FINAL REPORT

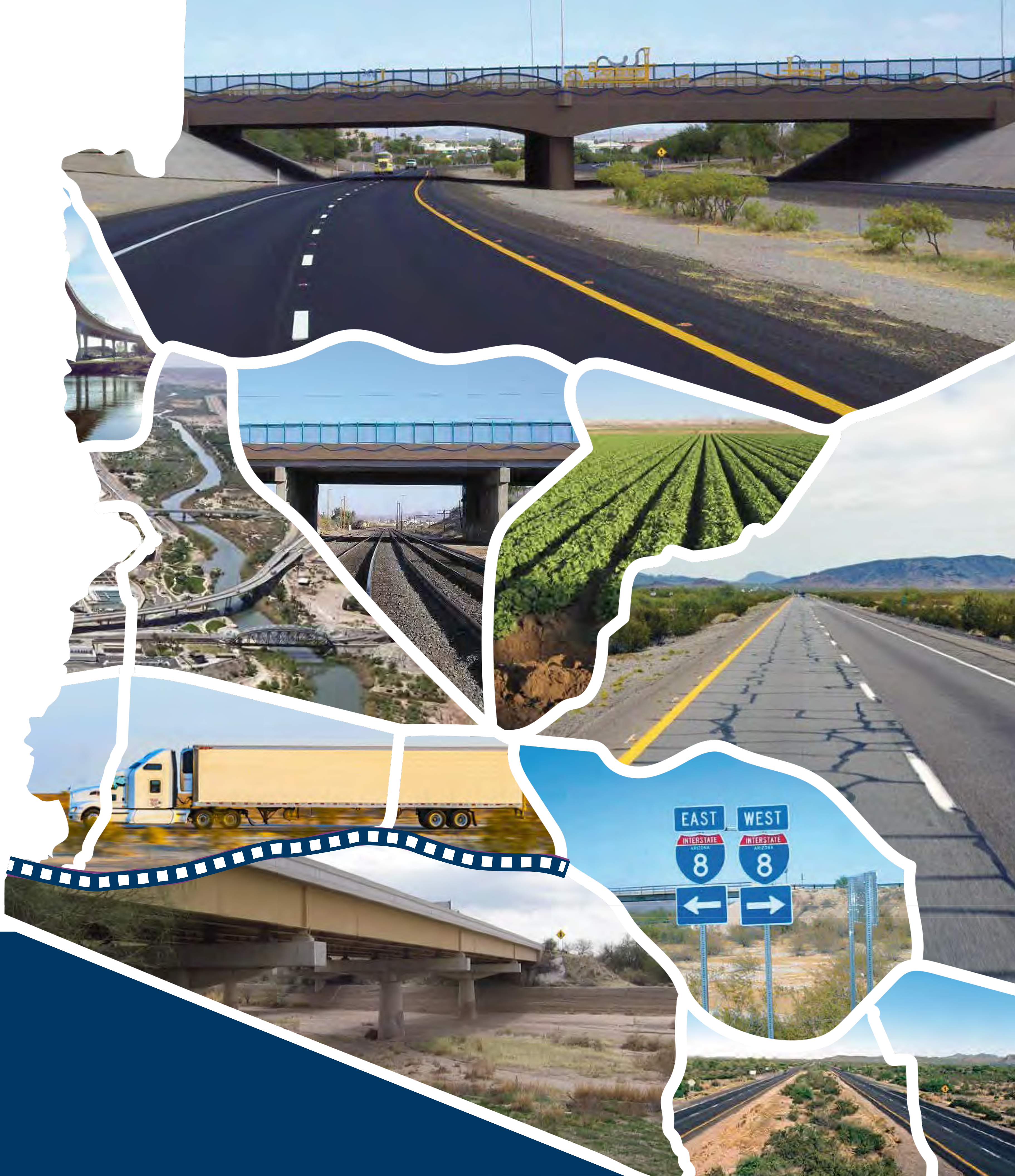
I-8 Corridor Profile Study

Arizona/California State Line to Junction I-10

PREPARED FOR ADOT APRIL 2023

ADOT WORK TASK NO.
MPD 0013-21

ADOT CONTRACT NO.
17-171970



Prepared by

AECOM

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ARIZONA DEPARTMENT OF TRANSPORTATION

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This report was funded in part through grants from the Federal Highway Administration, U.S. Department of Transportation. The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data, and for the use or adaptation of previously published material, presented herein. The contents do not necessarily reflect the official views or policies of the Arizona Department of Transportation or the Federal Highway Administration, U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation. Trade or manufacturers' names that may appear herein are cited only because they are considered essential to the objectives of the report. The U.S. government and the State of Arizona do not endorse products or manufacturers.

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ACRONYMS & ABBREVIATIONS

AADT	Average Annual Daily Traffic
ABISS	Arizona Bridge Information and Storage System
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
ASLD	Arizona State Land Department
AZTDM	Arizona Statewide Travel Demand Model
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe
BQAZ	Building a Quality Arizona
CCTV	Closed Circuit Television
CR	Cracking Rating
DCR	Design Concept Report
DMS	Dynamic Message Sign
EB	Eastbound
ECoNA	Economic Collaborative of Northern Arizona
FHWA	Federal Highway Administration
FMPO	Flagstaff Metropolitan Planning Organization
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
LRTP	Long-Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century
MP	Milepost
MPD	Multimodal Planning Division
NACOG	Northern Arizona Council of Governments
NAU	Northern Arizona University
NB	Northbound
NCFRP	National Cooperative Freight Research Program
NPV	Net Present Value
OP	Overpass
P2P	Planning-to-Programming
PA	Project Assessment
PAG	Pima Association of Governments
PARA	Planning Assistance for Rural Areas
PDI	Pavement Distress Index
PES	Performance Effectiveness Score
POE	Port-of-Entry
PS	Prioritization Score
PSR	Pavement Serviceability Rating
RTP	Regional Transportation Plan
RWIS	Road Weather Information System
SATS	Small Area Transportation Study
SB	Southbound
SCAG	Southern California Association of Governments
SERI	Species of Economic and Recreational Importance
SGCN	Species of Greatest Conservation Need
SHCG	Species and Habitat Conservation Guide
SHSP	Strategic Highway Safety Plan
SOV	Single Occupancy Vehicle
SPUI	Single Point Urban Interchange
SR	State Route

ACRONYMS & ABBREVIATIONS (continued)

STB	Surface Transportation Board
STIP	State Transportation Improvement Program
SWAP	State Wildlife Action Plan
TAC	Technical Advisory Committee
TI	Traffic Interchange
TIP	Transportation Improvement Plan
TTIS	Travel and Tourist Information System
UP	Underpass
USDOT	United States Department of Transportation
V/C	Volume-to-Capacity Ratio
VMT	Vehicle-Miles Travelled
VPD	Vehicles per Day
VSL	Variable Speed Limit
WACOG	Western Arizona Council of Governments
WB	Westbound
WIM	Weigh-in-Motion

Executive Summary

EXECUTIVE SUMMARY

INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this Corridor Profile Study (CPS) of Interstate 8 (I-8) between the California Border in Yuma and the Interstate 10 (I-10) Junction in Casa Grande. The study examines key performance measures relative to the I-8 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 has completed 21 CPS within four separate groupings or rounds. In 2020, ADOT separated the previously studied corridors into six groupings to be updated and reassessed: Northeast, Northcentral, Northwest, Southeast, Southcentral, and Southwest. The I-8, depicted in **Figure ES-1**, is one of the strategic statewide corridors identified and the subject of this CPS Update.

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:

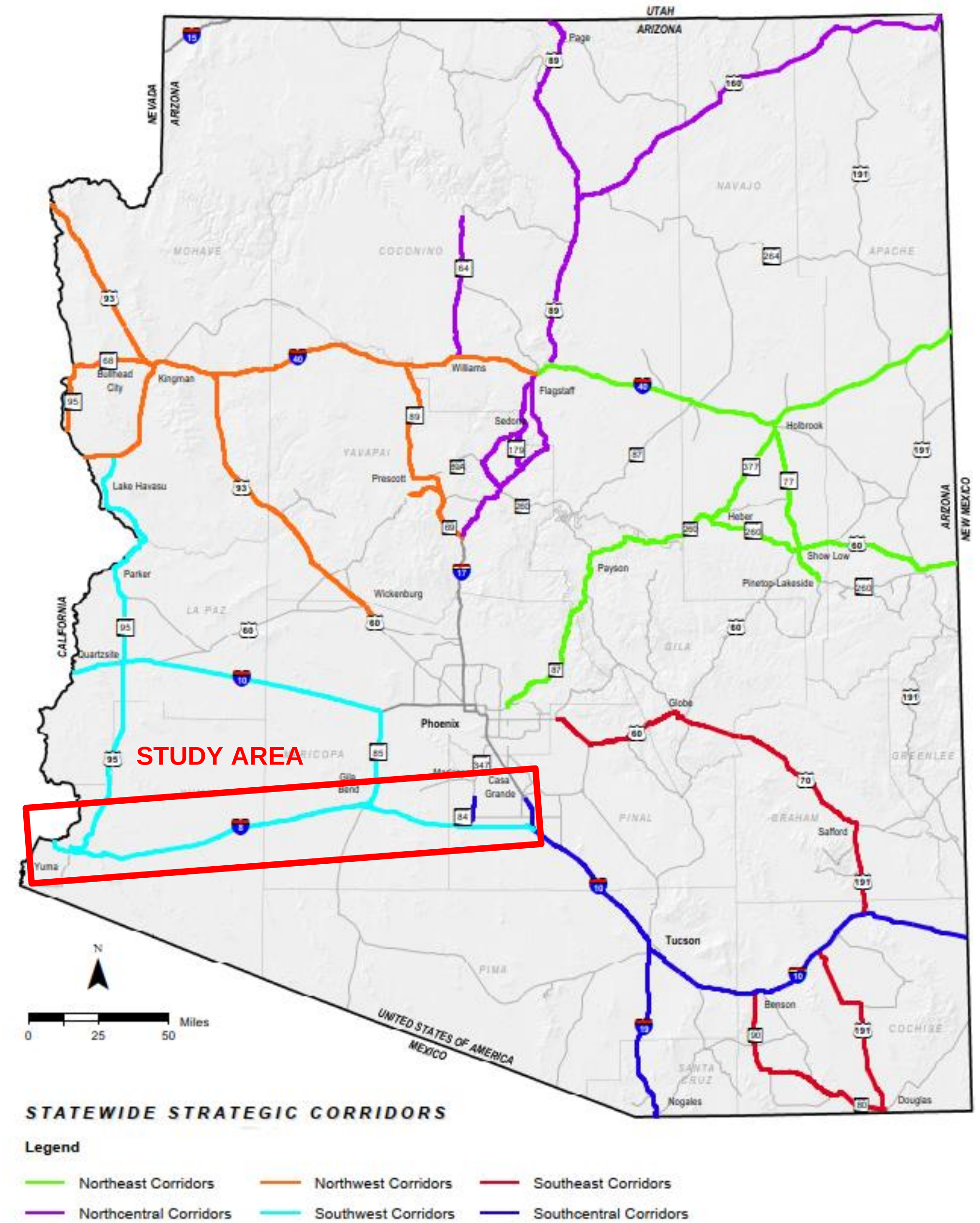
- Inventory past improvement recommendations
- Define corridor goals and objectives
- Assess existing performance based on quantifiable performance measures
- Propose various solutions to improve corridor performance
- Identify specific solutions that can provide quantifiable benefits relative to the 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 I-8 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 have been 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.

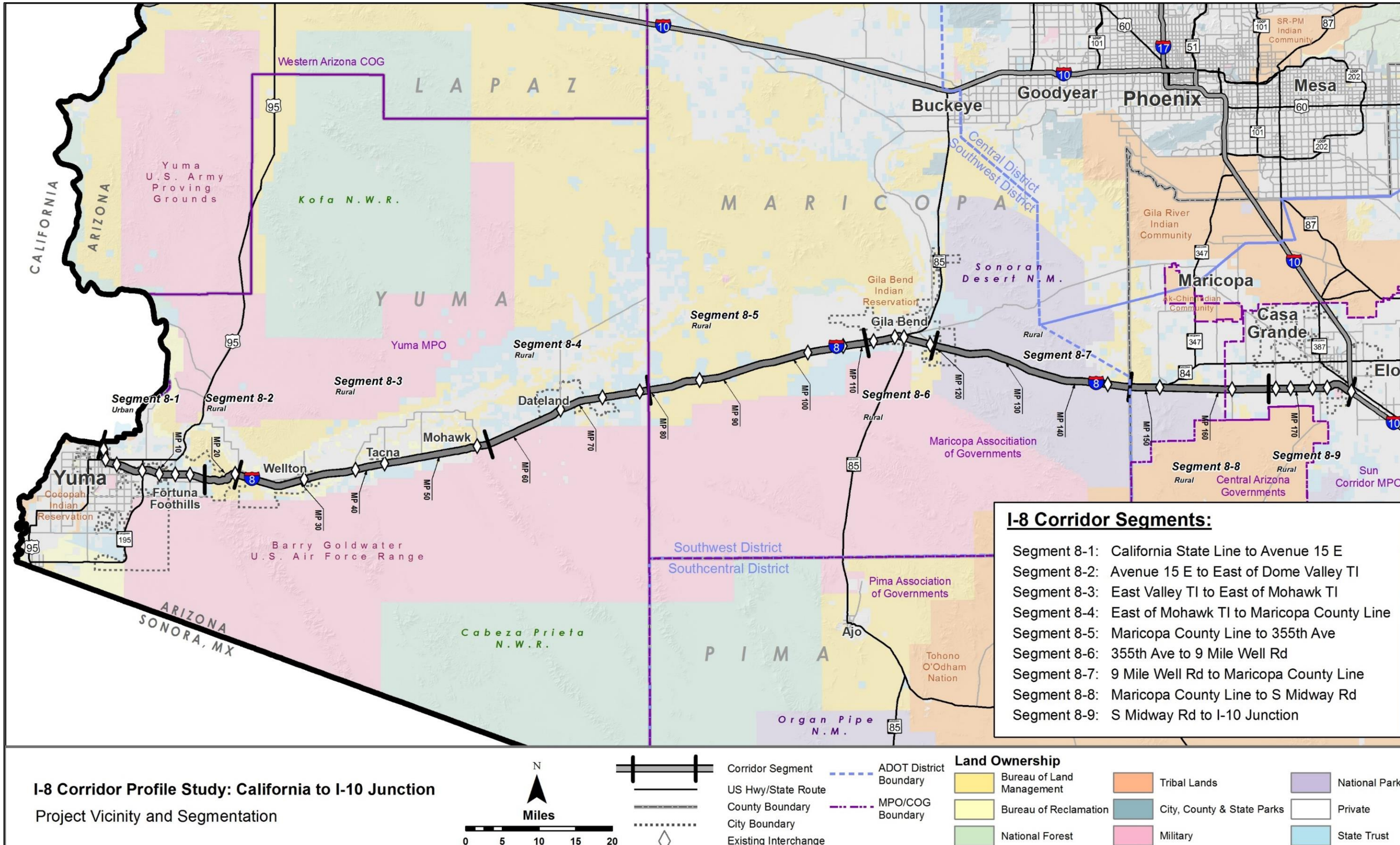
Figure ES-1: Corridor Study Area



Study Location and Corridor Segments

The I-8 Corridor is divided into 9 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 shown in **Figure ES-2**

Figure ES-2: Corridor Location and Segments



CORRIDOR PERFORMANCE

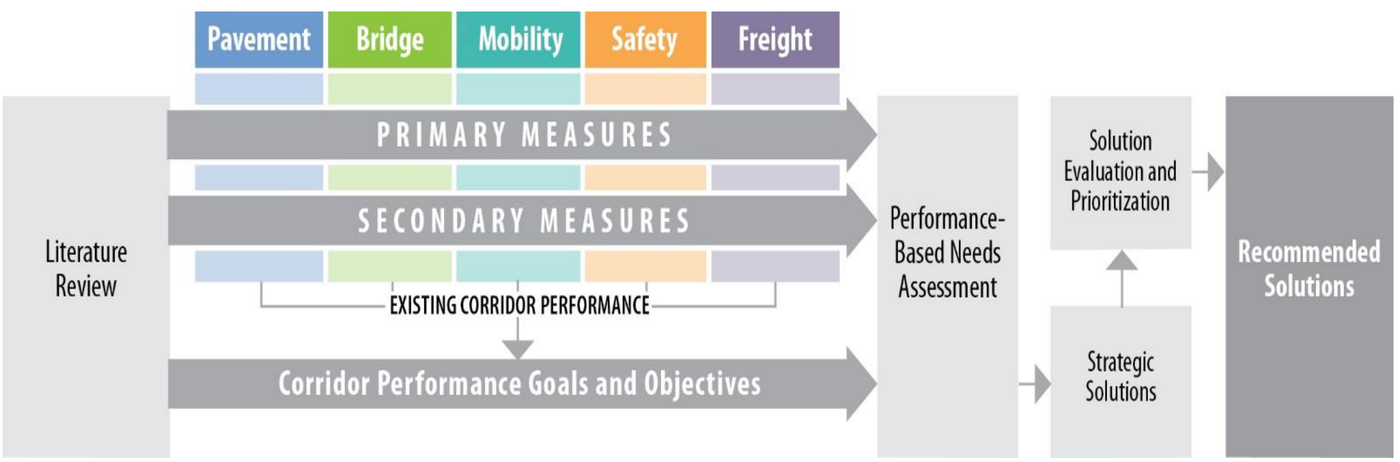
This chapter describes the evaluation of the existing performance of the I-8 Corridor. A series of performance measures is used to assess the corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

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 analysis:

- 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, cracking, and rutting	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** Based on lowest of deck, substructure, superstructure and structural evaluation rating	• Bridge Sufficiency • 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 suspected serious injury crashes	• Directional Safety Index • Strategic Traffic Safety Plan Emphasis Areas • Other Crash Unit Types • Safety Hot Spots
Freight	**Freight Index** Based on bi-directional truck travel time reliability	• Travel Time Reliability • 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 I-8 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.**

Based on the results of performance evaluation, the following general observations were made related to the performance of the I-8 Corridor

- Overall Performance: The Pavement, Mobility, and Freight performance areas show generally “good” performance; Bridge and Safety performance areas show generally “poor/below average” or “fair/average” performance
- Pavement Performance: The weighted average of the Pavement Index shows “good” performance for the I-8 Corridor; exceptions include Segments 8-3, 8-6 and 8-7 which show “fair” performance for the Pavement Index; the weighted average of % Area Failure shows “poor” performance for the corridor, exceptions include Segments 8-2 and 8-5 which show “fair” performance. Segments 8-8 and 8-9 show “good” performance
- Bridge Performance: The weighted average of the Bridge Index shows “fair” performance along the I-8 Corridor; the Bridge index predominantly shows “fair” performance, except for Segment 8-9, which shows “good” performance. The weighted average for Lowest Bridge Rating shows “fair” performance for the corridor; 13 total hotspots
- Mobility Performance: The weighted average of the Mobility Index and all secondary measures except % SOV Trips shows “good” performance throughout the I-8 Corridor
- Safety Performance: The weighted average of the Safety Index shows “average” performance for the I-8 Corridor; performance measures for crashes involving lane departures had “average” performance; several segments had insufficient data to generate reliable performance ratings for emphasis area crashes included as secondary measures
- Freight Performance: The weighted average of the Freight Index shows “good” performance along the I-8 Corridor; Closure Duration shows “good” performance for all Segments except 8-1 in the EB direction. There are two vertical clearance UP hotspots across the corridor
- Lowest Performing Segments: No segment has multiple Index ratings of “poor”

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	Bridge Sufficiency	Lowest Bridge Rating	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closures (occurrences/milepost/year)		Directional LOTTR (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
			EB	WB							EB	WB	EB	WB	EB	WB		
8-1[a]	16.3	4.02	4.03	4.13	31%	5.19	92.60	4	0.43	0.47	0.31	0.3	0.26	0.13	1.05	1.09	95.2%	15.3%
8-2[b]	5.1	4.02	3.94	4.07	10%	5.31	87.67	5	0.44	0.50	0.34	0.37	0.16	0.12	1.08	1.06	100.0%	12.6%
8-3[b]	35.1	3.74	3.59	3.82	43%	6.32	95.69	6	0.23	0.26	0.13	0.13	0.16	0.13	1.05	1.05	100.0%	13.2%
8-4[b]	23.1	4.00	3.71	4.05	35%	6.00	95.00	6	0.16	0.18	0.09	0.09	0.08	0.07	1.05	1.05	99.1%	7.4%
8-5[b]	30.8	4.41	4.22	4.34	13%	5.86	89.57	4	0.18	0.20	0.11	0.11	0.05	0.16	1.05	1.05	100.0%	6.1%
8-6[b]	9.6	3.32	3.62	3.43	60%	5.59	94.82	5	0.17	0.18	0.12	0.11	0.06	0.10	1.05	1.06	100.0%	5.8%
8-7[b]	27.6	3.70	3.84	3.88	48%	6.08	91.34	6	0.09	0.07	0.1	0.09	0.06	0.10	1.04	1.04	100.0%	5.8%
8-8[b]	18.9	4.67	4.39	4.41	0%	5.64	91.09	5	0.12	0.15	0.07	0.06	0.05	0.14	1.06	1.06	100.0%	12.4%
8-9[b]	11.5	4.26	3.86	4.02	4%	8.58	90.36	5	0.16	0.22	0.06	0.08	0.14	0.04	1.04	1.04	100.0%	13.5%
Weighted Corridor Average		4.03	3.91	4.04	29.4%	6.07	92.45	4.97	0.20	0.22	0.13	0.13	0.11	0.12	1.05	1.05	99.45%	9.79%

SCALES

Performance Level		Interstate			All				Urban				All		Interrupted / Uninterrupted		All	
Good/Above Average		> 3.75	> 3.75		< 5%	> 6.5	> 80	> 6	< 0.71				< 0.22		< 1.15		> 90%	> 17%
Fair/Average		3.00 - 3.75	3.40 - 3.75		5% - 20%	5.0 - 6.5	50 - 80	5 - 6	0.71 - 0.89				0.22 - 0.62		1.15 - 1.50		60% - 90%	11% - 17%
Poor/Below Average		< 3.00	< 3.40		> 20%	< 5.0	< 50	< 5	> 0.89				> 0.62		> 1.50		< 60%	< 11%
Performance Level									Rural									
Good/Above Average									< 0.56									
Fair/Average									0.56 - 0.76									
Poor/Below Average									> 0.76									

[a]Urban 4 Lane Freeway
[b]Rural 4 Lane Freeway with Daily Volume < 25,000

[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 + Suspected Serious Injury Crashes at Intersections	% of Fatal + Suspected Serious Injury Crashes Involving Lane Departures	% of Fatal + Suspected Serious Injury Crashes Involving Pedestrians	% of Fatal + Suspected Serious Injury Crashes Involving Trucks	% of Fatal + Suspected Serious Injury Crashes Involving Bicycles	Freight Index	MAX TTTR		Closure Duration (minutes/milepost/year/mile)		Bridge Vertical Clearance (feet)
			EB	WB							EB	WB	EB	WB	
8-1[a]	16.3	0.69	0.47	0.92	Not Applicable	55%	Not Applicable	Not Applicable	Not Applicable	1.27	1.21	1.33	52.67	22.86	15.33
8-2[b]	5.1	2.31	3.39	1.22	Not Applicable	100%	Not Applicable	Not Applicable	Not Applicable	1.28	1.33	1.24	25.88	21.49	16.14
8-3[b]	35.1	1.08	0.66	1.50	Not Applicable	83%	Not Applicable	Not Applicable	Not Applicable	1.09	1.09	1.09	41.55	12.94	16.2
8-4[b]	23.1	1.78	1.06	2.50	Not Applicable	81%	Not Applicable	Not Applicable	Not Applicable	1.08	1.08	1.08	7.26	9.15	No UP
8-5[b]	30.8	1.04	0.93	1.16	Not Applicable	76%	Not Applicable	Not Applicable	Not Applicable	1.08	1.08	1.08	4.29	21.66	No UP
8-6[b]	9.6	0.43	0.86	0.00	Not Applicable	Insufficient Data	Not Applicable	Not Applicable	Not Applicable	1.13	1.14	1.11	3.75	15.96	16.61
8-7[b]	27.6	0.62	0.82	0.43	Not Applicable	91%	Not Applicable	Not Applicable	Not Applicable	1.09	1.10	1.09	6.16	14.10	16.17
8-8[b]	18.9	0.62	1.23	0.00	Not Applicable	100%	Not Applicable	Not Applicable	Not Applicable	1.15	1.15	1.15	5.42	37.54	15.99
8-9[b]	11.5	1.17	1.53	0.81	Not Applicable	Insufficient Data	Not Applicable	Not Applicable	Not Applicable	1.10	1.11	1.10	20.33	2.61	16.00
Weighted Corridor Average		1.02	0.97	1.06	Not Applicable	82%	Not Applicable	Not Applicable	Not Applicable	1.12	1.11	1.12	18.49	17.40	16.06
SCALES															
Performance Level		Urban 4-Lane Freeway								Not Applicable					
Good/Above Average		< 0.73			N/A	< 60.6%	< 0.0%	< 6.9%	< 0.0%	< 1.15			< 44.18		> 16.50
Fair/Average		0.73 - 1.27			N/A	60.6% - 78.1%	0.0% - 4.9%	6.9% - 12.4%	0.0% - 0.0%	1.15 - 1.35			44.18 - 124.86		16.0 - 16.50
Poor/Below Average		> 1.27			N/A	> 78.1%	> 4.9%	> 12.4%	> 0.0%	> 1.35			> 124.86		< 16.5
Performance Level		Rural 4-Lane Freeway with Daily Volume <25,000													
Good/Above Average		< 0.84			N/A	< 72.8%	< 1.0%	< 19.0%	< 0.0%						
Fair/Average		0.84 - 1.16			N/A	72.8% - 76.4%	1.0% - 3.3%	19.0% - 22.5%	0.0% - 0.9%						
Poor/Below Average		> 1.16			N/A	> 76.4%	> 3.3%	> 22.5%	> 0.9%						

[a]Urban 4 Lane Freeway
[b]Rural 4 Lane Freeway with Daily Volume < 25,000

[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

I-8, an important national transportation corridor, spans between San Diego, California and Casa Grande, Arizona. In Arizona, I-8 originates at the Colorado River in the City of Yuma and extends approximately 178 miles east, passing through Yuma County and the Town of Welton, across Gila Bend in Maricopa County, and terminating at the I-10 Junction southeast of Casa Grande in Pinal County. Much of the I-8 corridor is rural and undeveloped.

The entire length of I-8 in Arizona is the subject of this CPS. More than a highway, the corridor is a multimodal facility that moves people and freight and connects communities. The corridor serves the growing Sun Corridor in central Arizona, supports freight movement (e.g., by transporting produce from the “lettuce capital of the US” near Yuma), and carries visitors west to the commercial and recreation centers in Western Arizona, Southern California and Mexico.

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 I-8 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 results, three “emphasis areas” were identified for the I-8 Corridor: Mobility, Safety and Freight.

Taking into account the corridor goals and identified emphasis areas, performance objectives were developed for each quantifiable performance measure that identified 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.

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

Needs Assessment Process

The performance-based needs assessment evaluates the difference between the baseline performance and the performance objectives for each of the five performance areas used to characterize the health of the corridor: Pavement, Bridge, Mobility, Safety, and Freight. The performance-based needs assessment process is illustrated in **Figure ES-4.**

The needs assessment compares baseline corridor performance with performance objectives to provide a starting point for the identification of performance needs. This mathematical comparison results in an initial need 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

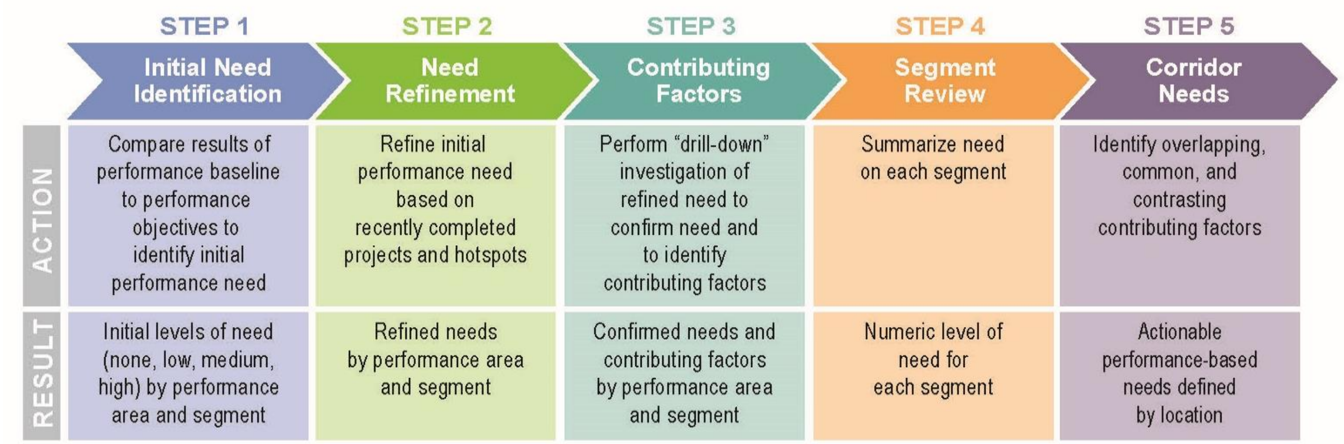


Figure ES-5: Initial Need Ratings in Relation to Baseline Performance (Bridge Example)

Performance Thresholds	Performance Level	Initial Level of Need	Description
	Good	None*	All levels of Good and top 1/3 of Fair (>6.0)
	Good		
6.5	Good		
	Fair		
	Fair	Low	Middle 1/3 of Fair (5.5-6.0)
	Fair	Medium	Lower 1/3 of Fair and top 1/3 of Poor (4.5-5.5)
5.0	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 I-8 Corridor). There are no segments with a High average need, six segments with a Medium average need, and eight segments with a Low average need.

Pavement Needs

- The Pavement Performance Area is not an emphasis area for the I-8 Corridor.
- Segment 8-8 has a level of need of "None" and have no hot spots
- There are various recently completed projects but do not impact the segment needs as they do not address enough of the corridor to impact performance or the pavement treatment chosen is a life extensions treatment, not a project that would eliminate the needs.

Bridge Needs

- The Bridge Performance Area is not an emphasis area for the I-8 Corridor.
- Segments 8-1, 8-2, 8-5, 8-8, and 8-9 contain Bridge hot spots
- There are recently completed projects in Segments 8-1 and 8-2 that could impact final segment need

Mobility Needs

- The Mobility Performance Area is an emphasis area for the I-8 Corridor.
- Overall Mobility needs are "None" throughout the corridor
- There are no recently completed projects along the I-8 Corridor impacting final segment need

Safety Needs

- The Safety Performance Area is an emphasis area for the I-8 Corridor.
- Segments 8-2, 8-3, and 8-4 have "High" safety needs
- No Segments contain Safety hot spots

Freight Needs

- The Freight Performance Area is an emphasis area for the I-8 Corridor.
- There are 8 bridge vertical clearance hot spots on the corridor
- No Segments have "High" closure duration need
- Segments 8-1 and 8-2 have "Medium" freight needs

Overlapping Needs

This section identifies overlapping performance needs on the I-8 Corridor, which provides guidance to develop strategic solutions that address more than one performance area with elevated levels of need. Completing projects that address multiple needs presents the opportunity to more effectively improve overall performance. A summary of the overlapping needs that relate to locations with elevated levels of need is provided below:

- Three segments I-8 Corridor shows some level of need in four out of the five performance areas
- Segments 8-2 and 8-3 have the highest levels of overall need
- Segments 8-2, 8-3, and 8-4 are the only segments with a "High" Emphasis Area need (Safety)

Table ES-3: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts (MP)								
	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9
	MP 0-16.3	MP 16.3-21.4	MP 21.4-56.5	MP 56.5-79.6	MP 79.6-110.4	MP 110.4-120	MP 120-147.6	MP 147.6-166.5	MP 166.5-178
Pavement	Low	Low	Low	Low	Low	Medium	Low	None	Low
Bridge	Low	Low	None	None	Low	Low	None	Low	Low
Mobility+	None	None	None	None	None	None	None	None	None
Safety+	Low	High	High	High	Medium	None	Low	Low	Medium
Freight+	Medium	Medium	Low	None	None	None	Low	Low	Low
Average Need	**1.00**	**1.46**	**1.08**	**0.85**	**0.77**	**0.46**	**0.62**	**0.62**	**1.00**

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

+ Identified as an emphasis area for the I-8 Corridor

** 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*

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 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 I-8 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 screen 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 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 change since the performance data was collected that was used to identify the need.

Candidate Solutions

For each elevated need within a strategic investment area that is not screen 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 I-40 West Corridor will be considered along with other candidate projects in the ADOT statewide programming process.

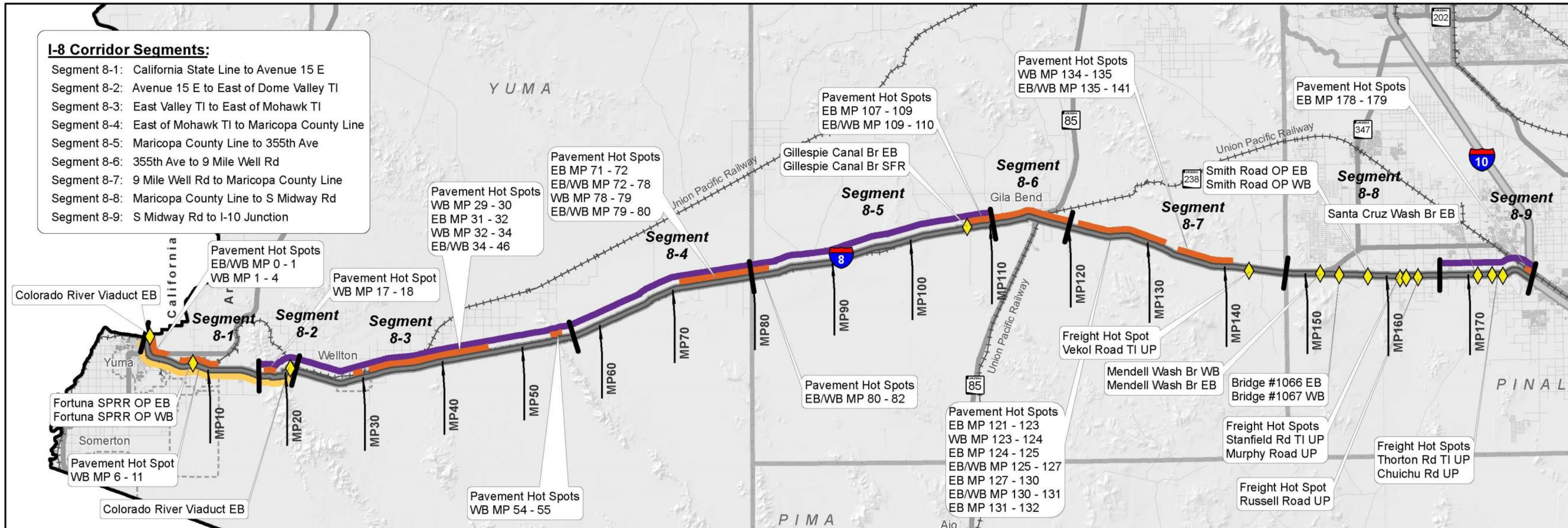
Candidate solutions include some or all of the following characteristics:

- 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

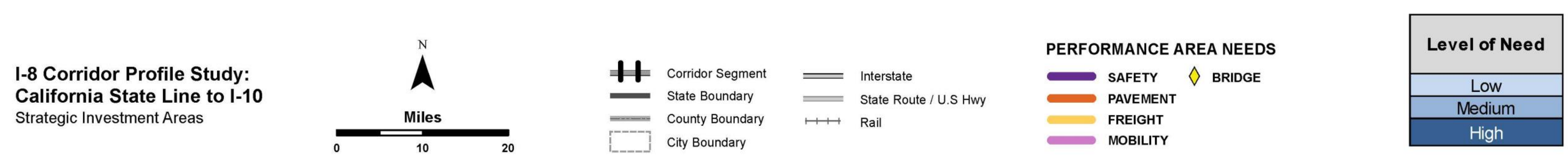
Figure ES-6: Strategic Investment Areas



Performance Area	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9
	MP 0-16.3	MP 16.3-21.4	MP 21.4-56.5	MP 56.5-79.6	MP 79.6-110.4	MP 110.4-120	MP 120-147.6	MP 147.6-166.5	MP 166.5-178
Pavement	Hot Spot	Hot Spot	Hot Spot	Hot Spot	Hot Spot	Medium	Hot Spot	-	Hot Spot
Bridge	Hot Spot	Hot Spot	-	-	Hot Spot	-	-	Hot Spot	Hot Spot
Mobility*	-	-	-	-	-	-	-	-	-
Safety*	-	High	High	High	Medium	-	-	-	Medium
Freight*	Medium	Medium	-	-	-	-	Hot Spot	Hot Spot	Hot Spot

* Identified as Emphasis Areas for I-8 Corridor

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



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 is 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 completed 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

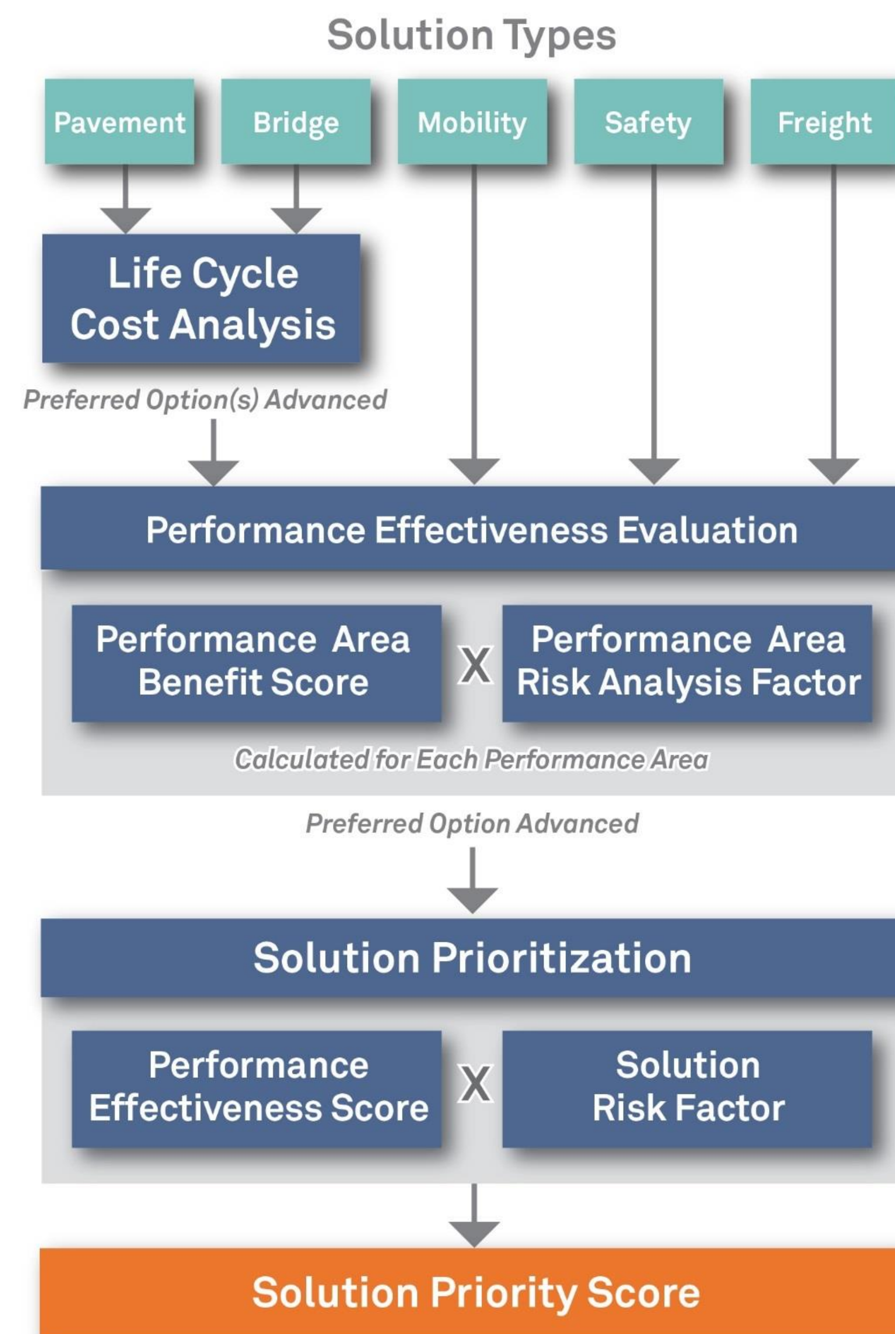
Solution Risk Analysis

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 the 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 indicated 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 I-8 corridor. Implementation of these solutions is anticipated to improve performance of the I-8 corridor in all five performance areas. he following observations were noted about the prioritized solutions:

- Candidate Solution 8.22 Arizola Area Safety Improvements ranked highest on the corridor due to a reduction in both Safety and Freight needs at a relatively low cost. Telegraph Pass Safety Improvements also ranked near the top of the corridor list.
- Several sections of I-8 roadway considered pavement hot spots will not be improved by any currently programmed projects. It is anticipated that other preservation programming processes will address these needs in the future.

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 I-8 Corridor:

- When recommending future projects along the I-8 Corridor, review historical ratings and levels of investment. According to data used for this study, the following pavement and bridge locations have exhibited high historical investment (pavement) or rating fluctuation (bridge) issues:
- Consider a corridor strategy to upgrade all bridges to current standards in anticipation of increased truck/freight traffic over the medium to long term.
- Consider corridor wide ITS solutions to assist truck/freight traffic over the medium to long term.

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 this 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 the I-8 Corridor, but across the entire state highway system where the conditions are applicable. The following list, which is in no particular order of priority, was derived from the initial four CPS rounds:

- 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 message 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 required 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 I-8 corridor will be considered along with other candidate projects in the ADOT statewide programming process. It is important to note that the 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.

These 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.

CPS Program Refinements

This CPS assessment is an update to the original CPS assessments conducted between 2017 and 2019. Due to changes in state and federal reporting standards as well as data availability, the original methodology has been adapted to produce comparable and relatable performance, need, and evaluation results. The methodology has changed as follows:

- Pavement performance now includes the addition of rutting as a component of the Pavement Distress measure
- Bridge performance no longer includes the % Functionally Obsolete secondary measure
- Safety performance includes updated secondary measure categories and is evaluated against updated statewide averages
- Mobility and Freight performance are evaluated using updated reliability measures based on Level of Travel Time Reliability and Truck Travel Time Reliability, which are new federal standard measures adapted from the previous Travel Time Index and Planning Time Index measures

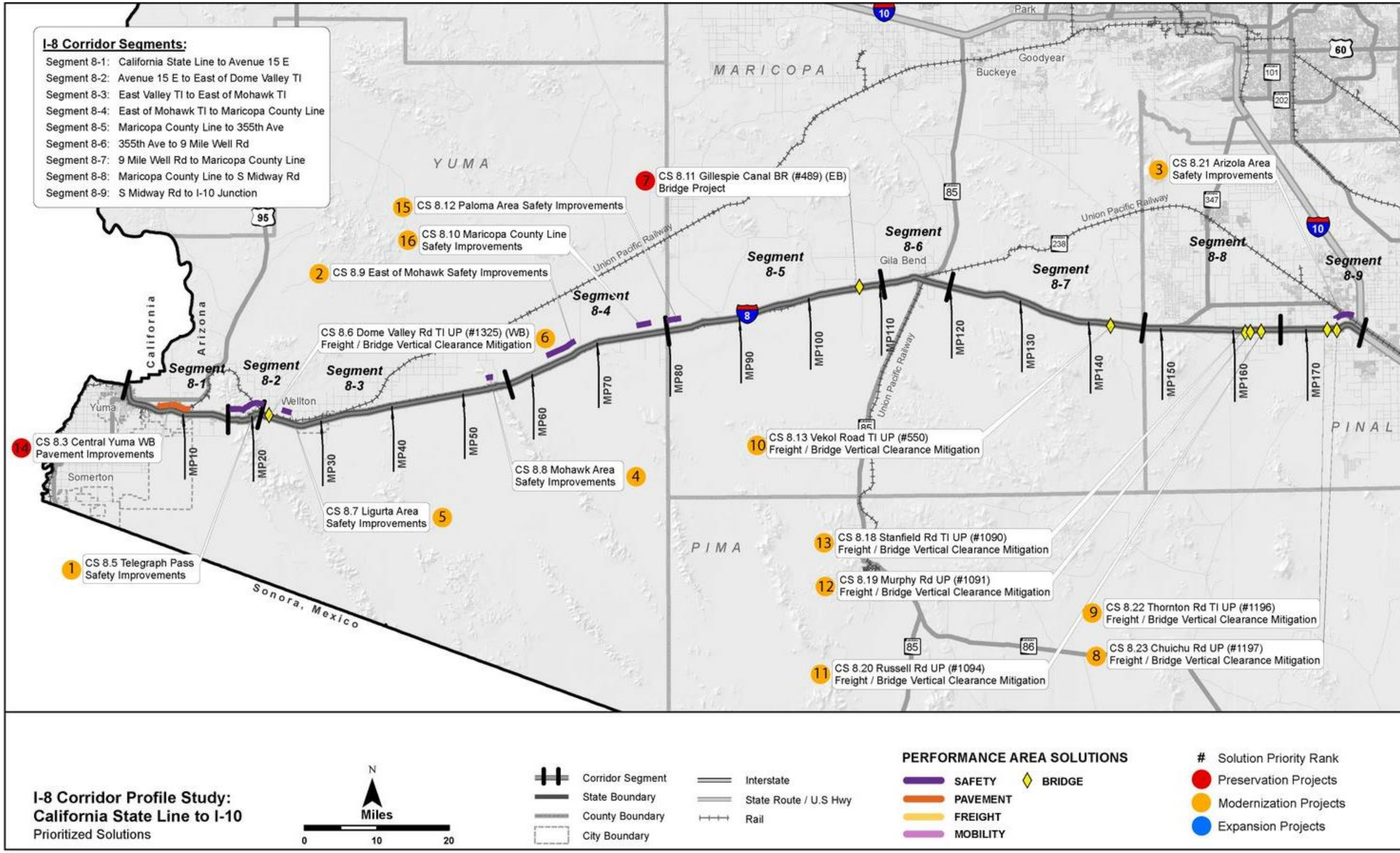
Table ES-4: Prioritized Recommended Solutions

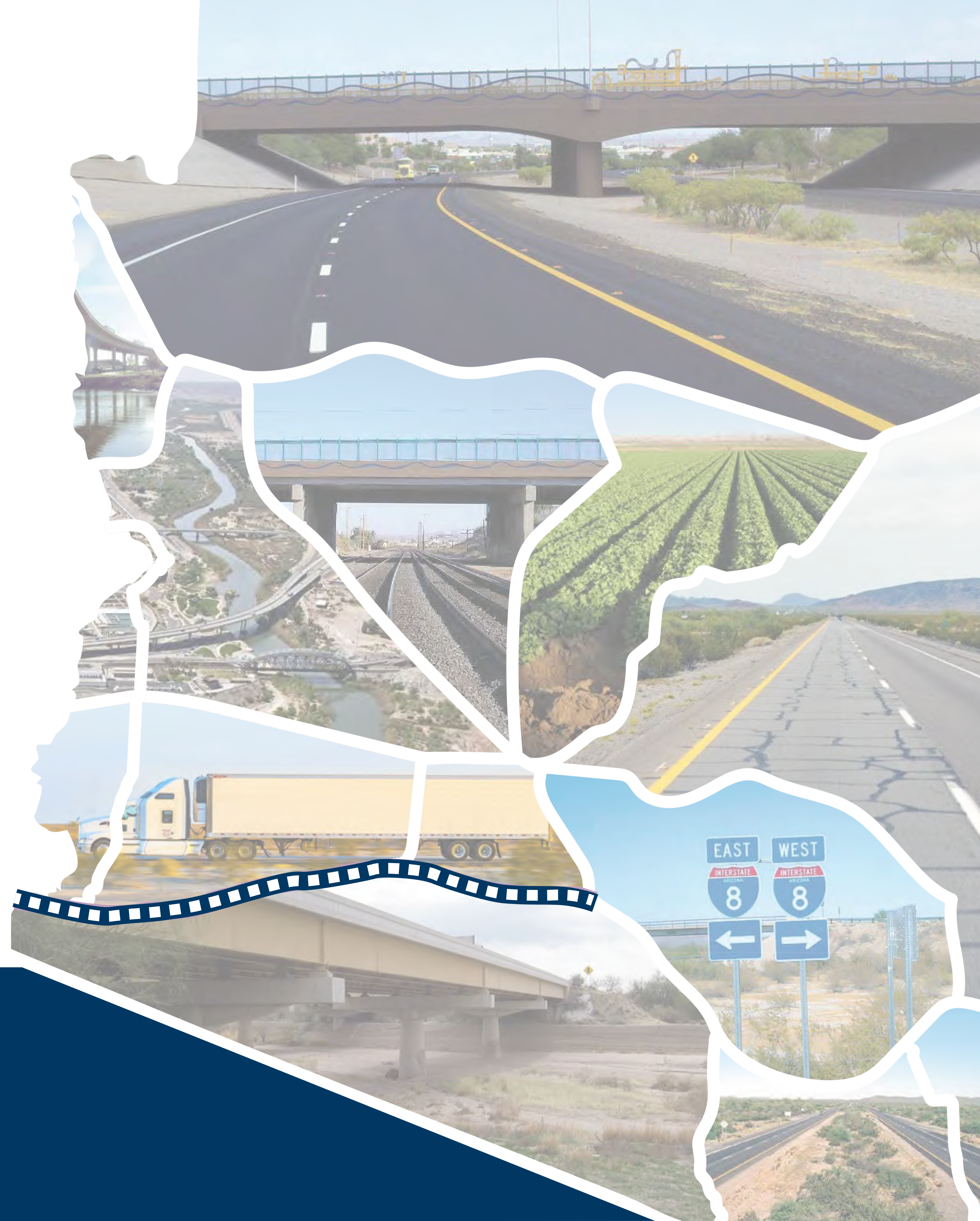
Rank	Candidate Solution #	Segment #	Solution Name and Location	Description / Scope	Estimated Cost (in millions)	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Prioritization Score
1	CS8.5	8-2	Telegraph Pass Safety Improvements	-Install an Eastbound speed feedback sign at MP 19.5 -Install chevrons, delineators, and raised reflective pavement markers along curve at MP 20.5-21	$0.14	M	**4905**
2	CS8.9	8-4	East of Mohawk Area Safety Improvements	-Install EB chevrons	$0.03	M	**312**
3	CS8.21	8-9	Arizola Area Safety Improvements	-Install curve warning signs with advisory speed plaque -Install raised pavement markers at both edges the roadway (both directions of travel) -Install chevron signs along curve in eastbound and westbound directions	$0.14	M	**268**
4	CS8.8	8-3	Mohawk Area Safety Improvements	-Install eastbound guardrail on the outside edge of traveled way	$0.28	M	**21**
5	CS8.7	8-3	Ligurta Area Safety Improvements	-Widen median shoulder in the westbound direction	$1.10	M	**16**
6	CS8.6	8-2	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$3.91	M	**11**
			Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**9**
7	CS8.11	8-5	Gillespie Canal BR (#489) (EB) – Bridge Replacement (Option B)	-Replace bridge	$1.05	P	**8**
8	CS8.23	8-9	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**8**
			Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$6.21	M	**1**
9	CS8.22	8-9	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**7**
			Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$7.44	M	**2**
10	CS8.13	8-7	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$4.8	M	**4**
			Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**3**
11	CS8.20	8-8	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	-Reprofile mainline	$1.26	M	**4**
			Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$6.5	M	**2**

Table ES-4: Prioritized Recommended Solutions (Continued)

Rank	Candidate Solution #	Segment #	Solution Name and Location	Description / Scope	Estimated Cost (in millions)	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Prioritization Score
12	CS8.19	8-8	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**4**
			Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$5.86	M	**2**
13	CS8.18	8-8	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**3**
			Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$7.2	M	**1**
14	CS8.3	8-1	Central Yuma WB Pavement Improvements (Option B)	-Replace pavement	$31.3	P	**3**
15	CS8.12	8-5	Paloma Area Safety Improvements	-Widen median shoulders	$2.21	M	**3**
16	CS8.10	8-4	Maricopa County Line Area Safety Improvements	-Widen median shoulders	$4.43	M	**2**

Figure ES-8: Prioritized Recommended Solutions





Final Report

Final Report

1.0 INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this Corridor Profile Study (CPS) of Interstate 8 (I-8) between the California Border in Yuma and the Interstate 10 (I-10) Junction in Casa Grande. The study examines key performance measures relative to the I-8 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 has completed 21 original CPS within four separate groupings or rounds. In 2020, ADOT separated the previously studied corridors into six groupings to be updated and reassessed: Northeast, Northcentral, Northwest, Southeast, Southcentral, and Southwest. The 9 corridor studies within the three southern groupings began in Spring 2022 and include:

<u>Southeast</u>

- SR 90/SR 80
- US 60/US 70/US 191: Florence Junction to Douglas

<u>Southcentral</u>

- I-10: SR 202L to the New Mexico State Line
- I-19: Nogales to I-10
- SR 347/SR 84

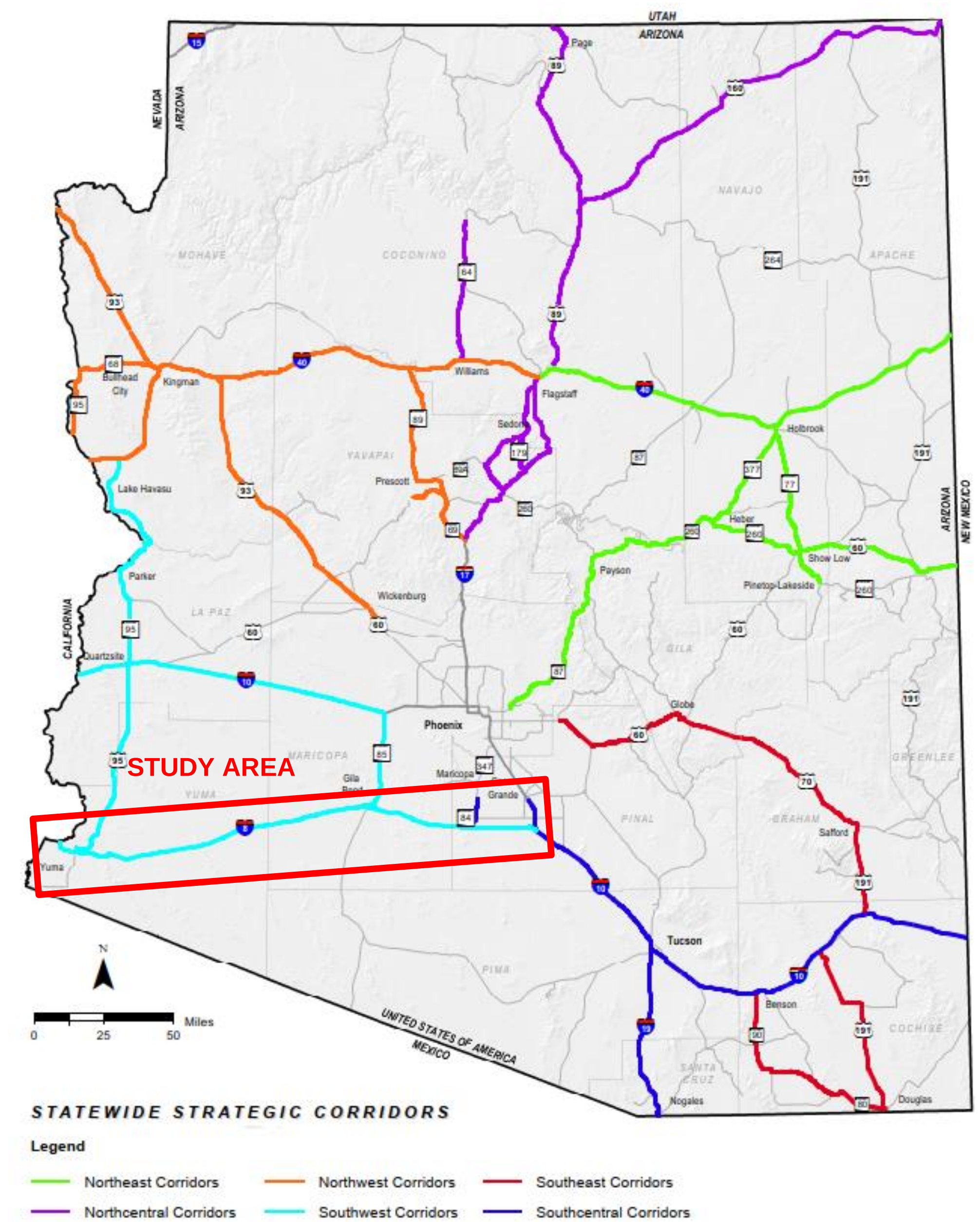
<u>Southwest</u>

- I-8: California State Line to I-10
- I-10/SR 85: California State Line to SR 85 and SR 85: I-10 to I-8
- SR 95: I-8 to I-40

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 I-8, depicted in **Figure 1,** is one of the strategic statewide corridors identified and the subject of this CPS Update.

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 I-8 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 I-8 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

I-8 is an important national transportation corridor, spanning between San Diego, California and Casa Grande, Arizona. In Arizona, I-8 originates at the Colorado River in the City of Yuma and extends approximately 178 miles east, passing through Yuma County and the Town of Wellton, across Gila Bend in Maricopa County, and terminating at the I-10 junction southeast of Casa Grande in Pinal County. Much of the I-8 corridor is rural and undeveloped.

The entire length of I-8 in Arizona is the subject of this CPS. More than a highway, the corridor is a multimodal facility that moves people and freight and connects communities. The corridor serves the growing Sun Corridor in central Arizona, supports freight movement (e.g., by transporting produce from the “lettuce capital of the US” near Yuma), and carries visitors west to the commercial and recreation centers in San Diego, California.

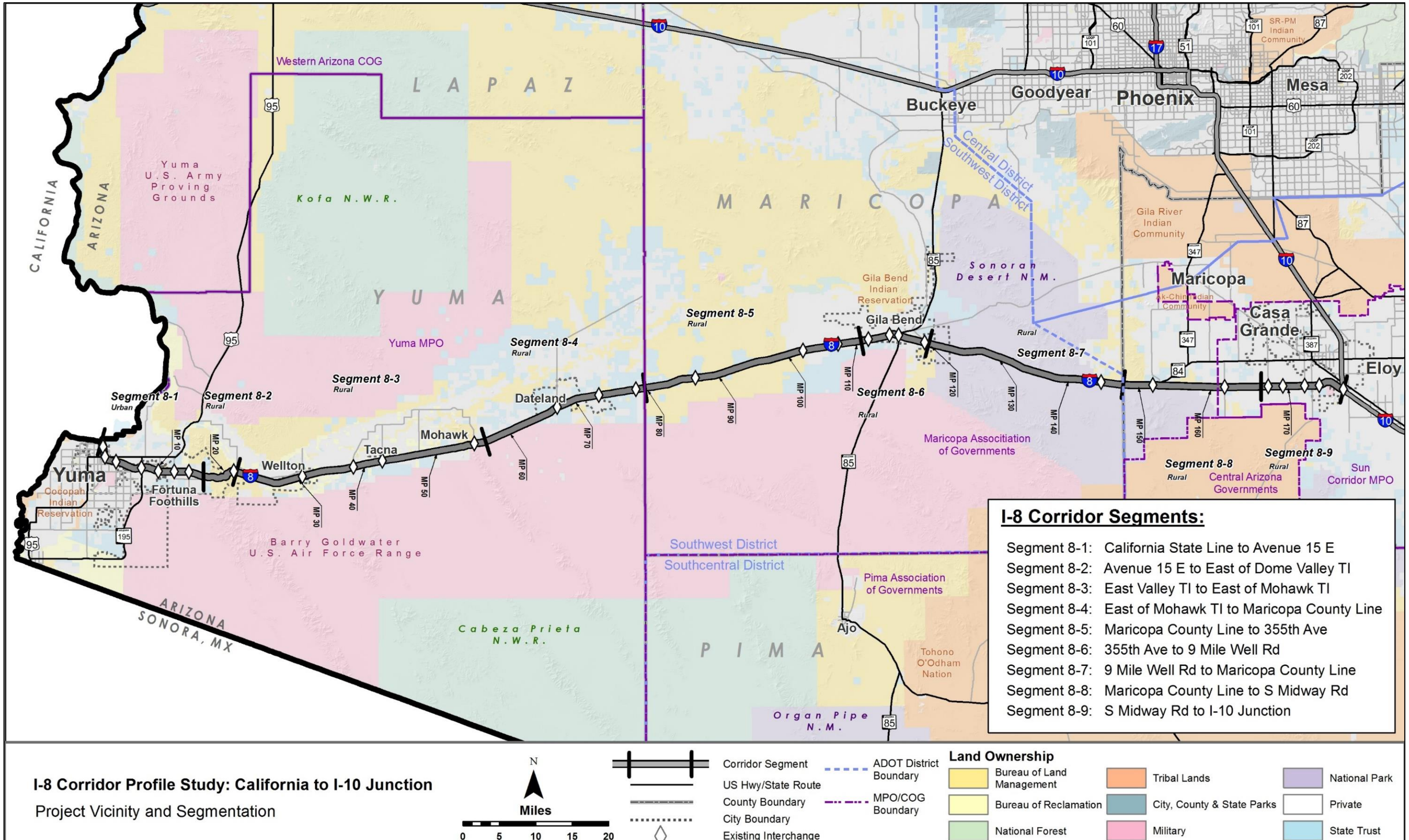
1.4 Corridor Segments

The I-8 corridor is divided into nine planning segments for analysis and evaluation. These planning segments allow the corridor to be analyzed at a detailed level so that location-specific needs can be readily identified and compared to other segments on this or other corridors. Segmentation by similar characteristics (e.g., urban/rural surroundings, road width, traffic volumes) allowed the analysis to highlight anomalies or instances of poor performance within the context of each segment. The corridor is segmented at logical breaks where context changes such as terrain, daily traffic volumes, or roadway typical section indicate. Additional segment breaks may occur at major intersections or junctions, where the corridor transitions from rural to urban environments, other similar operating environments, maintenance sections, and at jurisdictional changes. Corridor segments are described in **Table 1** and are shown in **Figure 2**.

Table 1: I-8 Corridor Segments

Segment #	Begin	End	Approx. Begin Milepost	Approx. End Milepost	Approx. Length (miles)	Typical Through Lanes (EB,WB)	2019 / 2040 Average Annual Daily Traffic Volume (vpd)	Character Description
8-1	California State Line	Avenue 15 E	0.0	16.3	16.3	2, 2	31,250 / 36,750	This segment starts at the California Border, traversing the urban area of Yuma and including seven traffic interchanges (TIs) for access. Within the limits, I-8 was constructed on new alignment away from old US 80, now Business 8 (B-8). At Avenue 9E, I-8 returns to the old US 80 alignment utilizing parallel frontage roads. Avenue15E serves as the Yuma city limit, with significant changes in terrain, level of development and traffic volumes.
8-2	Avenue 15 E	East of Dome Valley TI	16.3	21.4	5.1	2, 2	17,000 / 22,500	I-8 crosses through the mountainous terrain of Telegraph Pass, utilizing the old US 80 alignment. The US Border Patrol Station is also located in this section. One TI is located within Segment 8-2.
8-3	East of Dome Valley TI	East of Mohawk TI	21.4	56.5	35.1	2, 2	12,000 / 15,750	I-8 was constructed on a new alignment within this rural segment. Four TIs provide access to the local communities. The terrain is uniform except for the easternmost mile where Mohawk Pass allows a small mountain range to be crossed. There is little fluctuation in traffic numbers across this segment.
8-4	East of Mohawk TI	Maricopa County Line	56.5	79.6	23.1	2, 2	10,500 / 13,750	This segment is considered a rural operating environment and terminates at the Yuma County/Maricopa County line, which is also the break point between the Yuma Metropolitan Planning Organization (YMPO) and Maricopa Association of Governments (MAG). Beginning at the Mohawk TI, I-8 utilizes old US 80 as the eastbound roadway. Additionally, the county line has generally been used as a project limit. Two TIs are inclusive.
8-5	Maricopa County Line	355th Avenue	79.6	110.4	30.8	2, 2	11,250 / 15,000	This segment starts at the county line and ends at approximately the western limits of Gila Bend. This segment is differentiated by jurisdiction rather than any changes in terrain or traffic. Four TIs provide local access.
8-6	355th Avenue	9 Mile Well Road	110.4	120	9.6	2, 2	9,250 / 11,000	I-8 crosses the Gila Bend area between East and West TIs with a total of 4 TIs serving the area. The mainline roadway is on new alignment. Traffic numbers in this segment increase due to the B-8 and SR 85 junctions.
8-7	9 Mile Well Road	Maricopa County Line	120	147.6	27.6	2, 2	7,250 / 4,750	This segment runs from east Gila Bend to the Maricopa / Pinal County Line. One TI falls within the limits of Segment 8-7.
8-8	Maricopa County Line	S Midway Road	147.6	166.5	18.9	2, 2	6,250 / 10,500	This segment is defined by jurisdiction. Midway Road is assumed to be the western limits of Casa Grande development. The jurisdictional boundary between MAG and the Sun Corridor Metropolitan Planning Organization (SCMPO) occurs within this segment at approximately MP 160. Two TIs provide local access.
8-9	S Midway Road	Interstate 10	166.5	178	11.5	2, 2	8,000 / 17,000	This segment is defined as entering into the greater Casa Grande area. This segment terminates at the junction with I-10 and includes 5 TIs.

Figure 2: Corridor Location and Segments



1.5 Corridor Characteristics

The I-8 corridor provides movement for significant freight and recreation needs within Arizona. It serves intrastate, interstate, and international commerce linking the agriculturally rich Yuma area with California to the west and all points east. I-8 is a key link in the regional, statewide, and national freight network, collecting and distributing goods between Mexico, the west coast, and ports throughout the United States. It also serves as a major connection to recreational opportunities in Western Arizona, Southern California and Mexico.

National Context

I-8 is part of the National Highway System, traversing 345 miles between San Diego, California and Casa Grande, Arizona. It is designated as a national intercity truck route, a hazardous material route, and Key Commerce Corridor within Arizona, connecting west coast ports with Gulf coast ports and eastern markets. This route provides a more direct connection between I-10 east of Casa Grande and San Diego than following I-10 to Los Angeles. Within southern California, I-8 provides connectivity with access to I-5 and I-15, the Port of San Diego and the local military bases. It also runs parallel to the Barry M. Goldwater Air Force Range Complex, the nation’s third largest military reservation, covering approximately 1.7 million acres and used primarily for flight training.

Regional Connectivity

I-8 connects to US 95 and SR 195 in the Yuma area, SR 85 in Gila Bend, SR 84 just south of Maricopa which then connects to SR 347, and I-10 in Casa Grande. This connectivity provides regional access to major freight generators in southern and central Arizona with southern California and Mexico. Regional access is also provided for recreational opportunities along the Colorado River and in Southern California.

Commercial Truck Traffic

I-8 serves as a trade route for agricultural products grown in Yuma and the Gila River Valley, as well as for other statewide commerce needs, by providing access to west coast ports, Gulf Coast ports, and eastern markets. A concentration of major agricultural facilities is located in the Yuma area between Avenue 3E and Araby Road. Major distribution centers, such as Walmart, are also located in the Casa Grande area. The high volume of truck traffic on Avenue 3E and Araby Road creates congestion on the southern legs of these intersections. According to ADOT’s Highway Performance Monitoring System (HPMS) Location Report for 2019, the average daily commercial truck volumes along the corridor range from 450 – 2,350, with the higher frequencies closer to Yuma and I-10. One reason for the higher volume of commercial trucks near Yuma is the proximity to the San Luis Border Crossing. In addition, the Union Pacific Railroad (UPRR) also runs parallel to I-8 for much of the corridor, providing a major freight connection. Potential freight switching opportunities exist in both the Yuma and Casa Grande areas, providing an interface between rail freight, truck freight, and distribution centers.

The San Luis International Border Crossing is located less than 25 miles south of the City of Yuma via US 95. In 2021, this was the second busiest entry in terms of total number of loaded truck containers processed, accounting for approximately 10% of all international truck crossings within the State. The San Luis International Border Crossing was also the busiest crossing for personal vehicles and total pedestrians and accounted for over 40% of all personal vehicle crossings (Bureau of Transportation Statistics, 2021). 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 Secure Electronic Network for Travelers Rapid Inspection (SENTRI) Lanes. A second 80-acre commercial vehicle check point facility is five miles east of the original POE and is designed to process 150 trucks per day with the potential to expand to 650 trucks per day by 2030.

One permanent border checkpoint is located just east of Avenue 15E. Another checkpoint that is occasionally used is located just west of the Yuma/Maricopa County line. Both locations require all vehicles to stop for inspection, creating delay with commercial truck traffic.

One weigh-in-motion (WIM) station is located on I-8 just east of the California State Line. A WIM station allows for commercial truck traffic to utilize the scales but with reduced delay. There are four additional WIM traffic counters installed along the interstate corridor.

Commuter Traffic

Commuter traffic on I-8 occurs mostly within the urbanized areas of Yuma and Casa Grande, which are the primary economic centers along the corridor. According to ADOT’s most recent data, traffic volumes range from approximately 51,000 vehicles per day in the Yuma area to approximately 14,000 vehicles per day in the Casa Grande area. Within the Yuma area, the commuter traffic generally occurs between downtown Yuma and Fortuna Foothills, which lies entirely within Segment 8-1 of this CPS.

Additionally, there is a significant amount of military related uses in the Yuma region, with the Barry M. Goldwater Air Force Range Complex and the Marine Corps Air Station in the vicinity.

Recreation and Tourism

I-8 provides access to recreational opportunities along the Colorado River and in Southern California. Many recreational users travel I-8 to access the sand dunes just west of Yuma and the Colorado River in several areas along US/SR 95. This creates a mix of vehicle types on I-8, as many recreational vehicles with trailers use the route.

The Sonoran Desert National Monument is also located in the I-8 corridor between Gila Bend and Casa Grande. Motorists utilize I-8 to access SR 85 when traveling south to Organ Pipe National Monument and the border crossing with Mexico at Lukeville, which provides access to the Mexican port city of Puerto Peñasco.

Multimodal Uses

Freight Rail

The UPRR operates the historic Sunset Route connecting Los Angeles California to El Paso Texas. A major platform is located in Yuma, a legendary railroad town, and the railroad travels through Casa Grande. Nearly two-thirds of the Sunset Route is double-tracked to support the growing freight demand in the Southwest region. Moreover, the Sunset Route is a key corridor for North American railroads, carrying about 20 percent of all railroad traffic.

Passenger Rail

Amtrak operates one platform from Yuma. The Sunset Limited Route travels between Louisiana and California, with three trains departing weekly. The Texas Eagle Route, which runs from Chicago to San Antonio & Los Angeles, can also be accessed from the Sunset Limited Route.

Bicycles/Pedestrians

Bicycles are permitted to use the shoulders along I-8, which are generally 10 feet wide, although several bridges have a width that is less than 4 feet. Pedestrians are prohibited on this route.

Bus/Transit

The largest regional public transportation service provider along the I-8 corridor is the Yuma County Intergovernmental Public Transportation Authority with the Yuma County Area Transit (YCAT). YCAT provides nine fixed routes, a vanpool open to any commuter group in the county, an on-call demand service for individuals living with a disability, and a nighttime shuttle specifically serving colleges in the area. YCAT services connect Yuma to San Luis in the south and to the Town of Wellton to the east via I-8. YCAT also provides connections to and from the Greyhound stops in Yuma.

Greyhound operates two stops in Yuma, one along Castle Dome Avenue at the Yuma Palms Regional Center and the other just east at 14th Avenue. These stops service Greyhound Route 580, between El Paso and Los Angeles. The route has additional stops in Gila Bend and Casa Grande.

Aviation

Municipal airports along the corridor are located in Eloy and Gila Bend, with a larger airport located in Yuma, just south of I-8. The predominant use of the Eloy Airfield is for skydiving and regional crop dusting. The Gila Bend Airport has no permanently located aircraft and approximately ten operations per day. The Yuma International Airport is used for military aviation, commercial travel, and medical transport, as well as for general aviation purposes. The Yuma International Airport is currently served by one commercial airline, American Airlines, and provides up to four round-trip flights daily, three between Yuma and Phoenix Sky Harbor Airport (PHX), and one to Dallas-Fort Worth (DFW).

Land Ownership, Land Uses and Jurisdictions

As shown **Table 2**, I-8 crosses multiple jurisdictions and land holdings throughout Yuma, Maricopa, and Pinal Counties. A majority of the land west of Gila Bend is a checkerboard of private and State Trust land, with some Bureau of Land Management (BLM) ownership. East of Gila Bend, the corridor is predominantly National Park land, the Sonoran Desert National Monument, until just west of Casa Grande, where it again traverses a checkerboard of private and State Trust land. In the vicinity of the corridor, but not immediately adjacent to I-8, there are significant military and tribal lands. Much of the military, tribal, and national parks lands are open space. Occurrences where these areas have been utilized by drug traffickers and smugglers have been noted, which can cause abrupt crossings of I-8 at unmarked locations.

Population Centers

The major population centers within the I-8 corridor are centered around the urbanized areas of Yuma and Casa Grande. **Table 2** provides a summary of the US Census population and the state growth forecasts for the communities along I-8. The urbanized area of Yuma is experiencing growth trending to the east, along the I-8 corridor, with increases in the Fortuna Foothills area and beyond into the Wellton region. The small community of Gila Bend is at a major transportation junction and expects 41% growth in population between 2010 to 2040. Casa Grande serves as a major transportation hub at the junction of I-10 and I-8, and is an important center to Pinal County. It is currently experiencing significant growth in both population and employment opportunities, particularly focused in commercial and industrial development.

Table 2: Current and Future Population

Community	2010 Population	2020 Population	2040 Population	% Change 2010 – 2040	Total Growth
Yuma County	**195,751**	**203,881**	**296,030**	**34%**	**100,279**
Yuma	93,064	97,093	129,960	28%	36,896
Fortuna Foothills	26,265	27,776	33,360	21%	7,095
Wellton	2,882	3,345	4,668	38%	1,786
Tacna	602	629	594	-1%	-8
Maricopa County	**3,817,117**	**4,420,568**	**5,712,000**	**33%**	**1,894,883**
Gila Bend	1,900	2,200	3,200	41%	1,300
Pinal County	**376,369**	**425,264**	**820,877**	**54%**	**444,508**
Casa Grande	48,664	53,891	92,880	48%	44,216
Eloy	16,657	15,136	71,918	77%	55,261

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

Major Traffic Generators

Within the Yuma and Casa Grande areas, major traffic generators are related to freight, including agricultural and industrial traffic, as well as some military-related traffic in the Yuma area. Outside of the study area, major traffic generators are the southern California ports and the San Luis Border Crossing, which generate significant freight traffic on I-8. Additionally, recreational opportunities along the Colorado River, both near Yuma and further north to Parker, generate traffic on I-8.

Tribes

Tribal land within the vicinity of the I-8 corridor includes the Tohono O'Odham Nation and the Gila Bend Indian Reservation.

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 information included in the SWAP, the following were identified in relation to the I-8 Corridor:

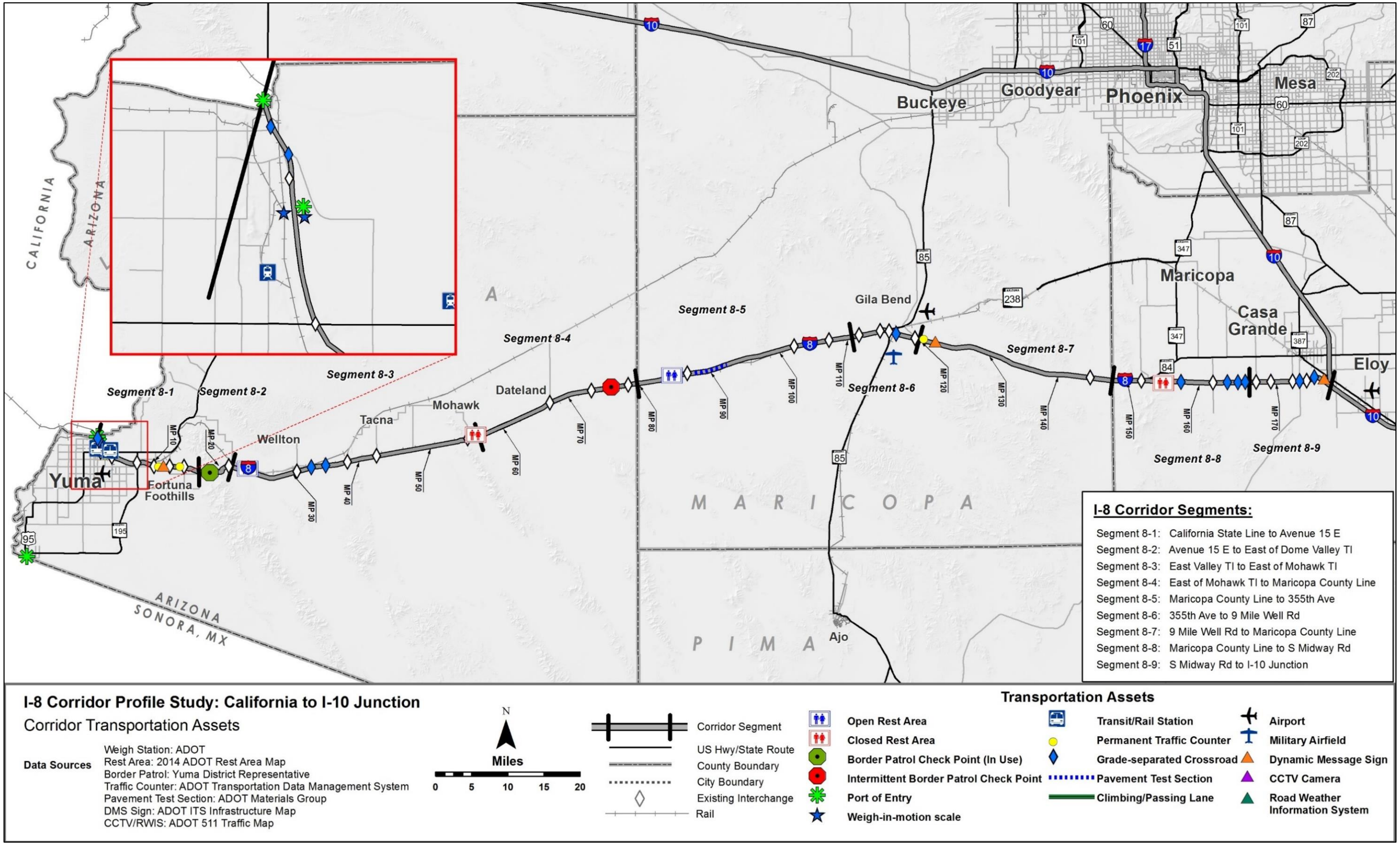
- Wildlife waters exist to the north and south of I-8 between SR 84 and Gila Bend.
- I-8 travels through allotments/pastures from just east of SR 84 to Gila Bend, and periodically from west of Gila Bend to east of Dateland. This roughly corresponds to the area controlled by the BLM.
- Some State Land holdings are present, primarily from just east of Gila Bend to Wellton.
- Arizona Wildlife Linkages – potential linkage zones exist along I-8 between MP 39 and MP 100 (Linkage No. 72), as well as crossing I-8 in the vicinity of MP 8-MP 9 (Linkage No. 70). Habitat fracture zones are identified from the California border to MP 18 (with the exception of MP 8-MP 9), MP 21-MP 39, MP 100-MP 120 and MP 150 to I-10.
- Species and Habitat Conservation Guide – indicates sensitive habitats in the vicinity of South Maricopa Mountains Wilderness, just north of I-8 to the east of Gila Bend, and along the Gila River in the vicinity of Wellton and Tacna.
- Species of greatest conservation need are identified in the vicinity of SR 84 and the Sonoran Desert National Monument.
- A moderate level of "species of economic and recreational importance" are identified along I-8 to the north from Casa Grande to the riparian area west of Gila Bend.

Corridor Assets

Corridor transportation assets are summarized in **Figure 3.** The majority of assets are located along the more densely populated portions of the corridor through Yuma and Casa Grande areas. There are two ports of entry, two weigh-in-motion scales and two transit/rail stations in Yuma, all of which are assets not provided elsewhere along the corridor. Additionally, near the eastern section of the corridor, beginning around MP 160 and continuing to I-10, is one Dynamic Message Sign (DMS), five grade-separated crossroads and five existing interchanges. This area has a higher concentration of grade-separated crossroads and existing interchanges than any other along the corridor.

The portion of the corridor between Yuma/Fortuna Foothills and MP 160 is generally more rural and the existing assets are predominately grade-separated crossroads and existing interchanges. This stretch of corridor, which is roughly 140 miles, includes one open rest area, one Border Patrol check points, one permanent traffic counter and one DMS.

Figure 3: 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 will continue with key stakeholders between February 2022 and March 2023 to present the results and obtain feedback.

Key stakeholders identified for this study included:

- ADOT Southwest District
- ADOT Southcentral District
- ADOT Technical Groups
- Yuma Metropolitan Planning Organization (YMPO)
- Central Arizona Governments (CAG)
- Sun Corridor Metropolitan Planning Organization (SCMPO)
- Arizona Game and Fish Department (AGFD)
- Arizona State Land Department (ASLD)
- Federal Highway Administration (FHWA)

Several Working Papers were developed during the course of 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 I-8 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

- 5 Year 2023-2027 Transportation Facilities Construction Program (ADOT)
- Statewide Bicycle and Pedestrian Plan Update (ADOT)
- Pedestrian Safety Action Plan, 2017 (ADOT)
- Climbing and Passing Lane Prioritization Study, 2015 (ADOT)
- Arizona Key Commerce Corridors, 2013 (ADOT)
- Arizona Multimodal Freight Analysis Study, 2008 (ADOT)
- Arizona State Freight Plan, 2016 (ADOT)
- Update to the Arizona State Freight Plan, 2022 (ADOT)
- Arizona Port of Entry Study, 2014 (ADOT)
- Arizona Roadway Departure Safety Implementation Plan, 2014 (ADOT)
- Arizona State Airport System Plan, 2018 (ADOT)
- Arizona State Rail Plan, 2011 (ADOT)
- Arizona Statewide Dynamic Message Master Plan, 2011 (ADOT)
- Arizona Statewide Rail Framework Study, 2010 (ADOT)
- Arizona Statewide Truck Parking Study, 2019
- Arizona Statewide Travel Demand Model (AZTDM)
- Arizona Wildlife Action Plan / Arizona Wildlife Linkages Assessment, 2012
- Wildlife Vehicle Conflict Study, 2020 (ADOT)
- Tentative Arizona Wildlife Conservation Strategy (AWCS)
- Building a Quality Arizona (BQAZ)
- Bureau of Land Management Travel Management Plan
- What Moves You Arizona? Long-Range Transportation Plan 2016-2040, 2018 (ADOT)
- Arizona Truck Parking Study, 2019 (ADOT)
- Arizona Strategic Traffic Safety Plan, 2019 (ADOT)
- Arizona Statewide ITS Architecture, 2018 (ADOT)
- Statewide Stormwater & Erosion Control Study, 2020 (ADOT)
- Detection and Warning Systems for Wrong-Way Driving, 2015 (ADOT)

Regional Planning Studies

- 2040 RTP, 2020 (SCMPO)
- I-8 Multi Modal Corridor Profile (ADOT)
- Interstate 11 (I-11) Southern Arizona Future Connectivity Corridor Feasibility Assessment Report (ADOT)
- Arizona – Sonora Border Master Plan, 2013
- Bi-National Border Transportation Infrastructure Needs Study (FHWA)
- Casa Grande Downtown Circulation Study (Casa Grande)
- Casa Grande General Plan 2030 (Casa Grande)
- City of Yuma Transportation Master Plan, 2014 (Yuma)
- Comprehensive Plan, 2019, updated 2021 (Pinal County)
- Draft Listing of Projects FY 2014-2035 (SCMPO)
- Freight Transportation Framework Plan, 2017 (MAG)
- I-8 and I-10/Hidden Valley Transportation Framework Study, 2009 (MAG)
- Momentum 2050, 2021 (MAG)
- Rail Corridor Study, 2013 (Yuma County)
- Regional Transportation Plan (RTP), 2015 (CAG)
- Regionally Significant Routes for Safety and Mobility Study, 2008 (Pinal County)
- Open Space and Trails Master Plan, 2007 (Pinal County)
- RTP 2022-2045 (YMPO)
- Short Range Transit Plan, 2021 (YCIPTA/YMPO)
- Transit Feasibility Study, 2011 (Pinal County)
- Town of Gila Bend General Plan 2026, 2017 (Gila Bend)

Planning Assistance for Rural Areas and Small Area Transportation Studies

- Yuma Expressway Study, 2013 (ADOT)
- Transportation Needs for the Foothills and Mesa Del Sol Areas, 2012 (ADOT/YMPO)
- Casa Grande SATS, 2008
- Pinal County SATS, 2006
- Pinal County Transit Element Report, 2006
- Southern Pinal County Regional Corridor Study, 2015
- Southern Pinal/Northern Pima Corridor Definition Study, 2007
- Wellton Transportation Long-Range Plan, 2011 PARA
- Regional Transit Study PARA, 2012 (Yuma)

Design Concept Reports and Project Assessments

- I-10 Jct. I-8 to Tangerine Road DCR
- SR 85 Gila Bend TI DCR
- I-8 at MP 17 Telegraph Pass PA
- I-10 Val Vista – Jct. I-8 PA
- I-8 Araby Road TI DCR
- I-8 Henness Road TI DCR

Summary of Prior Recommendations

Various studies and plans, including several DCRs, have recommended improvements to the I-8 Corridor as shown in **Table 3** and **Figure 4**. Many of these recommendations have already been implemented or programmed for completion.

- Widening of numerous sections of I-8, some of which will require right-of-way acquisition.
- Major TI improvements
- Addition of DMS infrastructure
- Addressing Bridge Vertical Clearance
- Acceleration & Deceleration Lanes

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	0	0	-	I-8 Colorado River Bridge Deck Rehab	√			-	-	N	
2	1	1	-	I-8 Port of Entry facility improvements	√	√		-	-	N	AZ Ports of Entry Study
3	2	2	-	Addition of eastbound DMS at CA state line		√		-	-	N	Arizona Statewide Dynamic Message Master Plan
4	2	12	10	I-8 Widening, 16th Street to Fortuna (6 lanes)			√	Buildout	-	N	City of Yuma Transportation Master Plan
5	7	7	-	I-8 Interchange Improvements: SR 195		√		FY 2037-41	-	N	Yuma Metropolitan Planning Organization Regional Transportation Plan – 2022-2045
6	7.6	7.6	-	New east-west freeway in Yuma, connecting to I-8			√		-	N	BQAZ
7	12.2	12.2	-	I-8 Interchange Improvements: Fortuna Road		√		FY 2037-41	N/A	N	Yuma Metropolitan Planning Organization Regional Transportation Plan – 2022-2045
8	14.2	14.2	-	I-8 Interchange Improvements: Foothills Boulevard		√		FY 2042-45	N/A	N	Yuma Metropolitan Planning Organization Regional Transportation Plan – 2022-2045
9	16.2	16.2	-	I-8, Ave 15E (New TI)			√	Buildout	-	N	Transportation Needs for the Foothills & Mesa Del Sol Areas
10	18	20	2	Addition of eastbound climbing lane			√	Low priority (Tier 3)	-	N	ADOT Climbing and Passing Lane Prioritization Study
11	20	35	15	I-8 Widening (6 lanes)			√	2033	-	N	Wellton Transportation Long Range Plan
12	18.84	20.95	2.11	Addition of Westbound Climbing Lane – High Priority			√	-	-		ADOT Climbing and Passing Lane Prioritization Study
13	21.06	21.06	-	Dome Valley Rd TI WB UP (#1325) Bridge Vertical Clearance Mitigation – Re-profile roadway (A)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
14	21.06	21.06	-	Dome Valley Rd TI WB UP (#1325) Bridge Vertical Clearance Mitigation – Replace bridge (B)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
15	22	56	34	Wellton-Mohawk Safety Improvements – Speed Feedback Signs and Installation of Lighting		√		-	-	N	I-8 Corridor Profile Study (2017)
16	27	27	-	I-8, Ave 25E (New TI)			√	2033	-	N	Wellton Transportation Long Range Plan
17	30	30	-	I-8, Ave 29E (Reconstruct TI)		√		2033	-	N	Wellton Transportation Long Range Plan
18	33	33	-	I-8, Ave 31E (New TI)			√	2033	-	N	Wellton Transportation Long Range Plan
19	36	36	-	Addition of eastbound DMS at S Ave 36 E		√		-	-	N	Arizona Statewide Dynamic Message Master Plan
20	36	36	-	Addition of westbound DMS at S Ave 36 E		√		-	-	N	Arizona Statewide Dynamic Message Master Plan
21	71	82	11	I-8 from W of Aztec to E of Aztec – Pavement Rehab	√			FY24	F034401C	N	ADOT 5-Year Program 2023-2027
22	115	115	-	Addition of eastbound DMS at SR-85		√		-	-	N	Arizona Statewide Dynamic Message Master Plan
23	116	178	62	Widen I-8 from 4 to 6 lanes			√	-	-	N	Key Commerce Corridors

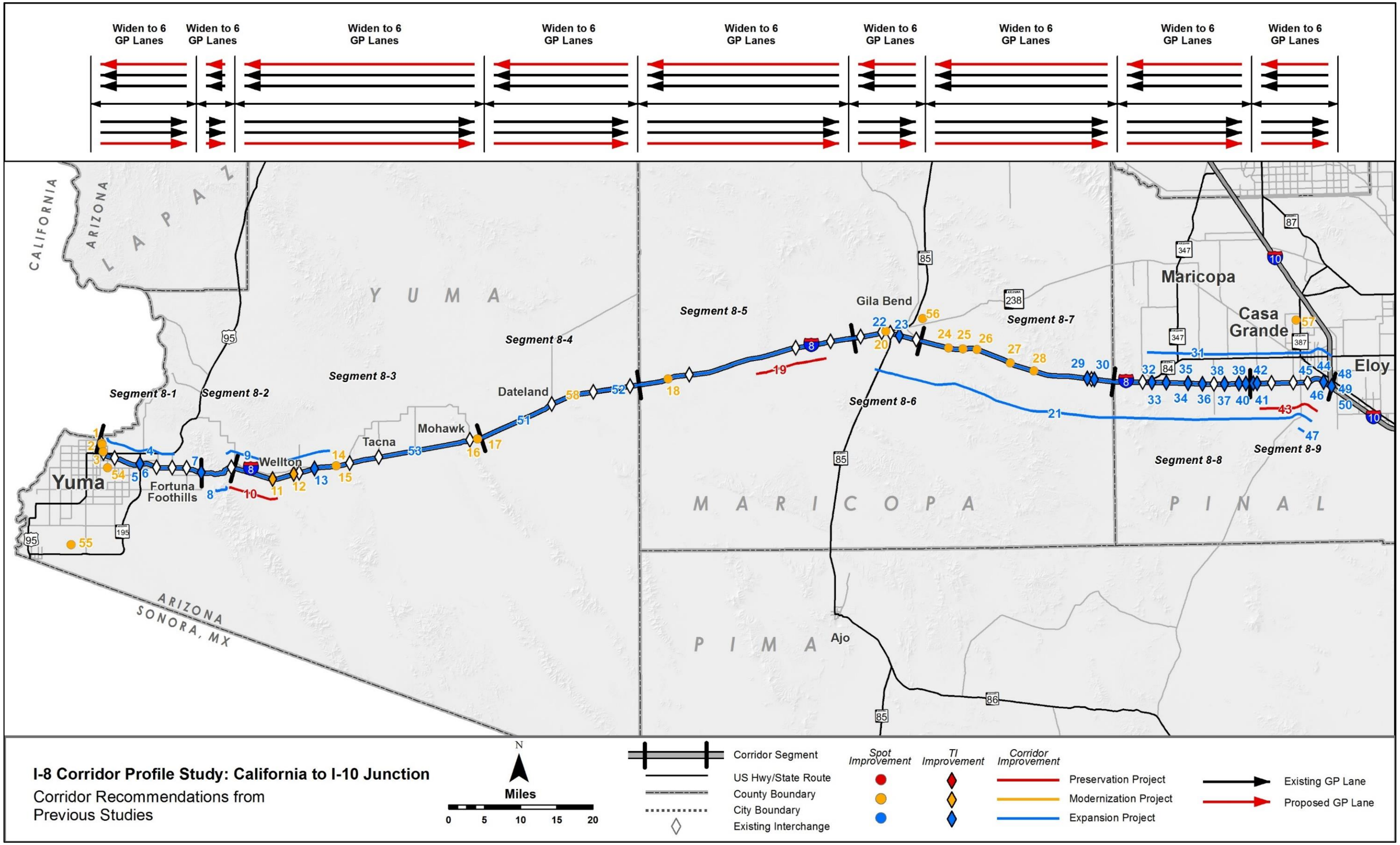
Table 3: Corridor Recommendations from Previous Studies (continued)

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)?	
24	117	117	-	Upgrade of I-8/SR-85 interchange (to accommodate SR-85 freeway)			√	Beyond 2035	-	N	Maricopa Association of Governments (MAG) 2035 RTP, MAG I-8/I-10 Hidden Valley Transportation Framework Study
25	124	124	-	I-8 Accelerate/Decelerate Lane with Cattleguard and sign (southbound)		√		-	-	Y	Bureau of Land Management Travel Management Plan and EA
26	128	128	-	I-8 Accelerate/Decelerate Lane with Cattleguard and sign (northbound) (MP 128)		√		-	-	Y	Bureau of Land Management Travel Management Plan and EA
27	133	133	-	I-8 Accelerate/Decelerate Lane with Cattleguard and sign (northbound)		√		-	-	N	Bureau of Land Management Travel Management Plan and EA
28	134.6	141.1	6.5	I-8 from MP 135 to County Line – Pavement Rehab	√			FY23	F038801C	N	ADOT 5-year 2023-2027
29	136.5	136.5	-	I-8 Accelerate/Decelerate Lane with Cattleguard and Sign		√		N/A	N/A	N	Bureau of Land Management Travel Management Plan and EA
30	144	144	-	Addition of I-8 interchange at Veko Valley Rd			√	N/A	N/A	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
31	144.5	144.5	-	Vekol Road TI UP (#550) Bridge Vertical Clearance Mitigation – Re-profile roadway (A)		√		N/A	N/A	N	I-8 Corridor Profile Study (2017)
32	144.5	144.5	-	Vekol Road TI UP (#550) Bridge Vertical Clearance Mitigation – Replace Bridge (B)		√		N/A	N/A	N	I-8 Corridor Profile Study (2017)
33	145	145	-	Addition of freeway to freeway interchange (to accommodate SR-303L freeway upgrade)			√	N/A	N/A	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
34	152	178	26	I-8, widening from SR-347 to I-10 (6 lanes)			√	2030	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
35	153	153	-	Addition of I-8 interchange at Ratson Rd			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
36	155	155	-	Addition of I-8 interchange at Green Rd			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
37	158	158	-	Addition of I-8 interchange at John Wayne Pkwy (proposed)			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
38	158	158	-	Permit for Smith Road under I-8 Overpass (northbound and southbound)		√		-	-	N	Bureau of Land Management Travel Management Plan and EA
39	160	160	-	Addition of I-8 interchange at Fuqua Rd			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
40	161.6	161.6	-	Stanfield Rd TI UP (#1090) Bridge Vertical Clearance Mitigation - Re-profile roadway (A)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
41	161.1	161.6	-	Stanfield Rd TI UP (#1090) Bridge Vertical Clearance Mitigation – Replace Bridge (B)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
42	162.5	162.5	-	Murphy Rd UP (#1091) Bridge Vertical Clearance Mitigation – Re-profile roadway (A)		√		-	N/A	N	I-8 Corridor Profile Study (2017)

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)?	
43	162.5	162.5	-	Murphy Rd UP (#1091) Bridge Vertical Clearance Mitigation – Replace Bridge (B)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
44	163	163	-	Addition of I-8 interchange at Anderson Rd			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study, Casa Grande SATS/General Plan
45	165	165	-	New interchange at I-8/Indian Valley			√	-	-	N	Casa Grande General Plan
46	166	166	-	Addition of I-8 interchange at Russell Rd			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
47	167	167	-	New system interchange at I-8/Montgomery			√	-	-	N	Casa Grande SATS/GP
48	167.5	167.5	-	Addition of freeway to freeway interchange (to accommodate SR-303L freeway upgrade)			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study
49	169.5	178	8.5	Pavement preservation from Bianco Rd to I-10	√			2016	-	N	Sun Corridor MPO Draft Listing of Projects 2014-2035
50	172.5	172.5	-	Thornton Rd TI UP (#1196) Bridge Vertical Clearance Mitigation – Rehabilitate the bridge / Re-profile the roadway (A)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
51	172.5	172.5	-	Thornton Rd TI UP (#1196) Bridge Vertical Clearance Mitigation – Replace the bridge (B)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
52	173.5	173.5	-	Chuichu Rd UP (#1197) Bridge Vertical Clearance Mitigation – Re-profile roadway to achieve 16.5 feet vertical clearance (A)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
53	173.5	173.5	-	Chuichu Rd UP (#1197) Bridge Vertical Clearance Mitigation – Replace Bridge to achieve 16.5 feet vertical clearance (B)		√		-	N/A	N	I-8 Corridor Profile Study (2017)
54	177	177	-	New interchange of I-8/Henness			√	-	-	N	Casa Grande SATS/GP
55	177	177	-	Addition of I-8 interchange at Henness Rd			√	-	-	N	MAG I-8/I-10 Hidden Valley Transportation Framework Study, Sun Corridor MPO Draft Listing Projects
56	177	178	1	South frontage road from Henness to Cox Rd			√	2030	-	N	Sun Corridor MPO Draft Listing of Projects
57	178	178	-	Upgrade of I-8/I-10 interchange			√	-	-	N	ADOT I-10 Corridor Study, Junction I-8 to Tangerine Rd DCR, ADOT Key Commerce Corridors, MAG I-8/I-10 Hidden Valley Transportation Framework Study
58	-	-	-	Widen interstate highways to six lanes in rural Arizona			√	-	-	N	BQAZ
59	1	115	115	Intercity bus along I-8 from Gila Bend to Yuma. (2050)			√	-	-	N	BQAZ
60	1	115	115	Passenger rail along existing rail line from Gila Bend to Yuma (2050)			√	-	-	N	BQAZ
61	0	79	79	Various recommendations for improving safety associated with roadway departure incidents		√		-	-	N	Arizona Roadway Departure Safety Implementation Plan

Figure 4: Corridor Recommendations from Previous Studies



2.0 CORRIDOR PERFORMANCE

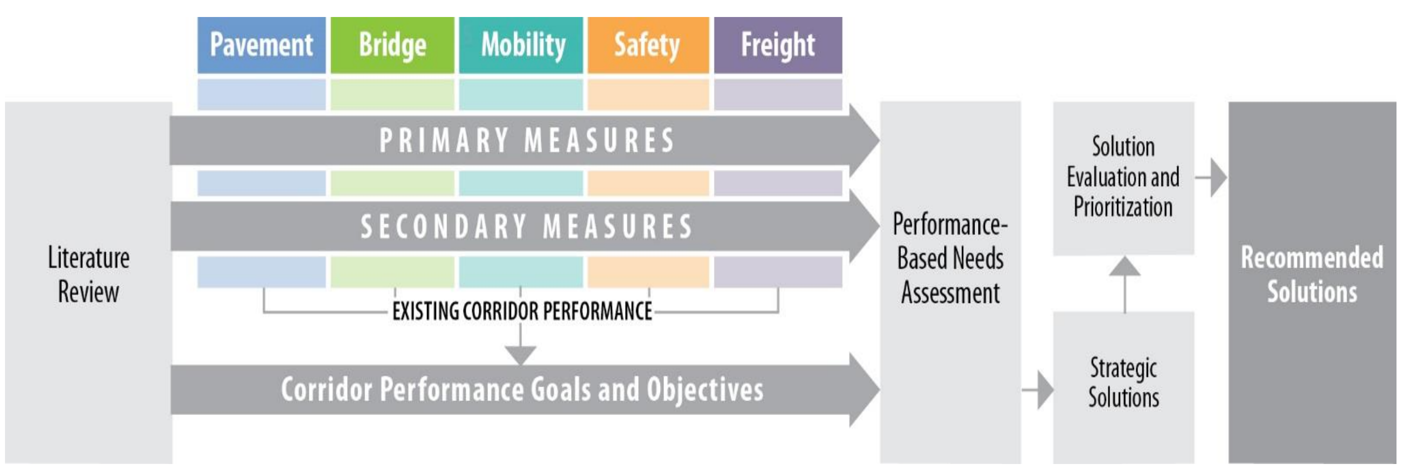
This chapter describes the evaluation of the existing performance of the I-8 Corridor. A series of performance measures is used to assess the corridor. The results of the performance evaluation are used to define corridor needs relative to the long-term goals and objectives for the corridor.

