1	Yuma Area Safety Improvements	29-34	15.41	0.469	0.462	0.007	4.13	1.50	0.044	0.259	0.258	0.001	2.10	1.50	0.004	2.622	2.622	0.001	1.31	1.50	0.002
CS95.2	Fortuna Wash Area Safety Improvements	35-39	17.17	0.469	0.462	0.007	2.08	1.50	0.021	0.259	0.245	0.014	7.83	1.50	0.163	2.622	2.617	0.005	7.31	1.50	0.060
CS95.3	Dome Valley Area Safety Improvements	39-42	3.34	0.469	0.462	0.007	2.08	1.50	0.022	0.259	0.259	0.000	7.64	1.50	0.000	2.622	2.621	0.001	7.31	1.50	0.015
CS95.4A	Yuma Proving Ground Area Safety and Freight Improvements (widen shoulders)	59-80	30.39	0.469	0.430	0.039	2.12	1.50	0.123	0.259	0.258	0.001	8.41	1.50	0.014	2.622	2.621	0.002	7.69	1.50	0.019
CS95.4B	Yuma Proving Ground Area Safety and Freight Improvements (passing lanes)	59-80	78.31	0.469	0.429	0.040	2.12	1.50	0.126	0.259	0.256	0.003	8.41	1.50	0.043	2.622	2.620	0.002	7.69	1.50	0.026
CS95.5	Yuma Proving Ground Freight Improvements	59-71	10.74	0.469	0.459	0.010	2.12	1.50	0.033	0.259	0.259	0.000	7.60	1.50	0.000	2.622	2.620	0.003	7.69	1.50	0.033
CS95.6	Quartzsite to Bouse Wash Freight Improvements	111-123	51.85	0.469	0.469	0.000	2.19	1.50	0.000	0.259	0.258	0.001	7.87	1.50	0.013	2.622	2.607	0.015	7.16	1.50	0.163
CS95.9A	Bouse Wash to Parker Freight Improvements (widen shoulders)	131-142	14.76	0.469	0.467	0.002	2.30	1.50	0.008	0.259	0.258	0.001	8.72	1.50	0.016	2.622	2.619	0.004	7.86	1.50	0.044
CS95.9B	Bouse Wash to Parker Freight Improvements (passing lanes)	131-142	42.37	0.469	0.467	0.002	2.30	1.50	0.008	0.259	0.251	0.008	8.72	1.50	0.107	2.622	2.617	0.005	7.86	1.50	0.065
CS95.10	Parker Safety and Freight Improvements	142-148	2.85	0.469	0.465	0.004	4.60	1.50	0.030	0.259	0.259	0.001	4.61	1.50	0.005	2.622	2.622	0.000	4.79	1.50	0.003
CS95.12	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	162-176	54.35	0.469	0.425	0.044	2.39	1.50	0.159	0.259	0.256	0.003	8.80	1.50	0.042	2.622	2.615	0.008	7.53	1.50	0.088
CS95.13A	Lake Havasu City Safety and Freight Improvements (roundabouts)	177-186	51.33	0.469	0.444	0.025	4.85	1.50	0.185	0.259	0.257	0.002	3.25	1.50	0.012	2.622	2.617	0.005	2.06	1.50	0.016
CS95.13B	Lake Havasu City Safety and Freight Improvements (turn lanes)	177-186	13.45	0.469	0.454	0.015	4.85	1.50	0.111	0.259	0.257	0.002	3.25	1.50	0.012	2.622	2.621	0.001	2.06	1.50	0.003
CS95.16	Lake Havasu City to I-40 Freight Improvements	194-198	9.63	0.469	0.461	0.008	2.53	1.50	0.032	0.259	0.258	0.001	8.30	1.50	0.017	2.622	2.622	0.001	8.24	1.50	0.009
CS95.17	I-40 Approach Freight Improvements	201-202	3.16	0.469	0.468	0.001	2.13	1.50	0.002	0.259	0.258	0.001	7.19	1.50	0.015	2.622	2.622	0.000	7.74	1.50	0.001

Performance Effectiveness Scoring

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Total Factored Benefit	VMT Factor	NPV Factor	Performance Effectiveness Score		miles	2014 ADT	1-way or 2-way	VMT
CS95.1	Yuma Area Safety Improvements	29-34	15.41	10.589	2.41	20.2	33.5		5.00	9480	2	47400
CS95.2	Fortuna Wash Area Safety Improvements	35-39	17.17	15.989	1.76	20.2	33.0		4.00	7782	2	31128
CS95.3	Dome Valley Area Safety Improvements	39-42	3.34	5.027	1.39	15.3	31.9		3.00	7782	2	23346
CS95.4A	Yuma Proving Ground Area Safety and Freight Improvements (widen shoulders)	59-80	30.39	23.515	1.82	15.3	21.6		21.00	1554	2	32634
CS95.4B	Yuma Proving Ground Area Safety and Freight Improvements (passing lanes)	59-80	78.31	21.369	1.82	20.2	10.1		21.00	1554	2	32634
CS95.5	Yuma Proving Ground Freight Improvements	59-71	10.74	13.650	0.20	20.2	5.1		1.89	1554	2	2937.06
CS95.6	Quartzsite to Bouse Wash Freight Improvements	111-123	51.85	20.238	2.55	20.2	20.1		20.00	2564	2	51280
CS95.9A	Bouse Wash to Parker Freight Improvements (widen shoulders)	131-142	14.76	9.135	2.51	20.2	31.3		11.00	4549	2	50039
CS95.9B	Bouse Wash to Parker Freight Improvements (passing lanes)	131-142	42.37	6.334	2.51	20.2	7.6		11.00	4549	2	50039
CS95.10	Parker Safety and Freight Improvements	142-148	2.85	6.865	0.62	15.3	23.0		1.03	9321	2	9600.63
CS95.12	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	162-176	54.35	26.476	3.45	20.2	34.0		15.00	5627	2	84405
CS95.13A	Lake Havasu City Safety and Freight Improvements (roundabouts)	177-186	51.33	12.198	4.17	20.2	20.0		9.00	14357	2	129213
CS95.13B	Lake Havasu City Safety and Freight Improvements (turn lanes)	177-186	13.45	6.520	4.17	15.3	30.9		9.00	14357	2	129213
CS95.16	Lake Havasu City to I-40 Freight Improvements	194-198	9.63	13.548	1.60	20.2	45.4		3.50	7921	2	27723.5
CS95.17	I-40 Approach Freight Improvements	201-202	3.16	2.015	0.37	20.2	4.8		0.70	7921	2	5544.7

Appendix J: Solution Prioritization Scores

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Pavement		Bridge		Safety		Mobility		Freight		Total Factored Score	Risk Factors					Weighted Risk Factor	Segment Need	Prioritization Score
				Score	%	Score	%	Score	%	Score	%	Score	%		Pavement	Bridge	Safety	Mobility	Freight			
CS95.1	Yuma Area Safety Improvements	29-34	15.41	0.000	0.0%	0.000	0.0%	9.449	89%	0.953	9%	0.186	2%	10.589	1.14	1.51	1.78	1.36	1.36	1.735	0.923	**54**
CS95.2	Fortuna Wash Area Safety Improvements	35-39	17.17	0.000	0.0%	0.000	0.0%	1.851	12%	7.560	47%	6.577	41%	15.989	1.14	1.51	1.78	1.36	1.36	1.409	1.615	**75**
CS95.3	Dome Valley Area Safety Improvements	39-42	3.34	0.000	0.0%	0.000	0.0%	2.060	41%	2.484	49%	0.483	10%	5.027	1.14	1.51	1.78	1.36	1.36	1.532	1.615	**79**
CS95.4A	Yuma Proving Ground Area Safety and Freight Improvements (widen shoulders)	59-80	30.39	0.000	0.0%	0.000	0.0%	7.450	32%	10.318	44%	5.747	24%	23.515	1.14	1.51	1.78	1.36	1.36	1.493	1.615	**52**
CS95.4B	Yuma Proving Ground Area Safety and Freight Improvements (passing lanes)	59-80	78.31	0.000	0.0%	0.000	0.0%	7.485	35%	5.931	28%	7.953	37%	21.369	1.14	1.51	1.78	1.36	1.36	1.507	1.615	**24**
CS95.5	Yuma Proving Ground Freight Improvements	59-71	10.74	0.000	0.0%	0.000	0.0%	1.167	9%	3.154	23%	9.329	68%	13.650	1.14	1.51	1.78	1.36	1.36	1.396	1.615	**12**
CS95.6	Quartzsite to Bouse Wash Freight Improvements	111-123	51.85	0.000	0.0%	0.000	0.0%	0.000	0%	6.032	30%	14.206	70%	20.238	1.14	1.51	1.78	1.36	1.36	1.360	1.077	**29**
CS95.9A	Bouse Wash to Parker Freight Improvements (widen shoulders)	131-142	14.76	0.000	0.0%	0.000	0.0%	0.079	1%	6.802	74%	2.253	25%	9.135	1.14	1.51	1.78	1.36	1.36	1.364	1.385	**59**
CS95.9B	Bouse Wash to Parker Freight Improvements (passing lanes)	131-142	42.37	0.000	0.0%	0.000	0.0%	0.082	1%	3.413	54%	2.840	45%	6.334	1.14	1.51	1.78	1.36	1.36	1.365	1.385	**14**
CS95.10	Parker Safety and Freight Improvements	142-148	2.85	0.000	0.0%	0.000	0.0%	5.832	85%	0.470	7%	0.563	8%	6.865	1.14	1.51	1.78	1.36	1.36	1.717	1.538	**61**
CS95.12	Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	162-176	54.35	0.000	0.0%	0.000	0.0%	9.743	37%	8.887	34%	7.846	30%	26.476	1.14	1.51	1.78	1.36	1.36	1.515	1.385	**71**
CS95.13A	Lake Havasu City Safety and Freight Improvements (roundabouts)	177-186	51.33	0.000	0.0%	0.000	0.0%	9.597	79%	1.136	9%	1.465	12%	12.198	1.14	1.51	1.78	1.36	1.36	1.690	1.846	**62**
CS95.13B	Lake Havasu City Safety and Freight Improvements (turn lanes)	177-186	13.45	0.000	0.0%	0.000	0.0%	5.588	86%	0.762	12%	0.170	3%	6.520	1.14	1.51	1.78	1.36	1.36	1.720	1.846	**98**
CS95.16	Lake Havasu City to I-40 Freight Improvements	194-198	9.63	0.000	0.0%	0.000	0.0%	4.202	31%	6.855	51%	2.490	18%	13.548	1.14	1.51	1.78	1.36	1.36	1.490	1.154	**78**
CS95.17	I-40 Approach Freight Improvements	201-202	3.16	0.000	0.0%	0.000	0.0%	0.170	8%	1.186	59%	0.660	33%	2.015	1.14	1.51	1.78	1.36	1.36	1.395	1.154	**8**

