CLIMBING AND PASSING LANE
PRIORITIZATION STUDY



Final Report
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ADOT JACOBS

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Acronyms

AADT	Annual Average Daily Traffic
ADOT	Arizona Department of Transportation
ALISS	Accident Location Information and Surveillance System
ATIS	Arizona Transportation. Information System
CL	Climbing Lane
COG	Council of Government
DOT	Department of Transportation
EB	Eastbound
EPDO	Equivalent Property Damage Only
GIS	Geographic Information System
HCM	Highway Capacity Manual
HPMS	Highway Performance Monitoring System
LOS	Level of Service
MPO	Metropolitan Planning Organization
NB	Northbound
PDO	Property Damage Only
PL	Passing Lane
SB	Southbound
STIP	Statewide Transportation Improvement Program
TAC	Technical Advisory Committee
TDMS	Transportation Data Management System
VMT	Vehicle Miles Traveled
WB	Westbound

1. PROJECT OVERVIEW

In 1999, the Arizona Department of Transportation (ADOT) commissioned a study to:

- Establish a process to identify locations where a passing or climbing lane would provide benefit to the traveling public; and
- Rank the identified passing and climbing lanes locations by the most effective and feasible projects.

The end result of that study was a prioritized list of general locations for passing and climbing lanes within Arizona. In 2003, the study was updated to refine the previous methodology and to identify and reprioritize passing and climbing lane locations. Since this study was completed there has been a significant change in traffic patterns on the Arizona State Highway System that warranted the need to develop an updated list of passing and climbing lane candidate locations. The purpose of this study is to further enhance the 2003 methodology and to develop a new priority list of locations for passing and climbing lanes utilizing ADOT's more robust and current transportation datasets.

For the purpose of this study, passing and climbing lanes are defined as:

Passing Lane - *Additional lane on highways to facilitate the passing of all types of slow moving vehicles at locations other than sustained grades where passing opportunities are unavailable or very limited over a long stretch of highway.*

Climbing Lane - *Additional lane on steep upgrades to facilitate the passing of trucks and slow moving vehicles whose speed drops because of the sustained grade rather than a lack of passing opportunity over a long stretch of highway.*

Key benefits of incorporating passing and climbing lanes on highways include:

- Reduced delays at specific bottleneck locations, such as steep upgrades where slow-moving vehicles are present;
- Improved overall traffic operations by breaking up traffic platoons and reducing delays caused by inadequate passing opportunities over substantial lengths of highway; and
- Improved safety by reducing the need for passing vehicles to travel in the opposing lane.

While passing and climbing lanes are physically identical, they serve two different purposes. Usually passing lanes are used on two-lane highways, while climbing lanes are utilized on extended upgrade locations on two-lane and multilane highways.

- For two-lane highways with moderate to high traffic volume levels, lack of passing opportunities at regular intervals often results in long queues and poor performance. In lieu of costly widening projects, adding a passing lane at these locations alleviates the problem.
- For two-lane highways with extended upgrade locations, trucks and other slow moving vehicles experience significant drop in speed causing long queues and poor performance even with low traffic volume levels. Adding a climbing lane at these locations alleviates the problem and

significantly enhances safety by reducing the need for passing vehicles to maneuver into the opposing lane.

- For multilane highways, "no passing" zones are not an issue. However, a highway with extended upgrade locations and high truck traffic causes the trucks to experience a significant drop in speed results in excessive queuing and unsafe conditions. Adding a climbing lane at these locations alleviates the problem.

For these reasons, this study identified, evaluated, and prioritized passing and climbing lanes for the following scenarios:

- Passing lanes on two-lane highways
- Climbing lanes on two-lane highways
- Climbing lanes on multilane highways

PURPOSE AND NEED

With the ultimate purpose of enhancing safety and improving mobility, the *Climbing and Passing Lane Prioritization Study* was initiated to develop a prioritized list of candidate locations for climbing and passing lanes. The need for this study stems directly from ADOT's desire to increase safety and mobility along the Arizona State Highway System. The project purpose is demonstrated with the following statement of need:

- Update the Methodology. The previous study and methodology has not been updated since 2003. ADOT now has more accurate data and several newer datasets which could be utilized to enhance the previous methodology to produce better recommendations.
- Update the List of Passing/Climbing Lane Locations. Since the last update, there has been a significant change in traffic patterns on the Arizona State Highway System that warranted the need to develop an updated list of passing and climbing lane candidate locations. In addition, several of the recommendations from the previous study have since been implemented and the list has to be updated.
- Address Safety and Improve Mobility. Adding a passing/climbing lane along an existing highway is one of the most cost effective ways to enhance safety and improve mobility. New passing/climbing lane locations would provide a tremendous benefit to the traveling public.