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

In 2015, the Fixing America's Surface Transportation Act (FAST Act) was passed. The FAST Act continued to emphasize the performance management approach identified in MAP-21 but included additional provisions for meeting established performance targets.

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.

While these performance areas were established prior to the earlier rounds of the CPS program, several related federal and ADOT reporting measures and targets were not yet in place at that time. These measures and targets have since been established (subsequent to completion of the prior CPS rounds). As such, it became necessary to revisit and revise the CPS performance measures to be more consistent with the latest federal and ADOT reporting measures and targets.

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

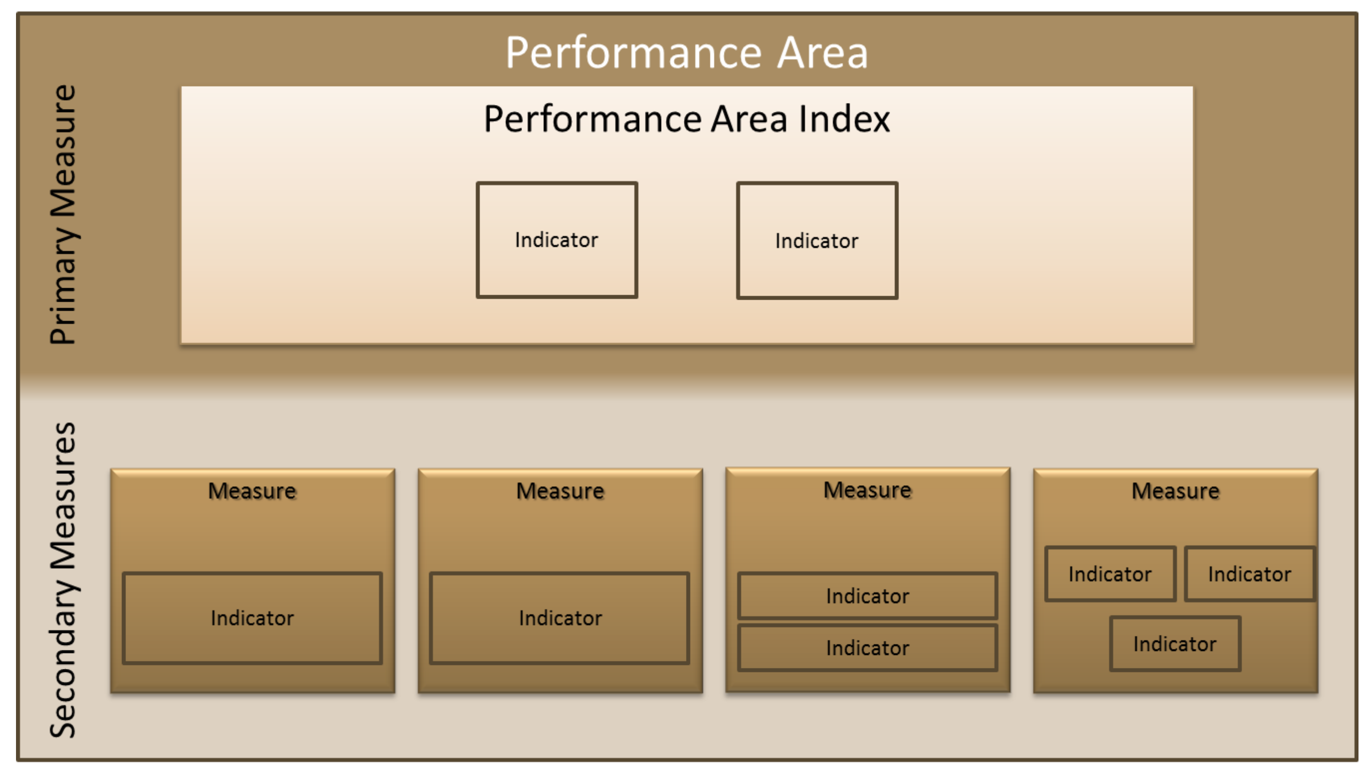
Performance Area	Primary Measure	Secondary Measures
Pavement	**Pavement Index** Based on a combination of International Roughness Index, cracking, and rutting	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** Based on lowest of deck, substructure, superstructure and structural evaluation rating	• Bridge Sufficiency • 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 suspected serious injury crashes	• Directional Safety Index • Strategic Traffic Safety Plan Emphasis Areas • Other Crash Unit Types • Safety Hot Spots
Freight	**Freight Index** Based on bi-directional truck travel time reliability	• Travel Time Reliability • 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

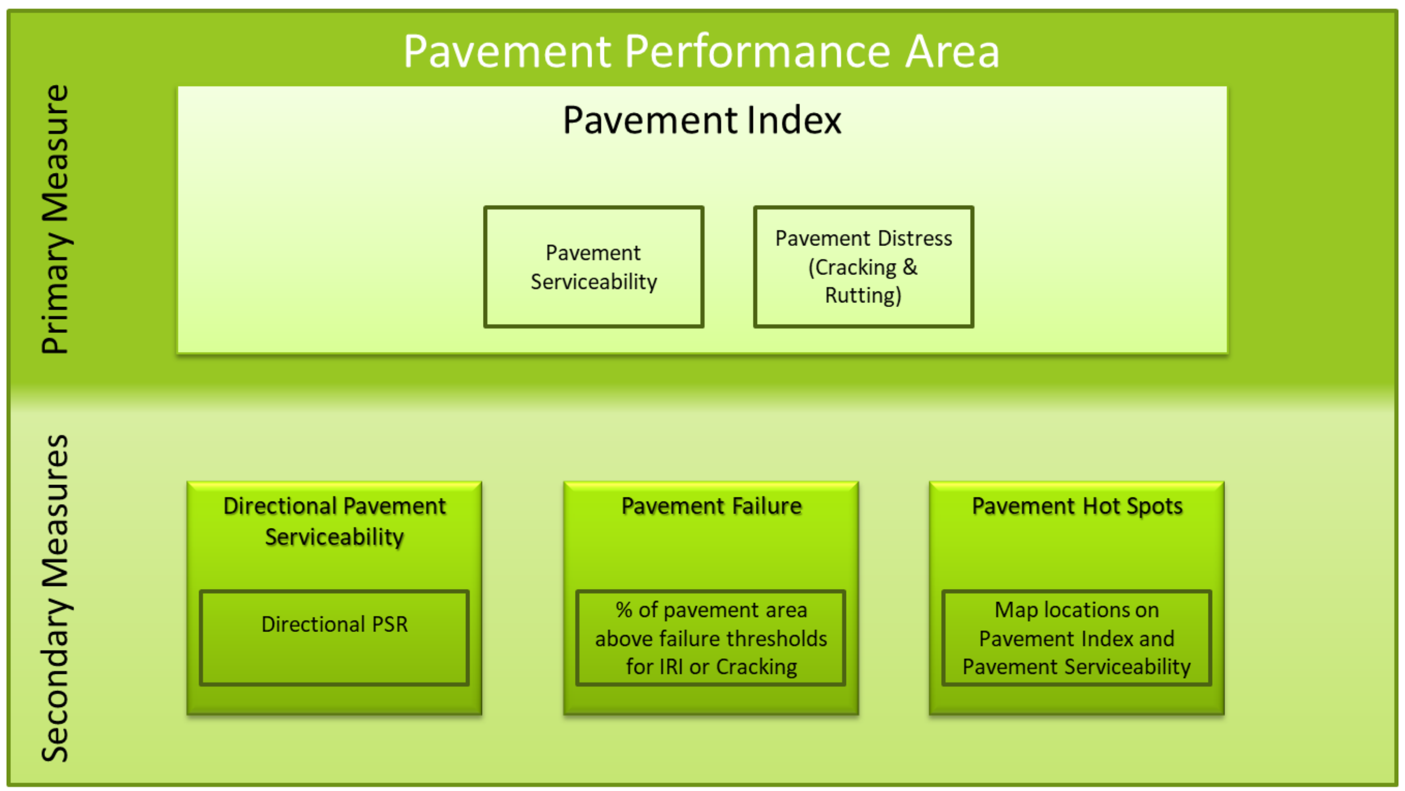


2.2 Pavement Performance Area

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 I-8 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.**

This CPS is an update to a previously completed report. The performance measures and performance thresholds have been revised from the previous version. For the Pavement performance area, the new methodology includes the use of Rutting data and the performance thresholds have been slightly modified.

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) and Rutting Rating, field-measured samples 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 I-8 Corridor, the following operating environments were identified:

- 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, Cracking, or Rutting

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:

- Overall, based on the weighted average of the Pavement Index, the pavement is in "good" condition.
- According to the Pavement Index, the entire corridor's pavement is in "good" condition except Segments 8-3, 8-6, and 8-7 which as "fair" performance.
- Greater than 50% of the pavement for Segment 8-6 is considered to be in failure. Segments 8-1, 8-3, 8-4, and 8-7 also have significant pavement failure.

- The Directional PSR performance is "good" with the exception of "fair" performance in both directions for Segments 8-6, and Segments 8-3, and 8-4 in the EB direction.
- Pavement hot spots include:
    - Segment 8-1 EB/WB MP 0-1, WB MP 1-4, WB MP 6-11
    - Segment 8-2 WB MP 17-18
    - Segment 8-3 WB MP 29-30, EB/WB 31-32, WB MP 32-34, EB/WB MP 34-46
    - Segment 8-4 EB MP 71-72, EB/WB MP 72-78, WB MP 78-79, EB/WB MP 79-80
    - Segment 8-5 EB/WB MP 80-82, EB MP 107-109, EB/WB MP 109-110
    - Segment 8-6 EB/WB MP 110-111, WB MP 111-113, EB/WB MP 113-114, WB MP 114-115, EB/WB MP 116-118, EB MP 118-119
    - Segment 8-7 EB MP 121-123, WB MP 123-124, EB MP 124-125, EB/WB MP 125-127, EB MP 127-130, EB/WB MP 130-131, EB MP 131-132, WB MP 134-135, EB/WB MP 135-141
    - Segment 8-9 EB MP 178-179

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

Table 5: Pavement Performance

Segment	Segment Length (miles)	Pavement Index	Pavement Serviceability		% Area Failure
			Dir 1 (EB)	Dir 2 (WB)	
8-1	16.3	4.02	4.03	4.13	31%
8-2	5.1	4.02	3.94	4.07	10%
8-3	35.1	3.79	3.69	3.82	42%
8-4	23.1	4.00	3.71	4.05	35%
8-5	30.8	4.41	4.22	4.34	13%
8-6	9.6	3.32	3.62	3.43	60%
8-7	27.6	3.70	3.84	3.88	48%
8-8	18.9	4.67	4.39	4.41	0%
8-9	11.5	4.26	3.86	4.02	4%
Weighted Corridor Average		4.04	3.93	4.04	29.3%
SCALES					
Good		> 3.75	> 3.75		< 5%
Fair		3.00 - 3.75	3.40 - 3.75		5% - 20%
Poor		< 3.00	< 3.40		> 20%

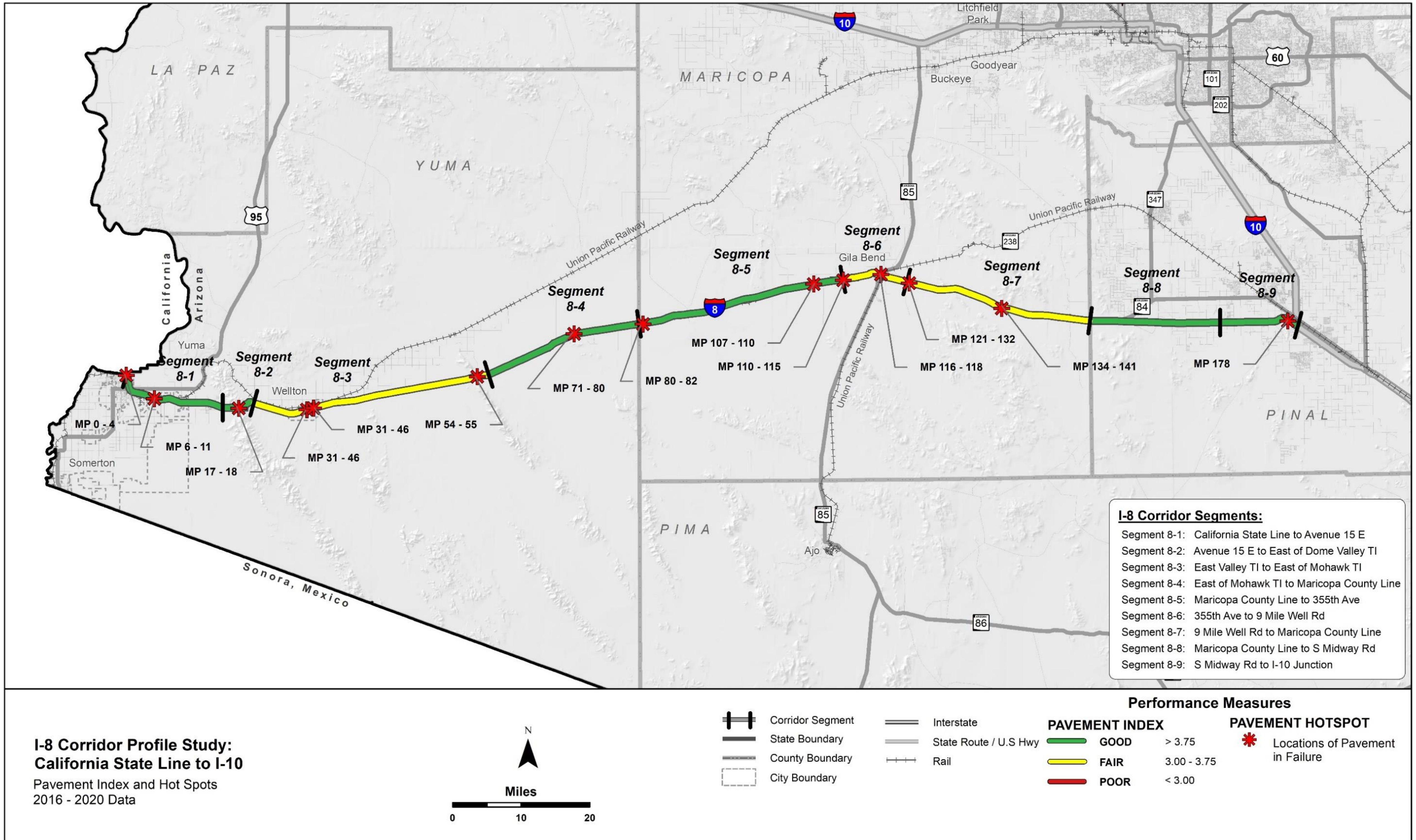
Statewide Transportation Asset Management Plan

Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21), identified national transportation system goals. The transportation asset management regulations associated with the infrastructure condition goals required the development of a Transportation Asset Management Plan (TAMP) covering National Highway System (NHS) bridges and pavements. As part of the statewide TAMP, ADOT developed pavement performance metrics and thresholds in compliance with federal tracking and reporting requirements, as shown in **Table 6**. The thresholds shown in **Table 6** are the basis for the TAMP and ADOT's federal reporting and are different than those used in this CPS, which are based on ADOT's Pavement Management System, as shown in **Table 5**. The TAMP reports asset condition information in the aggregate at the statewide level and applying the thresholds shown in **Table 6** would result in different segment-level performance than shown in **Table 5**.

Table 6: Statewide TAMP Metrics

Metric	Good	Fair	Poor
IRI (in./mile)	< 95	95-170	> 170
Cracking (%)	< 5	5-20 (asphalt) 5-15 (jointed concrete) 5-10 (cont. reinforced concrete)	> 20 > 15 > 10
Rutting (in.)	< 0.20	0.20–0.40	> 0.40
Faulting (in.)	<0.10	0.10-0.15	> 0.15

Figure 8: Pavement Performance

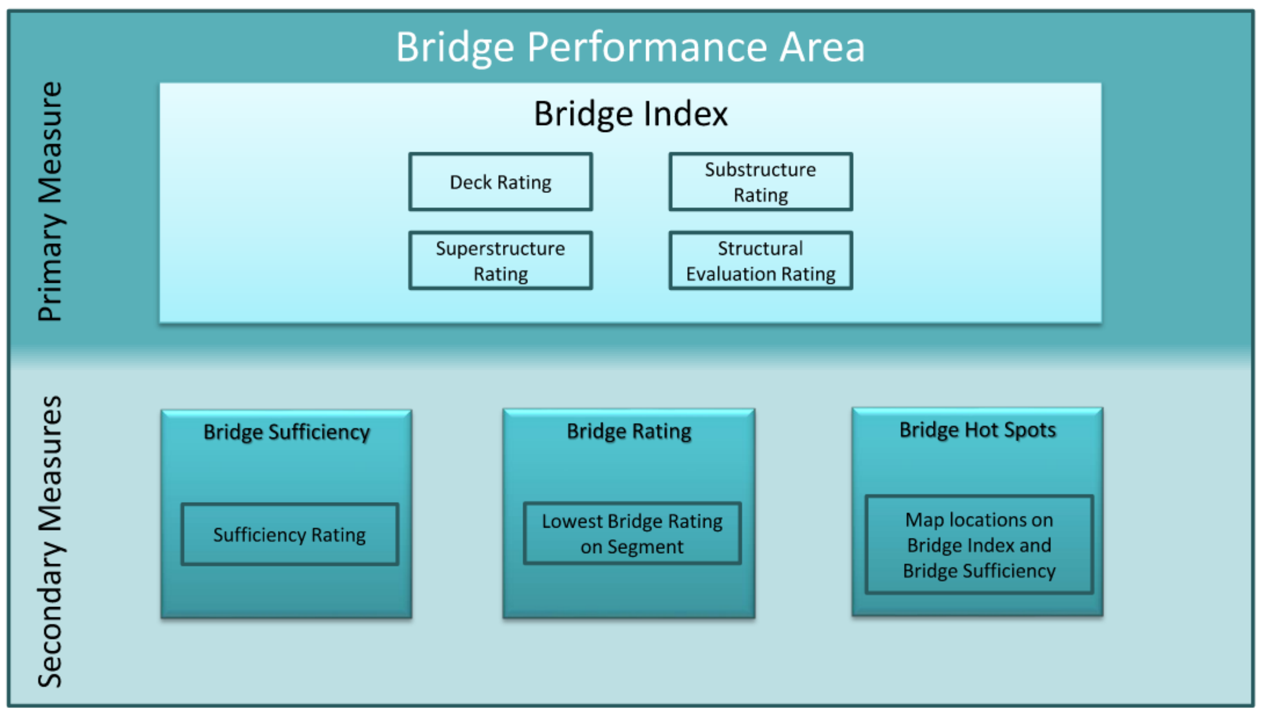


2.3 Bridge Performance Area

The Bridge Performance Area consists of a primary measure (Bridge Index) and three secondary measures, as shown in **Figure 9**. These measures assess the condition of the existing bridges along the I-8 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.**

This CPS is an update to a previously completed report. The performance measures and performance thresholds have been revised from the previous version. For the Bridge performance area, the new methodology does not include the performance metric related to Functionally Obsolete bridges, which was used in the previous methodology.

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

Three 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

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, and 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 three secondary measures provide more detailed information to assess bridge performance.

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

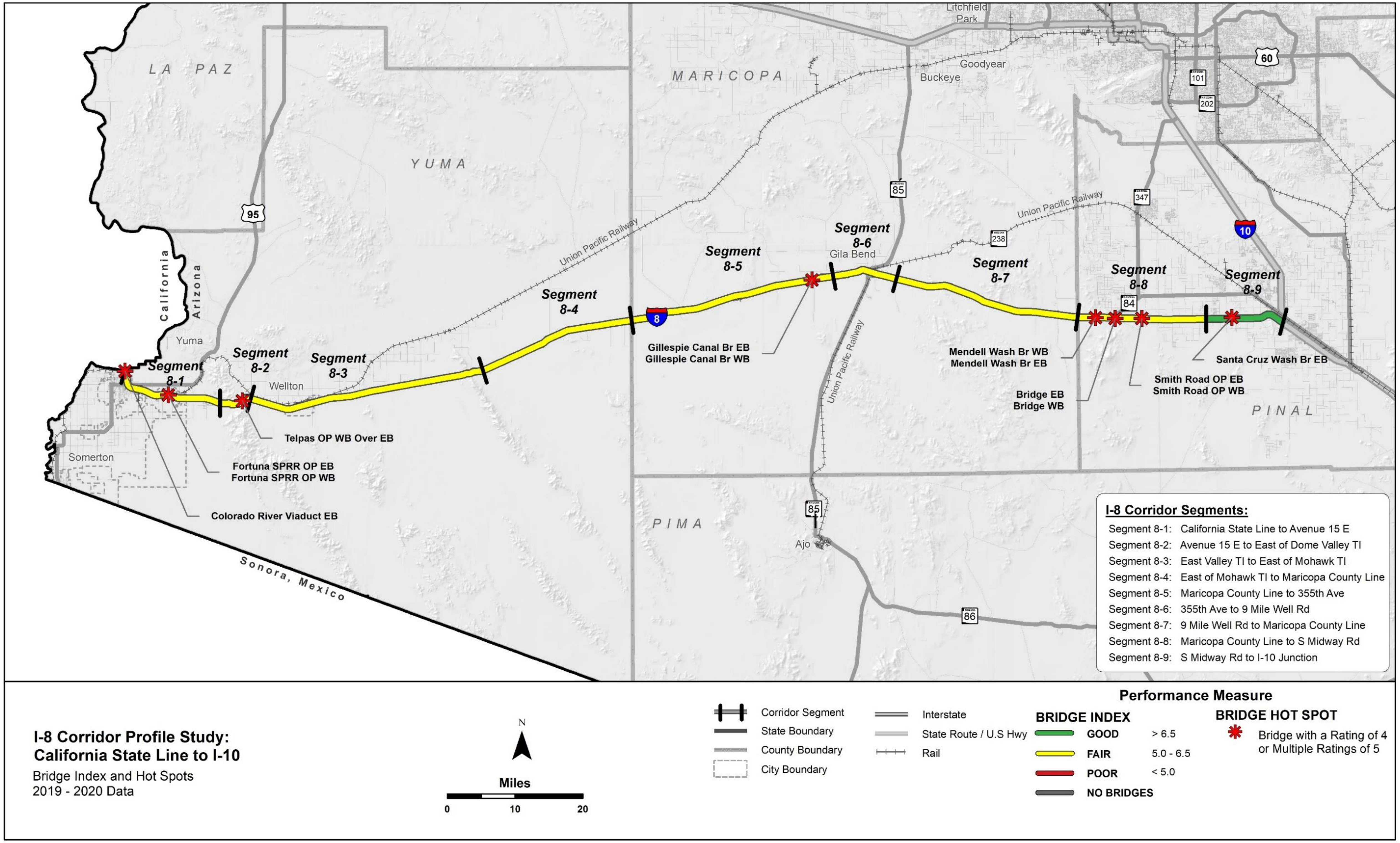
- The weighted average of the Bridge Index shows "fair" performance for the I-8 Corridor
- The Bridge Index shows "fair" performance throughout the entire corridor, except Segment 9
- The corridor has "fair" performance based on the weighted corridor average of Lowest Bridge Rating
- Every segment along the I-8 Corridor shows "good" performance for Bridge Sufficiency
- There are 13 Bridge Hot Spots along the corridor, as shown in **Figure 10**

Table 7 summarizes the Bridge performance results for the I-8 Corridor. **Figure 10** illustrates the primary Bridge Index performance and locations of Bridge hot spots along the I-8 Corridor. Maps for each secondary measure can be found in **Appendix A.**

Table 7: Bridge Performance

Segment #	Segment Length (miles)	# of Bridges	Bridge Index	Sufficiency Rating	Lowest Bridge Rating
8-1	16.3	19	5.19	92.60	4
8-2	5.1	6	5.31	87.67	5
8-3	35.1	19	6.32	95.69	6
8-4	23.1	6	6.00	95.00	6
8-5	30.8	14	5.86	89.57	4
8-6	9.6	18	5.59	94.82	5
8-7	27.6	5	6.08	91.34	6
8-8	18.9	14	5.64	91.09	5
8-9	11.5	14	8.58	90.36	5
Weighted Corridor Average			6.07	92.45	5.11
SCALES					
Performance Level			**ALL**		
Good			> 6.5	> 80	> 6
Fair			5.0 - 6.5	50 - 80	5 - 6
Poor			< 5.0	< 50	< 5

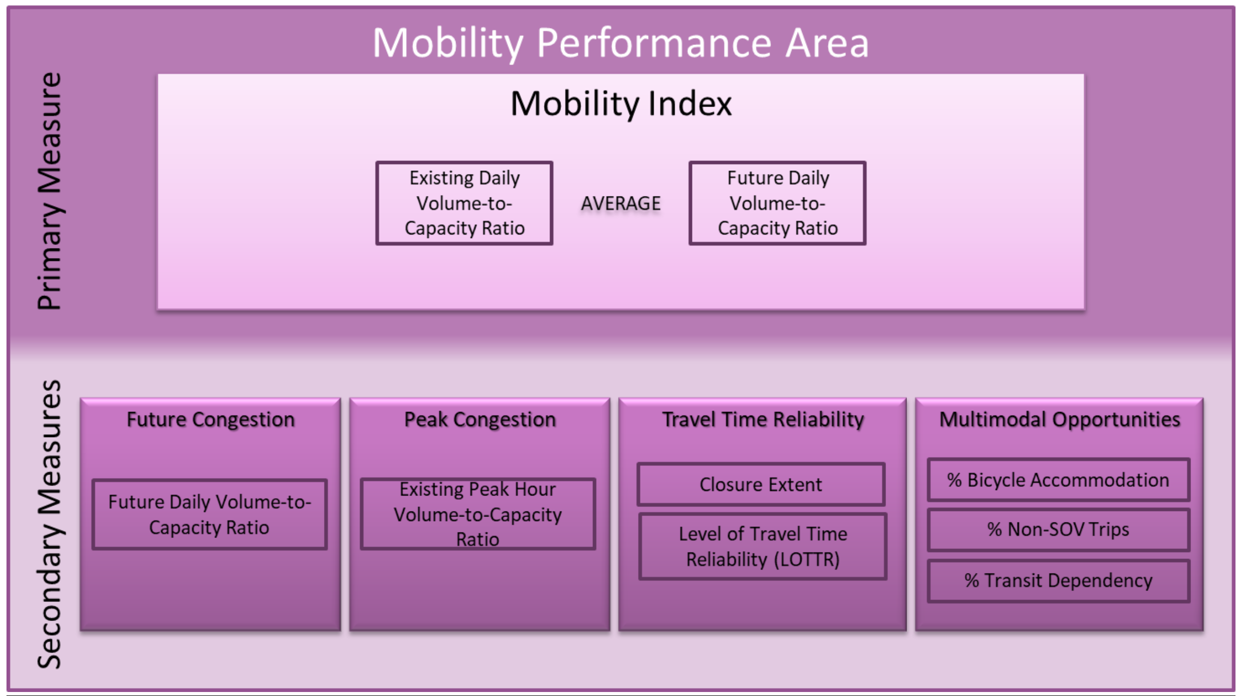
Figure 10: Bridge Performance



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 I-8 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 (2019) daily volume-to-capacity (V/C) ratio and the future (2040 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 (2030) 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. For the I-8 Corridor, the following operating environments were identified:

- Urban or Urban-Fringe Uninterrupted Flow: Segment 8-1
- Rural Uninterrupted Flow: Segments 8-2 through 8-9

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 (2040 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–

Two 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 particular milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel; a weighted average was applied to each closure that takes into account 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 were excluded from the analysis
- Level of Travel Time Reliability (LOTTR)
  - The ratio of the 80th percentile travel time to average (50th percentile) travel time for a given corridor segment in a specific direction; as corridor segments were often comprised of multiple roadway sections for which LOTTR was reported, a weighted average was applied to each section based on the section length in order to arrive at the segment LOTTR
  - The LOTTR reflects how consistent or dependable the travel might be from day to day or during different times of day.

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 the 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 shows “good” performance for the I-8 Corridor
- The Directional Existing Peak Hour V/C indicator show “good” performance for each segment of the corridor
- The Future Daily V/C indicator show “good” performance for each segment of the corridor
- All I-8 Segments show “good” performance for Closure Extents, except for Segment 8-1, which shows “fair”
- The Reliability measures show “good” or “fair” performance throughout the majority of the corridor
- % Non-SOV Trips show “poor” or “fair” performance throughout the corridor
- All segments show good performance for % Bicycle Accommodation

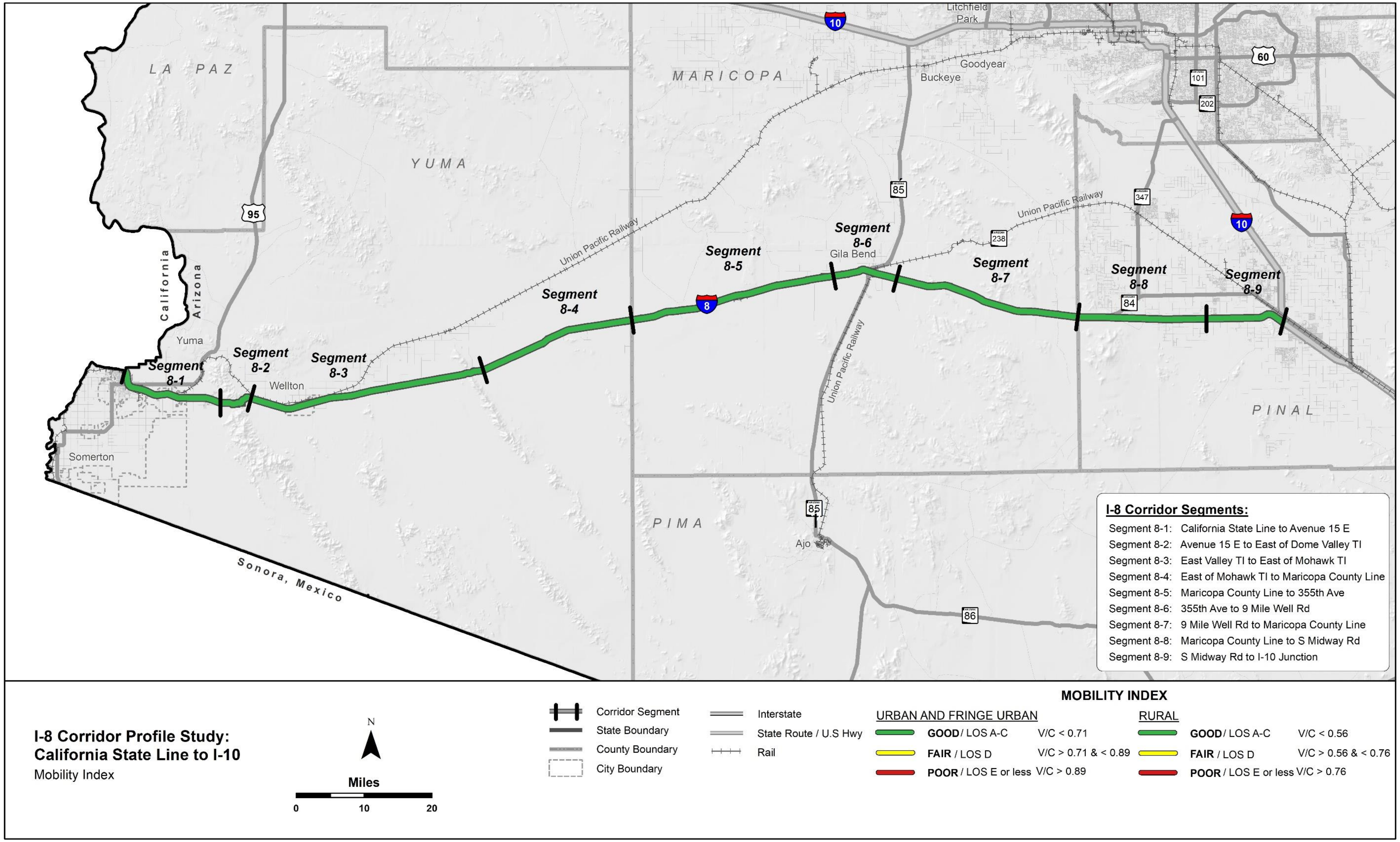
Table 8 summarizes the Mobility performance results for the I-8 Corridor. **Figure 12** illustrates the primary Mobility Index performance along the I-8 Corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 8: Mobility Performance

Segment	Length (mi)	Mobility Index	Future V/C	Existing Peak Hour V/C		Closure Extent (instances/milepost/year/mile)		Directional LOTTR (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
				EB	WB	EB	WB	EB	WB		
8-1[1]	16.3	0.43	0.47	0.31	0.30	0.26	0.13	1.05	1.09	95%	15.3%
8-2[2]	5.1	0.44	0.50	0.34	0.37	0.16	0.12	1.08	1.06	100%	12.6%
8-3[2]	35.1	0.23	0.26	0.13	0.13	0.16	0.13	1.05	1.05	100%	13.2%
8-4[2]	23.1	0.16	0.18	0.09	0.09	0.08	0.07	1.05	1.05	99%	7.4%
8-5[2]	30.8	0.18	0.20	0.11	0.11	0.05	0.16	1.05	1.05	100%	6.1%
8-6[2]	9.6	0.17	0.18	0.12	0.11	0.06	0.10	1.05	1.06	100%	5.8%
8-7[2]	27.6	0.09	0.07	0.10	0.09	0.06	0.10	1.04	1.04	100%	5.8%
8-8[2]	18.9	0.12	0.15	0.07	0.06	0.05	0.14	1.06	1.06	100%	12.4%
8-9[2]	11.5	0.16	0.22	0.06	0.08	0.14	0.04	1.04	1.04	100%	13.5%
Weighted Corridor Average		0.20	0.22	0.13	0.13	0.11	0.12	1.05	1.05	99.45%	9.79%
SCALES											
Performance Level		**Urban and fringe Urban**				**All**		**Interrupted / Uninterrupted Flow**		**All**	
Good		< 0.71				< 0.22		< 1.06		> 17%	> 90%
Fair		0.71 - 0.89				0.22 - 0.62		1.06 - 1.50		11% - 17%	60% - 90%
Poor		> 0.89				> 0.62		> 1.50		< 11%	< 60%
Performance Level		**Rural**									
Good		< 0.56									
Fair		0.56 - 0.76									
Poor		> 0.76									

[1]Urban Operating Environment
[2]Rural Operating Environment

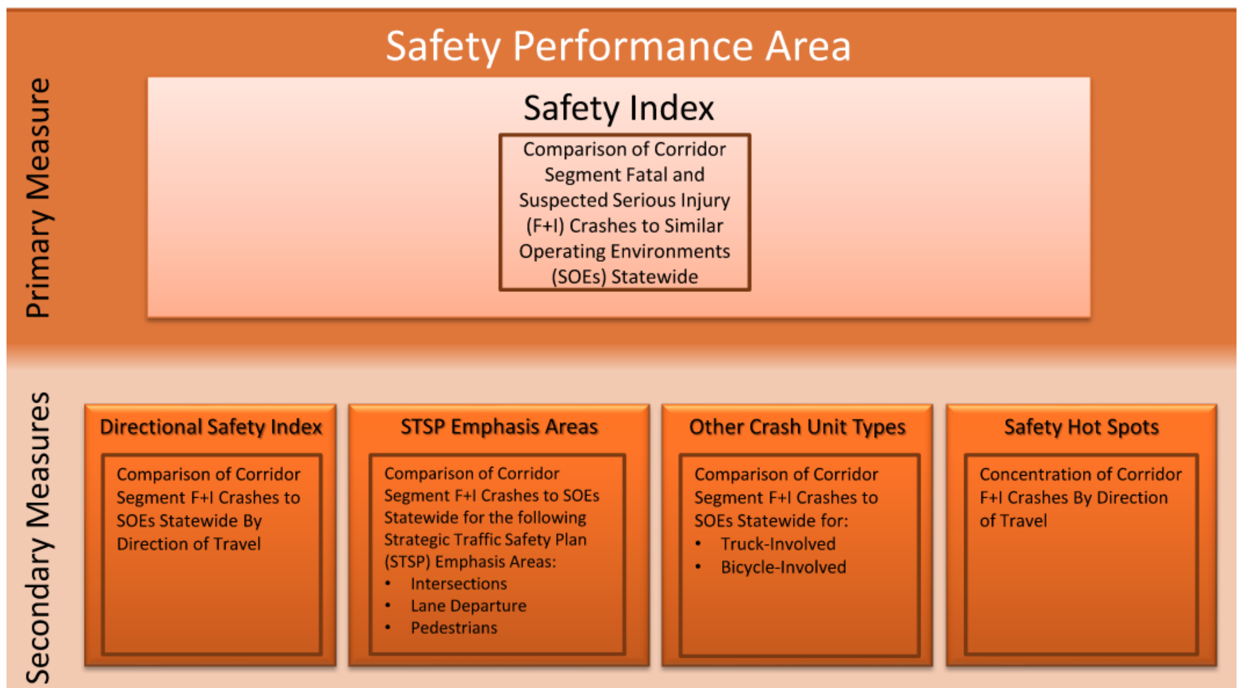
Figure 12: Mobility Performance



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 suspected serious injuries, as these types of crashes are the emphasis of the ADOT Strategic Traffic Safety Plan (STSP), 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 suspected serious injury crashes, the relative cost of those types of crashes, and crash occurrences on similar roadways in Arizona. According to ADOT's 2018 Highway Safety Improvement Program Application, fatal crashes have an estimated cost that is 17.3 times the estimated cost of incapacitating injury crashes ($9.5 million compared to $555,000).

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 I-8 Corridor, the following operating environments were identified:

- Urban 4-Lane Freeway: Segment 8-1
- Rural 4-Lane Freeway with Daily Volume < 25,000: Segments 8-2 through 8-9

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 suspected serious injury crashes

STSP Emphasis Areas

ADOT's 2019 STSP identified several emphasis areas for reducing fatal and suspected serious injury crashes. This measure compared rates of crashes in three STSP emphasis areas to other corridors with a similar operating environment. The three STSP emphasis areas related to crashes involving:

- Intersections
- Lane departures
- Pedestrians

Other Crash Unit Types

- The percentage of total fatal and suspected serious injury crashes that involves crash unit types of trucks and bicycles 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 suspected serious 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 weighted average of the Safety Index shows “average” performance for the I-8 Corridor; Segments 8-2, 8-4, and 8-9 show “below average” performance for the Safety Index
- The Directional Safety Index results show similar findings to the Safety Index with Segments 8-2, 8-3, 8-4, 8-5, 8-8, and 8-9 showing “below average” performance in at least one direction
- Segments 8-2, 8-3, 8-4, 8-7 and 8-8 show “below average” in the % of Fatal + Suspected Serious Injury Crashes Involving Lane Departures
- All the segments show insufficient data for % of Segment Fatal + Suspected Serious Injury Crashes at Intersections, Involving Pedestrians, Trucks, and Bicycles
- No safety hot spots were identified

Table 9 summarizes the Safety performance results for the I-8 Corridor. **Figure 14** illustrates the primary Safety Index performance and locations of Safety hot spots along the I-8 Corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 9: Safety Performance

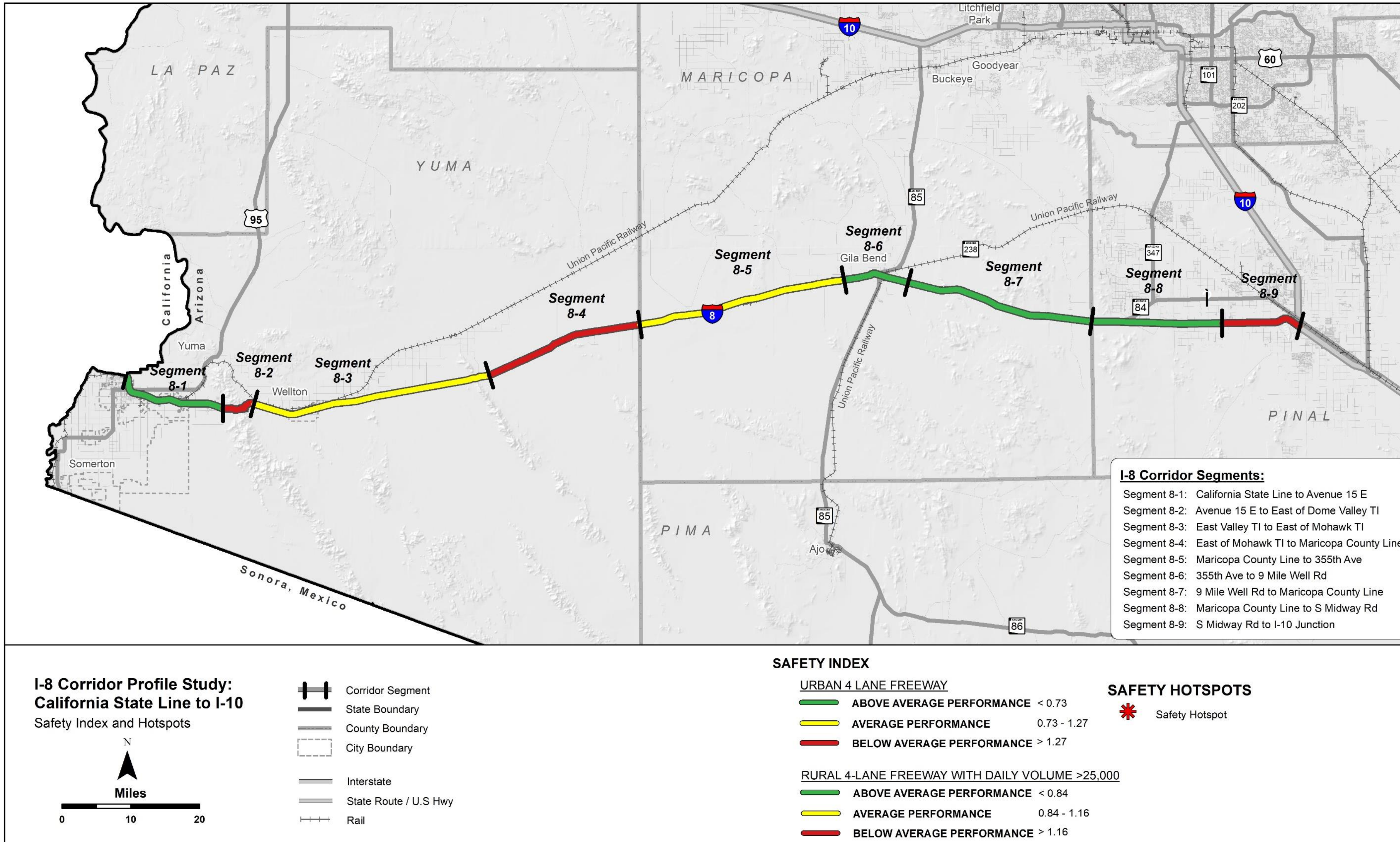
Segment	Segment Length (miles)	Safety Index	Directional Safety Index		% of Fatal + Suspected Serious Injury Crashes at Intersections	% of Fatal + Suspected Serious Injury Crashes Involving Lane Departures	% of Fatal + Suspected Serious Injury Crashes Involving Pedestrians	% of Fatal + Suspected Serious Injury Crashes Involving Trucks	% of Fatal + Suspected Serious Injury Crashes Involving Bicycles
			EB	WB					
8-1[a]	16.3	0.69	0.47	0.92	Not Applicable	55%	Insufficient Data	Insufficient Data	Insufficient Data
8-2[b]	5.1	2.31	3.39	1.22	Not Applicable	100%	Insufficient Data	Insufficient Data	Insufficient Data
8-3[b]	35.1	1.08	0.66	1.50	Not Applicable	83%	Insufficient Data	Insufficient Data	Insufficient Data
8-4[b]	23.1	1.78	1.06	2.50	Not Applicable	81%	Insufficient Data	Insufficient Data	Insufficient Data
8-5[b]	30.8	1.04	0.93	1.16	Not Applicable	76%	Insufficient Data	Insufficient Data	Insufficient Data
8-6[b]	9.6	0.43	0.86	0.00	Not Applicable	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
8-7[b]	27.6	0.62	0.82	0.43	Not Applicable	91%	Insufficient Data	Insufficient Data	Insufficient Data
8-8[b]	18.9	0.62	1.23	0.00	Not Applicable	100%	Insufficient Data	Insufficient Data	Insufficient Data
8-9[b]	11.5	1.17	1.53	0.81	Not Applicable	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data
Weighted Corridor Average		1.02	0.97	1.06	Not Applicable	82%	Insufficient Data	Insufficient Data	Insufficient Data
SCALES									
Performance Level		**Urban 4-Lane Freeway**							
Above Average		<0.73			N/A	< 60.6%	< 0.0%	< 6.9%	< 0.0%
Average		0.73 - 1.27			N/A	60.6% - 78.1%	0.0% - 4.9%	6.9% - 12.4%	0.0% - 0.0%
Below Average		> 1.16			N/A	> 78.1%	> 4.9%	> 12.4%	> 0.0%
Performance Level		**Rural 4-Lane Freeway with Daily Volume <25,000**							
Above Average		< 0.84			N/A	< 72.8%	< 1.0%	< 19.0%	< 0.0%
Average		0.84 - 1.16			N/A	72.8% - 76.4%	1.0% - 3.3%	19.0% - 22.5%	0.0% - 0.9%
Below Average		> 1.16			N/A	> 76.4%	> 3.3%	> 22.5%	> 0.9%

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

[a] Urban 4-Lane Freeway

[b] Rural 4-Lane Freeway with Daily Volume <25,000

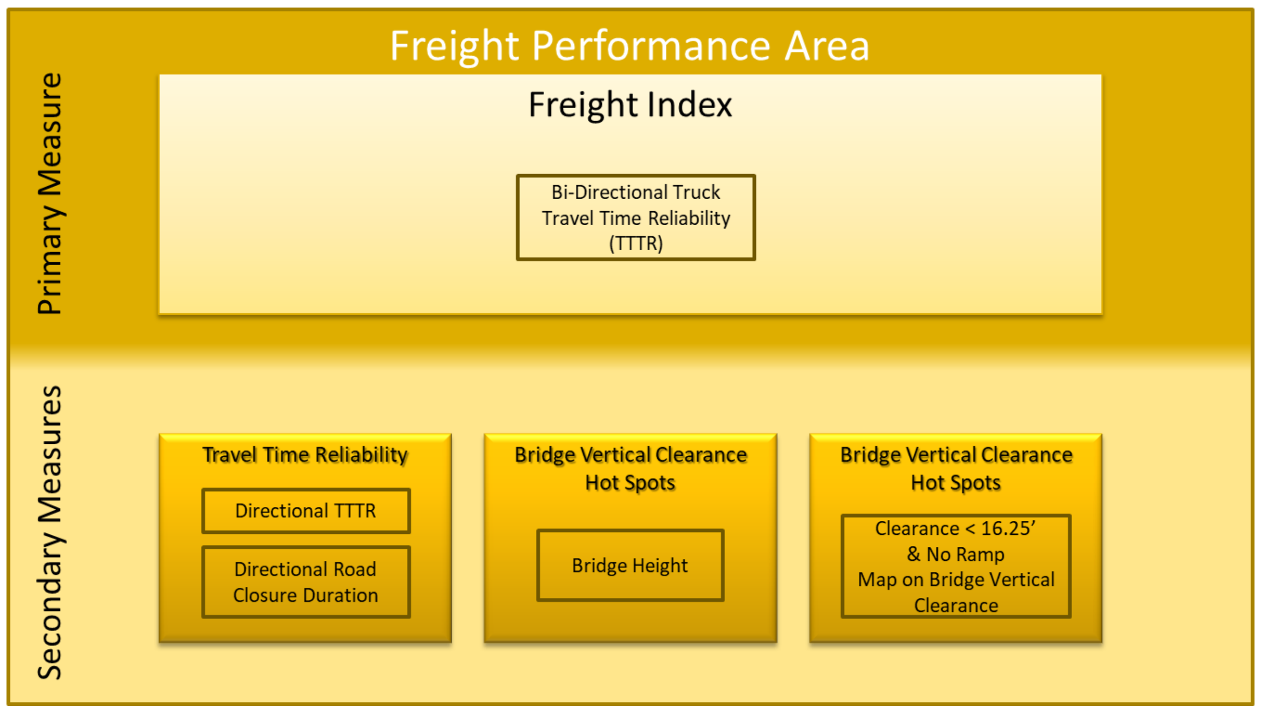
Figure 14: Safety Performance



2.6 Freight Performance Area

The Freight performance area consists of a single primary measure (Freight Index) and three secondary measures, as illustrated in **Figure 15**. All measures related to the reliability of truck travel are measured by observed truck travel time speed and delays to truck travel from road 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 travel time reliability for truck travel. The Truck Travel Time Reliability (TTTR) is the ratio of the 95th percentile truck travel time to average (50th percentile) truck travel time. The TTTR reflects the extra buffer time needed for on-time delivery while accounting for delay resulting from circumstances such as recurring congestion, 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 I-8 Corridor, the following operating environments were identified:

- Uninterrupted Flow: all segments

Secondary Freight Measures

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

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

- Directional Truck Travel Time Reliability (TTTR):
  - The ratio of the 95th percentile truck travel time to average (50th percentile) truck travel time for a given corridor segment in a specific direction; as corridor segments were often comprised of multiple roadway sections for which TTTR was reported, a weighted average was applied to each section based on the section length in order to arrive at the segment TTTR
- Directional Closure Duration
  - The average time (in minutes) a particular 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 takes into account 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 three secondary measures provide more detailed information to assess freight performance.

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

- All I-8 segments fall within the "good" threshold for the primary Freight Index measure, with the exceptions of Segments 8-1 and 8-2, and 8-8 which fall within the "fair" scoring threshold.
- All eastbound and westbound segments of I-8 scored within the "good" threshold for the Directional Travel Time Reliability, with the exception of Segments 8-1, 8-2 and 8-8 which fall within the "fair" scoring threshold

- Segment scores for the duration of closures involving trucks all fall within the "Good" scoring range, with the exception of EB 8-1, which falls within the "Fair" scoring range
- There are multiple locations with truck height restrictions along I-8, with most of the restrictions concentrated in the eastern portion of the corridor near Casa Grande. Among the height restrictions, there are six locations where trucks are not able to ramp around the restriction. The locations where trucks are unable to ramp around are considered hot spots

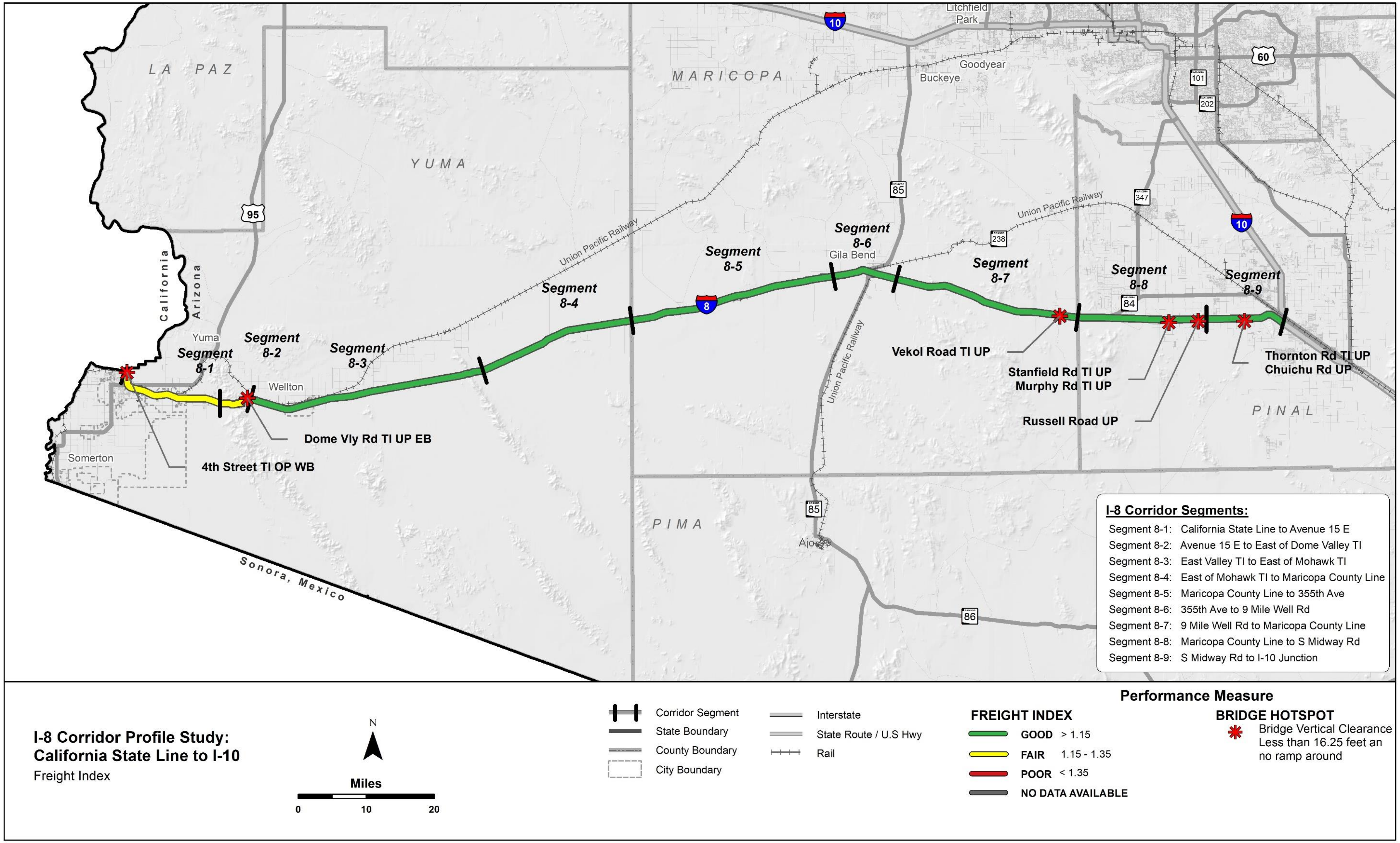
Table 10 summarizes the Freight performance results for the I-8 Corridor. **Figure 16** illustrates the primary Freight Index performance and locations of freight hot spots along the I-8 Corridor. Maps for each secondary measure can be found in **Appendix A**.

Table 10: Freight Performance

Segment #	Segment Mileposts	Freight Index	Directional TTTR		Closure Duration (minutes/mileposts/year/mile)		Bridge Vertical Clearance (feet)
			EB	WB	EB	WB	
8-1 [1^]	16.3	1.27	1.21	1.33	52.67	22.86	15.33
8-2 [2^]	5.1	1.28	1.33	1.24	25.88	21.49	16.14
8-3 [2^]	35.1	1.09	1.09	1.09	41.55	12.94	16.20
8-4 [2^]	23.1	1.08	1.08	1.08	7.26	9.15	No UP
8-5 [2^]	30.8	1.08	1.08	1.08	4.29	21.66	No UP
8-6 [2^]	9.6	1.13	1.14	1.11	3.75	15.96	16.61
8-7 [2^]	27.6	1.09	1.10	1.09	6.16	14.10	16.17
8-8 [2^]	18.9	1.15	1.15	1.15	5.42	37.54	15.99
8-9 [2^]	11.5	1.10	1.11	1.10	20.33	2.61	16.00
Weighted Corridor Average		1.12	1.11	1.12	18.49	17.40	16.06
SCALE							
Performance Level		Uninterrupted			All		
Good		< 1.15			< 44.18		> 16.50
Fair		1.15 - 1.35			44.18 - 124.86		16.0 - 16.50
Poor		> 1.35			> 124.86		< 16.0

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

Figure 16: Freight Performance



2.7 Corridor Performance Summary

Based on the results of the performance evaluation, the following general observations were made related to the performance of the I-8 Corridor:

- Overall Performance: The Pavement, Mobility, and Freight performance areas show generally "good" performance; Bridge and Safety performance areas show generally "poor/below average" or "fair/average" performance
- Pavement Performance: The weighted average of the Pavement Index shows "good" performance for the I-8 Corridor; exceptions include Segments 8-3, 8-6 and 8-7 which show "fair" performance for the Pavement Index; the weighted average of % Area Failure shows "poor" performance for the corridor, exceptions include Segments 8-2 and 8-5 which show "fair" performance. Segments 8-8 and 8-9 show "good" performance
- Bridge Performance: The weighted average of the Bridge Index shows "fair" performance along the I-8 Corridor; the Bridge index predominantly shows "fair" performance, except for Segment 8-9, which shows "good" performance. The weighted average for Lowest Bridge Rating shows "fair" performance for the corridor; 13 total hotspots
- Mobility Performance: The weighted average of the Mobility Index and all secondary measures except % SOV Trips shows "good" performance throughout the I-8 Corridor
- Safety Performance: The weighted average of the Safety Index shows "average" performance for the I-8 Corridor; performance measures for crashes involving lane departures had "average" performance; several segments had insufficient data to generate reliable performance ratings for emphasis area crashes included as secondary measures
- Freight Performance: The weighted average of the Freight Index shows "good" performance along the I-8 Corridor; Closure Duration shows "good" performance for all Segments except 8-1 in the EB direction. There are two vertical clearance UP hotspots across the corridor
- Lowest Performing Segments: No segment has multiple Index ratings of "poor"

Figure 17 shows the percentage of the I-8 Corridor that rates either "good/above average" performance, "fair/average" performance, or "poor/below average" performance for each primary measure. On the I-8 Corridor, Safety is the lowest performing area with 22% of the corridor in "poor" condition as it relates to the primary measure. Pavement, Mobility, and Freight are the highest performing areas along the I-8 Corridor with 59%, 100%, and 88% of the corridor, respectively, in "good" condition as it relates to the primary measures. The lowest performance along the I-8 Corridor generally occurs in the Bridge and Safety performance areas.

Table 11 shows a summary of corridor performance for all primary measures and secondary measure indicators for the I-8 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

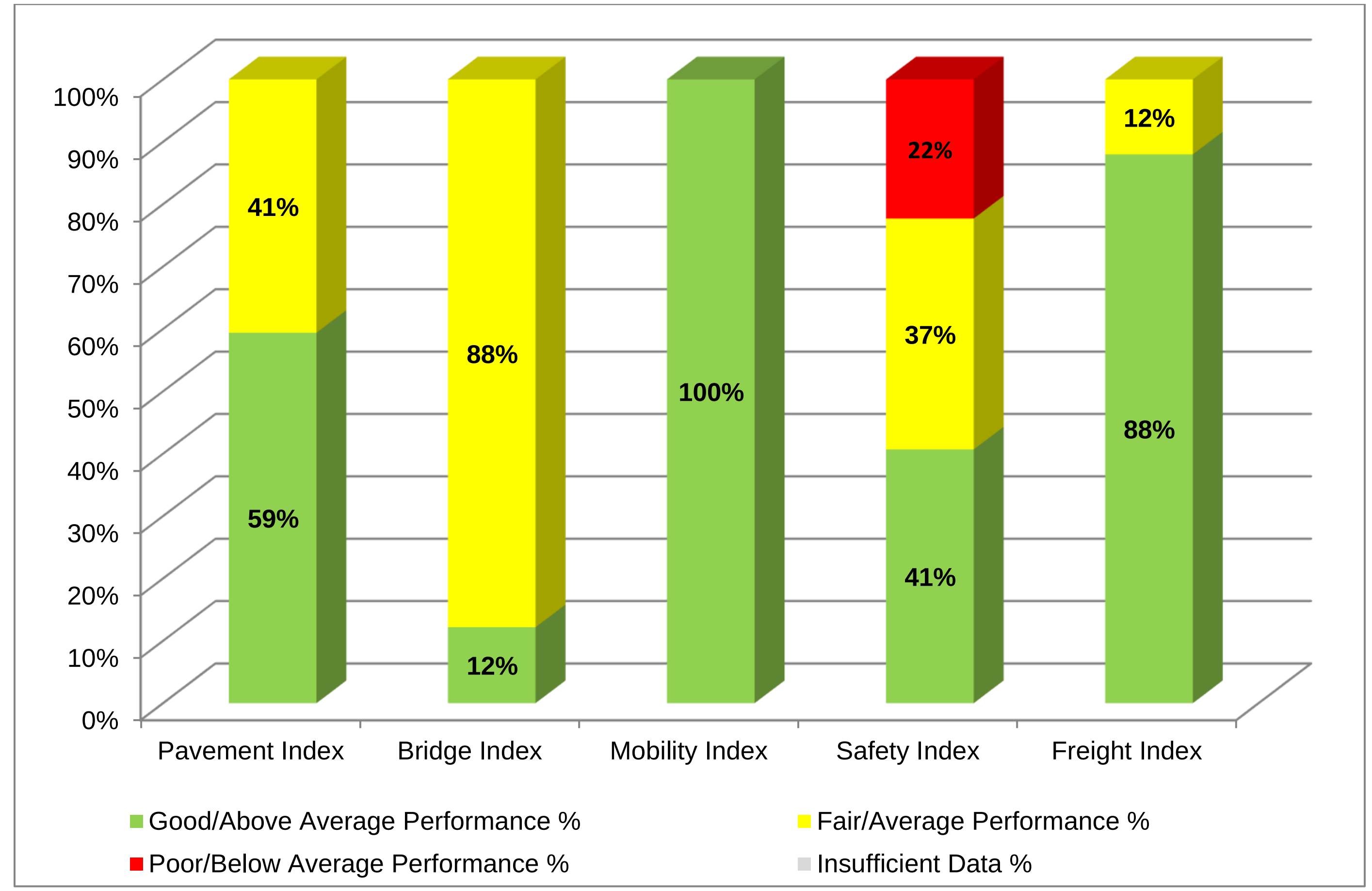


Figure 18: Corridor Performance Summary by Performance Measure

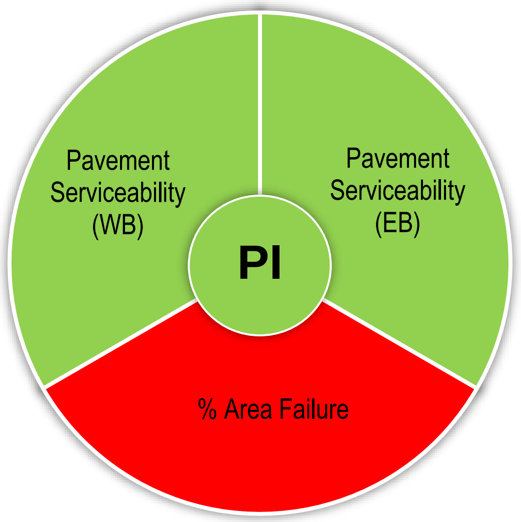
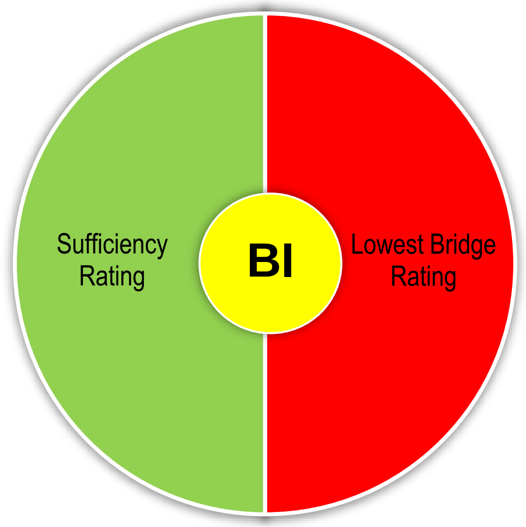
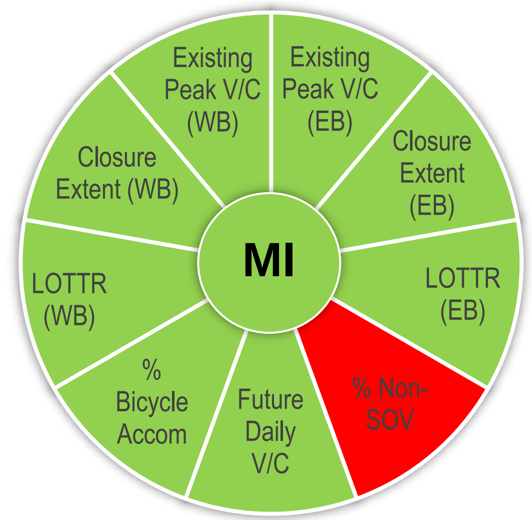
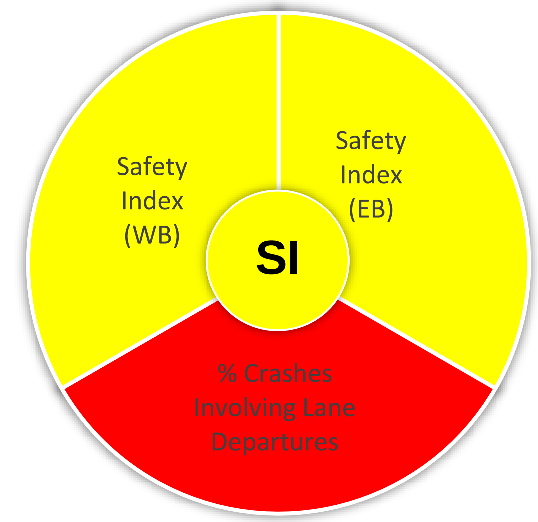
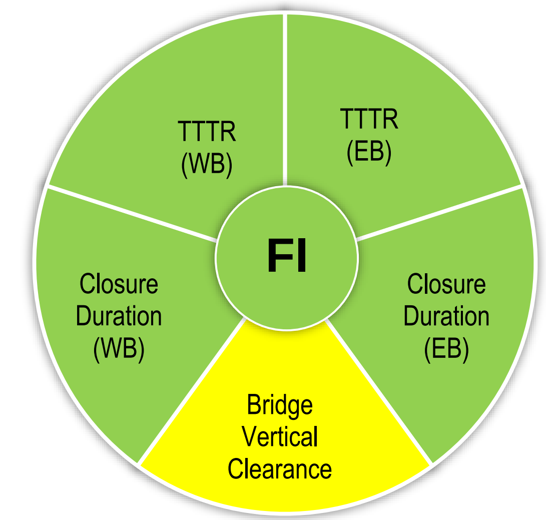
Pavement	Bridge	Mobility	Safety	Freight
				
Pavement Index (PI): based on three pavement condition ratings from the ADOT Pavement Database; the three ratings are the International Roughness Index (IRI), the Cracking Rating, and the Rutting Rating	**Bridge Index (BI):** based on four bridge condition 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 long-term future daily V/C ratio	**Safety Index (SI):** combines the bi-directional frequency and rate of fatal and suspected serious injury crashes, compared to crash occurrences on roads with similar operating environments in Arizona	**Freight Index (FI):** a reliability performance measure based on the bi-directional Truck Travel Time Reliability (TTTR) 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 ➢ **Lowest Bridge Rating** –the lowest rating of the four bridge condition ratings on each segment	➢ **Future Daily V/C** – the future daily 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 particular milepost is closed per year per mile on a given segment of the corridor in a specific direction of travel ➢ **Directional Level of Travel Time Reliability (LOTTR)** – the ratio of the 80th percentile peak period travel time to the 50th percentile peak period travel time for all vehicles ➢ **% 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 suspected serious injury crashes, compared to crash occurrences on roads with similar operating environments in Arizona ➢ **% of Fatal + Suspected Serious Injury Crashes Involving Lane Departures** – the percentage of total fatal and suspected serious injury crashes involving lane departures compared to the statewide average percentage on roads with similar operating environments	➢ **Directional TTTR** – the ratio of the 95th percentile peak period travel time to the 50th percentile peak period travel time for trucks ➢ **Closure Duration** – the average time a particular 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 11: 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	Bridge Sufficiency	Lowest Bridge Rating	Mobility Index	Future Daily V/C	Existing Peak Hour V/C		Closures (occurrences/milepost/year)		Directional LOTTR (all vehicles)		% Bicycle Accommodation	% Non-Single Occupancy Vehicle (SOV) Trips
			EB	WB							EB	WB	EB	WB	EB	WB		
8-1[a]	16.3	4.02	4.03	4.13	31%	5.19	92.60	4	0.43	0.47	0.31	0.3	0.26	0.13	1.05	1.09	95.2%	15.3%
8-2[b]	5.1	4.02	3.94	4.07	10%	5.31	87.67	5	0.44	0.50	0.34	0.37	0.16	0.12	1.08	1.06	100.0%	12.6%
8-3[b]	35.1	3.74	3.59	3.82	43%	6.32	95.69	6	0.23	0.26	0.13	0.13	0.16	0.13	1.05	1.05	100.0%	13.2%
8-4[b]	23.1	4.00	3.71	4.05	35%	6.00	95.00	6	0.16	0.18	0.09	0.09	0.08	0.07	1.05	1.05	99.1%	7.4%
8-5[b]	30.8	4.41	4.22	4.34	13%	5.86	89.57	4	0.18	0.20	0.11	0.11	0.05	0.16	1.05	1.05	100.0%	6.1%
8-6[b]	9.6	3.32	3.62	3.43	60%	5.59	94.82	5	0.17	0.18	0.12	0.11	0.06	0.10	1.05	1.06	100.0%	5.8%
8-7[b]	27.6	3.70	3.84	3.88	48%	6.08	91.34	6	0.09	0.07	0.1	0.09	0.06	0.10	1.04	1.04	100.0%	5.8%
8-8[b]	18.9	4.67	4.39	4.41	0%	5.64	91.09	5	0.12	0.15	0.07	0.06	0.05	0.14	1.06	1.06	100.0%	12.4%
8-9[b]	11.5	4.26	3.86	4.02	4%	8.58	90.36	5	0.16	0.22	0.06	0.08	0.14	0.04	1.04	1.04	100.0%	13.5%
Weighted Corridor Average		4.03	3.91	4.04	29.4%	6.07	92.45	4.97	0.20	0.22	0.13	0.13	0.11	0.12	1.05	1.05	99.45%	9.79%

SCALES

Performance Level	Interstate		All				Urban	All	Interrupted / Uninterrupted	All	
Good/Above Average	> 3.75	> 3.75	< 5%	> 6.5	> 80	> 6	< 0.71	< 0.22	< 1.15	> 90%	> 17%
Fair/Average	3.00 - 3.75	3.40 - 3.75	5% - 20%	5.0 - 6.5	50 - 80	5 - 6	0.71 - 0.89	0.22 - 0.62	1.15 - 1.50	60% - 90%	11% - 17%
Poor/Below Average	< 3.00	< 3.40	> 20%	< 5.0	< 50	< 5	> 0.89	> 0.62	> 1.50	< 60%	< 11%

Performance Level	Rural
Good/Above Average	< 0.56
Fair/Average	0.56 - 0.76
Poor/Below Average	> 0.76

[a]Urban 4 Lane Freeway
[b]Rural 4 Lane Freeway with Daily Volume < 25,000

[1]Urban Operating Environment
[2]Rural Operating Environment

Table 11: 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 + Suspected Serious Injury Crashes at Intersections	% of Fatal + Suspected Serious Injury Crashes Involving Lane Departures	% of Fatal + Suspected Serious Injury Crashes Involving Pedestrians	% of Fatal + Suspected Serious Injury Crashes Involving Trucks	% of Fatal + Suspected Serious Injury Crashes Involving Bicycles	Freight Index	MAX TTTR		Closure Duration (minutes/milepost/year/mile)		Bridge Vertical Clearance (feet)
			EB	WB							EB	WB	EB	WB	
8-1[a]	16.3	0.69	0.47	0.92	Not Applicable	55%	Not Applicable	Not Applicable	Not Applicable	1.27	1.21	1.33	52.67	22.86	15.33
8-2[b]	5.1	2.31	3.39	1.22	Not Applicable	100%	Not Applicable	Not Applicable	Not Applicable	1.28	1.33	1.24	25.88	21.49	16.14
8-3[b]	35.1	1.08	0.66	1.50	Not Applicable	83%	Not Applicable	Not Applicable	Not Applicable	1.09	1.09	1.09	41.55	12.94	16.2
8-4[b]	23.1	1.78	1.06	2.50	Not Applicable	81%	Not Applicable	Not Applicable	Not Applicable	1.08	1.08	1.08	7.26	9.15	No UP
8-5[b]	30.8	1.04	0.93	1.16	Not Applicable	76%	Not Applicable	Not Applicable	Not Applicable	1.08	1.08	1.08	4.29	21.66	No UP
8-6[b]	9.6	0.43	0.86	0.00	Not Applicable	Insufficient Data	Not Applicable	Not Applicable	Not Applicable	1.13	1.14	1.11	3.75	15.96	16.61
8-7[b]	27.6	0.62	0.82	0.43	Not Applicable	91%	Not Applicable	Not Applicable	Not Applicable	1.09	1.10	1.09	6.16	14.10	16.17
8-8[b]	18.9	0.62	1.23	0.00	Not Applicable	100%	Not Applicable	Not Applicable	Not Applicable	1.15	1.15	1.15	5.42	37.54	15.99
8-9[b]	11.5	1.17	1.53	0.81	Not Applicable	Insufficient Data	Not Applicable	Not Applicable	Not Applicable	1.10	1.11	1.10	20.33	2.61	16.00
Weighted Corridor Average		1.02	0.97	1.06	Not Applicable	82%	Not Applicable	Not Applicable	Not Applicable	1.12	1.11	1.12	18.49	17.40	16.06
SCALES															
Performance Level		Urban 4-Lane Freeway								Not Applicable					
Good/Above Average		< 0.73			N/A	< 60.6%	< 0.0%	< 6.9%	< 0.0%	< 1.15			< 44.18		> 16.50
Fair/Average		0.73 - 1.27			N/A	60.6% - 78.1%	0.0% - 4.9%	6.9% - 12.4%	0.0% - 0.0%	1.15 - 1.35			44.18 - 124.86		16.0 - 16.50
Poor/Below Average		> 1.27			N/A	> 78.1%	> 4.9%	> 12.4%	> 0.0%	> 1.35			> 124.86		< 16.5
Performance Level		Rural 4-Lane Freeway with Daily Volume <25,000													
Good/Above Average		< 0.84			N/A	< 72.8%	< 1.0%	< 19.0%	< 0.0%						
Fair/Average		0.84 - 1.16			N/A	72.8% - 76.4%	1.0% - 3.3%	19.0% - 22.5%	0.0% - 0.9%						
Poor/Below Average		> 1.16			N/A	> 76.4%	> 3.3%	> 22.5%	> 0.9%						

[a]Urban 4 Lane Freeway
[b]Rural 4 Lane Freeway with Daily Volume < 25,000

[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 I-8 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 results, three "emphasis areas" were identified for the I-8 Corridor: Pavement, Bridge, and Safety.

Taking into account 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 12** shows the I-8 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 or not the performance is in an emphasis area.

Table 12: Corridor Performance Goals and Objectives

ADOT Statewide LRTP Goals	I-8 Corridor Goals	I-8 Corridor Objectives	Performance Area	Primary Measure	Performance Objective	
				Secondary Measure Indicators	Corridor Average	Segment
Improve Mobility and Accessibility **Support Economic Growth**	Improve mobility and connectivity Provide a safe and reliable route for recreation 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 and future congestion in the urbanized areas Reduce delays from non-recurring events and incidents to improve reliability Improve bicycle accommodation	Mobility (Emphasis Area)	**Mobility Index**	Good	Fair or better
				Future Daily V/C		
				Existing Peak Hour V/C		
				Closure Extent		
				Directional Level of Travel Time Reliability		
				% 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 Reliability		
				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		
				Lowest Bridge Rating		
		Improve pavement ride quality	Pavement	Pavement Index	Fair or Better	Fair or better
				Directional Pavement Serviceability Rating		
				% Area Failure		
Enhance Safety and Security	Maintain highway security within the right-of way	Reduce fatal and serious injury crashes	Safety (Emphasis Area)	**Safety Index**	Above Average	Average or better
				Directional Safety Index		
				% Fatal + Suspected Serious Injury Crashes at Intersections		
				% Fatal + Suspected Serious Injury Crashes Involving Lane Departures		
				% Fatal + Suspected Serious Injury Crashes Involving Pedestrians		
				% Fatal + Suspected Serious Injury Crashes Involving Trucks		
				% Fatal + Suspected Serious Injury Crashes Involving Bicyclists		

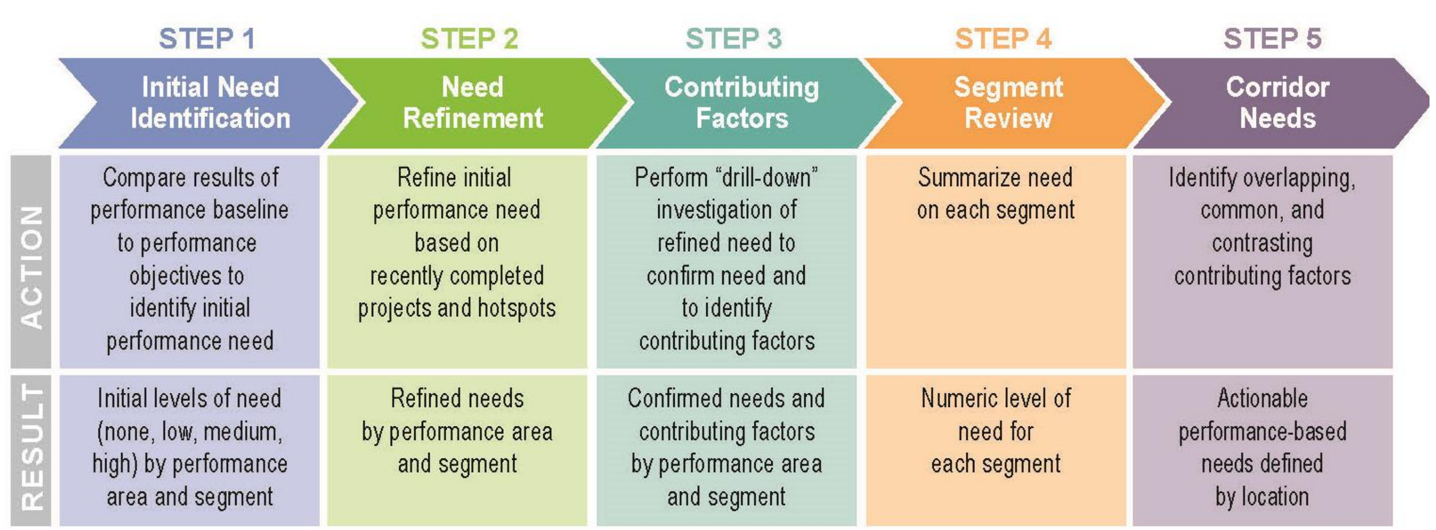
3.2 Needs Assessment Process

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
	Good	None*	All levels of Good and top 1/3 of Fair (>6.0)
	Good		
	Good		
6.5	Fair		
	Fair	Low	Middle 1/3 of Fair (5.5-6.0)
	Fair	Medium	Lower 1/3 of Fair and top 1/3 of Poor (4.5-5.5)
5.0	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 INRIX Database
- Highway Conditions Reporting System (HCRS) Database

Safety Performance Area

- Crash Database

Freight Performance Area

- INRIX 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 13** through **Table 17**.

Pavement Needs Refinement and Contributing Factors

- All Segments except 8-7 contain hot spots. Segments 8-1 thru 8-5, 8-7 and 8-9 have a Low level of need, Segment 8-6 has a Medium level of need, Segment 8-8 has a level of need of "None"
- Segment 8-2 went from None to Low due to pavement hot spot
- There are various recently completed projects but do not impact the segment needs as they do not address enough of the corridor to impact performance or the pavement treatment chosen is a life extensions treatment, not a project that would eliminate the needs
- See **Appendix D** for detailed information on contributing factors

Table 13: 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					
8-1	4.02	4.03	4.13	31%	0.60	EB/WB MP 0-1, WB MP 1-4, WB MP 6-11	None	Low
8-2	4.02	3.94	4.07	10%	0.00	WB MP 16-18	None	Low
8-3	3.79	3.69	3.82	42%	0.60	WB MP 29-30, EB MP 31-32, WB MP 32-34, EB/WB MP 34-46, EB/WB MP 54-55	2021 - Pavement Rehab MP 46-68, 2021 - Pavement Rehab MP 37-46	Low
8-4	4.00	3.71	4.05	35%	0.60	EB MP 71-72, EB/WB MP 72-78, WB MP 78-79, EB/WB MP 79-80	2021 - Pavement Rehab MP 46-68,	Low
8-5	4.41	4.22	4.34	13%	0.20	EB/WB MP 80-82, EB MP 107-109, EB/WB 109-110	2020 - Pavement Rehab MP 82-96	Low
8-6	3.32	3.62	3.43	60%	1.90	EB/WB MP 110-111, WB MP 111-113, EB/WB MP 113-114, WB MP 114-115, EB/WB MP 116-118, EB MP 118-119	None	Medium
8-7	3.70	3.84	3.88	48%	0.60	EB MP 121-123, WB MP 123-124, EB MP 124-125, EB/WB MP 125-127, EB MP 127-130, EB/WB MP 130-131, EB MP 131-132, WB MP 134-135, EB/WB MP 135-141	Pavement Rehab MP 134.6-141.12 (FY23)	Low
8-8	4.67	4.39	4.41	0%	0.00	None	2021 - Pavement Pres, MP 158.5-170.2	None
8-9	4.26	3.86	4.02	4%	0.00	EB MP 178-179	2021 - Pavement Pres, MP 158.5-170.2	Low

Need Scales for Interstates

Level of Need (Score)	Performance Score Need Scale			Segment Level Need Scale
None* (0)	> 3.5	> 3.63	< 10%	0
Low (1)	3.25 - 3.5	3.63 - 3.52	10% - 15%	< 1.5
Medium (2)	2.75 - 3.25	3.52 - 3.38	15% - 25%	1.5 - 2.5
High (3)	< 2.75	< 3.38	> 25%	> 2.5

Bridge Needs Refinement and Contributing Factors

- Segments 8-1, 8-2, 8-5, 8-8 and 8-9 contain Bridge hot spots
- Recently completed projects in Segments 8-1, and 8-2 impacted the final segment need
- See **Appendix D** for detailed information on contributing factors

Table 14: 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	Lowest Bridge Rating				
8-1	5.19	92.60	4.00	2.4	Colorado River Viaduct EB (#1700,MP 0.01), Fortuna SPRR OP EB (#1279, MP 8.69), Fortuna SPRR OP WB (#1280, MP 8.70)	Bridge Rehab in FY2022 Bridge 1701, Bridge 1700), Bridge Deck Repair MP 0.58-33	Low
8-2	5.31	87.67	5.00	2.2	Telpas OP WB Over EB (#972, MP 20.40)	Bridge Deck Repair MP 0.58-33	Low
8-3	6.32	95.69	6.00	0.0	None	2021 - Bridge Repair MP 46-68, Bridge Deck Repair MP 0.58-33	None
8-4	6.00	95.00	6.00	0.0	None	2022 - Bridge Repair MP 46-68	None
8-5	5.86	89.57	4.00	1.4	Gillespie Canal BR EB (#489, MP 107.02), Gillespie Canal BR SFR (#1009, MP 107.02)	None	Low
8-6	5.59	94.82	5.00	1.2	None	None	Low
8-7	6.08	91.34	6.00	0.0	None	None	None
8-8	5.64	91.09	5.00	1.2	Mendell Wash Br WB (#1065, MP 151.90), Mendell Wash Br EB (#1064, MP 151.90), Bridge EB (#1066, MP 153.40), Bridge WB (#1067, MP 153.40), Smith Road OP EB (#1068, MP 157.55), Smith Road OP WB (#1069, MP 157.55)	None	Low
8-9	8.58	90.36	5.00	0.2	Santa Cruz Wash BR EB (#1142, MP 170.90)	None	Low

Level of Need (Score)	Performance Score Need Scale			Segment Level Need Scale
None (0)	≥ 6.0	≥ 70	> 5	0
Low (1)	5.5 - 6.0	60 - 70	5	< 1.5
Medium (2)	4.5 - 5.5	40 - 60	4	1.5 - 2.5
High (3)	≤ 4.5	≤ 40	< 4	> 2.5

Mobility Needs Refinement and Contributing Factors

- Overall Mobility needs are None throughout the corridor
- There are no recently completed projects along the I-8 Corridor impacting final segment need
- See **Appendix D** for detailed information on contributing factors

Table 15: 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 LOTTR		% Bicycle Accommodation			
			EB	WB	EB	WB	EB	WB				
8-1	0.43	0.47	0.31	0.30	0.26	0.13	1.05	1.09	95%	0	None	None*
8-2	0.44	0.50	0.34	0.37	0.16	0.12	1.08	1.06	100%	0	None	None*
8-3	0.23	0.26	0.13	0.13	0.16	0.13	1.05	1.05	100%	0	None	None*
8-4	0.16	0.18	0.09	0.09	0.08	0.07	1.05	1.05	99%	0	None	None*
8-5	0.18	0.20	0.11	0.11	0.05	0.16	1.05	1.05	100%	0	None	None*
8-6	0.17	0.18	0.12	0.11	0.06	0.10	1.05	1.06	100%	0	None	None*
8-7	0.09	0.07	0.10	0.09	0.06	0.10	1.04	1.04	100%	0	None	None*
8-8	0.12	0.15	0.07	0.06	0.05	0.14	1.06	1.06	100%	0	None	None*
8-9	0.16	0.22	0.06	0.08	0.14	0.04	1.04	1.04	100%	0	None	None*

Level of Need (Score)	Performance Score Need Scale				Segment Level Need Scale
None* (0)	≤ 0.77 (Urban) ≤ 0.63 (Rural)	< 0.35	< 1.27[a]	> 80%	0
Low (1)	0.77 - 0.83 (Urban) 0.63 - 0.69 (Rural)	0.35 - 0.49	1.27 – 1.38	70% - 80%	< 1.5
Medium (2)	0.83 - 0.95 (Urban) 0.69 - 0.83 (Rural)	0.49 - 0.75	1.38 – 1.62	50% - 70%	1.5 - 2.5
High (3)	≥ 0.95 (Urban) ≥ 0.83 (Rural)	> 0.75	> 1.62	< 50%	> 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.*

Safety Needs Refinements and Contributing Factors

- Segments 8-2, 8-3, and 8-4 have "High" safety needs
- See **Appendix D** for detailed information on contributing factors

Table 16: 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 + Suspected Serious Injury Crashes at Intersections	% of Fatal + Suspected Serious Injury Crashes Involving Lane Departures	% of Fatal + Suspected Serious Injury Crashes Involving Pedestrians	% of Fatal + Suspected Serious Injury Crashes Involving Trucks	% of Fatal + Suspected Serious Injury Crashes Involving Bicycles				
		NB/EB	SB/WB									
8-1	0.69	0.47	0.92	Insufficient Data	55%	Insufficient Data	Insufficient Data	Insufficient Data	0.1	None	Bridge Deck Rehab MP 0.58-33 (2022), Bridge Rehab MP 0-4 (2022), Lighting Improvements (HPS to LED) MP 0-3 (2022)	Low
8-2	2.88	3.39	2.37	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	3.6	None	Bridge Deck Rehab MP 0.58-33 (2022)	High
8-3	1.08	0.66	1.50	Insufficient Data	83%	Insufficient Data	Insufficient Data	Insufficient Data	2.9	None	Bridge Deck Rehab MP 0.58-33 (2022), Pavement Rehab (2022)	High
8-4	1.61	1.06	2.16	Insufficient Data	85%	Insufficient Data	Insufficient Data	Insufficient Data	4.1	None	Pavement Rehab MP 71-82 (2023)	High
8-5	1.04	0.93	1.16	Insufficient Data	76%	Insufficient Data	Insufficient Data	Insufficient Data	1.6	None	None	Medium
8-6	0.43	0.86	0.00	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	0.0	None	None	None
8-7	0.62	0.82	0.43	Insufficient Data	91%	Insufficient Data	Insufficient Data	Insufficient Data	0.6	None	Pavement Rehab MP 134.6-141.12	Low
8-8	0.62	1.23	0.00	Insufficient Data	100%	Insufficient Data	Insufficient Data	Insufficient Data	0.8	None	None	Low
8-9	1.17	1.53	0.81	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data	2.3	None	None	Medium

Level of Need (Score)		Performance Score Needs Scale						Segment Level Need Scale
None* (0)	a	≤ 0.95	≤ 0%	≤ 74%	≤ 2%	≤ 20%	≤ 0%	0
	b	≤ 0.91	≤ 0%	≤ 66%	≤ 2%	≤ 9%	≤ 0%	
Low (1)	a	0.96 - 1.06	0%	75%	3%	21%	0%	≤ 1.5
	b	0.92 - 1.09	0%	72%	4%	11%	0%	
Medium (2)	a	1.07 - 1.26	0%	76% - 77%	> 3% & < 4%	22% - 23%	< 1%	1.5 - 2.5
	b	1.10 - 1.44	0%	73% - 83%	5% - 6%	12% - 14%	0%	
High (3)	a	≥ 1.27	≥ 0%	≥ 78%	≥ 4%	≥ 24%	≥ 1%	≥ 2.5
	b	≥ 1.45	≥ 0%	≥ 84%	≥ 7%	≥ 15%	≥ 0%	

**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 Refinements and Contributing Factors

- There are no bridge vertical clearance hot spots on the corridor
- All Segments have Low freight needs
- See **Appendix D** for detailed information on contributing factors

Table 17: Final Freight Needs

Segment #	Performance Score and Level of Need						Initial Segment Need	Hot Spots	Recently Completed Projects	Final Segment Need
	Freight Index	Directional TTTR		Closure Duration		Bridge Vertical Clearance				
		EB	WB	EB	WB					
8-1	1.27	1.21	1.27	52.67	22.86	15.33	3	4th Street UPRR UP	None	Low
8-2	1.28	1.33	1.24	25.88	21.49	16.14	2	Dome Valley Rd TI UP WB	None	Low
8-3	1.09	1.09	1.09	41.55	12.94	16.20	1	None	None	Low
8-4	1.08	1.08	1.08	7.26	9.15	No UP	0	None	None	Low
8-5	1.08	1.08	1.08	4.29	21.66	No UP	0	None	None	Low
8-6	1.13	1.14	1.11	3.75	15.96	16.61	0	None	None	Low
8-7	1.09	1.10	1.09	6.16	14.10	16.17	1	Vekol Road TI UP	None	Low
8-8	1.15	1.15	1.15	5.42	37.54	15.99	2	Stanfield Rd TI UP, Murphy Rd UP, Russell Road UP	None	Low
8-9	1.10	1.11	1.10	20.33	2.61	16	2	Thorton Rd TI UP, Chuichu Rd UP	None	Low

Level of Need (Score)		Performance Score Need Scale			Segment Level Need Scale
None* (0)	a b	< 1.58 < 1.22	< 71.07	> 16.33	0
Low (1)	a b	1.58 – 1.72 1.22 – 1.28	71.07 - 97.97	16.17 - 16.33	< 1.5
Medium (2)	a b	1.72 – 1.98 1.28 – 1.42	97.97 - 151.75	15.83 - 16.17	1.5 - 2.5
High (3)	a b	> 1.98 > 1.42	> 151.75	< 15.83	> 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.*

Segment Review

The needs for each segment were combined to numerically estimate the average level of need for each segment of the corridor. **Table 18** 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 (Pavement, Bridge, and Safety for the I-8 Corridor). There are no segments with a High average need, two segments with a Medium average need, and seven segments with a Low average need.

Table 18: Summary of Needs by Segment

Performance Area	Segment Number and Mileposts (MP)								
	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9
	MP 0-16.3	MP 16.3-21.4	MP 21.4-56.5	MP 56.5-79.6	MP 79.6-110.4	MP 110.4-120	MP 120-147.6	MP 147.6-166.5	MP 166.5-178
Pavement	Low	Low	Low	Low	Low	Medium	Low	None	Low
Bridge	Low	Low	None	None	Low	Low	None	Low	Low
Mobility+	None	None	None	None	None	None	None	None	None
Safety+	Low	High	High	High	Medium	None	Low	Low	Medium
Freight+	Medium	Medium	Low	None	None	None	Low	Low	Low
Average Need	**1.00**	**1.46**	**1.08**	**0.85**	**0.77**	**0.46**	**0.62**	**0.62**	**1.00**

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

+ Identified as an emphasis area for the I-8 Corridor

** 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*

<u>*Summary of Corridor*</u>

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

Pavement Needs

- The Pavement Performance Area is not an emphasis area for the I-8 Corridor.
- Segment 8-8 has a level of need of “None” and have no hot spots
- There are various recently completed projects but do not impact the segment needs as they do not address enough of the corridor to impact performance or the pavement treatment chosen is a life extensions treatment, not a project that would eliminate the needs.