Appendix K: Preliminary Scoping Reports for Prioritized Solutions

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Yuma Area Safety Improvements	
City/Town Name: Yuma	**County:** Yuma
Primary Route/Street: US 95	
Beginning Limit: MP 29	
End Limit: MP 34	
Project Length: 5 miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☐ Tribal; ☒ Other: State Land Trust *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*			
LPA/Tribal Name:			
LPA/Tribal Contact:			
Email Address:		**Phone Number:**	
Administration: ☐ ADOT Administered	☐ Self-Administered	☐ Certification Acceptance	

PROJECT NEED
MP 29 – 34 has above average left-turn and pedestrian crashes; likely contributing factors include limited or restricted sight distance at intersections, high approach speed, misjudging speed of on-coming traffic, lack of crossing opportunity for pedestrians, drivers running red light or stop sign, and failure to yield the right-of-way MP 29 – 30 has above average left-turn and pedestrian crashes; likely contributing factors include failure to yield the right-of-way and disregarding traffic signal

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☒
Address medium safety needs.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☒	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

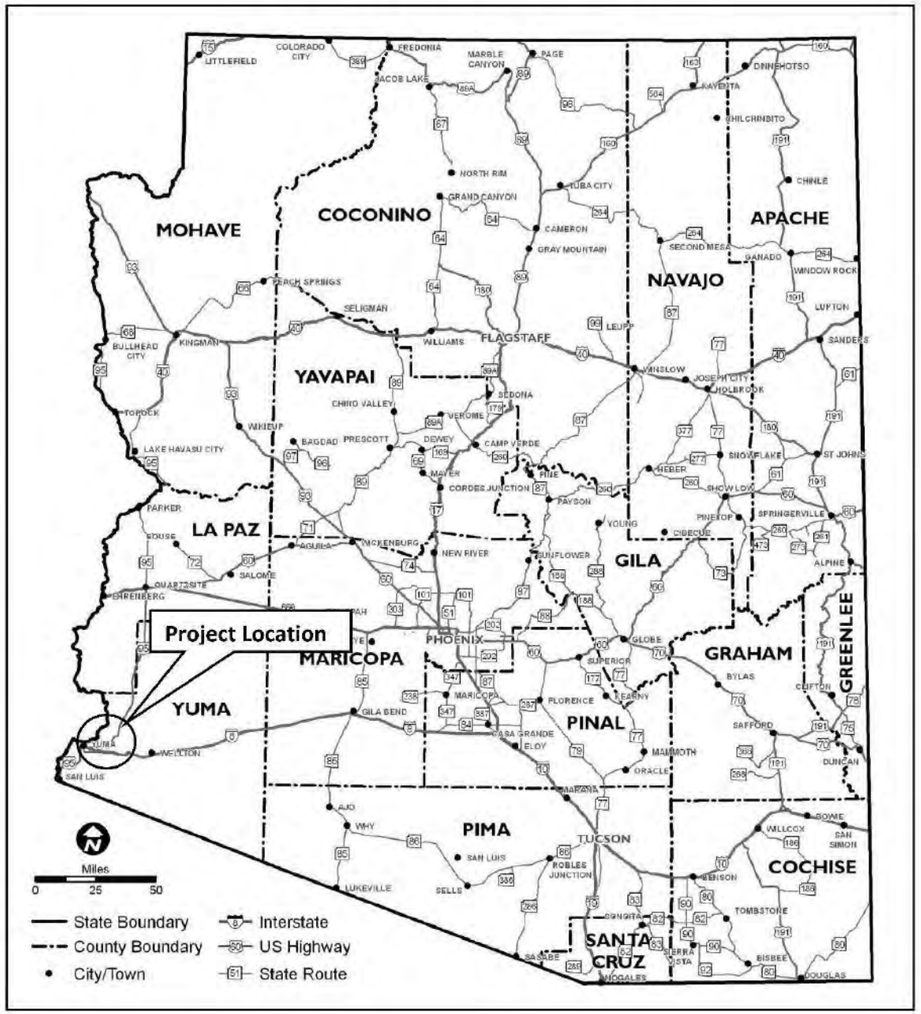
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering $410,000	Design $1,360,000	Right-of-Way $0	Construction $13,636,700	Total $15,416,700

PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Install two-way center turn lane (MP 29 – 32 expands from a 4-lane undivided highway to a 5-lane undivided highway, MP 32 – 34 expands from a 2-lane undivided highway to a 5-lane undivided highway) • Install raised medians at signalized intersection approaches (approximately 250' on each approach) • Improve signal visibility and install warning signs at the following intersections: Araby Road (MP 29.4), Avenue 7E (MP 29.9), Avenue 8E (MP 30.9), Avenue 11E (MP 33.7) • Widen Gila Canal Bridge (MP 33.55)

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Fortuna Wash Area Safety Improvements	
City/Town Name: –	**County:** Yuma
Primary Route/Street: US 95	
Beginning Limit: MP 35	
End Limit: MP 39	
Project Length: 4 miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☒ Federal; ☐ Tribal; ☒ Other: State Land Trust *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*			
LPA/Tribal Name:			
LPA/Tribal Contact:			
Email Address:		**Phone Number:**	
Administration: ☐ ADOT Administered	☐ Self-Administered	☐ Certification Acceptance	

PROJECT NEED
MP 35-39 has above average run off the road (left), equipment failure, rear end, nighttime, and roadside object-related crashes; likely contributing factors include driver inattention, large number of turning vehicles, drivers running red light or stop sign, poor nighttime visibility or lighting, obstructions in or near roadway, inadequate signs, delineators, or guardrail, and roadside design issues (inadequate clear distance); district representatives indicated animal-related crashes are common, and low water crossings have the potential to be a safety issue MP 37 - 38 has above average run off the road (left) and collision with fixed object crashes; likely contributing factors include inattention/distraction, failure to yield the right-of-way, and dark-unlighted conditions

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☒
Address high safety needs.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☒	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

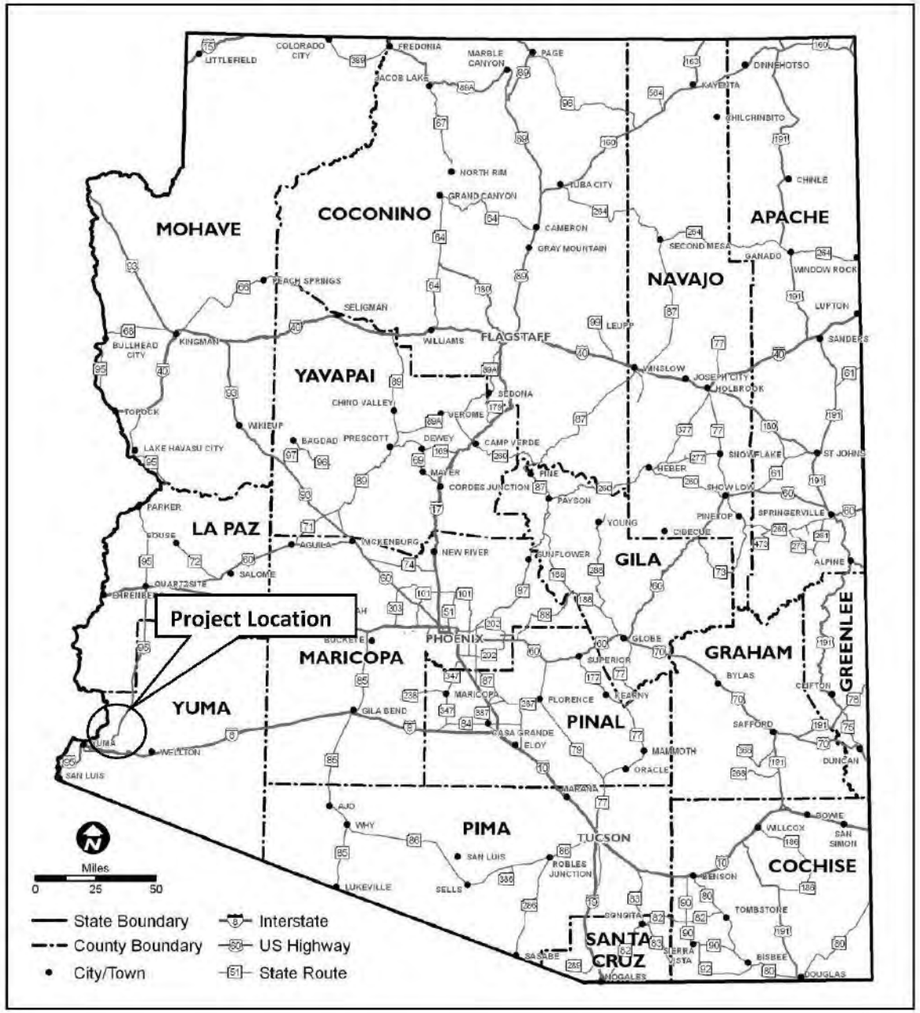
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering $460,000	Design $1,520,000	Right-of-Way $0	Construction $15,188,560	Total $17,168,560