PROJECT CHARTER

At the first Technical Advisory Committee (TAC) meeting, a *Project Charter* was developed with assistance from members of the TAC. As part of the Project Charter, a *Mission Statement* and *Goals* were developed to provide guidance to the study team.

Mission Statement

Develop a needs based prioritization for Climbing and Passing Lane locations on the Arizona State Highway System

Study Goals

Quality - Enhance safety and improve mobility; when typical design standards can't be met, reference the 2010 Highway Safety Manual for additional guidance; work towards objective and needs based prioritization for climbing and passing lanes; consider best practices from other states

Communication - Create a website to house climbing and passing lane study documents; reach every team member and/or intended recipient when communicating

Issue Resolution - Be proactive with resolving issues; understand the process for how this team moves issues forward and resolve issues timely; discuss at TAC meetings as necessary to communicate decisions to all team members

Teamwork - Interrelationships understood; work together to meet the challenge; take ownership of the study

Schedule - Keep and attend scheduled meetings; meet the delivery dates for the prioritization

Budget - Identify projects that can realistically be programmed; sensitivity to the route and route continuity (best bang for the dollar); communicate the need for specified funding for climbing/passing lanes

Project Delivery - Reach consensus on how to prioritize; include functional class factor when setting priorities; prepare a needs based prioritization that is defendable and can be reviewed annually – the end result is the list

TECHNICAL ADVISORY COMMITTEE

The study is guided by a Technical Advisory Committee (TAC). The role of the TAC is to provide technical guidance, support, advice, suggestions, recommendations, and to perform document reviews throughout the study process. TAC members included representatives from:

ADOT Statewide Project Management

ADOT Engineering Districts

ADOT Multimodal Planning

ADOT Traffic Design/Safety

ADOT Partnering Section

ADOT Roadway Design

ADOT State Engineer's Office

ADOT Communications Division

Federal Highway Administration

AGENCY/STAKEHOLDER COORDINATION

To develop a thorough understanding of the issues, deficiencies, and needs, the study team identified a core group of stakeholders and conducted two rounds of interviews. The stakeholders included representatives from each ADOT District office. The study team also sent out email notifications to each Council of Governments (COGs) and Metropolitan Planning Organizations (MPOs) to request feedback. Stakeholders' feedback summary is presented in later chapters of this document.

ADOT PARTNERING PROCESS

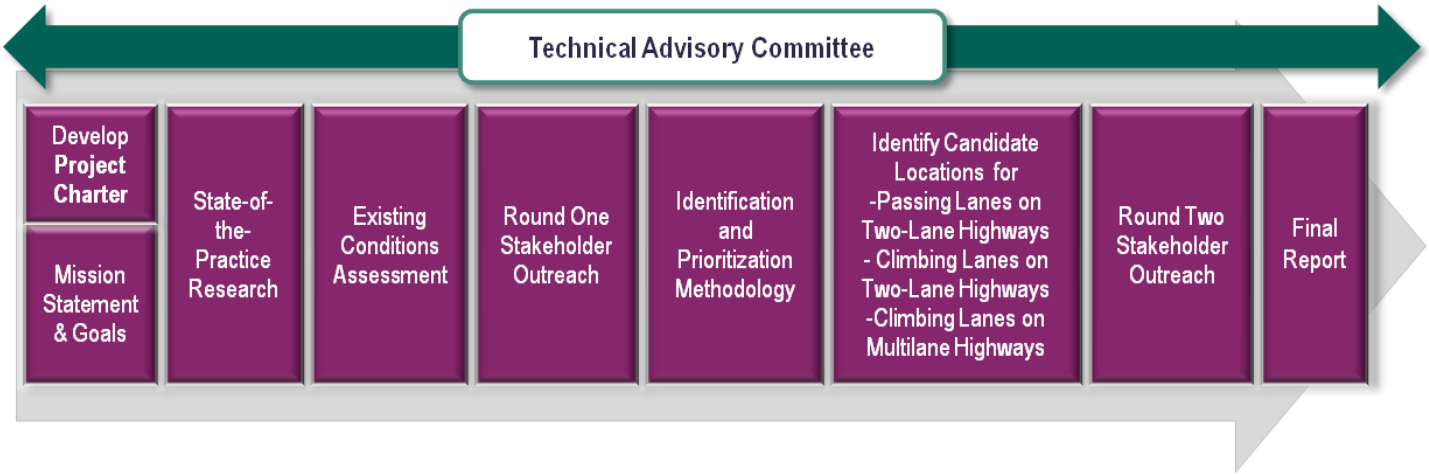
The *Climbing and Passing Lane Prioritization Study* was conducted as per the guidelines of ADOT's Partnering Process. Partnering is a process of collaborative teamwork to achieve measurable results through agreements and productive working relationships. The Partnering Principles include Communication, Commitment, Cooperation, and Continuous Improvement, and assist project teams to jointly solve problems, increase work efficiency, improve the project delivery process, and build and strengthen relationships. Project teams that agree on measurable goals, and utilize the partnering principles are more successful, and meet or exceed budget and schedule goals. In short, Partnering is a formal way for groups to work together and resolve issues.