Bridge Needs

- The Bridge Performance Area is not an emphasis area for the I-8 Corridor.
- Segments 8-1, 8-2, 8-5, 8-8, and 8-9 contain Bridge hot spots
- There are recently completed projects in Segments 8-1 and 8-2 that could impact final segment need

Mobility Needs

- The Mobility Performance Area is an emphasis area for the I-8 Corridor.
- Overall Mobility needs are “None” throughout the corridor
- There are no recently completed projects along the I-8 Corridor impacting final segment need

Safety Needs

- The Safety Performance Area is an emphasis area for the I-8 Corridor.
- Segments 8-2, 8-3, and 8-4 have “High” safety needs
- No Segments contain Safety hot spots

Freight Needs

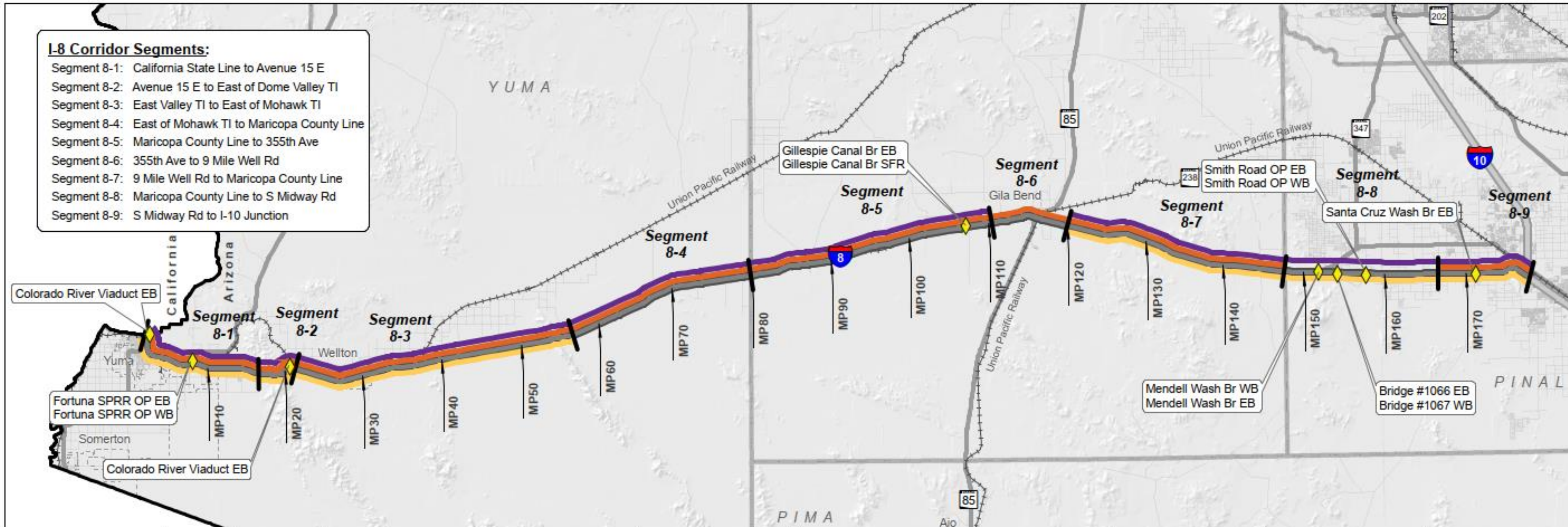
- The Freight Performance Area is an emphasis area for the I-8 Corridor.
- There are 8 bridge vertical clearance hot spots on the corridor
- No Segments have “High” closure duration need
- Segments 8-1 and 8-2 have “Medium” freight needs

<u>*Overlapping Needs*</u>

This section identifies overlapping performance needs on the I-8 Corridor, which provides guidance to develop strategic solutions that address more than one performance area with elevated levels of need. Completing projects that address multiple needs presents the opportunity to more effectively improve overall performance. A summary of the overlapping needs that relate to locations with elevated levels of need is provided below:

- Three segments I-8 Corridor shows some level of need in four out of the five performance areas
- Segments 8-2 and 8-3 have the highest levels of overall need
- Segments 8-2, 8-3, and 8-4 are the only segments with a “High” Emphasis Area need (Safety)

Figure 21: Corridor Needs Summary



Performance Area	8-1 MP 0-16.3	8-2 MP 16.3-21.4	8-3 MP 21.4-56.5	8-4 MP 56.5-79.6	8-5 MP 79.6-110.4	8-6 MP 110.4-120	8-7 MP 120-147.6	8-8 MP 147.6-166.5	8-9 MP 166.5-178
Pavement	Low	Low	Low	Low	Low	Medium	Low	None	Low
Bridge	Low	Low	None	None	Low	Low	None	Low	Low
Mobility*	None	None	None	None	None	None	None	None	None
Safety*	Low	High	High	High	Medium	None	Low	Low	Medium
Freight*	Medium	Medium	Low	None	None	None	Low	Low	Low
Average Need	1.00	1.46	1.08	0.85	0.77	0.46	0.62	0.62	1.00

* Identified as Emphasis Area

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

I-8 Corridor Profile Study: California State Line to I-10
Corridor Needs Summary

N
Miles
0 10 20

Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail

NEEDS SUMMARY
SAFETY
PAVEMENT
FREIGHT
MOBILITY
BRIDGE

Level of Need	Average Need
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 I-8 strategic investment areas (resulting from the elevated needs) are shown in **Figure 22**.

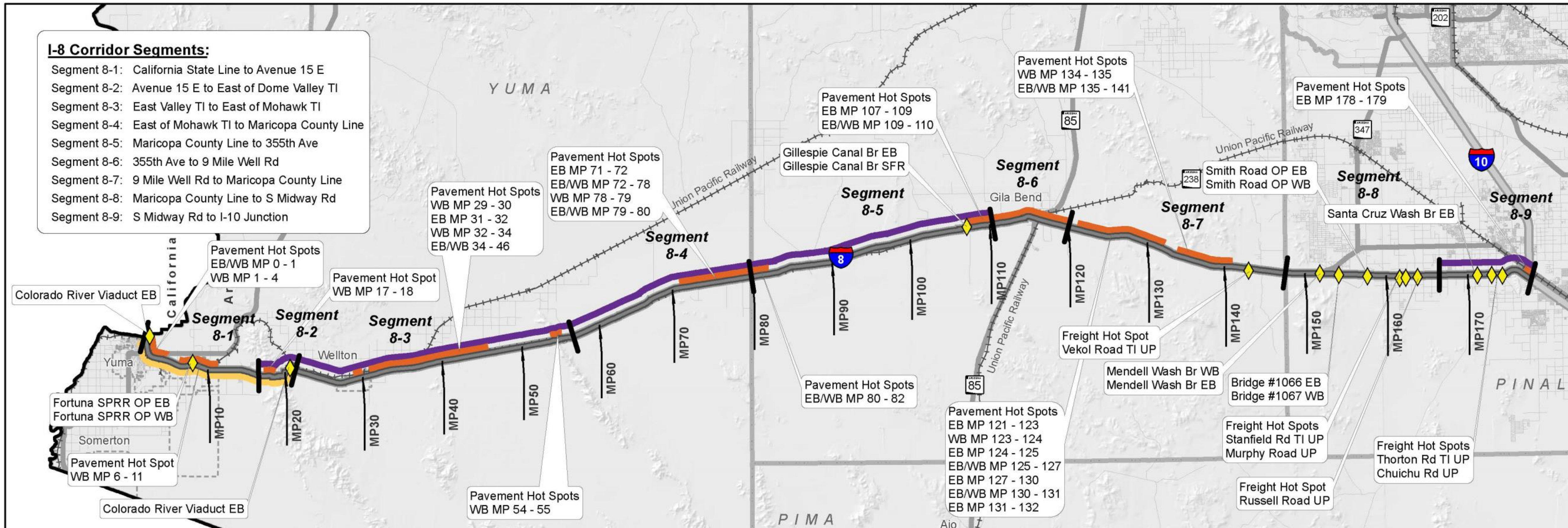
4.1 Screening Process

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 19 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 Area	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9
	MP 0-16.3	MP 16.3-21.4	MP 21.4-56.5	MP 56.5-79.6	MP 79.6-110.4	MP 110.4-120	MP 120-147.6	MP 147.6-166.5	MP 166.5-178
Pavement	Hot Spot	Hot Spot	Hot Spot	Hot Spot	Hot Spot	Medium	Hot Spot	-	Hot Spot
Bridge	Hot Spot	Hot Spot	-	-	Hot Spot	-	-	Hot Spot	Hot Spot
Mobility*	-	-	-	-	-	-	-	-	-
Safety*	-	High	High	High	Medium	-	-	-	Medium
Freight*	Medium	Medium	-	-	-	-	Hot Spot	Hot Spot	Hot Spot

* Identified as Emphasis Areas for I-8 Corridor
# N/A indicates insufficient or no data available to determine level of need

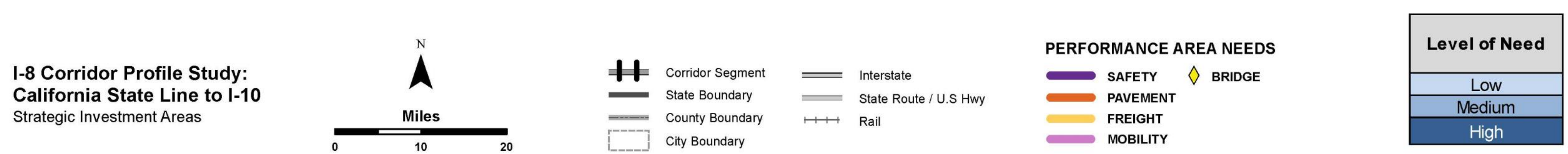


Table 19: Strategic Investment Area Screening

Segment # and MP	Level of Strategic Need					Location #	Type	Need Description	Advance (Y/N)	Screening Description
	Pavement	Bridge	Mobility	Safety	Freight					
8-1 MP 0.0-16.3	Hot Spot	Hot Spot	-	-	Medium	L1	Pavement	Pavement hot spot EB/WB MP 0-1; High level of historical investment has occurred on Segment 8-1	Y	No programmed project to address pavement hot spot; High historical investment
						L2	Pavement	Pavement hot spot WB MP 1-4 (High Cracking and Rutting); High level of historical investment	Y	No programmed project to address pavement hot spot; High historical investment
						L3	Pavement	Pavement hot spot WB MP 6-11 (High Cracking and Rutting); High level of historical investment	Y	No programmed project to address pavement hot spot; High historical investment
						L4	Bridge	Bridge hot spot, Colorado River Viaduct EB (#1700, MP 0.01), Deck (4)	N	Colorado River Viaduct EB Bridge is scheduled for rehab in FY2022.
						L5	Bridge	Hot spot at Fortuna SPRR OP EB (#1279, MP 8.69), Deck (5), Sub (5), Eval (5)	N	Bridge does not meet criteria for historical review, have multiple ratings of 5, therefore not considered strategic.
						L6	Bridge	Bridge hot spot at Fortuna SPRR OP WB (#1280, MP 8.70), Deck (5), Sub (5), Eval (5)	N	Bridge does not meet criteria for historical review, have multiple ratings of 5, therefore not considered strategic.
						L7	Freight	Freight shows a Medium level of need, slightly elevated Freight Index and TTTR. The Bridge Clearance is an issue for a portion of the Segment	Y	No programmed project to address Freight Need.
						L8	Freight	There is a height restriction hot spot located at the 4th Street UPRR UP (MP 0.58), clearance is < 16.25 with no ramp	Y	Bridge is located adjacent to the I-8 mainline and is therefore screened out from further consideration
8-2 MP 16.3-21.4	Hot Spot	-	-	High	Medium	L9	Pavement	Pavement hot spot WB MP 17-18 (High Cracking and Rutting); High level of historical investment has occurred on Segment 8-2	Y	No programmed project to address pavement hot spot; High historical investment
						L10	Safety	Crash trends show single vehicle (83%), speed too fast for conditions (33%), overturning (67%), ran off the road left (33%), and daylight conditions (67%)	Y	No programmed project to address Safety need.
						L11	Freight	Medium Freight need due to Freight Index, Directional TTTR and one bridge clearance issue	Y	No programmed project to address Freight Need.
						L12	Freight	Hot spot at Dome Valley Rd TI UP WB (#1325, MP 21.06). Clearance < 16.25 with no ramp	Y	No programmed project to address Freight hot spot.
8-3 MP 21.4-56.5	Hot Spot	-	-	High	-	L13	Pavement	Pavement hot spot WB MP 29-30 (High Rutting); Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L14	Pavement	Pavement hot spot EB MP 31-32 (High IRI, Cracking, and Rutting); Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L15	Pavement	Pavement hot spot WB MP 32-34 (High IRI, Cracking, and Rutting); Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L16	Pavement	Pavement hot spot EB/WB 34-46 (High IRI, Cracking, and Rutting); Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L17	Pavement	Pavement hot spot WB MP 54-55 (High Cracking and Rutting)	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L18	Safety	Safety shows a High need. Crash trends show single vehicle (70%), speed too fast for conditions (30%), overturning (48%), ran off the road right (26%), and daylight conditions (74%)	Y	No programmed project to address the Safety need.

Legend: Strategic investment area screened out from further consideration

Table 19: 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					
8-4 MP 56.5-79.6	Hot Spot	-	-	High	-	L19	Pavement	Pavement hot spot EB MP 71-72 (High Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic. Pavement Rehab project has been programmed which will address the hot spot.
						L20	Pavement	Pavement hot spot EB/WB 72-78 (High IRI, Cracking, and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic. Pavement Rehab project has been programmed which will address the hot spot.
						L21	Pavement	Pavement hot spot WB MP 78-79 (High Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L22	Pavement	Pavement hot spot EB/WB MP 79-80 (High IRI, Cracking, and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L23	Safety	Safety shows a High need. Crash trends show single vehicle (65%), day light conditions (60%, overturning (50%)	Y	No programmed project to address the Safety need.
8-5 MP 79.6-110.4	Hot Spot	Hot Spot	-	Medium	-	L24	Pavement	Pavement hot spot EB/WB MP 80-82 (High IRI and Rutting); Low level of historical investment has occurred on Segment 8-5	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L25	Pavement	Pavement hot spot EB MP 107-109 (High IRI and Rutting); Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L26	Pavement	Pavement hot spot EB/WB MP 109-110 (High IRI and Rutting); Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L27	Bridge	Bridge hot spot at Gillespie Canal Br EB (#489, MP 107.02), Super (4), Eval (4)	Y	No programmed project to address the Bridge hot spot; High level of historical rating.
						L28	Bridge	Bridge hot spot at Gillespie Canal SFR (#1009, MP 107.02), Deck (5), Sub (5), Super (5), Eval (5)	N	Bridge does not meet criteria for historical review, have multiple ratings of 5, therefore not considered strategic.
						L29	Safety	Medium Safety need. Crash trends show single vehicle (67%), speed too fast for conditions (38%), ran off the road left (29%), and daylight conditions (52%)	Y	No programmed project to address the Safety need.
8-6 MP 110.4-120	Medium	-	-	-	-	L30	Pavement	Pavement shows a Medium need and has multiple hot spots at WB MP 111-113, EB/WB MP 113-114, WB MP 114-115, EB/WB MP 116-118, EB MP 118-119; Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.

Legend: Strategic investment area screened out from further consideration

Table 19: 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					
8-7 MP 120-147.6	Hot Spot	-	-	-	Hot Spot	L31	Pavement	Pavement hot spot EB MP 121-123 (Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L32	Pavement	Pavement hot spot WB MP 123-124 (Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L33	Pavement	Pavement hot spot EB MP 124-125 (Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L34	Pavement	Pavement hot spot EB/WB MP 125-127 (Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L35	Pavement	Pavement hot spot EB MP 127-130 (Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L36	Pavement	Pavement hot spot EB/WB MP 130-131 (Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L37	Pavement	Pavement hot spot EB 131-132 (Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.
						L38	Pavement	Pavement hot spot WB MP 134-135 (Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic. Pavement Rehab project will address the hot spot.
						L39	Pavement	Pavement hot spot EB/WB MP 135-141 (High IRI, Cracking and Rutting); Medium level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic. Pavement Rehab project will address the hot spot.
						L40	Freight	Freight hot spot at Vekol Road TI UP (#550, MP 144.55). Clearance 16.17 with no ramp	Y	No programmed project to address the Freight hot spot.
8-8 MP 147.6-166.5	-	Hot Spot	-	-	Hot Spot	L41	Bridge	Bridge hot spot at Mendell Wash Br WB (#1065, MP 151.90) Deck (5), Sub (5), Eval (5)	Y	No programmed project to address the bridge hot spot; High historical rating
						L42	Bridge	Bridge hot spot at Mendell Wash Br EB (#1064, MP 151.90), Deck (5), Sub (5), Eval (5)	Y	No programmed project to address the bridge hot spot; High historical rating
						L43	Bridge	Bridge hot spot at Bridge EB (#1066, MP 153.40), Deck (5), Sub (5), Eval (5)	Y	No programmed project to address the bridge hot spot; High historical rating
						L44	Bridge	Bridge hot spot at Bridge WB (#1067, MP 153.45), Deck (5), Sub (5), Eval (5)	Y	No programmed project to address the bridge hot spot; High historical rating
						L45	Bridge	Bridge hot spot at Smith Road OP EB (#1068, MP 157.55), Deck (5), Sub (5), Eval (5)	N	Bridge does not meet criteria for historical investment, have multiple ratings of 5, therefore not considered strategic.
						L46	Bridge	Bridge hot spot at Smith Road OP WB (#1069, MP 157.55), Deck (5), Sub (5), Eval (5)	N	Bridge does not meet criteria for historical investment, have multiple ratings of 5, therefore not considered strategic.
						L47	Freight	Freight hot spot at Stanfield Rd TI UP (#1090, MP 161.60). Clearance 16.11 with no ramp	Y	No programmed project to address the Freight hot spot.
						L48	Freight	Freight hot spot at Murphy Rd UP (#1091, MP 162.50). Clearance 16.21 with no ramp	Y	No programmed project to address the Freight hot spot.
						L49	Freight	Freight hot spot at Russell Road UP (#1094, MP 164.50). Clearance 16.24 with no ramp	Y	No programmed project to address the Freight hot spot.
8-9 MP 166.5-178	Hot Spot	Hot Spot	-	Medium	Hot Spot	L50	Bridge	Bridge hot spot at Santa Cruz Wash BR EB (#1142, MP 170.90), Deck (5), Sub (5), Super (6), Eval (5)	N	Bridge does not meet criteria for historical investment, have multiple ratings of 5, therefore not considered strategic.
						L51	Safety	Crash trends show single vehicle (60%), speed too fast for conditions (80%), overturning (40%), and daylight conditions (80%)	Y	No programmed project to address the Safety need.
						L52	Freight	Freight hot spot at Thornton Rd TI UP (#1196, MP 172.55). Clearance 16.00 with no ramp	Y	No programmed project to address the Freight hot spot.
						L53	Freight	Freight hot spot at Chuichu Rd UP (#1197, MP 173.55). Clearance 16.04 with no ramp	Y	No programmed project to address the Freight hot spot.
						L55	Pavement	Pavement hot spot EB MP 178-179; Low level of historical investment	N	Does not meet criteria for previous investment, therefore not considered strategic.

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 I-8 Corridor will be considered along with other candidate projects in the ADOT statewide programming process.

Characteristics of Strategic 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 24 candidate solutions are proposed to address the identified needs on the I-8 Corridor.

Table 20 identifies each strategic location that has been assigned a candidate solution with a number (e.g., CS8.1, CS8.2, 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 will 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.

Table 20: Candidate Solutions

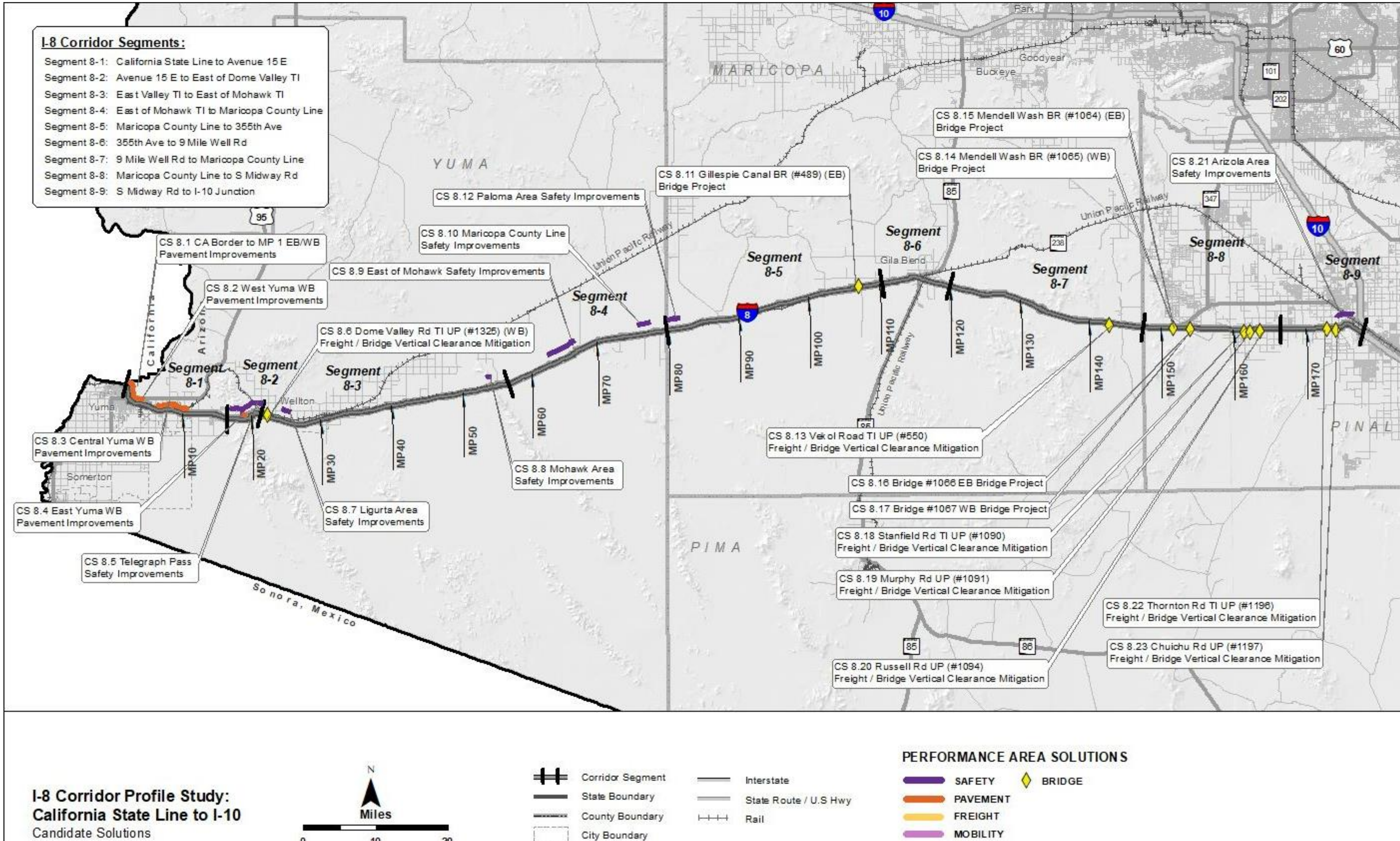
Candidate Solution #	Segment #	Location #	Beginning Milepost	Ending Milepost	Candidate Solution Name	Option*	Candidate Solution Scope	Investment Category (Preservation [P] Modernization [M] Expansion [E])
CS8.1	8-1	L1	0	1	CA Border to MP 1 EB/WB Pavement Improvements	A	-Rehabilitate pavement	P
						B	-Replace pavement	M
CS8.2	8-1	L2	1	4	West Yuma WB Pavement Improvements	A	-Rehabilitate pavement	P
						B	-Replace pavement	M
CS8.3	8-1	L3	6	11	Central Yuma WB Pavement Improvements	A	-Rehabilitate pavement	P
						B	-Replace pavement	M
CS8.4	8-2	L9	17	18	East Yuma WB Pavement Improvements	A	-Rehabilitate pavement	P
						B	-Replace pavement	M
CS8.5	8-2	L10	19.5	21	Telegraph Pass Safety Improvements	-	-Install an Eastbound speed feedback sign at MP 19.5 -Install chevrons, delineators, and raised reflective pavement markers along curve at MP 20.5-21	M
CS8.6	8-2	L11 & L12	21.91	21.21	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	A	-Reprofile mainline	M
						B	-Replace bridge	M
CS8.7	8-3	L18	24	25	Ligurta Area Safety Improvements	-	-Widen median shoulder in the westbound direction	M
CS8.8	8-3	L18	54	54.5	Mohawk Area Safety Improvements	-	-Install eastbound guardrail on the outside edge of traveled way	M
CS8.9	8-4	L23	66.35	66.95	East of Mohawk Area Safety Improvements	-	-Install EB chevrons	M
CS8.10	8-4	L23	76	78	Maricopa County Line Area Safety Improvements	-	-Widen median shoulders	M
CS8.11	8-5	L27	107.02	107.02	Gillespie Canal BR (#489) (EB) Bridge Project	A	-Rehabilitate bridges	P
						B	-Replace bridge	M
CS8.12	8-5	L29	80	82	Paloma Area Safety Improvements	-	-Widen median shoulders	M
CS8.13	8-7	L40	144.55	144.55	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	A	-Reprofile mainline	M
						B	-Replace bridge	M
CS8.14	8-8	L41	151.90	151.90	Mendell Wash BR (#1065) (WB) Bridge Project	A	-Rehabilitate bridge	P
						B	-Replace bridge	M
CS8.15	8-8	L42	151.90	151.90	Mendell Wash BR (#1064) (EB) Bridge Project	A	-Rehabilitate bridge	P
						B	-Replace bridge	M
CS8.16	8-8	L43	153.40	153.40	Bridge EB (#1066) Bridge Project	A	-Rehabilitate bridge	P
						B	-Replace bridge	M
CS8.17	8-8	L44	153.45	153.45	Bridge WB (#1067) Bridge Project	A	-Rehabilitate bridge	P
						B	-Replace bridge	M
CS8.18	8-8	L47	161.60	161.60	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	A	-Reprofile mainline	M
						B	-Replace bridge	M

Table 20: Candidate Solutions (continued)

Candidate Solution #	Segment #	Location #	Beginning Milepost	Ending Milepost	Candidate Solution Name	Option*	Candidate Solution Scope	Investment Category (Preservation [P] Modernization [M] Expansion [E])
CS8.19	8-8	L48	162.50	162.50	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	A	-Reprofile mainline	M
						B	-Replace bridge	M
CS8.20	8-8	L49	164.50	164.50	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	A	-Reprofile mainline	M
						B	-Replace bridge	M
CS8.21	8-9	L52	175	176	Arizola Area Safety Improvements	-	-Install curve warning signs with advisory speed plaque -Install raised pavement markers at both edges the roadway (both directions of travel) -Install chevron signs along curve in eastbound and westbound directions	M
CS8.22	8-9	L53	172.55	172.55	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	A	-Reprofile mainline	M
						B	-Replace bridge	M
CS8.23	8-9	L54	173.55	173.55	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	A	-Reprofile mainline	M
						B	-Replace bridge	M

* ‘-‘: indicates only one solution is being proposed and no options are being considered

Figure 23: Candidate Solutions



5. 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.

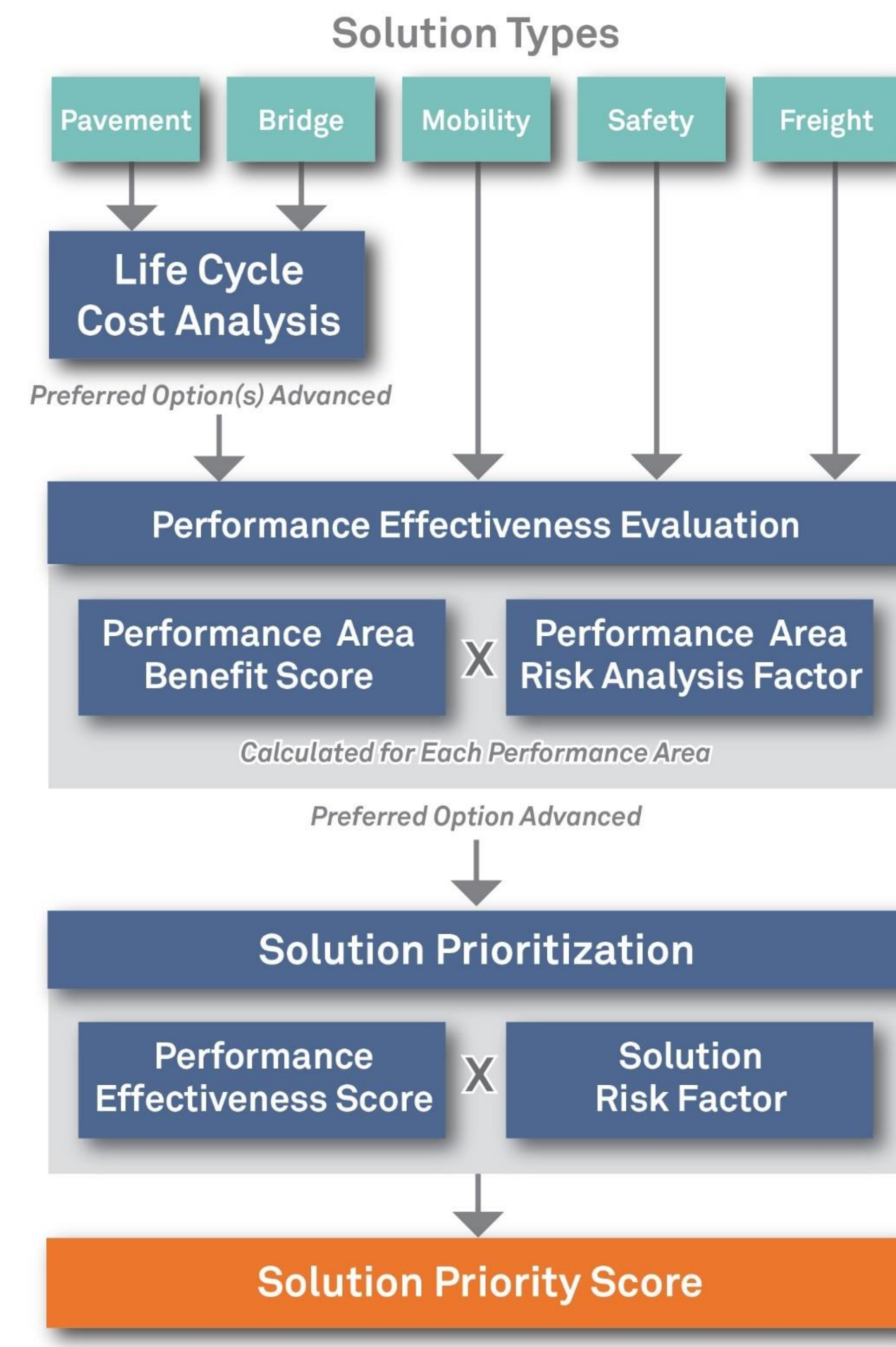
Solution Risk Analysis

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.

<u>Bridge LCCA</u>

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 2022 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 10**, LCCA was conducted for five bridge solutions on the I-8 Corridor, as noted in **Table 21**. Additional information regarding the bridge LCCA is included in **Appendix E**.

<u>Pavement LCCA</u>

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 2022 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 20**, LCCA was conducted for four pavement solutions on the I-8 Corridor, as noted in **Table 22**. Additional information regarding the pavement LCCA is contained in **Appendix E**.

As shown in **Table 21** and **Table 22**, 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. Therefore, it is assumed that the identified needs will be addressed by normal programming processes and these candidate solutions will be dropped from further consideration.
  - Mendell Wash Br WB #01065 (CS8.14, MP 151.90)
  - Mendell Wash Br EB #1064 (CS8.15, MP 151.90)
  - Bridge EB #01066 (CS8.176, MP 153.40)
  - Bridge WB #01067 (CS8.17, MP 153.45)
  - CA Border to MP 1 EB/WB Pavement Improvements (CS8.1, MP 0 – MP 1)
  - WB MP 1 – MP 4 Pavement Improvements (CS8.2, MP 1 – MP 4)
  - WB MP 17 – MP 18 Pavement Improvements (CS8.4, MP 17 – MP 18)
- Replacement or reconstruction was determined to be the most effective approach for the candidate solutions listed below; the replacement/reconstruction option of these solutions was carried forward to the Performance Effectiveness Evaluation:
  - Gillespie Canal Br EB #00489 (CS8.11, MP 107.02)
  - WB MP 6 – MP 11 Pavement Improvements (CS8.3, MP 6 – MP 11)

Table 21: 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		
Gillespie Canal Br EB #00489 (CS8.12, MP 107.02)	**$584,659.77**	$671,260.49	$549,821.87	1.06	1.22	1.0	Y	Service life complete by 2032 – Replacement is recommended
Mendell Wash Br WB #01065 (CS8.15, MP 151.90)	$1,853,386.58	$2,445,686.81	**$1,597,386.36**	1.16	1.53	1.0	Y	Not strategic solution alone – Rehabilitation is recommended
Mendell Wash Br EB #1064 (CS8.16, MP 151.90)	$2,110,818.17	$2,785,387.68	**$1,819,260.04**	1.16	1.53	1.0	Y	Not strategic solution alone – Rehabilitation is recommended
Bridge EB #01066 (CS8.17, MP 153.40)	$2,015,770.53	$2,658,827.53	**$1,728,785.56**	1.17	1.54	1.0	Y	Not strategic solution alone – Rehabilitation is recommended
Bridge WB #01067 (CS8.18, MP 153.45)	$2,015,770.53	$2,658,827.53	**$1,728,785.56**	1.17	1.54	1.0	Y	Not strategic solution alone – Rehabilitation is recommended

Table 22: 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		
CA Border to MP 1 EB/WB Pavement Improvements (CS8.1, MP 0 – MP 1)	$15,307,836	$14,012,198	$10,979,690	$12,242,639	1.39	1.28	1.00	1.12	Y	Asphalt rehabilitation is the lowest option and reconstruction is not within 15% of lowest cost. Not strategic as a stand-alone solution
East Yuma WB Pavement Improvements (CS8.2, MP 1 – MP 4)	$22,721,395	$21,018,296	$18,153,964	$20,785,415	1.25	1.16	1.00	1.14	Y	Asphalt rehabilitation is the lowest option and reconstruction is not within 15% of lowest cost. Not strategic as a stand-alone solution
Central Yuma WB Pavement Improvements (CS8.3, MP 6 – MP 11)	$38,269,589	$35,030,494	$37,855,947	$33,644,180	1.14	1.04	1.13	1.00	Y	Asphalt rehabilitation is the lowest option and asphalt reconstruction is within 15% of the lowest rehabilitation cost - Replacement is recommended
East Yuma WB Pavement Improvements (CS8.5, MP 17 – MP 18)	$7,653,918	$7,006,099	$5,489,845	$6,121,319	1.39	1.28	1.00	1.12	Y	Asphalt rehabilitation is the lowest option and reconstruction is not within 15% of lowest cost. Not strategic as a stand-alone solution

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 PES as defined in Section 5.0. 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) and Safety Index (due to crash reductions) would have a direct effect on the LOTTR 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 TTTR 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 daily volume and length of solution

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

The resulting PES values are shown in **Table 23**. 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 I-8 Corridor, the following candidate solutions have options to address Mobility, Safety, or Freight needs:

- CS8.6 (A and B) – Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation
- CS8.13 (A and B) – Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation
- CS8.18 (A and B) – Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation
- CS8.19 (A and B) – Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation
- CS8.20 (A and B) – Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation
- CS8.22 (A and B) – Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation
- CS8.23 (A and B) – Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation

Table 23: 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	Safety	Mobility	Freight				
CS8.3	8-1	B	Central Yuma WB Pavement Improvements	6-11	31.30	1.475	0.000	0.000	0.009	0.000	0.055	0.000	0.000	1.539	3.31	15.3	2.5
CS8.5	8-2	-	Telegraph Pass Safety Improvements	19.5-21	0.14	0.000	0.000	0.000	1.359	2.988	0.058	0.000	0.057	4.462	3.49	20.20	2247.5
CS8.6	8-2	A	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	21.06	1.26	0.000	0.000	0.000	0.000	1.379	0.000	0.000	0.000	1.379	0.29	15.30	4.8
CS8.6	8-2	B	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	21.06	3.91	0.000	0.962	0.000	0.000	1.480	0.000	0.000	0.000	2.441	0.29	30.60	5.4
CS8.7	8-3	-	Ligurta Area Safety Improvements	24-25	1.10	0.000	0.000	0.000	0.415	0.052	0.067	0.000	0.112	0.646	0.76	20.20	9.0
CS8.8	8-3	-	Mohawk Area Safety Improvements	54-54.5	0.28	0.000	0.000	0.000	0.200	0.052	0.040	0.000	0.130	0.421	0.40	20.20	11.9
CS8.9	8-4	-	East of Mohawk Area Safety Improvements	63-67	0.03	0.000	0.000	0.000	0.007	0.000	0.001	0.000	0.172	0.181	2.20	20.20	267.2
CS8.10	8-4	-	Maricopa County Line Area Safety Improvements	76-78	4.43	0.000	0.000	0.000	0.187	0.000	0.030	0.000	0.034	0.251	1.26	20.20	1.4
CS8.11	8-5	B	Gillespie Canal BR (#489) (EB) – Bridge Replacement	107.02	1.05	0.000	1.255	0.000	0.000	0.000	0.000	0.000	0.000	1.255	0.19	30.60	7.1
CS8.12	8-5	-	Paloma Area Safety Improvements	80-82	2.21	0.000	0.000	0.000	0.116	0.000	0.015	0.000	0.028	0.159	1.35	20.20	2.0
CS8.13	8-7	A	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	144.55	1.26	0.000	0.000	0.000	0.000	1.191	0.000	0.000	0.000	1.191	0.25	15.30	3.5
CS8.13	8-7	B	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	144.55	4.80	0.000	1.571	0.000	0.000	1.236	0.000	0.000	0.000	2.807	0.25	30.60	4.4

Table 24:: Performance Effectiveness Scores (continued)

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	Safety	Mobility	Freight				
CS8.18	8-8	A	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	161.60	1.26	0.000	0.000	0.000	0.000	1.715	0.000	0.000	0.000	1.585	0.21	15.30	4.0
CS8.18	8-8	B	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	161.60	7.20	0.000	0.233	0.000	0.000	1.729	0.000	0.000	0.000	1.948	0.21	30.60	1.7
CS8.19	8-8	A	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	162.50	1.26	0.000	0.000	0.000	0.000	1.715	0.000	0.000	0.000	1.729	0.21	15.30	4.4
CS8.19	8-8	B	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	162.50	5.86	0.000	0.192	0.000	0.000	1.773	0.000	0.000	0.000	1.907	0.21	30.60	2.1
CS8.20	8-8	A	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	164.50	1.26	0.000	0.000	0.000	0.000	1.715	0.000	0.000	0.000	1.773	0.21	15.30	4.5
CS8.20	8-8	B	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	164.50	6.50	0.000	0.566	0.000	0.000	0.425	0.000	0.000	0.000	1.773	0.21	30.60	1.7
CS8.21	8-9	-	Arizola Area Safety Improvements	175-176	0.16	0.000	0.000	1.129	0.000	1.318	0.074	0.000	0.095	2.449	0.52	20.20	162.0
CS8.22	8-9	A	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	172.55	1.26	0.000	0.000	0.000	0.000	1.775	0.000	0.000	0.000	1.553	0.27	15.30	5.1
CS8.22	8-9	B	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	172.55	7.44	0.000	0.000	0.000	0.000	0.540	0.000	0.000	0.000	1.318	0.27	30.60	1.5
CS8.23	8-9	A	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	173.55	1.26	0.000	0.000	0.000	0.000	0.608	0.000	0.000	0.000	1.775	0.27	15.30	5.8
CS8.23	8-9	B	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	173.55	6.21	0.000	0.000	0.000	0.000	1.715	0.000	0.000	0.000	0.540	0.27	30.60	0.7

*: 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

Frequency/Likelihood		Severity/Consequence				
		Insignificant	Minor	Significant	Major	Catastrophic
	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 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

Frequency/Likelihood			Severity/Consequence				
			Insignificant	Minor	Significant	Major	Catastrophic
		Weight	1.00	1.10	1.20	1.30	1.40
	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 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 23***

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 18***

Table 24 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. A prioritized list of candidate solutions is provided in the subsequent section. See **Appendix J** for additional information on the prioritization process.

Table 25: 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
CS8.3	8-1	B	Central Yuma WB Pavement Improvements	6-11	31.30	2.5	1.167	1.00	**3**	48.39%	0.00%	-	1.41%	0.00%
CS8.5	8-2	-	Telegraph Pass Safety Improvements	19.5-21	0.14	2247.5	1.493	1.46	**4905**	0.00%	0.00%	-	18.76%	25.24%
CS8.6	8-2	A	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	21.06	1.26	4.8	1.360	1.46	**9**	0.00%	0.00%	-	0.00%	11.65%
CS8.6	8-2	B	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	21.06	3.91	5.4	1.419	1.46	**11**	0.00%	21.79%	-	0.00%	12.50%
CS8.7	8-3	-	Ligurta Area Safety Improvements	24-25	1.10	9.0	1.674	1.08	**16**	0.00%	0.00%	-	22.77%	3.24%
CS8.8	8-3	-	Mohawk Area Safety Improvements	54-54.5	0.28	11.9	1.599	1.08	**21**	0.00%	0.00%	-	10.95%	3.24%
CS8.9	8-4	-	East of Mohawk Area Safety Improvements	63-67	0.03	267.2	1.379	0.85	**312**	0.00%	0.00%	-	0.18%	0.86%
CS8.10	8-4	-	Maricopa County Line Area Safety Improvements	76-78	4.43	1.4	1.723	0.85	**2**	0.00%	0.00%	-	4.92%	0.00%
CS8.11	8-5	B	Gillespie Canal BR (#489) (EB) – Bridge Replacement	107.02	1.05	7.1	1.510	0.77	**8**	0.00%	47.59%	-	0.00%	0.00%
CS8.12	8-5	-	Paloma Area Safety Improvements	80-82	2.21	2.0	1.706	0.77	**3**	0.00%	0.00%	-	8.61%	0.00%
CS8.13	8-7	A	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	144.55	1.26	3.5	1.360	0.62	**3**	0.00%	0.00%	-	0.00%	65.51%
CS8.13	8-7	B	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	144.55	4.80	4.4	1.444	0.62	**4**	0.00%	100.00%	-	0.00%	67.99%

Table 26: Prioritization Scores (continued)

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
CS8.18	8-8	A	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	161.60	1.26	4.0	1.360	0.62	**3**	-	0.00%	-	0.00%	44.83%
CS8.18	8-8	B	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	161.60	7.20	1.7	1.378	0.62	**1**	-	25.76%	-	0.00%	48.51%
CS8.19	8-8	A	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	162.50	1.26	4.4	1.360	0.62	**4**	-	0.00%	-	0.00%	48.91%
CS8.19	8-8	B	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	162.50	5.86	2.1	1.375	0.62	**2**	-	21.21%	-	0.00%	48.51%
CS8.20	8-8	A	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	164.50	1.26	4.5	1.360	0.62	**4**	-	0.00%	-	0.00%	50.14%
CS8.20	8-8	B	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	164.50	6.50	1.7	1.397	0.62	**2**	-	24.24%	-	0.00%	48.51%
CS8.21	8-9	-	Arizola Area Safety Improvements	175-176	0.16	162.0	1.653	1.00	**268**	0.00%	0.00%	-	67.94%	16.76%
CS8.22	8-9	A	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	172.55	1.26	5.1	1.360	1.00	**7**	0.00%	0.00%	-	0.00%	52.04%
CS8.22	8-9	B	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	172.55	7.44	1.5	1.360	1.00	**2**	0.00%	0.00%	-	0.00%	70.05%
CS8.23	8-9	A	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	173.55	1.26	5.8	1.360	1.00	**8**	0.00%	0.00%	-	0.00%	62.25%
CS8.23	8-9	B	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	173.55	6.21	0.7	1.360	1.00	**1**	0.00%	0.00%	-	0.00%	70.05%

6. SUMMARY OF CORRIDOR RECOMMENDATIONS

6.1 Prioritized Candidate Solution Recommendations

Table 25 and **Figure 27** show the prioritized candidate solutions recommended for the I-8 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 I-8 Corridor. The following observations were noted about the prioritized solutions:

- Candidate Solution 8.22 Arizola Area Safety Improvements ranked highest on the corridor due to a reduction in both Safety and Freight needs at a relatively low cost. Telegraph Pass Safety Improvements also ranked near the top of the corridor list
- Several sections of I-8 roadway considered pavement hot spots will not be improved by any currently programmed projects. It is anticipated that other preservation programming processes will address these needs in the future
- Consider a corridor strategy to upgrade all bridges to current standards in anticipation of increased truck/freight traffic over the medium to long term
- Consider corridor wide ITS solutions to assist truck/freight traffic over the medium to long term

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 I-8 Corridor:

- Consider a corridor strategy to upgrade all bridges to current standards in anticipation of increased truck/freight traffic over the medium to long term
- Consider corridor wide ITS solutions to assist truck/freight traffic over the medium to long term

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 this 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 the I-8 Corridor, but across the entire state highway system where the conditions are applicable. The following list, which is in no particular order of priority, was derived from the initial four CPS rounds:

- 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 message 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 required 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

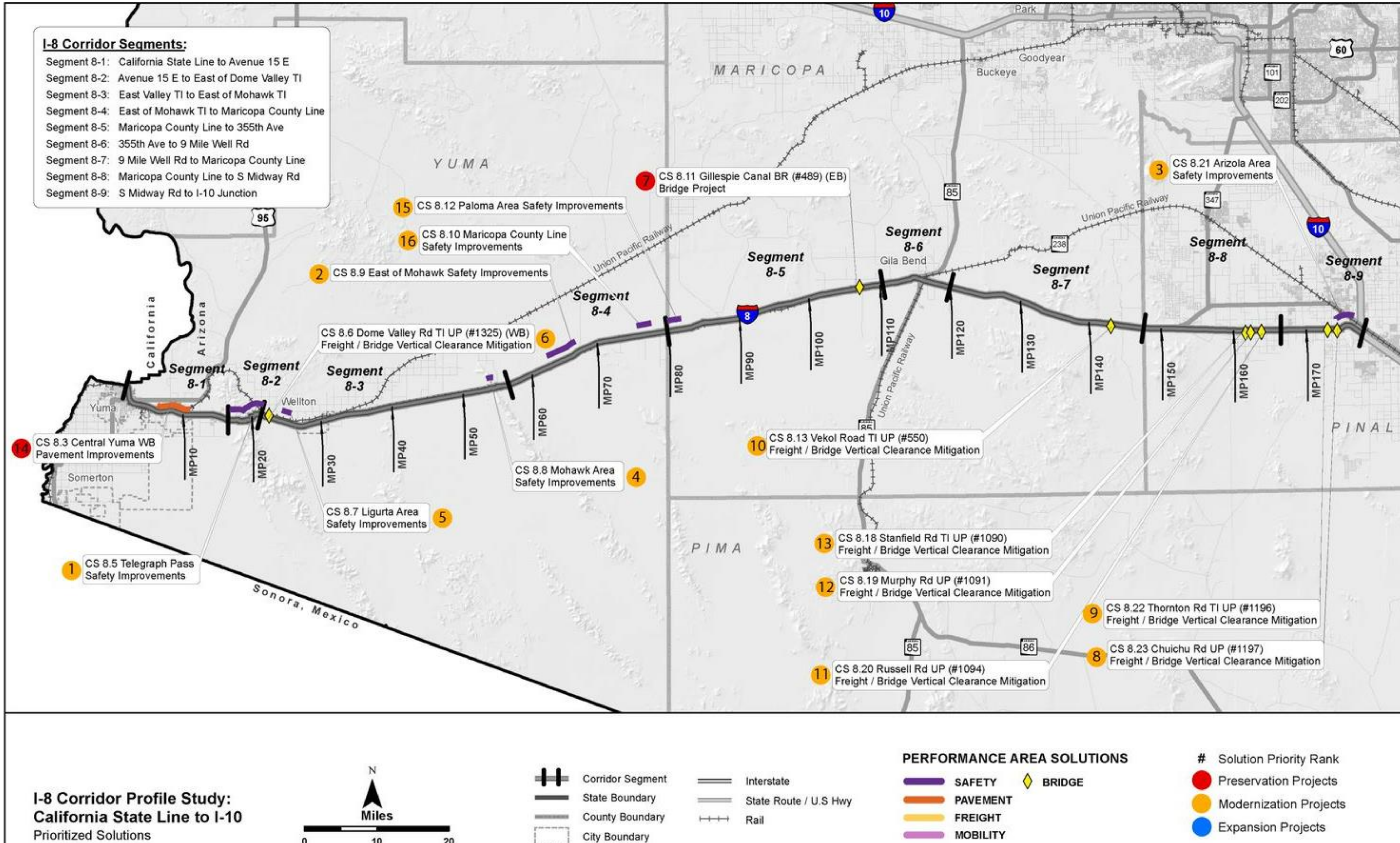
Table 27: Prioritized Recommended Solutions

Rank	Candidate Solution #	Segment #	Solution Name and Location	Description / Scope	Estimated Cost (in millions)	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Prioritization Score
1	CS8.5	8-2	Telegraph Pass Safety Improvements	-Install an Eastbound speed feedback sign at MP 19.5 -Install chevrons, delineators, and raised reflective pavement markers along curve at MP 20.5-21	$0.14	M	**4905**
2	CS8.9	8-4	East of Mohawk Area Safety Improvements	-Install EB chevrons	$0.03	M	**312**
3	CS8.21	8-9	Arizola Area Safety Improvements	-Install curve warning signs with advisory speed plaque -Install raised pavement markers at both edges the roadway (both directions of travel) -Install chevron signs along curve in eastbound and westbound directions	$0.14	M	**268**
4	CS8.8	8-3	Mohawk Area Safety Improvements	-Install eastbound guardrail on the outside edge of traveled way	$0.28	M	**21**
5	CS8.7	8-3	Ligurta Area Safety Improvements	-Widen median shoulder in the westbound direction	$1.10	M	**16**
6	CS8.6	8-2	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$3.91	M	**11**
			Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**9**
7	CS8.11	8-5	Gillespie Canal BR (#489) (EB) – Bridge Replacement (Option B)	-Replace bridge	$1.05	P	**8**
8	CS8.23	8-9	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**8**
			Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$6.21	M	**1**
9	CS8.22	8-9	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**7**
			Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$7.44	M	**2**
10	CS8.13	8-7	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$4.8	M	**4**
			Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**3**
11	CS8.20	8-8	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	-Reprofile mainline	$1.26	M	**4**
			Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$6.5	M	**2**

Table 28: Prioritized Recommended Solutions (continued)

Rank	Candidate Solution #	Segment #	Solution Name and Location	Description / Scope	Estimated Cost (in millions)	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Prioritization Score
12	CS8.19	8-8	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**4**
			Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$5.86	M	**2**
13	CS8.18	8-8	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation (Option A)	-Reprofile mainline	$1.26	M	**3**
			Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation (Option B)	-Replace bridge	$7.2	M	**1**
14	CS8.3	8-1	Central Yuma WB Pavement Improvements (Option B)	-Replace pavement	$31.3	P	**3**
15	CS8.12	8-5	Paloma Area Safety Improvements	-Widen median shoulders	$2.21	M	**3**
16	CS8.10	8-4	Maricopa County Line Area Safety Improvements	-Widen median shoulders	$4.43	M	**2**

Figure 27: Prioritized Recommended Solutions

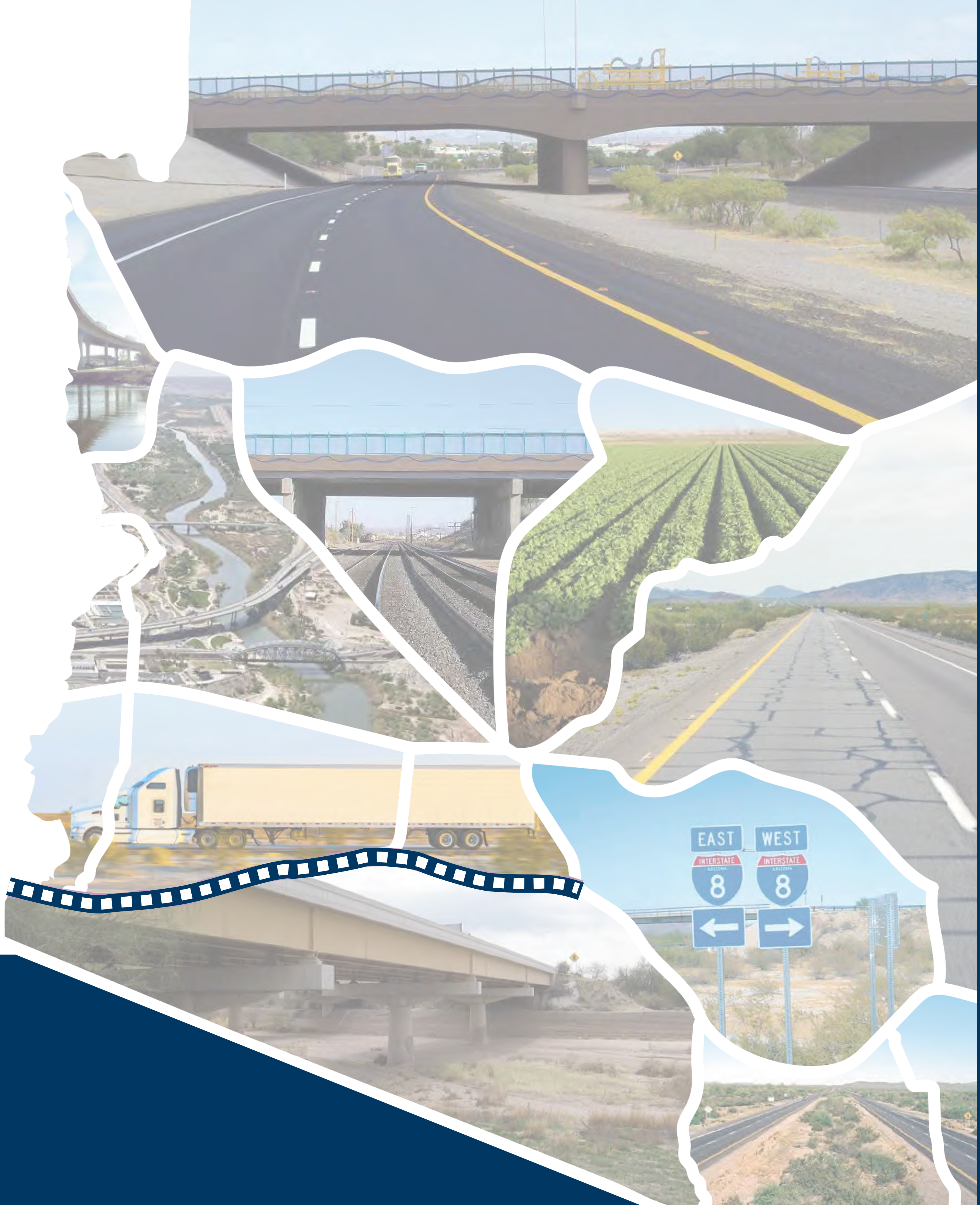


6.4 Next Steps

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 I-8 Corridor will be considered along with other candidate projects in the ADOT statewide programming process.

It is important to note that the 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.

These 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 I-8 Corridor. The following are the areas and maps included:

Pavement Performance Area:

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

Bridge Performance Area:

- Bridge Index and Hot Spots
- Bridge Sufficiency
- Lowest Bridge Rating

Mobility Performance Area:

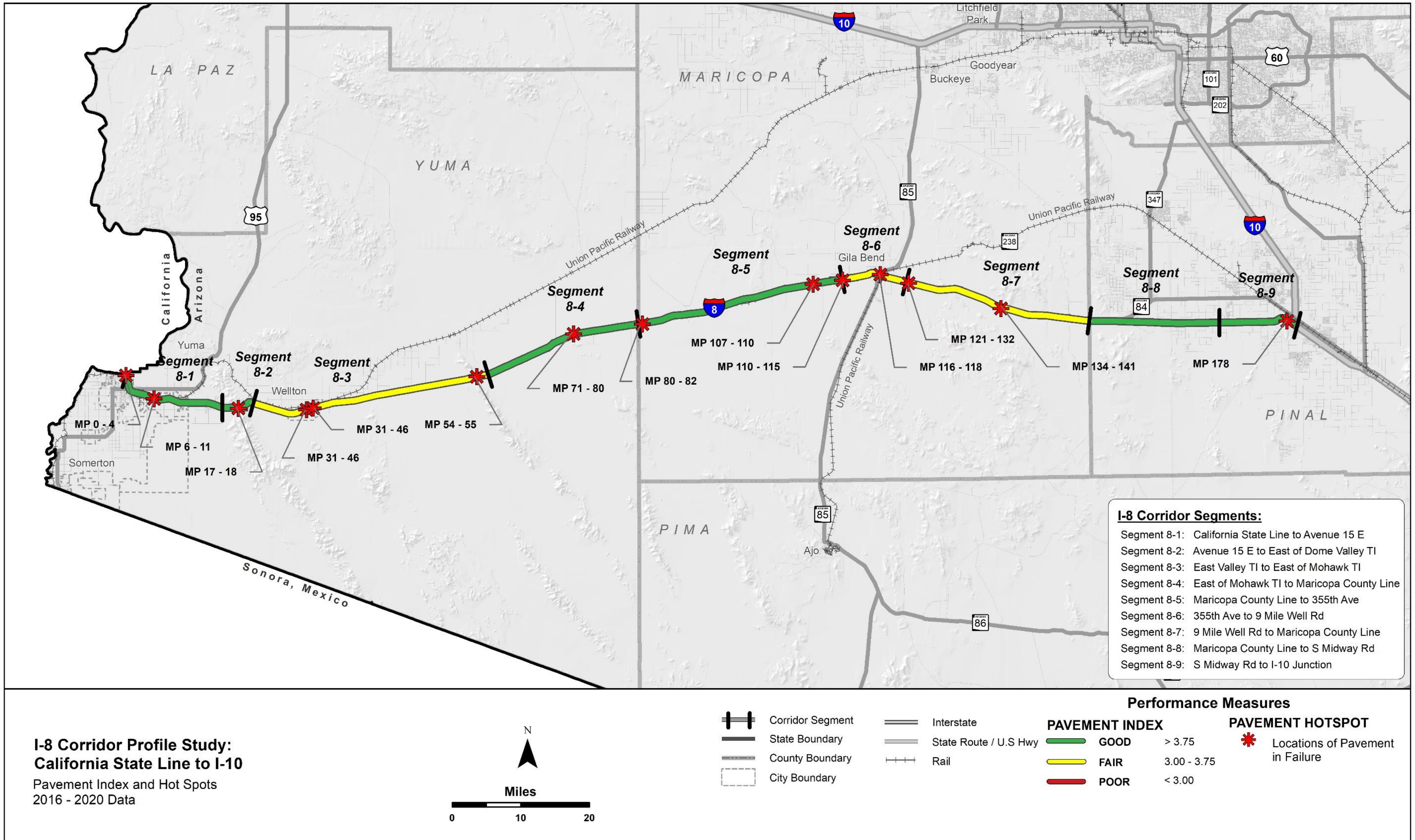
- Mobility Index
- Future Daily V/C Ratio
- Existing Peak Hour V/C (directional)
- Closure Frequency
- Directional LOTTR
- Multimodal Opportunities
- Percentage of Bicycle Accommodation

Safety Performance Area:

- Safety Index and Hot Spots
- Safety Index and Hot Spots (directional)
- % of Fatal + Suspected Serious Injury Crashes at Intersections – *Not Applicable*
- % of Fatal + Suspected Serious Injury Crashes Involving Lane Departures
- *% of Fatal + Suspected Serious Injury Crashes Involving Pedestrians – Insufficient Data*
- % of Fatal + Suspected Serious Injury Crashes Involving Trucks – *Insufficient Data*
- *% of Fatal + Suspected Serious Injury Crashes Involving Bicycles – Insufficient Data*

Freight Performance Area:

- Freight Index and Hot Spots
- Directional TTTR
- Closure Duration
- Bridge Vertical Clearance



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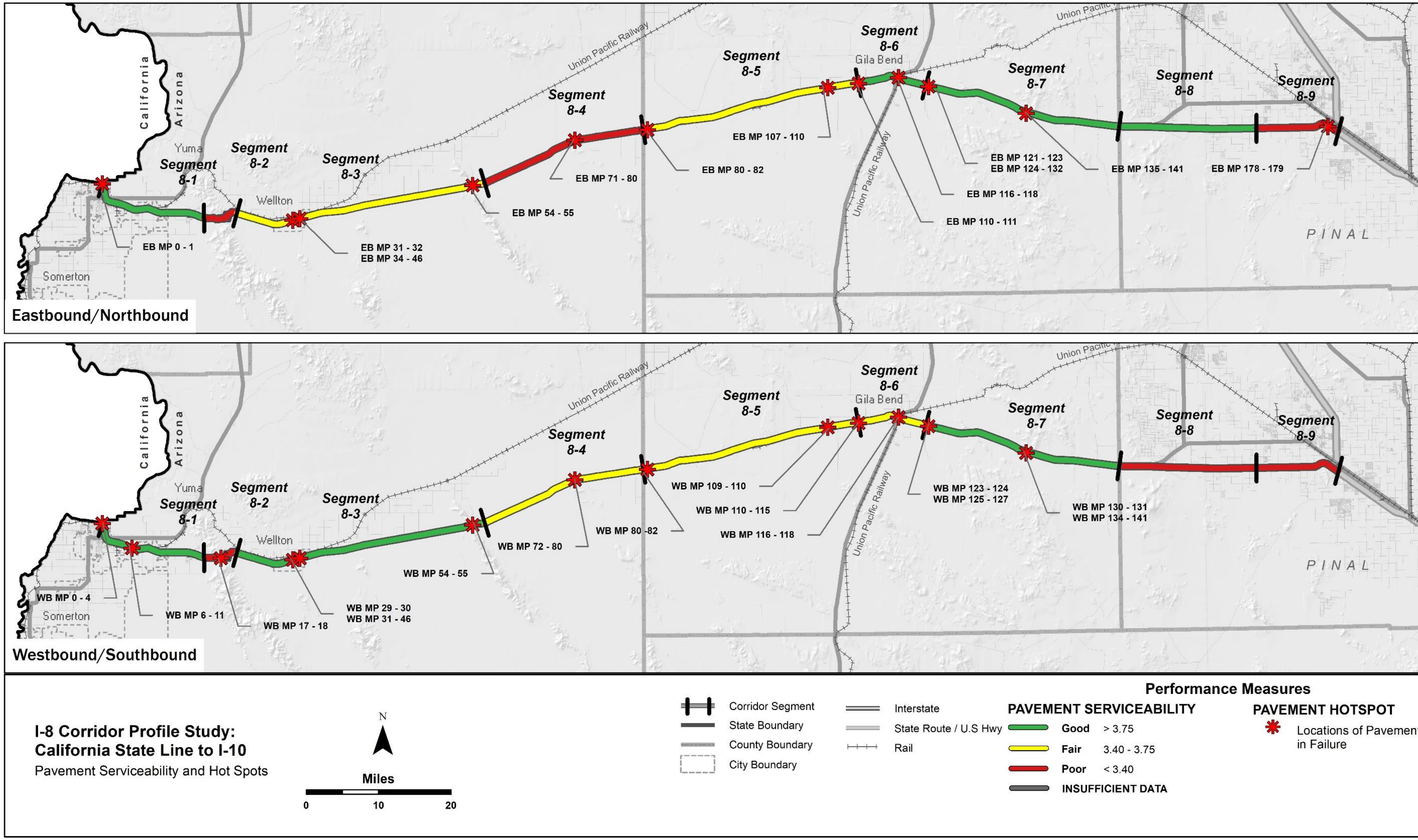
Goodyear
Litchfield Park
Union Pacific Railway
Segment 8-1
Segment 8-2
Segment 8-3
Segment 8-4
Segment 8-5
Segment 8-6
Segment 8-7
Segment 8-8
Segment 8-9
MP 0 - 4
MP 6 - 11
MP 17 - 18
MP 31 - 46
MP 31 - 46
MP 54 - 55
MP 71 - 80
MP 80 - 82
MP 107 - 110
MP 110 - 115
MP 116 - 118
MP 121 - 132
MP 134 - 141
MP 178
I-8 Corridor Segments:
Segment 8-1: California State Line to Avenue 15 E
Segment 8-2: Avenue 15 E to East of Dome Valley TI
Segment 8-3: East Valley TI to East of Mohawk TI
Segment 8-4: East of Mohawk TI to Maricopa County Line
Segment 8-5: Maricopa County Line to 355th Ave
Segment 8-6: 355th Ave to 9 Mile Well Rd
Segment 8-7: 9 Mile Well Rd to Maricopa County Line
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study: California State Line to I-10
Pavement Index and Hot Spots
2016 - 2020 Data
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measures
PAVEMENT INDEX
GOOD > 3.75
FAIR 3.00 - 3.75
POOR < 3.00
PAVEMENT HOTSPOT
Locations of Pavement in Failure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Segment 8-9
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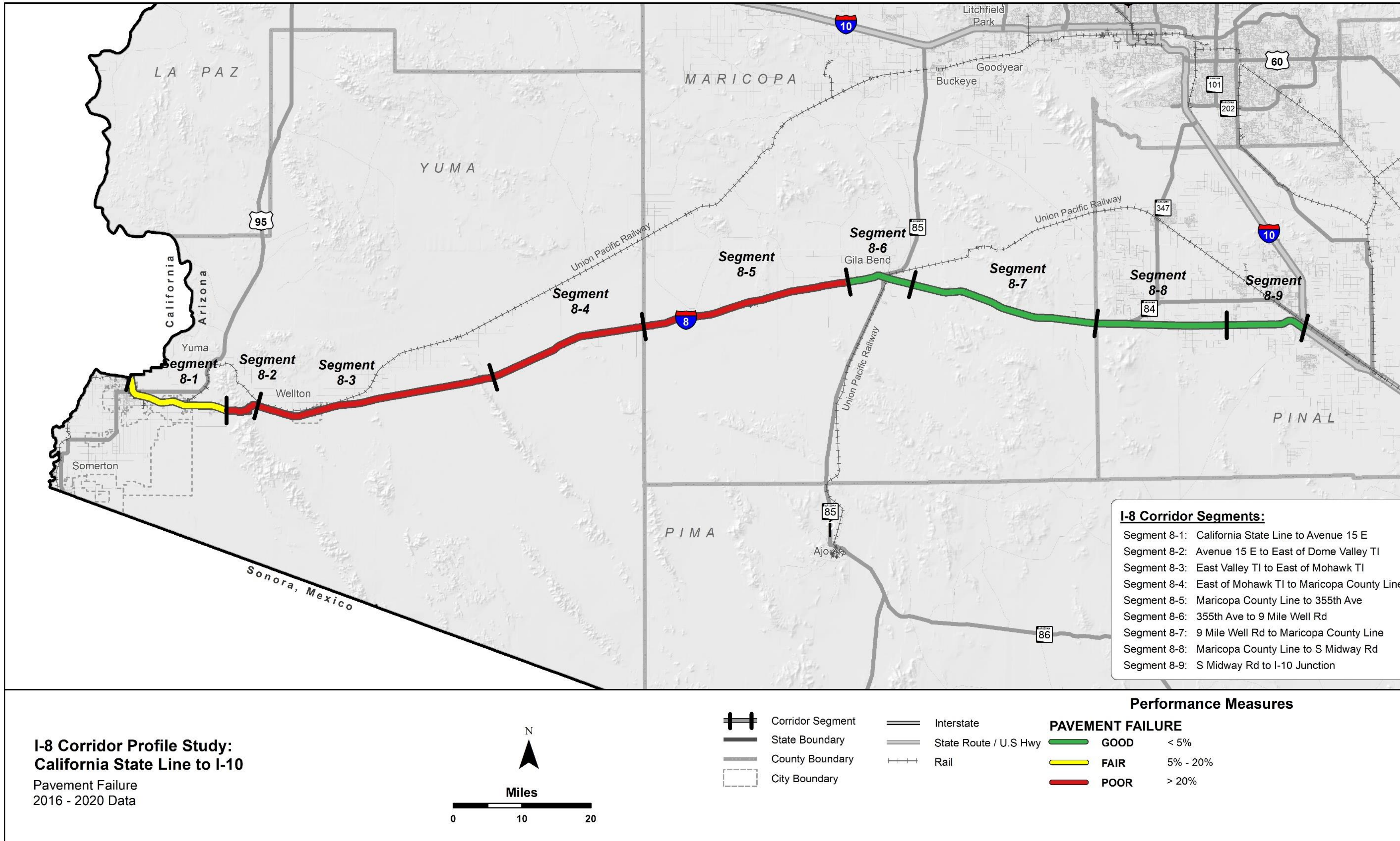
EB MP 31 - 32
EB MP 34 - 46
EB MP 54 - 55
EB MP 71 - 80
EB MP 80 - 82
EB MP 107 - 110
EB MP 110 - 111
EB MP 116 - 118
EB MP 121 - 123
EB MP 124 - 132
EB MP 135 - 141
EB MP 178 - 179
Westbound/Southbound
WB MP 0 - 4
WB MP 6 - 11
WB MP 17 - 18
WB MP 29 - 30
WB MP 31 - 46
WB MP 54 - 55
WB MP 72 - 80
WB MP 80 -82
WB MP 109 - 110
WB MP 110 - 115
WB MP 116 - 118
WB MP 123 - 124
WB MP 125 - 127
WB MP 130 - 131
WB MP 134 - 141
I-8 Corridor Profile Study:
California State Line to I-10
Pavement Serviceability and Hot Spots
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measures
PAVEMENT SERVICEABILITY
Good > 3.75
Fair 3.40 - 3.75
Poor < 3.40
INSUFFICIENT DATA
PAVEMENT HOTSPOT
Locations of Pavement in Failure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I-8 Corridor Profile Study:
California State Line to I-10
Pavement Failure
2016 - 2020 Data
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Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
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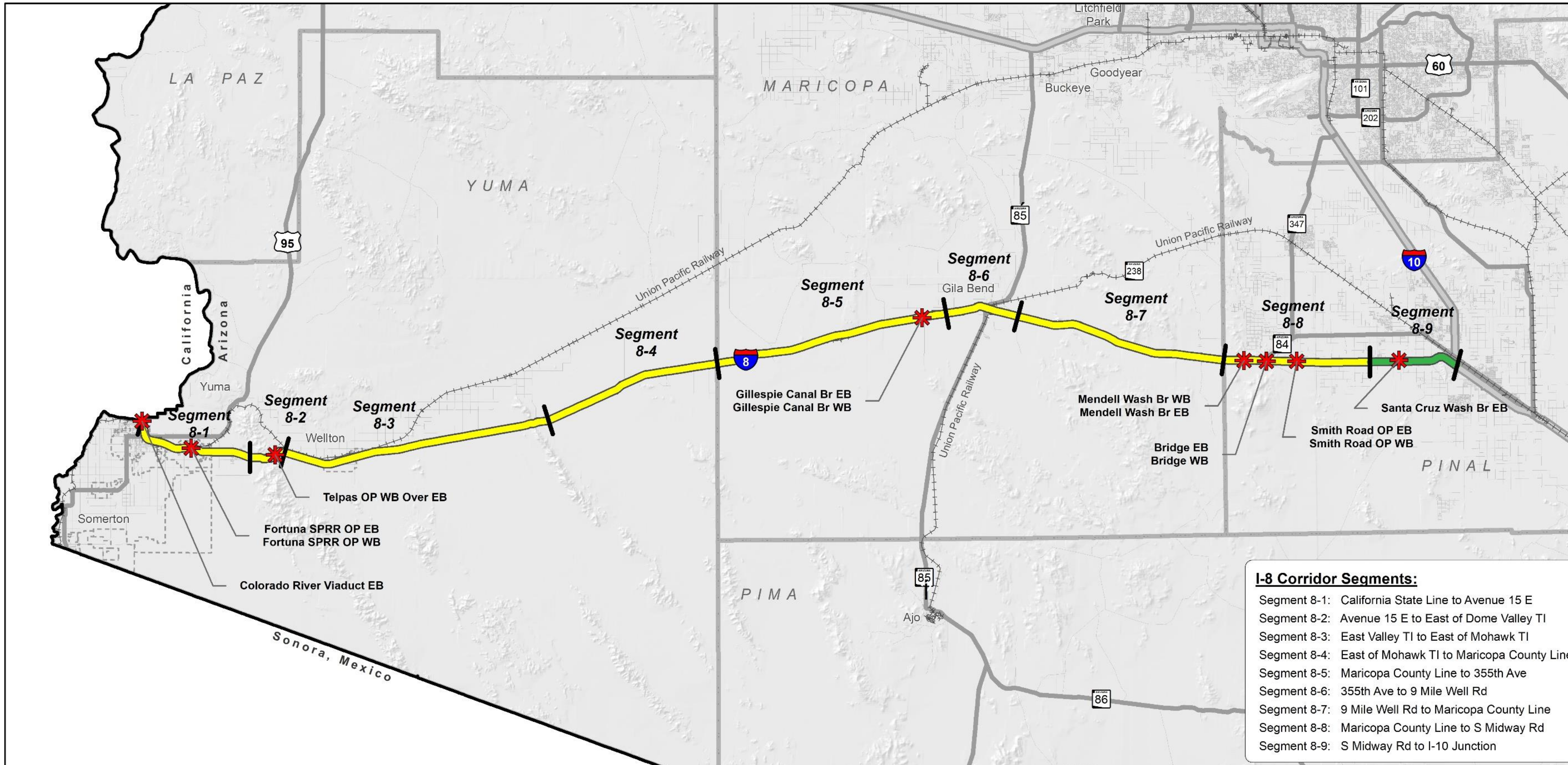
Performance Measures
PAVEMENT FAILURE
GOOD < 5%
FAIR 5% - 20%
POOR > 20%



I-8 Corridor Profile Study:
California State Line to I-10

Bridge Index and Hot Spots
2019 - 2020 Data

N

Miles
0 10 20

Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail

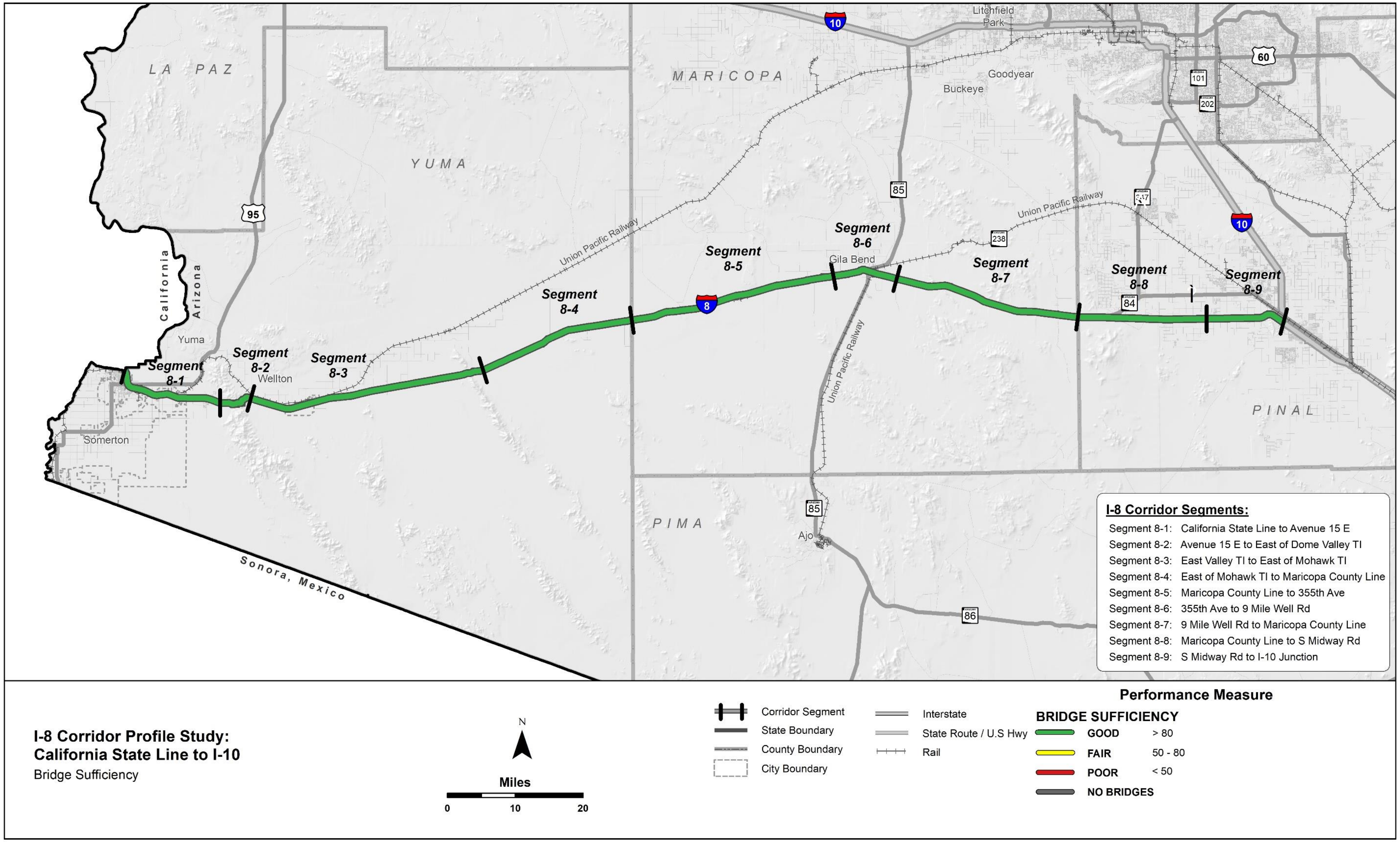
Performance Measure

BRIDGE INDEX

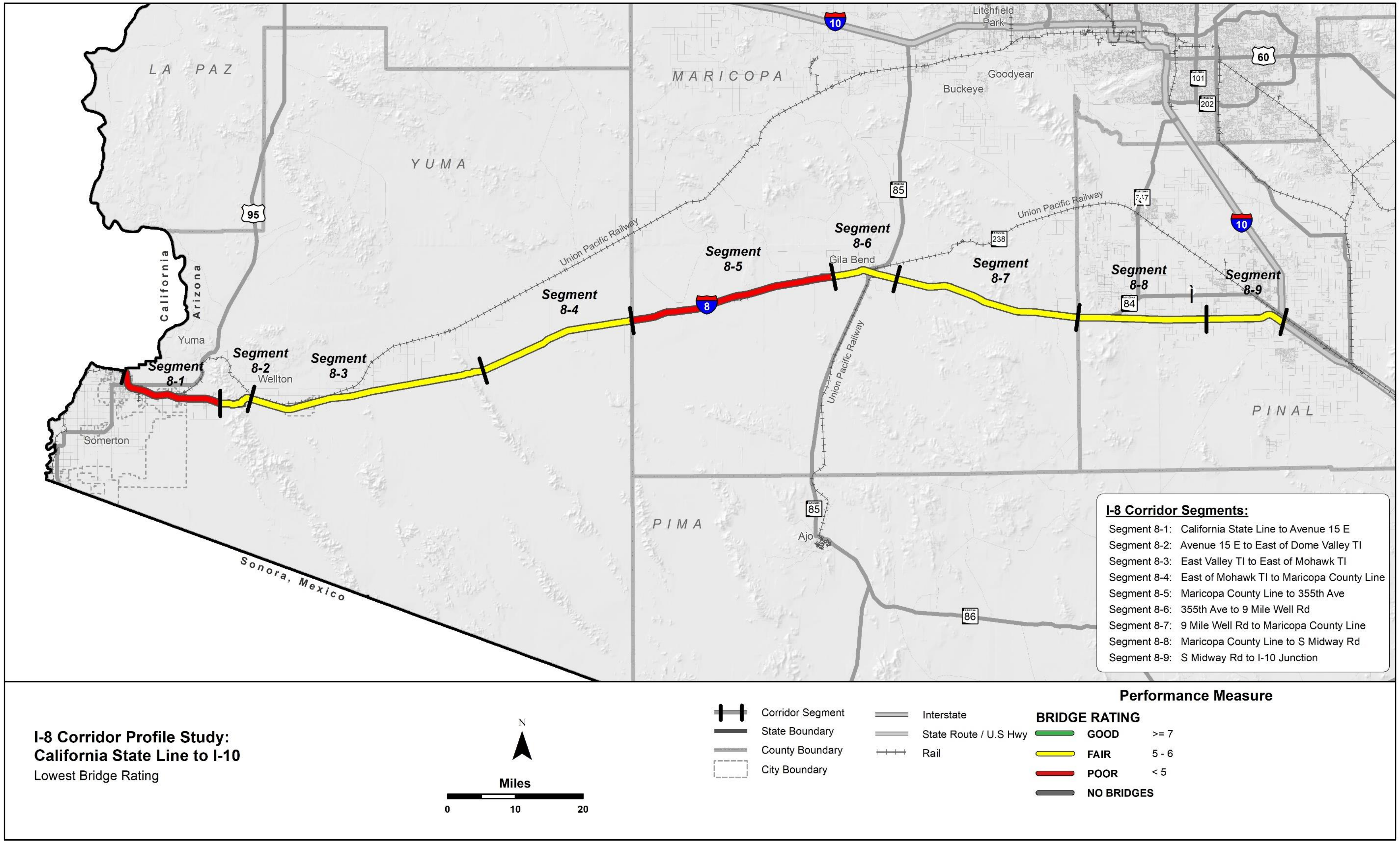
GOOD	> 6.5
FAIR	5.0 - 6.5
POOR	< 5.0
NO BRIDGES	

BRIDGE HOT SPOT

Bridge with a Rating of 4 or Multiple Ratings of 5



I-8 Corridor Profile Study:
California State Line to I-10
Bridge Sufficiency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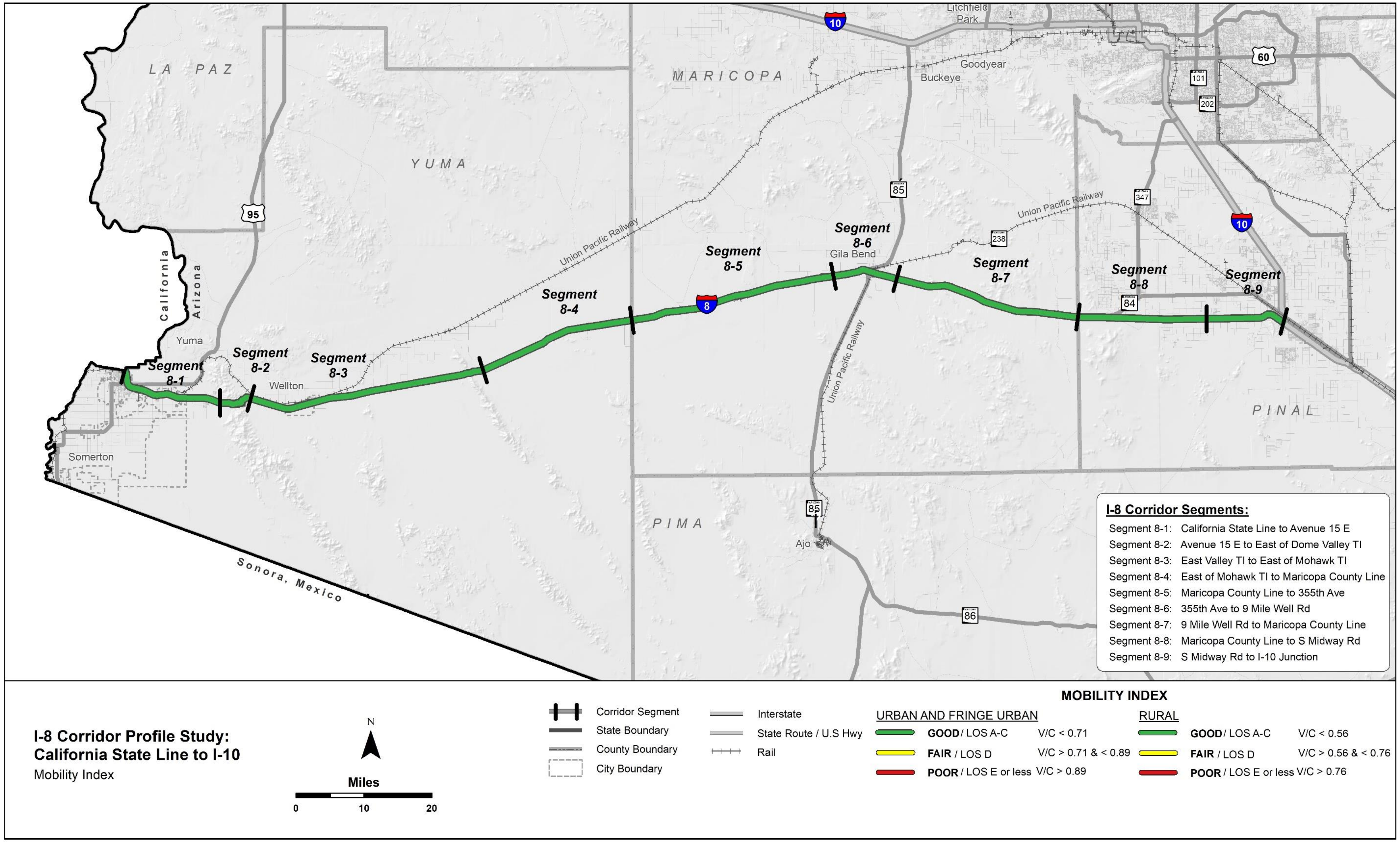
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study:
California State Line to I-10
Lowest Bridge Rating
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
BRIDGE RATING
GOOD >= 7
FAIR 5 - 6
POOR < 5
NO BRIDGES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I-8 Corridor Profile Study:
California State Line to I-10
Mobility Index
N
Miles
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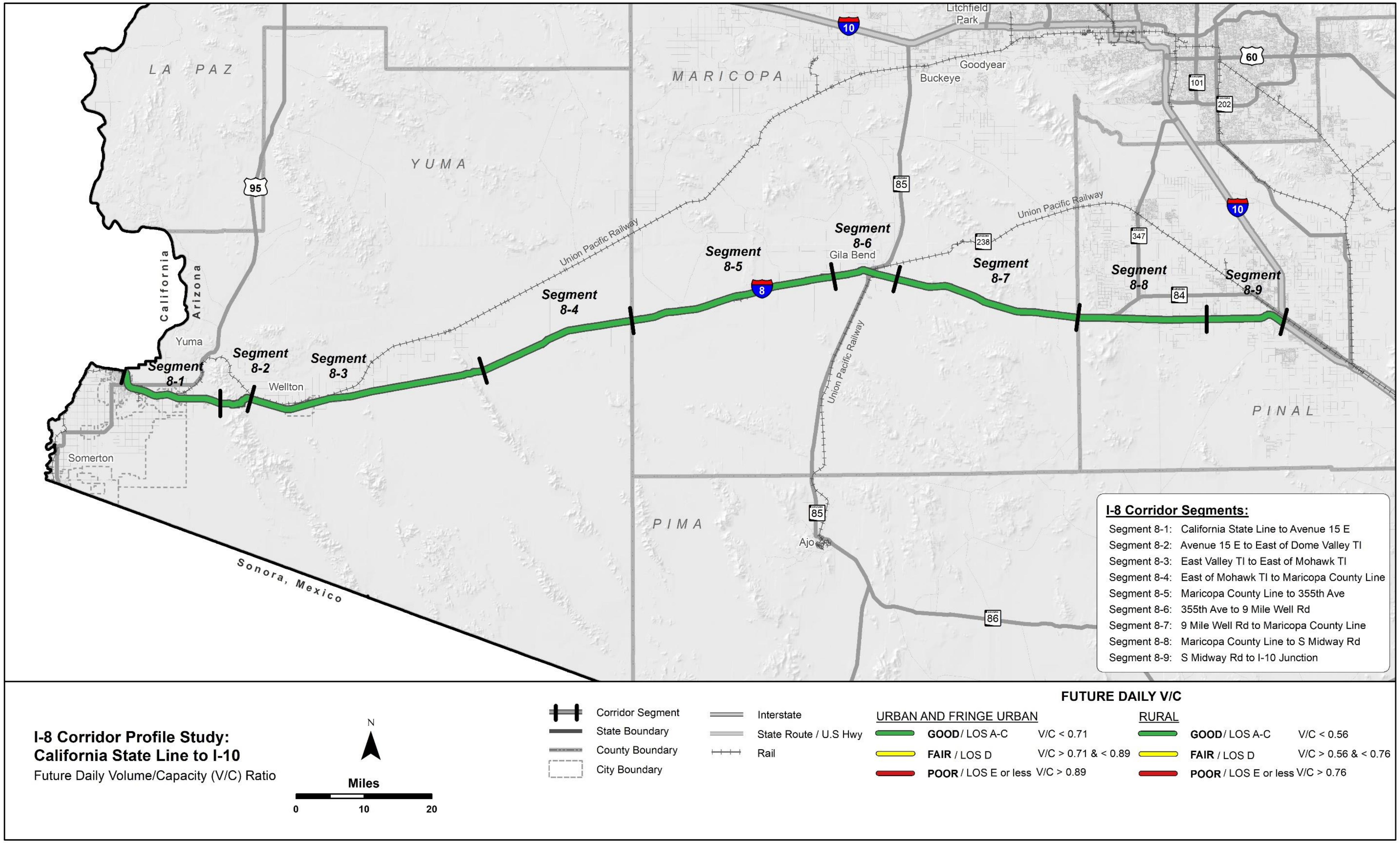
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
MOBILITY INDEX
URBAN AND FRINGE URBAN
GOOD / LOS A-C V/C < 0.71
FAIR / LOS D V/C > 0.71 & < 0.89
POOR / LOS E or less V/C > 0.89
RURAL
GOOD / LOS A-C V/C < 0.56
FAIR / LOS D V/C > 0.56 & < 0.76
POOR / LOS E or less V/C > 0.76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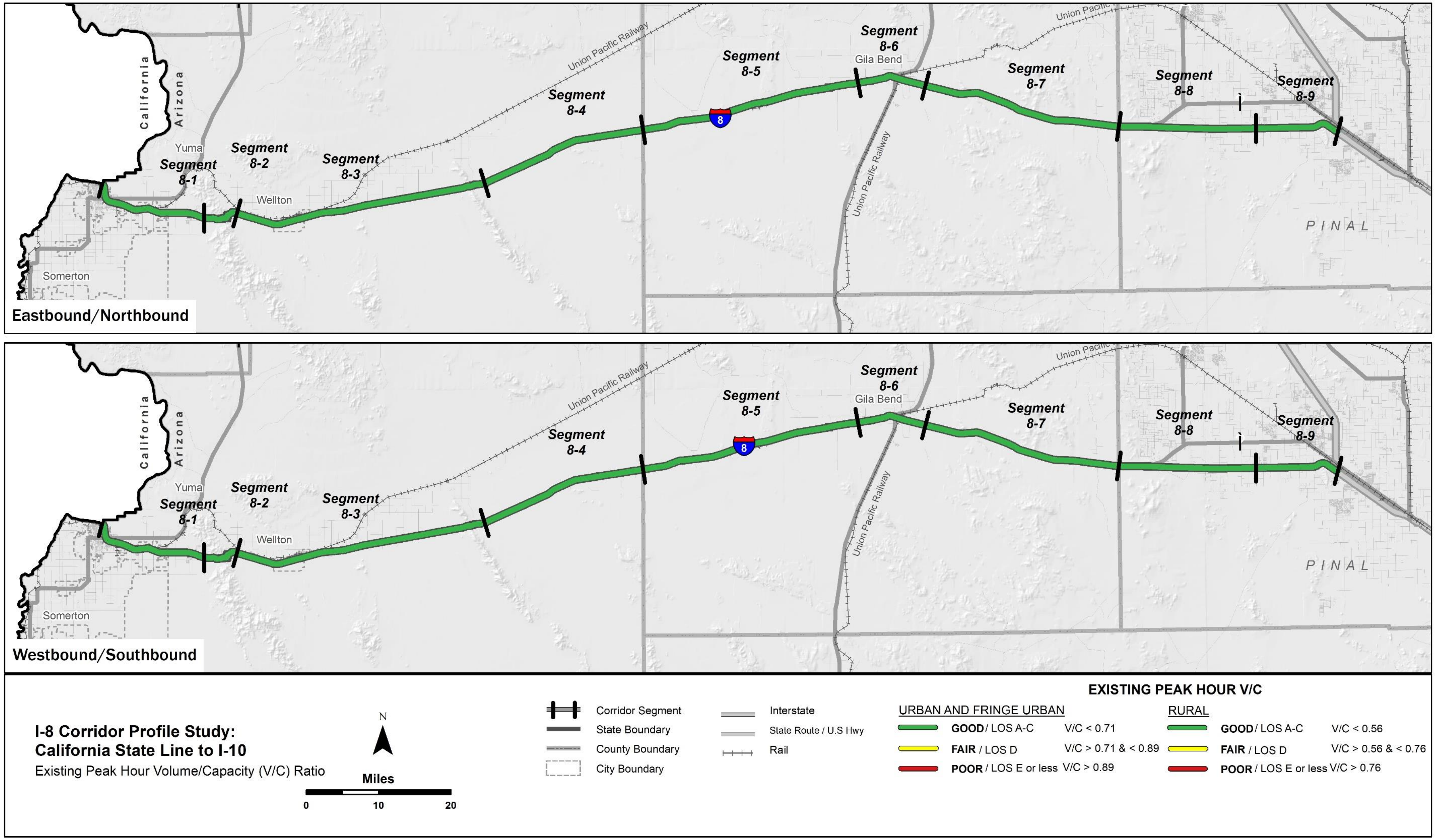
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study: California State Line to I-10
Future Daily Volume/Capacity (V/C) Ratio
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
FUTURE DAILY V/C
URBAN AND FRINGE URBAN
GOOD / LOS A-C V/C < 0.71
FAIR / LOS D V/C > 0.71 & < 0.89
POOR / LOS E or less V/C > 0.89
RURAL
GOOD / LOS A-C V/C < 0.56
FAIR / LOS D V/C > 0.56 & < 0.76
POOR / LOS E or less V/C > 0.76