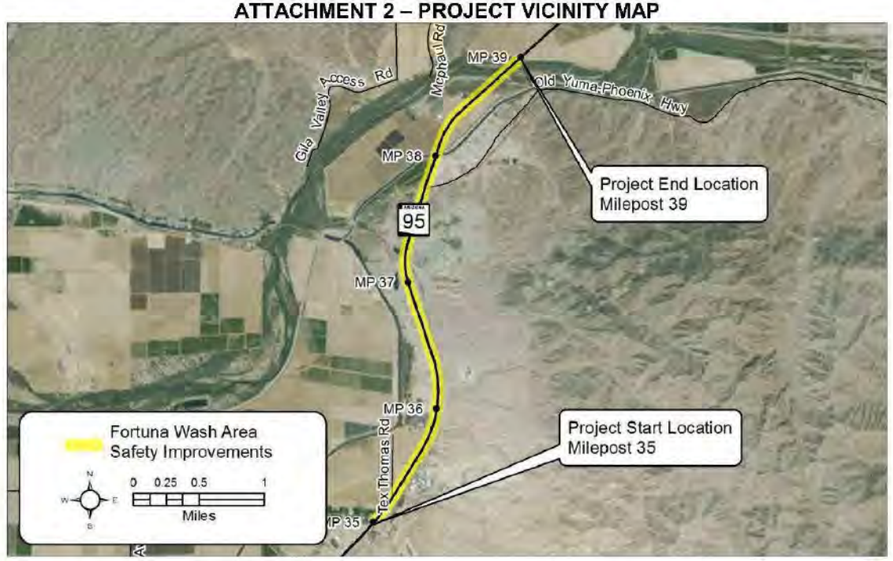
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Install two-way center turn lane (expand from a 2-lane undivided highway to a 5-lane highway); widen bridge over canal (MP 38.0) • Widen Welton Mohawk Canal Bridge (MP 36.0)

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ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Dome Valley Area Safety Improvements	
City/Town Name: –	**County:** Yuma
Primary Route/Street: US 95	
Beginning Limit: MP 39	
End Limit: MP 42	
Project Length: 3 miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☒ Federal; ☐ Tribal; ☒ Other: State Land Trust *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*	
LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance	

PROJECT NEED
MP 39-42 has above average run off the road (left), equipment failure, rear end, nighttime, and roadside object-related crashes; likely contributing factors include driver inattention, large number of turning vehicles, drivers running red light or stop sign, poor nighttime visibility or lighting, obstructions in or near roadway, inadequate signs, delineators, or guardrail, and roadside design issues (inadequate clear distance); district representatives indicated animal-related crashes are common, and low water crossings have the potential to be a safety issue

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

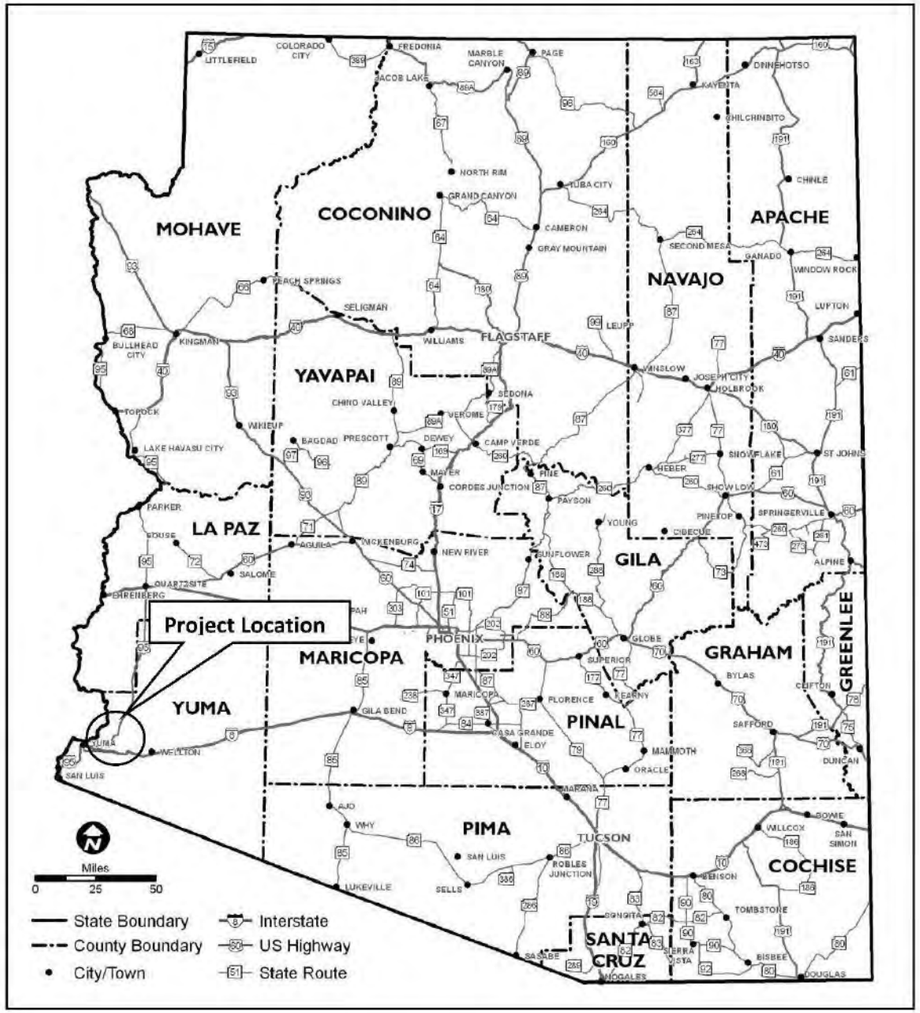
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$90,000	$300,000	$0	$2,953,550	$3,343,550

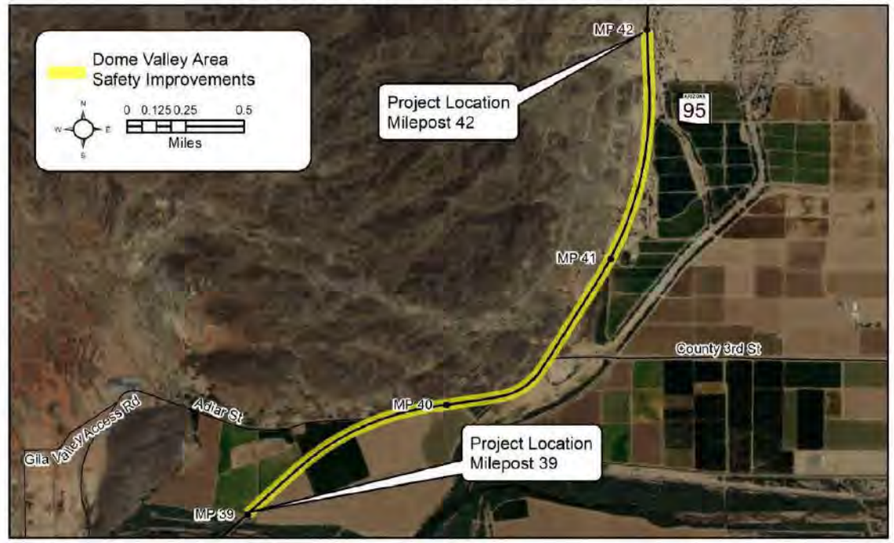
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map
2) Project Vicinity Map
3) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Widen shoulders; install chevrons at horizontal curve from MP 40.1 to 40.4 • Install warning signs for intersections with Adair Park Rd (MP 39.7) and County 3rd St (MP 40.5)

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Yuma Proving Ground Area Safety and Freight Improvements – Option A and B	
City/Town Name: –	**County:** Yuma and La Paz
Primary Route/Street: US 95	
Beginning Limit: MP 59	
End Limit: MP 80	
Project Length: 21 miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☒ Federal; ☐ Tribal; ☒ Other: Military *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*			
LPA/Tribal Name:			
LPA/Tribal Contact:			
Email Address:		**Phone Number:**	
Administration: ☐ ADOT Administered	☐ Self-Administered	☐ Certification Acceptance	

PROJECT NEED
MP 60 - 80 exhibits low trip reliability; percent of closures due to incidents/accidents is above the statewide average; note that a border patrol check point is located at MP 75.5 (non-actionable condition) MP 60 – 80 has above average single-vehicle, overturning, equipment failure, and low-light (dusk) crashes; likely contributing factors include roadside design issues (non-traversable side slops), inadequate shoulder widths, driver inattention, and poor delineation; district representatives indicated low water crossings have the potential to be a safety issue MP 62 – 64 has above average single-vehicle and overturning/rollover crashes; likely contributing factor includes driver inattention/distraction

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety and freight needs.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☒	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