The ADOT Partnering Office assisted with facilitating the creation of the collaborative partnership agreement. In addition, the Partnering facilitator assisted with setting up the measurement tool, Partnering Evaluation Program, or PEP. At the end of each TAC meeting, members were requested to complete and submit the PEP forms.

STUDY PROCESS

An eight step comprehensive process was used to complete this study. The study team maintained contact with TAC and stakeholders by meeting at regular intervals through the course of the study. Figure 1.1 illustrates the process utilized for this study.

Figure 1.1: Study Process



PASSING/CLIMBING LANES - STRATEGIC HIGHWAY SAFETY PLAN (SHSP)

ADOT recently adopted a Statewide SHSP; that is intended to be a "living" implementation document, coordinating the efforts of individual Emphasis Areas to the overall goals and objectives of the SHSP. The 2014 Arizona SHSP is a data-driven, strategic approach to reduce fatalities and serious injuries on state roads. The 2014 SHSP update defines 12 Emphasis Areas focused on improving specific areas of roadway safety. During the SHSP update process, the roadway infrastructure improvements were identified as an effective countermeasure.

SHSP Section 14: Roadway Infrastructure and Operations | Lane / Roadway Departure

This emphasis area addresses head-on crashes associated with highway segments. A head-on crash typically occurs when a vehicle crosses a centerline or a median and collides with an approaching vehicle, or when a driver travels the wrong way in a traffic lane. Head-on crashes are often a result of a driver's inadvertent actions, such as running off the road, or deliberate actions, such as performing unsafe passing maneuvers.

SHSP Section 14 – Goals and Objectives

The Emphasis Area goal for SHSP Section 14 is to, "reduce fatalities and the occurrence of serious injuries on all public roadways in Arizona through enhance roadway infrastructure and operations." The objectives for reducing the number of head-on fatal crashes are:

- Keep vehicles from encroaching into the opposite lane,
- Minimize the likelihood of a car crashing into an oncoming vehicle, and
- Reduce the severity of crashes that occur.

Effectiveness of Strategies and Proposed Action

The construction of passing and climbing lanes is a strategy that supports the SHSP Section 14 goals and objectives. A variety of studies conducted over the last twenty years have shown that the addition of passing and climbing lanes on highways reduces accident rates. Jacobs validated the safety benefit of adding passing and climbing lanes by conducting a crash analysis of selected location on both two-lane and multi-lane highways. The results of this analysis are documented on page 28 and 29 of this document.

2. PREVIOUS STUDIES, REPORTS, AND RESEARCH

ADOT'S PREVIOUS METHODOLOGY TO IDENTIFY AND PRIORITIZE PASSING LANE LOCATIONS

The process for identifying and prioritizing passing lanes on the Arizona State Highway System was first developed by the *1999-2000 Climbing/Passing Lane Study* and later updated in the *2003 Passing Lane Prioritization Update*. The *2003 Passing Lane Prioritization Update* identified issues in the 1999-2000 Study methodology and developed an enhanced methodology to identify and rank candidate passing lane locations. This section provides a summary of the methodology developed as part of the 2003 Study and are currently employed by ADOT to identify candidate locations and to establish an ultimate priority list of locations for passing lanes.