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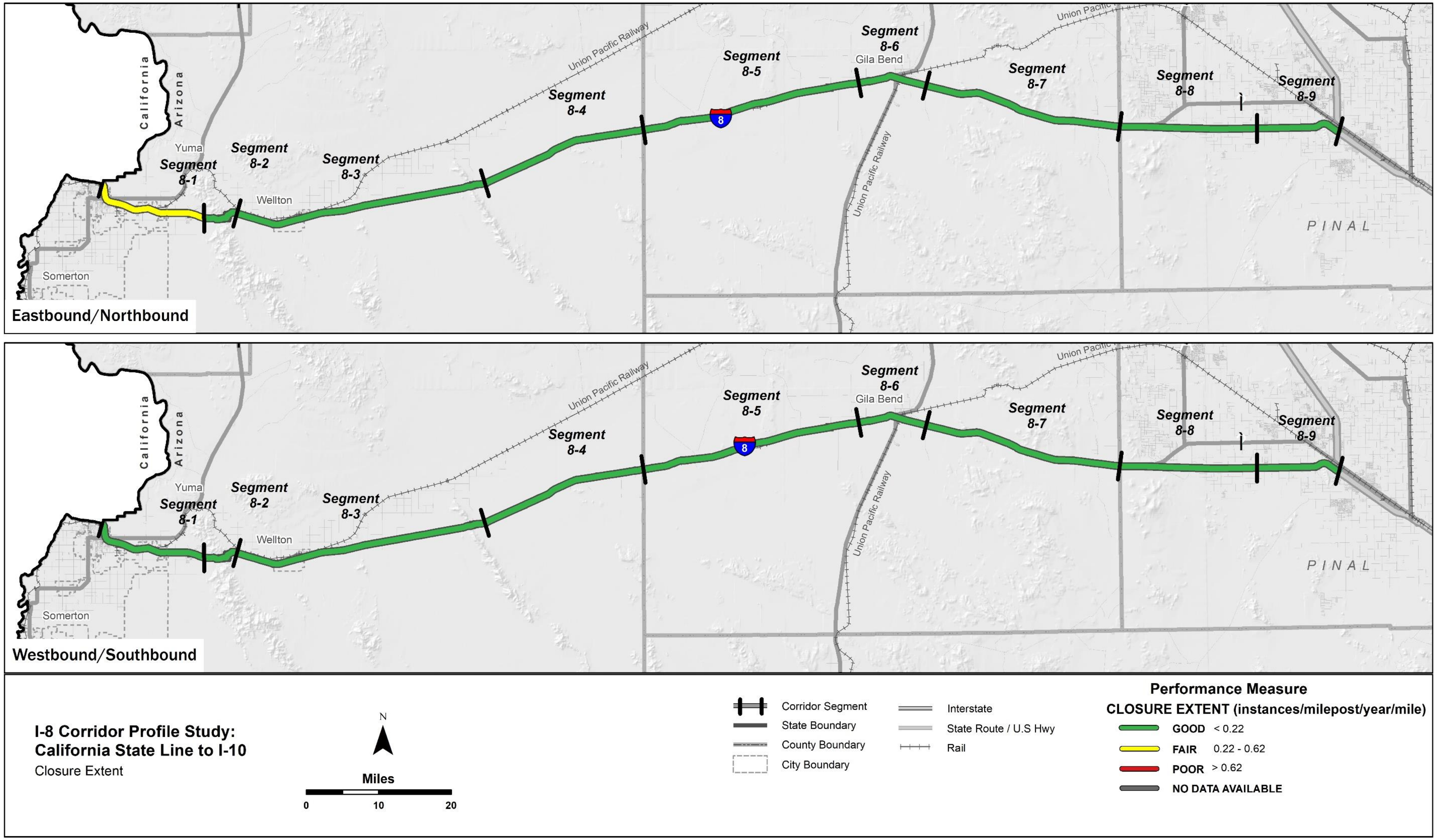
Segment 8-9
8
Eastbound/Northbound
Westbound/Southbound
I-8 Corridor Profile Study:
California State Line to I-10
Existing Peak Hour Volume/Capacity (V/C) Ratio
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
EXISTING PEAK HOUR V/C
URBAN AND FRINGE URBAN
GOOD / LOS A-C V/C < 0.71
FAIR / LOS D V/C > 0.71 & < 0.89
POOR / LOS E or less V/C > 0.89
RURAL
GOOD / LOS A-C V/C < 0.56
FAIR / LOS D V/C > 0.56 & < 0.76
POOR / LOS E or less V/C > 0.76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Segment 8-5
Segment 8-6
Segment 8-7
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Segment 8-9
8
I-8 Corridor Profile Study:
California State Line to I-10
Closure Extent
N
Miles
0
10
20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
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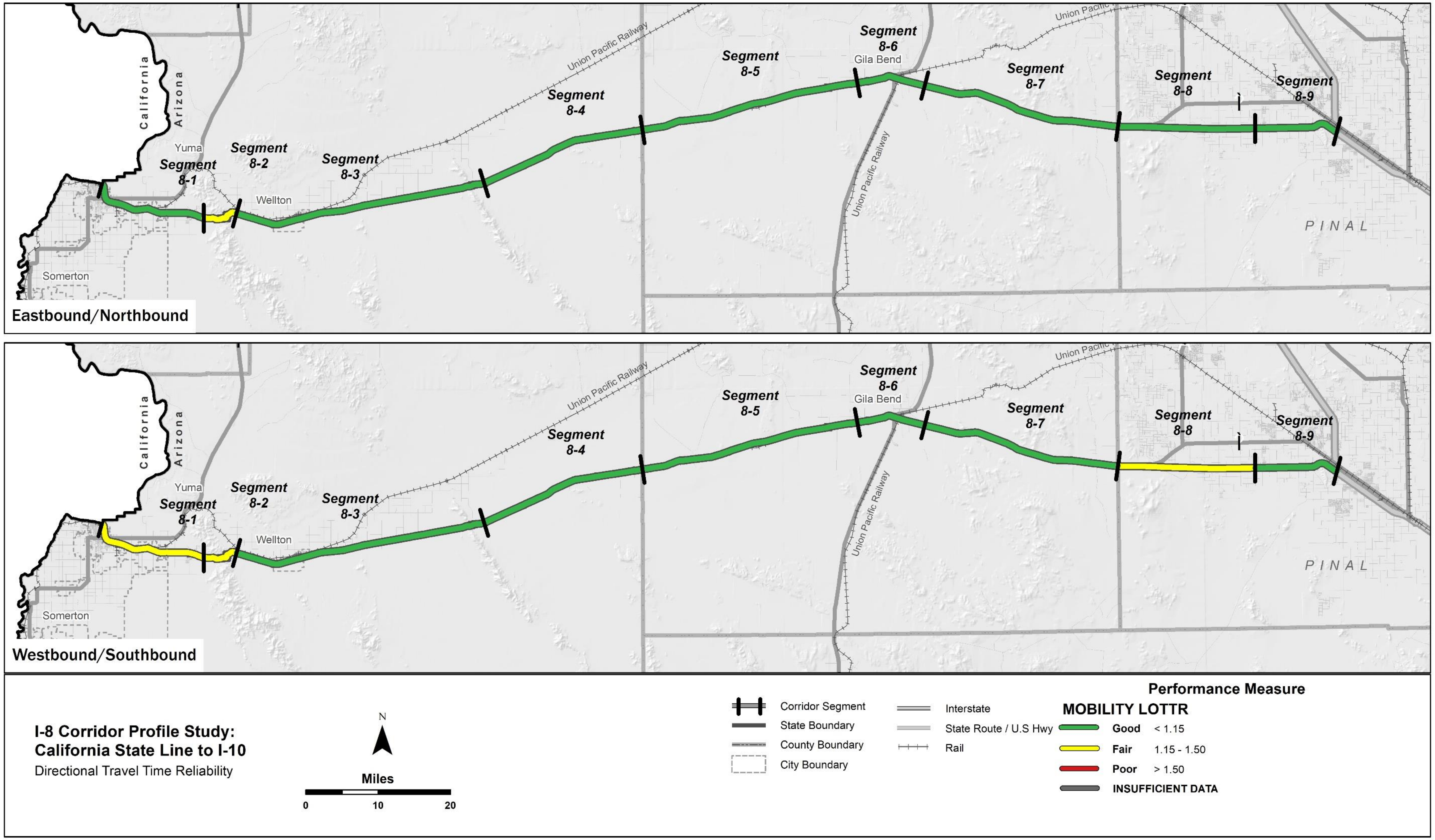
FAIR 0.22 - 0.62
POOR > 0.62
NO DATA AVAILABLE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Union Pacific Railway
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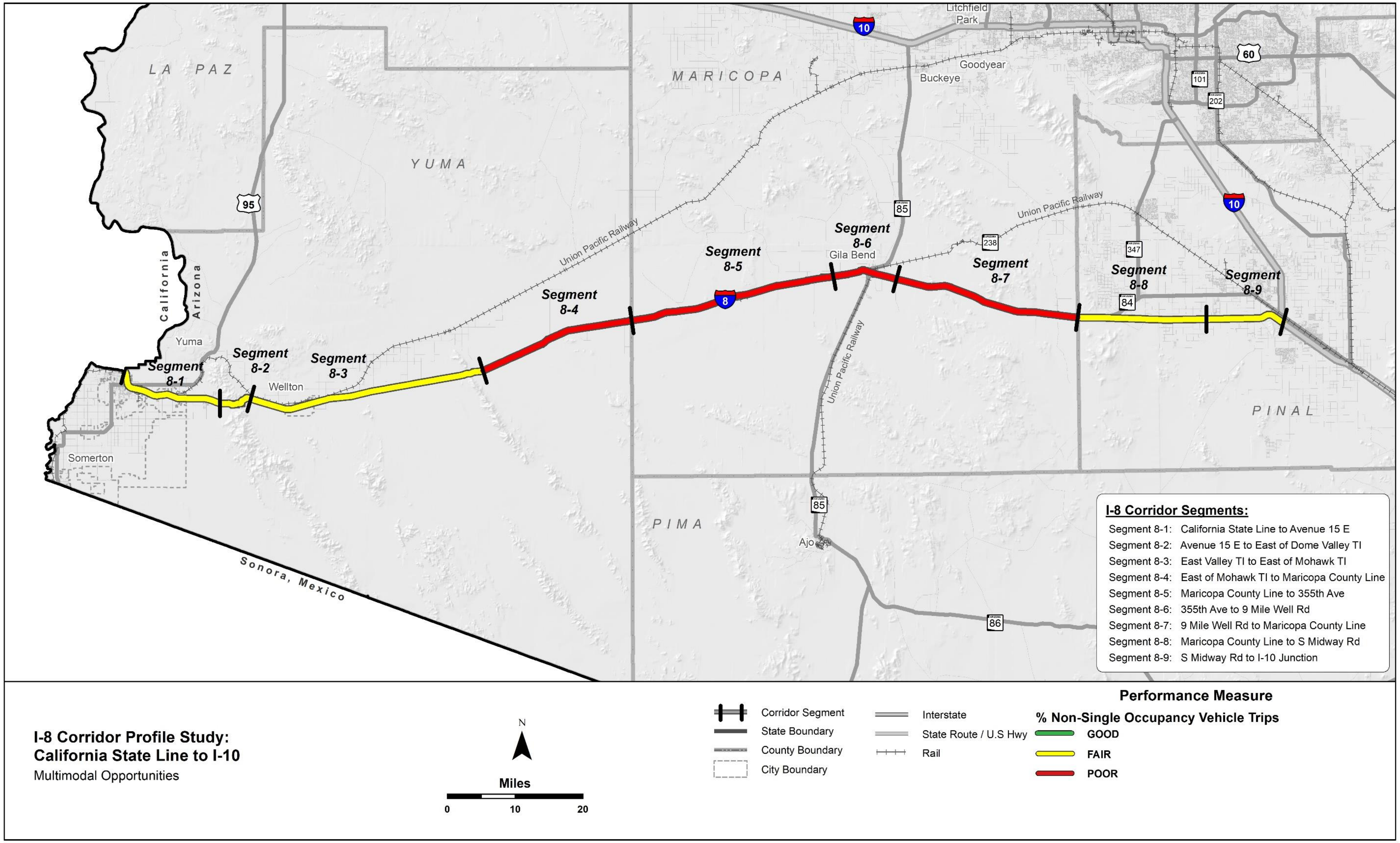
Segment 8-7
Segment 8-8
Segment 8-9
Eastbound/Northbound
Westbound/Southbound
I-8 Corridor Profile Study: California State Line to I-10
Directional Travel Time Reliability
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
MOBILITY LOTTR
Good < 1.15
Fair 1.15 - 1.50
Poor > 1.50
INSUFFICIENT DATA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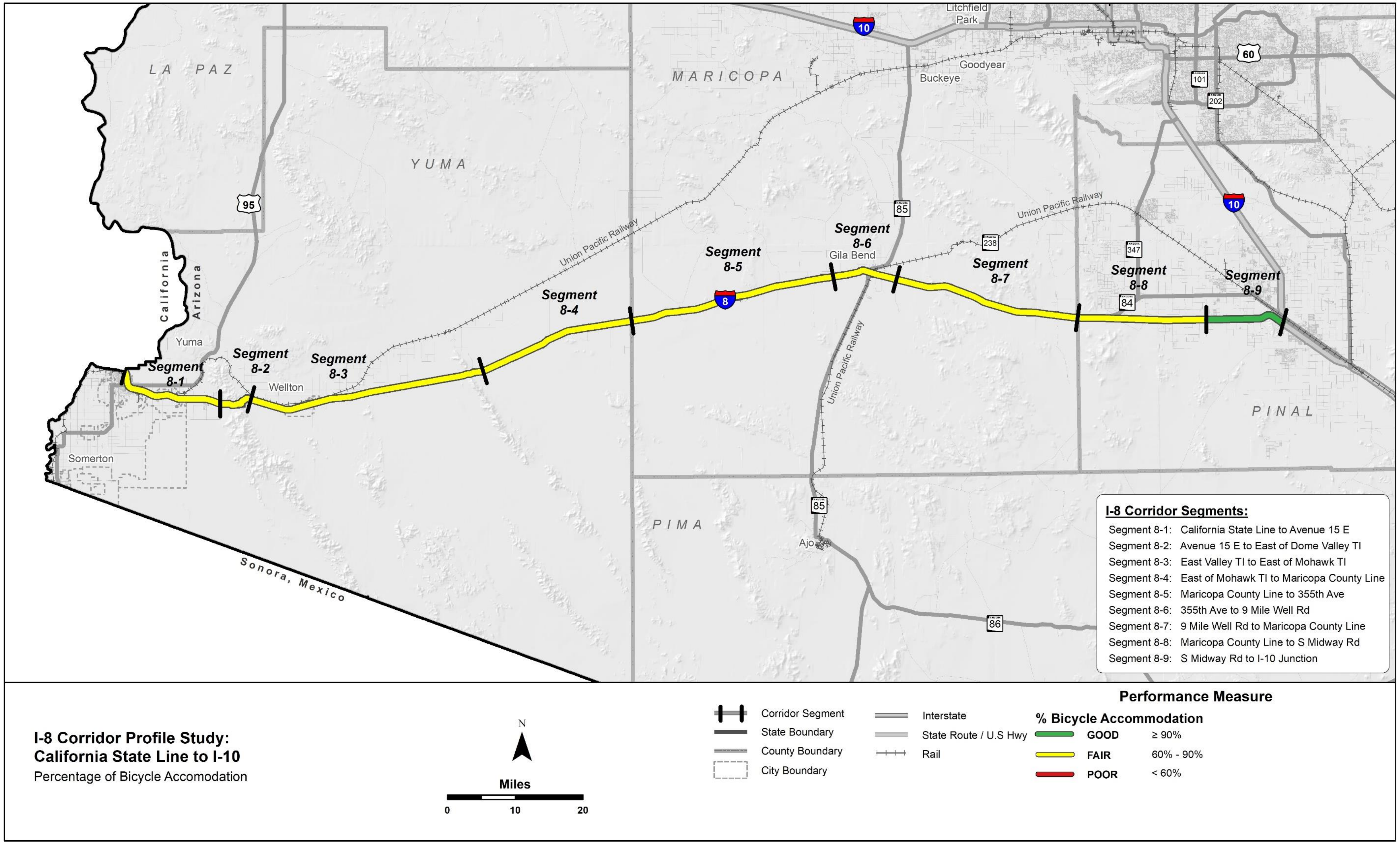
Segment 8-6
Segment 8-7
Segment 8-8
Segment 8-9
I-8 Corridor Segments:
Segment 8-1: California State Line to Avenue 15 E
Segment 8-2: Avenue 15 E to East of Dome Valley TI
Segment 8-3: East Valley TI to East of Mohawk TI
Segment 8-4: East of Mohawk TI to Maricopa County Line
Segment 8-5: Maricopa County Line to 355th Ave
Segment 8-6: 355th Ave to 9 Mile Well Rd
Segment 8-7: 9 Mile Well Rd to Maricopa County Line
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study:
California State Line to I-10
Multimodal Opportunities
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
% Non-Single Occupancy Vehicle Trips
GOOD
FAIR
POOR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Union Pacific Railway
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Segment 8-8
Segment 8-9
I-8 Corridor Segments:
Segment 8-1: California State Line to Avenue 15 E
Segment 8-2: Avenue 15 E to East of Dome Valley TI
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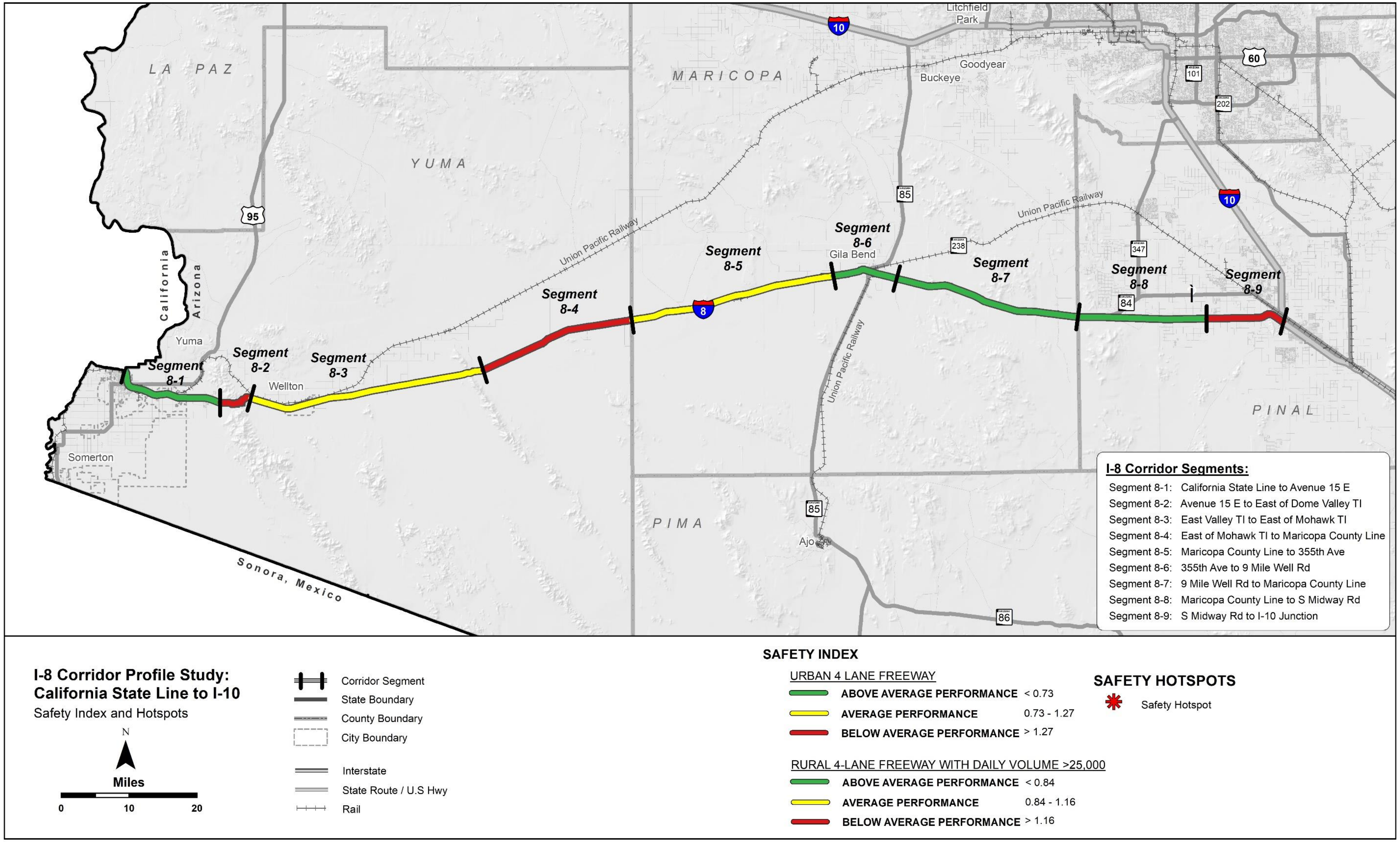
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study:
California State Line to I-10
Percentage of Bicycle Accomodation
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
% Bicycle Accommodation
GOOD ≥ 90%
FAIR 60% - 90%
POOR < 60%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Segment 8-7
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Segment 8-9
I-8 Corridor Segments:
Segment 8-1: California State Line to Avenue 15 E
Segment 8-2: Avenue 15 E to East of Dome Valley TI
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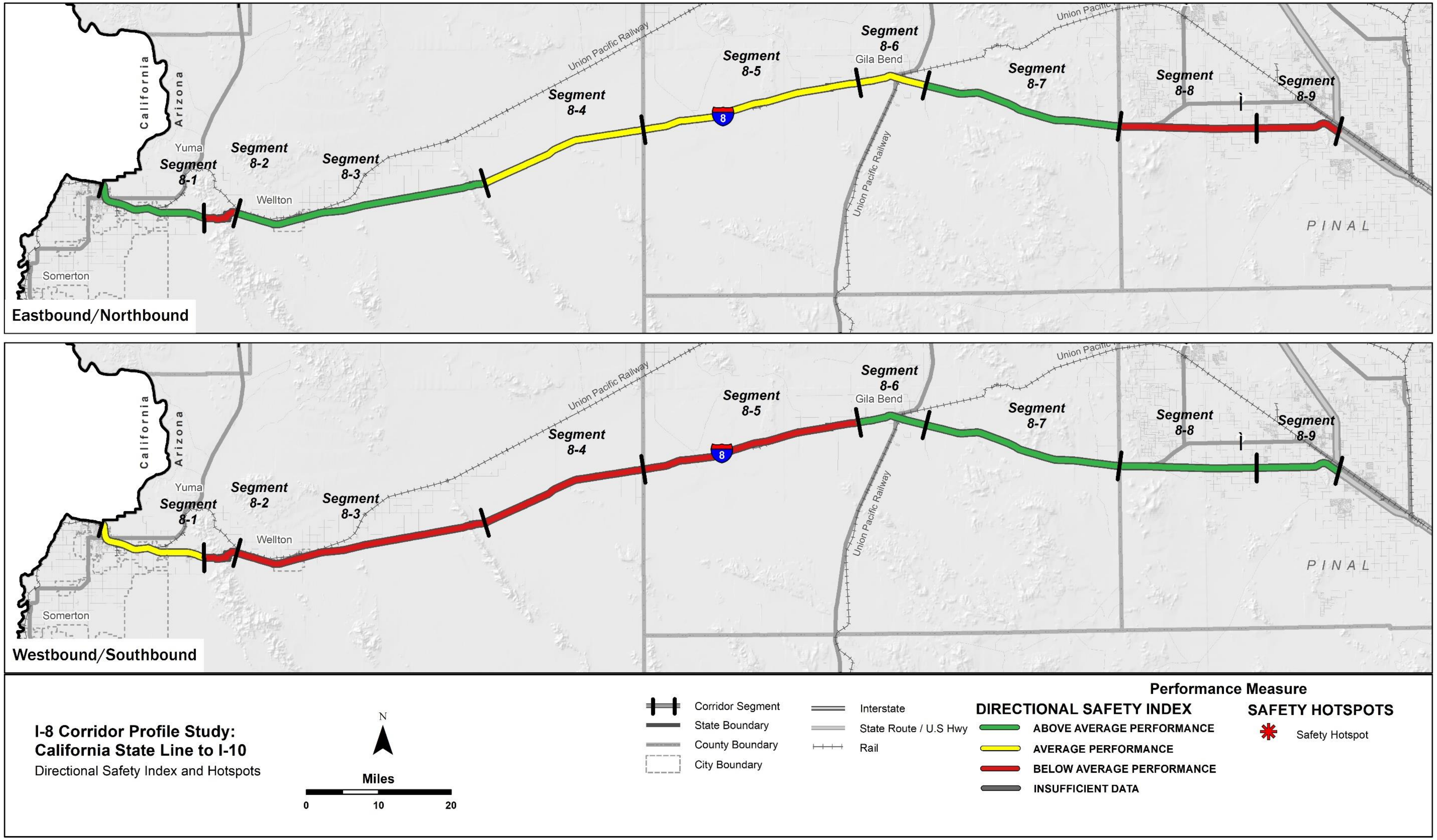
Segment 8-7: 9 Mile Well Rd to Maricopa County Line
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study:
California State Line to I-10
Safety Index and Hotspots
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
SAFETY INDEX
URBAN 4 LANE FREEWAY
ABOVE AVERAGE PERFORMANCE < 0.73
AVERAGE PERFORMANCE 0.73 - 1.27
BELOW AVERAGE PERFORMANCE > 1.27
RURAL 4-LANE FREEWAY WITH DAILY VOLUME >25,000
ABOVE AVERAGE PERFORMANCE < 0.84
AVERAGE PERFORMANCE 0.84 - 1.16
BELOW AVERAGE PERFORMANCE > 1.16
SAFETY HOTSPOTS
Safety Hotspot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PINAL
Union Pacific Railway
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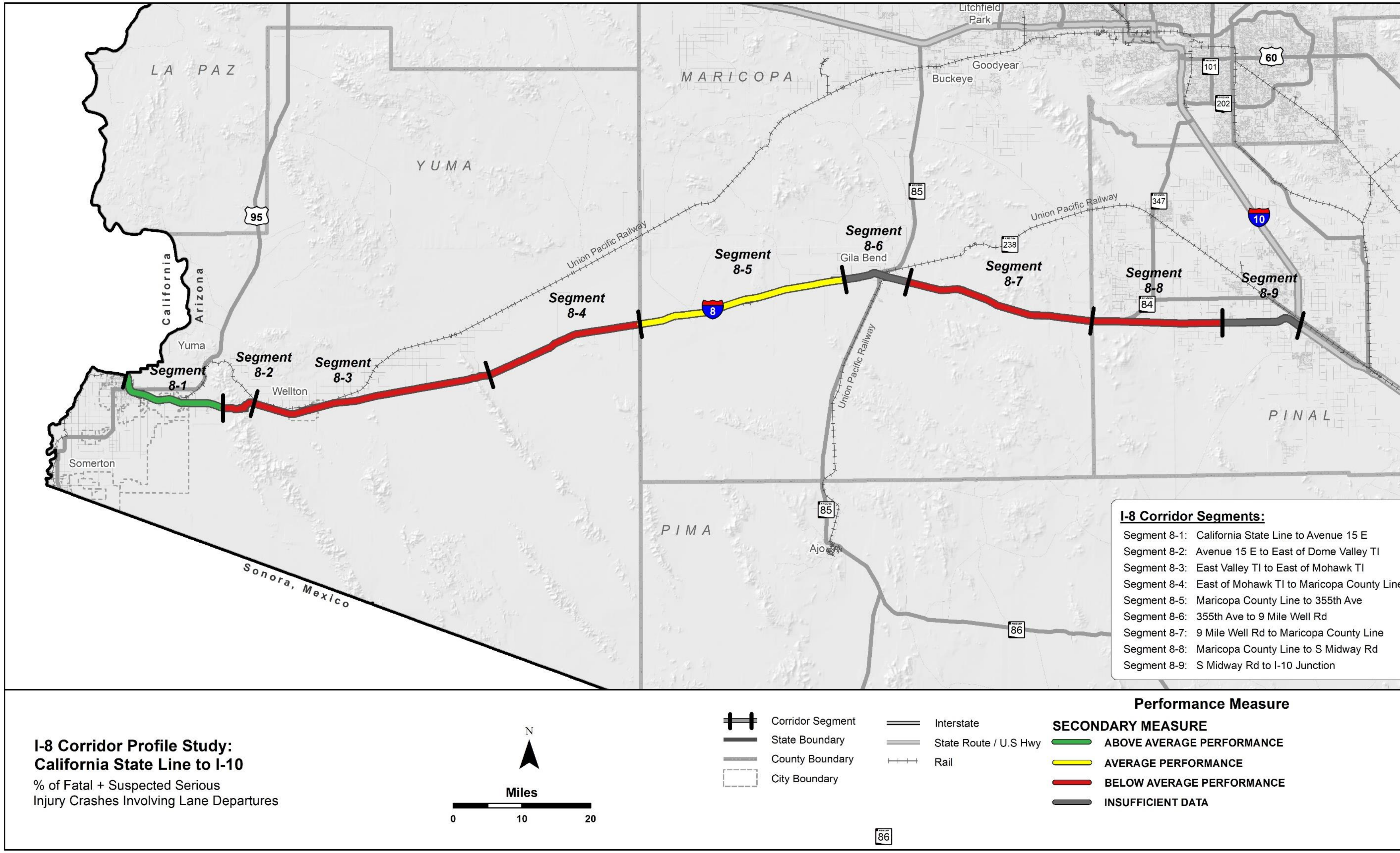
Segment 8-4
Segment 8-5
Segment 8-6
Segment 8-7
Segment 8-8
Segment 8-9
8
Eastbound/Northbound
Westbound/Southbound
I-8 Corridor Profile Study: California State Line to I-10
Directional Safety Index and Hotspots
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
DIRECTIONAL SAFETY INDEX
ABOVE AVERAGE PERFORMANCE
AVERAGE PERFORMANCE
BELOW AVERAGE PERFORMANCE
INSUFFICIENT DATA
SAFETY HOTSPOTS
Safety Hotspot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Segment 8-1
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Segment 8-8
Segment 8-9
I-8 Corridor Segments:
Segment 8-1: California State Line to Avenue 15 E
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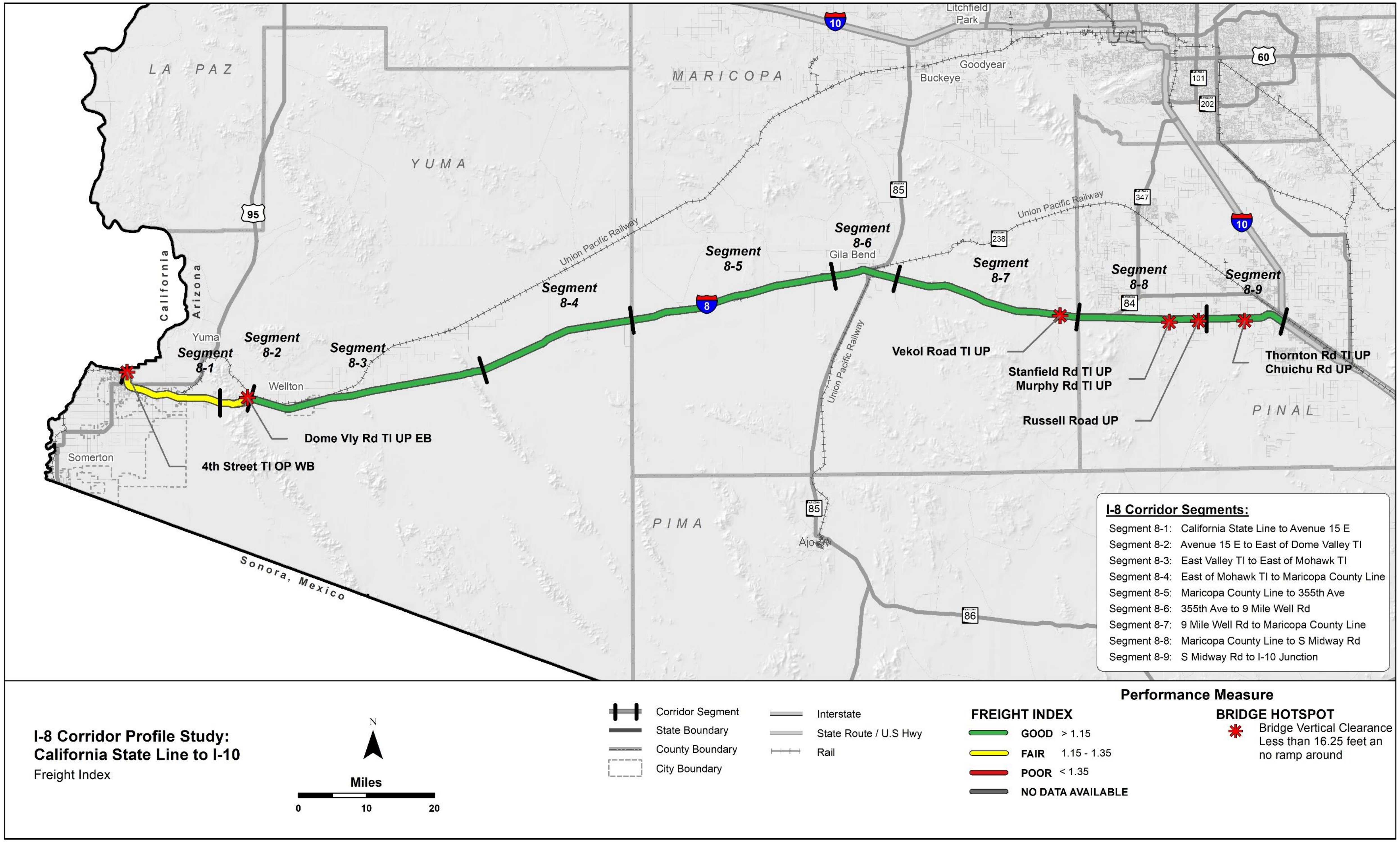
Segment 8-4: East of Mohawk TI to Maricopa County Line
Segment 8-5: Maricopa County Line to 355th Ave
Segment 8-6: 355th Ave to 9 Mile Well Rd
Segment 8-7: 9 Mile Well Rd to Maricopa County Line
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study:
California State Line to I-10
% of Fatal + Suspected Serious
Injury Crashes Involving Lane Departures
N
Miles
0
10
20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
SECONDARY MEASURE
ABOVE AVERAGE PERFORMANCE
AVERAGE PERFORMANCE
BELOW AVERAGE PERFORMANCE
INSUFFICIENT DATA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Buckeye
Goodyear
Litchfield Park
Union Pacific Railway
Segment 8-1
Segment 8-2
Segment 8-3
Segment 8-4
Segment 8-5
Segment 8-6
Segment 8-7
Segment 8-8
Segment 8-9
4th Street TI OP WB
Dome Vly Rd TI UP EB
Vekol Road TI UP
Stanfield Rd TI UP
Murphy Rd TI UP
Russell Road UP
Thornton Rd TI UP
Chuichu Rd UP
I-8 Corridor Segments:
Segment 8-1: California State Line to Avenue 15 E
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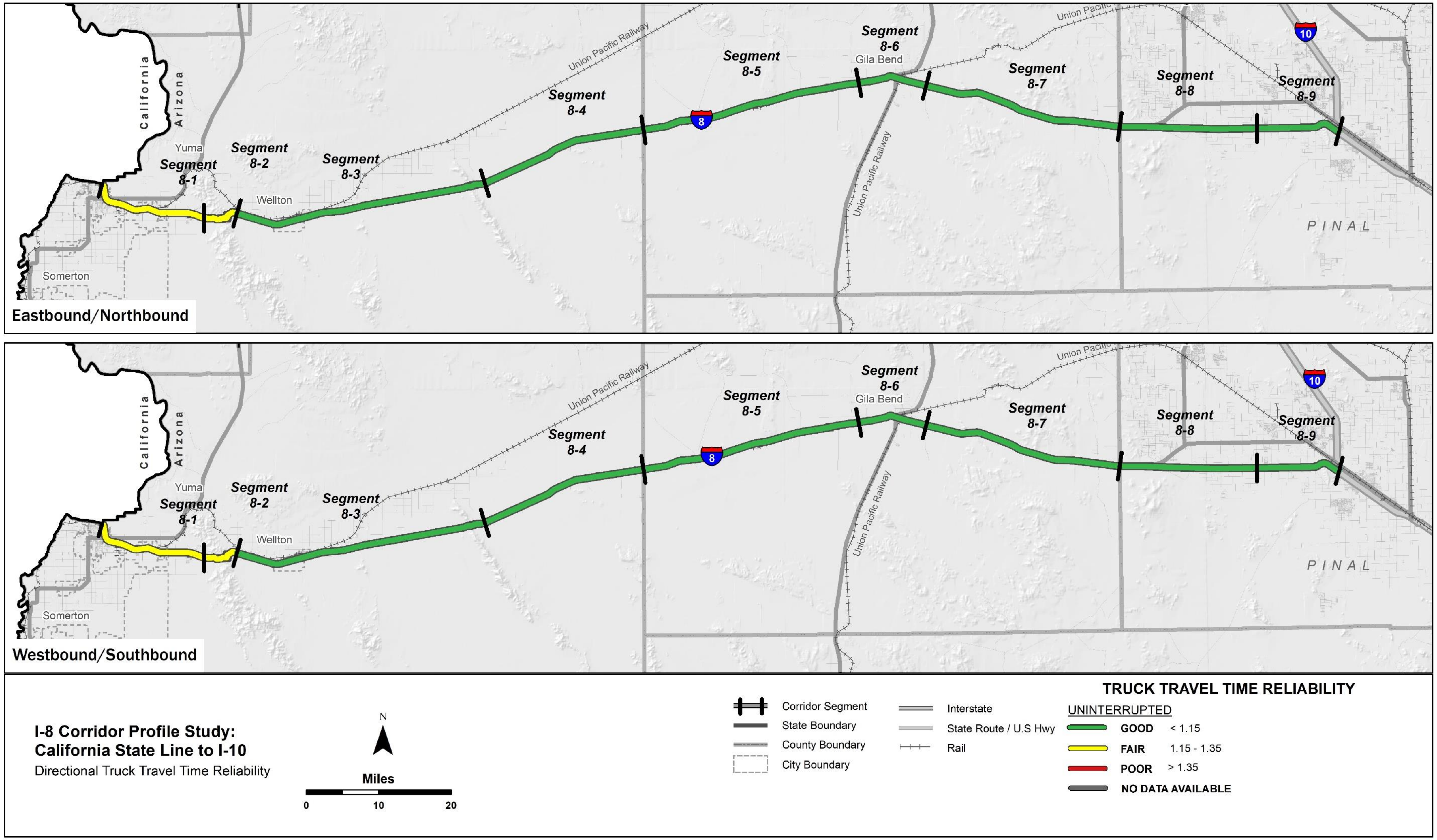
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study:
California State Line to I-10
Freight Index
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
FREIGHT INDEX
GOOD > 1.15
FAIR 1.15 - 1.35
POOR < 1.35
NO DATA AVAILABLE
BRIDGE HOTSPOT
Bridge Vertical Clearance Less than 16.25 feet an no ramp around


Eastbound/Northbound
Westbound/Southbound
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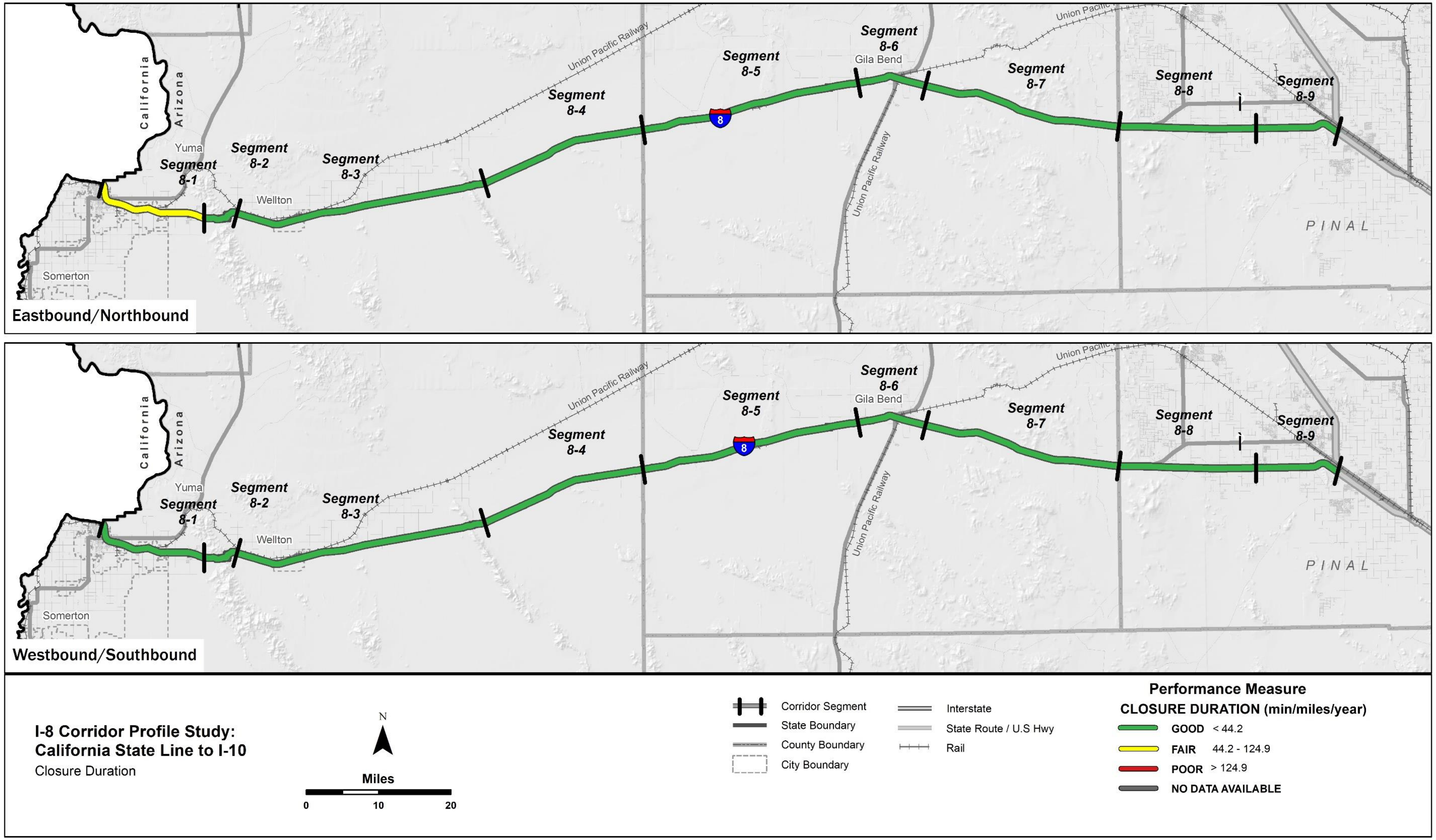
Arizona
Yuma
Somerton
Wellton
Gila Bend
PINAL
Union Pacific Railway
Union Pacific
Segment 8-1
Segment 8-2
Segment 8-3
Segment 8-4
Segment 8-5
Segment 8-6
Segment 8-7
Segment 8-8
Segment 8-9
8
10
I-8 Corridor Profile Study:
California State Line to I-10
Directional Truck Travel Time Reliability
N
Miles
0
10
20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
TRUCK TRAVEL TIME RELIABILITY
UNINTERRUPTED
GOOD < 1.15
FAIR 1.15 - 1.35
POOR > 1.35
NO DATA AVAILABLE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Union Pacific Railway
Union Pacific
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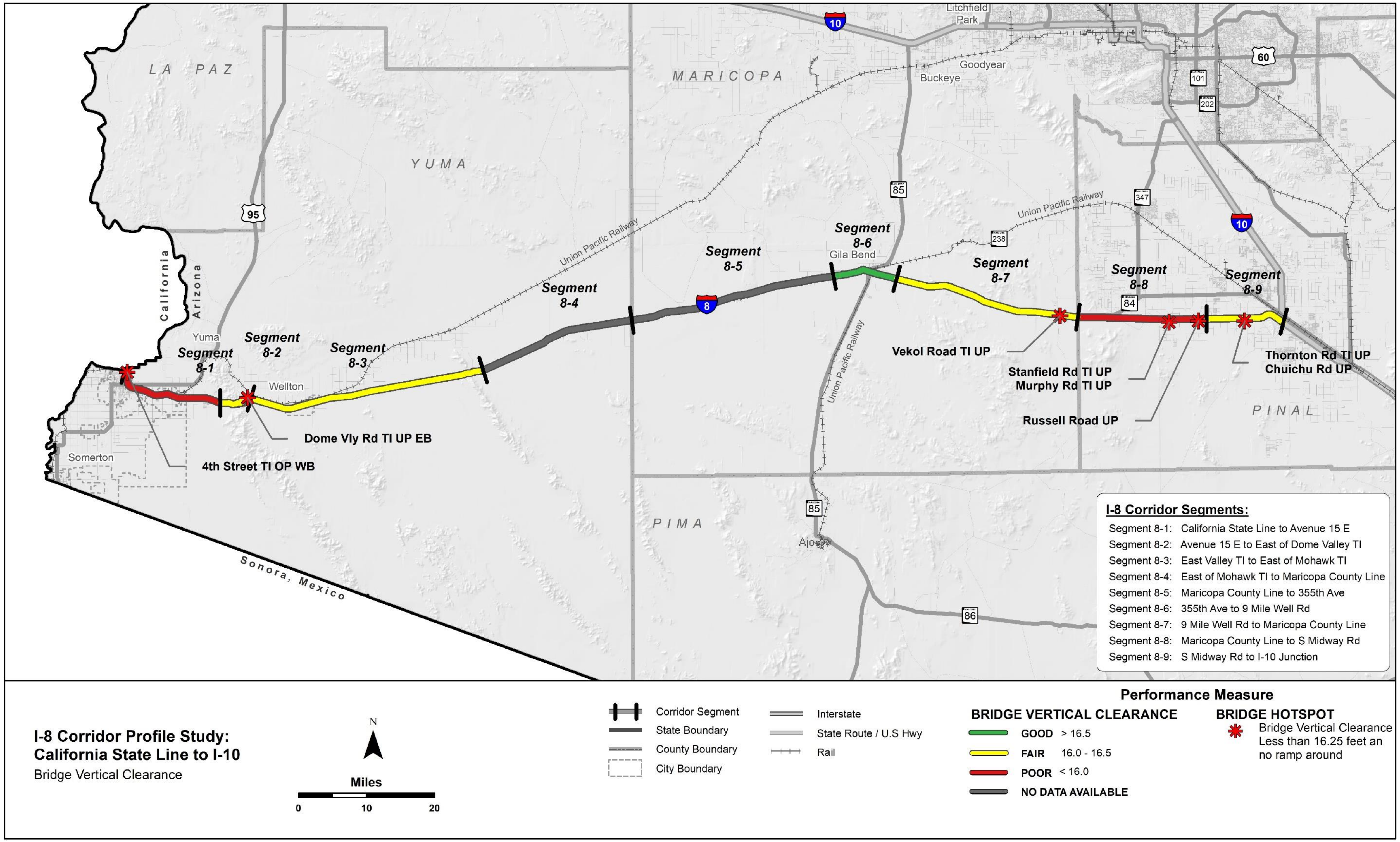
Segment 8-5
Segment 8-6
Segment 8-7
Segment 8-8
Segment 8-9
8
Eastbound/Northbound
Westbound/Southbound
I-8 Corridor Profile Study:
California State Line to I-10
Closure Duration
N
Miles
0
10
20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
CLOSURE DURATION (min/miles/year)
GOOD < 44.2
FAIR 44.2 - 124.9
POOR > 124.9
NO DATA AVAILABLE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4th Street TI OP WB
Dome Vly Rd TI UP EB
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Stanfield Rd TI UP
Murphy Rd TI UP
Russell Road UP
Thornton Rd TI UP
Chuichu Rd UP
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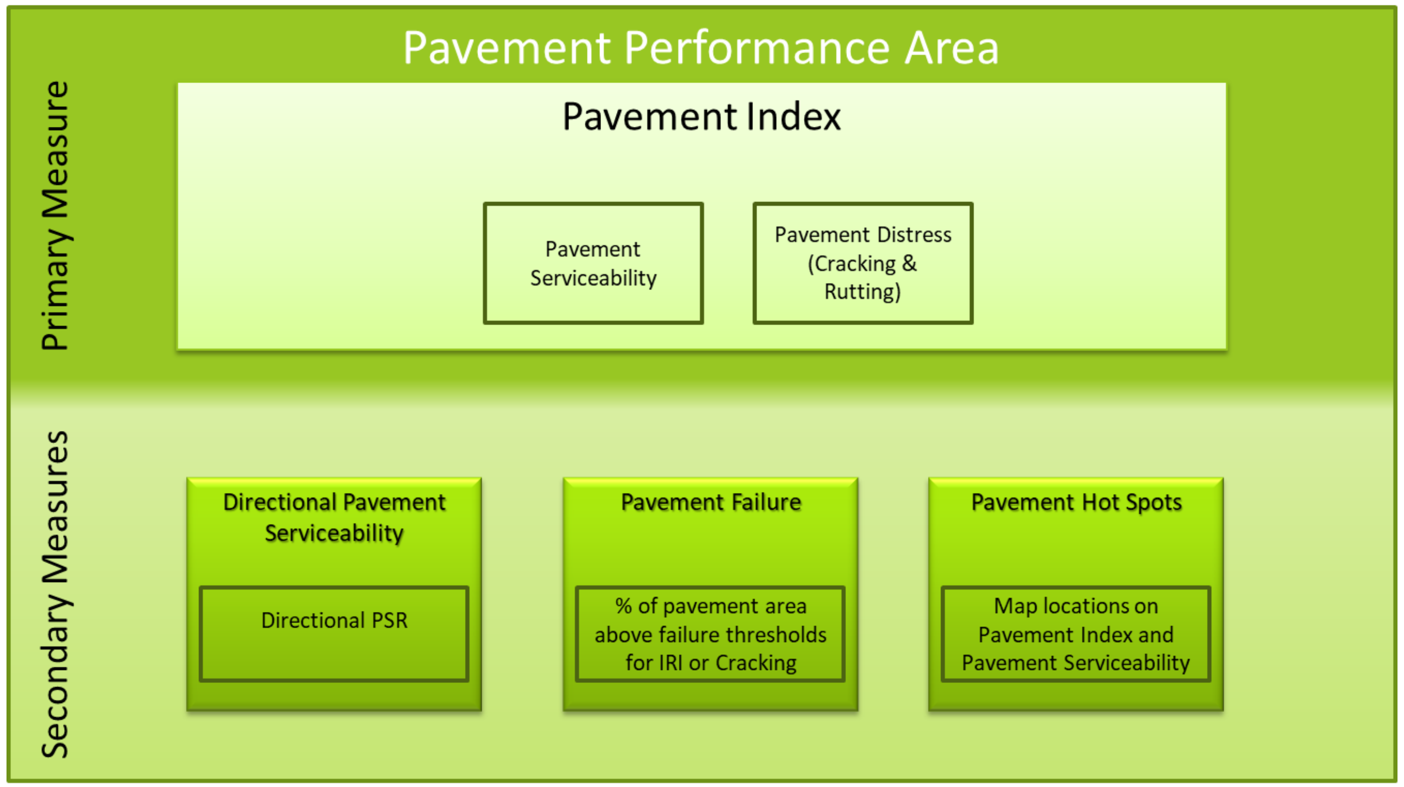
Segment 8-8: Maricopa County Line to S Midway Rd
Segment 8-9: S Midway Rd to I-10 Junction
I-8 Corridor Profile Study:
California State Line to I-10
Bridge Vertical Clearance
N
Miles
0 10 20
Corridor Segment
State Boundary
County Boundary
City Boundary
Interstate
State Route / U.S Hwy
Rail
Performance Measure
BRIDGE VERTICAL CLEARANCE
GOOD > 16.5
FAIR 16.0 - 16.5
POOR < 16.0
NO DATA AVAILABLE
BRIDGE HOTSPOT
Bridge Vertical Clearance Less than 16.25 feet an no ramp around

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.

<u>Primary Pavement Index</u>

The Pavement Index is calculated based on the use of three pavement condition ratings from the ADOT Pavement Database. The three ratings are the International Roughness Index (IRI), the Cracking rating, and the Rutting rating. The calculation of the Pavement Index uses a combination of these three 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. The Rutting rating is a measurement of the depth of pavement rutting based on field measurements. To facilitate the calculation of the index, the Cracking Rating and Rutting Rating were combined and converted to a Pavement Distress Index (PDI) using the following equation:

$$PDI = 5 - [\ (0.345 * C^{0.66}) + \left(0.01428 * \left(\frac{R}{2} * 100\right)^{1.32}\right) - \left(0.0823 * C^{0.18} * \left(\frac{R}{2} * 100\right)^{0.50}\right)\ ]$$

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 & Rutting (PDI)
Good	<75 (>3.75)	Cracking <5.75 Rutting < 0.35
Fair	75 - 102 (3.40 - 3.75)	Cracking 5.75 - 12 Rutting 0.35 – 0.55
Poor	>102(<3.40)	Cracking >12 Rutting > 0.55

Performance Level for Non-Interstates	IRI (PSR)	Cracking & Rutting (PDI)
Good	<94 (>3.5)	Cracking < 5.75 Rutting < 0.35
Fair	94 - 142 (2.90 - 3.5)	Cracking 5.75 - 12 Rutting 0.35 – 0.55
Poor	>142 (<2.90)	Cracking >12 Rutting > 0.55

The PSR and PDI are calculated for each 1-mile section of roadway. If PSR or PDI falls into a poor rating (<3.4 for PSR 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.

<u>Secondary Pavement Measures</u>

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, Cracking, or Rutting 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, Cracking rating, or Rutting rating that fall above the failure threshold as identified by ADOT Pavement Group. For interstates, an IRI rating above 105, a Cracking rating above 10, or a Rutting rating above 0.4 will be used as the thresholds which are slightly different than the ratings shown previously. For non-interstates, an IRI rating above 142, a Cracking rating above 10, or a Rutting rating above 0.4 will be used as the thresholds.

Scoring

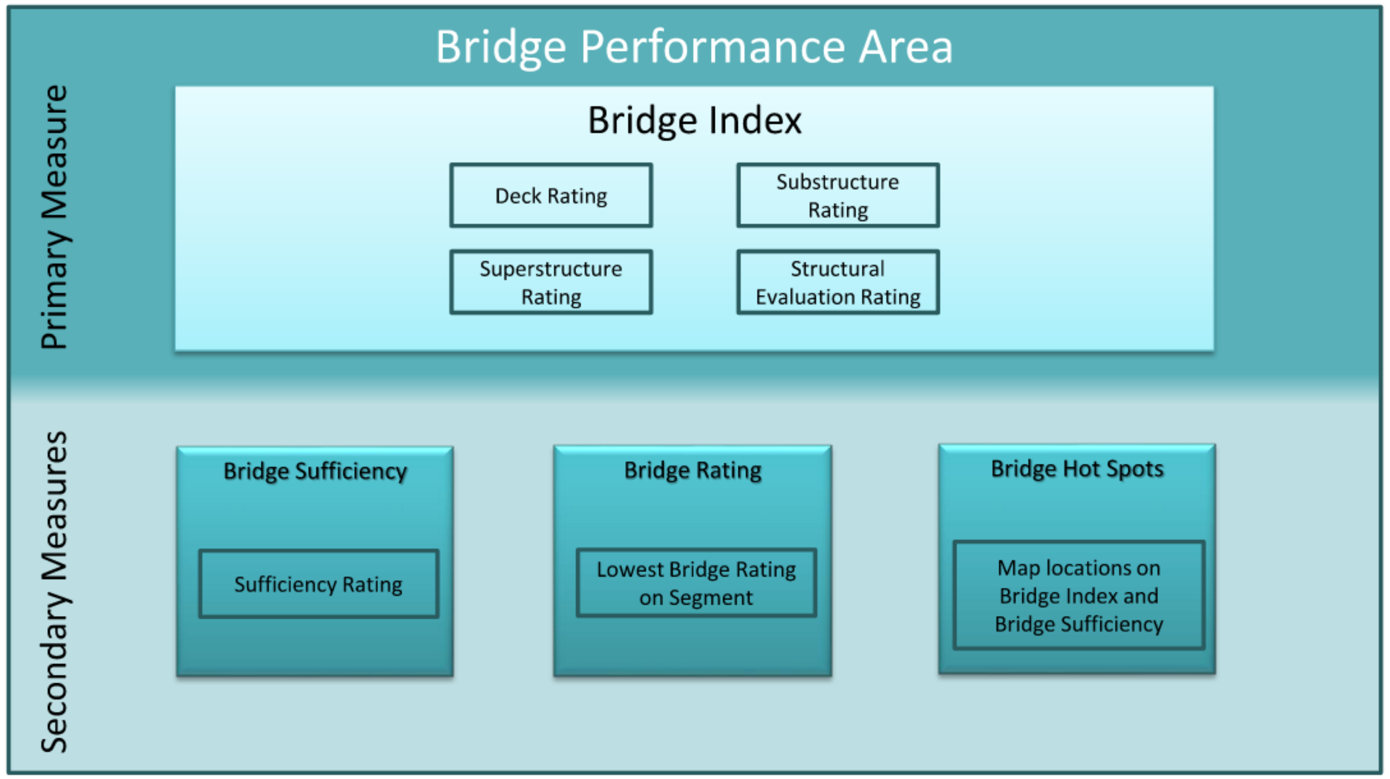
Performance Level	Pavement Index	
	Interstates	Non-Interstates
Good	>3.75	>3.6
Fair	3.0 - 3.75	2.8 - 3.6
Poor	<3.0	<2.8

Performance Level	Directional Pavement Serviceability	
	Interstates	Non-Interstates
Good	>3.75	>3.5
Fair	3.4 - 3.75	2.9 - 3.5
Poor	<3.4	<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.

<u>Primary Bridge Index</u>

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.

<u>Secondary Bridge Measures</u>

Three secondary measures will be evaluated:

- Bridge Sufficiency
- 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.

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:

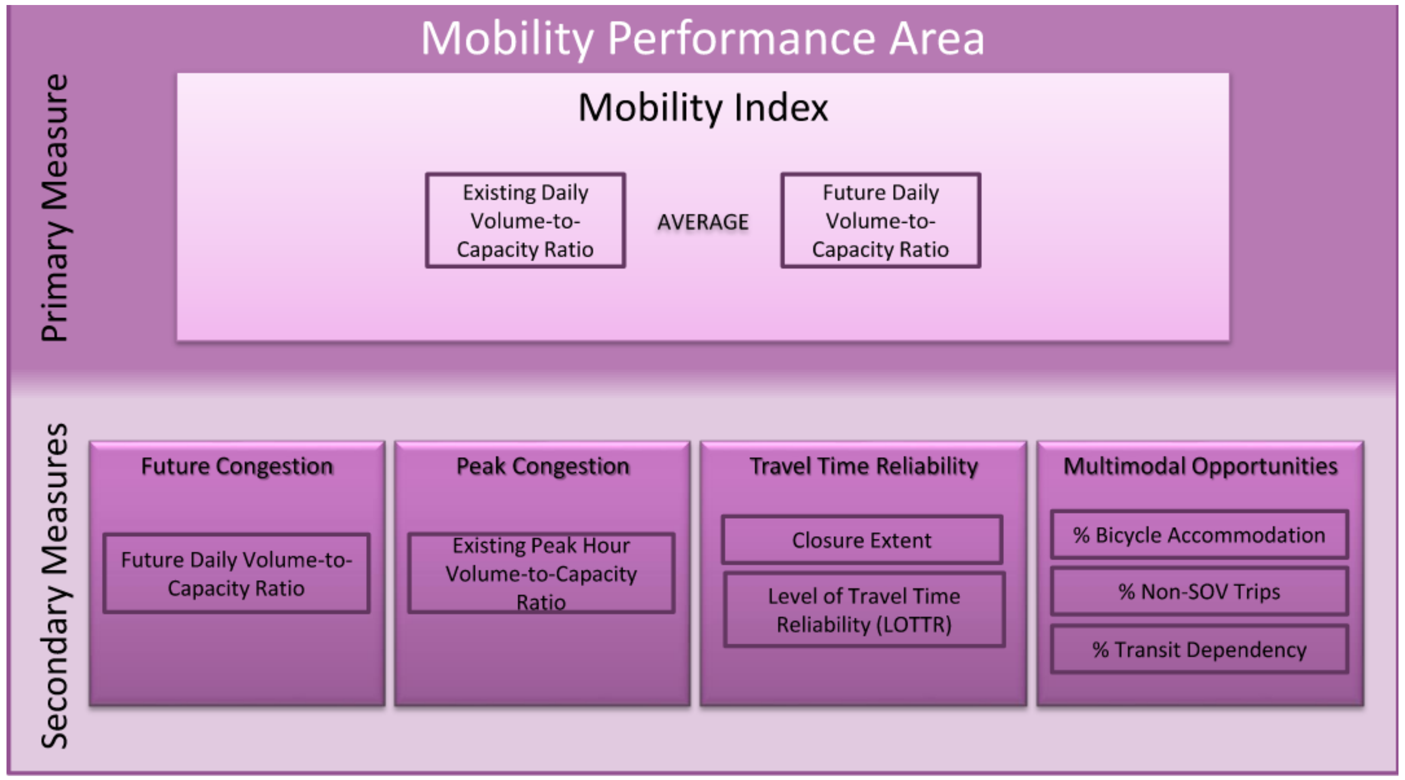
Performance Level	Bridge Index
Good	>6.5
Fair	5.0-6.5
Poor	<5.0

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

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

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 existing 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 future AADT volume for each segment by the existing 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 existing AADT segment volume. The following equation is used to apply the average annual compound growth rate:

Future AADT = Existing AADT x ((1+ACGR)^(Future Year-Existing Year))

The ACGR for each segment is defined by comparing the total volumes in the existing Arizona Travel Demand Model (AZTDM2) to the future AZTDM2 traffic volumes at each existing HPMS count station location throughout the corridor. Each existing and future 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 = ((Future Volume/Existing Volume)^(1/(Future Year-Existing Year))))-1

Secondary Mobility Measures

Four secondary measures are evaluated:

- Future Congestion
- Peak Congestion
- Travel Time Reliability

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

  - Closure Extent
  - Directional Level of Travel Time Reliability
- 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 two indicators. The two indicators are the number of times a piece of a corridor is closed for any specific reason and the directional Level of Travel Time Reliability (LOTTR).

<u>Closure Extent</u>: 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.

<u>Directional Level of Travel Time Reliability</u>: In terms of overall mobility, the LOTTR is the relationship of 80th percentile travel time to average (50th percentile) travel time for a given corridor segment in a specific direction.

Using INRIX 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). The highest value of the four time periods calculation is defined as the LOTTR for that data point. The weighted average LOTTR is calculated within each segment based on the number of data points collected and the length associated with the TMC location. The value of the weighted average LOTTR across each entry is used as the LOTTR 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.

<u>Percent Bicycle Accommodation</u>: 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.

<u>Percent Non-SOV Trips</u>: 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: 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	LOTTR on Uninterrupted Flow Facilities
Good	< 1.15
Fair	≥ 1.15 & < 1.50
Poor	≥ 1.50

Performance Level	LOTTR on Interrupted Flow Facilities
Good	< 1.15
Fair	≥ 1.15 & < 1.50
Poor	≥ 1.50

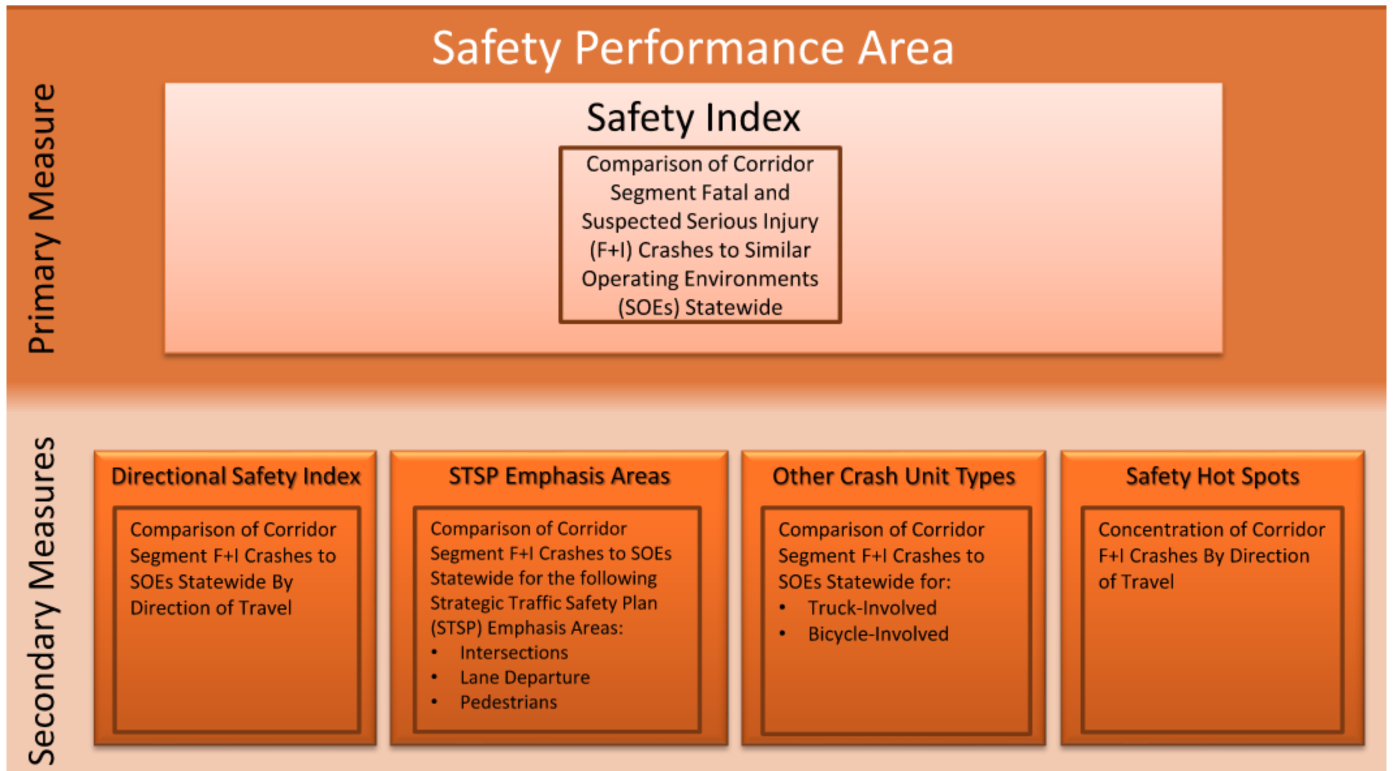
Performance Level	Percent Bicycle Accommodation
Good	≥ 90%
Fair	> 60% & ≤ 90%
Poor	< 60%

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 suspected serious injury crashes, the relative cost of those types of crashes, and crash occurrences on similar roadways in Arizona. According to ADOT's 2018 Highway Safety Improvement Program Manual, fatal crashes have an estimated cost that is 17.3 times the estimated cost of suspected serious injury crashes ($9.5 million compared to $550,000).

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

*CSS = 17.3 * (Normalized Fatal Crash Rate + Frequency) + (Normalized Suspected Serious 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	0.92	1.08
2 or 3 or 4 Lane Divided Highway	0.81	1.19
4 or 5 Lane Undivided Highway	0.78	1.22
6 Lane Highway	0.76	1.24
Rural 4 Lane Freeway with Daily Volume < 25,000	0.84	1.16
Rural 4 Lane Freeway with Daily Volume > 25,000	0.78	1.22
Urban 4 Lane Freeway	0.73	1.27
Urban or Rural 6 Lane Freeway	0.65	1.35
Urban > 6 Lane Freeway	0.89	1.11

** 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 suspected serious 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 suspected serious 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 suspected serious injury crashes:

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

Directional Safety Index: The Directional 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 suspected serious 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”

STSP Emphasis Areas: ADOT’s 2019 STSP identifies several emphasis areas for reducing fatal and suspected serious injury crashes. The three relevant STSP emphasis areas relate to crashes involving:

- Intersections
- Lane departures
- Pedestrians

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

The STSP emphasis areas performance is calculated using the following formula:

% Crashes Involving STSP Emphasis Area = Segment Crashes Involving STSP Emphasis Area / Total Segment Crashes

The percentage of total crashes involving STSP 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 STSP emphasis areas, the more the frequency of crashes involving STSP 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 STSP emphasis areas performance depends on the crash history on similar statewide operating environments, as shown in the tables below:

Similar Operating Environment	**Crashes at Intersections**	
	Lower Limit of Average*	**Upper Limit of Average***
2 or 3 Lane Undivided Highway	11.2%	15.6%
2 or 3 or 4 Lane Divided Highway	23.4%	29.3%
4 or 5 Lane Undivided Highway	43.8%	49.5%
6 Lane Highway	57.8%	73.2%
Rural 4 Lane Freeway with Daily Volume < 25,000	0.00%	0.00%
Rural 4 Lane Freeway with Daily Volume > 25,000	0.00%	0.00%
Urban 4 Lane Freeway	0.00%	0.00%
Urban or Rural 6 Lane Freeway	0.00%	0.00%
Urban > 6 Lane Freeway	0.00%	0.00%

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

Similar Operating Environment	Crashes Involving Lane Departures	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	66.9%	74.5%
2 or 3 or 4 Lane Divided Highway	56.4%	65.0%
4 or 5 Lane Undivided Highway	21.1%	32.1%
6 Lane Highway	11.7%	38.1%
Rural 4 Lane Freeway with Daily Volume < 25,000	72.8%	76.4%
Rural 4 Lane Freeway with Daily Volume > 25,000	69.0%	77.5%
Urban 4 Lane Freeway	60.6%	78.1%
Urban or Rural 6 Lane Freeway	55.7%	62.9%
Urban > 6 Lane Freeway	40.4%	43.2%

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

Similar Operating Environment	Crashes Involving Pedestrians	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	3.8%	7.2%
2 or 3 or 4 Lane Divided Highway	2.4%	3.6%
4 or 5 Lane Undivided Highway	8.8%	13.5%
6 Lane Highway	0.4%	11.9%
Rural 4 Lane Freeway with Daily Volume < 25,000	1.0%	3.3%
Rural 4 Lane Freeway with Daily Volume > 25,000	0.7%	4.7%
Urban 4 Lane Freeway	0.0%	4.9%
Urban or Rural 6 Lane Freeway	4.0%	7.9%
Urban > 6 Lane Freeway	1.6%	4.7%

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

The STSP emphasis area secondary safety performance measures for the Safety performance area include proportions of specific types of crashes within the total fatal and suspected serious injury crash frequencies. This more detailed categorization of fatal and suspected serious 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 STSP emphasis area secondary safety performance measures. If any of these criteria are met for a segment, that segment has "insufficient data" to reliably rate that STSP emphasis area performance:

- If the crash sample size (total fatal plus suspected serious 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 any of the STSP emphasis area performance measures is less than two crashes over the five-year analysis period, that entire STSP emphasis area performance measure has "insufficient data" and performance ratings are unreliable.

Other Crash Unit Types: Other crash unit types of interest are:

- Truck-involved crashes
- Bicycle-involved crashes

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

The crash unit type 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 each crash unit type 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.

<u>Scoring:</u>

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.

Similar Operating Environment	Crashes Involving Trucks	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	4.2%	8.0%
2 or 3 or 4 Lane Divided Highway	3.7%	9.9%
4 or 5 Lane Undivided Highway	0.8%	5.5%
6 Lane Highway	4.3%	7.5%
Rural 4 Lane Freeway with Daily Volume < 25,000	19.0%	22.5%
Rural 4 Lane Freeway with Daily Volume > 25,000	8.5%	18.0%
Urban 4 Lane Freeway	6.9%	12.4%
Urban or Rural 6 Lane Freeway	5.0%	12.9%
Urban > 6 Lane Freeway	1.9%	5.1%

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

Similar Operating Environment	Crashes Involving Bicycles	
	Lower Limit of Average*	Upper Limit of Average*
2 or 3 Lane Undivided Highway	0.0%	3.3%
2 or 3 or 4 Lane Divided Highway	0.0%	2.2%
4 or 5 Lane Undivided Highway	0.5%	3.8%
6 Lane Highway	0.0%	7.2%
Rural 4 Lane Freeway with Daily Volume < 25,000	0.0%	0.9%
Rural 4 Lane Freeway with Daily Volume > 25,000	0.0%	0.0%
Urban 4 Lane Freeway	0.0%	0.0%
Urban or Rural 6 Lane Freeway	0.0%	1.3%
Urban > 6 Lane Freeway	0.0%	0.0%

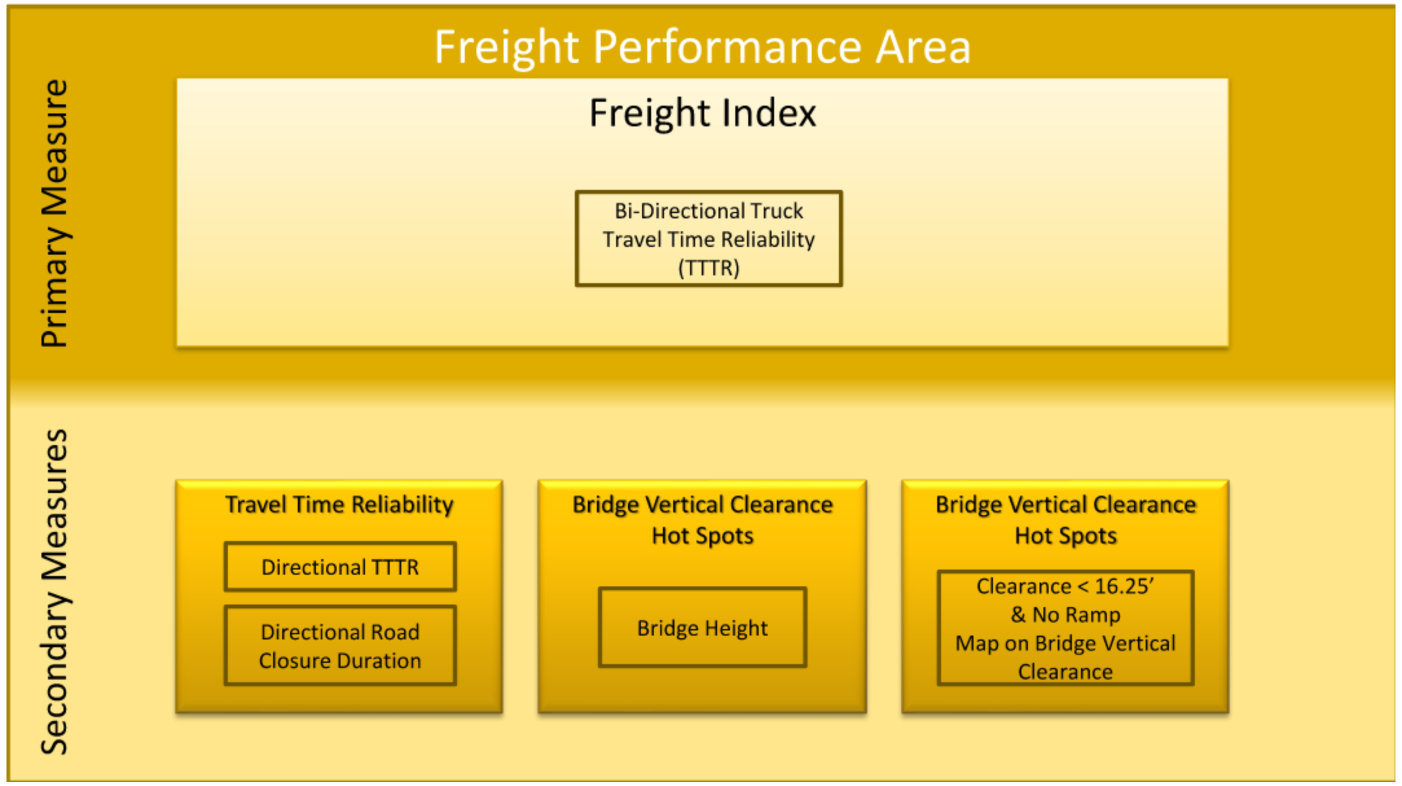
** Lower/upper limit of Average calculated as one standard deviation below/above the Mean*

The crash unit types have the same “insufficient data” criteria as the STSP emphasis areas.

Safety Hot Spots: A hot spot analysis was conducted that identified abnormally high concentrations of fatal and suspected serious 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 bi-directional truck travel time reliability (TTTR) for truck travel. The industry standard definition for the Truck Travel Time Reliability (TTTR) is the ratio of the 95th percentile travel time to average (50th percentile) travel time for trucks.

Using INRIX 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).

The highest calculated value of the four time periods is defined as the TTTR for that data point. The weighted average TTTR is calculated within each segment based on the number of data points collected and the length associated with the TMC location. The value of the weighted average TTTR across each entry is used as the TTTR for each respective segment within the corridor.

For each corridor segment, the TTTR is calculated for each direction of travel and then averaged to create a bi-directional TTTR. The Freight Index is equal to the average bi-directional TTTR for the segment.

The scale for rating the Freight Index differs between uninterrupted and interrupted flow facilities.

Secondary Freight Measures

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

- Travel Time Reliability
  - Directional Truck Travel Time Reliability
  - Closure Duration
- Bridge Vertical Clearance
- Bridge Vertical Clearance Hot Spots

Travel Time Reliability: Travel time reliability is a secondary measure that includes two indicators. The two indicators are the directional Truck Travel Time Reliability (TTTR) and the duration a piece of a corridor is closed for any specific reason.

Truck Travel Time Reliability: The performance measure for truck travel time reliability is directional TTTR. The industry standard definition for TTTR is the ratio of 95th percentile travel time to average (50th percentile) travel time for trucks for a given corridor segment in a specific direction.

Using INRIX 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). The highest value of the four time periods calculation is defined as the TTTR for that data point. The weighted average TTTR is calculated within each segment based on the number of data points collected and the length associated with the TMC location. The value of the weighted average TTTR across each entry is used as the TTTR for each respective segment within the corridor.

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 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	< 1.15	< 1.45
Fair	1.15 – 1.35	1.45 – 1.85
Poor	> 1.35	> 1.85

Performance Level	TTTR	
	Uninterrupted Flow Facilities	Interrupted Flow Facilities
Good	< 1.15	< 1.45
Fair	1.15 – 1.35	1.45 – 1.85
Poor	> 1.35	> 1.85

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

				Direction 1 (Eastbound)				Direction 2 (Westbound)				Direction 1 (Eastbound)		Direction 2 (Westbound)		Composite		Pavement Index	% Pavement Failure	
				# of Lanes	IRI	Cracking	Rutting	# of Lanes	IRI	Cracking	Rutting	PSR	PDI	PSR	PDI	Dir 1 (EB)	Dir 2 (WB)		Dir 1 (EB)	Dir 2 (WB)
Segment 1		***Interstate?***		**Yes**																
Milepost	0	to	1	2	75.39	0.00	-	2	64.89	0.00	-	3.75	5.00	3.91	5.00	4.13	4.24		2	2
Milepost	1	to	2	2	68.36	0.67	0.18	2	61.05	14.10	0.17	3.86	4.71	3.96	3.17	4.11	3.41		0	2
Milepost	2	to	3	2	54.95	0.00	0.20	2	48.30	12.10	0.19	4.06	4.69	4.16	3.33	4.25	3.58		0	2
Milepost	3	to	4	2	57.53	0.00	0.21	2	42.82	12.80	0.19	4.02	4.69	4.25	3.27	4.22	3.56		0	2
Milepost	4	to	5	2	40.73	0.00	0.22	2	37.52	8.50	0.16	4.28	4.67	4.34	3.71	4.55	3.89		0	0
Milepost	5	to	6	2	45.91	0.00	0.23	2	32.26	5.80	0.19	4.20	4.65	4.42	3.97	4.51	4.11		0	0
Milepost	6	to	7	2	54.79	0.00	0.21	2	45.19	10.10	0.18	4.06	4.67	4.21	3.53	4.24	3.73		0	2
Milepost	7	to	8	2	56.41	0.00	0.21	2	55.10	13.30	0.19	4.04	4.68	4.06	3.22	4.23	3.47		0	2
Milepost	8	to	9	2	76.60	0.00	0.25	2	48.17	15.44	0.20	3.74	4.61	4.16	3.03	4.00	3.37		0	2
Milepost	9	to	10	2	81.51	0.00	0.27	2	69.84	23.56	0.23	3.67	4.55	3.83	2.36	3.93	2.36		0	2
Milepost	10	to	11	2	53.41	0.00	0.23	2	49.09	10.70	0.20	4.08	4.65	4.15	3.45	4.48	3.66		0	2
Milepost	11	to	12	2	47.50	0.00	0.22	2	47.69	9.70	0.17	4.17	4.65	4.17	3.58	4.51	3.75		0	0
Milepost	12	to	13	2	45.05	0.00	0.19	2	44.93	6.50	0.18	4.21	4.73	4.22	3.90	4.57	3.99		0	0
Milepost	13	to	14	2	49.10	0.00	0.18	2	61.27	8.00	0.18	4.15	4.73	3.96	3.74	4.56	3.81		0	0
Milepost	14	to	15	2	51.08	0.00	0.14	2	51.13	1.00	0.13	4.12	4.82	4.12	4.70	4.33	4.52		0	0
Milepost	15	to	16	2	52.76	0.00	0.15	2	47.62	3.40	0.12	4.09	4.79	4.17	4.32	4.30	4.28		0	0
			Total	32				32												20
			Weighted Average									4.03	4.71	4.13	3.64	4.31	3.73			
			Factor									1.00		1.00						
			Indicator Score									4.03		4.13						**31.3%**
			Pavement Index															4.02		
Segment 2		***Interstate?***		**Yes**																
Milepost	16	to	17	2	66.95	0.00	0.18	2	53.44	9.40	0.15	3.88	4.73	4.08	3.62	4.13	3.76		0	0
Milepost	17	to	18	2	61.08	0.00	0.14	2	60.04	12.90	0.15	3.96	4.81	3.98	3.29	4.22	3.50		0	2
Milepost	18	to	19	2	58.14	0.00	0.15	2	62.06	2.63	0.12	4.01	4.79	3.95	4.44	4.24	4.10		0	0
Milepost	19	to	20	2	76.65	0.00	0.16	2	51.76	7.11	0.13	3.74	4.78	4.11	3.87	4.05	3.94		0	0
Milepost	20	to	21	2	51.26	0.00	0.13	2	43.86	7.30	0.11	4.11	4.84	4.23	3.86	4.33	3.97		0	0
			Total	10				10												2
			Weighted Average									3.94	4.79	4.07	3.82	4.20	3.85			
			Factor									1.00		1.00						
			Indicator Score									3.94		4.07						**10.0%**
			Pavement Index															4.02		
Segment 3		***Interstate?***		**Yes**																
Milepost	21	to	22	2	42.61	0.00	0.12	2	41.51	0.00	0.12	4.25	4.85	4.27	4.86	4.67	4.68		0	0
Milepost	22	to	23	2	49.53	0.00	0.11	2	51.33	0.00	0.11	4.14	4.86	4.11	4.87	4.65	4.34		0	0
Milepost	23	to	24	2	36.28	0.00	0.12	2	41.02	0.00	0.11	4.36	4.85	4.28	4.87	4.71	4.69		0	0

Milepost	24	to	25	2	44.20	0.00	0.12	2	48.95	0.00	0.10	4.23	4.85	4.15	4.88	4.66	4.66		0	0
Milepost	25	to	26	2	38.50	0.00	0.12	2	40.12	0.00	0.11	4.32	4.85	4.29	4.87	4.69	4.69		0	0
Milepost	26	to	27	2	42.17	0.00	0.13	2	39.73	0.00	0.11	4.26	4.83	4.30	4.86	4.66	4.69		0	0
Milepost	27	to	28	2	47.66	0.00	0.13	2	42.40	0.00	0.11	4.17	4.83	4.26	4.86	4.63	4.68		0	0
Milepost	28	to	29	2	46.91	0.00	0.11	2	50.57	0.50	0.12	4.18	4.86	4.13	4.81	4.66	4.60		0	0
Milepost	29	to	30	2	68.75	0.00	0.20	2	57.66	10.40	0.23	3.85	4.70	4.02	3.45	4.10	3.62		0	2
Milepost	30	to	31	2	67.38	0.00	0.20	2	63.12	9.40	0.21	3.87	4.71	3.93	3.57	4.12	3.68		0	0
Milepost	31	to	32	2	113.61	0.00	0.25	2	72.79	12.40	0.21	3.25	4.60	3.79	3.28	3.25	3.44		2	2
Milepost	32	to	33	2	104.92	0.00	0.26	2	76.21	18.20	0.24	3.36	4.57	3.74	2.76	3.36	3.05		0	2
Milepost	33	to	34	2	89.05	0.00	0.26	2	64.86	17.10	0.22	3.56	4.58	3.91	2.87	3.87	3.18		0	2
Milepost	34	to	35	2	125.44	0.00	0.31	2	78.87	22.20	0.24	3.10	4.47	3.71	2.45	3.10	2.45		2	2
Milepost	35	to	36	2	105.68	0.00	0.29	2	89.79	25.20	0.25	3.35	4.50	3.55	2.22	3.35	2.22		2	2
Milepost	36	to	37	2	105.36	0.00	0.27	2	115.12	27.50	0.29	3.35	4.56	3.23	2.00	3.35	2.00		2	2
Milepost	37	to	38	2	147.28	0.00	0.27	2	95.74	18.70	0.26	2.86	4.57	3.48	2.70	2.86	2.70		2	2
Milepost	38	to	39	2	124.43	0.00	0.23	2	93.05	15.60	0.24	3.12	4.65	3.51	2.97	3.12	3.13		2	2
Milepost	39	to	40	2	142.86	0.00	0.26	2	97.22	17.30	0.23	2.91	4.58	3.46	2.84	2.91	3.03		2	2
Milepost	40	to	41	2	124.86	0.00	0.22	2	94.80	14.80	0.23	3.11	4.66	3.49	3.06	3.11	3.36		2	2
Milepost	41	to	42	2	112.97	0.00	0.22	2	91.50	14.60	0.25	3.25	4.66	3.53	3.04	3.25	3.19		2	2
Milepost	42	to	43	2	107.07	0.00	0.22	2	100.09	16.90	0.23	3.33	4.67	3.42	2.88	3.33	3.26		2	2
Milepost	43	to	44	2	120.39	0.00	0.26	2	95.58	18.60	0.21	3.16	4.57	3.48	2.76	3.16	2.97		2	2
Milepost	44	to	45	2	141.99	0.00	0.24	2	112.59	17.10	0.22	2.91	4.63	3.26	2.87	2.91	3.26		2	2
Milepost	45	to	46	2	119.24	0.00	0.22	2	123.61	17.80	0.24	3.18	4.67	3.13	2.79	3.18	3.13		2	2
Milepost	46	to	47	2	58.37	0.00	0.13	2	54.90	0.00	0.10	4.01	4.84	4.06	4.88	4.26	4.30		0	0
Milepost	47	to	48	2	58.73	0.00	0.12	2	55.36	0.00	0.11	4.00	4.85	4.05	4.87	4.25	4.30		0	0
Milepost	48	to	49	2	65.03	0.00	0.13	2	60.57	0.00	0.11	3.91	4.82	3.97	4.87	4.18	4.24		0	0
Milepost	49	to	50	2	62.46	0.00	0.13	2	68.68	0.00	0.10	3.94	4.83	3.85	4.88	4.21	4.16		0	0
Milepost	50	to	51	2	58.32	0.00	0.13	2	61.80	0.00	0.12	4.01	4.84	3.95	4.85	4.26	4.22		0	0
Milepost	51	to	52	2	52.60	0.00	0.11	2	62.07	0.00	0.11	4.09	4.86	3.95	4.86	4.32	4.22		0	0
Milepost	52	to	53	2	53.33	0.00	0.12	2	66.29	0.00	0.13	4.08	4.84	3.89	4.84	4.31	4.17		0	0
Milepost	53	to	54	2	61.62	0.00	0.13	2	68.06	0.56	0.11	3.96	4.84	3.86	4.80	4.22	4.14		0	0
Milepost	54	to	55		-	-	-	2	94.14	17.43	0.15	-	-	3.50	2.89	-	3.08		0	2
Milepost	55	to	56	2	103.84	0.00	0.16	2	73.82	10.00	0.12	3.37	4.78	3.78	3.58	3.37	3.64		0	0
Milepost	56	to	57	2	39.42	0.00	0.10	2	50.01	0.00	0.09	4.30	4.88	4.13	4.90	4.71	4.36		0	0
			Total	70				72												60
			Weighted Average									3.69	4.73	3.82	3.82	3.88	3.71			
			Factor									1.00		1.00						
			Indicator Score									3.69		3.82						42.3%
			Pavement Index															3.79		
Segment 4		***Interstate?***		**Yes**																
Milepost	57	to	58	2	39.20	0.00	0.11	2	42.04	0.00	0.11	4.31	4.86	4.26	4.87	4.70	4.69		0	0
Milepost	58	to	59	2	39.90	0.00	0.11	2	51.18	0.00	0.10	4.30	4.86	4.12	4.88	4.69	4.34		0	0
Milepost	59	to	60	2	55.69	0.00	0.10	2	46.82	0.00	0.10	4.05	4.88	4.19	4.88	4.30	4.67		0	0

Milepost	60	to	61	2	54.94	0.00	0.11	2	49.04	0.00	0.11	4.06	4.86	4.15	4.87	4.30	4.65		0	0
Milepost	61	to	62	2	47.52	0.00	0.11	2	52.54	0.00	0.10	4.17	4.86	4.10	4.88	4.65	4.33		0	0
Milepost	62	to	63	2	66.21	0.00	0.12	2	50.04	0.00	0.11	3.89	4.85	4.13	4.87	4.18	4.35		0	0
Milepost	63	to	64	2	55.00	0.00	0.12	2	48.57	0.00	0.10	4.06	4.84	4.16	4.88	4.29	4.66		0	0
Milepost	64	to	65	2	53.01	0.00	0.12	2	48.01	0.00	0.10	4.09	4.85	4.17	4.88	4.32	4.66		0	0
Milepost	65	to	66	2	64.28	0.00	0.11	2	51.15	0.00	0.10	3.92	4.86	4.12	4.88	4.20	4.34		0	0
Milepost	66	to	67	2	35.69	0.00	0.14	2	41.25	0.00	0.21	4.37	4.81	4.27	4.69	4.68	4.56		0	0
Milepost	67	to	68	2	37.13	0.00	0.17	2	45.40	0.00	0.21	4.34	4.75	4.21	4.68	4.63	4.54		0	0
Milepost	68	to	69	2	34.43	0.00	0.18	2	34.24	0.00	0.19	4.39	4.73	4.39	4.73	4.63	4.63		0	0
Milepost	69	to	70	2	34.62	0.00	0.18	2	40.81	0.00	0.18	4.38	4.74	4.28	4.75	4.63	4.61		0	0
Milepost	70	to	71	2	42.45	0.00	0.17	2	38.20	0.00	0.18	4.26	4.77	4.32	4.74	4.61	4.61		0	0
Milepost	71	to	72	2	166.85	0.00	0.23	2	41.80	0.80	0.18	2.65	4.65	4.27	4.68	2.65	4.56		2	0
Milepost	72	to	73	2	118.51	0.00	0.21	2	85.69	17.90	0.18	3.19	4.67	3.61	2.84	3.19	3.07		2	2
Milepost	73	to	74	2	111.58	0.00	0.15	2	60.04	16.70	0.17	3.27	4.79	3.98	2.95	3.27	3.26		2	2
Milepost	74	to	75	2	186.06	0.00	0.23	2	61.00	17.40	0.17	2.47	4.64	3.97	2.89	2.47	3.21		2	2
Milepost	75	to	76	2	147.43	0.00	0.23	2	76.10	14.90	0.17	2.86	4.63	3.74	3.10	2.86	3.29		2	2
Milepost	76	to	77	2	151.22	0.00	0.25	2	109.90	20.00	0.17	2.81	4.60	3.29	2.68	2.81	3.29		2	2
Milepost	77	to	78	2	163.37	0.00	0.25	2	69.90	12.10	0.15	2.69	4.61	3.83	3.36	2.69	3.50		2	2
Milepost	78	to	79	2	76.18	0.20	0.12	2	66.33	18.10	0.14	3.74	4.88	3.89	2.85	4.09	3.16		0	2
Milepost	79	to	80	2	136.73	10.40	0.18	2	75.21	17.80	0.18	2.97	3.50	3.76	2.85	2.97	3.12		2	2
			Total	46				46												32
			Weighted Average									3.71	4.72	4.05	4.16	3.90	4.09			
			Factor									1.00		1.00						
			Indicator Score									3.71		4.05						34.8%
			Pavement Index															4.00		
Segment 5		***Interstate?***		**Yes**																
Milepost	80	to	81	2	212.11	22.10	0.27	2	88.70	36.00	0.18	2.23	2.43	3.57	1.54	2.23	1.54		2	2
Milepost	81	to	82	2	116.41	9.80	0.20	2	67.07	23.20	0.15	3.21	3.54	3.88	2.44	3.21	2.44		2	2
Milepost	82	to	83	2	25.60	0.00	0.12	2	29.28	0.00	0.13	4.54	4.84	4.47	4.83	4.75	4.72		0	0
Milepost	83	to	84	2	27.54	0.00	0.11	2	27.41	0.00	0.14	4.50	4.86	4.51	4.81	4.75	4.72		0	0
Milepost	84	to	85	2	24.47	0.00	0.12	2	27.16	0.00	0.13	4.56	4.85	4.51	4.83	4.76	4.73		0	0
Milepost	85	to	86	2	23.57	0.00	0.11	2	29.11	0.00	0.12	4.57	4.86	4.48	4.85	4.77	4.74		0	0
Milepost	86	to	87	2	22.84	0.00	0.11	2	30.17	0.00	0.12	4.58	4.86	4.46	4.86	4.78	4.74		0	0
Milepost	87	to	88	2	29.19	0.00	0.12	2	27.39	0.00	0.10	4.48	4.85	4.51	4.87	4.74	4.76		0	0
Milepost	88	to	89	2	26.35	0.00	0.12	2	21.20	0.00	0.11	4.52	4.84	4.61	4.86	4.75	4.78		0	0
Milepost	89	to	90	2	25.62	0.00	0.13	2	20.20	0.00	0.11	4.54	4.83	4.63	4.87	4.74	4.80		0	0
Milepost	90	to	91	2	30.05	0.00	0.12	2	21.87	0.00	0.11	4.46	4.85	4.60	4.87	4.73	4.79		0	0
Milepost	91	to	92	2	29.45	0.00	0.12	2	25.71	0.00	0.11	4.47	4.85	4.53	4.86	4.74	4.77		0	0
Milepost	92	to	93	2	24.73	0.00	0.12	2	24.52	0.00	0.11	4.55	4.86	4.56	4.87	4.76	4.77		0	0
Milepost	93	to	94	2	22.49	0.00	0.12	2	22.97	0.00	0.11	4.59	4.84	4.58	4.87	4.77	4.78		0	0
Milepost	94	to	95	2	22.15	0.00	0.12	2	29.88	0.00	0.11	4.60	4.85	4.46	4.87	4.77	4.75		0	0
Milepost	95	to	96	2	23.24	0.00	0.11	2	27.21	0.00	0.11	4.58	4.86	4.51	4.86	4.78	4.75		0	0

Milepost	96	to	97	2	31.08	0.00	0.14	2	27.68	0.00	0.15	4.44	4.82	4.50	4.79	4.70	4.70		0	0
Milepost	97	to	98	2	31.63	0.00	0.15	2	22.79	0.00	0.16	4.43	4.80	4.59	4.78	4.69	4.72		0	0
Milepost	98	to	99	2	28.17	0.00	0.14	2	23.06	0.00	0.16	4.49	4.81	4.58	4.78	4.72	4.72		0	0
Milepost	99	to	100	2	26.74	0.00	0.13	2	22.66	0.00	0.15	4.52	4.83	4.59	4.80	4.74	4.74		0	0
Milepost	100	to	101	2	27.94	0.00	0.14	2	23.15	0.00	0.14	4.50	4.81	4.58	4.81	4.71	4.74		0	0
Milepost	101	to	102	2	28.63	0.00	0.13	2	26.45	0.00	0.14	4.48	4.83	4.52	4.81	4.72	4.72		0	0
Milepost	102	to	103	2	34.91	0.00	0.14	2	29.01	0.00	0.15	4.38	4.81	4.48	4.80	4.68	4.70		0	0
Milepost	103	to	104	2	26.40	0.00	0.15	2	21.13	0.00	0.14	4.52	4.80	4.61	4.81	4.72	4.75		0	0
Milepost	104	to	105	2	25.08	0.00	0.13	2	22.69	0.00	0.12	4.55	4.83	4.59	4.85	4.75	4.77		0	0
Milepost	105	to	106	2	25.63	0.20	0.13	2	27.92	0.00	0.13	4.54	4.86	4.50	4.84	4.77	4.73		0	0
Milepost	106	to	107	2	103.93	0.20	0.18	2	89.44	0.00	0.22	3.37	4.81	3.56	4.66	3.37	3.89		0	0
Milepost	107	to	108	2	118.16	0.00	0.21	2	96.38	0.00	0.23	3.19	4.69	3.47	4.64	3.19	3.82		2	0
Milepost	108	to	109	2	114.15	0.00	0.19	2	101.55	0.00	0.23	3.24	4.73	3.40	4.64	3.24	3.40		2	0
Milepost	109	to	110	2	133.59	0.00	0.19	2	112.08	0.00	0.23	3.01	4.71	3.27	4.65	3.01	3.27		2	2
			Total	60				60												16
			Weighted Average									4.22	4.70	4.34	4.62	4.40	4.41			
			Factor									1.00		1.00						
			Indicator Score									4.22		4.34						**13.3%**
			Pavement Index															4.41		
Segment 6		***Interstate?***		**Yes**																
Milepost	110	to	111	2	144.88	0.00	0.23	2	150.55	0.00	0.26	2.88	4.64	2.82	4.57	2.88	2.82		2	2
Milepost	111	to	112	2	98.93	0.00	0.24	2	131.24	0.00	0.25	3.43	4.61	3.04	4.61	3.79	3.04		0	2
Milepost	112	to	113	2	95.18	0.00	0.29	2	133.43	0.00	0.21	3.48	4.51	3.01	4.68	3.79	3.01		0	2
Milepost	113	to	114	2	127.31	0.00	0.23	2	149.12	0.00	0.21	3.08	4.65	2.84	4.69	3.08	2.84		2	2
Milepost	114	to	115	2	97.34	0.00	0.14	2	141.92	0.00	0.20	3.45	4.81	2.92	4.70	3.86	2.92		0	2
Milepost	115	to	116	2	70.30	3.13	0.13	2	100.57	10.00	0.15	3.83	4.35	3.41	3.56	3.99	3.46		0	0
Milepost	116	to	117	2	79.71	36.30	0.17	2	70.85	15.40	0.13	3.69	1.52	3.82	3.08	1.52	3.30		2	2
Milepost	117	to	118	2	71.59	20.20	0.14	2	58.09	18.50	0.14	3.81	2.68	4.01	2.82	2.68	3.17		2	2
Milepost	118	to	119	2	43.99	15.50	0.17	2	46.79	2.10	0.12	4.23	3.05	4.19	4.51	3.40	4.41		2	0
Milepost	119	to	120	2	42.34	8.10	0.15	2	43.37	0.70	0.13	4.26	3.75	4.24	4.76	3.91	4.60		0	0
			Total	20				20												24
			Weighted Average									3.62	3.86	3.43	4.20	3.29	3.36			
			Factor									1.00		1.00						
			Indicator Score									3.62		3.43						**60.0%**
			Pavement Index															3.32		
Segment 7		***Interstate?***		**Yes**																
Milepost	120	to	121	2	36.81	9.00	0.14	2	35.47	5.90	0.15	4.35	3.66	4.37	3.99	3.87	4.11		0	0
Milepost	121	to	122	2	33.91	14.40	0.15	2	38.67	1.10	0.15	4.40	3.15	4.32	4.66	3.53	4.55		2	0
Milepost	122	to	123	2	44.12	13.70	0.20	2	35.68	3.90	0.15	4.23	3.18	4.37	4.23	3.50	4.27		2	0
Milepost	123	to	124	2	36.72	8.20	0.17	2	36.20	13.80	0.17	4.35	3.73	4.36	3.19	3.92	3.54		0	2
Milepost	124	to	125	2	37.08	10.50	0.14	2	34.04	7.80	0.14	4.34	3.52	4.39	3.79	3.77	3.97		2	0
Milepost	125	to	126	2	47.54	11.90	0.14	2	34.29	15.80	0.15	4.17	3.39	4.39	3.03	3.62	3.44		2	2