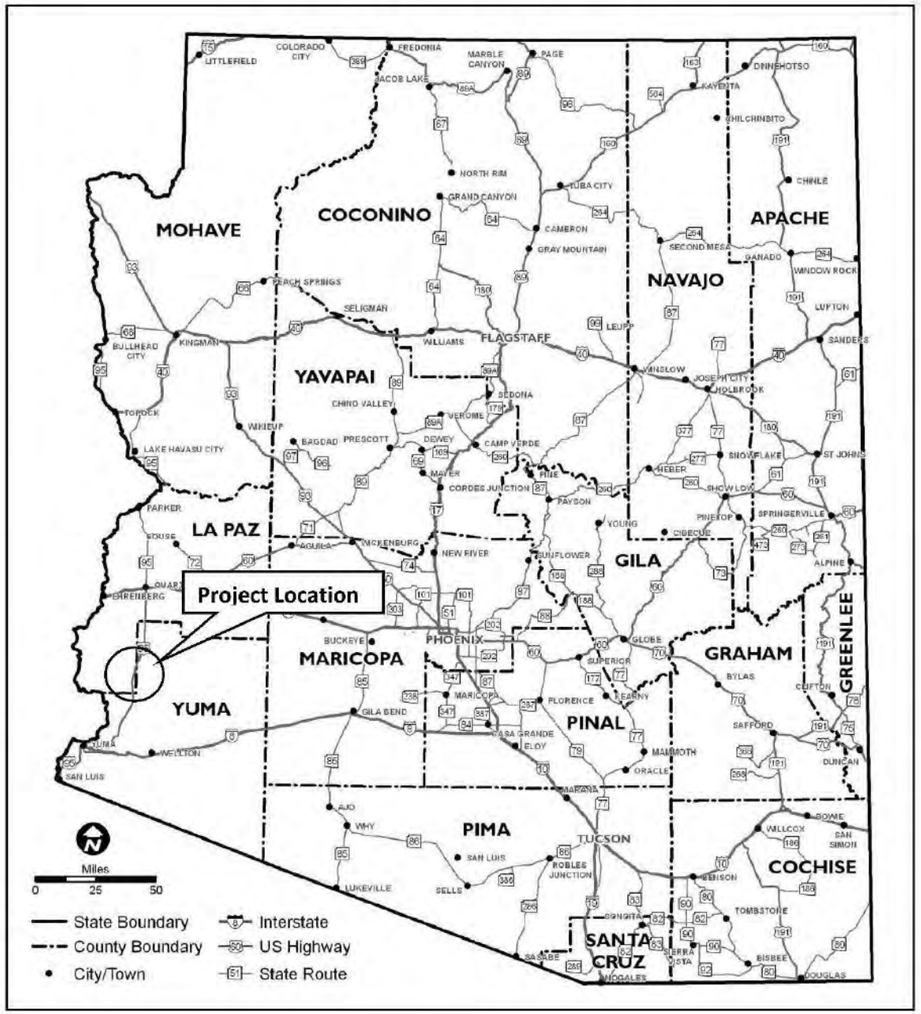
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$810,000 (option A)	$2,690,000 (option A)	$0 (option A)	$26,888,400 (option A)	$30,888,400 (option A)
$2,080,000 (option B)	$6,930,000 (option B)	$0 (option B)	$69,300,000 (option B)	$78,310,000 (option B)

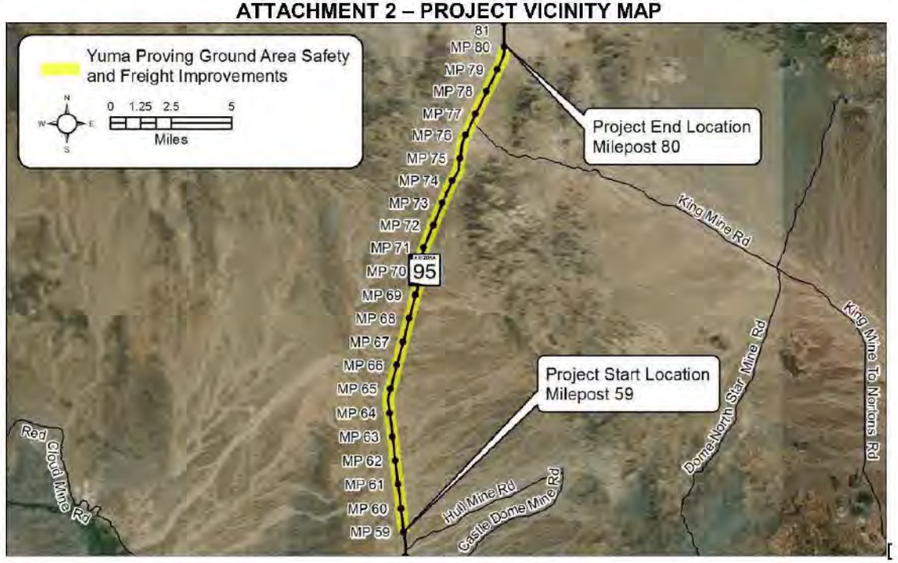
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• **Option A:** • Widen shoulders (NB/SB) • **Option B:** • Construct alternating passing lanes

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Yuma Proving Ground Freight Improvements	
City/Town Name:	**County:** La Paz
Primary Route/Street: US 95	
Beginning Limit: MP 59	
End Limit: MP 71	
Project Length: 12 miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☐ Federal; ☐ Tribal; ☒ Other: Military *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*			
LPA/Tribal Name:			
LPA/Tribal Contact:			
Email Address:	**Phone Number:**		
Administration: ☐ ADOT Administered	☐ Self-Administered	☐ Certification Acceptance	

PROJECT NEED
MP 60 - 71 exhibits low trip reliability; percent of closures due to incidents/accidents is above the statewide average; note that a border patrol check point is located at MP 75.5 (non-actionable condition) District representatives indicated low water crossings have the potential to be a safety issue as well

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high freight and need and also potential safety concern.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ : Drainage/Shoulders		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

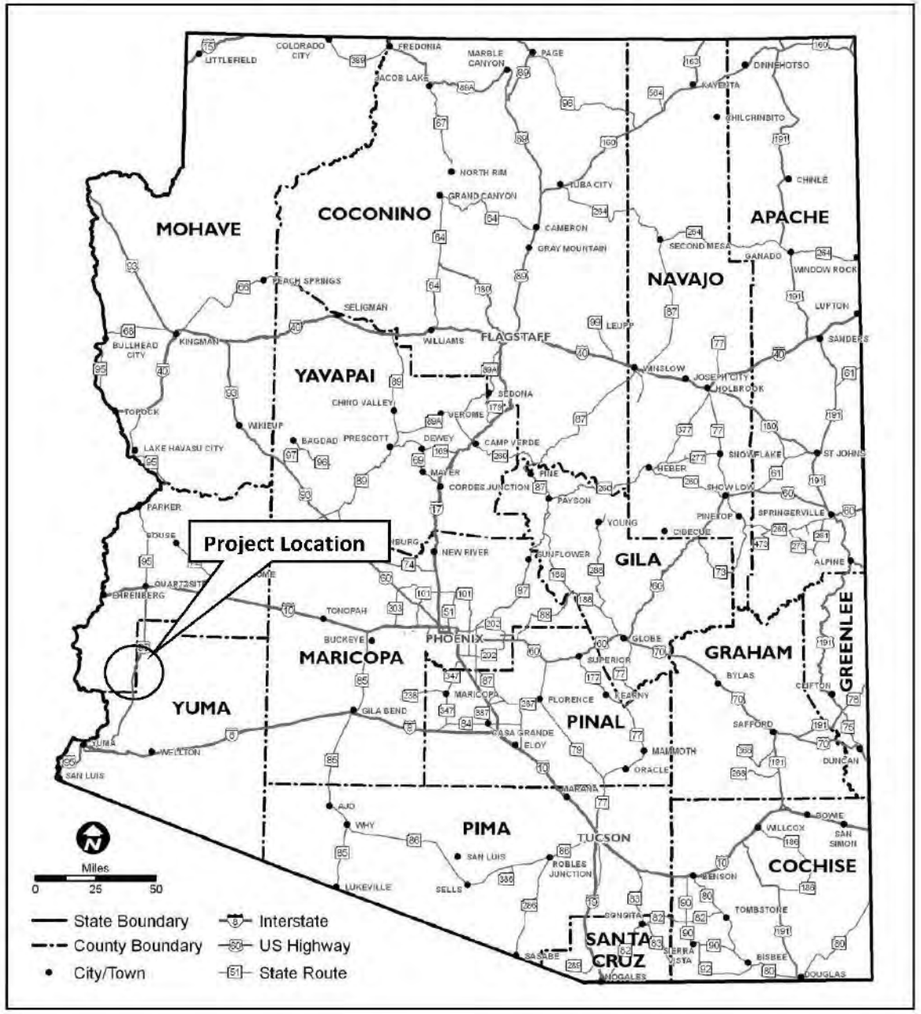
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$290,000	$950,000	$0	$9,504,000	$10,744,000

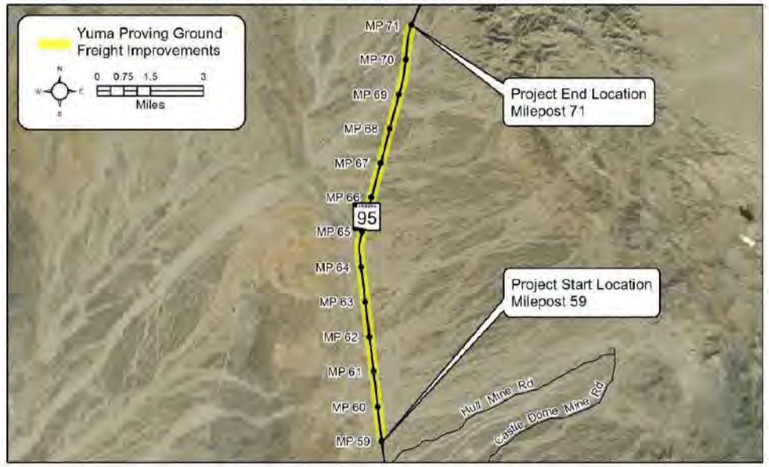
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Construct drainage structures and re-profile roadway at 10 locations where flows are concentrated by upstream channelization (MP 59 – MP 60 three crossings, MP 61.0, MP 62.4, MP 66.0, MP 66.8, MP 69.1-69.3 two crossings, MP 71.3)