Step 1. **Identify "Universe" of Candidate Locations.** Table 2.1 provides a summary of the datasets utilized to develop a "Universe" of potential passing lane locations. Using this data, the state highway system is divided into smaller segments to reflect roadway segments with similar roadway characteristics (i.e., segments with identical AADT, number of lanes, truck percentage, etc.). Level of Service (LOS) is then calculated for each segment based on a volume-to-capacity (VC) ratio to ensure equal weights were given to each segment. Segments with an LOS of B or worse are identified and used to create a list of preliminary locations for a passing lane.

Table 2.1: Current Passing Lanes Methodology Data Items and Sources

Data Item	Data Source
Number of Travel Lanes	Roadway Log
Annual Average Daily Traffic (AADT)	HPMS/Historical Traffic Volume Database
Passing Length, No Passing Length	Striping Database
Directional Distribution	HPMS/Historical Traffic Volume Database
K Factor	HPMS/Historical Traffic Volume Database
Seasonal Adjustment Factors	ADOT Data Center
Truck Percentage	HPMS/Historical Traffic Volume Database
Highway Geometrics	ADOT Data Center
Speed	ADOT Data Center
Terrain	HPMS
Accidents	ALISS Accident Database – Traffic Records

Source: 2003 Passing Lane Prioritization Update

Step 2. **Compare Candidate Locations to Locations Recommended by ADOT Engineering Districts.** Based on their local knowledge, ADOT District Engineers create a list of recommended locations for a passing lane. The District's Engineer's candidate locations are then compared to the "Universe" candidate locations developed in Step 1. If candidate locations identified in Step 1 were not recommended by the District Engineers, roadway segments are verified against the data items presented in Table 2.1. A list of all candidate locations is developed based on locations identified in Step 1 and verified District Engineer recommendations.

Step 3. **Select Preliminary List of Candidate Locations.** Utilizing Highway Capacity Manual (HCM) methods, the LOS is determined for each candidate location. On a two-lane highway, the estimated LOS is based on two factors:

a. *Percent-Time-Spent-Following* reflects the average percentage of time a vehicle on a highway spends following other vehicles. Percent-time-spent-following is estimated from the demand flow rate, the directional distribution of traffic, and the percentage of no-passing zones.

b. *Average-Travel-Speed* represents the actual speed a vehicle achieves on a highway (not speed limit) after taking into consideration factors such as grade, percentage of no passing zones, traffic volumes etc.

Segments with a LOS of D or worse are identified and used to create a list of preliminary candidate locations of passing lanes.

Step 4. **Filter Preliminary List of Candidate Locations.** The preliminary list of candidate locations identified in Step 3 are compared against ADOT's Five-Year Transportation Facilities Construction Program. Candidate locations that are programmed are removed from the preliminary list in the ranking program in Step 5.

Step 5. **Rank Preliminary Candidate Passing Lanes on Two-Lane Highways**. The preliminary list of candidate locations is ranked using performance criteria displayed in Table 2.2. For each performance criterion a standard score is computed for each candidate location; the standard score indicates how much the criterion deviates from the mean of all candidate locations. A total score for each candidate is computed by summing points for each criterion. Based on the total score of the candidate, the segments are ranked and divided into three tiers (with each tier representing a range of project scores).

Table 2.2: Performance Criteria for Ranking Candidate Passing Lane Locations

Performance Criteria	Maximum Number of Points
Mobility (Existing level-of-service)	5
Percent-time-spent-following	10
Average-travel-speed	5
Passing related accidents	10
Accident rate	10

Source: 2003 Passing Lane Prioritization Update

Step 6. **Compare Preliminary Candidates with Candidates Identified By ADOT Districts.** For segments recommended by the ADOT Engineering Districts in Step 2, data is verified and evaluated to determine the need for a passing lane at the location. On a case by case basis, additional analysis may include review of grade, truck percentages, AADT, etc.

Step 7. **Review of Preliminary Candidates by ADOT Districts.** ADOT Engineering Districts review the preliminary list of ranked candidate locations for the following information:

a. Candidate location programmed or scoped for passing lanes or widening,
b. Passing lane already exist, and

c. Viability or constructability.

Step 8. **Ultimate List of Ranked Candidate Locations for Passing Lanes after Districts Review.** Upon review by the ADOT Engineering Districts, an ultimate list of candidate locations for passing lanes on two-lane highways is prepared by eliminating all segments that were either programmed or deemed not viable. This ultimate list is re-ranked using the procedures outlined in Step 5.

STATE-OF-THE-PRACTICE RESEARCH FOR PASSING LANES

Reviewing current practices and methodologies utilized by state Department of Transportation (DOT) agencies and relevant technical literature often provides insight into best practices that ADOT can utilize to enhance or streamline the identification and prioritization of passing lanes.