Milepost	126	to	127	2	56.08	12.20	0.15	2	42.34	15.80	0.14	4.04	3.35	4.26	3.04	3.56	3.40		2	2
Milepost	127	to	128	2	45.08	11.50	0.15	2	38.94	4.10	0.14	4.21	3.42	4.31	4.22	3.66	4.25		2	0
Milepost	128	to	129	2	45.96	11.30	0.15	2	36.85	8.10	0.16	4.20	3.44	4.35	3.74	3.67	3.92		2	0
Milepost	129	to	130	2	38.97	13.70	0.17	2	41.94	5.80	0.15	4.31	3.20	4.26	4.01	3.53	4.08		2	0
Milepost	130	to	131	2	40.16	14.60	0.17	2	39.25	11.50	0.16	4.29	3.12	4.31	3.41	3.47	3.68		2	2
Milepost	131	to	132	2	42.07	10.30	0.18	2	42.60	4.00	0.16	4.26	3.51	4.25	4.21	3.74	4.23		2	0
Milepost	132	to	133	2	36.96	4.90	0.18	2	41.86	4.60	0.18	4.34	4.09	4.26	4.12	4.17	4.16		0	0
Milepost	133	to	134	2	40.58	2.90	0.18	2	40.16	6.70	0.18	4.29	4.35	4.29	3.88	4.33	4.00		0	0
Milepost	134	to	135	2	82.50	6.10	0.22	2	71.42	10.30	0.19	3.65	3.90	3.81	3.50	3.73	3.59		0	2
Milepost	135	to	136	2	99.52	10.70	0.25	2	118.78	22.90	0.19	3.43	3.39	3.18	2.44	3.42	3.18		2	2
Milepost	136	to	137	2	129.09	15.40	0.24	2	130.22	24.20	0.25	3.06	2.99	3.05	2.29	3.06	3.05		2	2
Milepost	137	to	138	2	133.63	25.80	0.22	2	118.93	17.20	0.20	3.01	2.20	3.18	2.88	3.01	3.18		2	2
Milepost	138	to	139	2	156.68	23.90	0.18	2	134.99	21.30	0.24	2.76	2.38	2.99	2.51	2.76	2.99		2	2
Milepost	139	to	140	2	118.54	16.40	0.21	2	113.46	22.70	0.22	3.19	2.93	3.25	2.43	3.19	3.25		2	2
Milepost	140	to	141	2	112.16	15.20	0.22	2	107.84	17.90	0.20	3.26	3.03	3.32	2.82	3.26	3.32		2	2
Milepost	141	to	142	2	103.98	2.70	0.25	2	80.07	2.40	0.19	3.37	4.28	3.69	4.40	3.37	3.90		0	0
Milepost	142	to	143	2	94.08	0.00	0.23	2	90.31	0.00	0.20	3.50	4.63	3.55	4.70	3.84	3.89		0	0
Milepost	143	to	144	2	91.06	0.00	0.26	2	90.15	0.00	0.24	3.54	4.57	3.55	4.62	3.85	3.87		0	0
Milepost	144	to	145	2	84.35	0.00	0.27	2	102.08	0.00	0.25	3.63	4.55	3.39	4.61	3.91	3.39		0	0
Milepost	145	to	146	2	76.08	0.00	0.25	2	85.43	0.00	0.23	3.74	4.61	3.61	4.64	4.00	3.92		0	0
Milepost	146	to	147	2	77.76	0.00	0.22	2	88.55	0.00	0.25	3.72	4.66	3.57	4.60	4.00	3.88		0	0
Milepost	147	to	148	2	69.72	0.00	0.20	2	67.26	0.00	0.20	3.84	4.70	3.87	4.70	4.10	4.12		0	0
			Total	56				56												54
			Weighted Average									3.84	3.64	3.88	3.74	3.64	3.76			
			Factor									1.00		1.00						
			Indicator Score									3.84		3.88						48.2%
			Pavement Index															3.70		
Segment 8		***Interstate?***		**Yes**																
Milepost	148	to	149	2	34.61	0.00	0.13	2	30.20	0.10	0.12	4.38	4.82	4.46	4.90	4.69	4.77		0	0
Milepost	149	to	150	2	35.93	0.00	0.15	2	28.08	0.10	0.13	4.36	4.79	4.49	4.89	4.66	4.77		0	0
Milepost	150	to	151	2	36.06	0.00	0.14	2	29.11	0.00	0.12	4.36	4.82	4.48	4.84	4.68	4.73		0	0
Milepost	151	to	152	2	38.38	0.00	0.14	2	33.98	0.00	0.14	4.32	4.81	4.39	4.81	4.66	4.69		0	0
Milepost	152	to	153	2	30.10	0.10	0.14	2	28.16	0.00	0.14	4.46	4.88	4.49	4.82	4.76	4.72		0	0
Milepost	153	to	154	2	36.20	0.00	0.17	2	31.11	0.00	0.13	4.36	4.76	4.44	4.83	4.64	4.71		0	0
Milepost	154	to	155	2	34.88	0.00	0.15	2	30.38	0.00	0.13	4.38	4.79	4.45	4.83	4.67	4.72		0	0
Milepost	155	to	156	2	31.96	0.00	0.14	2	27.92	0.00	0.13	4.43	4.81	4.50	4.84	4.69	4.73		0	0
Milepost	156	to	157	2	33.70	0.00	0.14	2	29.66	0.20	0.13	4.40	4.81	4.47	4.87	4.69	4.75		0	0
Milepost	157	to	158	2	34.30	0.00	0.15	2	31.98	0.00	0.13	4.39	4.80	4.43	4.83	4.68	4.71		0	0
Milepost	158	to	159	2	34.71	0.00	0.15	2	34.80	0.50	0.13	4.38	4.80	4.38	4.80	4.67	4.68		0	0
Milepost	159	to	160	2	33.42	0.00	0.12	2	31.92	0.00	0.14	4.40	4.84	4.43	4.82	4.71	4.70		0	0
Milepost	160	to	161	2	35.01	0.00	0.12	2	38.46	0.30	0.14	4.38	4.84	4.32	4.83	4.70	4.68		0	0
Milepost	161	to	162	2	32.81	0.00	0.13	2	39.30	0.00	0.14	4.41	4.83	4.31	4.81	4.71	4.66		0	0

Milepost	162	to	163	2	32.10	0.00	0.13	2	32.24	0.00	0.13	4.43	4.83	4.42	4.83	4.71	4.71		0	0
Milepost	163	to	164	2	32.42	0.40	0.13	2	31.27	0.00	0.14	4.42	4.82	4.44	4.81	4.70	4.70		0	0
Milepost	164	to	165	2	34.68	3.30	0.12	2	40.23	0.00	0.14	4.38	4.34	4.29	4.82	4.35	4.66		0	0
Milepost	165	to	166	2	33.54	4.80	0.11	2	40.17	0.00	0.14	4.40	4.15	4.29	4.81	4.22	4.65		0	0
Milepost	166	to	167	2	39.25	0.80	0.12	2	45.06	1.20	0.13	4.31	4.74	4.21	4.66	4.61	4.52		0	0
			Total	38				38												0
			Weighted Average									4.39	4.75	4.41	4.82	4.64	4.70			
			Factor									1.00		1.00						
			Indicator Score									4.39		4.41						**0.0%**
			Pavement Index															4.67		
Segment 9	***Interstate?***			**Yes**																
Milepost	167	to	168	2	38.59	0.30	0.11	2	45.14	0.20	0.14	4.32	4.86	4.21	4.86	4.70	4.66		0	0
Milepost	168	to	169	2	40.30	0.10	0.11	2	35.60	0.10	0.12	4.29	4.91	4.37	4.91	4.73	4.75		0	0
Milepost	169	to	170	2	43.85	0.30	0.12	2	41.27	0.10	0.11	4.23	4.85	4.27	4.92	4.67	4.73		0	0
Milepost	170	to	171	2	75.70	1.78	0.15	2	48.81	0.00	0.13	3.75	4.54	4.15	4.84	3.99	4.63		0	0
Milepost	171	to	172	2	75.36	0.00	0.15	2	60.05	0.00	0.12	3.75	4.79	3.98	4.85	4.07	4.24		0	0
Milepost	172	to	173	2	76.08	0.00	0.16	2	73.22	0.00	0.14	3.74	4.78	3.79	4.81	4.06	4.09		0	0
Milepost	173	to	174	2	77.85	0.00	0.15	2	67.90	0.00	0.15	3.72	4.79	3.86	4.80	4.04	4.15		0	0
Milepost	174	to	175	2	70.85	0.10	0.15	2	58.75	0.10	0.14	3.82	4.87	4.00	4.88	4.14	4.26		0	0
Milepost	175	to	176	2	74.99	0.30	0.12	2	62.37	0.40	0.14	3.76	4.86	3.94	4.81	4.09	4.20		0	0
Milepost	176	to	177	2	67.84	0.00	0.12	2	58.90	0.00	0.14	3.86	4.85	4.00	4.82	4.16	4.24		0	0
Milepost	177	to	178	2	73.62	0.30	0.15	2	63.83	0.20	0.13	3.78	4.82	3.92	4.87	4.09	4.21		0	0
Milepost	178	to	179	2	105.94	5.71	0.17	2	80.14	0.29	0.13	3.34	3.99	3.69	4.85	3.34	4.04		2	0
			Total	24				24												2
			Weighted Average									3.86	4.74	4.02	4.85	4.17	4.35			
			Factor									1.00		1.00						
			Indicator Score									3.86		4.02						**4.2%**
			Pavement Index															4.26		

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 8-1: California State Line to Avenue 15 E (MP 0 to MP 16.3)												
Colorado River Viaduct EB	1700	0.01	118207	92.20	4.00	7.00	7.00	7.00	4.0	0		
Colorado River Viaduct WB	1701	0.01	114724.0	94.20	5.00	7.00	7.00	7.00	5.0	0		
4th Street UPRR UP	2075	0.58	17318.0	-2.00	N	7.00	6.00	N	6.0	0		
4th St TI OP WB	1323	0.58	10118.0	92.00	5.00	6.00	6.00	6.00	5.0	0		
4th St TI OP EB	1322	0.58	8323.0	92.10	5.00	6.00	7.00	6.00	5.0	0		
US 95 TI UP	1380	2.23	34580.0	96.00	7.00	6.00	7.00	6.00	6.0	0		
Ave 2E UP	1381	2.99	23220.0	88.30	5.00	6.00	8.00	6.00	5.0	0		
Ave 3E TI OP WB	2682	3.99	9542.0	98.00	6.00	7.00	7.00	7.00	6.0	0		
Ave 3E TI OP EB	2681	3.99	9542.0	98.00	7.00	7.00	7.00	7.00	7.0	0		
Araby Rd TI OP WB	1278	7.67	5968.0	92.00	5.00	6.00	7.00	6.00	5.0	0		
Araby Rd TI OP EB	1277	7.67	5968.0	92.00	5.00	7.00	7.00	7.00	5.0	0		
Fortuna SPRR OP EB	1279	8.69	10004.0	77.00	5.00	5.00	7.00	5.00	5.0	0		
Fortuna SPRR OP WB	1280	8.70	10004.0	77.00	5.00	5.00	7.00	5.00	5.0	0		
E Yuma TI OP EB	1188	9.43	11143.0	88.40	5.00	7.00	7.00	7.00	5.0	0		
E Yuma TI OP WB	1281	9.44	11143.0	88.40	5.00	6.00	7.00	6.00	5.0	0		
Fortuna Rd TI UP	2432	12.20	27014.0	99.00	7.00	8.00	7.00	7.00	7.0	0		
Foothills Blvd TI UP	2117	14.25	26967.0	90.00	7.00	7.00	7.00	7.00	7.0	0		
Fortuna Wash Br EB	1190	14.87	8729.0	96.30	6.00	7.00	6.00	6.00	6.0	0		
Fortuna Wash Br WB	1191	14.87	8729.0	96.40	7.00	7.00	6.00	6.00	6.0	0		
Total			471,243									
Weighted Average				92.60					5.19	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**92.60**						**0.00%**	4	
Bridge Index									**5.19**			
Segment 2												
Dublin Wash Br EB	1566	16.85	1720	86.40	6.00	6.00	6.00	5.00	5.0	0		
Wash Br EB	303	18.12	2097	85.40	7.00	7.00	7.00	5.00	5.0	0		
Telpas OP WB Over EB	971	18.80	12095	88.90	5.00	7.00	7.00	7.00	5.0	0		
Telpas OP WB Over EB	972	20.40	11305	76.90	5.00	5.00	7.00	5.00	5.0	0		
Dome Vly Rd TI UP EB	1324	21.04	6698	98.10	6.00	7.00	6.00	6.00	6.0	0		
Dome Vly Rd TI UP WB	1325	21.06	5673	95.40	6.00	7.00	7.00	7.00	6.0	0		
Total			39,588									
Weighted Average				87.67					5.31	0.00%		

Factor				1.00					1.00	1.00		
Indicator Score				**87.67**						**0.00%**	**5**	
Bridge Index									**5.31**			
Segment 3												
Red Top Wash Br WB	1327	22.90	6374	96.50	6.00	8.00	7.00	7.00	6.0	0		
Red Top Wash Br EB	1326	22.91	6374	96.40	6.00	8.00	7.00	7.00	6.0	0		
Ligurta Wash Br WB	1329	24.10	19041	96.50	6.00	8.00	7.00	7.00	6.0	0		
Ligurta Wash Br EB	1328	24.10	19041	96.40	6.00	7.00	7.00	7.00	6.0	0		
Ave 25E OP WB	1331	26.70	4344	94.30	6.00	6.00	7.00	6.00	6.0	0		
Ave 25E OP EB	1330	26.70	4344	93.80	6.00	6.00	7.00	6.00	6.0	0		
Wellton TI UP	1332	30.80	10820	95.80	6.00	6.00	7.00	6.00	6.0	0		
Wellton Canal Br EB	1333	31.50	4425	96.60	6.00	6.00	7.00	6.00	6.0	0		
Wellton Canal Br WB	1334	31.50	4425	96.50	6.00	6.00	8.00	6.00	6.0	0		
Ave 31E UP	1335	32.89	8279	98.00	6.00	6.00	7.00	6.00	6.0	0		
Ave 33E UP	1336	34.91	20352	96.90	7.00	8.00	7.00	7.00	7.0	0		
Mohawk Canal Br OP EB	2738	36.40	11290	97.60	7.00	8.00	8.00	8.00	7.0	0		
Mohawk Canal Br OP WB	2739	36.40	11334	96.70	7.00	7.00	7.00	7.00	7.0	0		
Antelope Hill TI UP	1194	37.98	9133	86.80	6.00	7.00	7.00	7.00	6.0	0		
Tacna TI UP	1195	42.08	8992	95.80	6.00	7.00	7.00	7.00	6.0	0		
Mohawk SPRR OP WB	1136	54.85	6304	96.60	7.00	8.00	7.00	7.00	7.0	0		
Mohawk SPRR OP EB	1135	54.85	6304	96.60	7.00	8.00	7.00	7.00	7.0	0		
Mohawk TI OP EB	784	54.92	6510	92.50	6.00	7.00	7.00	7.00	6.0	0		
Mohawk TI OP WB	785	54.92	6510	92.60	6.00	6.00	7.00	6.00	6.0	0		
Total			174,196									
Weighted Average				95.69					6.32	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**95.69**						**0.00%**	**6**	
Bridge Index									**6.32**			
Segment 4												
Dateland TI OP EB	681	67.43	4644	95.00	6.00	6.00	7.00	6.00	6.0	0		
Dateland TI OP WB	682	67.43	4644	95.00	6.00	6.00	7.00	6.00	6.0	0		
Aztec TI OP EB	683	73.48	4171	96.00	6.00	6.00	7.00	6.00	6.0	0		
Aztec TI OP WB	684	73.48	4171	96.00	6.00	6.00	7.00	6.00	6.0	0		
Spot Rd TI OP WB	686	78.40	4171	94.00	6.00	6.00	7.00	6.00	6.0	0		
Spot Rd TI OP EB	685	78.40	4171	94.00	6.00	6.00	7.00	6.00	6.0	0		
Total			25,972									
Weighted Average				95.00					6.00	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**95.00**						**0.00%**	**6**	
Bridge Index									**6.00**			
Segment 5												
Wash Bridge EB	317	83.14	5197	94.70	6.00	6.00	6.00	6.00	6.0	0		

Sentinel TI OP EB	687	87.04	4171	95.00	6.00	7.00	7.00	7.00	6.0	0		
Sentinel TI OP WB	688	87.04	4171	95.00	6.00	6.00	7.00	6.00	6.0	0		
Painted Rock TI OP EB	509	102.27	3870	93.00	6.00	6.00	6.00	6.00	6.0	0		
Painted Rock TI OP WB	510	102.27	3870	93.00	7.00	7.00	7.00	7.00	7.0	0		
Paloma Rd TI OP EB	566	106.54	4171	95.00	6.00	6.00	7.00	6.00	6.0	0		
Paloma Rd TI OP WB	567	106.54	4171	95.00	6.00	6.00	7.00	6.00	6.0	0		
Gillespie Canal Br EB	489	107.02	1935	59.00	6.00	6.00	4.00	4.00	4.0	0		
Gillespie Cnl Br SFR	1009	107.02	2160	73.70	5.00	5.00	5.00	5.00	5.0	0		
Gillespie Cnal Br WB	568	107.07	1849	85.60	6.00	6.00	5.00	5.00	5.0	0		
Gillespie Cnl Br SFR	1010	109.55	2544	85.80	6.00	6.00	6.00	6.00	6.0	0		
Gillespie Canal Br EB	490	109.55	2295	78.00	6.00	6.00	5.00	5.00	5.0	0		
Gillespie Cnal Br WB	569	109.55	2193	96.60	6.00	6.00	6.00	6.00	6.0	0		
Wash Bridge SFR	1505	110.35	1232	71.60	7.00	7.00	6.00	6.00	6.0	0		
Total			43,829									
Weighted Average				89.57					5.86	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**89.57**						**0.00%**	**4**	
Bridge Index									**5.86**			
Segment 6												
Citrus Vly TI OP EB	570	111.42	4171	96.00	6.00	6.00	7.00	6.00	6.0	0		
Citrus Vly TI OP WB	571	111.42	4171	96.00	6.00	7.00	7.00	7.00	6.0	0		
Sauceda Wash Br WB	1554	113.27	4518	96.60	6.00	6.00	6.00	6.00	6.0	0		
Sauceda Wash Br EB	442	113.27	4050	85.60	6.00	6.00	7.00	5.00	5.0	0		
Sauceda Wash Br SFR	439	113.27	2359	76.80	6.00	6.00	7.00	6.00	6.0	0		
SB 8 & SPRR OP WB	1556	115.14	26755	94.10	5.00	7.00	6.00	6.00	5.0	0		
SB 8 & SPRR OP EB	1555	115.14	26755	93.10	5.00	7.00	7.00	7.00	5.0	0		
Hwy 85 OP WB	1557	115.62	6943	96.80	6.00	6.00	7.00	6.00	6.0	0		
Hwy 85 OP EB	1558	115.62	6943	96.80	6.00	6.00	7.00	6.00	6.0	0		
Gila Bend Cnl Br WB	1395	115.95	3618	96.70	6.00	7.00	6.00	6.00	6.0	0		
Gila Bend Cnl Br EB	1394	115.95	4500	97.80	6.00	7.00	6.00	6.00	6.0	0		
TC & GBRR OP WB	1340	116.35	4824	96.70	6.00	8.00	6.00	6.00	6.0	0		
TC & GBRR OP EB	1339	116.35	4824	96.70	6.00	8.00	6.00	6.00	6.0	0		
County Rd OP WB	1342	116.76	4301	94.70	6.00	6.00	7.00	6.00	6.0	0		
County Rd OP EB	1341	116.76	4301	94.80	6.00	6.00	7.00	6.00	6.0	0		
Sand Tanks Wash Br WB	1344	117.43	8161	96.80	6.00	6.00	6.00	6.00	6.0	0		
Sand Tanks Wash Br EB	1343	117.43	8161	96.80	6.00	6.00	6.00	6.00	6.0	0		
E Gila Bend TI UP	1345	119.42	11928	97.30	6.00	7.00	7.00	7.00	6.0	0		
Total			141,283									
Weighted Average				94.82					5.59	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**94.82**						**0.00%**	**5**	

Bridge Index									**5.59**			
Segment 7												
Freeman TI OP WB	534	140.80	1160	90.00	7.00	7.00	7.00	7.00	7.0	0		
Freeman TI OP EB	533	140.80	1160	90.00	7.00	7.00	7.00	7.00	7.0	0		
Vekol Road TI UP	550	144.55	6960	76.50	6.00	6.00	7.00	6.00	6.0	0		
Vekol Wash Bridge WB	422	144.74	8460	96.50	7.00	6.00	6.00	6.00	6.0	0		
Vekol Wash Bridge EB	552	144.74	9728	97.80	6.00	7.00	6.00	6.00	6.0	0		
Total			27,468									
Weighted Average				91.34					6.08	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**91.34**						**0.00%**	**6**	
Bridge Index									**6.08**			
Segment 8												
State Rte 84 TI UP	1063	151.70	10349	87.20	5.00	7.00	6.00	6.00	5.0	0		
Mendell Wash Br WB	1065	151.90	6134	84.80	5.00	5.00	7.00	5.00	5.0	0		
Mendell Wash Br EB	1064	151.90	6986	85.80	5.00	5.00	7.00	5.00	5.0	0		
Bridge EB	1066	153.40	6091	85.80	5.00	5.00	7.00	5.00	5.0	0		
Bridge WB	1067	153.45	6091	84.80	5.00	5.00	7.00	5.00	5.0	0		
Smith Road OP EB	1068	157.55	3888	70.40	5.00	5.00	7.00	5.00	5.0	0		
Smith Road OP WB	1069	157.55	3888	69.40	5.00	5.00	7.00	5.00	5.0	0		
Santa Rosa Cnl Br WB	1437	160.57	2821	97.80	6.00	7.00	7.00	7.00	6.0	0		
Santa Rosa Cnl Br EB	1436	160.57	2821	97.80	6.00	7.00	7.00	7.00	6.0	0		
Stanfield Rd TI UP	1090	161.60	10449	95.90	6.00	7.00	6.00	6.00	6.0	0		
Murphy Rd UP	1091	162.50	8499	94.00	6.00	6.00	6.00	6.00	6.0	0		
Santa Rosa Wash Br EB	1092	163.00	21824	95.70	6.00	6.00	6.00	6.00	6.0	0		
Santa Rosa Wash Br WB	1093	163.00	21824	95.70	6.00	6.00	6.00	6.00	6.0	0		
Russell Road UP	1094	164.50	9434	95.00	6.00	6.00	7.00	6.00	6.0	0		
Total			121,099									
Weighted Average				91.09					5.64	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**91.09**						**0.00%**	**5**	
Bridge Index									**5.64**			
Segment 9												
Midway Rd UP	1137	166.50	8499	94.00	6.00	7.00	6.00	6.00	6.0	0		
Greenes Wash Br WB	1139	166.90	16579	95.70	6.00	6.00	7.00	6.00	6.0	0		
Greenes Wash Br EB	1138	166.90	16579	95.70	6.00	6.00	7.00	6.00	6.0	0		
Montgomery Rd TI UP	1140	167.50	8499	84.90	6.00	7.00	5.00	5.00	5.0	0		
Bianco Rd TI UP	1141	169.54	8499	98.00	6.00	7.00	6.00	6.00	6.0	0		
Santa Cruz Wash Br EB	1142	170.90	12355	83.60	5.00	5.00	6.00	5.00	5.0	0		

Santa Cruz Wash Br WB	1143	170.90	12355	95.80	6.00	6.00	7.00	6.00	6.0	0		
Thornton Rd TI UP	1196	172.55	10794	83.50	6.00	5.00	6.00	5.00	5.0	0		
Chuichu Rd UP	1197	173.53	9011	89.90	6.00	7.00	6.00	6.00	6.0	0		
Treckell Rd TI UP	1198	174.55	9293	89.80	6.00	7.00	6.00	6.00	6.0	0		
Peart Rd OP WB	1200	175.65	3962	95.60	6.00	6.00	7.00	6.00	6.0	0		
Peart Rd OP EB	1199	175.65	3962	95.70	6.00	6.00	7.00	6.00	6.0	0		
I8 EB TI OP	1103	178.33	8351	90.00	7.00	6.00	7.00	6.00	6.0	0		
I8 WB TI OP	1102	178.33	10067	77.00	7.00	7.00	7.00	7.00	7.0	0		
Total			88,649									
Weighted Average				90.36					8.58	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**90.36**						**0.00%**	**5**	
Bridge Index									**8.58**			

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 8												
Hell Canyon Bridge	20087	345.70	31388	82.10	7.00	8.00	8.00	8.00	7.0	0		
Total			31,388									
Weighted Average				82.10					7.00	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**82.10**						**0.00%**	**7**	
Bridge Index									**7.00**			
Segment 9												
Drake AT&SF RR OP	400	348.25	7105	60.80	5.00	6.00	7.00	6.00	5.0	0		
Meath Wash Bridge	20020	358.03	3370	81.70	8.00	8.00	8.00	8.00	8.0	0		
Johnson Canyon Br	40	362.30	3100	66.80	6.00	6.00	6.00	5.00	5.0	0		
Total			13,575									
Weighted Average				67.36					5.74	0.00%		
Factor				1.00					1.00	1.00		
Indicator Score				**67.36**						**0.00%**	**5**	
Bridge Index									**5.74**			

Mobility Performance Area Data

Segment	Begin MP	End MP	Facility Type	Flow Type	Terrain	No. of Lanes	Capacity Environment Type	Lane Width (feet)	NB/EB AADT	SB/WB AADT	2019 AADT	K Factor	D Factor	T Factor	Weighted Average Posted Speed Limit (mph)	Divided or Undivided
8-1	0	16.3	Urban	Uninterrupted	Rolling	4	Freeway Segment	12.00	15824	15384	31208	8%	52%	19%	65	Divided
8-2	16.3	21.4	Rural	Uninterrupted	Mountainous	4	Freeway Segment	12.00	8117	8782	16899	10%	52%	26%	65	Divided
8-3	21.4	56.5	Rural	Uninterrupted	Rolling	4	Freeway Segment	12.00	5858	5986	11844	7%	53%	27%	67.5	Divided
8-4	56.5	79.6	Rural	Uninterrupted	Level	4	Freeway Segment	12.00	5059	5359	10418	7%	52%	26%	75	Divided
8-5	79.6	110.4	Rural	Uninterrupted	Level	4	Freeway Segment	12.00	5653	5674	11327	8%	51%	28%	75	Divided
8-6	110.4	120	Rural	Uninterrupted	Rolling	4	Freeway Segment	12.00	4802	4403	9204	8%	52%	28%	75	Divided
8-7	120	147.6	Rural	Uninterrupted	Level	4	Freeway Segment	12.00	3715	3514	7,230	10%	52%	39%	75	Divided
8-8	147.6	166.5	Rural	Uninterrupted	Level	4	Freeway Segment	12.00	3230	2934	6,164	8%	53%	38%	75	Divided
8-9	166.5	178	Rural	Uninterrupted	Level	4	Freeway Segment	12.00	3664	4297	7,961	7%	59%	28%	73	Divided

LOTTR and TTTR Eastbound

Segment	TMC [Internal ID]	Time Period	RoadNumber	RoadName	Direction	Miles	Cars 50th % Travel Time (seconds) Location1	Trucks 50th % Travel Time (seconds) Location1	Cars 80th % Travel Time (seconds) Location1	Trucks 95th % Travel Time (seconds) Location1	Posted Speed limit	Posted Speed Travel Time (Seconds)	Assumed car free-flow speed	Assumed truck free-flow speed	LOTTR	TTTR	Peak LOTTR	Peak TTTR	TMC Weighting	Weighted LOTTR		Weighted TTTR	
1	115+05118	1 AM Peak	I-8	I-8	S	0.547032268	34	37	39	51	65	30	65	65	1.15	1.39	1.15	1.39	6%	1.06	1.06	1.21	1.21
1	115+05118	2 Mid Day	I-8	I-8	S	0.547032268	35	36	39	49	65	30	65	65	1.12	1.35							
1	115+05118	3 PM Peak	I-8	I-8	S	0.547032268	35	36	38	45	65	30	65	65	1.10	1.24							
1	115+05118	4 Weekend	I-8	I-8	S	0.547032268	33	36	37	44	65	30	65	65	1.11	1.24							
1	115+05119	1 AM Peak	I-8	I-8	S	0.40098627	24	24	31	56	65	22	65	65	1.28	2.27	1.28	2.27	4%				
1	115+05119	2 Mid Day	I-8	I-8	S	0.40098627	26	25	33	55	65	22	65	65	1.27	2.20							
1	115+05119	3 PM Peak	I-8	I-8	S	0.40098627	24	24	25	33	65	22	65	65	1.08	1.39							

1	115+05119	4 Weekend	I-8	I-8	S	0.40098627	23	23	24	27	65	22	65	65	1.06	1.18							
1	115+05120	1 AM Peak	I-8	I-8	E	1.133416172	65	66	69	83	65	63	65	65	1.05	1.25	1.06	1.25	12%				
1	115+05120	2 Mid Day	I-8	I-8	E	1.133416172	65	66	69	81	65	63	65	65	1.06	1.23							
1	115+05120	3 PM Peak	I-8	I-8	E	1.133416172	65	66	68	77	65	63	65	65	1.05	1.17							
1	115+05120	4 Weekend	I-8	I-8	E	1.133416172	64	65	67	76	65	63	65	65	1.05	1.17							
1	115+05121	1 AM Peak	I-8	I-8	E	2.992753476	168	170	174	192	65	166	65	65	1.04	1.13	1.04	1.13	31%				
1	115+05121	2 Mid Day	I-8	I-8	E	2.992753476	166	169	172	190	65	166	65	65	1.04	1.13							
1	115+05121	3 PM Peak	I-8	I-8	E	2.992753476	166	169	171	186	65	166	65	65	1.03	1.10							
1	115+05121	4 Weekend	I-8	I-8	E	2.992753476	165	168	171	188	65	166	65	65	1.03	1.11							
1	115+05122	1 AM Peak	I-8	I-8	E	1.503880674	84	85	86	96	65	83	65	65	1.03	1.14	1.03	1.14	16%				
1	115+05122	2 Mid Day	I-8	I-8	E	1.503880674	83	85	86	95	65	83	65	65	1.03	1.12							
1	115+05122	3 PM Peak	I-8	I-8	E	1.503880674	83	85	86	92	65	83	65	65	1.03	1.09							
1	115+05122	4 Weekend	I-8	I-8	E	1.503880674	83	84	86	93	65	83	65	65	1.03	1.10							
1	115+05123	1 AM Peak	I-8	I-8	E	1.678868986	94	94	97	108	65	93	65	65	1.03	1.14	1.04	1.14	18%				
1	115+05123	2 Mid Day	I-8	I-8	E	1.678868986	94	95	97	108	65	93	65	65	1.03	1.14							
1	115+05123	3 PM Peak	I-8	I-8	E	1.678868986	94	95	97	106	65	93	65	65	1.03	1.12							
1	115+05123	4 Weekend	I-8	I-8	E	1.678868986	93	94	97	106	65	93	65	65	1.04	1.12							
1	115+05124	1 AM Peak	I-8	I-8	E	1.32236501	74	74	77	84	65	73	65	65	1.04	1.13	1.04	1.13	14%				
1	115+05124	2 Mid Day	I-8	I-8	E	1.32236501	74	74	76	82	65	73	65	65	1.04	1.11							
1	115+05124	3 PM Peak	I-8	I-8	E	1.32236501	74	74	76	82	65	73	65	65	1.03	1.11							

1	115+05124	4 Weekend	I-8	I-8	E	1.32236501	73	74	76	82	65	73	65	65	1.04	1.11							
2	115+05125	1 AM Peak	I-8	I-8	E	5.823588526	428	428	467	533	55	381	55	55	1.09	1.24	1.15	1.33	100%	1.15	1.15	1.33	1.33
2	115+05125	2 Mid Day	I-8	I-8	E	5.823588526	435	438	482	574	55	381	55	55	1.11	1.31							
2	115+05125	3 PM Peak	I-8	I-8	E	5.823588526	437	440	480	553	55	381	55	55	1.10	1.26							
2	115+05125	4 Weekend	I-8	I-8	E	5.823588526	406	416	467	552	55	381	55	55	1.15	1.33							
3	115+05126	1 AM Peak	I-8	I-8	E	9.508104746	499	514	519	566	75	456	75	65	1.04	1.10	1.04	1.11	30%	1.04	1.04	1.09	1.09
3	115+05126	2 Mid Day	I-8	I-8	E	9.508104746	496	511	512	559	75	456	75	65	1.03	1.09							
3	115+05126	3 PM Peak	I-8	I-8	E	9.508104746	501	511	519	568	75	456	75	65	1.04	1.11							
3	115+05126	4 Weekend	I-8	I-8	E	9.508104746	497	513	519	570	75	456	75	65	1.04	1.11							
3	115+05127	1 AM Peak	I-8	I-8	E	6.480974767	335	345	347	370	75	311	75	65	1.04	1.07	1.04	1.07	20%				
3	115+05127	2 Mid Day	I-8	I-8	E	6.480974767	333	343	345	367	75	311	75	65	1.03	1.07							
3	115+05127	3 PM Peak	I-8	I-8	E	6.480974767	337	343	347	367	75	311	75	65	1.03	1.07							
3	115+05127	4 Weekend	I-8	I-8	E	6.480974767	334	345	348	370	75	311	75	65	1.04	1.07							
3	115+05128	1 AM Peak	I-8	I-8	E	3.568022233	184	190	192	206	75	171	75	65	1.04	1.08	1.04	1.08	11%				
3	115+05128	2 Mid Day	I-8	I-8	E	3.568022233	183	189	190	203	75	171	75	65	1.04	1.07							
3	115+05128	3 PM Peak	I-8	I-8	E	3.568022233	184	188	191	204	75	171	75	65	1.04	1.08							
3	115+05128	4 Weekend	I-8	I-8	E	3.568022233	184	189	192	204	75	171	75	65	1.04	1.08							
3	115+05129	1 AM Peak	I-8	I-8	E	12.61529182	652	675	676	721	75	606	75	65	1.04	1.07	1.04	1.07	39%				
3	115+05129	2 Mid Day	I-8	I-8	E	12.61529182	647	668	668	712	75	606	75	65	1.03	1.06							
3	115+05129	3 PM Peak	I-8	I-8	E	12.61529182	652	668	673	710	75	606	75	65	1.03	1.06							

3	115+05129	4 Weekend	I-8	I-8	E	12.61529182	649	671	675	721	75	606	75	65	1.04	1.07							
4	115+05130	1 AM Peak	I-8	I-8	E	11.76015488	608	629	631	672	75	564	75	65	1.04	1.07	1.04	1.08	53%	1.04	1.04	1.08	1.08
4	115+05130	2 Mid Day	I-8	I-8	E	11.76015488	602	623	623	672	75	564	75	65	1.03	1.08							
4	115+05130	3 PM Peak	I-8	I-8	E	11.76015488	605	620	626	666	75	564	75	65	1.03	1.07							
4	115+05130	4 Weekend	I-8	I-8	E	11.76015488	605	626	629	677	75	564	75	65	1.04	1.08							
4	115+05131	1 AM Peak	I-8	I-8	E	5.323620183	275	284	286	304	75	256	75	65	1.04	1.07	1.04	1.08	24%				
4	115+05131	2 Mid Day	I-8	I-8	E	5.323620183	273	282	282	304	75	256	75	65	1.04	1.08							
4	115+05131	3 PM Peak	I-8	I-8	E	5.323620183	274	281	284	302	75	256	75	65	1.04	1.08							
4	115+05131	4 Weekend	I-8	I-8	E	5.323620183	273	282	285	304	75	256	75	65	1.04	1.08							
4	115+05132	1 AM Peak	I-8	I-8	E	4.33961184	225	232	235	248	75	208	75	65	1.04	1.07	1.05	1.08	19%				
4	115+05132	2 Mid Day	I-8	I-8	E	4.33961184	222	230	231	248	75	208	75	65	1.04	1.08							
4	115+05132	3 PM Peak	I-8	I-8	E	4.33961184	223	229	231	246	75	208	75	65	1.04	1.08							
4	115+05132	4 Weekend	I-8	I-8	E	4.33961184	223	230	233	248	75	208	75	65	1.05	1.08							
4	115+05133	1 AM Peak	I-8	I-8	E	0.897434991	47	48	49	52	75	43	75	65	1.04	1.08	1.05	1.09	4%				
4	115+05133	2 Mid Day	I-8	I-8	E	0.897434991	46	48	48	52	75	43	75	65	1.04	1.09							
4	115+05133	3 PM Peak	I-8	I-8	E	0.897434991	46	47	48	51	75	43	75	65	1.04	1.08							
4	115+05133	4 Weekend	I-8	I-8	E	0.897434991	46	48	48	52	75	43	75	65	1.05	1.09							
5	115+05135	1 AM Peak	I-8	I-8	E	3.67971775	192	197	199	212	75	177	75	65	1.04	1.08	1.04	1.09	13%	1.04	1.04	1.08	1.08
5	115+05135	2 Mid Day	I-8	I-8	E	3.67971775	189	195	196	210	75	177	75	65	1.04	1.08							
5	115+05135	3 PM Peak	I-8	I-8	E	3.67971775	189	194	196	209	75	177	75	65	1.04	1.08							

5	115+05135	4 Weekend	I-8	I-8	E	3.67971775	189	195	198	212	75	177	75	65	1.04	1.09							
5	115+05136	1 AM Peak	I-8	I-8	E	2.456374895	129	132	134	144	75	118	75	65	1.04	1.09	1.05	1.09	9%				
5	115+05136	2 Mid Day	I-8	I-8	E	2.456374895	126	131	132	143	75	118	75	65	1.04	1.09							
5	115+05136	3 PM Peak	I-8	I-8	E	2.456374895	127	130	132	141	75	118	75	65	1.04	1.09							
5	115+05136	4 Weekend	I-8	I-8	E	2.456374895	127	131	133	144	75	118	75	65	1.05	1.09							
5	115+05137	1 AM Peak	I-8	I-8	E	14.55653659	756	778	782	830	75	699	75	65	1.03	1.07	1.04	1.07	51%				
5	115+05137	2 Mid Day	I-8	I-8	E	14.55653659	745	771	768	823	75	699	75	65	1.03	1.07							
5	115+05137	3 PM Peak	I-8	I-8	E	14.55653659	746	767	771	819	75	699	75	65	1.03	1.07							
5	115+05137	4 Weekend	I-8	I-8	E	14.55653659	749	771	776	826	75	699	75	65	1.04	1.07							
5	115+05138	1 AM Peak	I-8	I-8	E	3.610326888	187	193	195	206	75	173	75	65	1.04	1.07	1.05	1.08	13%				
5	115+05138	2 Mid Day	I-8	I-8	E	3.610326888	185	191	191	206	75	173	75	65	1.04	1.08							
5	115+05138	3 PM Peak	I-8	I-8	E	3.610326888	185	190	192	205	75	173	75	65	1.03	1.08							
5	115+05138	4 Weekend	I-8	I-8	E	3.610326888	185	191	194	206	75	173	75	65	1.05	1.08							
5	115+05139	1 AM Peak	I-8	I-8	E	4.269869102	222	228	231	244	75	205	75	65	1.04	1.07	1.04	1.08	15%				
5	115+05139	2 Mid Day	I-8	I-8	E	4.269869102	219	226	226	244	75	205	75	65	1.03	1.08							
5	115+05139	3 PM Peak	I-8	I-8	E	4.269869102	220	226	228	244	75	205	75	65	1.04	1.08							
5	115+05139	4 Weekend	I-8	I-8	E	4.269869102	220	226	229	244	75	205	75	65	1.04	1.08							
6	115+05140	1 AM Peak	I-8	I-8	E	2.373658558	127	130	134	144	75	114	75	65	1.05	1.11	1.05	1.11	44%	1.05	1.05	1.14	1.14
6	115+05140	2 Mid Day	I-8	I-8	E	2.373658558	125	128	131	142	75	114	75	65	1.04	1.11							
6	115+05140	3 PM Peak	I-8	I-8	E	2.373658558	125	128	131	142	75	114	75	65	1.05	1.11							

6	115+05140	4 Weekend	I-8	I-8	E	2.373658558	125	129	131	143	75	114	75	65	1.05	1.11							
6	115+05141	1 AM Peak	I-8	I-8	E	3.031567852	160	163	169	189	75	146	75	65	1.05	1.16	1.05	1.16	56%				
6	115+05141	2 Mid Day	I-8	I-8	E	3.031567852	157	160	165	182	75	146	75	65	1.05	1.13							
6	115+05141	3 PM Peak	I-8	I-8	E	3.031567852	158	161	167	183	75	146	75	65	1.05	1.14							
6	115+05141	4 Weekend	I-8	I-8	E	3.031567852	160	162	168	182	75	146	75	65	1.05	1.12							
7	115+05142	1 AM Peak	I-8	I-8	E	20.55896621	1094	1101	1122	1184	75	987	75	65	1.03	1.08	1.03	1.08	67%	1.03	1.03	1.10	1.10
7	115+05142	2 Mid Day	I-8	I-8	E	20.55896621	1083	1094	1110	1164	75	987	75	65	1.03	1.06							
7	115+05142	3 PM Peak	I-8	I-8	E	20.55896621	1083	1094	1110	1148	75	987	75	65	1.02	1.05							
7	115+05142	4 Weekend	I-8	I-8	E	20.55896621	1085	1099	1116	1175	75	987	75	65	1.03	1.07							
7	115+05143	1 AM Peak	I-8	I-8	E	3.339436962	174	176	180	189	75	160	75	65	1.03	1.07	1.04	1.08	11%				
7	115+05143	2 Mid Day	I-8	I-8	E	3.339436962	173	175	179	188	75	160	75	65	1.03	1.07							
7	115+05143	3 PM Peak	I-8	I-8	E	3.339436962	173	175	178	187	75	160	75	65	1.03	1.06							
7	115+05143	4 Weekend	I-8	I-8	E	3.339436962	173	176	180	189	75	160	75	65	1.04	1.08							
7	115+05144	1 AM Peak	I-8	I-8	E	6.89517457	365	369	384	432	75	331	75	65	1.05	1.17	1.05	1.17	22%				
7	115+05144	2 Mid Day	I-8	I-8	E	6.89517457	364	369	382	424	75	331	75	65	1.05	1.15							
7	115+05144	3 PM Peak	I-8	I-8	E	6.89517457	362	366	374	404	75	331	75	65	1.04	1.11							
7	115+05144	4 Weekend	I-8	I-8	E	6.89517457	362	365	375	404	75	331	75	65	1.04	1.11							
8	115+05144	1 AM Peak	I-8	I-8	E	6.89517457	365	369	384	432	75	331	75	65	1.05	1.17	1.05	1.17	32%	1.05	1.05	1.15	1.15
8	115+05144	2 Mid Day	I-8	I-8	E	6.89517457	364	369	382	424	75	331	75	65	1.05	1.15							
8	115+05144	3 PM Peak	I-8	I-8	E	6.89517457	362	366	374	404	75	331	75	65	1.04	1.11							

8	115+051 44	4 Weeke nd	I-8	I-8	E	6.8951745 7	362	365	375	404	75	331	75	65	1.04	1.1 1							
8	115+051 45	1 AM Peak	I-8	I-8	E	9.6429812 59	514	518	542	604	75	463	75	65	1.06	1.1 7	1.06	1.1 7	44%				
8	115+051 45	2 Mid Day	I-8	I-8	E	9.6429812 59	513	518	543	604	75	463	75	65	1.06	1.1 6							
8	115+051 45	3 PM Peak	I-8	I-8	E	9.6429812 59	503	508	519	554	75	463	75	65	1.03	1.0 9							
8	115+051 45	4 Weeke nd	I-8	I-8	E	9.6429812 59	501	508	520	550	75	463	75	65	1.04	1.0 8							
8	115+051 46	1 AM Peak	I-8	I-8	E	5.3421899 07	280	283	290	306	75	256	75	65	1.04	1.0 8	1.04	1.0 9	24%				
8	115+051 46	2 Mid Day	I-8	I-8	E	5.3421899 07	279	282	287	307	75	256	75	65	1.03	1.0 9							
8	115+051 46	3 PM Peak	I-8	I-8	E	5.3421899 07	278	282	286	300	75	256	75	65	1.03	1.0 6							
8	115+051 46	4 Weeke nd	I-8	I-8	E	5.3421899 07	279	282	288	304	75	256	75	65	1.03	1.0 8							
9	115+051 47	1 AM Peak	I-8	I-8	E	1.7193954 66	90	91	93	99	75	83	75	65	1.04	1.0 9	1.04	1.1 0	20%	1.04	1.04	1.11	1.11
9	115+051 47	2 Mid Day	I-8	I-8	E	1.7193954 66	89	91	93	100	75	83	75	65	1.04	1.1 0							
9	115+051 47	3 PM Peak	I-8	I-8	E	1.7193954 66	90	91	92	97	75	83	75	65	1.03	1.0 7							
9	115+051 47	4 Weeke nd	I-8	I-8	E	1.7193954 66	89	91	93	98	75	83	75	65	1.04	1.0 8							
9	115+051 48	1 AM Peak	I-8	I-8	E	2.6237919 35	138	139	143	152	75	126	75	65	1.04	1.1 0	1.04	1.1 0	31%				
9	115+051 48	2 Mid Day	I-8	I-8	E	2.6237919 35	137	139	141	151	75	126	75	65	1.03	1.0 9							
9	115+051 48	3 PM Peak	I-8	I-8	E	2.6237919 35	137	139	141	151	75	126	75	65	1.03	1.0 8							
9	115+051 48	4 Weeke nd	I-8	I-8	E	2.6237919 35	137	139	142	152	75	126	75	65	1.04	1.1 0							
9	115+051 49	1 AM Peak	I-8	I-8	E	1.3049268 33	71	72	74	84	75	63	75	65	1.05	1.1 7	1.06	1.1 7	15%				
9	115+051 49	2 Mid Day	I-8	I-8	E	1.3049268 33	70	71	73	82	75	63	75	65	1.05	1.1 6							
9	115+051 49	3 PM Peak	I-8	I-8	E	1.3049268 33	69	70	72	79	75	63	75	65	1.04	1.1 2							

9	115+05149	4 Weekend	I-8	I-8	E	1.304926833	70	71	74	82	75	63	75	65	1.06	1.16							
9	115+05150	1 AM Peak	I-8	I-8	E	2.908800497	156	158	161	170	75	140	75	65	1.03	1.08	1.04	1.09	34%				
9	115+05150	2 Mid Day	I-8	I-8	E	2.908800497	155	157	160	170	75	140	75	65	1.03	1.08							
9	115+05150	3 PM Peak	I-8	I-8	E	2.908800497	155	156	159	169	75	140	75	65	1.03	1.08							
9	115+05150	4 Weekend	I-8	I-8	E	2.908800497	155	157	161	172	75	140	75	65	1.04	1.09							

LOTTR and TTTR Westbound

Segment	TMC [Internal ID]	Time Period	RoadNumber	RoadName	Direction	Miles	Cars 50th % Travel Time (seconds) Location 1	Trucks 50th % Travel Time (seconds) Location 1	Cars 80th % Travel Time (seconds) Location 1	Trucks 95th % Travel Time (seconds) Location 1	Posted Speed limit	Posted Speed Travel Time (Seconds)	Assumed car free-flow speed	Assumed truck free-flow speed	LOTTR	TTTR	Peak LOTTR	Peak TTTR	TMC Weighting	Weighted LOTTR	Weighted TTTR
1	115-05117	1 AM Peak	I-8	I-8	N	0.566715437	34	35	43	78	65	31	65	65	1.25	2.24	1.43	2.41	3%	1.13	1.33
1	115-05117	2 Mid Day	I-8	I-8	N	0.566715437	35	37	50	89	65	31	65	65	1.43	2.41					
1	115-05117	3 PM Peak	I-8	I-8	N	0.566715437	33	33	36	62	65	31	65	65	1.10	1.85					
1	115-05117	4 Weekend	I-8	I-8	N	0.566715437	32	33	35	45	65	31	65	65	1.08	1.38					
1	115-05118	1 AM Peak	I-8	I-8	N	0.995287283	60	60	107	179	65	55	65	65	1.79	3.00	2.04	3.01	6%		
1	115-05118	2 Mid Day	I-8	I-8	N	0.995287283	64	66	131	200	65	55	65	65	2.04	3.01					
1	115-05118	3 PM Peak	I-8	I-8	N	0.995287283	57	58	62	133	65	55	65	65	1.09	2.30					
1	115-05118	4 Weekend	I-8	I-8	N	0.995287283	56	57	59	69	65	55	65	65	1.06	1.21					
1	115-05119	1 AM Peak	I-8	I-8	W	1.016954147	58	59	63	71	65	56	65	65	1.07	1.20	1.07	1.22	6%		
1	115-05119	2 Mid Day	I-8	I-8	W	1.016954147	58	59	62	71	65	56	65	65	1.07	1.20					
1	115-05119	3 PM Peak	I-8	I-8	W	1.016954147	58	59	62	72	65	56	65	65	1.07	1.22					
1	115-05119	4 Weekend	I-8	I-8	W	1.016954147	57	58	60	69	65	56	65	65	1.05	1.19					
1	115-05120	1 AM Peak	I-8	I-8	W	2.842954873	156	159	161	176	65	157	65	65	1.03	1.10	1.03	1.11	17%		
1	115-05120	2 Mid Day	I-8	I-8	W	2.842954873	157	159	161	178	65	157	65	65	1.03	1.11					
1	115-05120	3 PM Peak	I-8	I-8	W	2.842954873	157	160	162	175	65	157	65	65	1.03	1.10					

1	115-05120	4 Weekend	I-8	I-8	W	2.842954873	155	158	160	173	65	157	65	65	1.03	1.09					
1	115-05121	1 AM Peak	I-8	I-8	W	1.599796527	88	89	91	98	65	89	65	65	1.03	1.09	1.03	1.10	10%		
1	115-05121	2 Mid Day	I-8	I-8	W	1.599796527	89	90	91	98	65	89	65	65	1.03	1.10					
1	115-05121	3 PM Peak	I-8	I-8	W	1.599796527	89	90	92	98	65	89	65	65	1.03	1.09					
1	115-05121	4 Weekend	I-8	I-8	W	1.599796527	88	89	91	98	65	89	65	65	1.03	1.10					
1	115-05122	1 AM Peak	I-8	I-8	W	1.85041834	103	104	106	115	65	102	65	65	1.03	1.10	1.03	1.10	11%		
1	115-05122	2 Mid Day	I-8	I-8	W	1.85041834	104	104	107	115	65	102	65	65	1.03	1.10					
1	115-05122	3 PM Peak	I-8	I-8	W	1.85041834	104	104	107	115	65	102	65	65	1.03	1.10					
1	115-05122	4 Weekend	I-8	I-8	W	1.85041834	102	103	106	114	65	102	65	65	1.03	1.10					
1	115-05123	1 AM Peak	I-8	I-8	W	1.364812351	76	76	78	83	65	76	65	65	1.03	1.10	1.03	1.11	8%		
1	115-05123	2 Mid Day	I-8	I-8	W	1.364812351	76	76	78	85	65	76	65	65	1.03	1.11					
1	115-05123	3 PM Peak	I-8	I-8	W	1.364812351	76	77	79	85	65	76	65	65	1.03	1.10					
1	115-05123	4 Weekend	I-8	I-8	W	1.364812351	75	76	78	83	65	76	65	65	1.03	1.10					
1	115-05124	1 AM Peak	I-8	I-8	W	6.18605024	372	380	395	470	65	343	65	65	1.06	1.24	1.08	1.24	38%		
1	115-05124	2 Mid Day	I-8	I-8	W	6.18605024	372	378	394	464	65	343	65	65	1.06	1.23					
1	115-05124	3 PM Peak	I-8	I-8	W	6.18605024	374	382	400	473	65	343	65	65	1.07	1.24					
1	115-05124	4 Weekend	I-8	I-8	W	6.18605024	371	381	399	474	65	343	65	65	1.08	1.24					
2	115-05124	1 AM Peak	I-8	I-8	W	6.18605024	372	380	395	470	55	405	55	55	1.06	1.24	1.08	1.24	100%	1.08	1.24
2	115-05124	2 Mid Day	I-8	I-8	W	6.18605024	372	378	394	464	55	405	55	55	1.06	1.23					
2	115-05124	3 PM Peak	I-8	I-8	W	6.18605024	374	382	400	473	55	405	55	55	1.07	1.24					

2	115-05124	4 Weekend	I-8	I-8	W	6.18605024	371	381	399	474	55	405	55	55	1.08	1.24					
3	115-05125	1 AM Peak	I-8	I-8	W	9.15417785	478	492	497	540	75	439	75	65	1.04	1.10	1.05	1.11	29%	1.04	1.09
3	115-05125	2 Mid Day	I-8	I-8	W	9.15417785	478	492	495	540	75	439	75	65	1.04	1.10					
3	115-05125	3 PM Peak	I-8	I-8	W	9.15417785	481	495	500	543	75	439	75	65	1.04	1.10					
3	115-05125	4 Weekend	I-8	I-8	W	9.15417785	478	492	499	545	75	439	75	65	1.05	1.11					
3	115-05126	1 AM Peak	I-8	I-8	W	6.495316427	336	346	348	368	75	312	75	65	1.03	1.07	1.04	1.07	20%		
3	115-05126	2 Mid Day	I-8	I-8	W	6.495316427	336	346	347	368	75	312	75	65	1.03	1.06					
3	115-05126	3 PM Peak	I-8	I-8	W	6.495316427	339	349	353	374	75	312	75	65	1.04	1.07					
3	115-05126	4 Weekend	I-8	I-8	W	6.495316427	336	346	350	371	75	312	75	65	1.04	1.07					
3	115-05127	1 AM Peak	I-8	I-8	W	3.407201872	176	182	183	195	75	164	75	65	1.04	1.07	1.05	1.07	11%		
3	115-05127	2 Mid Day	I-8	I-8	W	3.407201872	176	181	182	195	75	164	75	65	1.04	1.07					
3	115-05127	3 PM Peak	I-8	I-8	W	3.407201872	177	183	185	196	75	164	75	65	1.04	1.07					
3	115-05127	4 Weekend	I-8	I-8	W	3.407201872	176	182	184	195	75	164	75	65	1.05	1.07					
3	115-05128	1 AM Peak	I-8	I-8	W	12.67100179	656	681	681	724	75	608	75	65	1.04	1.06	1.04	1.08	40%		
3	115-05128	2 Mid Day	I-8	I-8	W	12.67100179	655	678	675	720	75	608	75	65	1.03	1.06					
3	115-05128	3 PM Peak	I-8	I-8	W	12.67100179	661	682	688	736	75	608	75	65	1.04	1.08					
3	115-05128	4 Weekend	I-8	I-8	W	12.67100179	656	678	682	728	75	608	75	65	1.04	1.07					
4	115-05129	1 AM Peak	I-8	I-8	W	11.56423824	598	621	618	672	75	555	75	65	1.03	1.08	1.04	1.09	52%	1.04	1.08
4	115-05129	2 Mid Day	I-8	I-8	W	11.56423824	598	618	618	666	75	555	75	65	1.03	1.08					
4	115-05129	3 PM Peak	I-8	I-8	W	11.56423824	603	622	628	674	75	555	75	65	1.04	1.08					

4	115-05129	4 Weekend	I-8	I-8	W	11.56423824	599	619	625	673	75	555	75	65	1.04	1.09					
4	115-05130	1 AM Peak	I-8	I-8	W	5.249683018	270	280	280	299	75	252	75	65	1.04	1.06	1.04	1.08	24%		
4	115-05130	2 Mid Day	I-8	I-8	W	5.249683018	271	280	281	300	75	252	75	65	1.04	1.07					
4	115-05130	3 PM Peak	I-8	I-8	W	5.249683018	274	282	285	305	75	252	75	65	1.04	1.08					
4	115-05130	4 Weekend	I-8	I-8	W	5.249683018	270	280	282	301	75	252	75	65	1.04	1.08					
4	115-05131	1 AM Peak	I-8	I-8	W	4.376776016	225	233	233	250	75	210	75	65	1.04	1.07	1.04	1.07	20%		
4	115-05131	2 Mid Day	I-8	I-8	W	4.376776016	226	233	234	248	75	210	75	65	1.04	1.07					
4	115-05131	3 PM Peak	I-8	I-8	W	4.376776016	228	235	237	253	75	210	75	65	1.04	1.07					
4	115-05131	4 Weekend	I-8	I-8	W	4.376776016	226	233	235	250	75	210	75	65	1.04	1.07					
4	115-05132	1 AM Peak	I-8	I-8	W	0.926320098	48	49	50	53	75	44	75	65	1.04	1.07	1.05	1.08	4%		
4	115-05132	2 Mid Day	I-8	I-8	W	0.926320098	48	49	50	53	75	44	75	65	1.04	1.07					
4	115-05132	3 PM Peak	I-8	I-8	W	0.926320098	48	50	50	54	75	44	75	65	1.05	1.08					
4	115-05132	4 Weekend	I-8	I-8	W	0.926320098	48	49	50	53	75	44	75	65	1.05	1.07					
5	115-05134	1 AM Peak	I-8	I-8	W	4.437243092	228	237	237	255	75	213	75	65	1.04	1.08	1.05	1.08	16%	1.04	1.08
5	115-05134	2 Mid Day	I-8	I-8	W	4.437243092	229	237	237	254	75	213	75	65	1.03	1.07					
5	115-05134	3 PM Peak	I-8	I-8	W	4.437243092	231	238	241	258	75	213	75	65	1.04	1.08					
5	115-05134	4 Weekend	I-8	I-8	W	4.437243092	229	237	240	256	75	213	75	65	1.05	1.08					
5	115-05135	1 AM Peak	I-8	I-8	W	1.776659525	91	95	95	104	75	85	75	65	1.04	1.09	1.05	1.11	6%		
5	115-05135	2 Mid Day	I-8	I-8	W	1.776659525	92	95	96	105	75	85	75	65	1.04	1.11					
5	115-05135	3 PM Peak	I-8	I-8	W	1.776659525	93	95	97	105	75	85	75	65	1.04	1.10					

5	115-05135	4 Weekend	I-8	I-8	W	1.776659525	92	95	96	104	75	85	75	65	1.05	1.10					
5	115-05136	1 AM Peak	I-8	I-8	W	14.50842389	746	776	772	824	75	696	75	65	1.03	1.06	1.04	1.07	51%		
5	115-05136	2 Mid Day	I-8	I-8	W	14.50842389	752	776	776	823	75	696	75	65	1.03	1.06					
5	115-05136	3 PM Peak	I-8	I-8	W	14.50842389	757	780	785	834	75	696	75	65	1.04	1.07					
5	115-05136	4 Weekend	I-8	I-8	W	14.50842389	750	776	780	829	75	696	75	65	1.04	1.07					
5	115-05137	1 AM Peak	I-8	I-8	W	3.544635465	183	190	190	205	75	170	75	65	1.04	1.08	1.05	1.09	12%		
5	115-05137	2 Mid Day	I-8	I-8	W	3.544635465	184	190	191	206	75	170	75	65	1.04	1.09					
5	115-05137	3 PM Peak	I-8	I-8	W	3.544635465	185	190	193	206	75	170	75	65	1.04	1.08					
5	115-05137	4 Weekend	I-8	I-8	W	3.544635465	183	189	192	203	75	170	75	65	1.05	1.07					
5	115-05138	1 AM Peak	I-8	I-8	W	4.27720164	221	230	229	245	75	205	75	65	1.04	1.06	1.04	1.08	15%		
5	115-05138	2 Mid Day	I-8	I-8	W	4.27720164	223	230	230	245	75	205	75	65	1.03	1.06					
5	115-05138	3 PM Peak	I-8	I-8	W	4.27720164	224	230	234	248	75	205	75	65	1.04	1.08					
5	115-05138	4 Weekend	I-8	I-8	W	4.27720164	222	229	232	246	75	205	75	65	1.04	1.07					
6	115-05139	1 AM Peak	I-8	I-8	W	2.872572071	153	157	159	171	75	138	75	65	1.04	1.09	1.05	1.11	47%	1.05	1.11
6	115-05139	2 Mid Day	I-8	I-8	W	2.872572071	154	157	160	170	75	138	75	65	1.04	1.08					
6	115-05139	3 PM Peak	I-8	I-8	W	2.872572071	154	158	162	175	75	138	75	65	1.05	1.11					
6	115-05139	4 Weekend	I-8	I-8	W	2.872572071	152	157	159	172	75	138	75	65	1.04	1.10					
6	115-05140	1 AM Peak	I-8	I-8	W	3.183990673	165	169	174	188	75	153	75	65	1.05	1.11	1.06	1.12	53%		
6	115-05140	2 Mid Day	I-8	I-8	W	3.183990673	166	170	175	189	75	153	75	65	1.05	1.11					
6	115-05140	3 PM Peak	I-8	I-8	W	3.183990673	167	171	176	191	75	153	75	65	1.06	1.12					

6	115-05140	4 Weekend	I-8	I-8	W	3.183990673	166	170	176	188	75	153	75	65	1.06	1.11					
7	115-05141	1 AM Peak	I-8	I-8	W	20.69202046	1078	1096	1112	1171	75	993	75	65	1.03	1.07	1.03	1.07	67%	1.03	1.09
7	115-05141	2 Mid Day	I-8	I-8	W	20.69202046	1082	1097	1112	1170	75	993	75	65	1.03	1.07					
7	115-05141	3 PM Peak	I-8	I-8	W	20.69202046	1080	1096	1112	1164	75	993	75	65	1.03	1.06					
7	115-05141	4 Weekend	I-8	I-8	W	20.69202046	1080	1090	1108	1162	75	993	75	65	1.03	1.07					
7	115-05142	1 AM Peak	I-8	I-8	W	3.453964004	180	183	187	197	75	166	75	65	1.04	1.08	1.04	1.08	11%		
7	115-05142	2 Mid Day	I-8	I-8	W	3.453964004	181	183	187	197	75	166	75	65	1.03	1.08					
7	115-05142	3 PM Peak	I-8	I-8	W	3.453964004	181	183	187	196	75	166	75	65	1.03	1.07					
7	115-05142	4 Weekend	I-8	I-8	W	3.453964004	180	183	187	196	75	166	75	65	1.04	1.07					
7	115-05143	1 AM Peak	I-8	I-8	W	6.697796856	356	360	372	423	75	321	75	65	1.05	1.17	1.05	1.17	22%		
7	115-05143	2 Mid Day	I-8	I-8	W	6.697796856	357	361	372	416	75	321	75	65	1.04	1.15					
7	115-05143	3 PM Peak	I-8	I-8	W	6.697796856	353	358	367	398	75	321	75	65	1.04	1.11					
7	115-05143	4 Weekend	I-8	I-8	W	6.697796856	352	356	365	392	75	321	75	65	1.04	1.10					
8	115-05143	1 AM Peak	I-8	I-8	W	6.697796856	356	360	372	423	75	321	75	65	1.05	1.17	1.05	1.17	31%	1.05	1.15
8	115-05143	2 Mid Day	I-8	I-8	W	6.697796856	357	361	372	416	75	321	75	65	1.04	1.15					
8	115-05143	3 PM Peak	I-8	I-8	W	6.697796856	353	358	367	398	75	321	75	65	1.04	1.11					
8	115-05143	4 Weekend	I-8	I-8	W	6.697796856	352	356	365	392	75	321	75	65	1.04	1.10					
8	115-05144	1 AM Peak	I-8	I-8	W	9.582808387	521	527	554	617	75	460	75	65	1.06	1.17	1.06	1.17	44%		
8	115-05144	2 Mid Day	I-8	I-8	W	9.582808387	525	529	557	619	75	460	75	65	1.06	1.17					
8	115-05144	3 PM Peak	I-8	I-8	W	9.582808387	510	516	531	569	75	460	75	65	1.04	1.10					

8	115-05144	4 Weekend	I-8	I-8	W	9.582808387	505	510	523	551	75	460	75	65	1.04	1.08					
8	115-05145	1 AM Peak	I-8	I-8	W	5.339881926	279	284	290	308	75	256	75	65	1.04	1.08	1.04	1.09	25%		
8	115-05145	2 Mid Day	I-8	I-8	W	5.339881926	280	284	290	309	75	256	75	65	1.03	1.09					
8	115-05145	3 PM Peak	I-8	I-8	W	5.339881926	279	283	289	305	75	256	75	65	1.04	1.08					
8	115-05145	4 Weekend	I-8	I-8	W	5.339881926	279	282	287	302	75	256	75	65	1.03	1.07					
9	115-05146	1 AM Peak	I-8	I-8	W	1.413483426	74	75	77	82	75	68	75	65	1.04	1.09	1.04	1.09	17%	1.04	1.10
9	115-05146	2 Mid Day	I-8	I-8	W	1.413483426	74	75	77	82	75	68	75	65	1.04	1.09					
9	115-05146	3 PM Peak	I-8	I-8	W	1.413483426	74	75	77	81	75	68	75	65	1.04	1.09					
9	115-05146	4 Weekend	I-8	I-8	W	1.413483426	74	74	76	80	75	68	75	65	1.03	1.08					
9	115-05147	1 AM Peak	I-8	I-8	W	2.622066609	137	139	142	150	75	126	75	65	1.04	1.08	1.04	1.09	32%		
9	115-05147	2 Mid Day	I-8	I-8	W	2.622066609	137	140	142	152	75	126	75	65	1.04	1.09					
9	115-05147	3 PM Peak	I-8	I-8	W	2.622066609	137	139	142	150	75	126	75	65	1.04	1.08					
9	115-05147	4 Weekend	I-8	I-8	W	2.622066609	137	138	141	149	75	126	75	65	1.03	1.08					
9	115-05148	1 AM Peak	I-8	I-8	W	1.195795869	63	64	65	71	75	57	75	65	1.04	1.11	1.04	1.11	15%		
9	115-05148	2 Mid Day	I-8	I-8	W	1.195795869	63	64	65	71	75	57	75	65	1.04	1.10					
9	115-05148	3 PM Peak	I-8	I-8	W	1.195795869	63	64	65	70	75	57	75	65	1.04	1.11					
9	115-05148	4 Weekend	I-8	I-8	W	1.195795869	63	64	65	69	75	57	75	65	1.04	1.09					
9	115-05149	1 AM Peak	I-8	I-8	W	2.98280168	160	163	165	174	75	143	75	65	1.03	1.07	1.04	1.10	36%		
9	115-05149	2 Mid Day	I-8	I-8	W	2.98280168	159	162	164	176	75	143	75	65	1.03	1.09					
9	115-05149	3 PM Peak	I-8	I-8	W	2.98280168	160	162	165	178	75	143	75	65	1.04	1.10					

9	115-05149	4 Weekend	I-8	I-8	W	2.98280168	160	161	165	175	75	143	75	65	1.04	1.08					

<u>*Closure Data*</u>

			Total miles of closures		Avg Occurances/Mile/Year	
Length (miles)	**# of closures**	**# with F&I**	**EB**	**WB**	**EB**	**WB**
16.3	32	1	21.0	11.0	0.26	0.13
5.1	7	1	4.0	3.0	0.16	0.12
35.1	29	0	28.0	22.0	0.16	0.13
23.1	17	1	9.0	8.0	0.08	0.07
30.8	28	0	8.0	24.0	0.05	0.16
9.6	8	0	3.0	5.0	0.06	0.10
27.6	22	1	8.0	14.0	0.06	0.10
18.9	14	0	5.0	13.5	0.05	0.14
11.5	9	1	8.0	2.5	0.14	0.04

	ITIS Category Description											
	Closures		**Incidents/Accidents**		**Incidents/Crashes**		**Obstruction Hazards**		**Winds**		**Winter Storm Codes**	
Segment	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
1	1	0	3	3	10	6	1	1	0	0	0	0
2	0	0	0	1	4	2	0	0	0	0	0	0
3	0	0	6	4	10	9	0	0	0	0	0	0
4	0	0	3	2	6	6	0	0	0	0	0	0
5	0	0	1	5	7	15	0	0	0	0	0	0
6	0	0	0	1	3	4	0	0	0	0	0	0
7	0	0	3	3	4	11	0	0	0	0	0	0
8	0	0	2	0	3	8	0	1	0	0	0	0
9	0	0	0	0	7	1	0	0	0	0	0	0

HPMS Data

SEGMENT	MP_FROM	MP_TO	NB/EB AADT	SB/WB AADT	2019 AADT	K Factor	D-Factor	T-Factor
1	0	16	15824	15384	31208	8	52	19
2	16	21	8117	8782	16899	10	52	26
3	21	57	5858	5986	11844	7	53	27
4	57	80	5059	5359	10418	7	52	26
5	80	110	5653	5674	11327	8	51	28
6	110	120	4802	4403	9204	8	52	28
7	120	148	3715	3514	7230	10	52	39
8	148	167	3230	2934	6164	8	53	38
9	167	178	3664	4297	7961	7	59	28

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
1	100001	0.00	0.50	0.50	13233	10013	13233	10013	23246	6	54
	100002	0.50	2.24	1.74	12227	11632	12227	11632	23859	10	57
	100003	2.24	3.98	1.74	18049	17371	18049	17371	35420	7	62
	100004	3.98	7.60	3.62	20083	17346	20083	17346	37429	7	60
	100005	7.60	9.40	1.80	19196	18638	19196	18638	37834	7	65
	100006	9.40	12.22	2.82	17500	19000	17500	19000	36500	5	52
	100007	12.22	14.24	2.02	12532	13503	12532	13503	26035	11	52
	100008	14.24	16.30	2.06	8117	8782	8117	8782	16899	10	54
2	100008	16.30	21.40	5.10	8117	8782	8117	8782	16899	10	54
3	100009	21.40	30.81	9.41	5743	6966	5743	6966	12709	7	58
	100010	30.81	37.96	7.15	7000	6000	7000	6000	13000	8	67
	100011	37.96	42.08	4.12	6000	5000	6000	5000	11000	8	53
	100012	42.08	54.96	12.88	5327	5661	5327	5661	10988	7	56
	100013	54.96	56.50	1.54	5333	5287	5333	5287	10620	7	57
4	100013	56.50	67.44	10.94	5333	5287	5333	5287	10620	7	57
	100014	67.44	73.48	6.04	4400	5700	4400	5700	10100	6	56
	100015	73.48	78.47	4.99	5270	5073	5270	5073	10343	7	59
	100016	78.47	79.60	1.13	5000	5500	5000	5500	10500	8	60
5	100016	79.60	87.04	7.44	5000	5500	5000	5500	10500	8	60
	100017	87.04	102.30	15.26	5500	5500	5500	5500	11000	7	60
	100018	102.30	106.48	4.18	6859	6878	6859	6878	13737	14	69
	100019	106.48	110.40	3.92	6200	5400	6200	5400	11600	7	59
6	100019	110.40	111.43	1.03	6200	5400	6200	5400	11600	7	59
	100020	111.43	115.15	3.72	6000	5700	6000	5700	11700	8	60
	100021	115.15	115.63	0.48	3559	3117	3559	3117	6676	10	65

	100022	115.63	119.43	3.80	3575	3129	3575	3129	6704	8	51
	100023	119.43	120.00	0.57	3680	3708	3680	3708	7388	11	52
7	100023	120.00	140.81	20.81	3680	3708	3680	3708	7388	11	52
	100024	140.81	144.56	3.75	4124	2913	4124	2913	7037	5	61
	100025	144.56	147.60	3.04	3452	2930	3452	2930	6382	8	51
8	100025	147.60	151.69	4.09	3452	2930	3452	2930	6382	8	51
	100026	151.69	161.53	9.84	2966	2572	2966	2572	5538	9	56
	100027	161.53	166.50	4.97	3571	3654	3571	3654	7225	7	52
9	100027	166.50	167.53	1.03	3571	3654	3571	3654	7225	7	52
	100028	167.53	169.54	2.01	3533	3765	3533	3765	7298	7	51
	100029	169.54	172.54	3.00	1554	5117	1554	5117	6671	7	74
	100030	172.54	174.54	2.00	4306	4298	4306	4298	8604	7	52
	100031	174.54	178.00	3.46	5225	4087	5225	4087	9312	7	61

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
1	8-1	0	16.3	Divided	10.0	10.0	4.0	4.0	15.5	15.5	95%
2	8-2	16.3	21.4	Divided	10.0	10.0	4.0	4.0	5.1	5.1	100%
3	8-3	21.4	56.5	Divided	10.0	10.0	4.0	4.0	35.1	35.1	100%
4	8-4	56.5	79.6	Divided	9.9	9.9	4.8	4.0	22.8	23.0	99%
5	8-5	79.6	110.4	Divided	10.0	10.0	4.0	4.0	30.8	30.8	100%
6	8-6	110.4	120	Divided	10.0	10.0	4.0	4.0	9.6	9.6	100%
7	8-7	120	147.6	Divided	10.0	10.0	4.0	4.0	27.6	27.6	100%
8	8-8	147.6	166.5	Divided	9.7	9.4	3.7	3.4	18.9	18.9	100%
9	8-9	166.5	178	Divided	9.6	9.6	4.9	3.6	11.5	11.5	100%

AZTDM Data

SEGMENT	Growth Rate	% Non-SOV
8-1	0.78%	15.3%
8-2	1.39%	12.6%
8-3	1.36%	13.2%
8-4	1.36%	7.4%
8-5	1.37%	6.1%
8-6	0.87%	5.8%
8-7	-1.92%	5.8%
8-8	2.57%	12.4%
8-9	3.65%	13.5%

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]
8-1	1	Urban	Rolling	12.00	10.00	10.00	0.0	0	0	1.52	0.94	1.5	0.913	N/A	N/A	N/A	N/A	N/A	N/A	N/A	70.82	70.82	4121	4121	N/A	78,487
8-2	1	Rural	Mountainous	12.00	10.00	10.00	0.0	0	0	0	0.94	4.5	0.524	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	2362	2362	N/A	44,996
8-3	1	Rural	Rolling	12.00	10.00	10.00	0.0	0	0	0	0.94	2.5	0.712	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	3211	3211	N/A	61,169
8-4	1	Rural	Level	12.00	9.92	9.95	0.0	0	0	0	0.94	1.5	0.885	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	3993	3993	N/A	76,056
8-5	1	Rural	Level	12.00	10.00	10.00	0.0	0	0	0	0.94	1.5	0.877	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	3958	3958	N/A	75,388
8-6	1	Rural	Rolling	12.00	10.00	10.00	0.0	0	0	0	0.94	2.5	0.704	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	3177	3177	N/A	60,523
8-7	1	Rural	Level	12.00	10.00	10.00	0.0	0	0	0	0.94	1.5	0.837	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	3776	3776	N/A	71,919
8-8	1	Rural	Level	12.00	9.74	9.40	0.0	0	0	0	0.94	1.5	0.840	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	3792	3792	N/A	72,221
8-9	1	Rural	Level	12.00	9.63	9.63	0.0	0	0	0	0.94	1.5	0.877	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.40	75.40	3958	3958	N/A	75,388

Safety Performance Area Data

Segment	Segment Similar Operating Environment Type	Offset	Segment Length (miles)	Segment NB/EB Fatal Crashes	Segment SB/WB Fatal Crashes	Segment NB/EB Suspected Serious Injury Crashes	Segment SB/WB Suspected Serious Injury Crashes	Fatal + Suspected Serious Injury Crashes at Intersections	Fatal + Suspected Serious Injury Crashes Involving Lane Departures	Fatal + Suspected Serious Injury Crashes Involving Pedestrians	Fatal + Suspected Serious Injury Crashes Involving Trucks	Fatal + Suspected Serious Injury Crashes Involving Bicycles	Weighted Average NB/EB AADT	Weighted Average SB/WB AADT
1	Urban 4 Lane Freeway	6	16.3	2	4	2	3	0	6	1	0	0	16479	16549
2	Rural 4 Lane Freeway with Daily Volume < 25,000	4	5.1	3	1	0	1	0	5	0	1	0	8407	8058
3	Rural 4 Lane Freeway with Daily Volume < 25,000	4	35.1	3	7	5	8	0	19	1	5	0	5720	5732
4	Rural 4 Lane Freeway with Daily Volume < 25,000	4	23.1	3	7	4	7	0	17	0	2	0	5090	4871
5	Rural 4 Lane Freeway with Daily Volume < 25,000	4	30.8	4	5	6	6	0	16	2	4	0	6552	6295
6	Rural 4 Lane Freeway with Daily Volume < 25,000	4	9.6	1	0	0	0	0	1	0	1	0	4451	4225
7	Rural 4 Lane Freeway with Daily Volume < 25,000	4	27.6	2	1	5	3	0	10	0	2	0	3410	3317
8	Rural 4 Lane Freeway with Daily Volume < 25,000	4	18.9	2	0	4	0	0	6	0	1	0	3158	2952
9	Rural 4 Lane Freeway with Daily Volume < 25,000	4	11.5	2	1	1	1	0	3	0	1	0	4220	4030

HPMS Data

SEGMENT	MP_FROM	MP_TO	WEIGHTED AVERAGE NB/EB AADT	WEIGHTED AVERAGE SB/WB AADT	WEIGHTED AVERAGE AADT
1	0	16	16479	16549	33028
2	16	21	8407	8058	16465
3	21	57	5720	5732	11452
4	57	80	5090	4871	9961
5	80	110	6552	6295	12847
6	110	120	4451	4225	8676
7	120	148	3410	3317	6726
8	148	167	3158	2952	6111
9	167	178	4220	4030	8250

Freight Performance Area Data

			Total minutes of closures		Avg Mins/Mile/Year	
Length (miles)	# of closures	# with F&I	EB	WB	EB	WB
16.3	32	1	4292.7	1863.0	52.67	22.86
5.1	7	1	660.0	548.0	25.88	21.49
35.1	29	0	7292.1	2271.6	41.55	12.94
23.1	17	1	838.2	1057.0	7.26	9.15
30.8	28	0	660.0	3335.1	4.29	21.66
9.6	8	0	180.0	766.0	3.75	15.96
27.6	22	1	849.4	1945.9	6.16	14.10
18.9	14	0	512.4	3547.8	5.42	37.54
11.5	9	1	1168.9	150.0	20.33	2.61

ITIS Category Description											
Closures		Incidents/Accidents		Incidents/Crashes		Obstruction Hazards		Winds		Winter Storm Codes	
EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
1	0	3	3	10	6	1	1	0	0	0	0
0	0	0	1	4	2	0	0	0	0	0	0
0	0	6	4	10	9	0	0	0	0	0	0
0	0	3	2	6	6	0	0	0	0	0	0
0	0	1	5	7	15	0	0	0	0	0	0
0	0	0	1	3	4	0	0	0	0	0	0
0	0	3	3	4	11	0	0	0	0	0	0
0	0	2	0	3	8	0	1	0	0	0	0
0	0	0	0	7	1	0	0	0	0	0	0

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

Appendix D: Needs Methodology

Pavement Needs Assessment Methodology (Steps 1-3)

This section documents the approach for conducting the first three steps of a 5-step needs assessment process for the Pavement Performance Area. After completion of Step 3 for all performance areas (Pavement, Bridge, Mobility, Safety, and Freight), Step 4 will review each corridor segment to quantify a total level of need that combines all performance areas. Corridor needs are then identified in Step 5 of the process. The 5-step process is listed below:

- Step 1: Initial Needs
- Step 2: Final Needs
- Step 3: Contributing Factors
- Step 4: Segment Review
- Step 5: Corridor Needs

Step 1: Initial Needs

The input required to populate the Step 1 template includes transferring the existing performance score for each segment to the appropriate “Performance Score” columns. This includes the primary and secondary measures for Pavement. As each performance score is input into the template, the Initial Need will populate based on the weighted scoring system for each measure.

The Level of Need for each performance measure has levels of “None” (score = 0), “Low” (score = 1), “Medium” (score = 2), and “High” (score = 3). The assignment of these levels to individual performance measures for segments is determined by the table entitled “Needs Assessment Scales” within the Step 1 template.

To develop an aggregate Initial Need for each segment, the primary and secondary measures are combined by summing the weighted scored, with the primary measure having a weight of 1.0 while each secondary measure has a weight of 0.2 (0.1 each direction if directional). The Initial Need for each segment (combining the primary and secondary measures) has levels of “None” (score < 0.01), “Low” (score $\geq$ 0.01 and < 1.5), “Medium” (score $\geq$ 1.5 and < 2.5), and “High” (score $\geq$ 2.5).

The steps include:

Step 1.1

Enter the appropriate segment information into the columns titled “Segment”, “Segment Length”, “Segment Mileposts” and “Facility Type”.

Step 1.2

Populate the Step 1 template with the existing (baseline) performance scores for all primary and secondary performance measures from Existing Performance Analysis into the appropriate “Performance Score” columns. Copy the performance score for each segment to the appropriate “Performance Score” column. Paste only the “values” and do not overwrite the formatting.

Step 1.3

Indicate if Pavement is an Emphasis Area by selecting “Yes” or “No” in the row immediately below the segment information.

Step 1.4

Confirm that that the Step 1 template is generating the appropriate “Level of Need” for each primary and secondary measure by reviewing the relationship of baseline performance score to level of need.

Step 2: Final Needs

The Initial Need will be carried over to Step 2. The steps required to complete Step 2 are as follows:

Step 2.1

Confirm that the template has properly populated the segment information and the initial needs from the Step 1 template to the “Initial Need” column of the Step 2 template.

Step 2.2

Note in the “Hot Spots” column any pavement failure hot spots identified as part of the baseline corridor performance. For each entry, include the milepost limits of the hot spot. Hot spots are identified in the Pavement Index spreadsheet by the red cells in the columns titled “% Pavement Failure”. These locations are based on the following criteria:

Interstates: IRI > 105 or Cracking > 10 or Rutting > 0.4

Non-Interstates: IRI > 142 or Cracking > 10 or Rutting > 0.4

Every segment that has a % Pavement Failure greater than 0% will have at least one hot spot. Hot spot locations should be described as extending over consecutive miles. For example, if there is a pavement failure location that extends 5 consecutive miles, it should be identified as one hot spot, not 5 separate hot spots.

Step 2.3

Identify recently completed or under construction paving projects in the “Previous Projects” column. Include only projects that were completed after the pavement condition data period (check dates in pavement condition data provided by ADOT) that would supersede the results of the performance system.

Step 2.5

Update the “Final Need” column using the following criteria:

- If "None" but have a hot spot (or hot spots), the Final Need = Low, and note the reason for the change in the “Comments” column (column H).

- If a recent project has superseded the performance rating data, change the Final Need to “None” and note the reason for the change in the “Comments” column.

Example Scales for Level of Need

Pavement Index (Interstates) Performance Thresholds		Initial Need	Description (Non-Emphasis Area)
3.75		None	All of Good Performance and upper third of Fair Performance (>3.50)
		Low	Middle third of Fair Perf. (3.25 - 3.5)
3.0		Medium	Lower third of Fair and top third of Poor Performance (2.75-3.25)
		High	Lower two-thirds of Poor Performance (<2.75)

Need Scale for Interstates

Measure	None >=	Low >=	> Medium <		High <=
Pavement Index (corridor non-emphasis area)	3.5	3.25	3.25	2.75	2.75
Pavement Index (corridor emphasis area)	4.0	3.5	3.5	3.00	3.00
Pavement Index (segments)	3.5	3.25	3.25	2.75	2.75
Directional PSR	3.63	3.52	3.52	3.28	3.28
%Pavement Failure	10%	15%	15%	25%	25%

Need Scale for Highways (Non-Interstates)

Measure	None >=	Low >=	> Medium <		High <=
Pavement Index (corridor non-emphasis area)	3.33	3.07	3.07	2.53	2.53
Pavement Index (corridor emphasis area)	3.87	3.33	3.33	2.80	2.80
Pavement Index (segments)	3.33	3.07	3.07	2.53	2.53
Directional PSR	3.30	3.10	3.10	2.70	2.70
%Pavement Failure	10%	15%	15%	25%	25%

Step 2.6

Note any programmed projects that could have the potential to mitigate pavement needs in in the “Comments” column. Programmed projects are provided as information and do not impact the need rating. The program information can be found in ADOT’s 5-year construction program. If there are other comments relevant to the needs analysis (such as information from previous reports), they can be entered in the “Comments” column. However, only include information related to needs that have been identified through this process. Do not add or create needs from other sources.

Step 3: Contributing Factors

The Final Need ratings from Step 2 will populate into the Step 3 tab. The steps to complete Step 3 include:

Step 3.1

Input the level of historical investment for each segment. This will be determined from the numeric score from the Pavement History Table based on the following thresholds:

- Low = < 4.60
- Medium = 4.60 – 6.60
- High = > 6.60

If the PeCoS data shows a high level of maintenance investment, increase the historical investment rating by one level.

Step 3.2

Note the milepost ranges of pavement failure hot spots into the column titled “Contributing Factors and Comments.”

Step 3.3

Note any other information that may be contributing to the deficiency, or supplemental information, in the “Contributing Factors and Comments” column. This could come from discussions with ADOT District staff, ADOT Materials/Pavement Group, previous reports, or the historical investment data.

Step 3.4

Include any programmed projects from ADOT’s 5-year construction program in the “Contributing Factors and Comments” column.

Bridge Needs Assessment Methodology (Steps 1-3)

This section documents the approach for conducting the first three steps of a 5-step needs assessment process for the Bridge Performance Area. After completion of Step 3 for all performance areas (Pavement, Bridge, Mobility, Safety, and Freight), Step 4 will review each corridor segment to quantify a total level of need that combines all performance areas. Corridor needs are then identified in Step 5 of the process. The 5-step process is listed below:

- Step 1: Initial Needs
- Step 2: Final Needs
- Step 3: Contributing Factors
- Step 4: Segment Review
- Step 5: Corridor Needs

Step 1: Initial Needs

The input required to populate the Step 1 template includes transferring the existing performance score for each segment to the appropriate "Performance Score" columns. This includes the primary and secondary measures for Bridge. As each performance score is input into the template, the Initial Need will populate based on the weighted scoring system for each measure.

The Level of Need for each performance measure has levels of "None" (score = 0), "Low" (score = 1), "Medium" (score = 2), and "High" (score = 3). The assignment of these levels to individual performance measures for segments is determined by the table entitled "Needs Assessment Scales" within the Step 1 template.

To develop an aggregated Initial Need for each segment, the primary and secondary measures are combined by summing the weighted scored, with the primary measure having a weight of 1.0 while each secondary measure has a weight of 0.2 (0.1 each direction if directional). The Initial level of need for each segment (combining the primary and secondary measures) has levels of "None" (score < 0.01), "Low" (score $\geq$ 0.01 and < 1.5), "Medium" (score $\geq$ 1.5 and < 2.5), and "High" (score $\geq$ 2.5).

The steps include:

Step 1.1

Enter the appropriate segment information into the columns titled "Segment", "Segment Length", "Segment Mileposts" and "Number of Bridges."

Step 1.2

Populate the Step 1 template with the existing (baseline) performance scores for all primary and secondary performance measures from Existing Performance Analysis into the appropriate "Performance Score" columns. Copy the performance score for each segment to the appropriate "Performance Score" column. Paste only the "values" and do not overwrite the formatting.

Step 1.3

Indicate if Bridge is an Emphasis Area by selecting "Yes" or "No" in the row immediately below the segment information.

Step 1.4

Confirm that that the Step 1 template is generating the appropriate "Level of Need" for each primary and secondary measure by reviewing the relationship of baseline performance score to level of need.

Step 2: Final Needs

The Initial Need will be carried over to Step 2. The steps required to complete Step 2 are as follows:

Step 2.1

Confirm that the template has properly populated the initial needs from the Step 1 template to the "Initial Need" column of the Step 2 template.

Step 2.2

Note in the column titled "Hot Spots" any bridge hot spots identified as part of the baseline corridor performance. For each entry, note the specific location. Hot spots are identified as having any bridge rating of 4 or less, or multiple ratings of 5 in the deck, substructure, or superstructure ratings.

Step 2.3

Identify recently completed or under construction bridge projects in the "Previous Projects" column. Include only projects that were completed after the bridge condition data period (check dates in bridge condition data provided by ADOT) that would supersede the results of the performance system.

Step 2.4

Update the Final Need on each segment based on the following criteria:

- If the Initial Need is "None" and there is at least one hot spot located on the segment, change the Final Need to "Low".
- If a recent project has superseded the performance rating data, the performance data should be adjusted to increase the specific ratings and the resulting need should be reduced to account for the project.
- Note the reason for any change in the "Comments" column.

Step 2.5

Historical bridge rating data was tabulated and graphed to find any bridges that had fluctuations in the ratings. Note in the "Historical Review" column any bridge that was identified as having a potential historical rating concern based on the following criteria:

- Ratings increase or decrease (bar chart) more than 2 times
- Sufficiency rating drops more than 20 points

This is for information only and does not affect the level of need.

Step 2.6

Note the number of functionally obsolete bridges in each segment in the column titled "# Functionally Obsolete Bridges". This is for information only and does not affect the level of need.

Step 2.7

Identify each bridge "of concern" in the "Comments" column. Note any programmed projects that could have the potential to mitigate bridge needs. Programmed projects are provided as information and do not impact the need rating. The program information can be found in ADOT's 5-year construction program. If there are other comments relevant to the needs analysis (such as information from previous reports), they can be entered in the "Comments" column. However, only include information related to needs that have been identified through this process. Do not add or create needs from other sources.

Example Scales for Level of Need

Bridge Index Performance Thresholds	Level of Need		Description (Non-Emphasis Area)
	Good	None	All of Good Performance and upper third of Fair Performance (>6.0)
	Good		
	Good		
6.5	Fair		
	Fair	Low	Middle third of Fair Performance (5.5-6.0)
	Fair	Medium	Lower third of Fair and top third of Poor Performance (4.5-5.5)
5.0	Poor		
	Poor	High	Lower two-thirds of Poor Performance (<4.5)
	Poor		

Need Scale

Measure	None >=	Low >=	> Medium <		High <=
Bridge Index (corridor non-emphasis area)	6.0	5.5	5.5	4.5	4.5
Bridge Index (corridor emphasis area)	7.0	6.0	6.0	5.0	5.0
Bridge Index (segments)	6.0	5.5	5.5	4.5	4.5
Bridge Sufficiency	70	60	60	40	40
Bridge Rating	6.0	5.0	4.0	4.0	3.0

Step 3: Contributing Factors

The Final Need ratings from Step 2 will populate into the Step 3 tab. The steps to compete Step 3 include:

Step 3.1

Input the bridge name, structure number, and milepost information for each bridge "of concern" resulting from Step 2.

Step 3.2

For bridges that have a current rating of 5 or less, enter the specific rating, or state "No current ratings less than 6".

Step 3.3

For bridges that were identified for a historical review (step 2.5), state "Could have a repetitive investment issue". If a bridge was not identified for a historical review, state "This structure was not identified in historical review".

Step 3.4

Input any programmed projects from ADOT's 5-year construction program. Note any other information that may be contributing to the deficiency, or supplemental information. This could come from discussions with ADOT District staff, ADOT Bridge Group, or previous reports.

Mobility Needs Assessment Methodology (Steps 1-3)

This section documents the approach for conducting the first three steps of a 5-step needs assessment process for the Mobility Performance Area. After completion of Step 3 for all performance areas (Pavement, Bridge, Mobility, Safety, and Freight), Step 4 will review each corridor segment to quantify a total level of need that combines all performance areas. Corridor needs are then identified in Step 5 of the process. The 5-step process is listed below:

- Step 1: Initial Needs
- Step 2: Refined Needs
- Step 3: Contributing Factors
- Step 4: Segment Review
- Step 5: Corridor Needs

Step 1: Initial Needs

The input required to populate the Step 1 template includes transferring the existing performance score for each segment to the appropriate “Performance Score” columns from Existing Performance Analysis. This includes the primary and secondary measures for Mobility. As each performance score is input into the template, the Initial Need will populate based on the weighted scoring system for each measure.

The Level of Need for each performance measure has levels of “None” (score = 0), “Low” (score = 1), “Medium” (score = 2), and “High” (score = 3). The assignment of these levels to individual performance measures for segments is determined by the table entitled “Needs Assessment Scales” in the Step 1 tab.

To develop an aggregated Initial Need for each segment, the primary and secondary measures are combined by summing the weighted scores, with the primary measure having a weight of 1.0 while each secondary measure has a weight of 0.2 (0.1 each direction if directional). The Initial Need for each segment (combining the primary and secondary measures) has levels of “None” (score < 0.01), “Low” (score $\geq$ 0.01 and < 1.5), “Medium” (score $\geq$ 1.5 and < 2.5), and “High” (score $\geq$ 2.5).

The steps include:

Step 1.1

Input the accurate number of segments for your corridor in the column titled ‘Segment’ and the appropriate segment milepost limits and segment lengths in adjacent columns.

Step 1.2

Select the appropriate ‘Environment Type’ and ‘Facility Operation Type’ from the drop down menus as defined in Existing Performance Analysis.

Step 1.3

Select ‘Yes’ or ‘No’ from the drop down list to not if the Mobility Performance Area is an Emphasis Area for your corridor.

Step 1.4

Populate the Step 1 template with the existing (baseline) performance scores for all primary and secondary performance measures from Existing Performance Analysis. Copy the performance score for each segment to the appropriate “Performance Score” column.

Step 1.5

Confirm that that the Step 1 template is generating the appropriate “Level of Need” for each primary and secondary measure by reviewing the relationship of baseline performance score to level of need.

Step 2: Final Needs

The Initial Need will be carried over to Step 2 The steps required to complete Step 2 are as follows:

Step 2.1

Confirm that the template has properly populated the initial deficiencies from the Step 1 template to the Step 2 template.

Step 2.2

Identify recently completed or under construction projects that would be considered relevant to mobility performance. Include only projects that were constructed after the date for which the HPMS data used for traffic volumes would not include. Any completed or under construction roadway project after the HPMS data date that has the potential to mitigate a mobility issue on a corridor segment should be listed in the template. Such projects should include the construction of new travel lanes or speed limit changes on the main corridor only. Do not include projects involving frontage roads or crossings as they would not impact the corridor level performance.

Step 2.3

Update the Final Need using the following criteria:

- If a recent project has superseded the performance rating data and it is certain the project addressed the deficiency, change the need rating to “None”.
- If a recent project has superseded the performance rating data but it is uncertain that a project addressed the need, maintain the current deficiency rating and note the uncertainty as a comment.

Step 2.4

Note any programmed or planned projects that have the potential to mitigate any mobility needy on the segment. Programmed and Planned projects are provided as information and do not impact the deficiency rating. Future projects will be reviewed in the development of solution sets for identified needs and deficiencies. The source of future projects can be found in ADOT's 5-year construction program or other planning documents. Other comments relevant to the needs analysis can be entered.

Example Scales for Level of Need

Mobility Index (Urban and Fringe Urban) Performance Thresholds	Initial Need	Description (Non-Emphasis Area)
0.71	None	All of Good Performance and upper third of Fair Performance (<0.77)
	Low	Middle third of Fair Performance (0.77 - 0.83)
0.89	Medium	Lower third of Fair and top third of Poor Performance (0.83-0.95)
	High	Lower two-thirds of Poor Performance (>0.95)

Needs Scale

Measure		None <=	Low <=	> Medium <		High >=
Mobility Index (Corridor Emphasis Area)		Weighted calculation for the segment totals in corridor (urban vs. rural)				
Mobility Index (Corridor Non-Emphasis Area)		Weighted calculation for the segment totals in corridor (urban vs. rural)				
Mobility Index (Segment)	Urban	0.77	0.83	0.83	0.95	0.95
	Rural	0.63	0.69	0.69	0.83	0.83
Future Daily V/C	Urban	0.77	0.83	0.83	0.95	0.95
	Rural	0.63	0.69	0.69	0.83	0.83
Existing Peak hour V/C	Urban	0.77	0.83	0.83	0.95	0.95
	Rural	0.63	0.69	0.69	0.83	0.83
Closure Extent		0.35	0.49	0.49	0.75	0.75
Directional TTI	Uninterrupted	1.21	1.27	1.27	1.39	1.39
	Interrupted	1.53	1.77	1.77	2.23	2.23
Directional PTI	Uninterrupted	1.37	1.43	1.43	1.57	1.57
	Interrupted	4.00	5.00	5.00	7.00	7.00
Bicycle Accommodation		80%	70%	70%	50%	50%

Step 3: Contributing Factors

The Final Need ratings from Step 2 will populate into the Step 3 tab. The steps to compete Step 3 include:

Step 3.1

Input data from Mobility Index worksheet and corridor observations in appropriate columns for Roadway Variables.

Step 3.2

Input traffic variable data in appropriate columns as indicated, Buffer Index scores will auto populate.

Step 3.3

Input relevant mobility related infrastructure located within each segment as appropriate

Step 3.4

Input the Closure Extents that have occurred along the study corridor. Road closure information can be detailed out by the reason for the closure as documented in Highway Condition Reporting System (HCRS) data analyzed as part of the baseline corridor performance. Closure reasons include incident/accidents, winter storms, obstruction hazards, and undefined closures. Statewide average percentages for the various closure reasons have been calculated for most recent five-year period on ADOT's designated strategic corridors. Compare these statewide average percentages to the corridor percentages for the various closure reasons to identify higher than average percentages of one or more closure reasons on any given segment. Input the closures as follows and use red text to indicate that the segment percentage exceeds statewide averages:

- Total Number of Closures
- % Incidents/Accidents
- % Obstructions/Hazards
- % Weather Related

Step 3.5

List the non-actionable conditions that are present within each segment by milepost if possible. Non-Actionable conditions are conditions that exist within the environment of each segment that cannot be improved through an engineered solution. For example, the border patrol check point in Segment 3 of I-19 is a non-actionable condition.

Step 3.6

Considering all information input, identify and list the contributing factors to the Final Need score.

Safety Needs Assessment Methodology (Steps 1-3)

This section documents the approach for conducting the first three steps of a 5-step needs assessment process for the Safety Performance Area. After completion of Step 3 for all performance areas (Pavement, Bridge, Mobility, Safety, and Freight), Step 4 will review each corridor segment to quantify a total level of need that combines all performance areas. Corridor needs are then identified in Step 5 of the process. The 5-step process is listed below:

- Step 1: Initial Needs
- Step 2: Final Needs
- Step 3: Contributing Factors
- Step 4: Segment Review
- Step 5: Corridor Needs

Step 1: Initial Needs

The input required to populate the Step 1 template includes transferring the corridor characteristics and existing performance score for each segment to the appropriate "Performance Score" columns. This includes the primary and secondary measures for safety. As each performance score is input into the template, the Level of Need will populate based on the weighted scoring system for each measure.

The Level of Need for each performance measure has levels of "None" (score = 0), "Low" (score = 1), "Medium" (score = 2), and "High" (score = 3). The assignment of these levels to individual performance measures for segments is determined by the table entitled "Needs Scale" within the Step 1 template.

To develop an aggregated Initial Need for each segment, the primary and secondary measures are combined by summing the weighted scored, with the primary measure having a weight of 1.0 while each secondary measure has a weight of 0.2 (0.1 each direction if directional). The Initial Need for each segment (combining the primary and secondary measures) has levels of "None" (score < 0.01), "Low" (score $\geq$ 0.01 and < 1.5), "Medium" (score $\geq$ 1.5 and < 2.5), and "High" (score $\geq$ 2.5).

The steps include:

Step 1.1

Populate the Step 1 template with the corridor characteristics information. This includes segment operating environments and segment length. Also specify if the safety performance area is an emphasis area as determined in Goals and Objectives. The "Level of Need" is dependent on the input of the operating environment and "Emphasis Area" as the thresholds dynamically update accordingly.

Input the existing (baseline) performance scores for all primary and secondary performance measures from Existing Performance Analysis. Copy the performance score (paste values only) for each segment to the appropriate "Performance Score" column and conditional formatting should color each cell green, yellow, or red based on the corresponding performance thresholds.