5

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Quartzsite to Bouse Wash Freight Improvements	
City/Town Name:	**County:** La Paz
Primary Route/Street: SR 95	
Beginning Limit: MP 111	
End Limit: MP 131	
Project Length: 20 miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☒ Federal; ☐ Tribal; ☒ Other: State Trust Land *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*	
LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance	

PROJECT NEED
MP 111 -131 exhibits low trip reliability in the southbound direction; percent of closures due to incidents/accidents and obstructions/hazards are above the statewide average; two of three obstruction/hazard closures were due to flooding (MP 113.5 and MP 116)

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high freight need.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ : Drainage/Shoulders		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

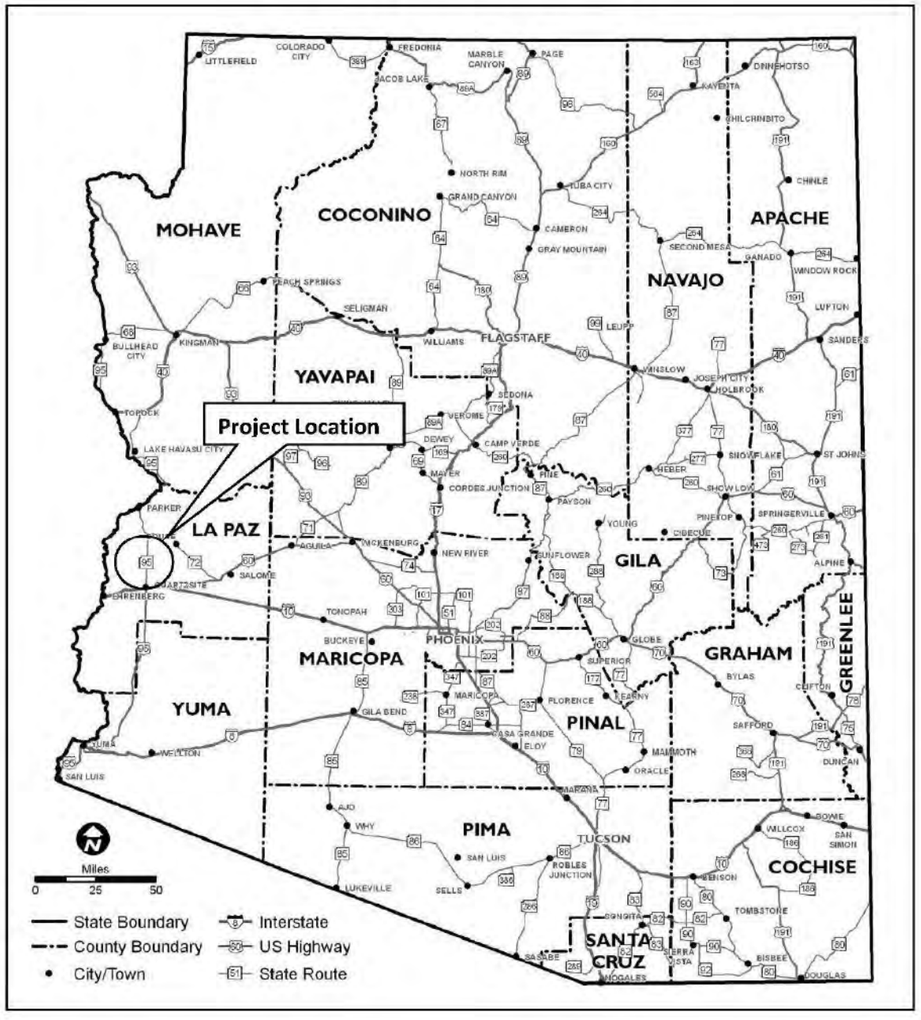
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$1,370,000	$4,590,000	$0	$45,892,000	$51,852,000

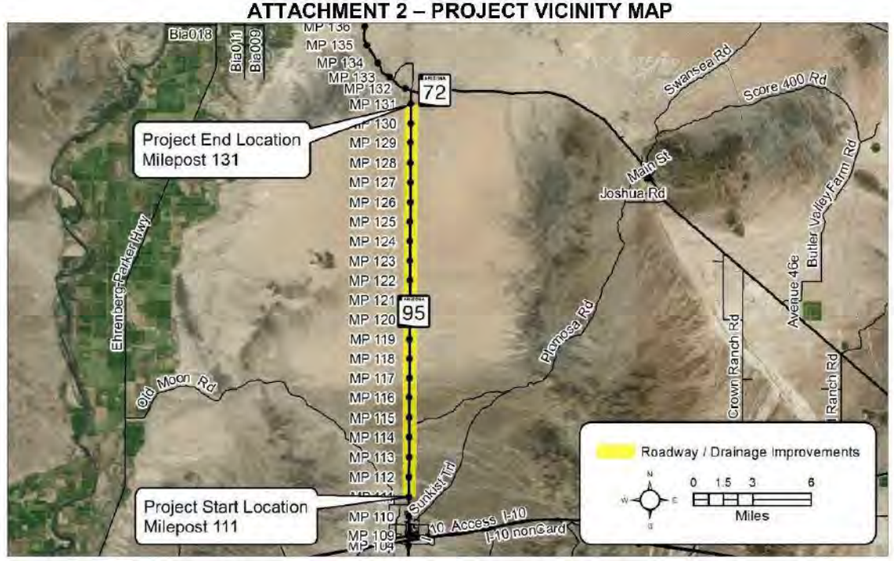
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Widen shoulders • Construct drainage structures and re-profile roadway at 19 locations with flooding potential: MP 110.8, 112.8, 113.1, 114.9, 115.1, 116.2, 116.6 are higher priority with upstream channelization concentrating flows; MP 117.1, 117.7, 118.9, 119.6, 119.8, 120.1, 120.6, 120.8, 121.4, 122.1, 122.3, 122.6 are additional locations

5

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Bouse Wash to Parker Freight Improvements – Option A and B	
City/Town Name: Parker	**County:** La Paz
Primary Route/Street: SR 95	
Beginning Limit: MP 131	
End Limit: MP 142	
Project Length: 11 Miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☒ Federal; ☒ Tribal; ☒ Other: State Trust Land *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*	
LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance	

PROJECT NEED
MP 131 - 142 exhibits low trip reliability in the northbound direction; percent of closures due to incidents/accidents and obstructions/hazards are above the statewide average; one obstruction/hazard closure due to flooding (MP 131-132)

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high freight need.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

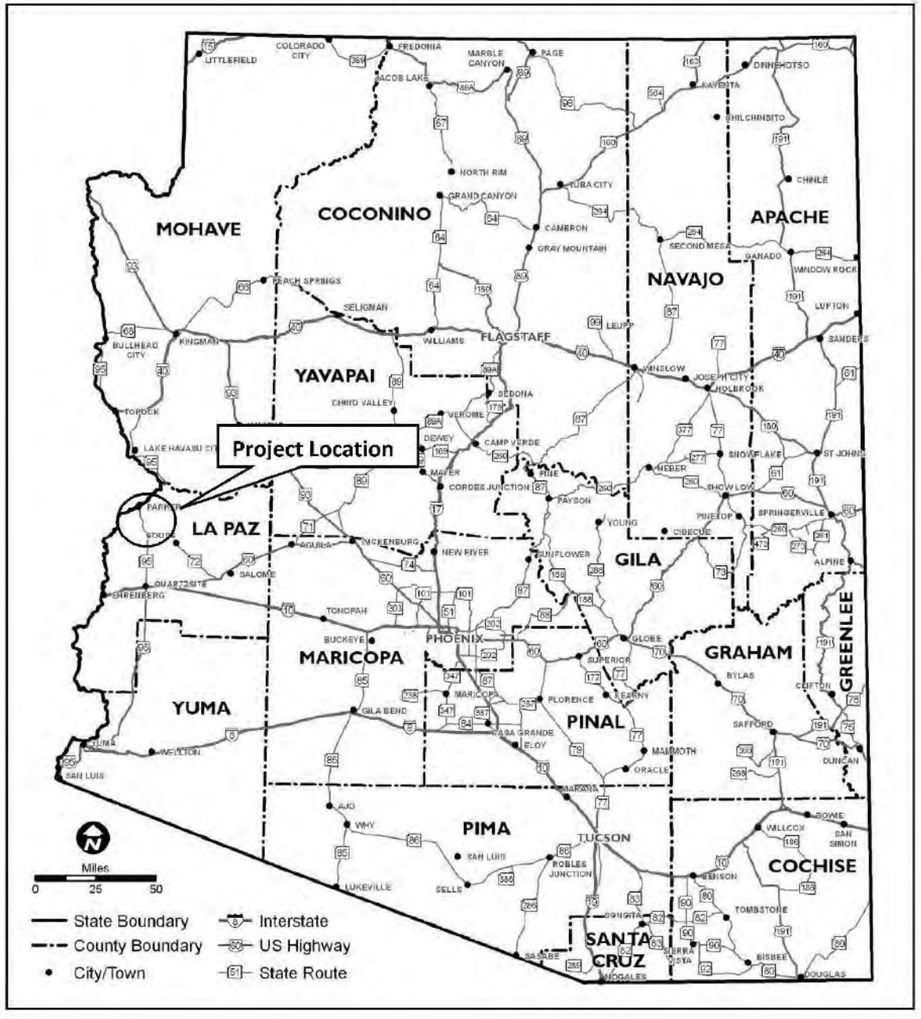
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$400,000 (option A) $1,130,000 (option B)	$1,310,000 (option A) $3,750,000 (option B)	$0 (option A) $0 (option B)	$13,046,000 (option A) $37,488,000 (option B)	$14,756,000 (option A) $42,368,000 (option B)