Literature Review

Kansas Department of Transportation (KSDOT)

Based on the *Design Guidelines for Passing Lanes on Two-Lane Two-way Rural Roads in Kansas* study conducted by KSDOT, the following are methods and procedures utilized by KSDOT to identify and prioritize passing lanes.

Overview: KSDOT utilizes a two-level process to determine highway segments that need passing lane(s). The two-level process includes:

- Network Level Analysis - Two-lane rural highway segments that operate at a LOS below a predefined acceptable level are identified. HCM LOS procedures for rural two-lane highways are utilized to develop AADT service levels. Figure 2.1 illustrates the suggested minimum AADT for LOS B and C in level and rolling terrain that KSDOT utilizes to warrant a passing lane(s).
- Project Level Analysis - Highway segments identified at the network level are ranked on the basis of their need for passing lanes. Utilizing a computer simulation tool, such as TWOPAS, detailed analysis of different passing lane length, spacing, and configuration is conducted.

Location Criteria: Location criteria can be grouped into four main considerations:

- Safety
  - Distance to side road or driveway intersections within and immediately after passing lane section as well as high volume side road intersection
  - Minimum sight distance
- Improved traffic performance
  - Select locations where there have been limited passing opportunities for approximately two miles or more and where field study shows substantial platooning (vehicles traveling together as a group, unable to pass)
  - Level terrain where a field study shows platooning
  - Leading away, rather than into, areas of traffic congestion (defined as no passing zones, reduced speed limit)
  - Start passing lanes on a horizontal curve to the left rather than right

  - Use TWOPAS to minimize percent time of day
- Design consistent with driver's expectation
  - On or immediately after a restricted passing opportunity that causes platooning
  - Length of segment
- Minimized construction costs
  - Avoid bridges, culverts, deep cuts, and high fills
  - Spacing between passing lanes is intended to make the passing lanes function as a coordinated system

Figure 2.1: KSDOT Suggested Minimum AADT for LOS B and C in Level and Rolling Terrain

		Projected Design Year AADT									
% Trucks		10		15		20		30		40	
LOS		B	C	B	C	B	C	B	C	B	C
% "no-passing" zones	0%	3900	6200	3700	5890	3520	5600	3210	5110	2950	4690
	20%	3460	5630	3290	5340	3130	5080	2850	4630	2620	4260
	40%	3030	5190	2880	4930	2740	4690	2500	4280	2290	3930
	60%	2740	4900	2600	4660	2480	4430	2260	4040	2080	3710
	80%	2450	4760	2330	4520	2220	4300	2020	3920	1860	3600
	100%	2310	4620	2190	4380	2090	4180	1900	3800	1750	3490

Assumptions: K=0.15, directional split = 60/40, PHF=0.92, Lane width 12 ft, shoulder width 6ft

Table S2: Suggested Minimum AADT for Rural Two-Lane Highways for Level of Service (LOS) B and C in Rolling Terrain that would Warrant Passing Lane(s)

		Projected Design Year AADT									
% Trucks		10		15		20		30		40	
LOS		B	C	B	C	B	C	B	C	B	C
% "no-passing" zones	0%	3000	4850	2630	4240	2340	3770	1910	3090	1620	2610
	20%	2660	4500	2320	3940	2070	3500	1690	2870	1430	2430
	40%	2190	4040	1920	3540	1710	3140	1400	2570	1180	2180
	60%	1960	3690	1720	3230	1530	2870	1250	2350	1060	1990
	80%	1730	3460	1520	3030	1350	2690	1100	2210	940	1670
	100%	1500	3230	1320	2830	1170	2520	960	2060	810	1740

Assumptions: K=0.15, directional split = 60/40, PHF=0.92, Lane width 12 ft, shoulder width 6ft

Source: KSDOT Design Guidelines for Passing Lanes on Two-Lane Two-way Rural Roads in Kansas

Missouri Department of Transportation (MODOT)

In 2004, MODOT conducted the *Benefits and Design/Location Criteria for Passing Lanes Study* to establish criteria for determining where passing lanes could improve LOS and safety on Missouri highways and to develop recommendations for the design, signing, and marking of passing lanes. The following is a summary of the results and recommendations provided in study.