Step 1.2

The thresholds for the corridor safety index are based on the segments' operating environments. To ensure that the correct corridor safety index threshold is applied, input the unique segment operating environments that exist with the corridor. Once the input is complete, the average of the Good/Fair and Fair/Poor thresholds for each of the operating environments is calculated and the "Level of Need" thresholds will be derived and applied to the main Step 1 Table.

Step 1.3

Confirm that the following criteria for "Insufficient Data" have been applied and that the resulting Level of Need has been shown as "N/A" where applicable.

- Crash frequency for a segment is less than 5 crashes over the 5-year crash analysis period.
- The change in +/- 1 crash results in the change of need level of 2 levels (i.e., changes from Above Average to Below Average or changes from Below Average to Above Average).
- The average segment crash frequency for the overall corridor (total fatal plus suspected serious injury crash frequency divided by the number of corridor segments) is less than 2 per segment over the 5-year crash analysis period.

Step 1.4

Confirm that the Step 1 template is generating the appropriate "Level of Need" for each primary and secondary measure by reviewing the relationship of baseline performance score to level of need.

Step 2: Final Needs

The Initial Need will be carried over to Step 2. The steps required to complete Step 2 are as follows:

Step 2.1

Confirm that the template has properly populated the initial needs from the Step 1 template to the Step 2 template.

Step 2.2

Using the crash concentration (hot spot) map developed as part of the baseline corridor performance, note the direction of travel and approximate milepost limits of each hot spot.

Step 2.3

Identify recently completed or under construction projects that would be considered relevant to safety performance. Include only projects that were not taken into account during the five-year crash data analysis period. Any completed or under construction roadway project after the crash analysis period that has the potential to mitigate a safety issue on a corridor segment should be listed in the template. Sources of recent or current project activity can include ADOT MPD staff, ADOT public notices, and ADOT District staff.

Step 2.4

Update the Final Need based on the following criteria:

- If there is a crash hot spot concentration on a "None" segment, upgrade the need rating to "Low."

Step 2.5

Note any programmed projects that could have the potential to mitigate any safety need on the segment. Programmed projects are provided as information and do not impact the need rating. Programmed projects will be reviewed in the development of solution sets for identified needs. The source of the programming information can be found in ADOT's 5-year construction program. Any other relevant issues identified in previous reports should also be reported.

Example Scales for Level of Need

Safety Index (6 Lane Highway) Performance Thresholds	Initial Need	Description (Non-Emphasis Area)
0.76	None	All of Above Average Performance and upper third of Average Performance (<0.92)
	Low	Middle third of Average Performance (0.92 - 1.08)
1.24	Medium	Lower third of Average and top third of Below Average Performance (1.08-1.40)
	High	Lower two-thirds of Below Average Performance (>1.40)

Needs Scale

Measure	None <=	Low <=	> Medium <	High >=
Safety Index (Corridor Emphasis Area)	Weighted calculation for the segment totals in corridor (operating environments)			

Safety Index (Corridor Non-Emphasis Area)		Weighted calculation for the segment totals in corridor (operating environments)				
Safety Index and Directional Safety Index (Segment)	2 or 3 Lane Undivided Highway	0.97	1.02	1.02	1.13	1.13
	2 or 3 or 4 Lane Divided Highway	0.94	1.07	1.07	1.32	1.32
	4 or 5 Lane Undivided Highway	0.93	1.08	1.08	1.37	1.37
	6 Lane Highway	0.92	1.08	1.08	1.4	1.4
	Rural 4 Lane Freeway with Daily Volume < 25,000	0.95	1.06	1.06	1.27	1.27
	Rural 4 Lane Freeway with Daily Volume > 25,000	0.93	1.08	1.08	1.37	1.37
	Urban 4 Lane Freeway	0.91	1.09	1.09	1.45	1.45
	Urban or Rural 6 Lane Freeway	0.88	1.11	1.11	1.58	1.58
	Urban > 6 Lane Freeway	0.96	1.03	1.03	1.18	1.18
% of Fatal + Susp. Serious Injury Crashes at Intersections	2 or 3 Lane Undivided Highway	13%	14%	14%	17%	17%
	2 or 3 or 4 Lane Divided Highway	25%	27%	27%	31%	31%
	4 or 5 Lane Undivided Highway	46%	48%	48%	52%	52%
	6 Lane Highway	63%	68%	68%	78%	78%
	Rural 4 Lane Freeway with Daily Volume < 25,000	0%	0%	0%	0%	0%
	Rural 4 Lane Freeway with Daily Volume > 25,000	0%	0%	0%	0%	0%
	Urban 4 Lane Freeway	0%	0%	0%	0%	0%
	Urban or Rural 6 Lane Freeway	0%	0%	0%	0%	0%
	Urban > 6 Lane Freeway	0%	0%	0%	0%	0%
% of Fatal + Susp. Serious Injury Crashes Involving Lane Departures	2 or 3 Lane Undivided Highway	69%	72%	72%	77%	77%
	2 or 3 or 4 Lane Divided Highway	59%	62%	62%	68%	68%
	4 or 5 Lane Undivided Highway	25%	29%	29%	36%	36%
	6 Lane Highway	21%	30%	30%	47%	47%
	Rural 4 Lane Freeway with Daily Volume < 25,000	74%	75%	75%	78%	78%
	Rural 4 Lane Freeway with Daily Volume > 25,000	72%	75%	75%	81%	81%
	Urban 4 Lane Freeway	66%	72%	72%	84%	84%
	Urban or Rural 6 Lane Freeway	58%	60%	60%	65%	65%
	Urban > 6 Lane Freeway	41%	42%	42%	44%	44%
% of Fatal + Susp. Serious Injury Crashes	2 or 3 Lane Undivided Highway	5%	6%	6%	8%	8%
	2 or 3 or 4 Lane Divided Highway	3%	3%	3%	4%	4%
	4 or 5 Lane Undivided Highway	10%	12%	12%	15%	15%
	6 Lane Highway	4%	8%	8%	16%	16%
	Rural 4 Lane Freeway with Daily Volume < 25,000	2%	3%	3%	4%	4%

Involving Pedestrians	Rural 4 Lane Freeway with Daily Volume > 25,000	2%	3%	3%	6%	6%
	Urban 4 Lane Freeway	2%	4%	4%	7%	7%
	Urban or Rural 6 Lane Freeway	5%	6%	6%	9%	9%
	Urban > 6 Lane Freeway	3%	4%	4%	6%	6%
% of Fatal + Susp. Serious Injury Crashes Involving Trucks	2 or 3 Lane Undivided Highway	5%	6%	6%	9%	9%
	2 or 3 or 4 Lane Divided Highway	6%	8%	8%	12%	12%
	4 or 5 Lane Undivided Highway	2%	4%	4%	7%	7%
	6 Lane Highway	5%	6%	6%	8%	8%
	Rural 4 Lane Freeway with Daily Volume < 25,000	20%	21%	21%	24%	24%
	Rural 4 Lane Freeway with Daily Volume > 25,000	12%	15%	15%	22%	22%
	Urban 4 Lane Freeway	9%	11%	11%	15%	15%
	Urban or Rural 6 Lane Freeway	8%	11%	11%	16%	16%
	Urban > 6 Lane Freeway	3%	4%	4%	6%	6%
% of Fatal + Susp. Serious Injury Crashes Involving Bicycles	2 or 3 Lane Undivided Highway	1%	2%	2%	4%	4%
	2 or 3 or 4 Lane Divided Highway	1%	2%	2%	3%	3%
	4 or 5 Lane Undivided Highway	2%	3%	3%	5%	5%
	6 Lane Highway	2%	4%	4%	9%	9%
	Rural 4 Lane Freeway with Daily Volume < 25,000	0%	0%	0%	1%	1%
	Rural 4 Lane Freeway with Daily Volume > 25,000	0%	0%	0%	0%	0%
	Urban 4 Lane Freeway	0%	0%	0%	0%	0%
	Urban or Rural 6 Lane Freeway	0%	0%	0%	1%	1%
	Urban > 6 Lane Freeway	0%	0%	0%	0%	0%

Step 3: Contributing Factors

The Final Need ratings from Step 2 will populate into the Step 3 tab.

Table 3 - Step 3 Template

A separate *Crash Summary Sheet* file contains summaries for 8 crash attributes for the entire corridor, for each corridor segment, and for statewide roadways with similar operating environments (the database of crashes on roadways with similar operating environments was developed in Existing Performance Analysis (the baseline corridor performance)). The crash attribute summaries are consistent with the annual ADOT Publication, *Crash Facts*. The 8 crash attribute summaries consist of the following:

- First Harmful Event (FHET)
- Crash Type (CT)
- Violation or Behavior (VB)
- Lighting Condition (LC)
- Roadway Surface Type (RST)
- First Unit Event (FUE)
- Driver Physical Condition (Impairment)
- Safety Device Usage (Safety Device)

Non-colored tabs in this spreadsheet auto-populate with filtered crash attributes. Each tab is described below:

- **Step_3_Summary** – This tab contains the filtered summary of crashes that exceed statewide thresholds for crashes on roadways with similar operating environments. Data in this tab are copied into the Step 3 template.
- **Statewide** – This tab contains a summary of statewide crashes from roadways with similar operating environments filtered by the 8 crash type summaries listed above. The crash type summaries calculate statewide crash thresholds (% total for fatal plus suspected serious crashes). The crash thresholds were developed to provide a statewide expected proportion of crash attributes against which the corridor segments' crash attributes can be compared. The crash thresholds were developed using the *Probability of Specific Crash Types Exceeding a Threshold Proportion* as shown in the Highway Safety Manual, Volume 1 (2010). The thresholds are automatically calculated within the spreadsheet. The threshold proportion was calculated as follows:

$$p*_i = \frac{\sum N_{Observed,i}}{\sum N_{Observed,i(total)}}$$

Where:

$p*_i$ = Threshold proportion

$\sum N_{Observed,i}$ = Sum of observed target crash frequency within the population

$\sum N_{Observed,i(total)}$ = Sum of total observed crash frequency within the population

A minimum crash sample size of 5 crashes over the 5-year crash analysis period is required for a threshold exceedance to be displayed in the Step 3 template. The probability of exceeding the crash threshold was not calculated to simplify the process.

- **Corridor** – A summary of corridor-wide crashes filtered by the 8 crash attribute summaries listed above.
- **Segment FHET** – A segment-by-segment summary of crashes filtered by first harmful event attributes.
- **Segment CT** – A segment-by-segment summary of crashes filtered by crash type attributes.

- **Segment VB** - A segment-by-segment summary of crashes filtered by violation or behavior attributes.
- **Segment LC** – A segment-by-segment summary of crashes filtered by lighting condition attributes.
- **Segment RST** – A segment-by-segment summary of crashes filtered by roadway surface attributes.
- **Segment FUE** – A segment-by-segment summary of crashes filtered by first unit event attributes.
- **Segment Impairment** – A segment-by-segment summary of crashes filtered by driver physical condition attributes related to impairment.
- **Segment Safety Device** – A segment-by-segment summary of crashes filtered by safety device usage attributes.

The steps to compete Step 3 include:

Step 3.1

Using the Crash_Summary_Sheet.xlsx, go to the "Step_3_Summary" tab. Input the operating environments for each segment in the table.

Step 3.2

Filter data from the ADOT database for the "CORRIDOR_DATA" tab by inserting the following data in the appropriate columns that are highlighted in gray for the "INPUT_CORRIDOR_DATA" tab:

- Incident ID
- Incident Crossing Feature (MP)
- Segment Number (Non-native ADOT data – must be manually assigned based on the location of the crash)
- Operating Environment (Non-native ADOT data – should already be assigned but if for some reason it isn't, it will need to be manually assigned)
- Incident Injury Severity
- Incident First Harmful Description
- Incident Collision Manner
- Incident Lighting Condition Description
- Unit Body Style
- Surface Condition
- First Unit Event Sequence
- Person Safety Equipment
- Personal Violation or Behavior
- Impairment

Note that columns highlighted in yellow perform a calculated input to aggregate specific crash descriptions. For example, crashes can contain various attributes for animal-involved crashes. The crash attributes that involve an animal were combined into a common attribute, such as "ANIMAL". This will allow the summaries to be consistent with the ADOT *Crash Facts*.

The data in the Impairment category contains blank descriptions if it was found that there was "No Apparent Influence" or if it was "Unknown". Using the crash data fields "PersonPhysicalDescription" 0 - 99, fill in the blank columns to reflect if the physical description is described as "No Apparent Influence" or "Unknown". Note that the native physical description data from the ADOT database may need to be combined to a single column.

Step 3.3

Confirm that the crash database is being properly filtered by comparing crash frequencies from the summary tables with the frequencies developed in Existing Performance Analysis. For example, the lookup function will fail if the filter is for "NO IMPROPER ACTION" if the database has the attribute of "NO_IMPROPER_ACTION".

Step 3.4

Copy and paste the Step_3_Summary into the Safety Needs Assessment spreadsheet in the Step 3 tab. Paste values only and remove the summaries with "0%s" for a clean display. Where duplicate values exist, go to the "Calcs" tab in the Crash_Summary_Sheet file to determine which categories have the same %. If there are more crash types with the same % than there is space in the table, select the crash type with the highest difference between the segment % and the statewide average %

Step 3.5

The Step 3 table in the Safety Needs Assessment spreadsheet should be similar to the Step 3 template. In the Segment Crash Summaries row, the top three crash attributes are displayed. Change the font color of the crash attributes that exceed the statewide crash threshold to red for emphasis. The attributes with a red font in the "Calcs" tab have exceeded statewide crash thresholds. Note that corridor-wide values are not compared to statewide values as corridor-wide values are typically a blend of multiple similar operating environments while the statewide values apply to one specific similar operating environment.

Step 3.6

Provide a summary of any observable patterns found within the crash Hot Spots, if any exist in the segments.

Step 3.7

Input any historic projects (going no further back than 15 years) that can be related to improving safety. Projects more than five years old may have exceeded their respective design life and could be contributing factors to safety performance needs.

Step 3.8

Input key points from District interviews or any important information from past discussions with District staff that is consistent with needs and crash patterns identified as part of the performance and needs assessment as this may be useful in identifying contributing causes. This information may be obtained from District Maintenance personnel by requesting the mile post locations that may be considered safety issues.

Step 3.9

For segments with one or more of the following characteristics, review crashes of all severity levels (not just fatal and suspected serious injury crashes). Identify likely contributing factors and compare that to the above statewide average comparison findings already calculated for fatal and suspected serious injury crashes. Refine the contributing factors list accordingly.

- Segments with Medium or High need
- Segments with a crash hot spot concentration (but only review crashes at the concentration areas)
- Segments with no apparent predominant contributing factors based on the comparison of fatal and suspected serious injury crashes to statewide averages if the segment has a Medium or High need.

Step 3.10

Considering all information in Steps 1-3, list the contributing factors using engineering judgment and the information on contributing factors available in Section 6.2 of the 2010 Highway Safety Manual. Additional sources for determining contributing factors may include aerial, “streetview”, and/or ADOT photologs. Other documents such as Design Concept Reports (DCR) or Road Safety Assessments can provide insight into the study corridor’s contributing factors.

Add comments as needed on additional information related to contributing factors that may have been provided by input from ADOT staff.

Freight Needs Assessment Methodology (Steps 1-3)

This section documents the approach for conducting the first three steps of a 5-step needs assessment process for the Freight Performance Area. After completion of Step 3 for all performance areas (Pavement, Bridge, Mobility, Safety, and Freight), Step 4 will review each corridor segment to quantify a total level of need that combines all performance areas. Corridor needs are then identified in Step 5 of the process. The 5-step process is listed below:

- Step 1: Initial Needs
- Step 2: Final Needs
- Step 3: Contributing Factors
- Step 4: Segment Review
- Step 5: Corridor Needs

Step 1: Initial Needs

The input required to populate the Step 1 template includes transferring the existing performance score and color for each segment to the appropriate "Performance Score" columns. This includes the primary and secondary measures for Freight. As each performance score is input into the template, the Initial Need will populate based on the weighted scoring system for each measure.

The Level of Need for each performance measure has levels of "None" (score = 0), "Low" (score = 1), "Medium" (score = 2), and "High" (score = 3). The assignment of these levels to individual performance measures for segments is determined by the table entitled "Needs Assessment Scale" within the Step 1 template.

To develop an aggregated Initial Need for each segment, the primary and secondary measures are combined by summing the weighted score, with the primary measure having a weight of 1.0 while each secondary measure has a weight of 0.2 (0.1 each direction if directional). The Initial Need for each segment (combining the primary and secondary measures) has levels of "None" (score < 0.01), "Low" (score $\geq$ 0.01 and < 1.5), "Medium" (score $\geq$ 1.5 and < 2.5), and "High" (score $\geq$ 2.5).

The steps include:

Step 1.1

Populate the Step 1 template with the existing (baseline) performance scores for all primary and secondary performance measures from Existing Performance Analysis. Copy the performance score for each segment to the appropriate "Performance Score" column. Select the *Facility Operations* for each segment from the drop-down list and input whether or not the performance area is an emphasis area. The corridor needs assessment scales will be updated automatically.

Step 1.2

Confirm that that the Step 1 template is generating the appropriate "Level of Need" for each primary and secondary measure by reviewing the relationship of baseline performance score to level of need.

Step 2: Final Needs

The Initial Need will be carried over to Step 2. The steps required to complete Step 2 are as follows:

Step 2.1

Confirm that the template has properly populated the initial need from the Step 1 template to the Step 2 template.

Step 2.2

Note any truck height restriction hot spots (clearance < 16.25') identified as part of the baseline corridor performance. For each entry, note the milepost of the height restriction and if the height restriction can be detoured by ramping around the obstruction. If it is not possible for a truck to ramp around the height restriction, note the existing height as well.

Step 2.3

Identify recently completed or under construction projects that would be considered relevant to freight performance. Include only projects that were not taken into account during the freight data analysis period. Any completed or under construction roadway project after the date of the data that has the potential to mitigate a freight issue on a corridor segment should be listed in the template. Such projects can include the construction of climbing lanes or Dynamic Message Signs (DMS) installation. Sources of recent or current project activity can be ADOT MPD staff, ADOT public notices, and ADOT District staff.

Step 2.4

Update the Final Need using the following criteria:

- If there is one or more truck height restriction hot spots where a truck cannot ramp around on a 'None' segment, increase (i.e., worsen) the need rating to 'Low'.
- If a recent project has superseded the performance rating data and it is certain the project addressed the need, change the need rating to "None".
- If a recent project has superseded the performance rating data but it is uncertain that a project addressed the need, maintain the current need rating and note the uncertainty as a comment.

Step 2.5

Note any programmed projects that could have the potential to mitigate any freight need on the segment. Programmed projects are provided as information and do not impact the need rating. Programmed projects will be reviewed in the development of solution sets for identified needs. The source of the programming information can be found in ADOT’s 5-year construction program. If there are other comments relevant to the needs analysis, they can be entered in the right-most column.

Example Scales for Level of Need

Freight Index (Interrupted) Performance Score Thresholds	Performance Level	Initial Performance Level of Need	Description (Non-emphasis Area)
	Good	None	All levels of Good and the top third of Fair (<1.58)
	Good		
1.45	Good		
	Fair		
	Fair	Low	Middle third of Fair (1.58-1.72)
1.85	Fair	Medium	Lower third of Fair and top third of Poor (1.72-1.98)
	Poor		
	Poor	High	Lower two-thirds of Poor (>1.98)
	Poor		

Needs Scale

Measure	None <=	Low <=	> Medium <		High >=
Corridor Freight Index (Emphasis Area)	Dependent on weighted average of interrupted vs. uninterrupted segments				
Corridor Freight Index (Non-Emphasis Area)	Dependent on weighted average of interrupted vs. uninterrupted segments				
Freight Index (Segment)					
Interrupted	1.58	1.72	1.72	1.98	1.98
Uninterrupted	1.22	1.28	1.28	1.42	1.42
Directional TTTR					
Interrupted	1.58	1.72	1.72	1.98	1.98
Uninterrupted	1.22	1.28	1.28	1.42	1.42
Closure Duration					
All Facility Operations	71.07	97.97	97.97	151.75	151.75
Measure	**None >=**	**Low >=**	**< Medium >**		**High <=**
Bridge Clearance (feet)					
All Bridges	16.33	16.17	16.17	15.83	15.83

Step 3: Contributing Factors

The Final Need ratings from Step 2 will populate into the Step 3 tab.

The steps to compete Step 3 include:

Step 3.1

Input all roadway variable data that describe each segment into the appropriate columns. Note that this data can be copied from the Mobility Needs Assessment spreadsheet for Needs Assessment.

Step 3.2

Input all traffic variables for each segment into the appropriate columns. Note that this data can be copied from the Mobility Needs Assessment spreadsheet for Needs Assessment.

Step 3.3

Input any freight-related infrastructure that currently exists on the corridor for each segment. The relevant infrastructure can include DMS locations, weigh stations, Ports of Entry (POE), rest areas, parking areas, and climbing lanes. Include the mileposts of the listed infrastructure. This data can be extracted from the most recent Highway Log and the 2015 Climbing and Passing Lane Prioritization Study.

Step 3.4

Input the Closure Extents that have occurred along the study corridor. Road closure information can be detailed out by the reason for the closure as documented in Highway Condition Reporting System (HCRS) data analyzed as part of the baseline corridor performance. Closure reasons include incident/accidents, winter storms, obstruction hazards, and undefined closures. Statewide average percentages for the various closure reasons have been calculated for the analysis period on ADOT’s designated strategic corridors. Compare these statewide average percentages to the corridor percentages for the various closure reasons to identify higher than average percentages of one or more closure reasons on any given segment. Note that this data can be copied from the Mobility Needs Assessment spreadsheet for Needs Assessment. Input the closures as follows and use red text to indicate that the segment percentage exceeds statewide averages:

- Total Number of Closures
- % Closures (No Reason)
- % Incidents/Accidents
- % Obstructions/Hazards
- % Weather Related

Step 3.5

List the non-actionable conditions that are present within each segment by milepost if possible. Non-Actionable conditions are conditions that exist within the environment of each segment that cannot be improved through an engineered solution. Examples of Non-Actionable conditions can include border patrol check points and other closures/restrictions not controlled by ADOT. Note that this data can be copied from the Mobility Needs Assessment spreadsheet for Needs Assessment.

Step 3.6

Input any programmed and planned projects or issues that have been identified from previous documents or studies that are relevant to the Final Need. Sources for this data include the current Highway Log, the 2015 Climbing and Passing Lane Prioritization Study, and ADOT’s 5-year construction program.

Step 3.7

Considering all information in Steps 1-3, identify the contributing factors to the Final Need column. Potential contributing factors to freight performance needs include roadway vertical grade, number of lanes, traffic volume-to-capacity ratios, presence/lack of a climbing lanes, and road closures. Also identify higher than average percentages of one or more closure reasons on any given segment.

Pavement Performance Area - Needs Analysis Step 1

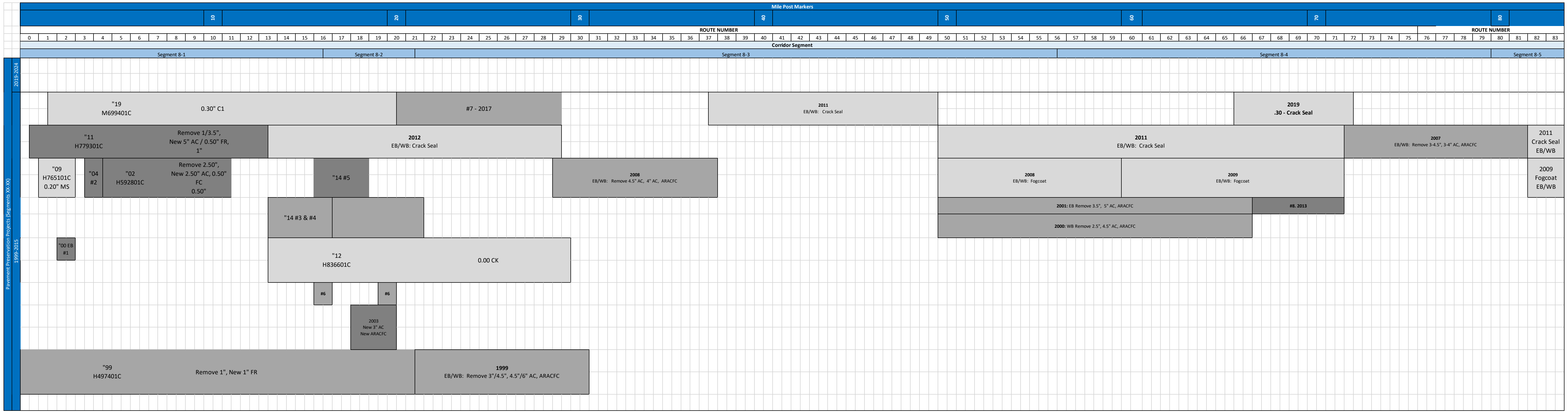
Segment #	Segment Length (miles)	Segment Mileposts (MP)	Facility Type	Pavement Index			Directional PSR					% Area Failure		
				Performance Score	Performance Objective	Level of Need	Performance Score		Performance Objective	Level of Need		Performance Score	Performance Objective	Level of Need
							EB	WB		EB	WB			
8-1	16.3	0 - 16.3	Interstate	4.02	Fair or Better	None	4.03	4.13	Fair or Better	None	None	31%	Fair or Better	High
8-2	5.1	16.3 - 21.4	Interstate	4.02	Fair or Better	None	3.94	4.07	Fair or Better	None	None	10%	Fair or Better	None
8-3	35.1	21.4 - 56.5	Interstate	3.79	Fair or Better	None	3.69	3.82	Fair or Better	None	None	42%	Fair or Better	High
8-4	23.1	56.5 - 79.6	Interstate	4.00	Fair or Better	None	3.71	4.05	Fair or Better	None	None	35%	Fair or Better	High
8-5	30.8	79.6 - 110.4	Interstate	4.41	Fair or Better	None	4.22	4.34	Fair or Better	None	None	13%	Fair or Better	Low
8-6	9.6	110.4 - 120	Interstate	3.32	Fair or Better	Low	3.62	3.43	Fair or Better	Low	Medium	60%	Fair or Better	High
8-7	27.6	120 - 147.6	Interstate	3.70	Fair or Better	None	3.84	3.88	Fair or Better	None	None	48%	Fair or Better	High
8-8	18.9	147.6 - 166.5	Interstate	4.67	Fair or Better	None	4.39	4.41	Fair or Better	None	None	0%	Fair or Better	None
8-9	11.5	166.5 - 178	Interstate	4.26	Fair or Better	None	3.86	4.02	Fair or Better	None	None	4%	Fair or Better	None

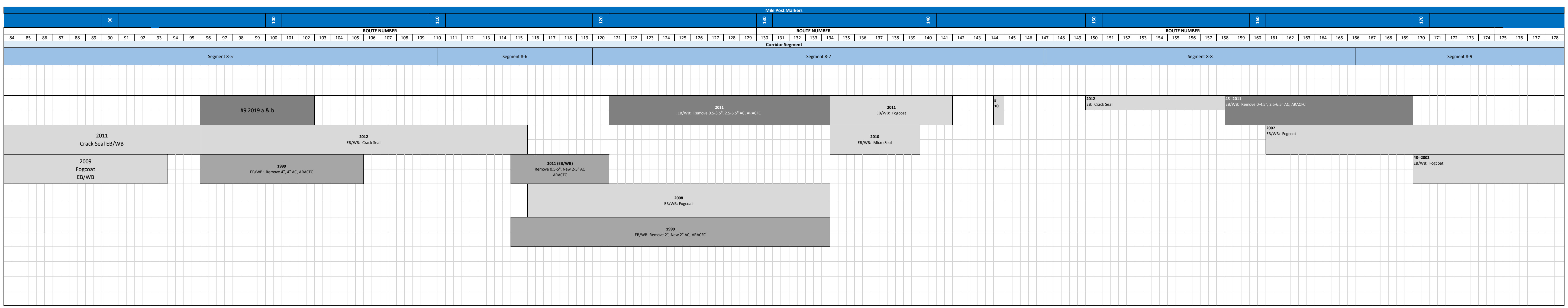
Pavement Performance Area - Needs Analysis Step 2

Segment #	Segment Length (miles)	Segment Mileposts (MP)	Initial Need	Need Adjustments		Final Need	Comments (may include programmed projects or issues from previous reports)
				Hot Spots	Previous Projects (which supersede condition data)		
8-1	16.3	0 - 16.3	Low	EB/WB MP 0-1, WB MP 1-4, WB MP 6-11	None	Low	
8-2	5.1	16.3 - 21.4	None	WB MP 16-18	None	Low	Changed Final Need to "Low" due to hot spot
8-3	35.1	21.4 - 56.5	Low	WB MP 29-30, EB MP 31-32, WB MP 32-34, EB/WB MP 34-46, EB/WB MP 54-55	2021 - Pavement Rehab MP 46-68, 2021 - Pavement Rehab MP 37-46 2022 - Pavement Pres (Mill Pavement - MP 29-37.09	Low	Recently completed pavement projects seem to address all of the hot spots
8-4	23.1	56.5 - 79.6	Low	EB MP 71-72, EB/WB MP 72-78, WB MP 78-79, EB/WB MP 79-80	2021 - Pavement Rehab MP 46-68,	Low	Pavement Rehab (MP 71 to 82) FY24, ADOT 5-Year Program FY 2023-27
8-5	30.8	79.6 - 110.4	Low	EB/WB MP 80-82, EB MP 107-109, EB/WB 109-110	2020 - Pavement Rehab MP 82-96	Low	Pavement Rehab (MP 71 to 82) FY24, ADOT 5-Year Program FY 2023-27

8-6	9.6	110.4 - 120	Medium	EB/WB MP 110-111, WB MP 111-113, EB/WB MP 113-114, WB MP 114-115, EB/WB MP 116-118, EB MP 118-119	None	Medium	
8-7	27.6	120 - 147.6	Low	EB MP 121-123, WB MP 123-124, EB MP 124-125, EB/WB MP 125-127, EB MP 127-130, EB/WB MP 130-131, EB MP 131-132, WB MP 134-135, EB/WB MP 135-141		Low	Pavement Rehab MP 134.6-141.12 (FY23) Pavement Rehab project only addresses a portion of the hot spots identified
8-8	18.9	147.6 - 166.5	None	None	2021 - Pavement Pres, MP 158.5-170.2	None	
8-9	11.5	166.5 - 178	None	EB MP 178-179	2021 - Pavement Pres, MP 158.5-170.2	Low	There has been a recently completed project, but not where the hot spot is located. So the final need has been changed to "Low"

Pavement History





Bid History Investment

		Segment Number																	
		1		2		3		4		5		6		7		8		9	
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
1	L1		90%		100%		25%		30%		45%		65%		25%		45%		100%
1			10%		100%		25%		70%		40%		40%		20%		35%		70%
1			20%		100%		35%		15%		50%				55%				
1			20%				20%		50%						5%				
1							20%												
1																			
3	L2		10%		100%	20%	25%	45%	35%		5%		50%		5%				
3			100%		20%	20%	35%	45%			30%		50%		55%				
3			5%		100%		30%												
3																			
3																			
3																			
4	L3	5%	80%		50%				20%		20%				50%		40%		30%
4			5%		50%														
4			40%																
4			5%																
6	L4																		
6																			
6																			
6																			
6																			
6																			
Sub-Total		0.2	10.1	0.0	13.6	1.2	4.0	2.7	3.5	0.0	3.2	0.0	4.1	0.0	4.9	0.0	2.4	0.0	2.9
Total		**10.2**		**13.6**		**4.6**		**4.9**		**3.2**		**4.1**		**4.9**		**2.4**		**2.9**	

Pavement Historical Investment

Segment	Pavement History Value (bid projects)	Pavement History (bid projects)	PeCos ($/mile/yr)	PeCos
8-1	10.2	High	$1,005.87	Low
8-2	13.6	High	$337.70	Low
8-3	4.6	Low	$118.59	Low
8-4	4.9	Medium	$2,086.24	Medium
8-5	3.2	Low	$484.87	Low
8-6	4.1	Low	$529.78	Low
8-7	4.9	Medium	$761.30	Low
8-8	2.4	Low	$509.34	Low
8-9	2.9	Low	$1,200.60	Medium

Resulting Historical Investment
High
High
Low
Medium
Low
Low
Medium
Low
Low

Pavement Performance Area - Needs Analysis Step 3

Segment #	Segment Length (miles)	Segment Mileposts (MP)	Final Need	Bid History Investment	PeCos History Investment	Resulting Historical Investment	Contributing Factors and Comments
8-1	16.3	0 - 16.3	Low	10.15	1005.87	High	
8-2	5.1	16.3 - 21.4	Low	13.6	337.7	High	
8-3	35.1	21.4 - 56.5	Low	4.55	118.59	Low	
8-4	23.1	56.5 - 79.6	Low	4.85	2086.24	Medium	
8-5	30.8	79.6 - 110.4	Low	3.2	484.87	Low	
8-6	9.6	110.4 - 120	Medium	4.05	529.78	Low	
8-7	27.6	120 - 147.6	Low	4.85	761.3	Medium	
8-8	18.9	147.6 - 166.5	None	2.4	509.34	Low	
8-9	11.5	166.5 - 178	Low	2.9	1200.6	Low	

Bridge Performance Area – Needs Analysis Step 1

Segment #	Segment Length (miles)	Segment Mileposts (MP)	Number of Bridges in Segment	Bridge Index			Lowest Bridge Rating			Sufficiency Rating			Initial Need
				Performance Score	Performance Objective	Level of Need	Performance Score	Performance Objective	Level of Need	Performance Score	Performance Objective	Level of Need	
8-1	16.3	0 - 16.3	19	5.19	Fair or Better	Medium	4	Fair or Better	Medium	92.60	Fair or Better	None	Medium
8-2	5.1	16.3 - 21.4	6	5.31	Fair or Better	Medium	5	Fair or Better	Low	87.67	Fair or Better	None	Medium
8-3	35.1	21.4 - 56.5	19	6.32	Fair or Better	None	6	Fair or Better	None	95.69	Fair or Better	None	None
8-4	23.1	56.5 - 79.6	6	6.00	Fair or Better	None	6	Fair or Better	None	95.00	Fair or Better	None	None
8-5	30.8	79.6 - 110.4	14	5.86	Fair or Better	Low	4	Fair or Better	Medium	89.57	Fair or Better	None	Low
8-6	9.6	110.4 - 120	18	5.59	Fair or Better	Low	5	Fair or Better	Low	94.82	Fair or Better	None	Low
8-7	27.6	120 - 147.6	5	6.08	Fair or Better	None	6	Fair or Better	None	91.34	Fair or Better	None	None
8-8	18.9	147.6 - 166.5	14	5.64	Fair or Better	Low	5	Fair or Better	Low	91.09	Fair or Better	None	Low
8-9	11.5	166.5 - 178	14	8.58	Fair or Better	None	5	Fair or Better	Low	90.36	Fair or Better	None	Low

Bridge Performance Area – Needs Analysis Step 2

Segment #	Segment Length (miles)	Segment Mileposts (MP)	Number of Bridges in Segment	Initial Need	Need Adjustments		Final Need	Historical Review	Comments
					Hot Spots (Rating of 4 or multiple 5's)	Previous Projects (which supersede condition data)			
8-1	16.3	0 - 16.3	19	Medium	Colorado River Viaduct EB (#1700,MP 0.01), Fortuna SPRR OP EB (#1279, MP 8.69), Fortuna SPRR OP WB (#1280, MP 8.70)	Bridge Rehab in FY2022 Bridge 1701, Bridge 1700), Bridge Deck Repair MP 0.58-33	Low		Recently Completed project brings the Final Need to "Low"
8-2	5.1	16.3 - 21.4	6	Medium	Telpas OP WB Over EB (#972, MP 20.40)	Bridge Deck Repair MP 0.58-33 (FY22)	Low		Recently Completed project brings the Final Need to "Low"
8-3	35.1	21.4 - 56.5	19	None	None	2021 - Bridge Repair MP 46-68, Bridge Deck Repair MP 0.58-33	None		Project is called Pavement Rehab and Bridge Repair for MP 46-68. Does not specify which structures
8-4	23.1	56.5 - 79.6	6	None	None	2022 - Bridge Repair MP 46-68	None		Project is called Pavement Rehab and Bridge Repair for MP 46-68. Does not specify which structures
8-5	30.8	79.6 - 110.4	14	Low	Gillespie Canal BR EB (#489, MP 107.02), Gillespie Canal BR SFR (#1009, MP 107.02)	None	Low		
8-6	9.6	110.4 - 120	18	Low	None	None	Low		
8-7	27.6	120 - 147.6	5	None	None	None	None		

8-8	18.9	147.6 - 166.5	14	Low	Mendell Wash Br WB (#1065, MP 151.90), Mendell Wash Br EB (#1064, MP 151.90), Bridge EB (#1066, MP 153.40), Bridge WB (#1067, MP 153.40), Smith Road OP EB (#1068, MP 157.55), Smith Road OP WB (#1069, MP 157.55)	None	Low		
8-9	11.5	166.5 - 178	14	Low	Santa Cruz Wash BR EB (#1142, MP 170.90)	None	Low		

Bridge Performance Area – Needs Analysis Step 3

Segment #	Segment Length (Miles)	Segment Mileposts (MP)	Number of Bridges in Segment	Final Need	Contributing Factors		
					Bridge	Current Ratings	Historical Review
8-1	16.3	0 - 16.3	19	Low	Colorado River Viaduct EB (#1700, MP 0.01), Fortuna SPRR OP EB (#1279, MP 7.67), Fortuna SPRR OP WB (#1280, MP 7.67)	Deck (4), Deck (5), Sub (5), Deck (5), Sub (5),	
8-2	5.1	16.3 - 21.4	6	Low	Telpas OP WB Over EB (#972, MP 20.40)	Deck (5), Sub (5)	
8-3	35.1	21.4 - 56.5	19	None	None		
8-4	23.1	56.5 - 79.6	6	None	None		
8-5	30.8	79.6 - 110.4	14	Low	Gillespie Canal BR EB (#489, MP 107.02), Gillespie Canal BR SFR (#1009, MP 107.02)	Super (4), Deck (5), Sub (5), Super (5)	
8-6	9.6	110.4 - 120	18	Low	None		
8-7	27.6	120 - 147.6	5	None	None		
8-8	18.9	147.6 - 166.5	14	Low	Mendell Wash Br WB (#1065, MP 151.90), Mendell Wash Br EB (#1064, MP 151.90), Bridge EB (#1066, MP 153.40), Bridge WB (#1067, MP 153.40),Smith Road OP EB (#1068, MP 157.55),Smith Road OP WB (#1069, MP 157.55)	Deck (5), Sub (5), Deck (5), Sub (5), Deck (5), Sub (5), Deck (5), Sub (5), Deck (5), Sub (5)	
8-9	11.5	166.5 - 178	14	Low	Santa Cruz Wash BR EB (#1142, MP 170.90)	Deck (5), Sub (5)	

Mobility Performance Area – Needs Analysis Step 1

Segment Mileposts	Segment Length (miles)	Environment Type	Facility Operation	Mobility Index			Future Daily V/C			Existing Peak Hour V/C					Closure Extent (occurrences/year/mile)				
				Performance Score	Performance Objective	Level of Need	Performance Score	Performance Objective	Level of Need	Performance Score		Performance Objective	Level of Need		Performance Score		Performance Objective	Level of Need	
										EB	WB		EB	WB	EB	WB		EB	WB
0 - 16.3	16.3	Urban	Uninterrupted	0.43	Fair or Better	None	0.47	Fair or Better	None	0.31	0.30	Fair or Better	None	None	0.26	0.13	Fair or Better	None	None
16.3 - 21.4	5.1	Rural	Uninterrupted	0.44	Fair or Better	None	0.50	Fair or Better	None	0.34	0.37	Fair or Better	None	None	0.16	0.12	Fair or Better	None	None
21.4 - 56.5	35.1	Rural	Uninterrupted	0.23	Fair or Better	None	0.26	Fair or Better	None	0.13	0.13	Fair or Better	None	None	0.16	0.13	Fair or Better	None	None
56.5 - 79.6	23.1	Rural	Uninterrupted	0.16	Fair or Better	None	0.18	Fair or Better	None	0.09	0.09	Fair or Better	None	None	0.08	0.07	Fair or Better	None	None
79.6 - 110.4	30.8	Rural	Uninterrupted	0.18	Fair or Better	None	0.20	Fair or Better	None	0.11	0.11	Fair or Better	None	None	0.05	0.16	Fair or Better	None	None
110.4 - 120	9.6	Rural	Uninterrupted	0.17	Fair or Better	None	0.18	Fair or Better	None	0.12	0.11	Fair or Better	None	None	0.06	0.10	Fair or Better	None	None
120 - 147.6	27.6	Rural	Uninterrupted	0.09	Fair or Better	None	0.07	Fair or Better	None	0.10	0.09	Fair or Better	None	None	0.06	0.10	Fair or Better	None	None
147.6 - 166.5	18.9	Rural	Uninterrupted	0.12	Fair or Better	None	0.15	Fair or Better	None	0.07	0.06	Fair or Better	None	None	0.05	0.14	Fair or Better	None	None
166.5 - 178	11.5	Rural	Uninterrupted	0.16	Fair or Better	None	0.22	Fair or Better	None	0.06	0.08	Fair or Better	None	None	0.14	0.04	Fair or Better	None	None

Segment	Segment Mileposts	Segment Length (miles)	Environment Type	Facility Operation	Directional LOTTR (all vehicles)					Bicycle Accommodation			Initial Need
					Performance Score		Performance Objective	Level of Need		Performance Score	Performance Objective	Level of Need	
					EB	WB		EB	WB				
8-1	0 - 16.3	16.3	Urban	Uninterrupted	1.05	1.09	Fair or Better	None	None	95%	Fair or Better	None	None
8-2	16.3 - 21.4	5.1	Rural	Uninterrupted	1.08	1.06	Fair or Better	None	None	100%	Fair or Better	None	None
8-3	21.4 - 56.5	35.1	Rural	Uninterrupted	1.05	1.05	Fair or Better	None	None	100%	Fair or Better	None	None
8-4	56.5 - 79.6	23.1	Rural	Uninterrupted	1.05	1.05	Fair or Better	None	None	99%	Fair or Better	None	None
8-5	79.6 - 110.4	30.8	Rural	Uninterrupted	1.05	1.05	Fair or Better	None	None	100%	Fair or Better	None	None
8-6	110.4 - 120	9.6	Rural	Uninterrupted	1.05	1.06	Fair or Better	None	None	100%	Fair or Better	None	None
8-7	120 - 147.6	27.6	Rural	Uninterrupted	1.04	1.04	Fair or Better	None	None	100%	Fair or Better	None	None
8-8	147.6 - 166.5	18.9	Rural	Uninterrupted	1.06	1.06	Fair or Better	None	None	100%	Fair or Better	None	None
8-9	166.5 - 178	11.5	Rural	Uninterrupted	1.04	1.04	Fair or Better	None	None	100%	Fair or Better	None	None

Mobility Performance Area – Needs Analysis Step 2

Segment	Segment Mileposts (MP)	Segment Length (miles)	Initial Need	Need Adjustments	Final Need	Planned and Programmed Future Projects
				Recent Projects Since 2019		
8-1	0 - 16.3	16.3	None	None	None	
8-2	16.3 - 21.4	5.1	None	None	None	
8-3	21.4 - 56.5	35.1	None	None	None	
8-4	56.5 - 79.6	23.1	None	None	None	
8-5	79.6 - 110.4	30.8	None	None	None	
8-6	110.4 - 120	9.6	None	None	None	
8-7	120 - 147.6	27.6	None	None	None	
8-8	147.6 - 166.5	18.9	None	None	None	
8-9	166.5 - 178	11.5	None	None	None	

Mobility Performance Area – Needs Analysis Step 3

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	Weighted Average Speed Limit	Aux Lanes	Divided/ Non-Divided	% No Passing	Existing LOS	Future 2040 LOS	% Trucks	
8-1	0 - 16.3	16.3	None	Interstate	Urban	Rolling	2	65	No	Divided	0%	A-C	A-C	19%	Port of Entry MP 0; Weigh-in-Motion Scale MP 1; Permanent Traffic Counter MP 3, 10.75, 13.75; DMS MP 11.25
8-2	16.3 - 21.4	5.1	None	Interstate	Rural	Mountainous	2	65	No	Divided	0%	A/B	A/B	26%	Border Patrol Check Point MP 18
8-3	21.4 - 56.5	35.1	None	Interstate	Rural	Rolling	2	67.5	No	Divided	0%	A/B	A/B	27%	Rest Area MP 23.5
8-4	56.5 - 79.6	23.1	None	Interstate	Rural	Level	2	75	No	Divided	0%	A/B	A/B	26%	Intermittent Border Patrol Check Point (Seasonal) MP 76
8-5	79.6 - 110.4	30.8	None	Interstate	Rural	Level	2	75	No	Divided	0%	A/B	A/B	28%	Rest Area MP 85; Pavement Test Section MP 88-92.5
8-6	110.4 - 120	9.6	None	Interstate	Rural	Rolling	2	75	No	Divided	0%	A/B	A/B	28%	None
8-7	120 - 147.6	27.6	None	Interstate	Rural	Level	2	75	No	Divided	0%	A/B	A/B	39%	Permanent Traffic Counter MP 121; DMS MP 122
8-8	147.6 - 166.5	18.9	None	Interstate	Rural	Level	2	75	No	Divided	0%	A/B	A/B	38%	None
8-9	166.5 - 178	11.5	None	Interstate	Rural	Level	2	73	No	Divided	0%	A/B	A/B	28%	DMS MP 177

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
				Total Number of Closures	# Incidents/ Accidents	% Incidents/ Accidents	# Obstructions/ Hazards	% Obstructions/ Hazards	# Weather Related	% Weather Related		
8-1	0 - 16.3	16.3	None	32	22	69%	2	6%	0	0%		
8-2	16.3 - 21.4	5.1	None	7	7	100%	0	0%	0	0%		
8-3	21.4 - 56.5	35.1	None	29	29	100%	0	0%	0	0%		
8-4	56.5 - 79.6	23.1	None	17	17	100%	0	0%	0	0%		
8-5	79.6 - 110.4	30.8	None	28	28	100%	0	0%	0	0%		
8-6	110.4 - 120	9.6	None	8	8	100%	0	0%	0	0%		
8-7	120 - 147.6	27.6	None	22	21	95%	0	0%	0	0%		
8-8	147.6 - 166.5	18.9	None	14	13	93%	1	7%	0	0%		
8-9	166.5 - 178	11.5	None	9	8	89%	0	0%	0	0%		

Safety Performance Area – Needs Analysis Step 1

Segment	Operating Environment	Offset	Segment Length (miles)	Segment Mileposts (MP)	Safety Index			Directional Safety Index					% of Fatal + Suspected Serious Injury Crashes at Intersections		
					Performance Score	Performance Objective	Level of Need	NB/EB Performance Score	SB/WB Performance Score	Performance Objective	NB/EB Level of Need	SB/WB Level of Need	Performance Score	Performance Objective	Level of Need
8-1	Urban 4 Lane Freeway	6	16.3	0.0 - 16.3	0.69	Average or Better	None	0.47	0.92	Average or Better	None	Low	*Insufficient Data*	Average or Better	N/A
8-2	Rural 4 Lane Freeway with Daily Volume < 25,000	4	5.1	16.3 - 21.4	2.88	Average or Better	High	3.39	2.37	Average or Better	High	High	*Insufficient Data*	Average or Better	N/A
8-3	Rural 4 Lane Freeway with Daily Volume < 25,000	4	35.1	21.4 - 56.5	1.08	Average or Better	Medium	0.66	1.50	Average or Better	None	High	*Insufficient Data*	Average or Better	N/A
8-4	Rural 4 Lane Freeway with Daily Volume < 25,000	4	23.1	56.5 - 79.6	1.61	Average or Better	High	1.06	2.16	Average or Better	Medium	High	*Insufficient Data*	Average or Better	N/A
8-5	Rural 4 Lane Freeway with Daily Volume < 25,000	4	30.8	79.6 - 110.4	1.04	Average or Better	Low	0.93	1.16	Average or Better	None	Medium	*Insufficient Data*	Average or Better	N/A
8-6	Rural 4 Lane Freeway with Daily Volume < 25,000	4	9.6	110.4 - 120	0.43	Average or Better	None	0.86	0.00	Average or Better	None	None	*Insufficient Data*	Average or Better	N/A
8-7	Rural 4 Lane Freeway with Daily Volume < 25,000	4	27.6	120 - 147.6	0.62	Average or Better	None	0.82	0.43	Average or Better	None	None	*Insufficient Data*	Average or Better	N/A
8-8	Rural 4 Lane Freeway with Daily Volume < 25,000	4	18.9	147.6 - 166.5	0.62	Average or Better	None	1.23	0.00	Average or Better	Medium	None	*Insufficient Data*	Average or Better	N/A
8-9	Rural 4 Lane Freeway with Daily Volume < 25,000	4	11.5	166.5 - 178	1.17	Average or Better	Medium	1.53	0.81	Average or Better	High	None	*Insufficient Data*	Average or Better	N/A

Segment	Operating Environment	Segment Length (miles)	Segment Mileposts (MP)	% of Fatal + Suspected Serious Injury Crashes Involving Lane Departures			% of Fatal + Suspected Serious Injury Crashes Involving Pedestrians			% of Fatal + Suspected Serious Injury Crashes Involving Trucks			Initial Need
				Performance Score	Performance Objective	Level of Need	Performance Score	Performance Objective	Level of Need	Performance Score	Performance Objective	Level of Need	
8-1	Urban 4 Lane Freeway	16.3	0.0 - 16.3	55%	Average or Better	None	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	Low
8-2	Rural 4 Lane Freeway with Daily Volume < 25,000	5.1	16.3 - 21.4	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	High
8-3	Rural 4 Lane Freeway with Daily Volume < 25,000	35.1	21.4 - 56.5	83%	Average or Better	High	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	High
8-4	Rural 4 Lane Freeway with Daily Volume < 25,000	23.1	56.5 - 79.6	85%	Average or Better	High	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	High
8-5	Rural 4 Lane Freeway with Daily Volume < 25,000	30.8	79.6 - 110.4	76%	Average or Better	Medium	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	Medium
8-6	Rural 4 Lane Freeway with Daily Volume < 25,000	9.6	110.4 - 120	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	None
8-7	Rural 4 Lane Freeway with Daily Volume < 25,000	27.6	120 - 147.6	91%	Average or Better	High	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	Low
8-8	Rural 4 Lane Freeway with Daily Volume < 25,000	18.9	147.6 - 166.5	100%	Average or Better	High	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	Low
8-9	Rural 4 Lane Freeway with Daily Volume < 25,000	11.5	166.5 - 178	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	*Insufficient Data*	Average or Better	N/A	Medium

Safety Performance Area – Needs Analysis Step 2

Segment	Segment Length (miles)	Segment Mileposts (MP)	Initial Need	Hot Spots	Relevant Recently Completed or Under Construction Projects (which supersede performance data)*	Final Need	Comments (may include tentatively programmed projects with potential to address need or other relevant issues identified in previous reports)
8-1	16.3	0.0 - 16.3	Low	None	Bridge Deck Rehab MP 0.58-33 (2022), Bridge Rehab MP 0-4 (2022), Lighting Improvements (HPS to LED) MP 0-3 (2022)	Low	
8-2	5.1	16.3 - 21.4	High	None	Bridge Deck Rehab MP 0.58-33 (2022)	High	
8-3	35.1	21.4 - 56.5	High	None	Bridge Deck Rehab MP 0.58-33 (2022), Pavement Rehab (2022)	High	
8-4	23.1	56.5 - 79.6	High	None	Pavement Rehab MP 71-82 (2023)	High	
8-5	30.8	79.6 - 110.4	Medium	None	None	Medium	
8-6	9.6	110.4 - 120	None	None	None	None	
8-7	27.6	120 - 147.6	Low	None	Pavement Rehab MP 134.6-141.12	Low	
8-8	18.9	147.6 - 166.5	Low	None	None	Low	
8-9	11.5	166.5 - 178	Medium	None	None	Medium	

Safety Performance Area – Needs Analysis Step 3

Segment Number	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9	Corridor-Wide Crash Characteristics
Segment Length (miles)	16.3	5.1	35.1	23.1	30.8	9.6	27.6	18.9	11.5	
Segment Milepost (MP)	0.0 - 16.3	16.3 - 21.4	21.4 - 56.5	56.5 - 79.6	79.6 - 110.4	110.4 - 120	120 - 147.6	147.6 - 166.5	166.5 - 178	
Final Need	Low	High	High	High	Medium	None	Low	Low	Medium	
Segment Crash Overview	6 Crashes were fatal 5 Crashes had suspected serious injuries 0 Crashes at intersections 6 Crashes involve lane departures 1 Crashes involve pedestrians 0 Crashes involve trucks 0 Crashes involve bicycles	5 Crashes were fatal 1 Crashes had suspected serious injuries 0 Crashes at intersections 5 Crashes involve lane departures 0 Crashes involve pedestrians 1 Crashes involve trucks 0 Crashes involve bicycles	10 Crashes were fatal 13 Crashes had suspected serious injuries 0 Crashes at intersections 14 Crashes involve lane departures 0 Crashes involve pedestrians 3 Crashes involve trucks 0 Crashes involve bicycles	9 Crashes were fatal 11 Crashes had suspected serious injuries 0 Crashes at intersections 15 Crashes involve lane departures 0 Crashes involve pedestrians 2 Crashes involve trucks 0 Crashes involve bicycles	9 Crashes were fatal 12 Crashes had suspected serious injuries 0 Crashes at intersections 14 Crashes involve lane departures 1 Crashes involve pedestrians 3 Crashes involve trucks 0 Crashes involve bicycles	1 Crashes were fatal 0 Crashes had suspected serious injuries 0 Crashes at intersections 0 Crashes involve lane departures 0 Crashes involve pedestrians 0 Crashes involve trucks 0 Crashes involve bicycles	3 Crashes were fatal 8 Crashes had suspected serious injuries 0 Crashes at intersections 7 Crashes involve lane departures 0 Crashes involve pedestrians 2 Crashes involve trucks 0 Crashes involve bicycles	2 Crashes were fatal 4 Crashes had suspected serious injuries 0 Crashes at intersections 6 Crashes involve lane departures 0 Crashes involve pedestrians 1 Crashes involve trucks 0 Crashes involve bicycles	3 Crashes were fatal 2 Crashes had suspected serious injuries 0 Crashes at intersections 3 Crashes involve lane departures 0 Crashes involve pedestrians 1 Crashes involve trucks 0 Crashes involve bicycles	48 Crashes were fatal 56 Crashes had suspected serious injuries 0 Crashes at intersections 66 Crashes involve lane departures 2 Crashes involve pedestrians 11 Crashes involve trucks 0 Crashes involve bicycles
Segment Crash Summaries (Fatal and Suspected Serious Injury Crashes)										
First Harmful Event Type	73% Involve Collision with Motor Vehicle 18% Involve Collision with Fixed Object 9% Involve Collision with Pedestrian	67% Involve Overturning 17% Involve Collision with Motor Vehicle 17% Involve Collision with Fixed Object	48% Involve Overturning 26% Involve Collision with Motor Vehicle 22% Involve Collision with Fixed Object	50% Involve Overturning 30% Involve Collision with Motor Vehicle 20% Involve Collision with Fixed Object	48% Involve Overturning 24% Involve Collision with Motor Vehicle 10% Involve Collision with Pedestrian	N/A - Sample Size too Small	55% Involve Overturning 27% Involve Collision with Fixed Object 18% Involve Collision with Motor Vehicle	83% Involve Overturning 17% Involve Collision with Motor Vehicle	40% Involve Collision with Motor Vehicle 20% Involve Overturning 20% Involve Collision with Fixed Object	46% Involve Overturning 30% Involve Collision with Motor Vehicle 17% Involve Collision with Fixed Object
Collision Type	27% Involve Sideswipe (same) 27% Involve Other 18% Involve Single Vehicle	83% Involve Single Vehicle 17% Involve Rear End	70% Involve Single Vehicle 13% Involve Other 9% Involve Sideswipe (same)	65% Involve Single Vehicle 15% Involve Rear End 10% Involve Head On	67% Involve Single Vehicle 10% Involve Rear End 10% Involve Other	N/A - Sample Size too Small	82% Involve Single Vehicle 9% Involve Rear End 9% Involve Sideswipe (same)	83% Involve Single Vehicle 17% Involve Sideswipe (same)	60% Involve Single Vehicle 40% Involve Rear End	65% Involve Single Vehicle 12% Involve Rear End 9% Involve Sideswipe (same)
Violation or Behavior	45% Involve Speed too Fast for Conditions 18% Involve Unsafe Lane Change 9% Involve Drove in Opposing Lane	50% Involve Failure to Keep in Proper Lane 33% Involve Speed too Fast for Conditions 17% Involve Unknown	30% Involve Speed too Fast for Conditions 30% Involve Failure to Keep in Proper Lane 13% Involve No Improper Action	40% Involve Speed too Fast for Conditions 20% Involve Failure to Keep in Proper Lane 10% Involve No Improper Action	38% Involve Speed too Fast for Conditions 29% Involve Failure to Keep in Proper Lane 14% Involve No Improper Action	N/A - Sample Size too Small	45% Involve Speed too Fast for Conditions 18% Involve Other 9% Involve No Improper Action	67% Involve Speed too Fast for Conditions 17% Involve No Improper Action 17% Involve Unknown	80% Involve Speed too Fast for Conditions 20% Involve Unknown	41% Involve Speed too Fast for Conditions 20% Involve Failure to Keep in Proper Lane 10% Involve No Improper Action
Lighting Conditions	64% Occur in Daylight Conditions 27% Occur in Dark-Unlighted Conditions 9% Occur in Dark-Lighted Conditions	67% Occur in Daylight Conditions 33% Occur in Dark-Unlighted Conditions	74% Occur in Daylight Conditions 17% Occur in Dark-Unlighted Conditions 4% Occur in Dawn Conditions	60% Occur in Daylight Conditions 35% Occur in Dark-Unlighted Conditions 5% Occur in Dark-Lighted Conditions	52% Occur in Daylight Conditions 38% Occur in Dark-Unlighted Conditions 10% Occur in Dawn Conditions	N/A - Sample Size too Small	73% Occur in Daylight Conditions 27% Occur in Dark-Unlighted Conditions	67% Occur in Dark-Unlighted Conditions 17% Occur in Daylight Conditions 17% Occur in Dawn Conditions	80% Occur in Daylight Conditions 20% Occur in Dark-Unlighted Conditions	63% Occur in Daylight Conditions 31% Occur in Dark-Unlighted Conditions 4% Occur in Dawn Conditions
Surface Conditions	82% Involve Dry Conditions 18% Involve Wet Conditions	100% Involve Dry Conditions	100% Involve Dry Conditions	90% Involve Dry Conditions 10% Involve Wet Conditions	100% Involve Dry Conditions	N/A - Sample Size too Small	91% Involve Dry Conditions 9% Involve Wet Conditions	83% Involve Dry Conditions 17% Involve Wet Conditions	100% Involve Dry Conditions	94% Involve Dry Conditions 6% Involve Wet Conditions 0% Involve Snow Conditions
First Unit Event	45% Involve a first unit event of Motor Vehicle in Transport 18% Involve a first unit event of Ran Off the Road (Left) 18% Involve a first unit event of Ran Off the Road (Right)	33% Involve a first unit event of Ran Off the Road (Left) 33% Involve a first unit event of Overturn 17% Involve a first unit event of Motor Vehicle in Transport	26% Involve a first unit event of Ran Off the Road (Right) 26% Involve a first unit event of Motor Vehicle in Transport 22% Involve a first unit event of Ran Off the Road (Left)	30% Involve a first unit event of Motor Vehicle in Transport 30% Involve a first unit event of Overturn 25% Involve a first unit event of Ran Off the Road (Left)	29% Involve a first unit event of Ran Off the Road (Left) 29% Involve a first unit event of Motor Vehicle in Transport 19% Involve a first unit event of Overturn	N/A - Sample Size too Small	36% Involve a first unit event of Overturn 18% Involve a first unit event of Crossed Median 18% Involve a first unit event of Other Non-Collision	33% Involve a first unit event of Ran Off the Road (Left) 33% Involve a first unit event of Overturn 17% Involve a first unit event of Crossed Median	40% Involve a first unit event of Overturn 20% Involve a first unit event of Ran Off the Road (Left) 20% Involve a first unit event of Ran Off the Road (Right)	26% Involve a first unit event of Motor Vehicle in Transport
Driver Physical Condition	55% No Apparent Influence 36% Unknown 9% Under the Influence of Drugs or Alcohol	50% Unknown 33% No Apparent Influence 17% Under the Influence of Drugs or Alcohol	70% No Apparent Influence 9% Under the Influence of Drugs or Alcohol 9% Fatigued/Fell Asleep	55% No Apparent Influence 25% Unknown 20% Fatigued/Fell Asleep	48% No Apparent Influence 24% Unknown 19% Under the Influence of Drugs or Alcohol	N/A - Sample Size too Small	45% No Apparent Influence 18% Under the Influence of Drugs or Alcohol 18% Fatigued/Fell Asleep	33% Fatigued/Fell Asleep 33% Unknown 17% Under the Influence of Drugs or Alcohol	60% No Apparent Influence 20% Under the Influence of Drugs or Alcohol 20% Physical Impairment	52% No Apparent Influence 22% Unknown 13% Under the Influence of Drugs or Alcohol
Safety Device Usage	55% Shoulder And Lap Belt Used 36% None Used 9% Not Applicable	50% Shoulder And Lap Belt Used 50% None Used	61% Shoulder And Lap Belt Used 17% None Used 9% Air Bag Deployed/Shoulder-Lap Belt	60% Shoulder And Lap Belt Used 25% None Used 5% Helmet Used	38% Shoulder And Lap Belt Used 33% None Used 10% Helmet Used	N/A - Sample Size too Small	45% Shoulder And Lap Belt Used 18% None Used 18% Helmet Used	50% Shoulder And Lap Belt Used 50% None Used	60% None Used 20% Shoulder And Lap Belt Used 20% Unknown	50% Shoulder And Lap Belt Used 31% None Used 6% Helmet Used
Hot Spot Crash Summaries	None	None	None	None	None	None	None	None	None	
Previously Completed Safety-Related Projects	Bridge Deck Rehab MP 0.58-33 (2022), Bridge Rehab MP 0-4 (2022), Lighting Improvements (HPS to LED) MP 0-3 (2022)	Bridge Deck Rehab MP 0.58-33 (2022)	Bridge Deck Rehab MP 0.58-33 (2022), Pavement Rehab (2022)	Pavement Rehab MP 71-82 (2023)	None	None	Pavement Rehab MP 134.6-141.12	None	None	
District Interviews/Discussions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Contributing Factors	• High frequency of motor vehicle-motor vehicle crashes, many involving sideswipe (same direction) • Contributing factors may include driver violation (speeding), pavement marking visibility,and lighting • Crashes most common between MP 3 -7	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Contributing factors may include speeding, roadway geometry, roadside slope/recoverable area, and curve delination. • Crashes are most common from MP 18-21	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Contributing factors may include speeding, lack of median barrier, median width, grade difference between directions of travel, roadway curvature and delineation.	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Higher trend in nighttime crashes. • Contributing factors may include speeding, lack of median barrier, median width, grade difference between directions of travel, roadway curvature and delineation, and lighting.	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Higher trend in nighttime crashes. • Contributing factors may include speeding, lack of median barrier, median terrain, roadside recoverable area, roadway curvature and delineation, and lighting. • Crash clustering between MP 80-83.	N/A - Sample Size too Small	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Contributing factors may include speeding, median terrain, roadside slope/recoverable area, roadway curvature and delineation.	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Contributing factors may include speeding, median terrain, roadside slope/recoverable area, roadway curvature and delineation. • Some crash clustering between MP 149-151 and MP 162-164.	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Contributing factors may include speeding, median terrain, roadside slope/recoverable area, roadway curvature and delineation. • Some crash clustering between MP 175-176.	• High frequency of single vehicle crashes, many of which involve run-off road and overturning. • Contributing factors may include speeding, lack of median barrier, median terrain, roadside slope/recoverable area, roadway curvature and delineation.

Freight Performance Area – Needs Analysis Step 1

Segment	Facility Operations	Segment Mileposts (MP)	Segment Length (miles)	Freight Index			Directional TTTR (trucks only)				
				Performance Score	Performance Objective	Level of Need	Performance Score		Performance Objective	Level of Need	
							EB	WB		EB	WB
8-1	Uninterrupted	0 - 16.3	16.3	1.27	Fair or Better	Low	1.21	1.27	Fair or Better	None	Low
8-2	Uninterrupted	16.3 - 21.4	5.1	1.28	Fair or Better	Low	1.33	1.24	Fair or Better	Medium	Low
8-3	Uninterrupted	21.4 - 56.5	35.1	1.09	Fair or Better	None	1.09	1.09	Fair or Better	None	None
8-4	Uninterrupted	56.5 - 79.6	23.1	1.08	Fair or Better	None	1.08	1.08	Fair or Better	None	None
8-5	Uninterrupted	79.6 - 110.4	30.8	1.08	Fair or Better	None	1.08	1.08	Fair or Better	None	None
8-6	Uninterrupted	110.4 - 120	9.6	1.13	Fair or Better	None	1.14	1.11	Fair or Better	None	None
8-7	Uninterrupted	120 - 147.6	27.6	1.09	Fair or Better	None	1.10	1.09	Fair or Better	None	None
8-8	Uninterrupted	147.6 - 166.5	18.9	1.15	Fair or Better	None	1.15	1.15	Fair or Better	None	None
8-9	Uninterrupted	166.5 - 178	11.5	1.10	Fair or Better	None	1.11	1.10	Fair or Better	None	None

Segment	Facility Operations	Segment Mileposts (MP)	Segment Length (miles)	Closure Duration (minutes/mile/year)					Bridge Clearance (feet)			Initial Need
				Performance Score		Performance Objective	Level of Need		Performance Score	Performance Objective	Level of Need	
				EB	WB		EB	WB				
8-1	Uninterrupted	0 - 16.3	16.3	52.67	22.86	Fair or Better	None	None	15.33	Fair or Better	High	Medium
8-2	Uninterrupted	16.3 - 21.4	5.1	25.88	21.49	Fair or Better	None	None	16.14	Fair or Better	Medium	Medium
8-3	Uninterrupted	21.4 - 56.5	35.1	41.55	12.94	Fair or Better	None	None	16.20	Fair or Better	Low	Low
8-4	Uninterrupted	56.5 - 79.6	23.1	7.26	9.15	Fair or Better	None	None	No UP	Fair or Better	None	None
8-5	Uninterrupted	79.6 - 110.4	30.8	4.29	21.66	Fair or Better	None	None	No UP	Fair or Better	None	None
8-6	Uninterrupted	110.4 - 120	9.6	3.75	15.96	Fair or Better	None	None	16.61	Fair or Better	None	None
8-7	Uninterrupted	120 - 147.6	27.6	6.16	14.10	Fair or Better	None	None	16.17	Fair or Better	Low	Low
8-8	Uninterrupted	147.6 - 166.5	18.9	5.42	37.54	Fair or Better	None	None	15.99	Fair or Better	Medium	Low
8-9	Uninterrupted	166.5 - 178	11.5	20.33	2.61	Fair or Better	None	None	16.00	Fair or Better	Medium	Low

Freight Performance Area – Needs Analysis Step 2

Segment	Segment Length (miles)	Segment Mileposts (MP)	Initial Need	Truck Height Restriction Hot Spots (Clearance < 16.25')	Relevant Recently Completed or Under Construction Projects (which supersede performance data)*	Final Need	Comments (may include tentatively programmed projects with potential to address needs or other relevant issues identified in previous reports)
8-1	16.3	0 - 16.3	Medium	4th Street UPRR UP	None	Medium	
8-2	5.1	16.3 - 21.4	Medium	Dome Valley Rd TI UP WB	None	Medium	
8-3	35.1	21.4 - 56.5	Low		None	Low	
8-4	23.1	56.5 - 79.6	None		None	None	
8-5	30.8	79.6 - 110.4	None		None	None	
8-6	9.6	110.4 - 120	None		None	None	
8-7	27.6	120 - 147.6	Low	Vekol Road TI UP	None	Low	
8-8	18.9	147.6 - 166.5	Low	Stanfield Rd TI UP, Murphy Rd UP, Russell Road UP	None	Low	
8-9	11.5	166.5 - 178	Low	Thorton Rd TI UP, Chuichu Rd UP	None	Low	

Freight Performance Area – Needs Analysis Step 3

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	Weighted Average Speed Limit	Aux Lanes	Divided/ Non-Divided	% No Passing	Existing LOS	Future 2040 LOS	% Trucks	
8-1	0 - 16.3	16.3	Medium	Interstate	Urban	Rolling	2	65	No	Divided	0%	A-C	A-C	19%	DMS MP 11.5; POE MP 1; POE/Weigh Station MP-2
8-2	16.3 - 21.4	5.1	Medium	Interstate	Rural	Mountainous	2	65	No	Divided	0%	A-C	A-C	26%	None
8-3	21.4 - 56.5	35.1	Low	Interstate	Rural	Rolling	2	67.5	No	Divided	0%	A-C	A-C	27%	Rest Area MP 23.5
8-4	56.5 - 79.6	23.1	None	Interstate	Rural	Level	2	75	No	Divided	0%	A-C	A-C	26%	None
8-5	79.6 - 110.4	30.8	None	Interstate	Rural	Level	2	75	No	Divided	0%	A-C	A-C	28%	Rest Area MP 85
8-6	110.4 - 120	9.6	None	Interstate	Rural	Rolling	2	75	No	Divided	0%	A-C	A-C	28%	None
8-7	120 - 147.6	27.6	Low	Interstate	Rural	Level	2	75	No	Divided	0%	A-C	A-C	39%	DMS MP 122
8-8	147.6 - 166.5	18.9	Low	Interstate	Rural	Level	2	75	No	Divided	0%	A-C	A-C	38%	None
8-9	166.5 - 178	11.5	Low	Interstate	Rural	Level	2	73	Yes	Divided	0%	A-C	A-C	28%	DMS MP 177

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			
0 - 16.3	16.3	Medium	32	22	69%	2	6%	0	0%	None		
16.3 - 21.4	5.1	Medium	7	7	100%	0	0%	0	0%	Border Patrol Check Point MP 18		
21.4 - 56.5	35.1	Low	29	29	100%	0	0%	0	0%	None		
56.5 - 79.6	23.1	None	17	17	100%	0	0%	0	0%	Intermittent Border Patrol Check Point (Seasonal) MP 76		
79.6 - 110.4	30.8	None	28	28	100%	0	0%	0	0%	None		
110.4 - 120	9.6	None	8	8	100%	0	0%	0	0%	None		
120 - 147.6	27.6	Low	22	21	95%	0	0%	0	0%	None		
147.6 - 166.5	18.9	Low	14	13	93%	1	7%	0	0%	None		
166.5 - 178	11.5	Low	9	8	89%	0	0%	0	0%	None		

Needs Summary Table

Performance Area	Segment Number and Mileposts (MP)								
	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9
	MP 0-16.3	MP 16.3-21.4	MP 21.4-56.5	MP 56.5-79.6	MP 79.6-110.4	MP 110.4-120	MP 120-147.6	MP 147.6-166.5	MP 166.5-178
Pavement	Low	Low	Low	Low	Low	Medium	Low	None	Low
Bridge	Low	Low	None	None	Low	Low	None	Low	Low
Mobility*	None	None	None	None	None	None	None	None	None
Safety*	Low	High	High	High	Medium	None	Low	Low	Medium
Freight*	Medium	Medium	Low	None	None	None	Low	Low	Low
Average Need	**1.00**	**1.46**	**1.08**	**0.85**	**0.77**	**0.46**	**0.62**	**0.62**	**1.00**

**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 I-8 Corridor.

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

Appendix E: Life-Cycle Cost Analysis

Pavement Life-Cycle Cost Analysis Worksheet

Project Details	
Project title	CA Border to MP 1 EB/WB Pavement Improvements
Route	I-8
Milepost begin	0
Milepost end	1

Existing Roadway Characteristics			
Surface type (Asphalt or Concrete)	=	Concrete	*<<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)	=	4	
Right shoulder width (ft)	=	10	
Total roadway analysis segment length (centerline miles)	=	1	
Current year	=	2023	
Elevation (> 4,000 ft or < 4,000 ft)?	=	< 4,000 ft	*<<Select from Pull-down List>>*
Roadway width (ft) [each direction lanes & shoulders]	=	38	
Total lane-miles [total traffic direction lanes & shoulders]	=	6.3	
Total square feet [total traffic direction lanes & shoulders]	=	401,280	
Total square yards [total traffic direction lanes & shoulders]	=	44,587	

LCCA Parameters		
Analysis period (years)	=	40
Year of net present value	=	2024
First year of improvements	=	2028
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	$609,000	$9.6	$87
Asphalt Reconstruction	8"-12"	26-30	$487,000	$7.7	$69
Concrete Medium Rehab	1"-3"	24-28	$131,000	$2.1	$19
Concrete Light Rehab	<1"	18-22	$87,000	$1.4	$12
Asphalt Medium Rehab	3"-8"	20-24	$183,000	$2.9	$26
Asphalt Light Rehab	<3"	14-18	$122,000	$1.9	$17

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	$2,377,536	$37.5	$338	$15,057,728
Asphalt Reconstruction	8"-12"	26-30	$1,901,248	$30.0	$270	$12,041,237
Concrete Medium Rehab	1"-3"	24-28	$383,568	$6.1	$54	$2,429,264
Concrete Light Rehab	<1"	18-22	$254,736	$4.0	$36	$1,613,328
Asphalt Medium Rehab	3"-8"	20-24	$535,824	$8.5	$76	$3,393,552
Asphalt Light Rehab	<3"	14-18	$357,216	$5.6	$51	$2,262,368

Pavement Life-Cycle Cost Analysis Worksheet

Project Details	
Project title	WB Pavement Improvements
Route	I-8
Milepost begin	1
Milepost end	4

Existing Roadway Characteristics			
Surface type (Asphalt or Concrete)	=	Asphalt	*<<Select from Pull-down List>>*
# of directions of travel (1 = one-way; 2 = two-way)	=	1	
# of lanes (in one direction)	=	2	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	4	
Right shoulder width (ft)	=	10	
Total roadway analysis segment length (centerline miles)	=	3	
Current year	=	2023	
Elevation (> 4,000 ft or < 4,000 ft)?	=	< 4,000 ft	*<<Select from Pull-down List>>*
Roadway width (ft) [each direction lanes & shoulders]	=	38	
Total lane-miles [total traffic direction lanes & shoulders]	=	9.5	
Total square feet [total traffic direction lanes & shoulders]	=	601,920	

Total square yards [total traffic direction lanes & shoulders]	=	66,880

LCCA Parameters		
Analysis period (years)	=	40
Year of net present value	=	2024
First year of improvements	=	2028
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	$609,000	$9.6	$87
Asphalt Reconstruction	8"-12"	26-30	$487,000	$7.7	$69
Concrete Medium Rehab	1"-3"	24-28	$131,000	$2.1	$19
Concrete Light Rehab	<1"	18-22	$87,000	$1.4	$12
Asphalt Medium Rehab	3"-8"	20-24	$183,000	$2.9	$26
Asphalt Light Rehab	<3"	14-18	$122,000	$1.9	$17

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	$2,377,536	$37.5	$338	$22,586,592
Asphalt Reconstruction	8"-12"	26-30	$1,901,248	$30.0	$270	$18,061,856
Concrete Medium Rehab	1"-3"	24-28	$383,568	$6.1	$54	$3,643,896
Concrete Light Rehab	<1"	18-22	$254,736	$4.0	$36	$2,419,992
Asphalt Medium Rehab	3"-8"	20-24	$535,824	$8.5	$76	$5,090,328
Asphalt Light Rehab	<3"	14-18	$357,216	$5.6	$51	$3,393,552

Pavement Life-Cycle Cost Analysis Worksheet

Project Details	
Project title	WB Pavement Improvements
Route	I-8

Milepost begin	6
Milepost end	11

Existing Roadway Characteristics

Surface type (Asphalt or Concrete)	=	Asphalt	*<<Select from Pull-down List>>*
# of directions of travel (1 = one-way; 2 = two-way)	=	1	
# of lanes (in one direction)	=	2	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	4	
Right shoulder width (ft)	=	10	
Total roadway analysis segment length (centerline miles)	=	5	
Current year	=	2023	
Elevation (> 4,000 ft or < 4,000 ft)?	=	< 4,000 ft	*<<Select from Pull-down List>>*
Roadway width (ft) [each direction lanes & shoulders]	=	38	
Total lane-miles [total traffic direction lanes & shoulders]	=	15.8	
Total square feet [total traffic direction lanes & shoulders]	=	1,003,200	
Total square yards [total traffic direction lanes & shoulders]	=	111,467	

LCCA Parameters

Analysis period (years)	=	40
Year of net present value	=	2024
First year of improvements	=	2028
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	$609,000	$9.6	$87
Asphalt Reconstruction	8"-12"	26-30	$487,000	$7.7	$69
Concrete Medium Rehab	1"-3"	24-28	$131,000	$2.1	$19
Concrete Light Rehab	<1"	18-22	$87,000	$1.4	$12
Asphalt Medium Rehab	3"-8"	20-24	$183,000	$2.9	$26
Asphalt Light Rehab	<3"	14-18	$122,000	$1.9	$17

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	$2,377,536	$37.5	$338	$37,644,320
Asphalt Reconstruction	8"-12"	26-30	$1,901,248	$30.0	$270	$30,103,093
Concrete Medium Rehab	1"-3"	24-28	$383,568	$6.1	$54	$6,073,160
Concrete Light Rehab	<1"	18-22	$254,736	$4.0	$36	$4,033,320
Asphalt Medium Rehab	3"-8"	20-24	$535,824	$8.5	$76	$8,483,880
Asphalt Light Rehab	<3"	14-18	$357,216	$5.6	$51	$5,655,920

Pavement Life-Cycle Cost Analysis Worksheet

Project Details	
Project title	WB Pavement Improvements
Route	I-8
Milepost begin	17
Milepost end	18

Existing Roadway Characteristics			
Surface type (Asphalt or Concrete)	=	Asphalt	*<<Select from Pull-down List>>*
# of directions of travel (1 = one-way; 2 = two-way)	=	1	
# of lanes (in one direction)	=	2	
Width of typical lane (ft)	=	12	
Left shoulder width (ft)	=	4	
Right shoulder width (ft)	=	10	
Total roadway analysis segment length (centerline miles)	=	1	
Current year	=	2023	
Elevation (> 4,000 ft or < 4,000 ft)?	=	< 4,000 ft	*<<Select from Pull-down List>>*
Roadway width (ft) [each direction lanes & shoulders]	=	38	
Total lane-miles [total traffic direction lanes & shoulders]	=	3.2	
Total square feet [total traffic direction lanes & shoulders]	=	200,640	
Total square yards [total traffic direction lanes & shoulders]	=	22,293	

LCCA Parameters		
Analysis period (years)	=	40
Year of net present value	=	2024
First year of improvements	=	2028

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	$609,000	$9.6	$87
Asphalt Reconstruction	8"-12"	26-30	$487,000	$7.7	$69
Concrete Medium Rehab	1"-3"	24-28	$131,000	$2.1	$19
Concrete Light Rehab	<1"	18-22	$87,000	$1.4	$12
Asphalt Medium Rehab	3"-8"	20-24	$183,000	$2.9	$26
Asphalt Light Rehab	<3"	14-18	$122,000	$1.9	$17

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	$2,377,536	$37.5	$338	$7,528,864
Asphalt Reconstruction	8"-12"	26-30	$1,901,248	$30.0	$270	$6,020,619
Concrete Medium Rehab	1"-3"	24-28	$383,568	$6.1	$54	$1,214,632
Concrete Light Rehab	<1"	18-22	$254,736	$4.0	$36	$806,664
Asphalt Medium Rehab	3"-8"	20-24	$535,824	$8.5	$76	$1,696,776
Asphalt Light Rehab	<3"	14-18	$357,216	$5.6	$51	$1,131,184

*Based on the candidate solutions presented in **Table 19**, LCCA was not conducted for any bridges and pavement on the I-8 Corridor.*

Appendix F: Crash Modification Factors and Factored Unit Construction Costs

SOLUTION	2016 CONST UNIT COST	INFLATION FACTOR 2016-2022	2022 CONST UNIT COST	UNIT	FACTOR^	2016 FACTORED CONST UNIT COST	2022 FACTORED CONST UNIT COST	DESCRIPTION	2016 CMF FOR CORRIDOR PROFILE STUDIES	2022 CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
REHABILITATION											
Rehabilitate Pavement (AC)	$276,500	1.74	$481,110	Mile	2.20	$610,000	$1,060,000	Mill and replace 1"-3" AC pavement; accounts for 38' width; for one direction of travel on two-lane roadway; includes pavement, striping, delineators, RPMs, rumble strips	0.70	0.68	Updated to include 2 additional values (in addition to 3 previous values) from CMF Clearinghouse and revised combination of rehabilitate pavement (0.88), striping, delineators, RPMs (0.77 for combination), and rumble strips (0.89) = 0.68
Rehabilitate Bridge	$65	1.74	$113	SF	2.20	$140	$250	Based on deck area; bridge only - no other costs included	0.95	0.95	Assumed - should have a minor effect on crashes at the bridge
GEOMETRIC IMPROVEMENT											
Re-profile Roadway	$974,500	1.74	$1,695,630	Mile	2.20	$2,140,000	$3,730,000	Includes excavation of approximately 3", pavement replacement (AC), striping, delineators, RPMs, rumble strips, for one direction of travel on two-lane roadway (38' width)	0.70	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	1.74	$5,150,400	Mile	2.20	$6,510,000	$11,330,000	All costs per direction except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.50	0.50	Based on Caltrans and NCDOT
Improve Skid Resistance	$675,000	1.74	$1,174,500	Mile	2.20	$1,490,000	$2,580,000	Average cost of pavement 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	0.65	Updated to include 6 additional values (in addition to 6 previous values) from CMF Clearinghouse (0.71) and calculated composite CMF value using that 0.71 value, the HSM value (0.87) for skid resistance; striping, delineators, RPMs (0.77 for combination), and rumble strips (0.89) = 0.65
INFRASTRUCTURE IMPROVEMENT											
Reconstruct to Urban Section	$1,000,000	1.74	$1,740,000	Mile	2.20	$2,200,000	$3,828,000	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	0.88	From HSM

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Construct Auxiliary Lanes (AC)	$914,000	1.74	$1,590,360	Mile	2.20	$2,011,000	$3,499,000	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	0.78	Average of 4 values from clearinghouse
Construct Climbing Lane (High)	$3,000,000	1.74	$5,220,000	Mile	2.20	$6,600,000	$11,484,000	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	0.75	From HSM
Construct Climbing Lane (Medium)	$2,250,000	1.74	$3,915,000	Mile	2.20	$4,950,000	$8,613,000	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	0.75	From HSM
Construct Climbing Lane (Low)	$1,500,000	1.74	$2,610,000	Mile	2.20	$3,300,000	$5,742,000	In one direction; all costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.75	0.75	From HSM
Construct Reversible Lane (Low)	$2,400,000	1.74	$4,176,000	Lane-Mile	2.20	$5,280,000	$9,190,000	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	0.73 for uphill and 0.88 for downhill	Based on proposed conditions on I-17 with 2 reversible lanes and a concrete barrier
Construct Reversible Lane (High)	$4,800,000	1.74	$8,352,000	Lane-Mile	2.20	$10,560,000	$18,370,000	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	0.73 for uphill and 0.88 for downhill	Based on proposed conditions on I-17 with 2 reversible lanes and a concrete barrier
Construct Passing Lane	$1,500,000	1.74	$2,610,000	Mile	2.20	$3,300,000	$5,742,000	In one direction; all costs except bridges; applicable to areas with small or moderate fills and cuts, minimal retaining walls	0.63	0.63	Average of 3 values from clearinghouse
Construct Entry/Exit Ramp	$730,000	1.74	$1,270,200	Each	2.20	$1,610,000	$2,790,000	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, typical earthwork & drainage; does not include any major structures or improvements on crossroad	1.09	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	1.74	$1,331,100	Each	2.20	$1,680,000	$2,930,000	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	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.

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Construct Turn Lanes	$42,500	1.74	$73,950	Each	2.20	$93,500	$163,000	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	0.81	Average 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	1.74	$774,300	Each	2.20	$979,000	$1,703,000	Cost per ramp; includes pavement, striping, signing, RPMs, lighting, minor earthwork, & drainage; For converting existing ramp to parallel-type configuration	0.21	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	1.74	$1,077,060	Each	2.20	$1,361,800	$2,370,000	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	0.21	Will be same as "Modify Ramp"
Replace Pavement (AC) (with overexcavation)	$1,446,500	1.74	$2,516,910	Mile	2.20	$3,180,000	$5,540,000	Accounts for 38' width; for one direction of travel on two-lane roadway; includes pavement, overexcavation, striping, delineators, RPMs, rumble strips	0.70	0.70	Same as rehab
Replace Pavement (PCCP) (with overexcavation)	$1,736,500	1.74	$3,021,510	Mile	2.20	$3,820,000	$6,650,000	Accounts for 38' width; for one direction of travel on two-lane roadway; includes pavement, overexcavation, striping, delineators, RPMs, rumble strips	0.70	0.70	Same as rehab
Replace Bridge (Short)	$125	1.74	$218	SF	2.20	$280	$480	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing small washes	0.95	0.95	Assumed - should have a minor effect on crashes at the bridge
Replace Bridge (Medium)	$160	1.74	$278	SF	2.20	$350	$610	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	0.95	Assumed - should have a minor effect on crashes at the bridge
Replace Bridge (Long)	$180	1.74	$313	SF	2.20	$400	$690	Based on deck area; bridge only - no other costs included; cost developed generally applies to bridges crossing large rivers or canyons	0.95	0.95	Assumed - should have a minor effect on crashes at the bridge
Widen Bridge	$175	1.74	$305	SF	2.20	$390	$670	Based on deck area; bridge only - no other costs included	0.90	0.90	Assumed - should have a minor effect on crashes at the bridge

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Install Pedestrian Bridge	$135	1.74	$235	SF	2.20	$300	$520	Includes cost to construct bridge based on linear feet of the bridge. This cost includes and assumes ramps and sidewalks leading to the structure.	0.1 (pedestrian only)	0.1 (pedestrian only)	Assumed direct access on both sides of structure
Implement Automated Bridge De-icing	$115	1.74	$200	SF	2.20	$250	$440	Includes cost to replace bridge deck and install system	0.72 (snow/ice)	0.72 (snow/ice)	Average of 3 values on clearinghouse for snow/ice
Install Wildlife Crossing Under Roadway	$650,000	1.74	$1,131,000	Each	2.20	$1,430,000	$2,488,000	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)	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	1.74	$1,983,600	Each	2.20	$2,508,000	$4,364,000	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)	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	1.74	$487,200	Each	2.20	$616,000	$1,072,000	Includes 3-36" pipes and roadway reconstruction (approx. 1,000 ft) to install pipes	0.70	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Construct Drainage Structure - Intermediate	$540,000	1.74	$939,600	Each	2.20	$1,188,000	$2,067,000	Includes 5 barrel 8'x6' RCBC and roadway reconstruction (approx. 1,000 ft) to install RCBC	0.70	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Construct Drainage Structure - Major	$8,000	1.74	$13,920	LF	2.20	$17,600	$30,600	Includes bridge that is 40' wide and reconstruction of approx. 500' on each approach	0.70	0.70	Same as rehab; CMF applied to crashes 1/8 mile upstream/downstream of the structure
Install Acceleration Lane	$127,500	1.74	$221,850	Each	2.20	$280,500	$488,000	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	0.85	Average of 6 values from the FHWA Desktop Reference for Crash Reduction Factors
Install Curb and Gutter	$211,200	1.74	$367,488	Mile	2.20	$465,000	$808,000	In both directions; curb and gutter	0.89	0.89	From CMF Clearinghouse
Install Sidewalks, Curb, and Gutter	$475,200	1.74	$826,848	Mile	2.20	$1,045,000	$1,819,000	In both directions; 5' sidewalks, curb, and gutter	0.89 installing sidewalk 0.24 (pedestrian	0.89 installing sidewalk 0.24 (pedestrian	From CMF Clearinghouse Avg of 6 values from FHWA Desktop Reference

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									crashes only)	crashes only)	
Install Sidewalks	$264,000	1.74	$459,360	Mile	2.20	$581,000	$1,011,000	In both directions; 5' sidewalks	0.24 (pedestrian crashes only)	0.24 (pedestrian crashes only)	Avg of 6 values from FHWA Desktop Reference
OPERATIONAL IMPROVEMENT											
Implement Variable Speed Limits (Wireless, Overhead)	$718,900	1.25	$898,625	Mile	2.20	$1,580,000	$1,980,000	In one direction; includes 1 sign assembly per mile (foundation and structure), wireless communication, detectors	0.92	0.91 (all crashes) 0.69 (weather-related)	Originally only 1 value from CMF Clearinghouse. Updated to include 1 value for all crashes and 2 additional values for weather-related crashes
Implement Variable Speed Limits (Wireless, Ground-mount)	$169,700	1.25	$212,125	Mile	2.20	$373,300	$467,000	In one direction; includes 2 signs per mile (foundations and posts), wireless communication, detectors	0.92	0.91 (all crashes) 0.69 (weather-related)	Originally only 1 value from CMF Clearinghouse. Updated to include 1 value for all crashes and 2 additional values for weather-related crashes
Implement Variable Speed Limits (Wireless, Solar, Overhead)	$502,300	1.25	$627,875	Mile	2.20	$1,110,000	$1,380,000	In one direction; includes 1 sign assembly per mile (foundation and structure), wireless communication, detectors, solar power	0.92	0.91 (all crashes) 0.69 (weather-related)	Originally only 1 value from CMF Clearinghouse. Updated to include 1 value for all crashes and 2 additional values for weather-related crashes
Implement Variable Speed Limits (Wireless, Solar, Ground-mount)	$88,400	1.25	$110,500	Mile	2.20	$194,500	$243,000	In one direction; includes 2 signs per mile (foundations and posts), wireless communication, detectors, solar power	0.92	0.91 (all crashes) 0.69 (weather-related)	Originally only 1 value from CMF Clearinghouse. Updated to include 1 value for all crashes and 2 additional values for weather-related crashes
Implement Ramp Metering (Low)	$25,000	1.25	$31,250	Each	2.20	$55,000	$68,800	For each entry ramp location; urban area with existing ITS backbone infrastructure; includes signals, poles, timer, pull boxes, etc.	0.64	0.64	From 1 value from clearinghouse; CMF applied to crashes 0.25 miles after gore
Implement Ramp Metering (High)	$150,000	1.25	$187,500	Mile	2.20	$330,000	$413,000	Area without existing ITS backbone infrastructure; in addition to ramp meters, also includes conduit, fiber optic lines, and power	0.64	0.64	From 1 value from clearinghouse

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Implement Signal Coordination	$140,000	1.25	$175,000	Mile	2.20	$308,000	$385,000	Includes conduit, conductors, and controllers for 4 intersections that span a total of approximately 2 miles	0.90	0.90	Assumed
Implement Left-Turn Phasing	$7,500	1.25	$9,375	Each	2.20	$16,500	$20,600	Includes four new signal heads (two in each direction) and associated conductors for one intersection	0.88 (protected) 0.98 (permitted /protected or protected/ permitted)	0.88 (protected) 0.98 (permitted /protected or protected/ permitted)	From HSM; CMF = 0.94 for each protected approach and 0.99 for each permitted/protected or protected/permitted approach. CMFs of different approaches should be multiplied together. CMF applied to crashes within intersection
Install Adaptive Signal Control and Signal Coordination	$363,500	1.25	$454,375	mile	2.20	$800,000	$1,000,000	Controller upgrades, advanced detection, software configuration, cameras; includes conduit, conductors, and controllers for 4 intersections that span a total of approximately 2 miles for coordination	0.81 (adaptive control)0.90 (signal coordination)	0.78 (adaptive control)0.90 (signal coordination)	Updated to include 15 additional values (in addition to 2 previous values) for adaptive control from CMF Clearinghouse
ROADSIDE DESIGN											
Install Guardrail	$130,000	1.74	$226,200	Mile	2.20	$286,000	$498,000	One side of road	0.62 (ROR)	0.62 (ROR)	0.62 is average of 2 values from clearinghouse
Install Cable Barrier	$80,000	1.74	$139,200	Mile	2.20	$176,000	$306,000	In median	0.81	0.65	Updated to include 5 additional values (in addition to 5 previous values) from CMF Clearinghouse
Widen Shoulder (AC)	$256,000	1.74	$445,440	Mile	2.20	$563,000	$980,000	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')	0.68 (1-4') 0.64 (>= 4')	0.86 is average 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.)