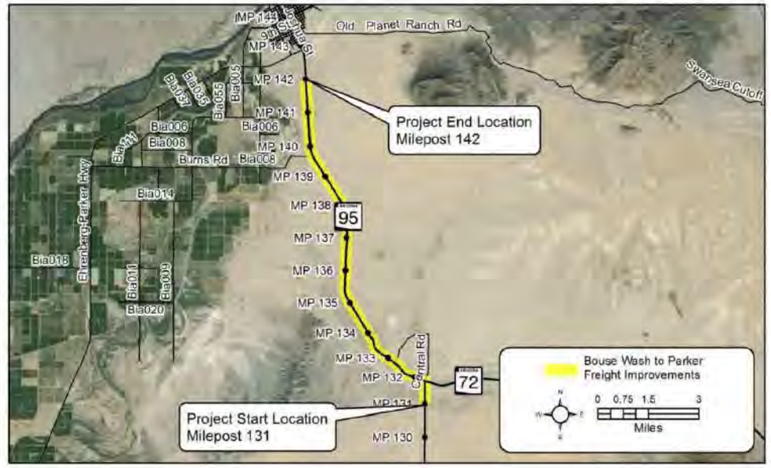
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work** **)**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• **Option A:** • Widen shoulders (NB/SB) • Construct drainage structure and re-profile roadway at MP 134.4 • • **Option B:** • Construct alternating passing lanes • Construct drainage structure and re-profile roadway at MP 134.4

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: 9-2-2016	**ADOT Project Manager:**
Project Name: Parker Safety and Freight Improvements	
City/Town Name: Parker	**County:** La Paz
Primary Route/Street: SR 95	
Beginning Limit: MP 142	
End Limit: MP 150	
Project Length: 8 Miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☐ Federal; ☒ Tribal; ☒ Other: State Land Trust *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*			
LPA/Tribal Name:			
LPA/Tribal Contact:			
Email Address:		**Phone Number:**	
Administration: ☐ ADOT Administered	☐ Self-Administered	☐ Certification Acceptance	

PROJECT NEED
MP 142 – 149 has above average angle, left-turn, pedestrian, centerline crossover, and low-light (dawn) crashes; likely contributing factors include inadequate sight distance, drivers running red light or stop sign, excessive speeds, poor nighttime visibility or lighting, inadequate roadway geometry, and inadequate pavement markings; crash locations include Mohave Road, 4th Street, and Bluewater Dr MP 142 - 149 exhibits low trip reliability in the northbound direction; percent of closures due to incidents/accidents and obstructions/hazards are above the statewide average

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address medium safety need and high freight need.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

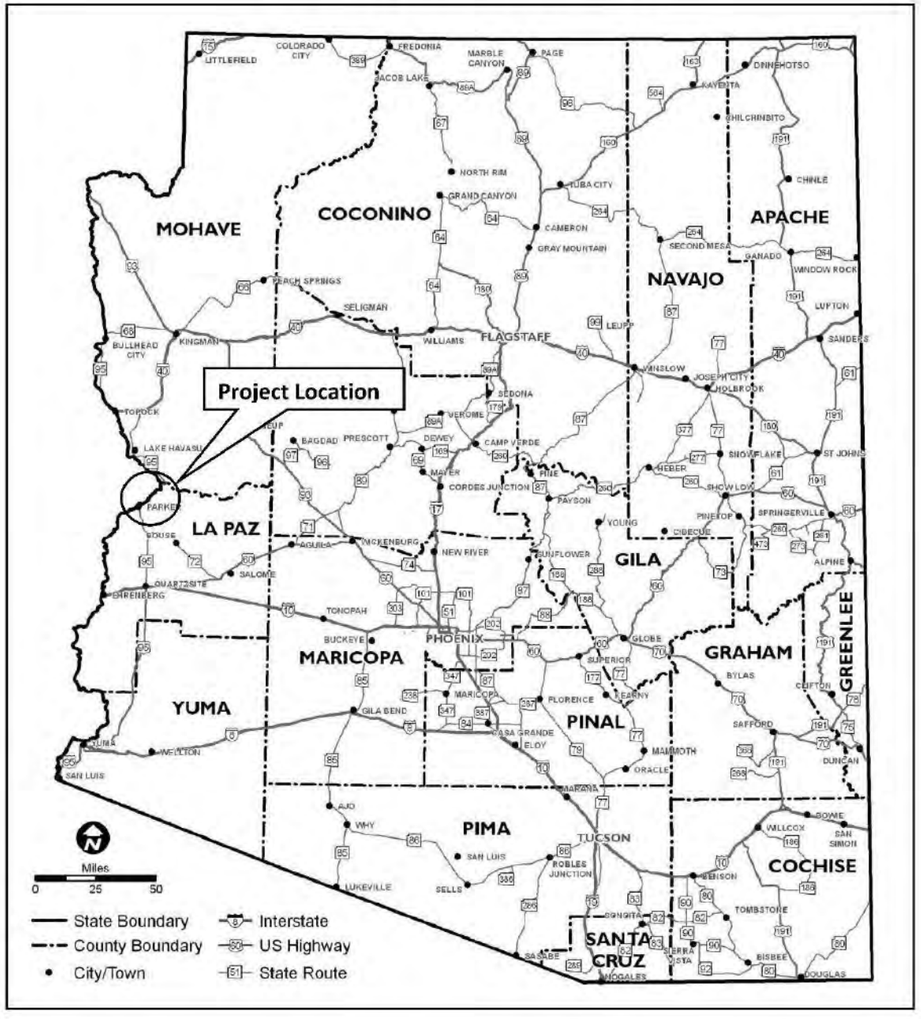
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$70,000	$230,000	$220,000	$2,333,500	$2,853,500

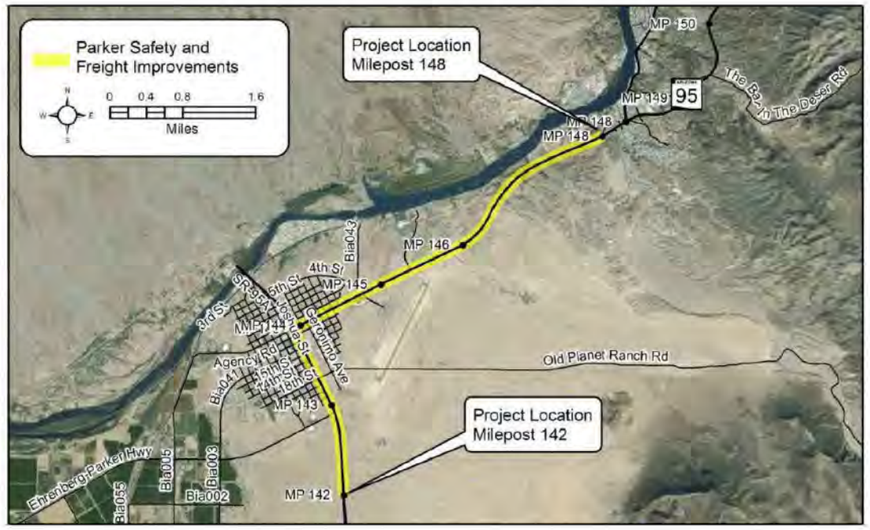
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work** **)**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Construct right turn lanes at Riverside Drive (MP 148.3, NB and SB), Cove Avenue (MP 148.2, NB and SB), Ironwood Road (MP 147.5, SB), and Mesquite Drive (MP 147.3, SB) • Improve signal visibility and install warning signs and transverse rumble strips north of Resort Drive to alert southbound traffic

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Bill Williams River Bridge to Lake Havasu City Safety and Freight Improvements	
City/Town Name:	**County:** Mohave
Primary Route/Street: SR 95	
Beginning Limit: MP 162	
End Limit: MP 176	
Project Length: 14 Miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☒ Federal; ☐ Tribal; ☒ Other: State Parks, State Trust Land, Wildlife Refuge *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*		
LPA/Tribal Name:		
LPA/Tribal Contact:		
Email Address:	**Phone Number:**	
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance		

PROJECT NEED
MP 162 – 176 has above average rear end, head on, weather-related, and nighttime crashes; likely contributing factors include poor nighttime visibility or lighting, inadequate pavement markings, inadequate roadway shoulders, roadside design issues (non-traversable side slopes), and driver inattention MP 162 - 176 exhibits low trip reliability; percent of closures due to incidents/accidents is above the statewide average

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety need and medium freight need.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