Overview: MODOT utilizes two types of criteria to determine where passing lanes could provide LOS and safety benefits on Missouri highways:

- Screening Criteria - utilized to screen an entire network of two-lane highways for potential passing lane candidate locations.
- Site-Specific Criteria - utilized to screen a specific roadway section where passing lanes may provide substantial LOS and safety benefits and that warrant additional field investigation.

A review of pre- and post-passing lane conditions was conducted at three different sites. Overall, it was found that the overall queue time improved by 10-31% in comparison to a conventional two-lane highway without passing lanes. At the three sites, LOS conditions improved from LOS levels of C and D to LOS levels of A and B with the inclusion of passing lanes. In addition, accident frequency per mile, per year, was reduced by 12-24% compared to two-land highways without passing lanes.

Location Criteria: Preliminary Screening Criteria:

- Traffic volumes - Site section for passing lanes focuses on two-lane highways with existing and projected traffic volumes between 5,000 and 20,000 vehicles daily.
- Available Length of Roadway - Utilizing HCM methods, roadway segments capable of installing a passing lane of an optimal length. The study recommends a minimum available roadway length of 2.50 miles as a preliminary screening criterion.
- Planned or Programmed Improvements at the Site - Sites that are already programmed for four-lane highway improvements should be removed from consideration for passing lanes.

Site-Specific Criteria:

- Truck Volume - Based on AASHTO's Green Book, identify isolated steep upgrades and downgrades in which passing lanes can be strategically placed to pass slow-moving vehicles.
- Operating Speed - The study suggests that passing lanes are appropriate for two-lane highway sections with 85th percentile speeds over 45 mph and are most suitable for locations with 85th percentile speeds over 55 mph.

Texas Department of Transportation (TxDOT)

TxDOT, in conjunction with the Texas Transportation Institute (TTI), completed the *Design Guidelines for Passing Lanes of Two-Lane Roadways* study in an effort to create a "Super 2" design criteria for inclusion in the TxDOT Roadway Design Manual. The three critical elements of the "Super 2" design criteria focused on passing lane length and spacing, lane and shoulder width requirements, and signing and marking strategies. The following is a summary of the passing lane design criteria developed by TxDOT.

Overview: To simulate the location of the passing lane sections, the advance microscopic simulation program TWOPAS was utilized to model two-lane, two-way rural highways with passing lanes. Hypothetically, two-lane highways were modeled and passing lane designs were tested that had passing lane spacing between one and eight miles and passing lane lengths between 0.25 and 2 miles. The study tested traffic volumes ranging between 400 and 1,000 vph, with a truck percentage between 0 to 40 percent.

Measures of operational performance utilized by TxDOT to determine the impact of the passing lanes on two-lane highways include:

- Percent time delay,
- Percent of vehicles in platoon,
- Speed,
- Lane Utilization,
- Platoon structure, and
- Time headway distribution.

Location Criteria: Based on the results of the simulation analysis, TxDOT developed a set of passing lane location criteria recommendations that included:

- Recommended passing lane length is presented in Figure 2.2. These values reflect higher speed limits for rural roads.
- Uphill grades are preferred sites over downhill grades. Passing lanes on significant uphill grades should extend beyond the crest of the hill.
- Passing lane sections should be placed to avoid major intersections.
- If present, minor intersections that do not require deceleration lanes should be located near the midpoint of passing lane sections, avoiding transition areas.

Figure 2.2: TxDOT Recommended Values of Length and Spacing by ADT and Terrain

ADT (vpd)		Recommended Passing Lane Length (mi)	Recommended Distance Between Passing Lanes (mi)
Level Terrain	Rolling Terrain		
≤1950	≤1650	0.8-1.1	9.0-11.0
2800	2350	0.8-1.1	4.0-5.0
3150	2650	1.2-1.5	3.8-4.5
3550	3000	1.5-2.0	3.5-4.0

Source: TxDOT Design Guidelines for Passing Lanes of Two-Lane Roadways

Peer Agency Review

In order to further examine current methodologies utilized by DOTs to identify and prioritize passing lanes, project team members contacted agency staff at Nevada, Colorado, Texas, New Mexico, and Missouri DOTs. Agency staff was asked to provide details on current processes and success stories; however, little feedback was received.

ADOT'S PREVIOUS METHODOLOGY TO IDENTIFY AND PRIORITIZE CLIMBING LANE LOCATIONS

This section provides a summary of the methodology developed as part of the 2003 Study and are currently employed by ADOT to identify candidate locations and to establish an ultimate priority list of locations for climbing lanes.