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Rehabilitate Shoulder (AC)	$113,000	1.74	$196,620	Mile	2.20	$249,000	$433,000	One direction of travel (14' total shoulder 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	0.72	0.98 is average of 34 values on clearinghouse for shoulder 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	1.74	$633,360	Mile	2.20	$801,000	$1,393,000	One direction of travel (14' total shoulder 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	0.72	0.98 is average of 34 values on clearinghouse for shoulder 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	1.74	$9,570	Mile	2.20	$12,000	$21,000	Both edges - one direction of travel; includes only rumble strip; no shoulder rehab or paving or striping	0.89	0.89	Average of 75 values on clearinghouse and consistent with HSM
Install Centerline Rumble Strip	$2,800	1.74	$4,872	Mile	2.20	$6,000	$11,000	Includes rumble strip only; no pavement rehab or striping	0.85	0.85	From HSM
Install Wildlife Fencing	$340,000	1.74	$591,600	Mile	2.20	$748,000	$1,302,000	Fencing only plus jump outs for 1 mile (both directions)	0.50 (wildlife)	0.50 (wildlife)	Assumed
Remove Tree/Vegetation	$200,000	1.74	$348,000	Mile	2.20	$440,000	$766,000	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)	0.72 (snow/ice)	Average of 3 values on clearinghouse for snow/ice
Increase Clear Zone	$59,000	1.74	$102,660	Mile	2.20	$130,000	$226,000	In one direction; includes widening the clear zone by 10' to a depth of 3'	0.71	0.71	Median of 14 values from FHWA Desktop Reference for Crash Reduction Values
Install Access Barrier Fence	$15	1.74	$26	LF	2.20	$33	$60	8' fencing along residential section of roadway	0.10 (pedestrian only)	0.10 (pedestrian only)	Equal to pedestrian overpass
Install Rock-Fall Mitigation - Wire Mesh	$1,320,000	1.74	$2,296,800	Mile	2.20	$2,904,000	$5,053,000	Includes wire mesh and rock stabilization (one direction)	0.75 (debris)	0.75 (debris)	Assumed
Install Rock-Fall Mitigation - Containment Fence & Barrier	$2,112,000	1.74	$3,674,880	Mile	2.20	$4,646,000	$8,085,000	Includes containment fencing, concrete barrier, and rock stabilization (one direction)	0.75 (debris)	0.75 (debris)	Assumed
Install Raised Concrete Barrier in Median	$650,000	1.74	$1,131,000	Mile	2.20	$1,430,000	$2,488,000	Includes concrete barrier with associated striping and reflective markings; excludes lighting in barrier (one direction)	0.90 (Cross-median and head	0.90 (Cross-median and head	All cross median and head-on fatal or incapacitating injury crashes are eliminated completely; all remaining crashes have 0.90 applied

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									on crashes eliminated completely)	on crashes eliminated completely)	
Formalize Pullout (Small)	$7,500	1.74	$13,050	Each	2.20	$17,000	$29,000	Includes paving and signage (signs, posts, and foundations) - approximately 4,200 sf	0.97	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	1.74	$47,850	Each	2.20	$61,000	$105,000	Includes paving and signage (signs, posts, and foundations) - approximately 22,500 sf	0.97	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	1.74	$140,070	Each	2.20	$177,100	$308,000	Includes paving and signage (signs, posts, and foundations) - approximately 70,000 sf	0.97	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	1.74	$261,000	Each	2.20	$330,000	$574,000	4-legged intersection; includes poles, foundations, conduit, controller, heads, luminaires, mast arms, etc.	0.95	0.95	From HSM; CMF applied to crashes within intersection only
Improve Signal Visibility	$35,000	1.74	$60,900	Each	2.20	$77,000	$134,000	4-legged intersection; signal head size upgrade, installation of new back-plates, and installation of additional signal heads on new poles.	0.85	0.85	Average of 7 values from clearinghouse; CMF applied to crashes within intersection only
Install Raised Median	$360,000	1.74	$626,400	Mile	2.20	$792,000	$1,378,000	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	0.83	Average from HSM
Install Transverse Rumble Strip/Pavement Markings	$3,000	1.74	$5,220	Each	2.20	$7,000	$11,000	Includes pedestrian markings and rumble strips only across a 30' wide travelway; no pavement rehab or other striping	0.95	0.95	Average 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	1.74	$2,610,000	Each	2.20	$3,300,000	$5,742,000	Removal of signal at 4-legged intersection; realignment of each leg for approx. 800 feet including paving, curbs, sidewalk, striping, lighting, signing	0.22	0.22	From HSM; CMF applied to crashes within intersection only

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Construct Double-Lane Roundabout	$1,800,000	1.74	$3,132,000	Each	2.20	$3,960,000	$6,890,000	Removal of signal at 4-legged intersection; realignment of each leg for approx. 800 feet including paving, curbs, sidewalk, striping, lighting, signing	0.40	0.40	From HSM; CMF applied to crashes within intersection only
Install Indirect Left Turn Intersection	$1,140,000	1.74	$1,983,600	each	2.20	$2,500,000	$4,364,000	Raised concrete median improvements; intersection improvements; turn lanes	0.80	0.76	Updated to include 2 additional values (in addition to 1 previous value) from CMF Clearinghouse
Convert Standard Diamond Interchange to Diverging Diamond Interchange	$2,272,700	1.74	$3,954,498	each	2.20	$5,000,000	$8,700,000	Convert traditional diamond interchange into diverging diamond interchange; assumes re-use of existing bridges	0.67	0.56	Updated to include 2 additional values (in addition to 1 previous value) from CMF Clearinghouse
Left-in Only Center Raised Median Improvements	$84,100	1.74	$146,334	each	2.20	$185,000	$322,000	Left-in only center raised median improvements	0.87	0.87	CMF Clearinghouse
ROADWAY DELINEATION											
Install High-Visibility Edge Line Striping	$10,800	1.25	$13,500	Mile	2.20	$23,800	$29,700	2 edge lines and lane line - one direction of travel	0.77	0.77	Average 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	1.25	$8,125	Mile	2.20	$14,300	$17,900	Both edges - one direction of travel			Average 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	1.25	$2,500	Mile	2.20	$4,400	$5,500	Both edges - one direction of travel			Average 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	1.25	$7,500	Each	2.20	$13,200	$16,500	Installation of a series of three in-lane route markings in one lane	0.95	0.95	Assumed; CMF applied to crashes within 1.0 mile before the gore
IMPROVED VISIBILITY											

SOLUTION	2016 CONST UNIT COST	INFLATION FACTOR 2016-2022	2022 CONST UNIT COST	UNIT	FACTOR^	2016 FACTORED CONST UNIT COST	2022 FACTORED CONST UNIT COST	DESCRIPTION	2016 CMF FOR CORRIDOR PROFILE STUDIES	2022 CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Cut Side Slopes	$80	1.74	$139	LF	2.20	$200	$300	For small grading to correct sight distance issues; not major grading	0.85	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	1.74	$469,800	Mile	2.20	$594,000	$1,034,000	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)	0.75 (night)	Average of 3 values on clearinghouse & consistent with HSM
Install Lighting (solar powered LED)	$10,000	1.74	$17,400	Pole	2.20	$22,000	$38,300	Offset lighting, not high-mast; solar power LED; includes poles, luminaire, solar panel	0.75 (night)	0.75 (night)	Average of 3 values on clearinghouse & consistent with HSM
DRIVER INFORMATION/WARNING											
Install Dynamic Message Sign (DMS)	$250,000	1.25	$312,500	Each	2.20	$550,000	$688,000	Includes sign, overhead structure, and foundations; wireless communication; does not include power supply	1.00	1.00	Not expected to reduce crashes
Install Dynamic Weather Warning Beacons	$40,000	1.25	$50,000	Each	2.20	$88,000	$110,000	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)	0.80 (weather-related)	Average 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	1.25	$31,250	Each	2.20	$55,000	$68,800	Assumes solar operation and no communication; ground mounted; includes regulatory sign, posts, foundations, solar panel, and dynamic sign	0.94	0.94	Average of 2 clearinghouse values; CMF applies to crashes within 0.50 miles after a sign
Install Chevrons	$18,400	1.25	$23,000	Mile	2.20	$40,500	$50,600	On one side of road - includes signs, posts, and foundations	0.79	0.79	Average of 11 clearinghouse values
Install Curve Warning Signs	$2,500	1.25	$3,125	Each	2.20	$5,500	$6,900	Includes 2 signs, posts, and foundations	0.83	0.83	Average of 4 clearinghouse values; CMF applies to crashes within 0.25 miles after a sign
Install Traffic Control Device Warning Signs	$2,500	1.25	$3,125	Each	2.20	$5,500	$6,900	Includes 2 signs, posts, and foundations	0.85	0.85	FHWA Desktop Reference for Crash Reduction Factors; CMF applies to crashes within 0.25 miles after a sign

SOLUTION	2016 CONST UNIT COST	INFLATION FACTOR 2016-2022	2022 CONST UNIT COST	UNIT	FACTOR^	2016 FACTORED CONST UNIT COST	2022 FACTORED CONST UNIT COST	DESCRIPTION	2016 CMF FOR CORRIDOR PROFILE STUDIES	2022 CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
(e.g., stop sign ahead, signal ahead, etc.)											
Install Other General Warning Signs (e.g., intersection ahead, wildlife in area, slow vehicles, etc.)	$2,500	1.25	$3,125	Each	2.20	$5,500	$6,900	Includes 2 signs, posts, and foundations	0.97	0.97	Assumed; CMF applies to crashes within 0.25 miles after a sign
Install Wildlife Warning System	$162,000	1.25	$202,500	Each	2.20	$356,400	$446,000	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)	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	1.25	$18,750	Each	2.20	$33,000	$41,300	In both directions; includes warning sign, post, and foundation, and flashing beacons (assumes solar power) at one location	0.75	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 Rectangular Rapid Flashing Beacons (RRFB)	$15,000	1.25	$18,750	Each	2.20	$33,000	$41,300	In both directions; includes warning sign, post, and foundation, and flashing beacons (assumes solar power) at one location	n/a	0.53 (pedestrian)	CMF Clearinghouse Countermeasures Tech Sheet
Install Larger Stop Sign with Beacons	$10,000	1.25	$12,500	Each	2.20	$22,000	$27,500	In one direction; includes large stop sign, post, and foundation, and flashing beacons (assumes solar power) at one location	0.85/0.81	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
Install Advanced Warning Signal System	$108,000	1.25	$135,000	each	2.20	$238,000	$297,000	Overhead static sign with flashing beacons, detectors, and radar system. Signs for each mainline approach of the intersection (2)	0.61	0.61	FHWA Desktop Reference for CRF
DATA COLLECTION											

SOLUTION	2016 CONST UNIT COST	INFLATION FACTOR 2016-2022	2022 CONST UNIT COST	UNIT	FACTOR^	2016 FACTORED CONST UNIT COST	2022 FACTORED CONST UNIT COST	DESCRIPTION	2016 CMF FOR CORRIDOR PROFILE STUDIES	2022 CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Install Roadside Weather Information System (RWIS)	$60,000	1.25	$75,000	Each	2.20	$132,000	$165,000	Assumes wireless communication and solar power, or connection to existing power and communications	1.00	1.00	Not expected to reduce crashes
Install Closed Circuit Television (CCTV) Camera	$25,000	1.25	$31,250	Each	2.20	$55,000	$68,800	Assumes connection to existing ITS backbone or wireless communication; does not include fiber-optic backbone infrastructure; includes pole, camera, etc.	1.00	1.00	Not expected to reduce crashes
Install Vehicle Detection Stations	$15,000	1.25	$18,750	Each	2.20	$33,000	$41,300	Assumes wireless communication and solar power, or connection to existing power and communications	1.00	1.00	Not expected to reduce crashes
Install Flood Sensors (Activation)	$15,000	1.25	$18,750	Each	2.20	$33,000	$41,300	Sensors with activation cabinet to alert through texting (agency)	1.00	1.00	Not expected to reduce crashes
Install Flood Sensors (Gates)	$100,000	1.25	$125,000	Each	2.20	$220,000	$275,000	Sensors with activation cabinet to alert through texting (agency) and beacons (public) plus gates	1.00	1.00	Not expected to reduce crashes
WIDEN CORRIDOR											
Construct New General Purpose Lane (PCCP)	$1,740,000	1.74	$3,027,600	Mile	2.20	$3,830,000	$6,660,000	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	0.90	North Carolina DOT uses 0.90 and Florida DOT uses 0.87
Construct New General Purpose Lane (AC)	$1,200,000	1.74	$2,088,000	Mile	2.20	$2,640,000	$4,590,000	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	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	1.74	$2,742,240	Mile	2.20	$3,467,200	$6,030,000	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	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	1.74	$1,832,220	Mile	2.20	$2,316,600	$4,030,000	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	0.75	From FHWA Desktop Reference for Crash Reduction Factors, CMF Clearinghouse, and SR 87 CPS comparison

SOLUTION	2016 CONST UNIT COST	INFLATION FACTOR 2016-2022	2022 CONST UNIT COST	UNIT	FACTOR^	2016 FACTORED CONST UNIT COST	2022 FACTORED CONST UNIT COST	DESCRIPTION	2016 CMF FOR CORRIDOR PROFILE STUDIES	2022 CMF FOR CORRIDOR PROFILE STUDIES	CMF NOTES
Construct 4-Lane Divided Highway (Using Existing 2-Lane Road for one direction)	$3,000,000	1.74	$5,220,000	Mile	2.20	$6,600,000	$11,484,000	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	0.67	Assumed
Construct 4-Lane Divided Highway (No Use of Existing Roads)	$6,000,000	1.74	$10,440,000	Mile	2.20	$13,200,000	$22,968,000	In both directions; assumes addition of 2 new lanes (AC) with standard shoulders in each direction; includes all costs except bridges	0.67	0.67	Assumed
Construct Bridge over At-Grade Railroad Crossing	$10,000,000	1.74	$17,400,000	Each	2.20	$22,000,000	$38,280,000	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)	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	1.74	$26,100,000	Each	2.20	$33,000,000	$57,420,000	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)	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	1.74	$1,566,000	Mile	2.20	$1,980,000	$3,445,000	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	0.95	Similar to general purpose lane
ALTERNATE ROUTE											
Construct Frontage Roads	$2,400,000	1.74	$4,176,000	Mile	2.20	$5,280,000	$9,190,000	For 2-lane AC frontage road; includes all costs except bridges; for generally at-grade facility with minimal walls	0.90	0.90	Assumed - similar to new general purpose lane
Construct 2-Lane Undivided Highway	$3,000,000	1.74	$5,220,000	Mile	2.20	$6,600,000	$11,484,000	In both directions; assumes addition of 2 new lanes (AC) with standard shoulders in each direction; includes all costs except bridges	0.90	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
- Caries 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

Risk Priority

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)	Grade (%)	Interrupted Flow (Y/N)	Outside/ Right Shoulder Width (ft)	1-lane each direction
8.1	31,208	1		155				5,930	N	1	N	10	N
8.2	31,208	3		165				5,930	N	1	N	10	N
8.3	31,208	5		170				5,930	N	1	N	10	N
8.4A	31,208	0.3		130				5,930	N	1	N	10	N
8.4B	31,208	0	0	130	8	N		5,930	N	1	N	10	N
8.5	16,899	1		300				4,394	Y	1	N	10	N
8.6	16,899	5.1		400				4,394	Y	1	N	10	N
8.7A	16,899	0		400				4,394	Y	1	N	10	N
8.7B	16,899	0	20	400	8	N	16.14	4,394	Y	1	N	10	N
8.8	11,844	1		350				3,198	Y	1	N	10	N
8.9	11,844	0.5		350				3,198	Y	1	N	10	N
8.10	10,418	4		400				2,709	Y	1	N	10	N
8.11	10,418	2		400				2,709	Y	1	N	10	N
8.12	11,327	0	1	650	8	Y	N/A	3,172	Y	1	N	10	N
8.13	11,327	2		650				3,172	Y	1	N	10	N
8.14A	7,230	0.3		1,732				2,820	Y	1	N	10	N
8.14B	7,230	0	99	1,732	8	N		2,820	Y	1	N	10	N
8.15	6,164	0	1	1,815	8	Y	N/A	2,342	Y	1	N	9.4	N
8.16	6,164	0	1	1,815	8	Y	N/A	2,342	Y	1	N	9.4	N
8.17	6,164	0	1	1,695	8	Y	N/A	2,342	Y	1	N	9.4	N
8.18	6,164	0	1	1,695	8	Y	N/A	2,342	Y	1	N	9.4	N
8.19A	6,164	0.3		1,358				2,342	Y	1	N	9.4	N
8.19B	6,164	0	2	1,341	8	N	16.21	2,342	Y	1	N	9.4	N

Solution Number	Bridge	Pavement	Mobility	Safety	Freight	Risk Score (0 to 10) Bridge	Pavement	Mobility	Safety	Freight
8.1	N	Y	Y	Y	Y	0.00	4.92	1.17	1.40	2.58
8.2	N	Y	Y	Y	Y	0.00	4.92	2.42	1.40	2.58
8.3	N	Y	Y	Y	Y	0.00	4.92	2.95	1.40	2.58
8.4A	N	Y	Y	Y	Y	0.00	4.92	0.41	1.40	2.58
8.4B	Y	N	Y	Y	Y	2.83	0.00	0.00	1.40	2.58
8.5	N	Y	Y	Y	Y	0.00	3.83	4.03	0.96	5.56
8.6	N	Y	Y	Y	Y	0.00	3.83	5.66	0.96	5.56
8.7A	N	Y	Y	Y	Y	0.00	3.83	3.33	0.96	5.56
8.7B	Y	N	Y	Y	Y	2.47	0.00	3.33	0.96	5.56
8.8	N	N	Y	Y	Y	0.00	0.00	3.84	0.73	5.17
8.9	N	N	Y	Y	Y	0.00	0.00	3.60	0.73	5.17
8.10	N	N	Y	Y	Y	0.00	0.00	4.80	0.66	4.98
8.11	N	N	Y	Y	Y	0.00	0.00	4.17	0.66	4.98
8.12	Y	N	Y	Y	Y	2.42	0.00	3.33	0.71	5.17
8.13	N	N	Y	Y	Y	0.00	0.00	4.23	0.71	5.17
8.14A	N	Y	Y	Y	Y	0.00	2.51	3.43	0.49	5.03
8.14B	Y	N	Y	Y	Y	3.74	0.00	3.33	0.49	5.03
8.15	Y	N	Y	Y	Y	2.19	0.00	3.33	0.66	4.82
8.16	Y	N	Y	Y	Y	2.19	0.00	3.33	0.66	4.82
8.17	Y	N	Y	Y	Y	2.19	0.00	3.33	0.66	4.82
8.18	Y	N	Y	Y	Y	2.19	0.00	3.33	0.66	4.82
8.19A	N	Y	Y	Y	Y	0.00	2.19	3.42	0.66	4.82
8.19B	Y	N	Y	Y	Y	0.69	0.00	3.33	0.66	4.82

Appendix H: Candidate Solution Cost Estimates

Solution #	Location #	Name	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost (assuming $12/sf)	Construction Cost	Total Cost
CS8.1	L1	CA Border to MP 1 EB/WB Pavement Improvements	P	**A**	Rehabilitate Pavement	0	1	Mile	2	$1,060,000	$63,600	$212,000		$2,120,000	$2,395,600
								Mile	0		$0	$0		$0	$0
										Solution Total	**$63,600**	**$212,000**	**$0**	**$2,120,000**	**$2,395,600**
			M	**B**	Repalce Pavement	0	1	Mile	2	$5,540,000	$332,400	$1,108,000		$11,080,000	$12,520,400
								Mile	0		$0	$0		$0	$0
										Solution Total	**$332,400**	**$1,108,000**	**$0**	**$11,080,000**	**$12,520,400**
CS8.2	L2	WB Pavement Improvements	P	**A**	Rehabilitate Pavement	1	4	Mile	3	$1,060,000	$95,400	$318,000		$3,180,000	$3,593,400
										Solution Total	**$95,400**	**$318,000**	**$0**	**$3,180,000**	**$3,593,400**
			M	**B**	Repalce Pavement	1	4	Mile	3	$5,540,000	$498,600	$1,662,000		$16,620,000	$18,780,600
								Mile	0		$0	$0		$0	$0
										Solution Total	**$498,600**	**$1,662,000**	**$0**	**$16,620,000**	**$18,780,600**
CS8.3	L3	WB Pavement Improvements	P	**A**	Rehabilitate Pavement	6	11	Mile	5.0	$1,060,000	$159,000	$530,000		$5,300,000	$5,989,000
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$159,000**	**$530,000**	**$0**	**$5,300,000**	**$5,989,000**
			M	**B**	Replace Pavement	6	11	Mile	5.0	$5,540,000	$831,000	$2,770,000		$27,700,000	$31,301,000
										Solution Total	**$831,000**	**$2,770,000**	**$0**	**$27,700,000**	**$31,301,000**
CS8.5	L9	WB Pavement Improvements	P	**A**	Rehabilitate Pavement	17	18	Mile	1.0	$1,060,000	$31,800	$106,000		$1,060,000	$1,197,800
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$31,800**	**$106,000**	**$0**	**$1,060,000**	**$1,197,800**
			M	**B**	Replace Pavement	17	18	Mile	1.0	$5,540,000	$166,200	$554,000		$5,540,000	$6,260,200
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$166,200**	**$554,000**	**$0**	**$5,540,000**	**$6,260,200**
CS8.6	L10	Telegraph Pass Safety Improvements	M	**-**	Install Chevrons	20.5	21	Mile	1.0	$50,600	$1,500	$5,100		$50,600	$57,200
					Install speed feedback sign at MP 19.5	19.5	19.5	Each	1.0	$68,800	$2,100	$6,900		$68,800	$77,800
											$0	$0		$0	$0
											$0	$0		$0	$0
										Solution Total	**$3,600**	**$12,000**	**$0**	**$119,400**	**$135,000**
CS8.7	L11 & 12	Dome Valley Rd TI UP (#1325) (WB) Feight / Bridge Vertical Clearance Mitigation	M	**A**	Reprofile Mainline	20.91	21.21	Mile	0.3	$3,730,000	$33,600	$111,900		$1,119,000	$1,264,500
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$33,600**	**$111,900**	**$0**	**$1,119,000**	**$1,264,500**
			M	**B**	Replace Bridge	21.06	21.06	SF	5673.0	$610	$103,800	$346,100		$3,460,530	$3,910,430
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$103,800**	**$346,100**	**$0**	**$3,460,530**	**$3,910,430**
CS8.8	L18		M	-	Widen median shoulder WB	24	25	Mile	1.0	$980,000	$29,400	$98,000		$980,000	$1,107,400
											$0	$0		$0	$0

Solution #	Location #	Name	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost (assuming $12/sf)	Construction Cost	Total Cost
		Ligurta Area Safety Improvements									$0	$0		$0	$0
										Solution Total	**$29,400**	**$98,000**	**$0**	**$980,000**	**$1,107,400**
CS8.9	L18	Mohawk Area Safety Improvements	M	-	Install EB guardrail on outside edge	54	54.5	Mile	0.5	$498,000	$7,500	$24,900		$249,000	$281,400
								Mile	0.0		$0	$0		$0	$0
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$7,500**	**$24,900**	**$0**	**$249,000**	**$281,400**
CS8.10	L23	East of Mohawk Area Safety Improvements	M	-	Install EB Chevrons	66.35	66.95	Mile	0.6	$50,600	$900	$3,000		$30,360	$34,260
											$0	$0		$0	$0
											$0	$0		$0	$0
										Solution Total	**$900**	**$3,000**	**$0**	**$30,360**	**$34,260**
CS8.11	L23	Maricopa County Line Area Safety Improvements	M	-	Widen median shoulder	76	78	Mile	2.0	$980,000	$58,800	$196,000		$1,960,000	$2,214,800
											$0	$0		$0	$0
											$0	$0		$0	$0
										Solution Total	**$58,800**	**$196,000**	**$0**	**$1,960,000**	**$2,214,800**
CS8.12	L27	Gillespie Canal BR (#489) (EB) Bridge Project	P	**A**	Rehabilitate Bridge	107.02	107.02	SF	1935.0	$250	$14,500	$48,400		$483,750	$546,650
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$14,500**	**$48,400**	**$0**	**$483,750**	**$546,650**
			M	**B**	Replace Bridge	107.02	107.02	SF	1935.0	$480	$27,900	$92,900		$928,800	$1,049,600
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$27,900**	**$92,900**	**$0**	**$928,800**	**$1,049,600**
CS8.13	L29	Paloma Area Safety Improvements	M	-	Widen median shoulder	80	82	Mile	2.0	$980,000	$58,800	$196,000		$1,960,000	$2,214,800
											$0	$0		$0	$0
											$0	$0		$0	$0
										Solution Total	**$58,800**	**$196,000**	**$0**	**$1,960,000**	**$2,214,800**
CS8.14	L40	Vekol Rd TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	M	**A**	Reprofile Mainline	144.4	144.7	Mile	0.3	$3,730,000	$33,600	$111,900		$1,119,000	$1,264,500
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$33,600**	**$111,900**	**$0**	**$1,119,000**	**$1,264,500**
			M	**B**	Replace Bridge	144.55	144.55	SF	6960.0	$610	$127,400	$424,600		$4,245,600	$4,797,600
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$127,400**	**$424,600**	**$0**	**$4,245,600**	**$4,797,600**
CS8.15	L41	Mendell Wash BR (#1065) (WB) Bridge Project	P	**A**	Rehabilitate Bridge	151.9	151.9	SF	6134.0	$250	$46,000	$153,400		$1,533,500	$1,732,900
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$46,000**	**$153,400**	**$0**	**$1,533,500**	**$1,732,900**
			M	**B**	Repalce Bridge	151.9	151.9	SF	6134.0	$480	$88,300	$294,400		$2,944,320	$3,327,020
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$88,300**	**$294,400**	**$0**	**$2,944,320**	**$3,327,020**

Solution #	Location #	Name	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost (assuming $12/sf)	Construction Cost	Total Cost
CS8.16	L42	Mendell Wash BR (#1064) (EB) Bridge Project	P	**A**	Rehabilitate Bridge	151.9	151.9	SF	6986.0	$250	$52,400	$174,700		$1,746,500	$1,973,600
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$52,400**	**$174,700**	**$0**	**$1,746,500**	**$1,973,600**
			M	**B**	Repalce Bridge	151.9	151.9	SF	6986.0	$480	$100,600	$335,300		$3,353,280	$3,789,180
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$100,600**	**$335,300**	**$0**	**$3,353,280**	**$3,789,180**
CS8.17	L43	Bridge EB (#1066) Bridge Project	P	**A**	Rehabilitate Bridge	153.4	153.4	SF	6091.0	$250	$45,700	$152,300		$1,522,750	$1,720,750
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$45,700**	**$152,300**	**$0**	**$1,522,750**	**$1,720,750**
			M	**B**	Repalce Bridge	153.4	153.4	SF	6091.0	$480	$87,700	$292,400		$2,923,680	$3,303,780
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$87,700**	**$292,400**	**$0**	**$2,923,680**	**$3,303,780**
CS8.18	L44	Bridge WB (#1067) Bridge Project	P	**A**	Rehabilitate Bridge	153.45	153.45	SF	6091.0	$250	$45,700	$152,300		$1,522,750	$1,720,750
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$45,700**	**$152,300**	**$0**	**$1,522,750**	**$1,720,750**
			M	**B**	Replace Bridge	153.45	153.45	SF	6091.0	$480	$87,700	$292,400		$2,923,680	$3,303,780
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$87,700**	**$292,400**	**$0**	**$2,923,680**	**$3,303,780**
CS8.19	L47	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	M	**A**	Reprofile Mainline	161.45	161.75	Mile	0.3	$3,730,000	$33,600	$111,900		$1,119,000	$1,264,500
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$33,600**	**$111,900**	**$0**	**$1,119,000**	**$1,264,500**
			M	**B**	Replace Bridge	161.6	161.6	SF	10449.0	$610	$191,200	$637,400		$6,373,890	$7,202,490
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$191,200**	**$637,400**	**$0**	**$6,373,890**	**$7,202,490**
CS8.20	L48	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	M	**A**	Reprofile Mainline	162.35	162.65	Mile	0.3	$3,730,000	$33,600	$111,900		$1,119,000	$1,264,500
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$33,600**	**$111,900**	**$0**	**$1,119,000**	**$1,264,500**
			M	**B**	Replace Bridge	162.5	162.5	SF	8499.0	$610	$155,500	$518,400		$5,184,390	$5,858,290
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$155,500**	**$518,400**	**$0**	**$5,184,390**	**$5,858,290**
CS8.21	L49	Russell Rd UP (#1094) Freight / Bridge Vertical	M	**A**	Reprofile Mainline	164.35	164.65	Mile	0.3	$3,730,000	$33,600	$111,900		$1,119,000	$1,264,500
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$33,600**	**$111,900**	**$0**	**$1,119,000**	**$1,264,500**
			M	**B**	Replace Bridge	164.5	164.5	SF	9434.0	$610	$172,600	$575,500		$5,754,740	$6,502,840
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$172,600**	**$575,500**	**$0**	**$5,754,740**	**$6,502,840**

Solution #	Location #	Name	Investment Category (Preservation [P], Modernization [M], Expansion [E])	Option	Scope	BMP	EMP	Unit	Quantity	Factored Construction Unit Cost	Preliminary Engineering Cost	Design Cost	Right-of-Way Cost (assuming $12/sf)	Construction Cost	Total Cost
		Clearance Mitigation													
CS8.22	L52	Arizola Area Safety Improvements	M	-	Install curve warning signs with advisory speed plaque	175	176	Each	4.0	$6,900	$800	$2,800		$27,600	$31,200
					Install chevron signs for curve EB/WB	175	176	Mile	2.0	$50,600	$3,000	$10,100		$101,200	$114,300
					Install raised pavement markers at both edges EB/WB	175	176	Mile	2.0	$5,500	$300	$1,100		$11,000	$12,400
									0.0		$0	$0		$0	$0
									0.0		$0	$0		$0	$0
										Solution Total	**$4,100**	**$14,000**	**$0**	**$139,800**	**$157,900**
CS8.23	L53	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	M	**A**	Reprofile Mainline	172.4	172.7	Mile	0.3	$3,730,000	$33,600	$111,900		$1,119,000	$1,264,500
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$33,600**	**$111,900**	**$0**	**$1,119,000**	**$1,264,500**
			M	**B**	Replace Bridge	172.55	172.55	SF	10794.0	$610	$197,500	$658,400		$6,584,340	$7,440,240
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$197,500**	**$658,400**	**$0**	**$6,584,340**	**$7,440,240**
CS8.24	L54	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	M	**A**	Reprofile Mainline	173.4	173.7	Mile	0.3	$3,730,000	$33,600	$111,900		$1,119,000	$1,264,500
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$33,600**	**$111,900**	**$0**	**$1,119,000**	**$1,264,500**
			M	**B**	Replace Bridge	173.55	173.55	SF	9011.0	$610	$164,900	$549,700		$5,496,710	$6,211,310
								Mile	0.0		$0	$0		$0	$0
										Solution Total	**$164,900**	**$549,700**	**$0**	**$5,496,710**	**$6,211,310**

Appendix I: Performance Effectiveness Scores

Need Reduction

LEGEND:
- user entered value
- calculated value for reference only
- calculated value for entry/use in other spreadsheet
- for input into Performance Effectiveness Score spreadsheet
- assumed values (do not modify)

Solution #	CS8.1A	CS8.1B	CS8.2A	CS8.2B	CS8.3A	CS8.3B	CS8.5A	CS8.5B	CS8.6	CS8.7A	CS8.7B	CS8.8	CS8.9	CS8.10	CS8.11	CS8.12A	CS8.12B	CS8.13	CS8.14A	CS8.14B
Description	<CA Border to MP 1 EB/WB Pavement Improvements>	<CA Border to MP 1 EB/WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<Telegraph Pass Safety Improvements>	<Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation>	<Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation>	<Ligurta Area Safety Improvements>	<Mohawk Area Safety Improvements>	<East of Mohawk Area Safety Improvements>	<Maricopa County Line Area Safety Improvements>	<Gillespie Canal BR (#489) (EB) Bridge Project>	<Gillespie Canal BR (#489) (EB) Bridge Project>	<Paloma Area Safety Improvements>	<Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation>	<Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation>
Project Beg MP	0	0	1	1	6	6	17	17	19.5	21.06	21.06	24	54	63	76	107.02	107.02	80	144.55	144.55
Project End MP	1	1	4	4	11	11	18	18	21	21.06	21.06	25	54.5	67	78	107.02	107.02	82	144.55	144.55
Project Length (miles)	1	1	3	3	5	5	1	1	1.5	0	0	1	0.5	4	2	0	0	2	0	0
Segment Beg MP	0	0	0	0	0	0	16.3	20.5	16.3	16.3	16.3	21.4	21.4	56.5	56.5	79.6	79.6	79.6	120	120
Segment End MP	16.3	16.3	16.3	16.3	16.3	16.3	21.4	22	21.4	21.4	21.4	56.5	56.5	79.6	79.6	110.4	110.4	110.4	147.6	147.6
Segment Length (miles)	16.3	16.3	16.3	16.3	16.3	16.3	5.1	1.5	5.1	5.1	5.1	35.1	35.1	23.1	23.1	30.8	30.8	30.8	27.6	27.6
Segment #	1	1	1	1	1	1	2	2	2	2	2	3	3	4	4	5	5	5	7	7
Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Project Type (one-way or two-way)	two-way	two-way	one-way	one-way	one-way	one-way	one-way	one-way	two-way	one-way	one-way	two-way	two-way	two-way	two-way	one-way	one-way	two-way	two-way	two-way
Additional Lanes (one-way)																				
Pro-Rated # of Lanes	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Solution #	CS8.15A	CS8.15B	CS8.16A	CS8.16B	CS8.17A	CS8.17B	CS8.18A	CS8.18B	CS8.19A	CS8.19B	CS8.20A	CS8.20B	CS8.21A	CS8.21B	CS8.22	CS8.23A	CS8.23B	CS8.24A	CS8.24B
Description	<Mendell Wash BR (#1065) (WB) Bridge Project>	<Mendell Wash BR (#1065) (WB) Bridge Project>	<Mendell Wash BR (#1064) (EB) Bridge Project>	<Mendell Wash BR (#1064) (EB) Bridge Project>	<Bridge EB (#1066) Bridge Project>	<Bridge EB (#1066) Bridge Project>	<Bridge WB (#1067) Bridge Project>	<Bridge WB (#1067) Bridge Project>	<Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation>	<Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation>	<Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation>	<Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation>	<Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation>	<Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation>	<Arizola Area Safety Improvements>	<Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation>	<Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation>	<Chuichu Rd UP (#1197) Freigth / Bridge Vertical Clearance Mitigation>	<Chuichu Rd UP (#1197) Freigth / Bridge Vertical Clearance Mitigation>
Project Beg MP	151.90	151.90	151.90	151.90	153.40	153.40	153.45	153.45	161.60	161.60	162.50	162.50	164.50	164.50	175	172.55	172.55	173.55	173.55
Project End MP	151.90	151.90	151.90	151.90	153.40	153.40	153.45	153.45	161.60	161.60	162.50	162.50	164.50	164.50	176	172.55	172.55	173.55	173.55
Project Length (miles)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Segment Beg MP	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	166.5	166.5	166.5	166.5	166.5
Segment End MP	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	178	178	178	178	178
Segment Length (miles)	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	11.5	11.5	11.5	11.5	11.5
Segment #	8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9
Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Project Type (one-way or two-way)	one-way	one-way	one-way	one-way	one-way	one-way	one-way	one-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)																			
Pro-Rated # of Lanes	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

LEGEND:
- user entered value
- calculated value for reference only
- calculated value for entry/use in other spreadsheet
- for input into Performance Effectiveness Score spreadsheet
- assumed values (do not modify)

		Solution #	CS8.1A	CS8.1B	CS8.2A	CS8.2B	CS8.3A	CS8.3B	CS8.5A	CS8.5B	CS8.6	CS8.7A	CS8.7B	CS8.8	CS8.9
		Description	<CA Border to MP 1 EB/WB Pavement Improvements>	<CA Border to MP 1 EB/WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<Telegraph Pass Safety Improvements>	<Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation>	<Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation>	<Ligurta Area Safety Improvements>	<Mohawk Area Safety Improvements>
		Project Beg MP	0	0	1	1	6	6	17	17	19.5	21.06	21.06	24	54
		Project End MP	1	1	4	4	11	11	18	18	21	21.06	21.06	25	54.5
		Project Length (miles)	1	1	3	3	5	5	1	1	1.5	0	0	1	0.5
		Segment Beg MP	0	0	0	0	0	0	16.3	20.5	16.3	16.3	16.3	21.4	21.4
		Segment End MP	16.3	16.3	16.3	16.3	16.3	16.3	21.4	22	21.4	21.4	21.4	56.5	56.5
		Segment Length (miles)	16.3	16.3	16.3	16.3	16.3	16.3	5.1	1.5	5.1	5.1	5.1	35.1	35.1
		Segment #	1	1	1	1	1	1	2	2	2	2	2	3	3
		Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2
		Project Type (one-way or two-way)	two-way	two-way	one-way	one-way	one-way	one-way	one-way	one-way	two-way	one-way	one-way	two-way	two-way
		Additional Lanes (one-way)	0	0	0	0	0	0	0	0	0	0	0	0	0
		Pro-Rated # of Lanes	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Notes and Directions	Description													
BRIDGE / BRIDGE INDEX	Input current value from performance system	Original Segment Bridge Index											5.31		
	Input current value from performance system	Original lowest rating for specific bridge											6		
	Input post-project value (For repair +1, rehab +2, replace=8)	Post-Project lowest rating for specific bridge											8		
	Enter in Bridge Index spreadsheet to calculate new Bridge Index	Post-Project lowest rating for specific bridge	0	0	0	0	0	0	0	0	0	0	8	0	0
	Input updated segment value from updated Bridge Index spreadsheet	Post-Project Segment Bridge Index											5.60		
	Enter in Bridge Needs spreadsheet to update segment level Bridge Need	Post-Project Segment Bridge Index	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.60	0.00	0.00
SUFF RATING	Input current value from performance system	Original Segment Sufficiency Rating											87.67		
	Input current value from performance system	Original Sufficiency Rating for specific bridge											95		
	Input post-project value (For repair +10, rehab +20, replace=98)	Post-Project Sufficiency Rating for specific bridge											98		
	Enter in Bridge Index spreadsheet to calculate new Bridge Index	Post-Project Sufficiency Rating for specific bridge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.00	0.00	0.00
	Input updated segment value from updated Bridge Index spreadsheet	Post-Project Segment Sufficiency Rating											88.04		
	Enter in Bridge Needs spreadsheet to update segment level Bridge Need	Post-Project Segment Sufficiency Rating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	88.04	0.00	0.00
BR RTNG	Input current value from performance system	Original Segment Bridge Rating											5.00		
	Input updated segment value from updated Bridge Index spreadsheet	Post-Project Segment Bridge Rating											5.00		
	Enter in Bridge Needs spreadsheet to update segment level Bridge Need	Post-Project Segment Bridge Rating	0	0	0	0	0	0	0	0	0	0	5	0	0
Needs	User entered value from Bridge Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Original Segment Bridge Need	2.11	2.11	2.11	2.11	2.11	2.11	1.79	1.79	1.79	1.79	1.79	0.18	0.18
	User entered value from Bridge Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Post-Project Segment Bridge Need	2.11	2.11	2.11	2.11	2.11	2.11	1.79	1.79	1.79	1.79	1.40	0.18	0.18

Solution #	CS8.10	CS8.11	CS8.12A	CS8.12B	CS8.13	CS8.14A	CS8.14B	CS8.15A	CS8.15B	CS8.16A	CS8.16B	CS8.17A	CS8.17B
Description	<East of Mohawk Area Safety Improvements>	<Maricopa County Line Area Safety Improvements>	<Gillespie Canal BR (#489) (EB) Bridge Project>	<Gillespie Canal BR (#489) (EB) Bridge Project>	<Paloma Area Safety Improvements>	<Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation>	<Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation>	<Mendell Wash BR (#1065) (WB) Bridge Project>	<Mendell Wash BR (#1065) (WB) Bridge Project>	<Mendell Wash BR (#1064) (EB) Bridge Project>	<Mendell Wash BR (#1064) (EB) Bridge Project>	<Bridge EB (#1066) Bridge Project>	<Bridge EB (#1066) Bridge Project>
Project Beg MP	63	76	107.02	107.02	80	144.55	144.55	151.9	151.9	151.9	151.9	153.4	153.4
Project End MP	67	78	107.02	107.02	82	144.55	144.55	151.9	151.9	151.9	151.9	153.4	153.4
Project Length (miles)	4	2	0	0	2	0	0	0	0	0	0		
Segment Beg MP	56.5	56.5	79.6	79.6	79.6	120	120	147.6	147.6	147.6	147.6	147.6	147.6
Segment End MP	79.6	79.6	110.4	110.4	110.4	147.6	147.6	166.5	166.5	166.5	166.5	166.5	166.5
Segment Length (miles)	23.1	23.1	30.8	30.8	30.8	27.6	27.6	18.9	18.9	18.9	18.9		
Segment #	4	4	5	5	5	7	7	8	8	8	8	8	8
Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2
Project Type (one-way or two-way)	two-way	two-way	one-way	one-way	two-way	two-way	two-way	one-way	one-way	one-way	one-way	one-way	one-way
Additional Lanes (one-way)	0	0	0	0	0	0	0	0	0	0	0	0	0
Pro-Rated # of Lanes	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00		
Description													
Original Segment Bridge Index			5.86	5.86			6.08	5.64	5.64	5.64	5.64	5.64	5.64
Original lowest rating for specific bridge			4	4			6	5	5	5	5	5	5
Post-Project lowest rating for specific bridge			6	8			8	7	8	7	8	7	8
Post-Project lowest rating for specific bridge	0	0	6	8	0	0	8	7	8	7	8	7	8
Post-Project Segment Bridge Index			5.94	6.03			6.59	5.74	5.79	5.76	5.81	5.74	5.79
Post-Project Segment Bridge Index	0.00	0.00	5.94	6.03	0.00	0.00	6.59	5.74	5.79	5.76	5.81	5.74	5.79
Original Segment Sufficiency Rating			89.57	89.57			91.34	91.09	91.09	91.09	91.09	91.09	91.09
Original Sufficiency Rating for specific bridge			59.00	59.00			76.50	84.80	84.80	85.80	85.80	85.80	85.80
Post-Project Sufficiency Rating for specific bridge			79.00	98.00			98.00	98.00	98.00	98.00	98.00	98.00	98.00
Post-Project Sufficiency Rating for specific bridge	0.00	0.00	79.00	98.00	0.00	0.00	98.00	98.00	98.00	98.00	98.00	98.00	98.00
Post-Project Segment Sufficiency Rating			90.46	91.30			96.79	91.76	91.76	91.76	91.79	91.75	91.70
Post-Project Segment Sufficiency Rating	0.00	0.00	90.46	91.30	0.00	0.00	96.79	91.76	91.76	91.76	91.79	91.70	91.70
Original Segment Bridge Rating			4	4			6	5	5	5	5	5	5
Post-Project Segment Bridge Rating			5	5			6	5	5	5	5	5	5
Post-Project Segment Bridge Rating	0	0	5	5	0	0	6	5	5	5	5	5	5
Original Segment Bridge Need	0.5	0.5	1.09	1.09	1.09	0.42	0.42	1.32	1.32	1.32	1.32	1.32	1.32
Post-Project Segment Bridge Need	0.5	0.5	0.72	0.57	1.09	0.42	0.0	1.12	1.02	1.08	0.98	1.12	1.02

Solution #	CS8.18A	CS8.18B	CS8.19A	CS8.19B	CS8.20A	CS8.20B	CS8.21A	CS8.21B	CS8.22	CS8.23A	CS8.23B	CS8.24A	CS8.24B
Description	<Bridge WB (#1067) Bridge Project>	<Bridge WB (#1067) Bridge Project>	<Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation>	<Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation>	<Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation>	<Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation>	<Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation>	<Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation>	<Arizola Area Safety Improvements>	<Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation>	<Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation>	<Chuichu Rd UP (#1197) Freigtht / Bridge Vertical Clearance Mititgation>	<Chuichu Rd UP (#1197) Freigtht / Bridge Vertical Clearance Mititgation>
Project Beg MP	153.45	153.45	161.6	161.6	162.5	162.5	164.5	164.5	175	172.55	172.55	173.55	173.55
Project End MP	153.45	153.45	161.6	161.6	162.5	162.5	164.5	164.5	176	172.55	172.55	173.55	173.55
Project Length (miles)													
Segment Beg MP	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	166.5	166.5	166.5	166.5	166.5
Segment End MP	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	178	178	178	178	178
Segment Length (miles)													
Segment #	8	8	8	8	8	8	8	8	9	9	9	9	9
Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2
Project Type (one-way or two-way)	one-way	one-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	0	0	0	0	0	0	0	0	0	0	0	0
Pro-Rated # of Lanes													
Description													
Original Segment Bridge Index	5.64	5.64		5.64		5.64		5.64			8.58		8.58
Original lowest rating for specific bridge	5	5		6		6		6			5		6
Post-Project lowest rating for specific bridge	7	8		8		8		8			8		8
Post-Project lowest rating for specific bridge	7	8	0	8	0	8	0	8	0	0	8	0	8
Post-Project Segment Bridge Index	5.74	5.79		5.81		5.78		5.80			8.94		8.78
Post-Project Segment Bridge Index	5.74	5.79	0.00	5.81	0.00	5.78	0.00	5.80	0.00	0.00	8.94	0.00	8.78
Original Segment Sufficiency Rating	91.09	91.09		91.09		91.09		91.09			90.36		90.36
Original Sufficiency Rating for specific bridge	84.80	84.80		95.90		94.00		95.00			83.50		89.90
Post-Project Sufficiency Rating for specific bridge	98.00	98.00		98.00		98.00		98.00			98.00		98.00
Post-Project Sufficiency Rating for specific bridge	98.00	98.00	0.00	98.00	0.00	98.00	0.00	98.00	0.00	0.00	98.00	0.00	98.00
Post-Project Segment Sufficiency Rating	91.80	91.75		91.27		91.37		91.32			91.56		90.92
Post-Project Segment Sufficiency Rating	91.75	91.75	0.00	91.27	0.00	91.37	0.00	91.32	0.00	0.00	91.56	0.00	90.92
Original Segment Bridge Rating	5	5		5		5		5			5		5
Post-Project Segment Bridge Rating	5	5		5		5		5			5		5
Post-Project Segment Bridge Rating	5	5	0	5	0	5	0	5	0	0	5	0	5
Original Segment Bridge Need	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	0.1	0.1	0.1	0.1	0.1
Post-Project Segment Bridge Need	1.12	1.02	1.32	0.98	1.32	1.04	1.32	1.0	0.1	0.1	0.1	0.1	0.1

LEGEND:
- user entered value
- calculated value for reference only
- calculated value for entry/use in other spreadsheet
- for input into Performance Effectiveness Score spreadsheet
- assumed values (do not modify)

		Solution #	CS8.1A	CS8.1B	CS8.2A	CS8.2B	CS8.3A	CS8.3B	CS8.5A	CS8.5B	CS8.6	CS8.7A	CS8.7B	CS8.8	CS8.9
		Description	<CA Border to MP 1 EB/WB Pavement Improvements>	<CA Border to MP 1 EB/WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<WB Pavement Improvements>	<Telegraph Pass Safety Improvements>	<Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation>	<Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation>	<Ligurta Area Safety Improvements>	<Mohawk Area Safety Improvements>
		Project Beg MP	0	0	1	1	6	6	17	17	19.5	21.06	21.06	24	54
		Project End MP	1	1	4	4	11	11	18	18	21	21.06	21.06	25	54.5
		Project Length (miles)	1	1	3	3	5	5	1	1	1.5	0	0	1	0.5
		Segment Beg MP	0	0	0	0	0	0	16.3	20.5	16.3	16.3	16.3	21.4	21.4
		Segment End MP	16.3	16.3	16.3	16.3	16.3	16.3	21.4	22	21.4	21.4	21.4	56.5	56.5
		Segment Length (miles)	16.3	16.3	16.3	16.3	16.3	16.3	5.1	1.5	5.1	5.1	5.1	35.1	35.1
		Segment #	1	1	1	1	1	1	2	2	2	2	2	3	3
		Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2
		Project Type (one-way or two-way)	two-way	two-way	one-way	one-way	one-way	one-way	one-way	one-way	two-way	one-way	one-way	two-way	two-way
		Additional Lanes (one-way)	0	0	0	0	0	0	0	0	0	0	0	0	0
		Pro-Rated # of Lanes	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Notes and Directions	Description													
PAVEMENT / PAVEMENT INDEX	Input current value from performance system	Original Segment Pavement Index	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02					
	Input current value from performance system	Original Segment IRI in project limits	70.14	70.14	50.72	50.72	53.48	53.48	60.04	60.04					
	Input current value from performance system	Original Segment Cracking in project limits	0	0	9.9	9.9	14.62	14.62	12.90	12.90					
	Input current value from performance system	Original Segment Rutting in project limits	0	0	0.19	0.19	0.20	0.20	0.15	0.15					
	Input post-project value (For rehab, increase to 45; for replace increase to 30)	Post-Project IRI in project limits	45	30	45	30	45	30	45	30					
	Enter in Pavement Index spreadsheet to calculate new Pavement Index	Post-Project IRI in project limits	45	30	45	30	45	30	45	30	0	0	0	0	0
	Input post-project value (Lower to 0 for rehab or replace)	Post-Project Cracking in project limits	0	0	0	0	0	0	0	0					
	Enter in Pavement Index spreadsheet to calculate new Pavement Index	Post-Project Cracking in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
	Input post-project value (Lower to 0 for rehab or replace)	Post-Project Rutting in project limits	0	0	0	0	0	0	0	0					
	Enter in Pavement Index spreadsheet to calculate new Pavement Index	Post-Project Rutting in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
	Input updated segment value from updated Pavement Index spreadsheet	Post-Project Segment Pavement Index	4.06	4.06	4.14	4.14	4.25	4.26	4.15	4.16					
	Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment Pavement Index	4.06	4.06	4.14	4.14	4.25	4.26	4.15	4.16	0	0	0	0	0
DIRECTION PSR	Input current value from performance system (direction 1)	Original Segment Directional PSR (EB)	4.03	4.08											
	Input current value from performance system (direction 2)	Original Segment Directional PSR (WB)	4.13	4.13	4.13	4.13	4.13	4.13	4.07	4.07					
	Value from above	Original Segment IRI in project limits	70.14	70.14	50.72	50.72	53.48	53.48	60.04	60.04	0	0	0	0	0
	Value from above	Post-Project directional IRI in project limits	45	30	45	30	45	30	45	30	0	0	0	0	0
	Input updated segment value from updated Pavement Index spreadsheet (direction 1)	Post-Project Segment Directional PSR (EB)	4.21	4.46											
	Input updated segment value from updated Pavement Index spreadsheet (direction 2)	Post-Project Segment Directional PSR (WB)	4.21	4.46	4.15	4.19	4.17	4.25	4.12	4.17					
	Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment Directional PSR (EB)	4.21	4.46	0	0	0	0	0	0	0	0	0	0	0
	Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment Directional PSR (WB)	4.21	4.46	4.15	4.19	4.17	4.25	4.12	4.17	0	0	0	0	0
% FAIL	Input current value from performance system	Original Segment % Failure	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	10.0%	10.0%					
	Input value from updated Pavement Index spreadsheet	Post-Project Segment % Failure	25.0%	25.0%	22.0%	22.0%	16.0%	16.0%	0.0%	0.0%					
	Enter in Pavement Needs spreadsheet to update segment level Pavement Need	Post-Project Segment % Failure	25.0%	25.0%	22.0%	22.0%	16.0%	16.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Needs	User entered value from Pavement Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Original Segment Pavement Need	0.62	0.62	0.62	0.62	0.62	0.62	0.1	0.1	0.1	0.1	0.1	0.87	0.87
	User entered value from Pavement Needs spreadsheet and for use in Performance Effectiveness spreadsheet	Post-Project Segment Pavement Need	0.50	0.50	0.44	0.44	0.32	0.32	0.0	0.0	0.1	0.1	0.1	0.87	0.87

Solution #	CS8.10	CS8.11	CS8.12A	CS8.12B	CS8.13	CS8.14A	CS8.14B	CS8.15A	CS8.15B	CS8.16A	CS8.16B	CS8.17A	CS8.17B
Description	<East of Mohawk Area Safety Improvements>	<Maricopa County Line Area Safety Improvements>	<Gillespie Canal BR (#489) (EB) Bridge Project>	<Gillespie Canal BR (#489) (EB) Bridge Project>	<Paloma Area Safety Improvements>	<Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation>	<Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation>	<Mendell Wash BR (#1065) (WB) Bridge Project>	<Mendell Wash BR (#1065) (WB) Bridge Project>	<Mendell Wash BR (#1064) (EB) Bridge Project>	<Mendell Wash BR (#1064) (EB) Bridge Project>	<Bridge EB (#1066) Bridge Project>	<Bridge EB (#1066) Bridge Project>
Project Beg MP	63	76	107.02	107.02	80	144.55	144.55	151.9	151.9	151.9	151.9	153.4	153.4
Project End MP	67	78	107.02	107.02	82	144.55	144.55	151.9	151.9	151.9	151.9	153.4	153.4
Project Length (miles)	4	2	0	0	2	0	0	0	0	0	0		
Segment Beg MP	56.5	56.5	79.6	79.6	79.6	120	120	147.6	147.6	147.6	147.6	147.6	147.6
Segment End MP	79.6	79.6	110.4	110.4	110.4	147.6	147.6	166.5	166.5	166.5	166.5	166.5	166.5
Segment Length (miles)	23.1	23.1	30.8	30.8	30.8	27.6	27.6	18.9	18.9	18.9	18.9		
Segment #	4	4	5	5	5	7	7	8	8	8	8	8	8
Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2
Project Type (one-way or two-way)	two-way	two-way	one-way	one-way	two-way	two-way	two-way	one-way	one-way	one-way	one-way	one-way	one-way
Additional Lanes (one-way)	0	0	0	0	0	0	0	0	0	0	0	0	0
Pro-Rated # of Lanes	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00		
Description													
Original Segment Pavement Index													
Original Segment IRI in project limits													
Original Segment Cracking in project limits													
Original Segment Rutting in project limits													
Post-Project IRI in project limits													
Post-Project IRI in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Cracking in project limits													
Post-Project Cracking in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Rutting in project limits													
Post-Project Rutting in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Segment Pavement Index													
Post-Project Segment Pavement Index	0	0	0	0	0	0	0	0	0	0	0	0	0
Original Segment Directional PSR (EB)													
Original Segment Directional PSR (WB)													
Original Segment IRI in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project directional IRI in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Segment Directional PSR (EB)													
Post-Project Segment Directional PSR (WB)													
Post-Project Segment Directional PSR (EB)	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Segment Directional PSR (WB)	0	0	0	0	0	0	0	0	0	0	0	0	0
Original Segment % Failure													
Post-Project Segment % Failure													
Post-Project Segment % Failure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Original Segment Pavement Need	0.71	0.71	0.23	0.23	0.23	1.07	1.07	0.0	0.0	0.0	0.0	0.0	0.0
Post-Project Segment Pavement Need	0.71	0.71	0.23	0.23	0.23	1.07	1.07	0.0	0.0	0.0	0.0	0.0	0.0

Solution #	CS8.18A	CS8.18B	CS8.19A	CS8.19B	CS8.20A	CS8.20B	CS8.21A	CS8.21B	CS8.22	CS8.23A	CS8.23B	CS8.24A	CS8.24B
Description	<Bridge WB (#1067) Bridge Project>	<Bridge WB (#1067) Bridge Project>	<Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation>	<Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation>	<Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation>	<Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation>	<Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation>	<Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation>	<Arizola Area Safety Improvements>	<Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation>	<Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation>	<Chuichu Rd UP (#1197) Freigtht / Bridge Vertical Clearance Mititgation>	<Chuichu Rd UP (#1197) Freigtht / Bridge Vertical Clearance Mititgation>
Project Beg MP	153.45	153.45	161.6	161.6	162.5	162.5	164.5	164.5	175	172.55	172.55	173.55	173.55
Project End MP	153.45	153.45	161.6	161.6	162.5	162.5	164.5	164.5	176	172.55	172.55	173.55	173.55
Project Length (miles)													
Segment Beg MP	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	166.5	166.5	166.5	166.5	166.5
Segment End MP	166.5	166.5	166.5	166.5	166.5	166.5	166.5	166.5	178	178	178	178	178
Segment Length (miles)													
Segment #	8	8	8	8	8	8	8	8	9	9	9	9	9
Current # of Lanes (both directions)	2	2	2	2	2	2	2	2	2	2	2	2	2
Project Type (one-way or two-way)	one-way	one-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	0	0	0	0	0	0	0	0	0	0	0	0
Pro-Rated # of Lanes													
Description													
Original Segment Pavement Index													
Original Segment IRI in project limits													
Original Segment Cracking in project limits													
Original Segment Rutting in project limits													
Post-Project IRI in project limits													
Post-Project IRI in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Cracking in project limits													
Post-Project Cracking in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Rutting in project limits													
Post-Project Rutting in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Segment Pavement Index													
Post-Project Segment Pavement Index	0	0	0	0	0	0	0	0	0	0	0	0	0
Original Segment Directional PSR (EB)													
Original Segment Directional PSR (WB)													
Original Segment IRI in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project directional IRI in project limits	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Segment Directional PSR (EB)													
Post-Project Segment Directional PSR (WB)													
Post-Project Segment Directional PSR (EB)	0	0	0	0	0	0	0	0	0	0	0	0	0
Post-Project Segment Directional PSR (WB)	0	0	0	0	0	0	0	0	0	0	0	0	0
Original Segment % Failure													
Post-Project Segment % Failure													
Post-Project Segment % Failure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Original Segment Pavement Need	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.04	0.04	0.04	0.04
Post-Project Segment Pavement Need	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.04	0.04	0.04	0.04

Application of Multiple Crash Modification Factors

CS 8.6 EB - Now 8.5

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Current Fatal	Current Incap	Post-Project Fatal	Post-Project Incap	Reduction Fatal	Reduction Incap		Length	Notes
19.5	20	0.94	1	1	1	EB	0.940	2	0	1.880	0.000	0.120	0.000	Segment 2	0.5	EB Speed feedback sign at MP 19.5
20	20.5	1	1	1	1	EB	1.000	0	0	0.000	0.000	0.000	0.000			
20.5	21	0.79	1	1	1	EB	0.790	1	0	0.790	0.000	0.210	0.000		0.5	Chevrons - both directions
								3	0			**0.330**	**0.000**			

CS 8.6 WB

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Current Fatal	Current Incap	Post-Project Fatal	Post-Project Incap	Reduction Fatal	Reduction Incap		Length	Notes
19.5	20.5	1	1	1	1	WB	1.000	0	0	0.000	0.000	0.000	0.000	Segment 2		
20.5	21	0.79	1	1	1	WB	0.790	1	0	0.790	0.000	0.210	0.000		0.5	Chevrons - both directions
								1	0			**0.210**	**0.000**			

CS 8.22 EB

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Current Fatal	Current Incap	Post-Project Fatal	Post-Project Incap	Reduction Fatal	Reduction Incap		Length	Notes
175	175.5	0.77	0.79	0.83	1	EB	0.631	0	1	0.000	0.631	0.000	0.369	Segment 9	0.5	curve warning sign + chevron +RPMs
175.5	176	0.77	0.79	1	1	EB	0.689	1	0	0.689	0.000	0.311	0.000		0.5	chevron +RPMs
								1	1			**0.311**	**0.369**			

CS 8.22 WB

BMP	EMP	CMF1	CMF2	CMF3	CMF4	Dir	Effective CMF	Current Fatal	Current Incap	Post-Project Fatal	Post-Project Incap	Reduction Fatal	Reduction Incap		Length	Notes
175	175.5	0.77	0.79	1	1	WB	0.689	1	0	0.689	0.000	0.311	0.000	Segment 9	0.5	chevron +RPMs
175.5	176	0.77	0.79	0.83	1	WB	0.631	0	0	0.000	0.000	0.000	0.000		0.5	curve warning sign + chevron +RPMs
								1	0			**0.311**	**0.000**			

Performance Area Scoring

Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	Pavement Existing Segment Need	Pavement Post-Solution Segment Need	Pavement Raw Score	Pavement Risk Factor	Pavement Factored Score	Bridge Existing Segment Need	Bridge Post-Solution Segment Need	Bridge Raw Score	Bridge Risk Factor	Bridge Factored Score	Safety Existing Segment Need	Safety Post-Solution Segment Need	Safety Raw Score	Safety Risk Factor	Safety Factored Score	Mobility Existing Segment Need	Mobility Post-Solution Segment Need	Mobility Raw Score	Mobility Risk Factor	Mobility Factored Score	Freight Existing Segment Need	Freight Post-Solution Segment Need	Freight Raw Score	Freight Risk Factor	Freight Factored Score	Total Risk Factored Performance Area Benefit
CS8.3B	WB Pavement Improvements	MP 6-11	31.30	0.620	0.320	0.300	4.92	1.475	2.110	2.110	0.000	0.00	0.000	0.460	0.454	0.006	1.40	0.009	0.000	0.000	0.000	2.95	0.000	2.065	2.065	0.000	2.58	0.000	1.484
CS8.5	Telegraph Pass Safety Improvements	MP 16.3-21.4	0.14	0.100	0.100	0.000	3.83	0.000	1.790	1.790	0.000	0.00	0.000	7.558	6.140	1.418	0.96	1.359	0.000	0.000	0.000	5.66	0.000	2.128	1.591	0.537	5.56	2.988	4.347
CS8.6A	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	MP 21.06	1.26	0.100	0.100	0.000	3.83	0.000	1.790	1.790	0.000	0.00	0.000	7.558	7.558	0.000	0.96	0.000	0.000	0.000	0.000	3.33	0.000	2.128	1.880	0.248	5.56	1.379	1.379
CS8.6B	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	MP 21.06	3.91	0.100	0.100	0.000	3.83	0.000	1.790	1.400	0.390	2.47	0.962	7.558	7.558	0.000	0.96	0.000	0.000	0.000	0.000	3.33	0.000	2.128	1.862	0.266	5.56	1.480	2.441
CS8.7	Ligurta Area Safety Improvements	MP 24-25	1.10	0.868	0.868	0.000	0.00	0.000	0.180	0.180	0.000	0.00	0.000	2.482	1.917	0.565	0.73	0.415	0.000	0.000	0.000	3.84	0.000	0.308	0.298	0.010	5.17	0.052	0.467
CS8.8	Mohawk Area Safety Improvements	MP 54-54.5	0.28	0.868	0.868	0.000	0.00	0.000	0.180	0.180	0.000	0.00	0.000	2.482	2.210	0.272	0.73	0.200	0.000	0.000	0.000	3.60	0.000	0.308	0.298	0.010	5.17	0.052	0.251
CS8.9	East of Mohawk Area Safety Improvements	MP 63-67	0.03	0.712	0.712	0.000	0.00	0.000	0.500	0.500	0.000	0.00	0.000	5.728	5.718	0.010	0.66	0.007	0.000	0.000	0.000	4.80	0.000	0.012	0.011	0.000	4.98	0.000	0.007
CS8.10	Maricopa County Line Area Safety Improvements	MP 76-78	4.43	0.712	0.712	0.000	0.00	0.000	0.500	0.500	0.000	0.00	0.000	5.728	5.447	0.282	0.66	0.187	0.000	0.000	0.000	4.17	0.000	0.018	0.018	0.000	4.98	0.000	0.187
CS8.11B	Gillespie Canal BR (#489) (EB) Bridge Project	MP 107.02	1.05	0.233	0.233	0.000	0.00	0.000	1.088	0.570	0.518	2.42	1.255	1.907	1.907	0.000	0.71	0.000	0.000	0.000	0.000	3.33	0.000	0.018	0.018	0.000	5.17	0.000	1.255
CS8.12	Paloma Area Safety Improvements	MP 80-82	2.21	0.233	0.233	0.000	0.00	0.000	1.088	1.088	0.000	0.00	0.000	1.907	1.743	0.164	0.71	0.116	0.000	0.000	0.000	4.23	0.000	0.018	0.018	0.000	5.17	0.000	0.116
CS8.13A	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	MP 144.55	1.26	1.073	1.073	0.000	2.51	0.000	0.420	0.420	0.000	0.00	0.000	0.894	0.894	0.000	0.49	0.000	0.000	0.000	0.000	3.43	0.000	0.362	0.125	0.237	5.03	1.191	1.191
CS8.13B	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	MP 144.55	4.80	1.073	1.073	0.000	2.51	0.000	0.420	0.000	0.420	3.74	1.571	0.894	0.894	0.000	0.49	0.000	0.000	0.000	0.000	3.33	0.000	0.362	0.116	0.246	5.03	1.236	2.807
CS8.18A	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	MP 161.60	1.26	0.000	0.000	0.000	2.19	0.000	1.320	1.320	0.00	0.00	0.000	1.055	1.055	0.00	0.66	0.000	0.000	0.000	0.000	3.42	0.000	0.734	0.405	0.329	4.82	1.585	1.585
CS8.18B	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	MP 161.60	7.20	0.000	0.000	0.000	0.00	0.000	1.320	0.980	0.34	0.69	0.233	1.055	1.055	0.00	0.66	0.000	0.000	0.000	0.000	3.33	0.000	0.734	0.378	0.356	4.82	1.715	1.948
CS8.19A	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	MP 162.50	1.26	0.000	0.000	0.000	2.19	0.000	1.320	1.320	0.00	0.00	0.000	1.055	1.055	0.00	0.66	0.000	0.000	0.000	0.000	3.42	0.000	0.734	0.375	0.359	4.82	1.729	1.729
CS8.19B	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	MP 162.50	5.86	0.000	0.000	0.000	0.00	0.000	1.320	1.040	0.28	0.69	0.192	1.055	1.055	0.00	0.66	0.000	0.000	0.000	0.000	3.33	0.000	0.734	0.378	0.356	4.82	1.715	1.907
CS8.20A	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	MP 164.50	1.26	0.000	0.000	0.00	2.19	0.000	1.320	1.320	0.00	0.00	0.000	1.055	1.055	0.00	0.66	0.000	0.000	0.000	0.000	3.42	0.000	0.734	0.366	0.368	4.82	1.773	1.773
CS8.20B	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	MP 164.50	6.50	0.000	0.000	0.00	0.00	0.000	1.320	1.000	0.32	1.77	0.566	1.055	1.055	0.00	0.66	0.000	0.000	0.000	0.000	3.33	0.000	0.734	0.378	0.356	4.82	1.715	2.281
CS8.21	Arizola Area Safety Improvements	MP 175-176	0.16	0.042	0.042	0.00	0.00	0.000	0.100	0.100	0.00	0.00	0.000	2.409	0.773	1.64	0.69	1.129	0.000	0.000	0.000	3.68	0.000	0.500	0.416	0.084	5.07	0.425	1.553
CS8.22A	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	MP 172.55	1.26	0.042	0.042	0.00	2.62	0.000	0.100	0.100	0.00	0.00	0.000	2.409	2.409	0.00	0.69	0.000	0.000	0.000	0.000	3.44	0.000	0.500	0.240	0.260	5.07	1.318	1.318
CS8.22B	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	MP 172.55	7.44	0.042	0.042	0.00	0.00	0.000	0.100	0.100	0.00	0.94	0.000	2.409	2.409	0.00	0.69	0.000	0.000	0.000	0.000	3.33	0.000	0.500	0.150	0.350	5.07	1.775	1.775
CS8.23A	Chuichu Rd UP (#1197) Freigtht / Bridge Vertical Clearance Mitigation	MP 173.55	1.26	0.042	0.042	0.00	2.62	0.000	0.100	0.100	0.00	0.00	0.000	2.409	2.409	0.00	0.69	0.000	0.000	0.000	0.000	0.11	0.000	0.500	0.189	0.311	1.74	0.540	0.540
CS8.23B	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	MP 173.55	6.21	0.042	0.042	0.00	0.00	0.000	0.100	0.100	0.00	0.86	0.000	2.409	2.409	0.00	0.69	0.000	0.000	0.000	0.000	0.00	0.000	0.500	0.150	0.350	1.74	0.608	0.608

Emphasis Area Scoring

				Safety Emphasis Area						Mobility Emphasis Area						Freight Emphasis Area									
Candidate Solution #	Candidate Solution Name	Milepost Location	Estimated Cost ($ millions)	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	Total Factored Benefit	VMT Factor	NPV Factor	Performance Effectiveness Score
CS8.3B	WB Pavement Improvements	MP 6-11	$ 31.30	1.813	1.787	0.026	1.40	1.50	0.055	0.000	0.000	0.000	2.95	1.50	0.000	0.757	0.757	0.000	2.58	1.50	0.000	1.539	3.31	15.3	2.5
CS8.5	Telegraph Pass Safety Improvements	MP 16.3-21.4	$ 0.14	1.813	1.773	0.040	0.96	1.50	0.058	0.000	0.000	0.000	5.66	1.50	0.000	0.757	0.750	0.007	5.56	1.50	0.057	4.462	3.49	20.20	2247.5
CS8.6A	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	MP 21.06	$ 1.26	1.813	1.813	0.000	0.96	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	5.56	1.50	0.000	1.379	0.29	15.30	4.8
CS8.6B	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	MP 21.06	$ 3.91	1.813	1.813	0.000	0.96	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	5.56	1.50	0.000	2.441	0.29	30.60	5.4
CS8.7	Ligurta Area Safety Improvements	MP 24-25	$ 1.10	1.813	1.753	0.061	0.73	1.50	0.067	0.000	0.000	0.000	3.84	1.50	0.000	0.757	0.743	0.014	5.17	1.50	0.112	0.646	0.76	20.20	9.0
CS8.8	Mohawk Area Safety Improvements	MP 54-54.5	$ 0.28	1.813	1.777	0.036	0.73	1.50	0.040	0.000	0.000	0.000	3.60	1.50	0.000	0.757	0.740	0.017	5.17	1.50	0.130	0.421	0.40	20.20	11.9
CS8.9	East of Mohawk Area Safety Improvements	MP 63-67	$ 0.03	1.813	1.812	0.001	0.66	1.50	0.001	0.000	0.000	0.000	4.80	1.50	0.000	0.757	0.734	0.023	4.98	1.50	0.172	0.181	2.20	20.20	267.2
CS8.10	Maricopa County Line Area Safety Improvements	MP 76-78	$ 4.43	1.813	1.783	0.030	0.66	1.50	0.030	0.000	0.000	0.000	4.17	1.50	0.000	0.757	0.752	0.005	4.98	1.50	0.034	0.251	1.26	20.20	1.4
CS8.11B	Gillespie Canal BR (#489) (EB) Bridge Project	MP 107.02	$ 1.05	1.813	1.813	0.000	0.71	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	5.17	1.50	0.000	1.255	0.19	30.60	7.1
CS8.12	Paloma Area Safety Improvements	MP 80-82	$ 2.21	1.813	1.800	0.014	0.71	1.50	0.015	0.000	0.000	0.000	4.23	1.50	0.000	0.757	0.753	0.004	5.17	1.50	0.028	0.159	1.35	20.20	2.0
CS8.13A	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	MP 144.55	$ 1.26	1.813	1.813	0.000	0.49	1.50	0.000	0.000	0.000	0.000	3.43	1.50	0.000	0.757	0.757	0.000	5.03	1.50	0.000	1.191	0.25	15.30	3.5
CS8.13B	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	MP 144.55	$ 4.80	1.813	1.813	0.000	0.49	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	5.03	1.50	0.000	2.807	0.25	30.60	4.4
CS8.18A	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	MP 161.60	$ 1.26	1.813	1.813	0.000	0.66	1.50	0.000	0.000	0.000	0.000	3.42	1.50	0.000	0.757	0.757	0.000	4.82	1.50	0.000	1.585	0.21	15.30	4.0
CS8.18B	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	MP 161.60	$ 7.20	1.813	1.813	0.000	0.66	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	4.82	1.50	0.000	1.948	0.21	30.60	1.7
CS8.19A	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	MP 162.50	$ 1.26	1.813	1.813	0.000	0.66	1.50	0.000	0.000	0.000	0.000	3.42	1.50	0.000	0.757	0.757	0.000	0.00	1.50	0.000	1.729	0.21	15.30	4.4
CS8.19B	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	MP 162.50	$ 5.86	1.813	1.813	0.000	0.66	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	4.82	1.50	0.000	1.907	0.21	30.60	2.1
CS8.20A	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	MP 164.50	$ 1.26	1.813	1.813	0.000	0.66	1.50	0.000	0.000	0.000	0.000	3.42	1.50	0.000	0.757	0.757	0.000	4.82	1.50	0.000	1.773	0.21	15.30	4.5
CS8.20B	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	MP 164.50	$ 6.50	1.813	1.813	0.000	0.66	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	4.82	1.50	0.000	1.773	0.21	30.60	1.7
CS8.21	Arizola Area Safety Improvements	MP 175-176	$ 0.16	1.813	1.742	0.071	0.69	1.50	0.074	0.000	0.000	0.000	3.68	1.50	0.000	0.757	0.744	0.012	5.07	1.50	0.095	2.449	0.52	20.20	162.0
CS8.22A	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	MP 172.55	$ 1.26	1.813	1.813	0.000	0.69	1.50	0.000	0.000	0.000	0.000	3.44	1.50	0.000	0.757	0.757	0.000	5.07	1.50	0.000	1.553	0.27	15.30	5.1
CS8.22B	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	MP 172.55	$ 7.44	1.813	1.813	0.000	0.69	1.50	0.000	0.000	0.000	0.000	3.33	1.50	0.000	0.757	0.757	0.000	5.07	1.50	0.000	1.318	0.27	30.60	1.5
CS8.23A	Chuichu Rd UP (#1197) Freigtht / Bridge Vertical Clearance Mitigation	MP 173.55	$ 1.26	1.813	1.813	0.000	0.69	1.50	0.000	0.000	0.000	0.000	0.11	1.50	0.000	0.757	0.757	0.000	1.74	1.50	0.000	1.775	0.27	15.30	5.8
CS8.23B	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	MP 173.55	$ 6.21	1.813	1.813	0.000	0.69	1.50	0.000	0.000	0.000	0.000	0.00	1.50	0.000	0.757	0.757	0.000	1.74	1.50	0.000	0.540	0.27	30.60	0.7

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			
CS8.3B	WB Pavement Improvements	MP 6-11	$ 31.30	1.475	95.8%	0.000	0.0%	0.064	4.2%	0.000	0.0%	0.000	0.0%	1.539	1.14	1.51	1.78	1.36	1.36	1.167	1.00	**3**
CS8.5	Telegraph Pass Safety Improvements	MP 16.3-21.4	$ 0.14	0.000	0.0%	0.000	0.0%	1.417	31.8%	0.000	0.0%	3.045	68.2%	4.462	1.14	1.51	1.78	1.36	1.36	1.493	1.46	**4905**
CS8.6A	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	MP 21.06	$ 1.26	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.379	100.0%	1.379	1.14	1.51	1.78	1.36	1.36	1.360	1.46	**9**
CS8.6B	Dome Valley Rd TI UP (#1325) (WB) Freight / Bridge Vertical Clearance Mitigation	MP 21.06	$ 3.91	0.000	0.0%	0.962	39.4%	0.000	0.0%	0.000	0.0%	1.480	60.6%	2.441	1.14	1.51	1.78	1.36	1.36	1.419	1.46	**11**
CS8.7	Ligurta Area Safety Improvements	MP 24-25	$ 1.10	0.000	0.0%	0.000	0.0%	0.482	74.7%	0.000	0.0%	0.164	25.3%	0.646	1.14	1.51	1.78	1.36	1.36	1.674	1.08	**16**
CS8.8	Mohawk Area Safety Improvements	MP 54-54.5	$ 0.28	0.000	0.0%	0.000	0.0%	0.240	56.9%	0.000	0.0%	0.181	43.1%	0.421	1.14	1.51	1.78	1.36	1.36	1.599	1.08	**21**
CS8.9	East of Mohawk Area Safety Improvements	MP 63-67	$ 0.03	0.000	0.0%	0.000	0.0%	0.008	4.4%	0.000	0.0%	0.173	95.6%	0.181	1.14	1.51	1.78	1.36	1.36	1.379	0.85	**312**
CS8.10	Maricopa County Line Area Safety Improvements	MP 76-78	$ 4.43	0.000	0.0%	0.000	0.0%	0.217	86.5%	0.000	0.0%	0.034	13.5%	0.251	1.14	1.51	1.78	1.36	1.36	1.723	0.85	**2**
CS8.11B	Gillespie Canal BR (#489) (EB) Bridge Project	MP 107.02	$ 1.05	0.000	0.0%	1.255	100.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.255	1.14	1.51	1.78	1.36	1.36	1.510	0.77	**8**
CS8.12	Paloma Area Safety Improvements	MP 80-82	$ 2.21	0.000	0.0%	0.000	0.0%	0.131	82.3%	0.000	0.0%	0.028	17.7%	0.159	1.14	1.51	1.78	1.36	1.36	1.706	0.77	**3**
CS8.13A	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	MP 144.55	$ 1.26	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.191	100.0%	1.191	1.14	1.51	1.78	1.36	1.36	1.360	0.62	**3**
CS8.13B	Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	MP 144.55	$ 4.80	0.000	0.0%	1.571	56.0%	0.000	0.0%	0.000	0.0%	1.236	44.0%	2.807	1.14	1.51	1.78	1.36	1.36	1.444	0.62	**4**
CS8.18A	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	MP 161.60	$ 1.26	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.585	100.0%	1.585	1.14	1.51	1.78	1.36	1.36	1.360	0.62	**3**
CS8.18B	Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	MP 161.60	$ 7.20	0.000	0.0%	0.233	12.0%	0.000	0.0%	0.000	0.0%	1.715	88.0%	1.948	1.14	1.51	1.78	1.36	1.36	1.378	0.62	**1**
CS8.19A	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	MP 162.50	$ 1.26	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.729	100.0%	1.729	1.14	1.51	1.78	1.36	1.36	1.360	0.62	**4**
CS8.19B	Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	MP 162.50	$ 5.86	0.000	0.0%	0.192	10.1%	0.000	0.0%	0.000	0.0%	1.715	89.9%	1.907	1.14	1.51	1.78	1.36	1.36	1.375	0.62	**2**
CS8.20A	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	MP 164.50	$ 1.26	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.773	100.0%	1.773	1.14	1.51	1.78	1.36	1.36	1.360	0.62	**4**
CS8.20B	Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	MP 164.50	$ 6.50	0.000	0.0%	0.566	24.8%	0.000	0.0%	0.000	0.0%	1.715	75.2%	2.281	1.14	1.51	1.78	1.36	1.36	1.397	0.62	**2**
CS8.21	Arizola Area Safety Improvements	MP 175-176	$ 0.16	0.000	0.0%	0.000	0.0%	1.202	69.8%	0.000	0.0%	0.519	30.2%	1.722	1.14	1.51	1.78	1.36	1.36	1.653	1.00	**268**
CS8.22A	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	MP 172.55	$ 1.26	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.318	100.0%	1.318	1.14	1.51	1.78	1.36	1.36	1.360	1.00	**7**
CS8.22B	Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	MP 172.55	$ 7.44	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	1.775	100.0%	1.775	1.14	1.51	1.78	1.36	1.36	1.360	1.00	**2**
CS8.23A	Chuichu Rd UP (#1197) Freigtht / Bridge Vertical Clearance Mitigation	MP 173.55	$ 1.26	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.540	100.0%	0.540	1.14	1.51	1.78	1.36	1.36	1.360	1.00	**8**
CS8.23B	Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	MP 173.55	$ 6.21	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.000	0.0%	0.608	100.0%	0.608	1.14	1.51	1.78	1.36	1.36	1.360	1.00	**1**

Appendix K: Preliminary Scoping Reports for Prioritized Solutions

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Central Yuma WB Pavement Improvements	
City/Town:	**County: Yuma**
COG/MPO: YMPO	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: (Milepost / Cross Street) 6	
End Limit: (Milepost / Cross Street) 11	
Project Length: 5	
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

Segment 8-1 has several pavement hot spots.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the pavement hot spots. The recommended solution intends to reduce pavement hot spots and increase pavement performance.

ADOT

PRELIMINARY SCOPING REPORT

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)*
The recommended solution could significantly impact normal traffic operations during construction.
The recommended solution proposes new infrastructure, presenting an environmental risk.
The recommended solution is near an urbanized area, presenting possible stakeholder issues.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$831,000	$2,770,000	$0	$27,700,000	$31,301,000

RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

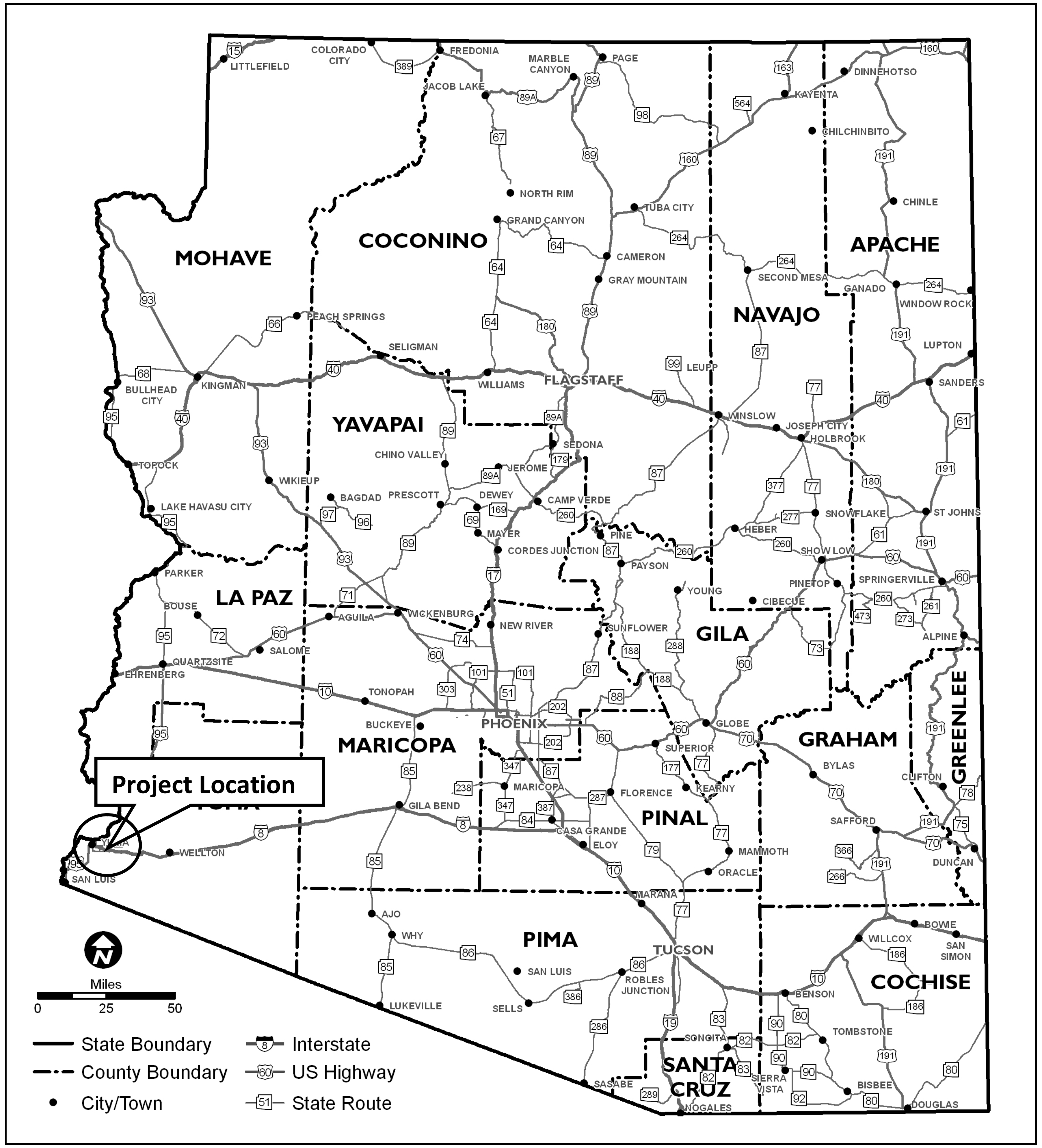
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

1) **State Location Map**
2) **Project Vicinity Map**
3) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option B** • Replace pavement • • • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option A** • Rehabilitate pavement • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Telegraph Pass Safety Improvements	
City/Town: East of Yuma	**County: Yuma**
COG/MPO: YMPO	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 16.3	
End Limit: MP 21.4	
Project Length: 5.1	
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

Segment 8-2 has a High Safety need.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the Safety need. The recommended solution is intended to improve safety and reduce the overall occurrence of crashes.

PROJECT RISKS

ADOT

PRELIMINARY SCOPING REPORT

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)*

The recommended solution proposes signing, which requires ground disturbance with new poles and foundations, presenting an environmental risk.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$3,600	$12,000	$0	$119,400	$135,000

RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

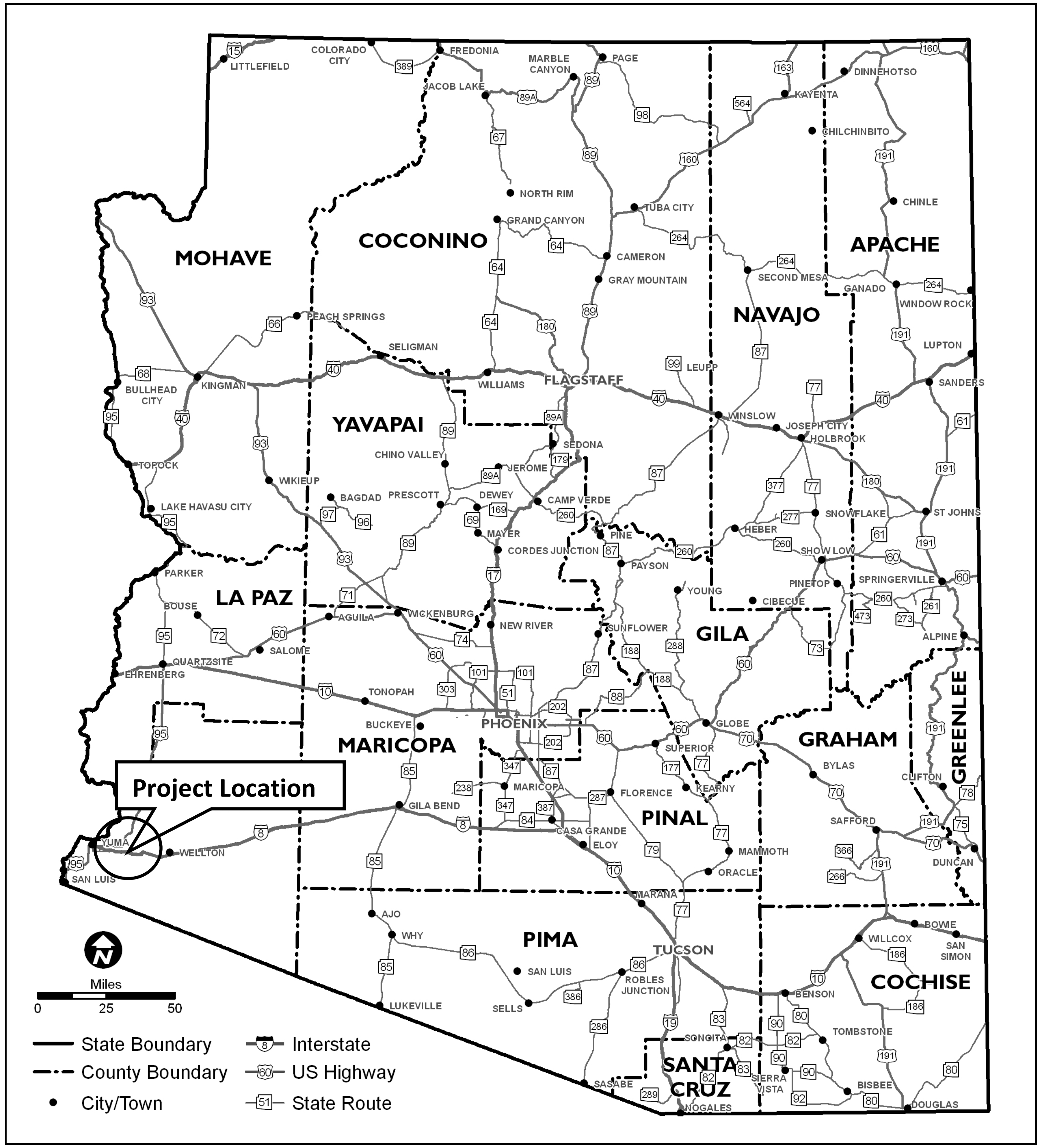
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

4) **State Location Map**
5) **Project Vicinity Map**
6) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY REPORT

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install chevrons at MP 20.5-21 • Install eastbound speed feedback sign at MP 19.5 •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Dome Valley Rd TI UP (#1325)	
City/Town: East of Yuma	**County: Yuma**
COG/MPO: YMPO	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 20.91	
End Limit: MP 21.21	
Project Length: 0.3	
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

Segment 8-2 has a Medium Freight need. Reprofiling the roadway is intended to reduce the Freight need in Segment 8-2 and increase vertical clearance.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the Freight need in segment 8-2. The recommended solution is intended to increase freight performance.

PROJECT RISKS

ADOT

PRELIMINARY SCOPING REPORT

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)*

The recommended solution could significantly impact normal traffic operations during construction.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$33,360	$111,900	$0	$1,119,000	$1,264,500

RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

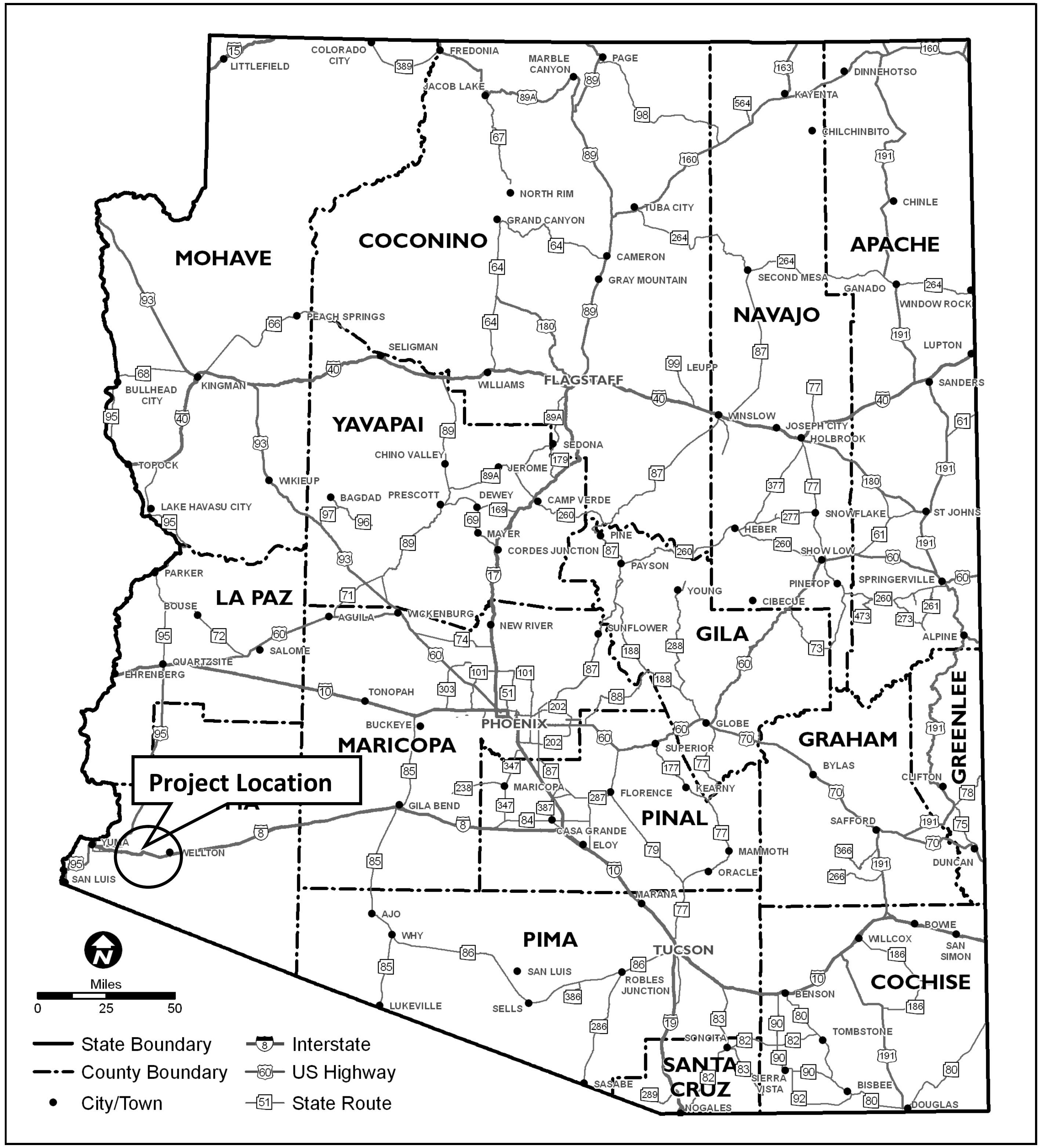
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

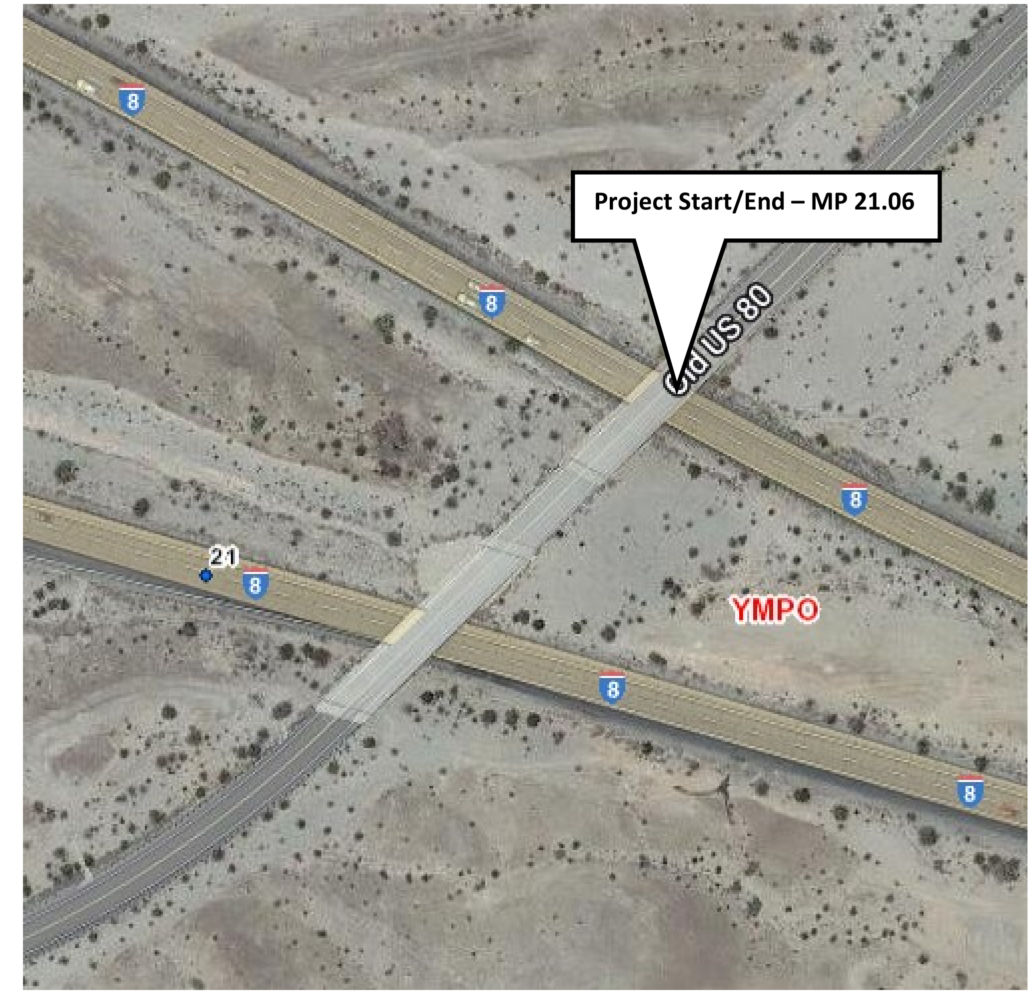
7) **State Location Map**
8) **Project Vicinity Map**
9) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP



ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option A** • Reprofile mainline •

SCOPE ITEMS CONSIDERED, BUT <u>NOT</u> INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option B** • Replace Bridge •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Ligurta Area Safety Improvements	
City/Town: Welton	**County: Yuma**
COG/MPO: YMPO	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP **24**	
End Limit: MP 25	
Project Length: 1	
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
Segment 8-3 has a High Safety need.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the of the Safety need in Segment 8-3. The recommended solution is intended to increase safety and reduce the overall occurrence of crashes.			

PROJECT RISKS
Check any risks identified that may impact the project's scope, schedule, or budget:

ADOT

PRELIMINARY SCOPING REPORT

☒ 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)* The recommended solution could significantly impact normal traffic operations during construction. The recommended solution proposes widening shoulders, which could present an environmental risk.	

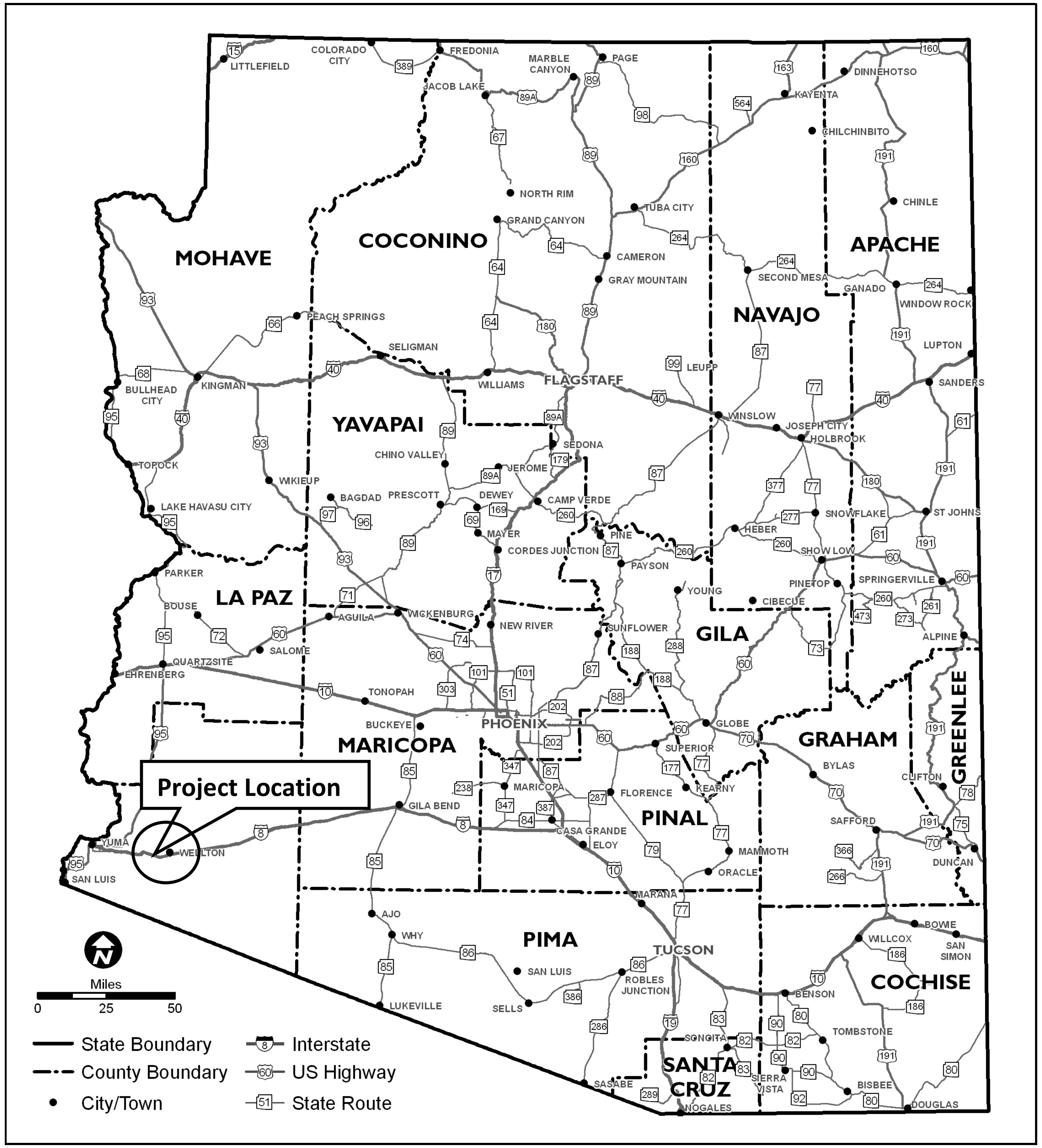
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $29,400	Design $98,000	Right-of-Way $0	Construction $980,000	Total $1,107,400

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
10) State Location Map **11) Project Vicinity Map** **12) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Widen WB median shoulder • • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • • • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Mohawk Area Safety Improvements	
City/Town: Approximately 14 miles west of Dateland	**County: Yuma**
COG/MPO: YMPO	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 54	
End Limit: MP 54.5	
Project Length: 0.5	
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
Segment 8-3 has a High Safety need.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the Safety need. The recommended solution is intended to improve safety and reduce the overall occurrence of crashes.			

PROJECT RISKS

ADOT

PRELIMINARY SCOPING REPORT

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)*
The recommended solution could significantly impact normal traffic operations during construction.
The recommended solution proposes guardrail, which requires ground disturbance, presenting an environmental risk.

POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

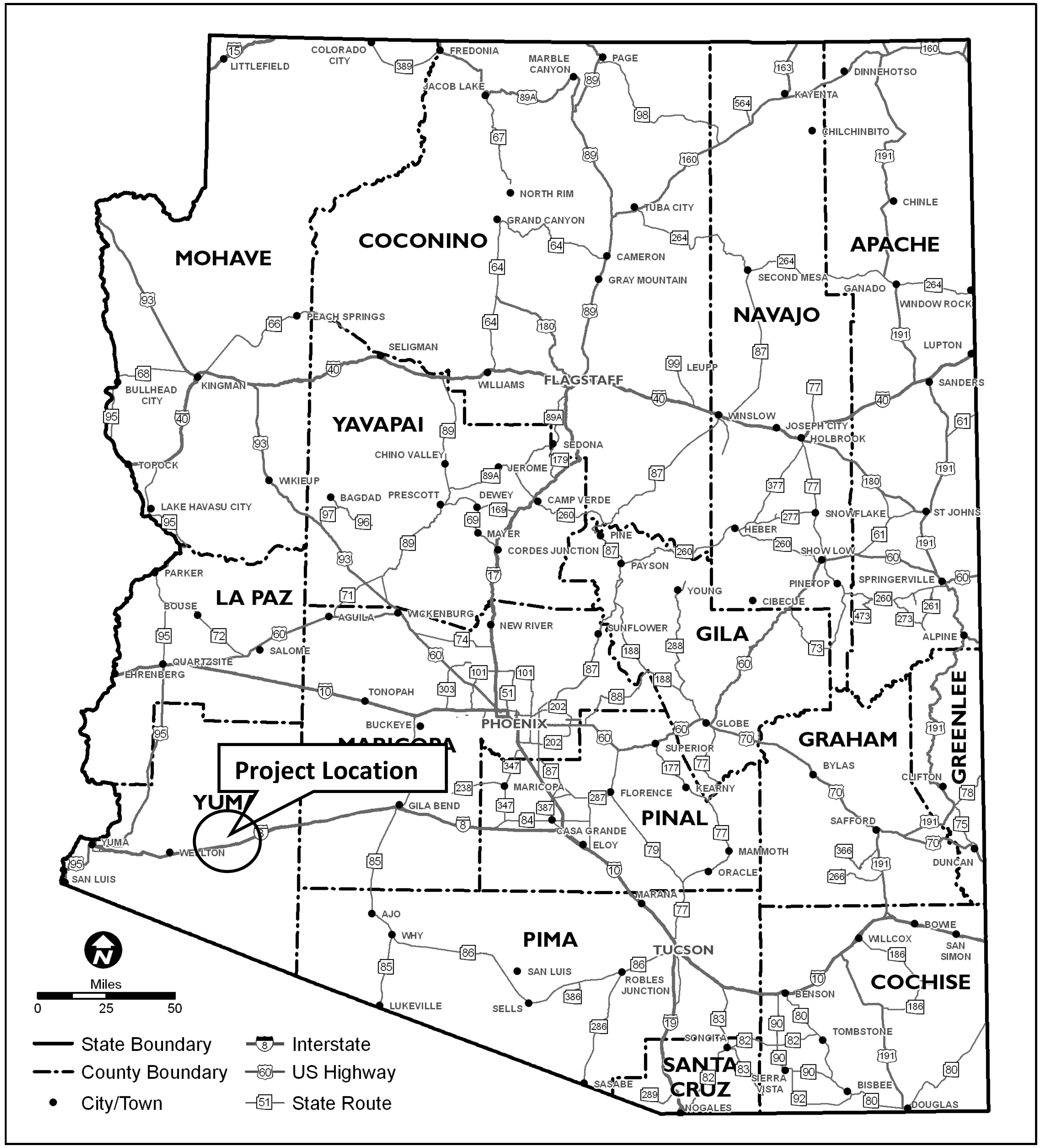
COST ESTIMATE				
Preliminary Engineering $7,500	Design $24,900	Right-of-Way $0	Construction $249,000	Total $281,400

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

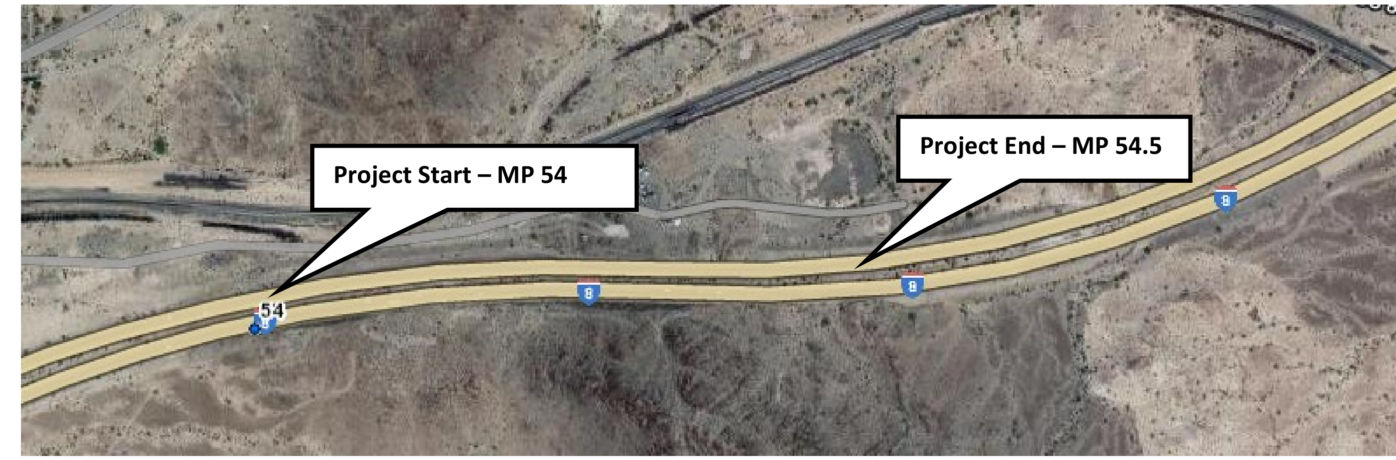
ATTACHMENTS

13) **State Location Map**
14) **Project Vicinity Map**
15) **Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install EB guardrail on the outside edge • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: East of Mohawk Area Safety Improvements	
City/Town: West of Dateland	**County: Yuma**
COG/MPO: YMPO	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 66.35	
End Limit: MP 66.95	
Project Length: 0.6	

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

Segment 8-4 has a High Safety need.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the Safety needs in Segment 8-4. The recommended solution is intended to improve safety and reduce the overall occurrence of crashes.

ADOT

PRELIMINARY SCOPING REPORT

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)*
The recommended solution proposes implementation of chevrons, which requires ground disturbance, presenting an environmental risk.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$900	$3,000	$0	$30,360	$34,260

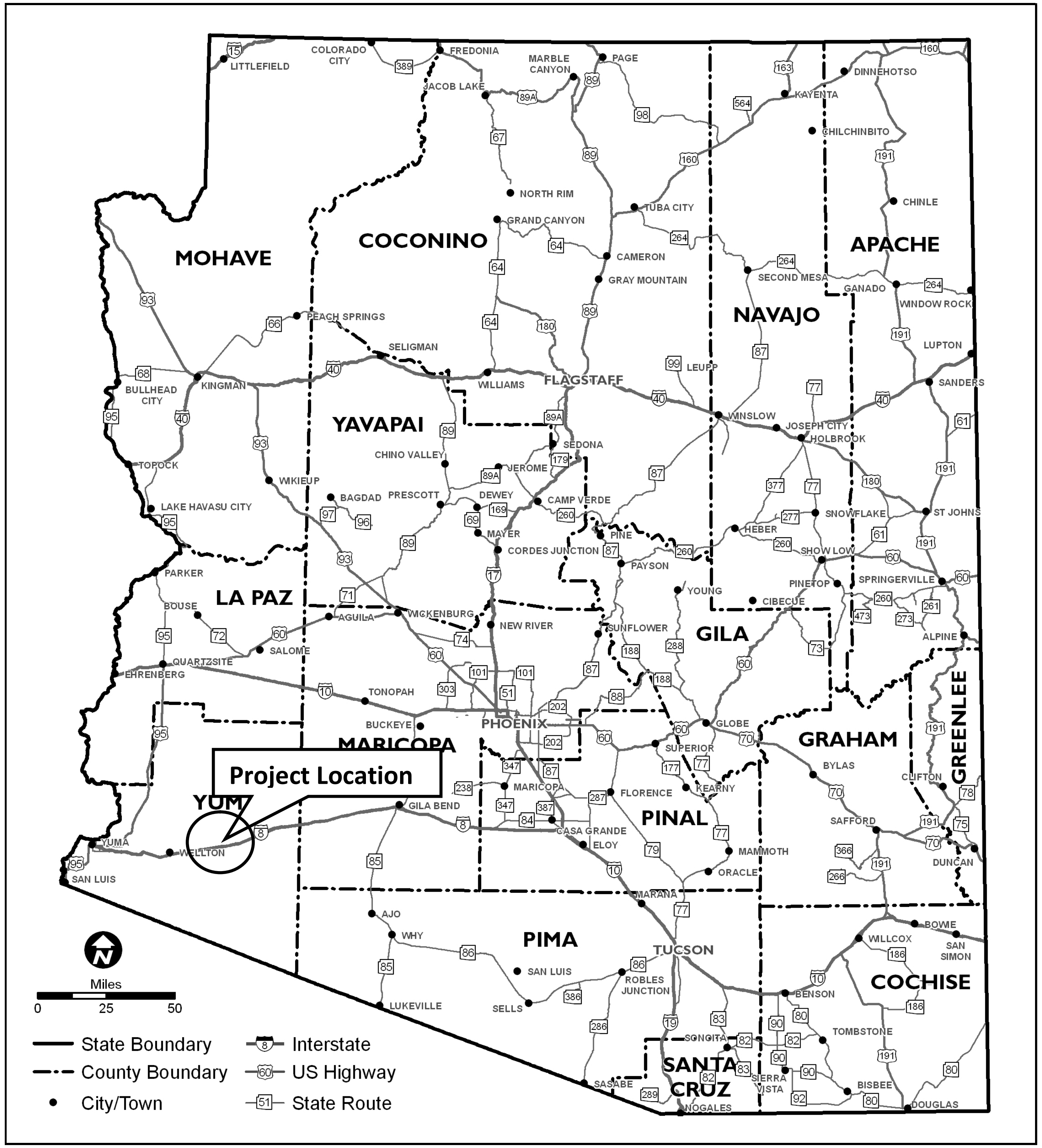
RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS

16) State Location Map
17) Project Vicinity Map
18) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install EB chevrons • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • • • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Maricopa County Line Area Safety Improvements	
City/Town: East of Dateland	**County: Yuma**
COG/MPO: YMPO	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 76	
End Limit: MP 78	
Project Length: 2	
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

Segment 8-4 has a high safety need.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the safety needs. Widening median shoulders is intended to increase safety and reduce the overall occurrence of crashes.

ADOT

PRELIMINARY SCOPING REPORT

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)*

The recommended solution could significantly impact normal traffic operations during construction.

The recommended solution proposes widening shoulders, presenting an environmental risk.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$58,800	$196,000	$0	$1,960,000	$2,214,800

RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

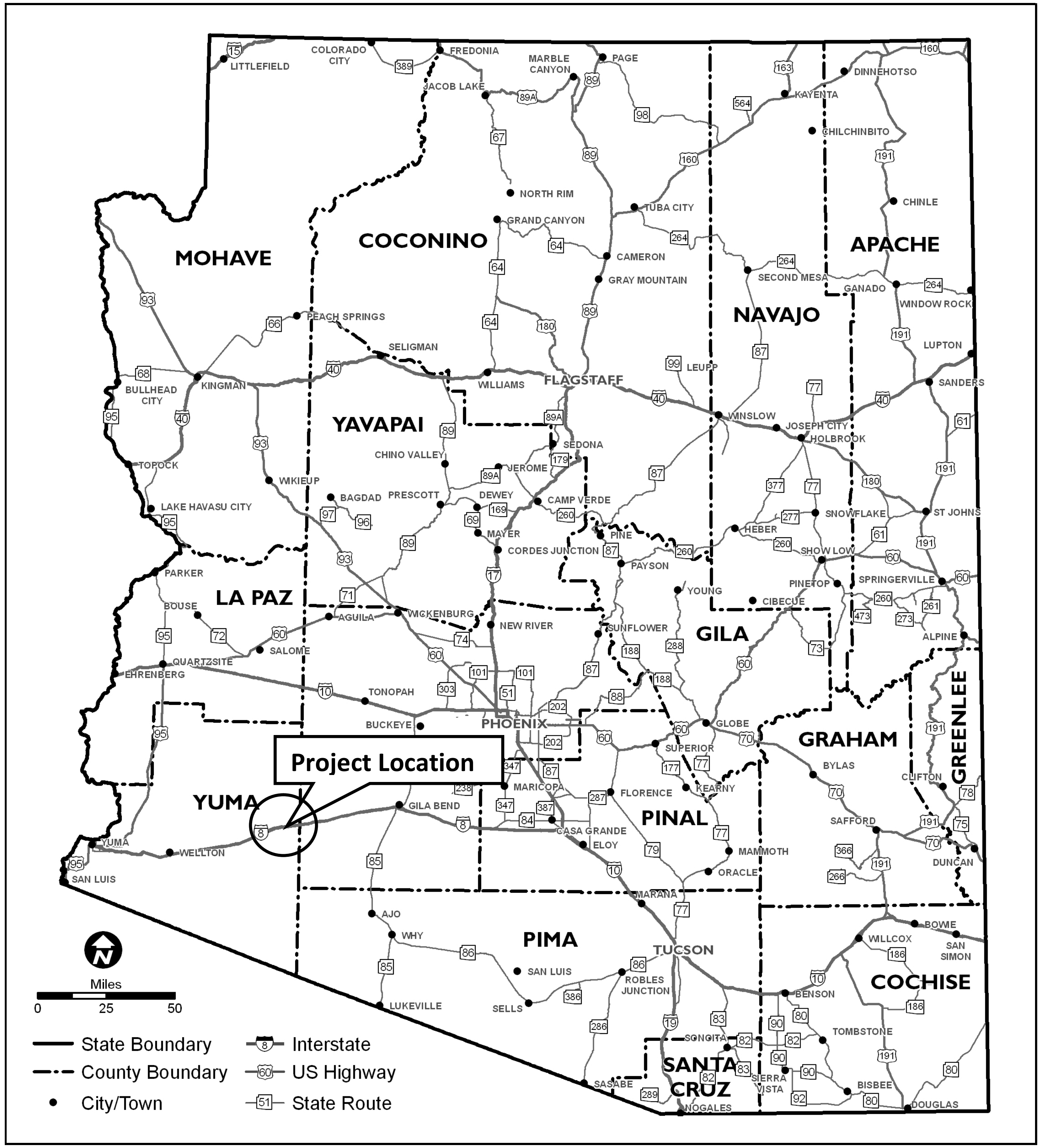
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

19) State Location Map
20) Project Vicinity Map
21) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Widen median shoulder • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Gillespie Canal BR (#489)	
City/Town: West of Gila Bend	**County: Maricopa**
COG/MPO: MAG	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 107.02	
End Limit: MP 107.02	
Project Length:	
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

Segment 8-5 has Bridge hot spots

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the Bridge hot spots in Segment 8-5.

ADOT

PRELIMINARY SCOPING REPORT

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)*
The recommended solution could significantly impact normal traffic operations during construction.

POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG ☐ Local	☐ TAP ☐ Private	☐ HSIP ☐ Tribal	☐ State ☐ Other:

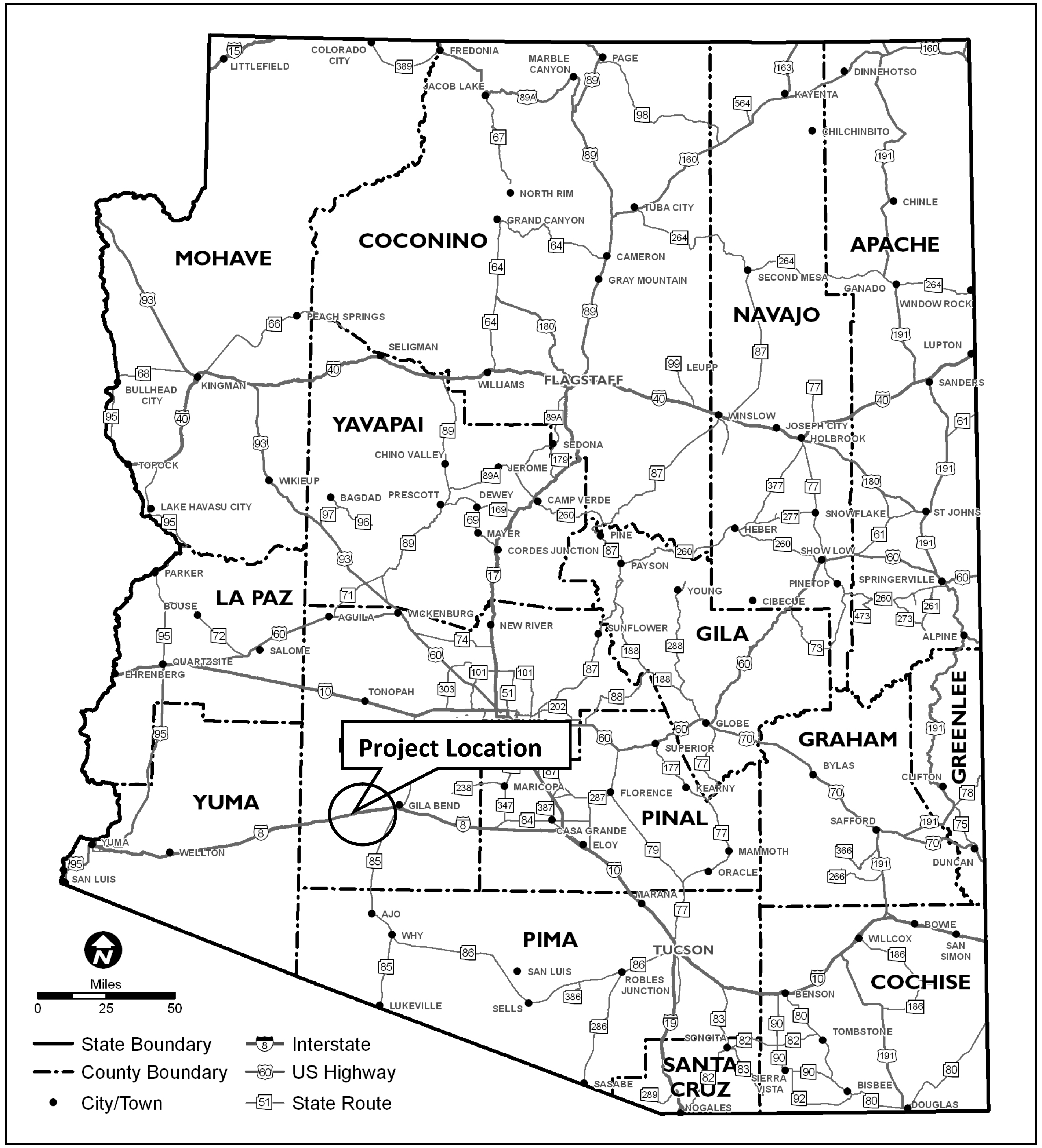
COST ESTIMATE				
Preliminary Engineering $27,900	Design $92,900	Right-of-Way $0	Construction $928,800	Total $1,049,600

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS

22) State Location Map
23) Project Vicinity Map
24) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option B** • Replace Bridge • • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option A** • Rehabilitate Bridge • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Paloma Area Safety Improvements	
City/Town: East of Dateland	**County: Maricopa**
COG/MPO: MAG	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 80	
End Limit: MP 82	
Project Length: 2	
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

Segment 8-5 has a medium safety need.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the safety need in Segment 8-5. The recommended solution is intended to improve safety and reduce the overall occurrence of crashes.

ADOT

PRELIMINARY SCOPING REPORT

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)*

The recommended solution could significantly impact normal traffic operations during construction.

The recommended solution proposes widening shoulders, presenting an environmental risk.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$58,800	$196,000	$0	$1,960,000	$2,214,800

RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

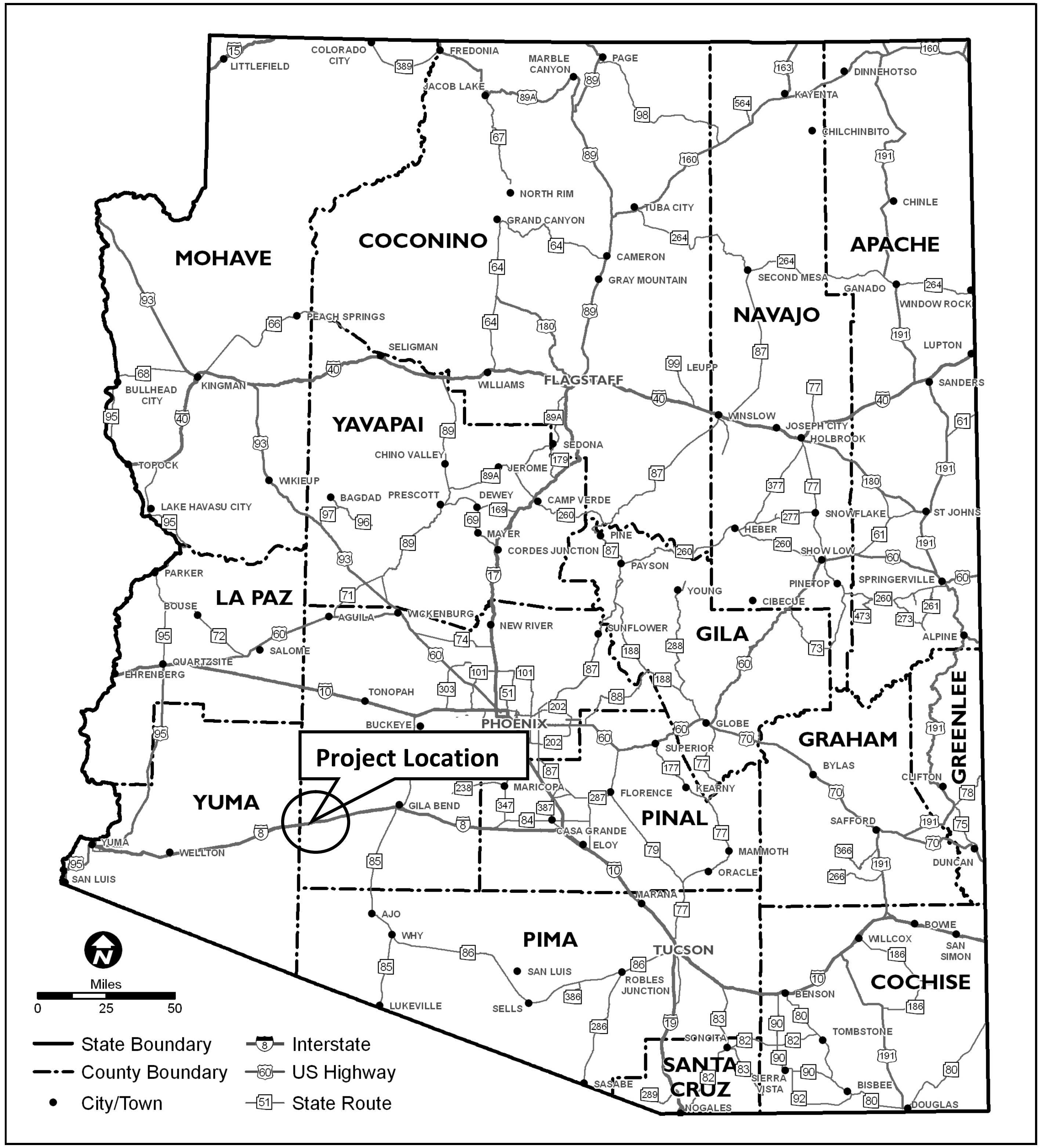
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

25) State Location Map
26) Project Vicinity Map
27) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Widen median shoulder • • •

SCOPE ITEMS CONSIDERED, BUT <u>NOT</u> INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • • • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Vekol Rd TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	
City/Town: Approximately 30 miles east of Gila Bend	**County: Maricopa**
COG/MPO: MAG	**ADOT District: Southwest**
Primary Route/Street: I-8	
Beginning Limit: MP 144.4	
End Limit: MP 144.7	
Project Length: 0.3	
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
Segment 8-7 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots. The recommended solution intends to improve freight performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

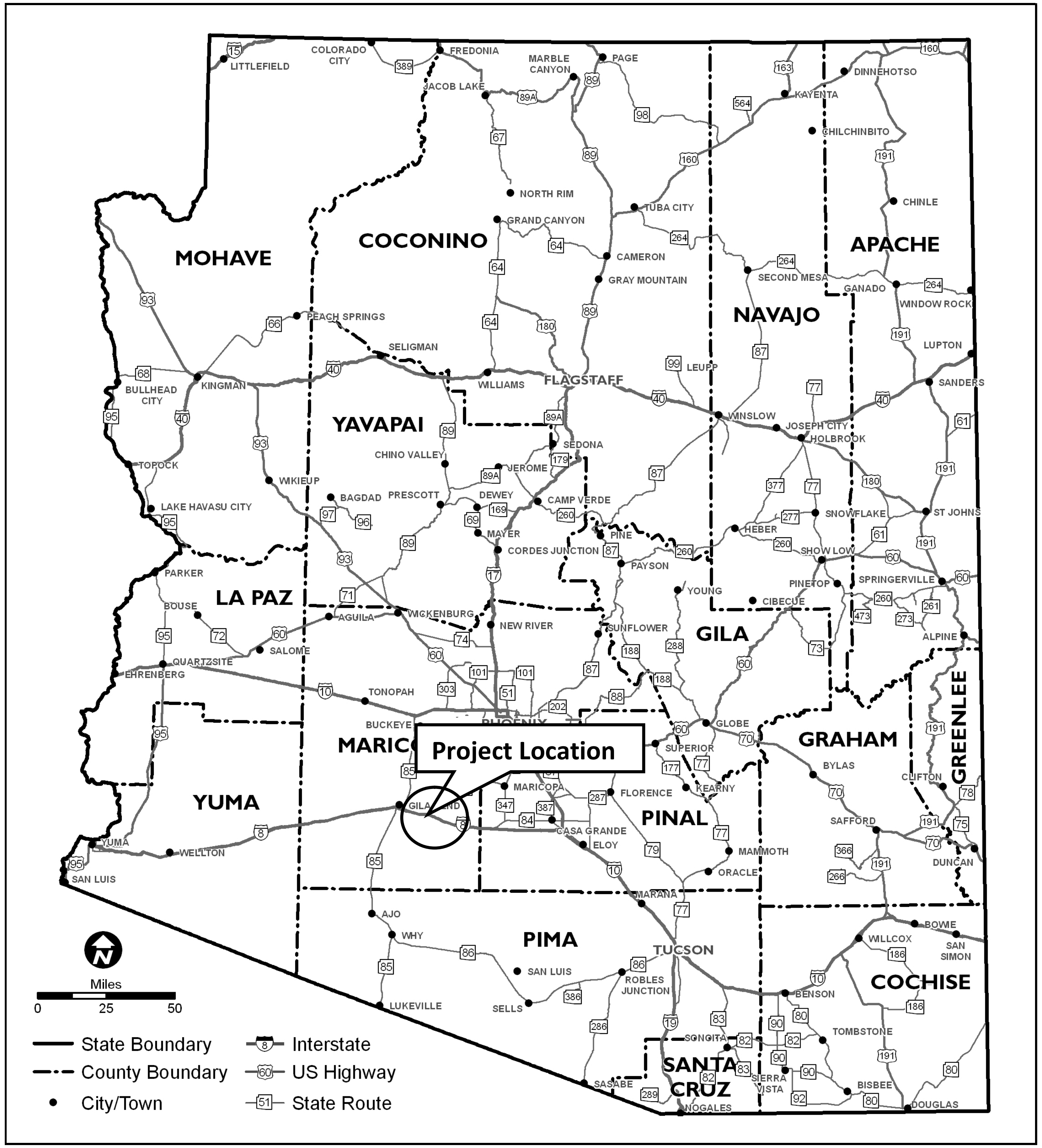
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $33,600	Design $111,900	Right-of-Way $0	Construction $1,119,000	Total $1,264,500

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
28) State Location Map **29) Project Vicinity Map** **30) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option A** • Reprofile mainline • • • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option B** • Replace Bridge • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Vekol Road TI UP (#550) Freight / Bridge Vertical Clearance Mitigation	
City/Town: Approximately 30 miles east of Gila Bend	**County: Maricopa**
COG/MPO: MAG	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 144.55	
End Limit: MP 144.55	
Project Length:	
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
Segment 8-7 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots in Segment 8-7. The recommended solution is intended to improve the freight performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

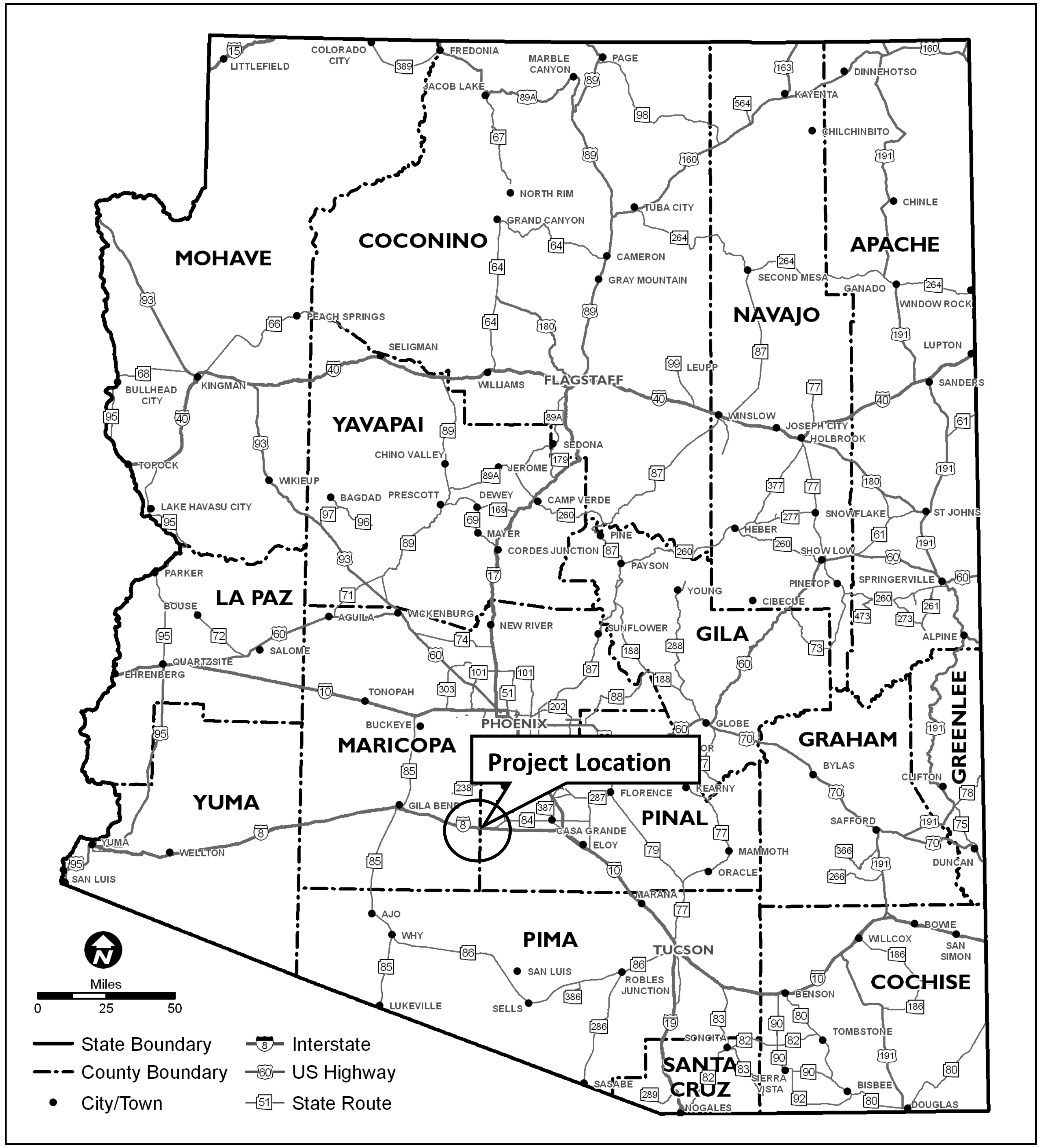
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $127,400	Design $424,600	Right-of-Way $0	Construction $4,245,600	Total $4,797,600

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
31) State Location Map **32) Project Vicinity Map** **33) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option B** • Replace Bridge • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option A** • Reprofile mainline •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 161.45	
End Limit: MP 161.75	
Project Length: 0.3	
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
Segment 8-8 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots in Segment 8-8. The recommended solution intends to improve fright performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

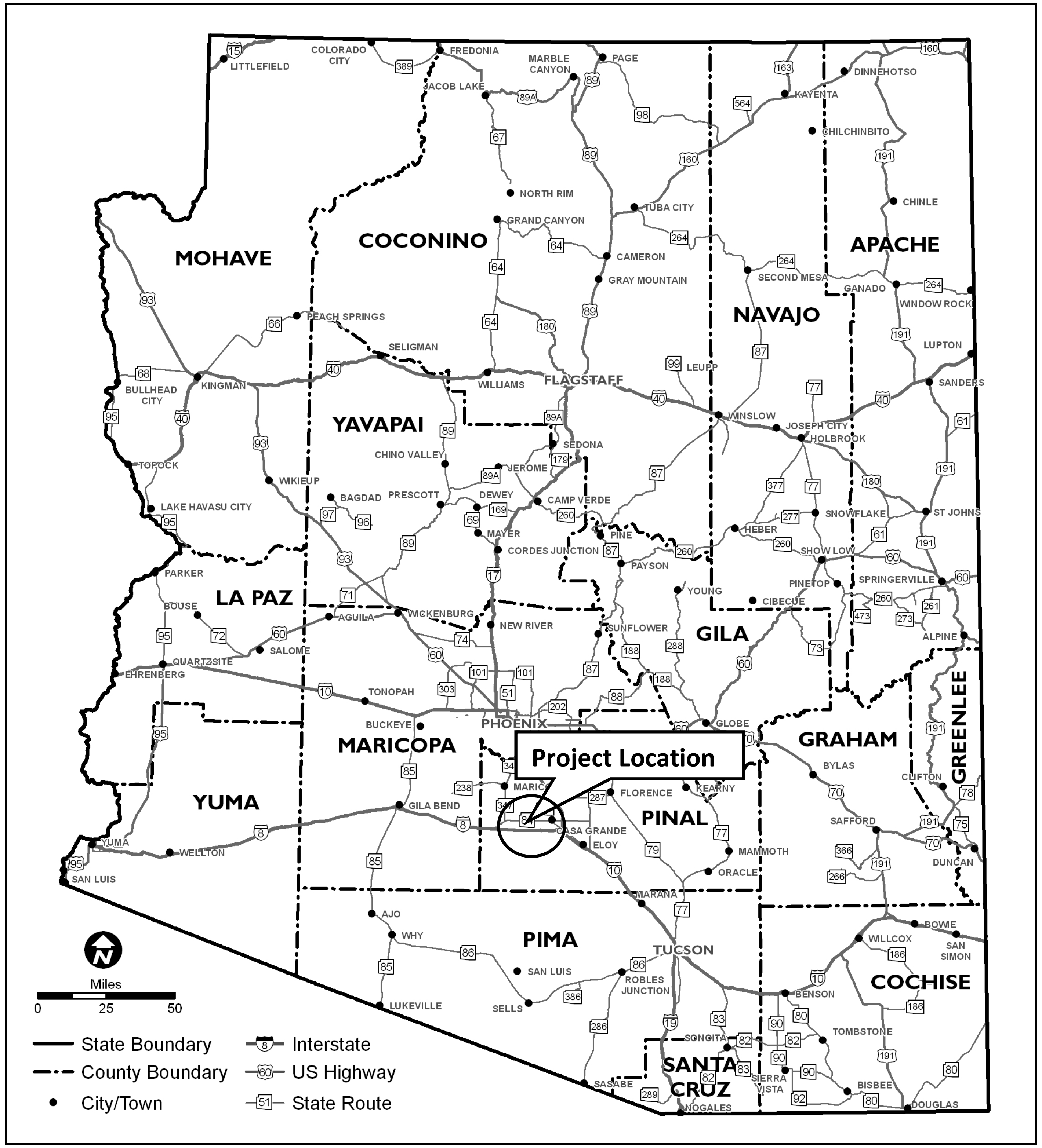
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $33,600	Design $111,900	Right-of-Way $0	Construction $1,119,000	Total $1,264,500

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
34) State Location Map **35) Project Vicinity Map** **36) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option A** • Reprofile mainline • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option B** • Replace Bridge • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Stanfield Rd TI UP (#1090) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 161.60	
End Limit: MP 161.60	
Project Length:	
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
Segment 8-8 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots. The recommended solution is intended to improve freight performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

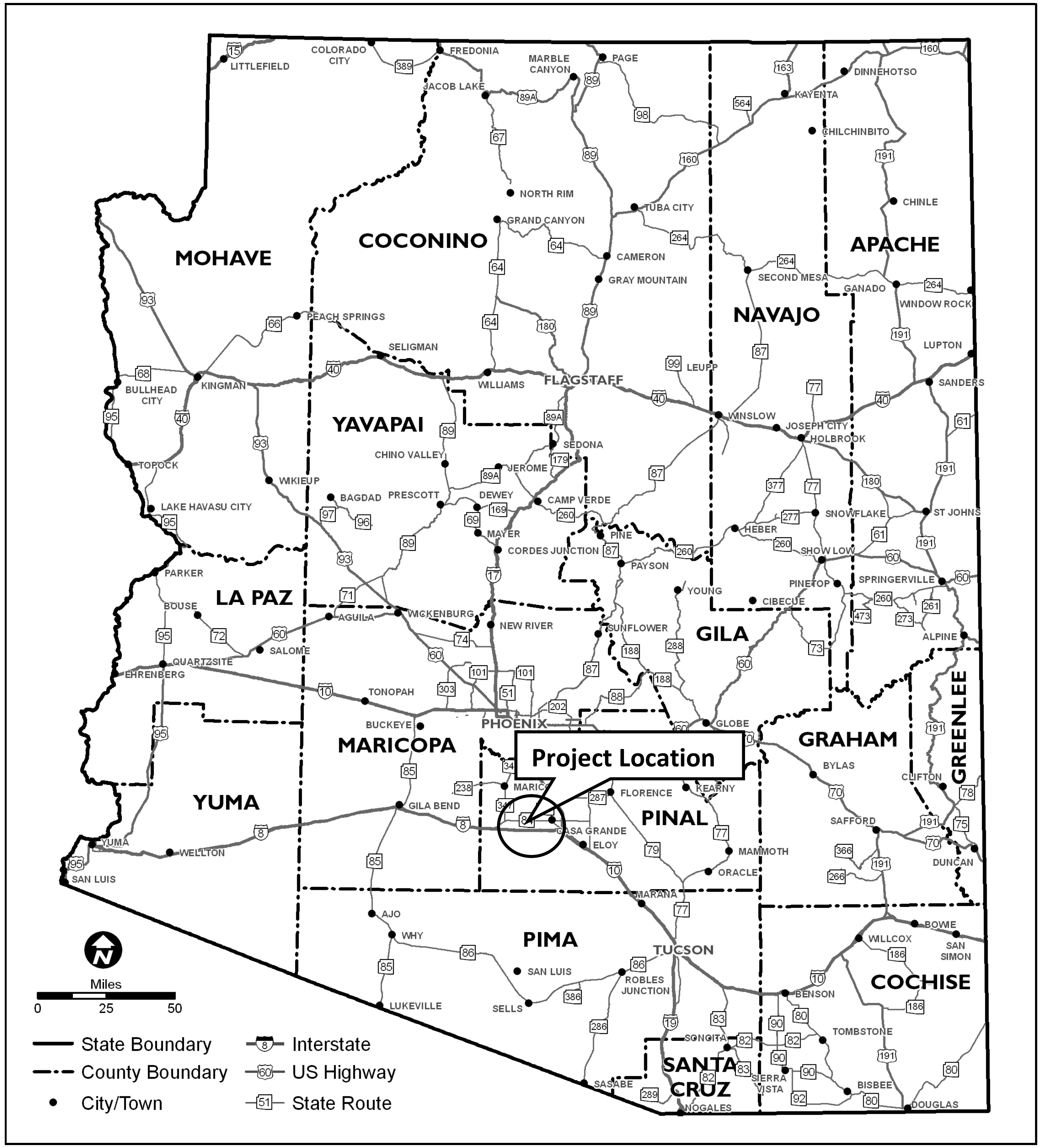
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $191,200	Design $637,400	Right-of-Way $0	Construction $6,373,890	Total $7,202,490

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

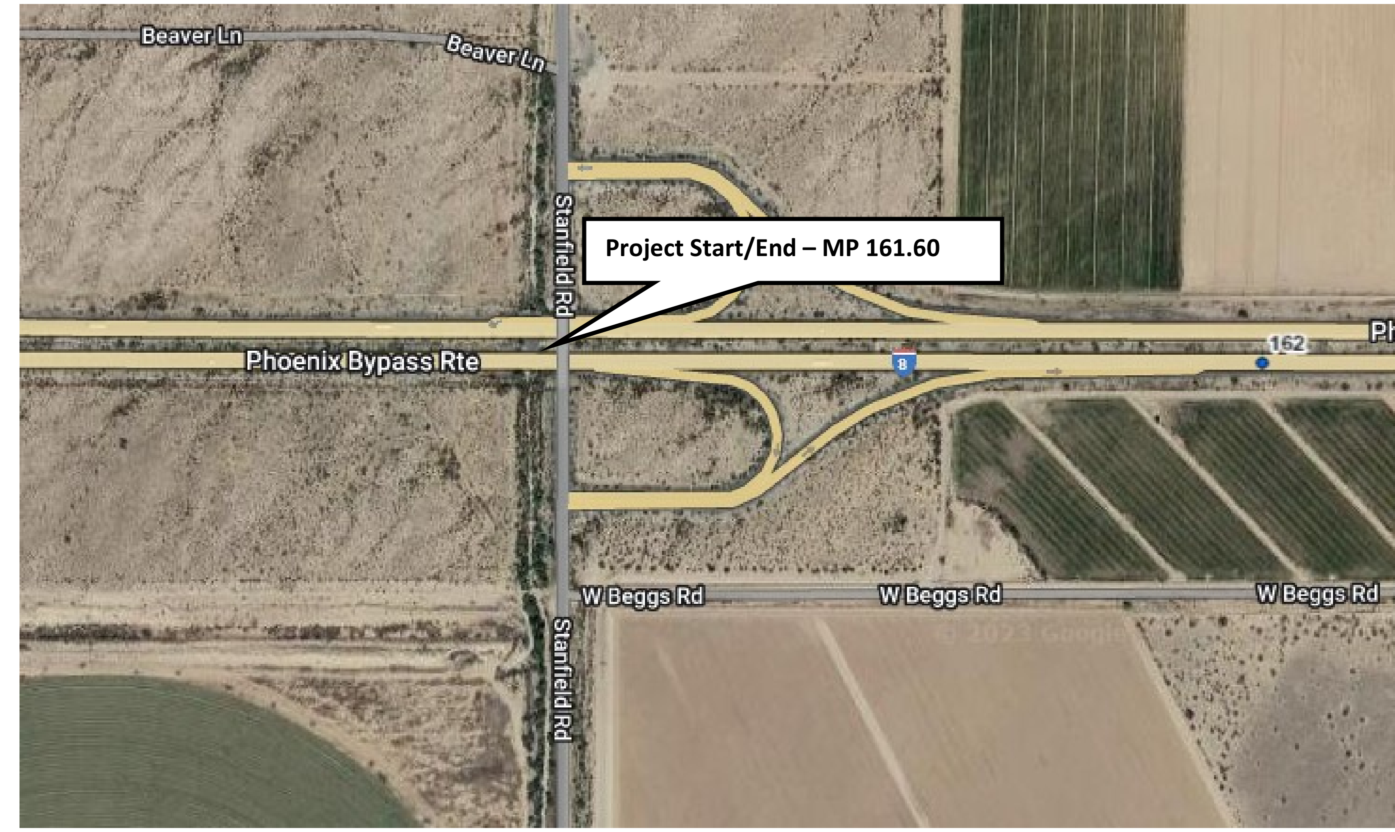
ATTACHMENTS
37) State Location Map **38) Project Vicinity Map** **39) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option B** • Replace Bridge • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option A** • Reprofile mainline • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 162.35	
End Limit: MP 162.65	
Project Length: 0.3	
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
Segment 8-8 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots. The recommended solution is intended to improve freight performance in Segment 8-8.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

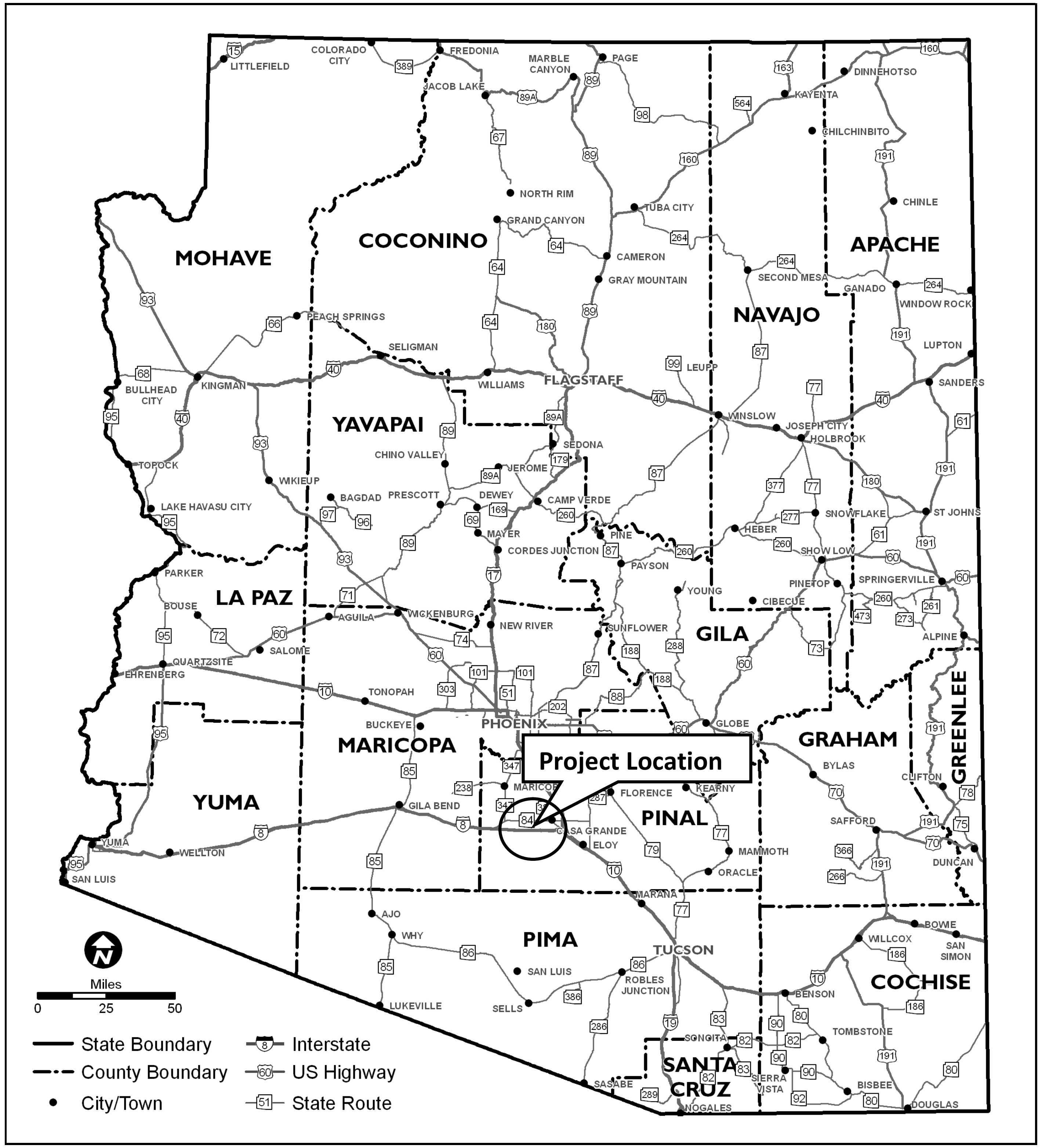
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $33,600	Design $111,900	Right-of-Way $0	Construction $1,119,000	Total $1,264,500

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
40) State Location Map **41) Project Vicinity Map** **42) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option A** • Reprofile mainline • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option B** • Replace Bridge • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Murphy Rd UP (#1091) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 162.50	
End Limit: MP 162.50	
Project Length:	
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
Segment 8-8 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots. The recommended solution is intended to improve freight performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

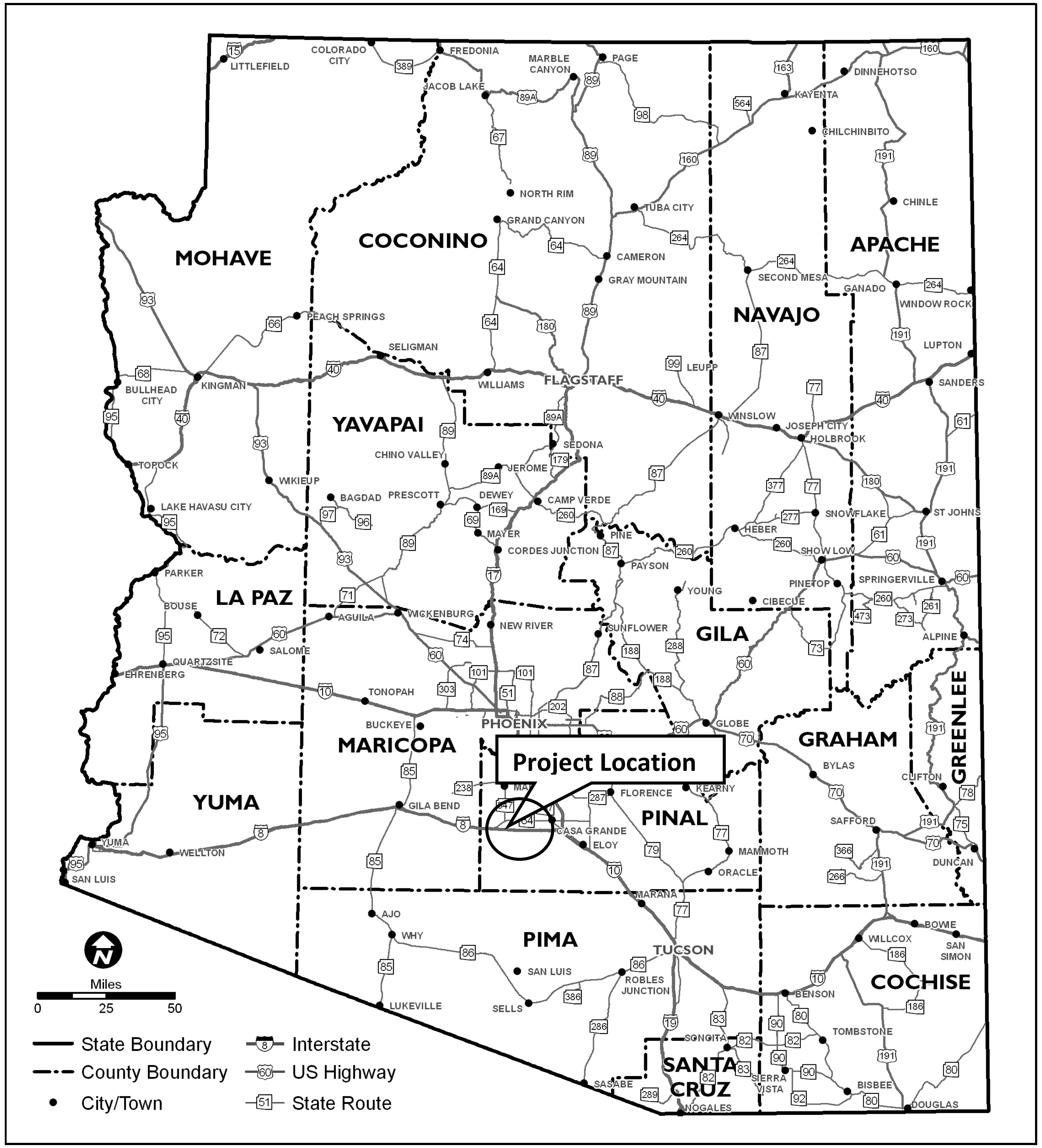
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $155,500	Design $518,400	Right-of-Way $0	Construction $5,184,390	Total $5,858,290

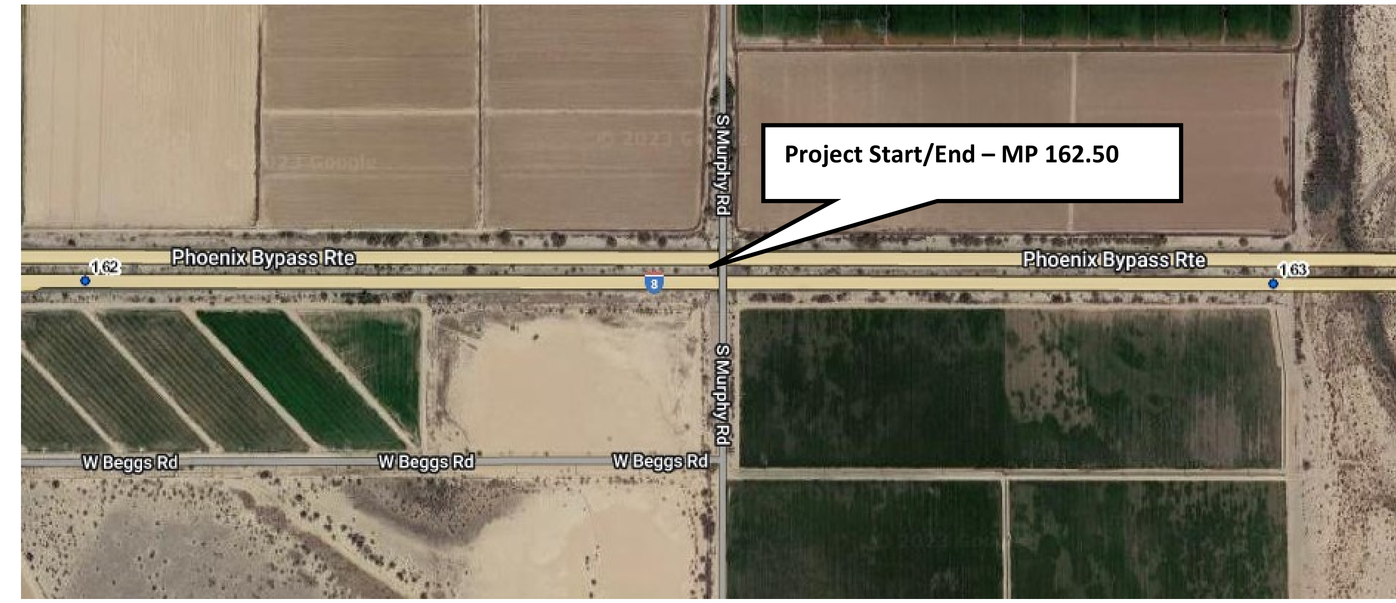
RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
43) State Location Map **44) Project Vicinity Map** **45) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option B** • Replace Bridge • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option A** • Reprofile mainline • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 164.35	
End Limit: MP 164.65	
Project Length: 0.3	
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

Segment 8-8 has freight hot spots.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☐	Expansion ☐

The recommended solution addresses a portion of the hot spot locations in segment 8-8. The recommended solution is intended to improve freight performance.

ADOT

PRELIMINARY SCOPING REPORT

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)*

The recommended solution could significantly impact normal traffic operations during construction.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$33,600	$111,900	$0	$1,119,000	$1,264,500

RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

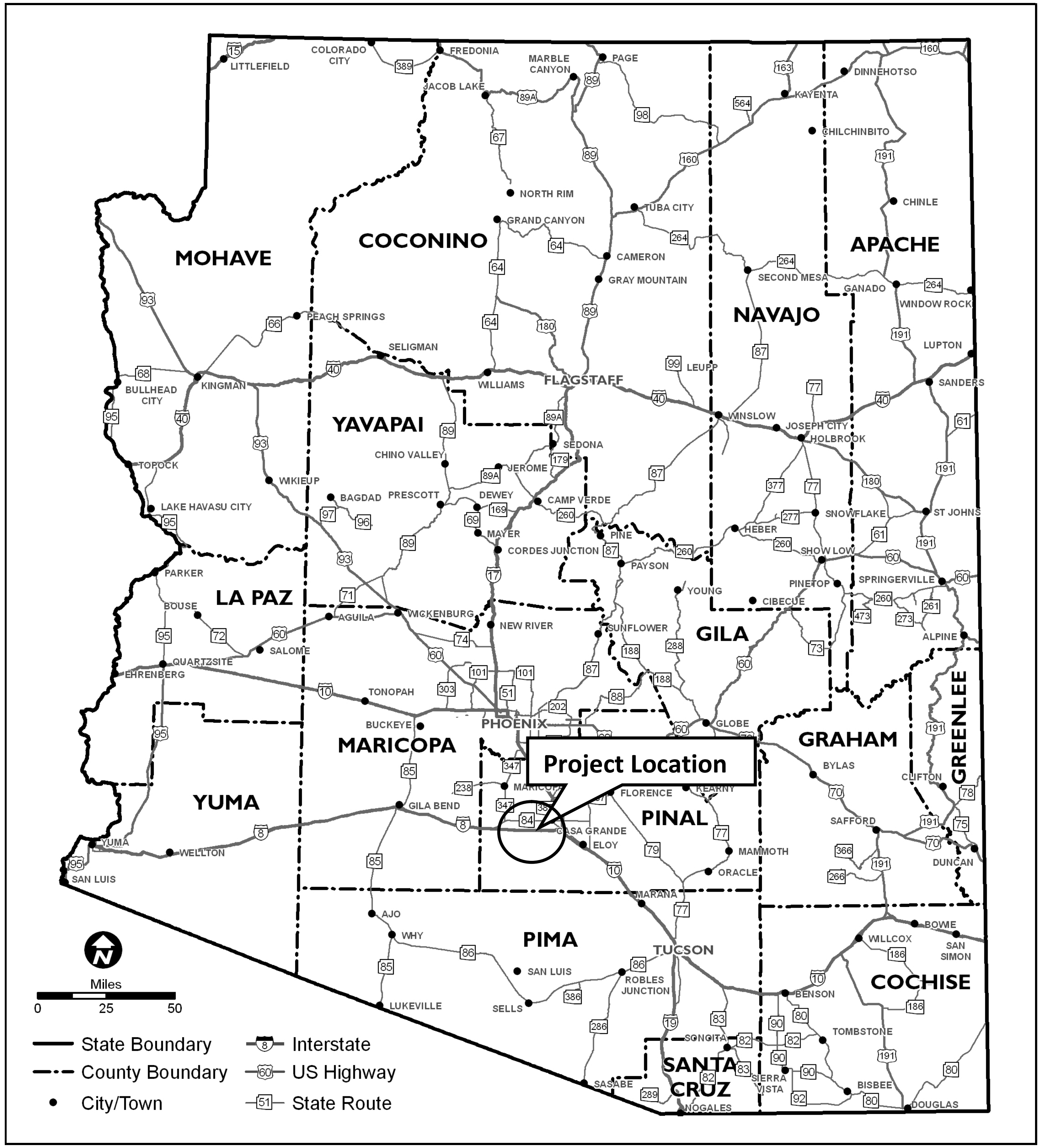
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

46) State Location Map
47) Project Vicinity Map
48) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option A** • Reprofile mainline • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option B** • Replace Bridge • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Russell Rd UP (#1094) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 164.50	
End Limit: MP 164.50	
Project Length:	
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
Segment 8-8 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the hot spots. The recommended solution is intended to improve freight performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* Recommended solution could significantly impact normal traffic operations during construction.	

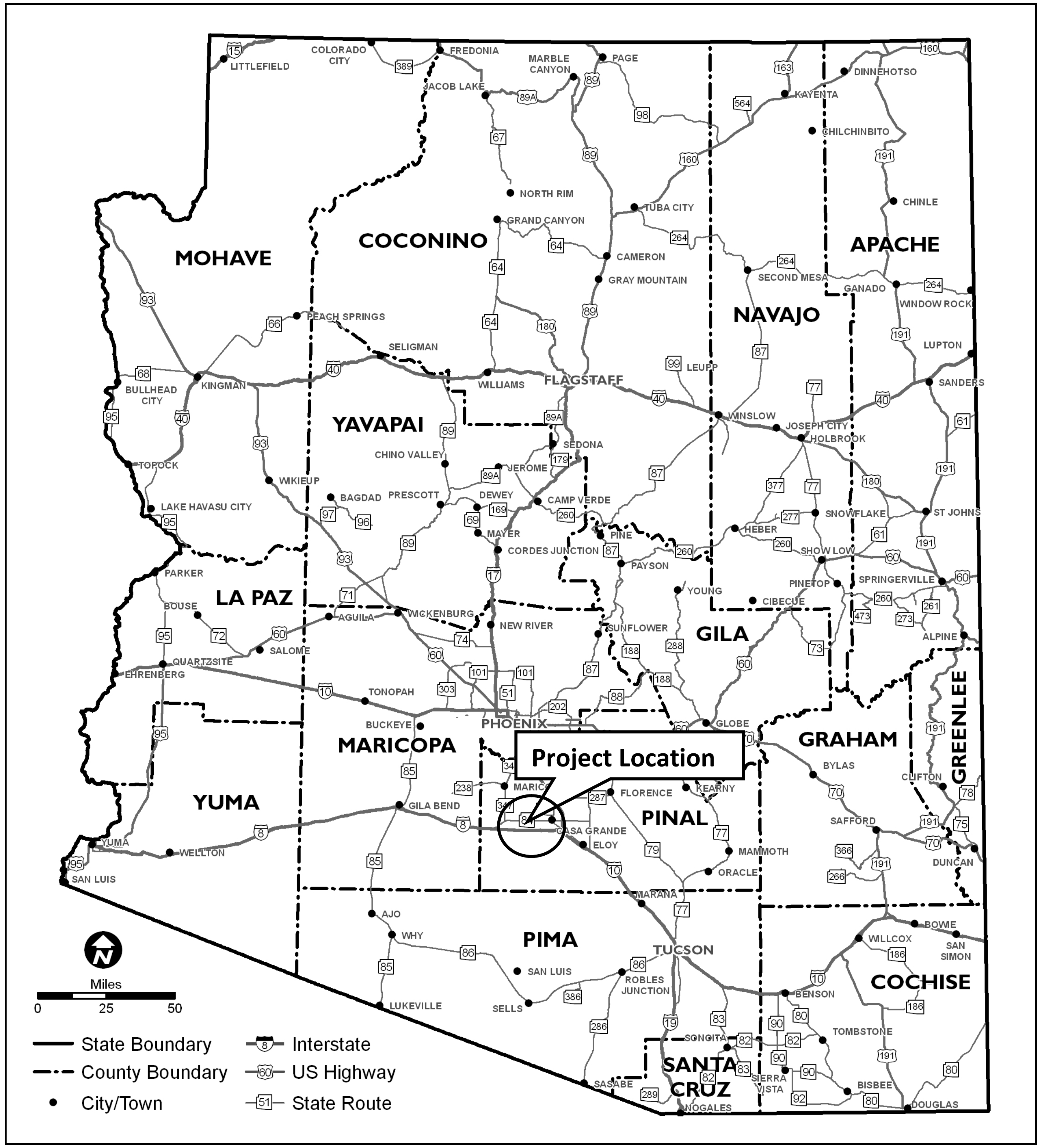
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $172,600	Design $575,500	Right-of-Way $0	Construction $5,754,740	Total $6,502,840

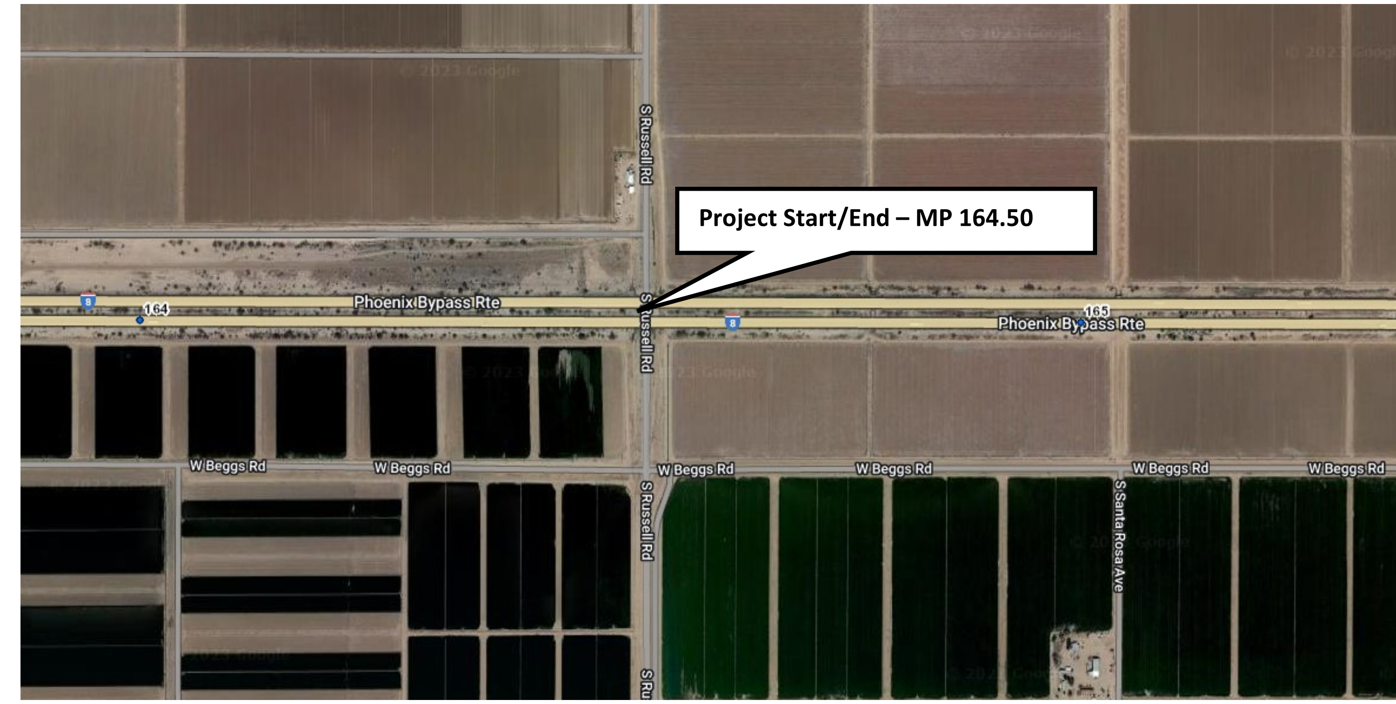
RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
49) State Location Map **50) Project Vicinity Map** **51) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format)
• **Option B**
• Replace Bridge
•
•

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why)
• **Option A**
• Reprofile mainline
•
•

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Arizola Area Safety Improvements	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 175	
End Limit: MP 176	
Project Length: 1	
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

Segment 8-9 has a medium safety need.

PROJECT PURPOSE

What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐

The recommended solution addresses a portion of the safety need. The recommended solution is intended to improve safety and reduce the overall occurrence of crashes.

ADOT

PRELIMINARY SCOPING REPORT

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)*

The recommended solution could significantly impact normal traffic operations during construction.

The recommended solution proposes implementing signing, which requires ground disturbance with new poles and foundations, presenting an environmental risk.

POTENTIAL FUNDING SOURCE(S)

Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE

Preliminary Engineering	Design	Right-of-Way	Construction	Total
$4,100	$14,000	$0	$139,800	$157,900

RECOMMENDED PROJECT DELIVERY

Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:

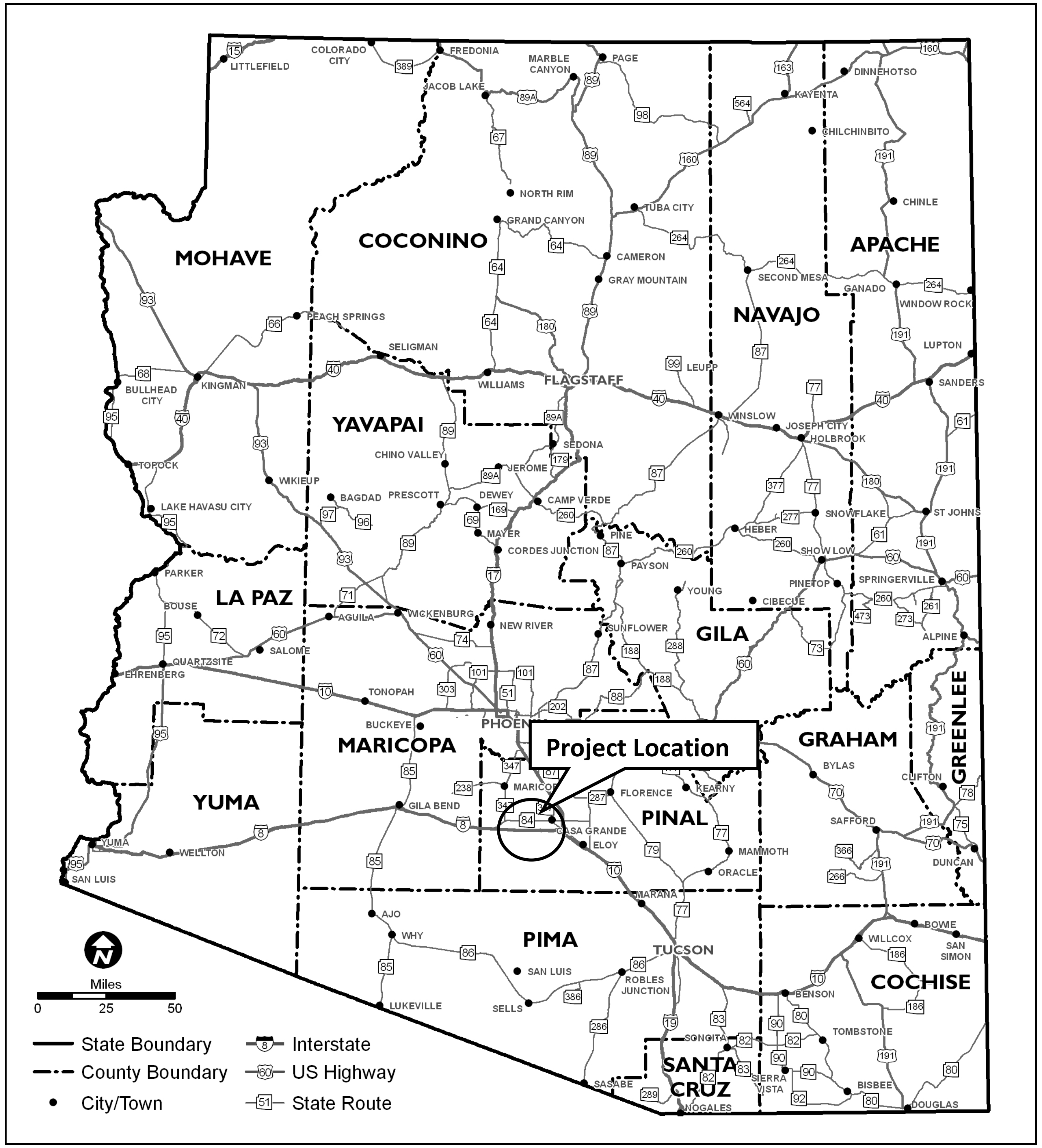
Design Program Year: FY

Construction Program Year: FY

ATTACHMENTS

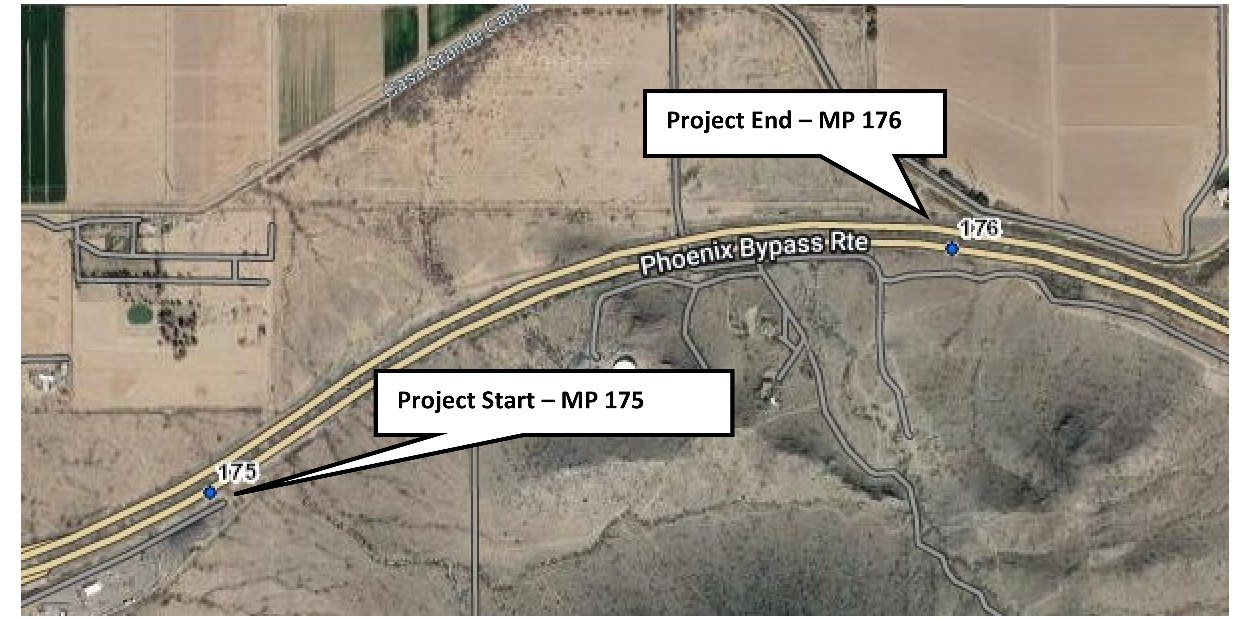
52) State Location Map
53) Project Vicinity Map
54) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP



ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • Install curve warning signs with advisory speed plaque • Install chevron signs for curve EB/WB • Install raised pavement markers at both edges of the roadway (both directions of travel) • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 172.4	
End Limit: MP 172.7	
Project Length: 0.3	
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
Segment 8-9 has a low Freight need but has several Freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the hots spots. The recommended solution is intended to increase Freight performance in segment 8-9			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

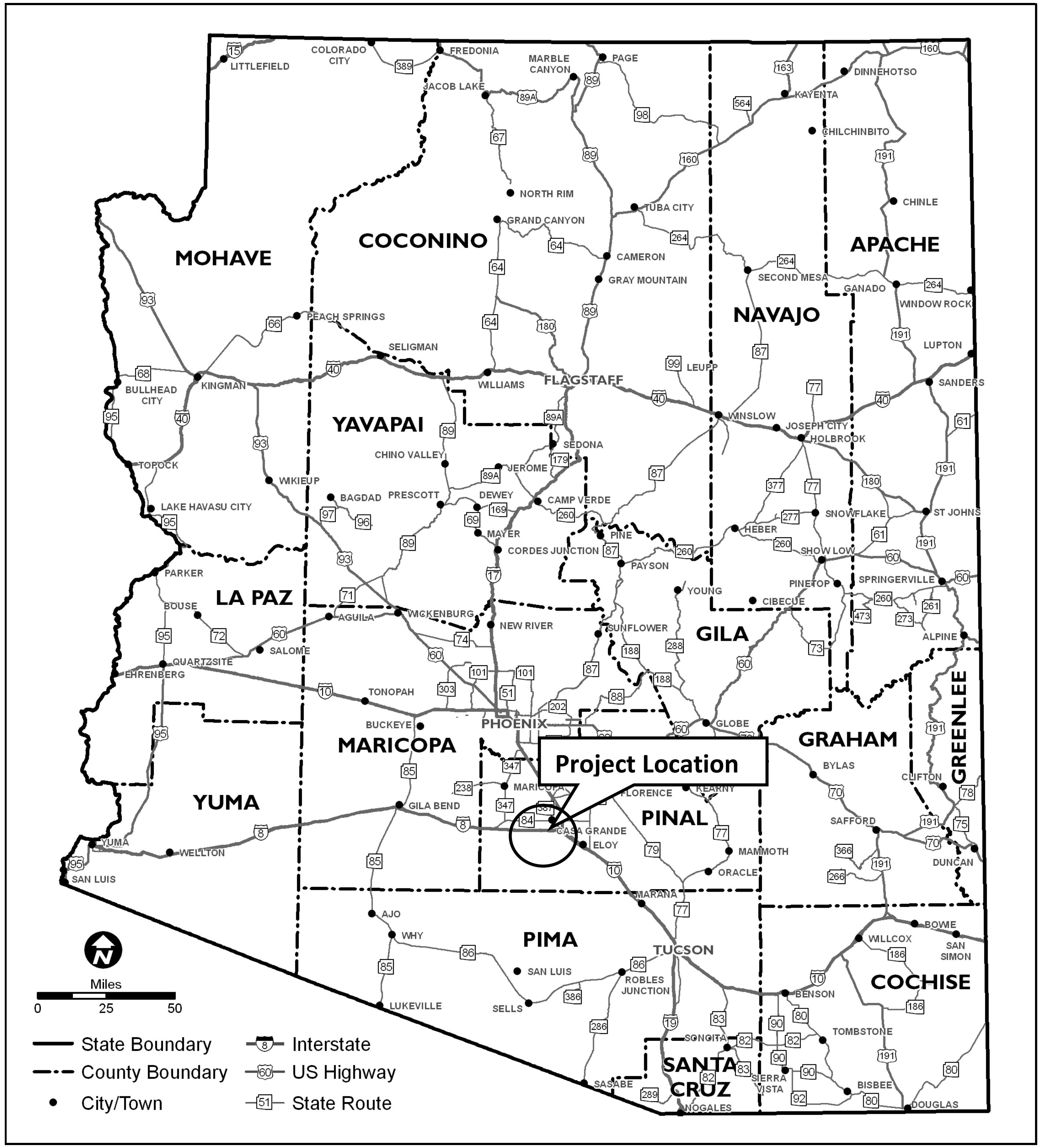
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $33,600	Design $111,900	Right-of-Way $0	Construction $1,119,000	Total $1,264,000

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
55) State Location Map **56) Project Vicinity Map** **57) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option A** • Reprofile Mainline •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option B** • Replace Bridge •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Thornton Rd TI UP (#1196) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street:	
Beginning Limit: MP 172.55	
End Limit: MP 172.55	
Project Length:	
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
Segment 8-9 has freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots. The recommended solution intends to improve freight performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

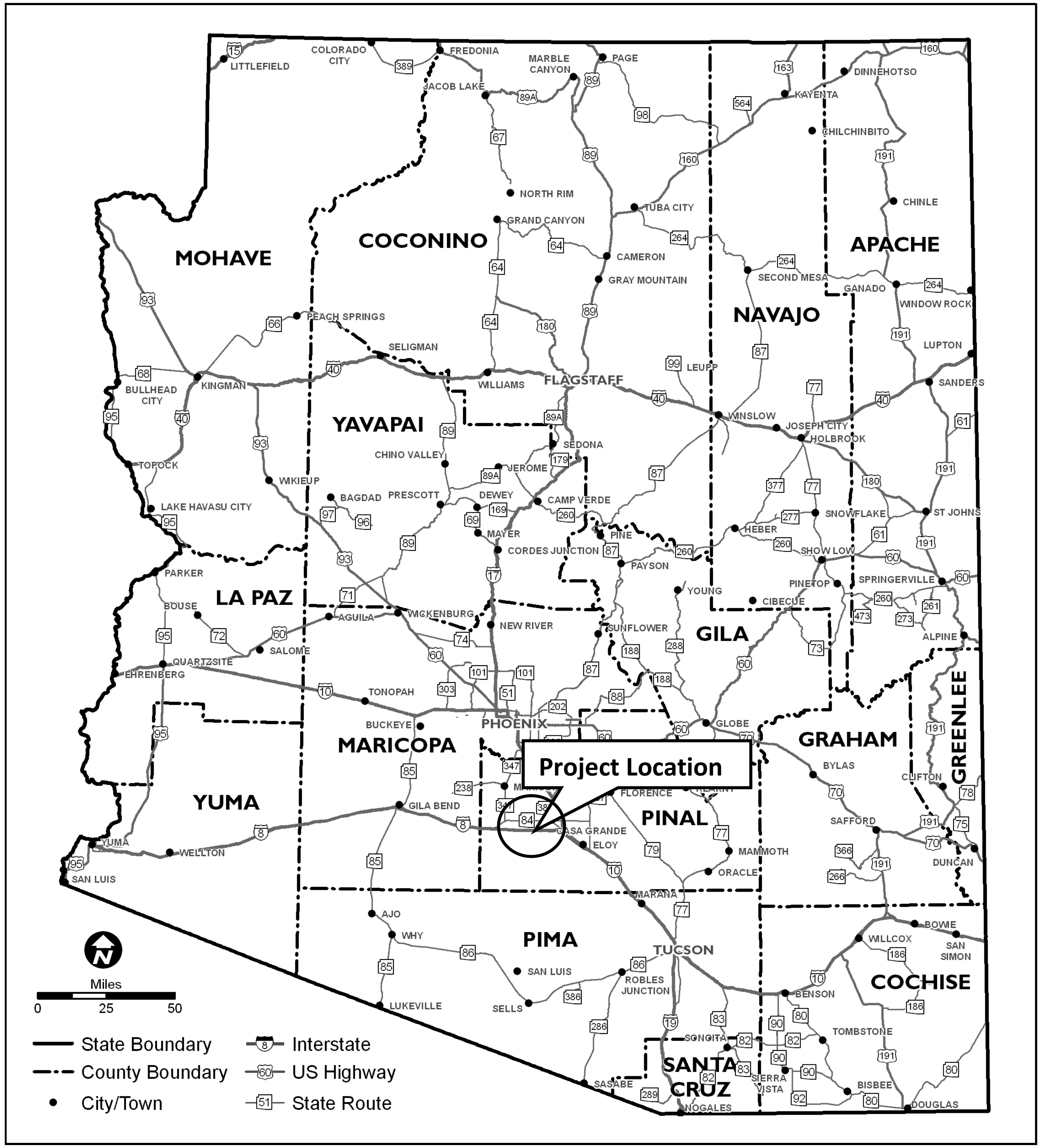
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $197,500	Design $658,400	Right-of-Way $0	Construction $6,584,340	Total $7,440,240

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

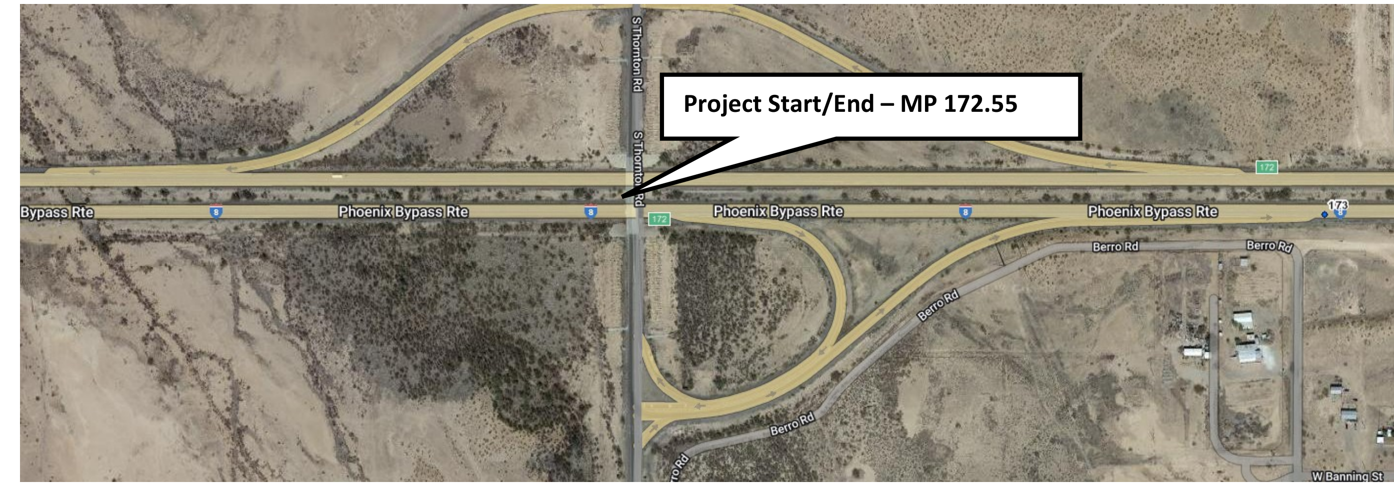
ATTACHMENTS
58) State Location Map
59) Project Vicinity Map
60) Project Scope of Work

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP



ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option B** • Replace bridge • •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option A** • Reprofile mainline • •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Chuichu Rd TI UP (#1197) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 173.4	
End Limit: MP 173.7	
Project Length: 0.3	
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
Segment 8-9 has a Low Freight need but has several hot spots within the segment.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the Freight hot spots within Segment 8-9. The recommended solution is intended to improve freight performance.			

PROJECT RISKS

ADOT

PRELIMINARY SCOPING REPORT

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)* The recommended solution could significantly impact normal traffic operations during construction.	

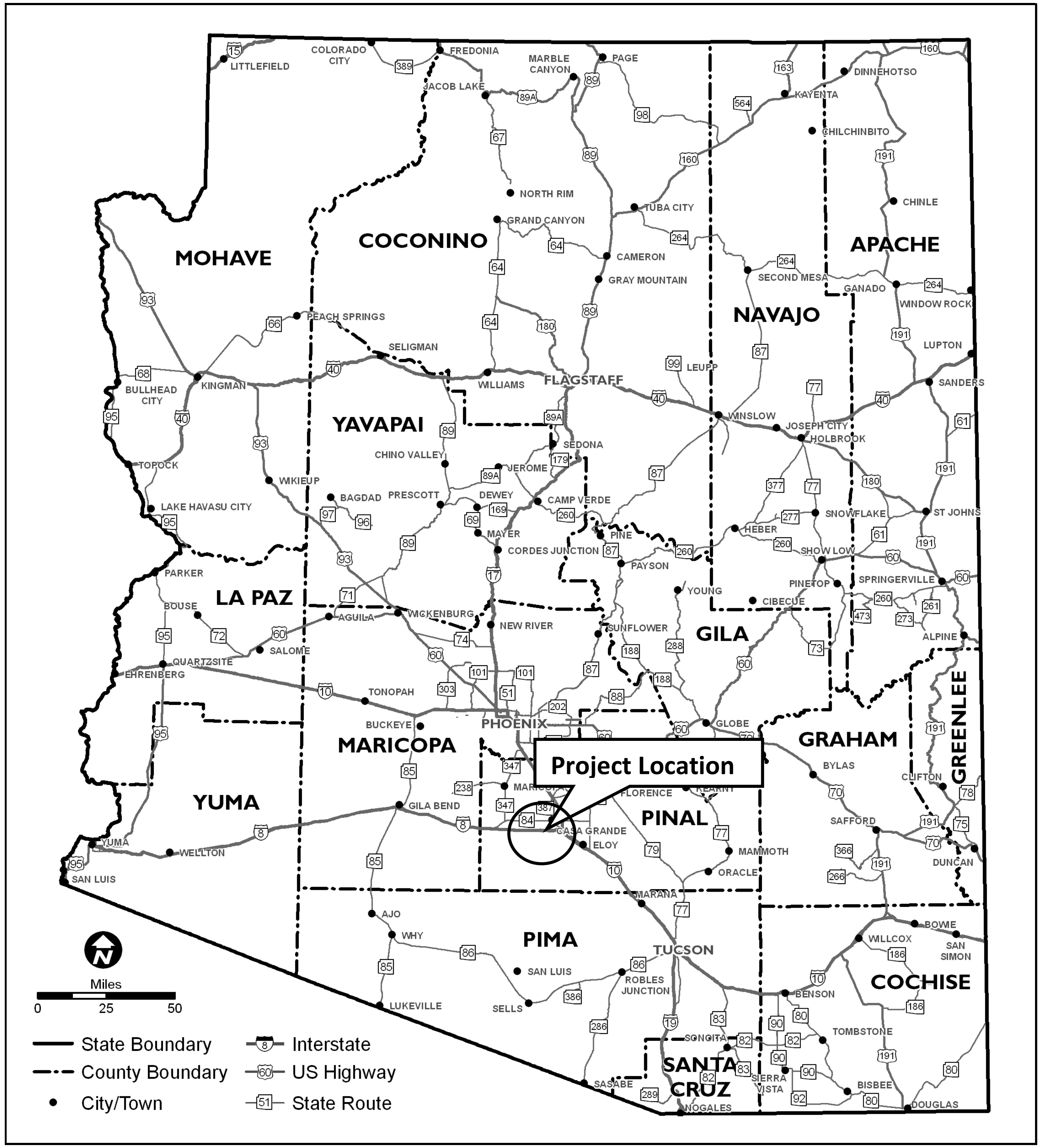
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering	Design	Right-of-Way	Construction	Total
$33,600	$111,900	$0	$1,119,000	$1,264,500

RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
61) State Location Map **62) Project Vicinity Map** **63) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ADOT

ATTACHMENT 2 – PROJECT VICINITY MAP

ADOT

ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option A** • Reprofile Roadway •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option B** • Replace Bridge •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

ADOT

PRELIMINARY SCOPING REPORT

GENERAL PROJECT INFORMATION	
Date: 3/31/2023	**ADOT Project Manager:**
Project Name: Chuichu Rd UP (#1197) Freight / Bridge Vertical Clearance Mitigation	
City/Town: West of Casa Grande	**County: Pinal**
COG/MPO: SCMPO	**ADOT District: Southcentral**
Primary Route/Street: I-8	
Beginning Limit: MP 173.55	
End Limit: MP 173.55	
Project Length:	
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
Segment 8-9 has several freight hot spots.

PROJECT PURPOSE			
What is the Primary Purpose of the Project?	Preservation ☐	Modernization ☒	Expansion ☐
The recommended solution addresses a portion of the freight hot spots. The recommended solution is intended to increase freight performance.			

ADOT

PRELIMINARY SCOPING REPORT

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)* The Recommended solution could significantly impact normal traffic operations during construction. The recommended solution is near an urbanized area and could have potential stakeholder issues.	

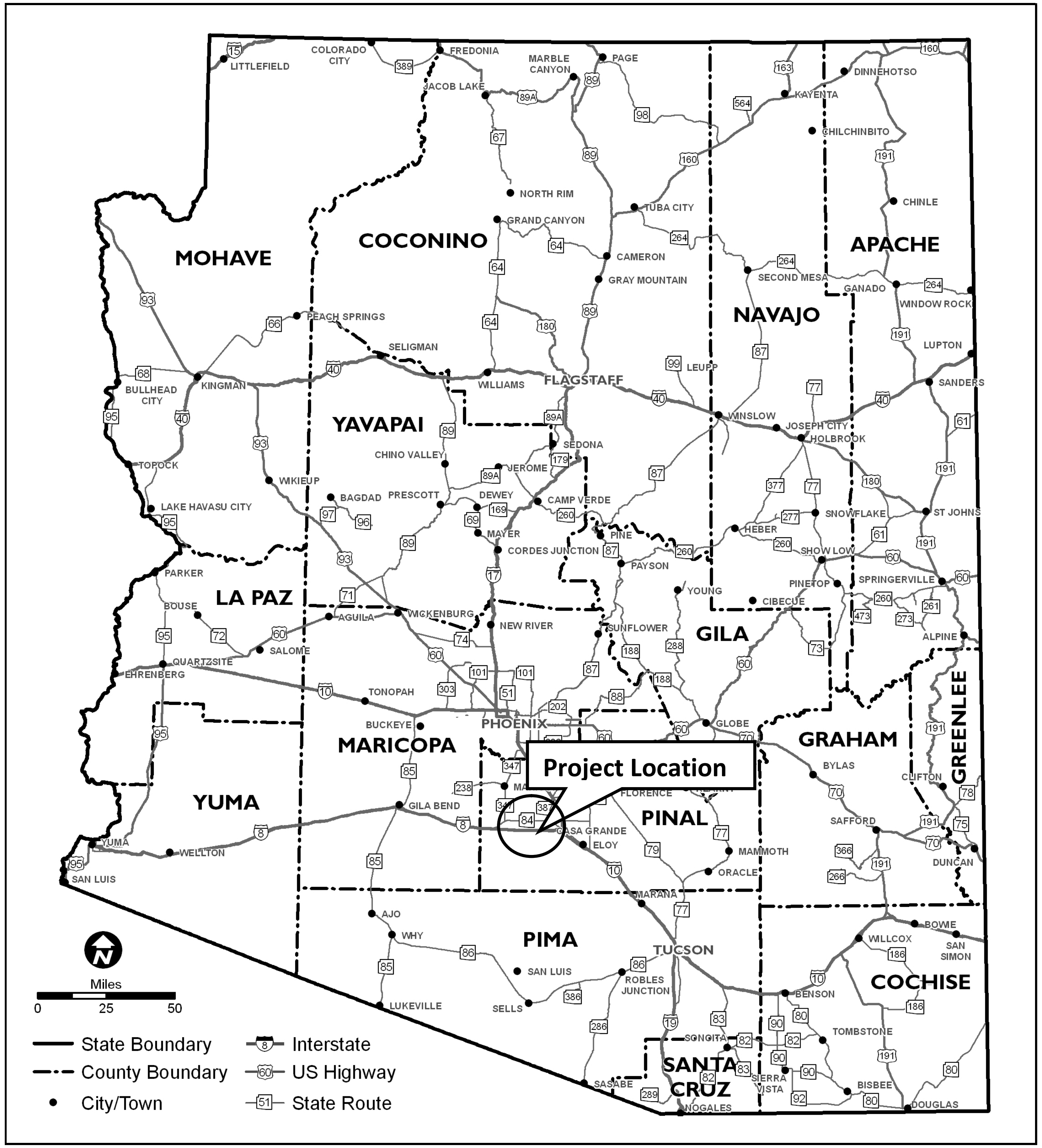
POTENTIAL FUNDING SOURCE(S)				
Anticipated Project Design/Construction Funding Type: *(Check all that apply)*	☐ STBG	☐ TAP	☐ HSIP	☐ State
	☐ Local	☐ Private	☐ Tribal	☐ Other:

COST ESTIMATE				
Preliminary Engineering $164,900	Design $549,700	Right-of-Way $0	Construction $5,496,710	Total $6,211,310

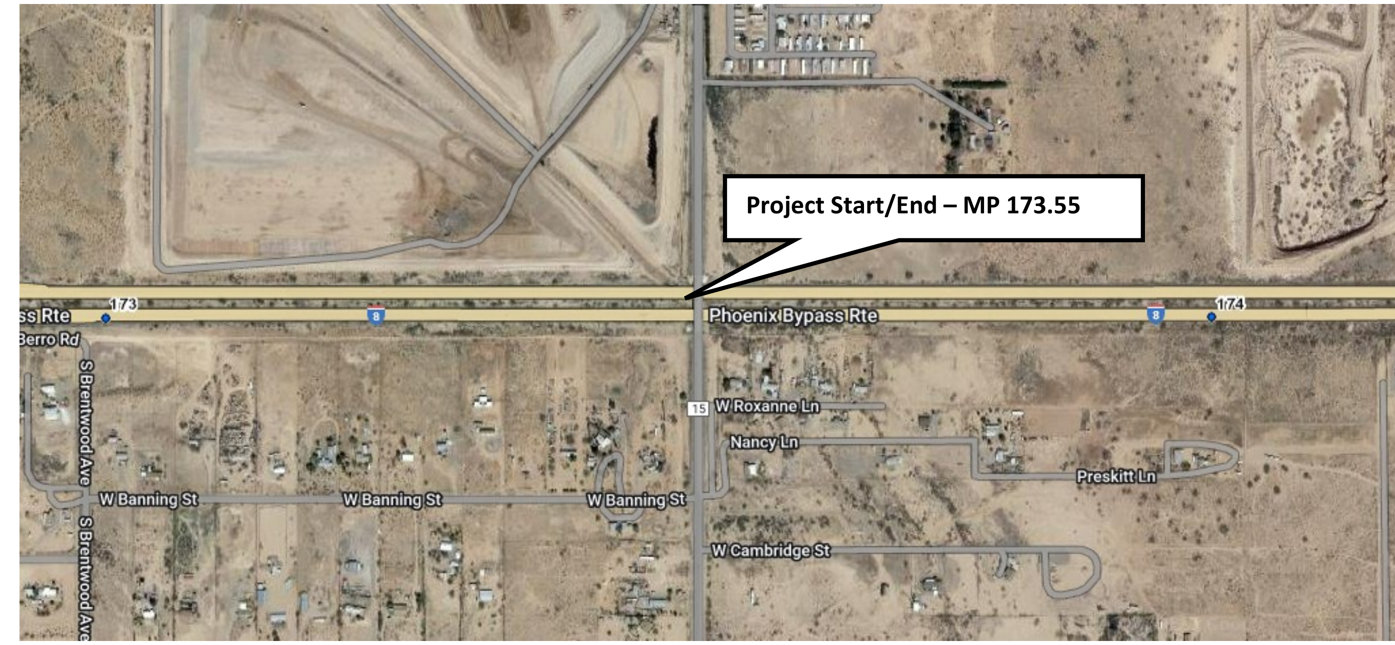
RECOMMENDED PROJECT DELIVERY
Delivery: ☐ Design-Bid-Build ☐ Design-Build ☐ Other:
Design Program Year: FY
Construction Program Year: FY

ATTACHMENTS
64) State Location Map **65) Project Vicinity Map** **66) Project Scope of Work**

ATTACHMENT 1 – STATE LOCATION MAP



ATTACHMENT 2 – PROJECT VICINITY MAP



ATTACHMENT 3 – SCOPE OF WORK

SCOPE OF WORK
(Provide a detailed breakdown of the project's scope of work using bullet format) • **Option B** • Replace Bridge •

SCOPE ITEMS CONSIDERED, BUT NOT INCLUDED
(Describe scope items considered, but not accepted by the Pre-Scoping Team and why) • **Option A** • Reprofile mainline •

Pursuant to 23 USC 409: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.