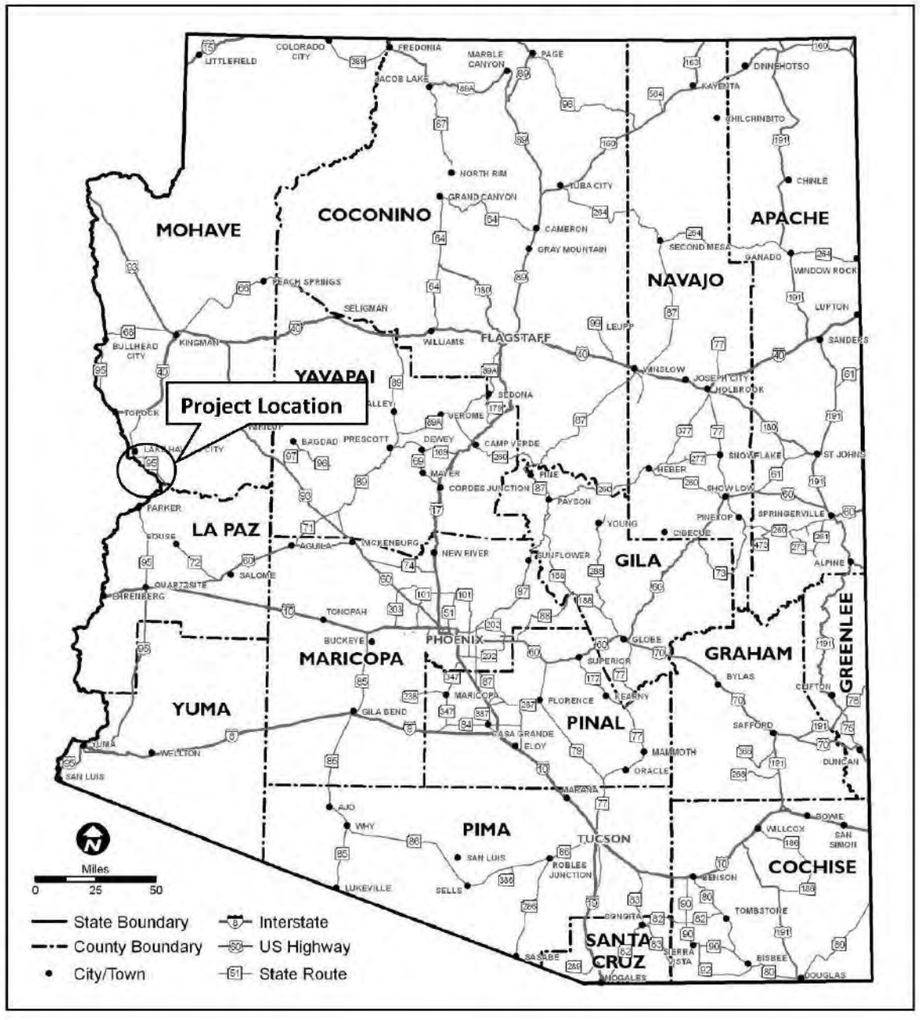
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$1,440,000	$4,800,000	$0	$48,113,125	$54,353,125

PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Widen shoulders (NB/SB) • Construct alternating passing lanes at MP 172.8 – MP 177 and MP 164 – MP 169.8 • Install curve warning signs, advisory speed sign and chevrons at MP 162.3

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Lake Havasu City Safety and Freight Improvements – Option A and B	
City/Town Name: Lake Havasu City	**County:** Mohave
Primary Route/Street: SR 95	
Beginning Limit: MP 177	
End Limit: MP 186	
Project Length: 9 Miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☒ Federal; ☐ Tribal; ☒ Other: State Trust Land, State Parks *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*			
LPA/Tribal Name:			
LPA/Tribal Contact:			
Email Address:		**Phone Number:**	
Administration: ☐ ADOT Administered	☐ Self-Administered	☐ Certification Acceptance	

PROJECT NEED

MP 177-190 has above average overturning, rear-end, and angle crashes; likely contributing factors include drivers running red light or stop sign, driver inattention, inadequate signal timing, poor visibility of signals, unexpected stops on approach, excessive speeds, and misjudging speed of on-coming traffic

MP 177 - 190 exhibits low trip reliability in the northbound direction; percent of closures due to incidents/accidents is above the statewide average

MP 179-190 is a safety hot spot within the Lake Havasu City limits in both directions; district representatives indicated the lack of access control measures as a contributing factor, and a higher concentration of crashes due to vehicles making left-turns; differential settling of the approaches to the Falls Spring Wash Bridge (#2265) (MP 186.2) may also be contributing to safety issues

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high safety needs and medium bridge and freight needs.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☒	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

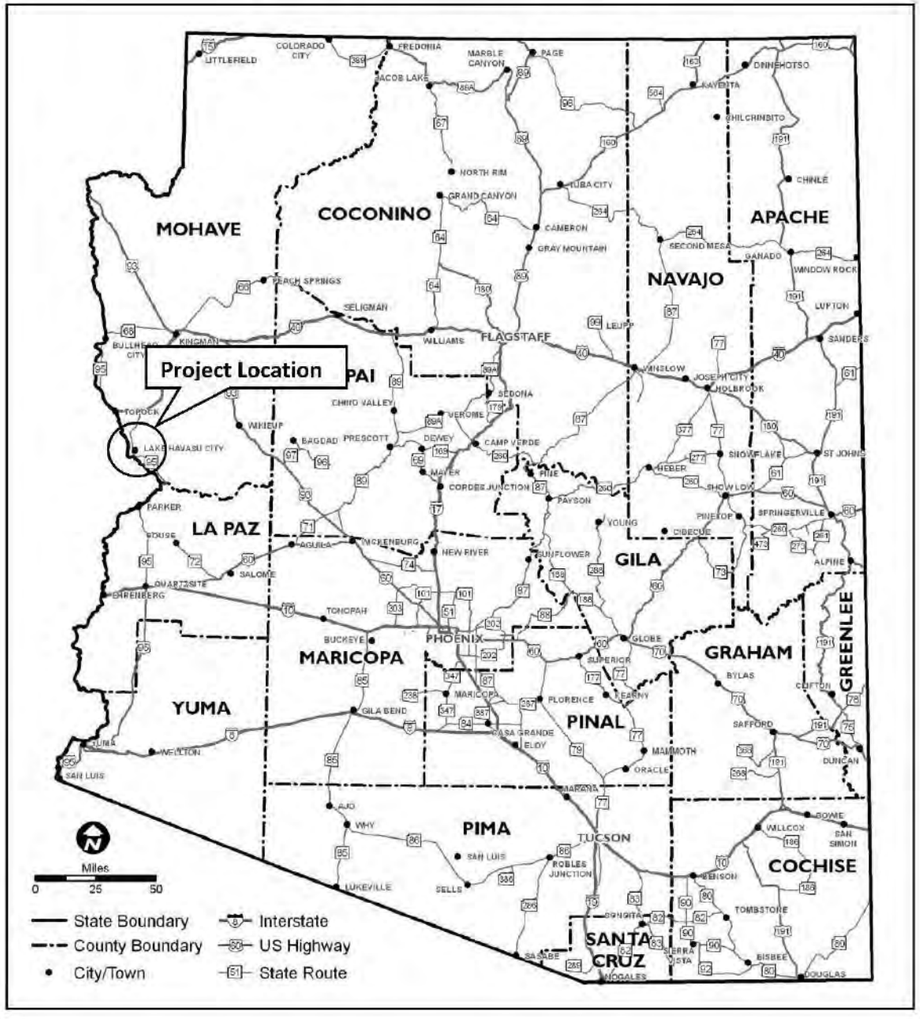
COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$1,350,000 (option A) $350,000 (option B)	$4,490,000 (option A) $1,170,000 (option B)	$480,000 (option A) $140,000 (option B)	$45,008,000 (option A) $11,788,000 (option B)	$51,328,000 (option A) $13,448,000 (option B)

PROJECT DELIVERY			
Delivery: ☐ Design-Bid-Build	☐ Design-Build	☐ Other:	
Design Program Year: FY			
Construction Program Year: FY			

ATTACHMENTS

1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• **Option A:** • Reconstruct 9 signalized intersections as double lane roundabouts (Mulberry Ave, Smoketree Ave, Swanson Ave, Mesquite Ave, Palo Verde Blvd S, Industrial Blvd, W Acoma Blvd, Kiowa Blvd N, Palo Verde Blvd N) • Install raised median throughout City limits (MP 177 – MP 186) • Mitigate differential settling on Falls Spring Wash Bridge (MP 186.2) • **Option B:** • Construct southbound right turn lanes at Smoketree Ave, Swanson Ave, W Acoma Blvd, Lake Dr • Install raised median throughout City limits (MP 177 – MP 186) • Implement signal coordination/adjust timing • Mitigate differential setline on Falls Spring Was Bridge (MP 186.2) •

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: Lake Havasu City to I-40 Freight Improvements	
City/Town Name: -	**County:** Mohave
Primary Route/Street: SR 95	
Beginning Limit: MP 194	
End Limit: MP 198	
Project Length: 4 Miles	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☐ Private; ☒ Federal; ☐ Tribal; ☐ Other: *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*		
LPA/Tribal Name:		
LPA/Tribal Contact:		
Email Address:	**Phone Number:**	
Administration: ☐ ADOT Administered	☐ Self-Administered	☐ Certification Acceptance

PROJECT NEED
MP 190 - 202 exhibits low trip reliability; percent of closures due to incidents/accidents and obstructions/hazards are above the statewide average

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
Address high freight need.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☐	System Enhancement ☒
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