Step 1. **Identify "Universe" of Candidate Locations.** Table 2.3 provides a summary of the datasets utilized to develop a "Universe" of potential climbing lane locations. In addition, the American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets suggests that climbing lanes on two-lane highways are considered if all the following criteria exists:

a. The directional flow rate on the upgrade exceeds 200 vph
b. The directional flow rate for trucks on the upgrade exceeds 20 vph
c. Any one of the following conditions: a speed reduction of 10 mph for a typical heavy truck, LOS E or F on the grade, or a reduction of two or more levels-of-service from the approach segment to the grade.

Using this data, roadway segments that have a grade over 2.5 percent and a length of at least 500 ft are identified.

Table 2.3: Current Climbing Lanes Methodology Data Items and Sources

Data Item	Data Source
Number of Travel Lanes	Roadway Log
Annual Average Daily Traffic (AADT)	HPMS/Historical Traffic Volume Database
Percent Grade	GPS Data
Length of Grade	GPS Data
Passing Length, No Passing Length	Striping Database
Directional Distribution	HPMS/Historical Traffic Volume Database
K Factor	HPMS/Historical Traffic Volume Database
Seasonal Adjustment Factors	ADOT Data Center
Truck Percentage	HPMS/Historical Traffic Volume Database
Highway Geometrics	ADOT Data Center
Speed	ADOT Data Center
Terrain	HPMS
Accidents	ALISS Accident Database – Traffic Records

Source: 2003 Passing Lane Prioritization Update

Step 2. Verify that "Universe" Candidate Locations Meet Minimum Criteria Requirements for a Climbing Lane. "Universe" candidate locations developed in Step 1 are verified against GIS data to ensure that they meet minimum criteria for climbing lanes (i.e., directional flow rate on upgrade exceeds 200 vph, and directional flow rate for trucks on the upgrade exceeds 20 vph). Candidates that do not meet the minimum criteria are eliminated from the "Universe."

Step 3. Compare Candidate Locations to Locations Recommended by ADOT Engineering Districts. Based on their local knowledge, ADOT District Engineers create a list of recommended locations for a climbing lane. The District's Engineer's candidate locations are then compared to the "Universe" candidate locations developed in Step 1. If candidate locations identified in Step 1 are not recommended by the District Engineers, roadway segments are verified against the data items presented in Table 2.3. A list of all candidate locations a developed based on locations identified in Step 1 and verified against District Engineer recommendations.

Step 4. Select Preliminary List of Candidate Locations. Utilizing HCM methods, the LOS is determined for each candidate location. On a two-lane highway, the estimated LOS is based on two factors:

a. Percent-Time-Spent-Following - reflects the average percentage of time a vehicle on a highway spends following other vehicles. Percent-time-spent-following is estimated from the demand flow rate, the directional distribution of traffic, and the percentage of no-passing zones.

b. Average-Travel-Speed - represents the actual speed a vehicle achieves on a highway (not speed limit) after taking into consideration factors such as grade, percentage of no passing zones, traffic volumes etc.

Segments with a LOS of D or worse are identified and used to create a list of preliminary candidate locations of climbing lanes.

Step 5. Filter Preliminary List of Candidate Locations. The preliminary list of candidate climbing lane locations identified in Step 3 are compared against ADOT's Five-Year Transportation Facilities Construction Program. Candidate locations that are programmed are removed from the preliminary list in the ranking program in Step 5.

Step 6. Rank Preliminary Candidate Climbing Lanes on Two-Lane Highways. The preliminary list of candidate locations is ranked using the performance criteria displayed in Table 2.4. For each performance criterion a standard score is computed for each candidate location; the standard score indicates how much the criterion deviates from the mean of all candidate locations. A total score for each candidate is computed by summing points for each criterion. Based on the total score of the candidate, the segments are ranked and divided into three tiers (with each tier representing a range of project scores).

Step 7. Compare Preliminary Candidates with Candidates Identified By ADOT Districts. For segments recommended by the ADOT Engineering Districts in Step 2, data is verified and a further evaluation is conducted to determine the need for a climbing lane at the location. On a case by case basis, additional analysis may include review of grade, truck percentages, AADT, etc.