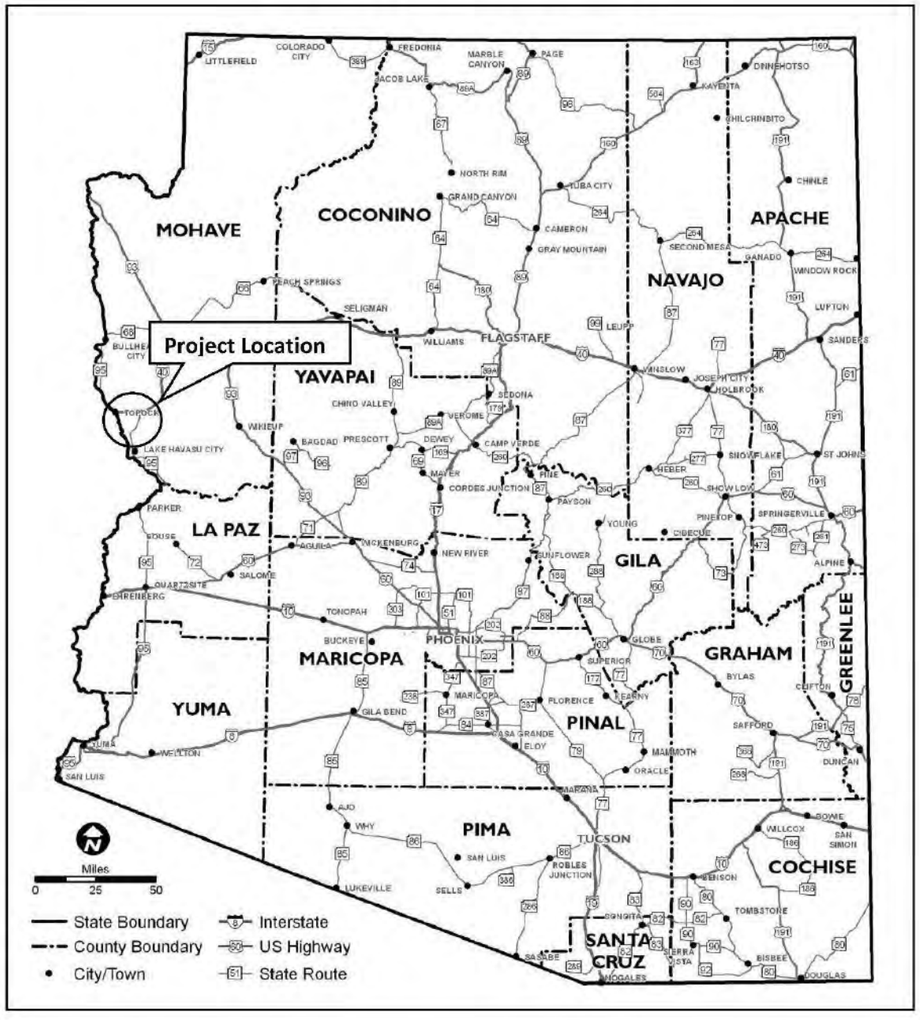
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$260,000	$850,000	$0	$8,520,600	$9,630,600

PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map **2) Project Vicinity Map** **3) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Widen shoulders MP 194.5 – MP 196.0 • Construct alternating passing lanes MP 196-MP 198.

ADOT **PRELIMINARY SCOPING REPORT**

GENERAL PROJECT INFORMATION	
Date: March 2017	**ADOT Project Manager:**
Project Name: I-40 Approach Freight Improvements	
City/Town Name:	**County:** Mohave
Primary Route/Street: SR 95	
Beginning Limit: MP 201.3	
End Limit: MP 202	
Project Length: 1 Mile	
Right-of-Way Ownership(s) (where proposed project construction would occur): *(Check all that apply)* ☐ City/Town; ☐ County; ☒ ADOT ; ☐ Private ; ☐ Federal; ☐ Tribal; ☐ Other:	
Adjacent Land Ownership(s): *(Check all that apply)* ☐ City/Town; ☐ County; ☐ ADOT; ☒ Private; ☒ Federal; ☐ Tribal; ☒ Other: State Land Trust *http://gis.azland.gov/webapps/parcel/*	

LOCAL PUBLIC AGENCY (LPA) or TRIBAL GOVERNMENT INFORMATION *(If applicable)*	
LPA/Tribal Name:	
LPA/Tribal Contact:	
Email Address:	**Phone Number:**
Administration: ☐ ADOT Administered ☐ Self-Administered ☐ Certification Acceptance	

PROJECT NEED
MP 201 - 202 exhibits low trip reliability; percent of closures due to incidents/accidents and obstructions/hazards are above the statewide average

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☐	Expansion ☒
Address high freight need.			

ADOT **PRELIMINARY SCOPING REPORT**

PROJECT TYPE		
Pavement Preservation ☐	Roadway Widening ☒	System Enhancement ☐
Bridge Scour/Rehab ☐	Bridge Replacement ☐	Sign Replacement ☐
Other ☐ :		

PROJECT RISKS	
Check any risks identified that may impact the project's scope, schedule, or budget:	
☐ Access / Traffic Control / Detour Issues	☐ Right-of-Way
☐ Constructability / Construction Window Issues	☐ Environmental
☐ Stakeholder Issues	☐ Utilities
☐ Structures & Geotech	☐ Other:
Risk Description: *(If a box is checked above, briefly explain the risk)*	

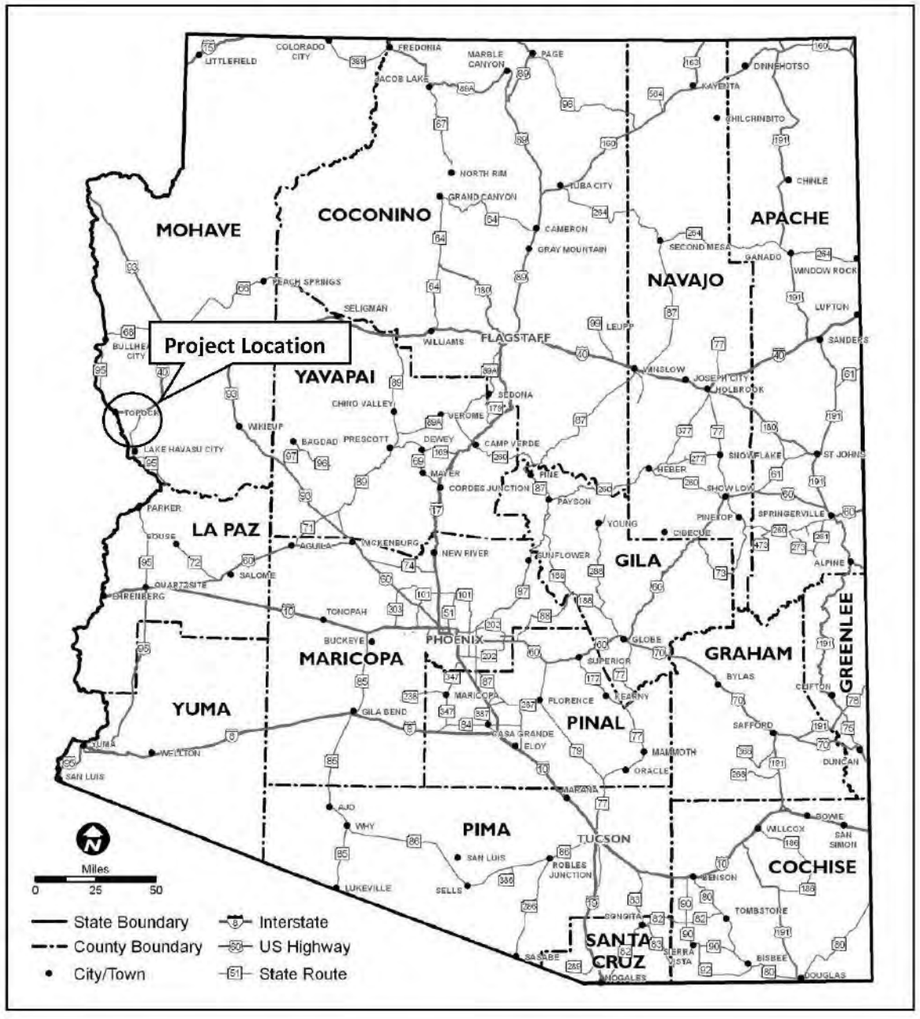
FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STP	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Other:	

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$80,000	$280,000	$0	$2,800,000	$3,160,000

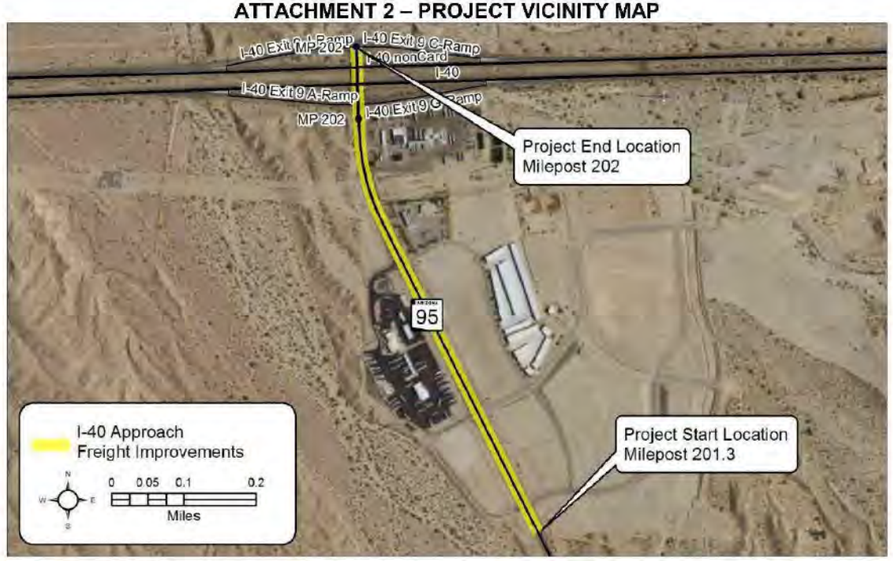
PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
1) State Location Map
2) Project Vicinity Map
3) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
• Construct auxiliary lane(s) to create a 5-lane section through activity center • Install signs prohibiting left turns in/out of the northern Wendy's/Pilot driveway