Table 2.4: Performance Criteria for Ranking Candidate Climbing Lane Locations

Performance Criteria	Maximum Number of Points
Mobility (Existing level-of-service)	5
Percent-time-spent-following	10
Average-travel-speed	5
Passing related accidents	10
Accident rate	10

Source: 2003 Climbing Lane Prioritization Update

Step 8. Review of Preliminary Candidates by ADOT Districts. ADOT Engineering Districts review the preliminary list of ranked candidate locations for the following information:

a. Candidate location programmed or scoped for climbing lanes or widening,
b. Climbing lane already exist, and
c. Viability or constructability.

Step 9. Ultimate List of Ranked Candidate Locations for Climbing Lanes after Districts Review. Upon review by the ADOT Engineering Districts, an ultimate list of list of candidate locations for climbing lanes on two-lane highways is prepared by eliminating all segments that were either programmed or deemed not viable. This ultimate list is re-ranked using the procedures outlined in Step 5.

STATE-OF-THE-PRACTICE RESEARCH FOR CLIMBING LANES

Literature Review

Missouri Department of Transportation (MODOT)

In 2004, MODOT conducted the *Benefits and Design/Location Criteria for Passing Lanes Study* to establish criteria for determining where passing and climbing lanes could improve LOS and safety on Missouri highways and to develop recommendations for the design, signing, and marking of climbing lanes. The following is a summary of the results and recommendations provided in study.

Overview: MODOT utilizes two types of criteria to determine where climbing lanes could provide LOS and safety benefits on Missouri highways:

- Screening Criteria - utilized to screen an entire network of two-lane highways for potential climbing lane candidate locations.
- Site-Specific Criteria - utilized to screen a specific roadway sections where climbing lanes may provide substantial LOS and safety benefits and that warrant additional field investigation.

Location Criteria: Preliminary Screening Criteria:

- Traffic volumes - Site section for focuses on two-lane highways with existing and projected traffic volumes between 5,000 and 20,000 vehicles daily.

- Available Length of Roadway - The study recommends a minimum available roadway length of 2.50 miles as a preliminary screening criterion.
- Planned or Programmed Improvements at the Site - Sites that are already programmed for four-lane highway improvements should be removed from consideration for climbing lanes.

Site-Specific Criteria:

- Truck Volume or percent trucks
- Operating Speed

Following the guidelines set forth by the AASHTO *Green Book*[4], to justify the addition of a climbing lane on a two-lane highway, the MODOT verifies that the required criteria are met. Climbing lanes may also be justified, even where the critical length of grade is not exceeded, based on LOS analysis conducted with HCM procedures.

South Dakota Department of Transportation (SDDOT)

SDDOT's *Roadway Design Manual* incorporates detailed criteria guidelines that need to be satisfied in order to justify the inclusion of a climbing lane. The following is a summary of the guidelines presented in the SDDOT *Roadway Design Manual*.

Overview: Three conditions, reflecting economic conditions, should be satisfied to justify climbing lanes. These include the following:

- Upgrade traffic flow rate > 200 vph. With traffic data obtained from the projects scope or from the Transportation Inventory Management Office, use design hourly volume-two way (DHV) and multiply by 0.6 (50 to 70 percent range) to obtain traffic flow one way.
- Upgrade truck flow rate > 20 VPH. From traffic data received use trucks % (T DHV) and multiply by condition 1 above. *Note: Recreational vehicle (RV) traffic is not included with the percentage of trucks; therefore if condition 2 does not exist with given truck %, this condition may be satisfied if a significant part of traffic is RV.*
- One of the following conditions exist:
  - A 10 mph or greater speed reduction is expected for a typical heavy truck.
  - LOS E or F exists on the grade. LOS based on average traveling speed for a two-lane highway.
  - A reduction of two or more levels-of-service is experienced when moving from the approach segment to the grade.

If all three of the above mentioned conditions exist an analysis shall be completed to determine the location of a climbing lane. The *Roadway Design Manual* recommends that when warranted, the climbing lane should begin when the truck

speed is reduced 10 mph below the average running speed for all traffic. The end of the climbing lane should extend until trucks obtain a speed within 10 mph of the average running speed for all traffic or until sufficient sight distance is available. In addition, climbing lanes should be a minimum of 0.5 miles long excluding tapers to be effective.

Peer Agency Review

In order to further examine current methodologies utilized by DOTs to identify and prioritize climbing lanes, project team members contacted agency staff at Nevada, Colorado, Texas, New Mexico, and Missouri DOTs. Agency staff were asked to provide details on current processes and success stories; however, little feedback was received.

3. EXISTING CONDITIONS ASSESSMENT

This chapter presents a summary of the existing passing and climbing lane location inventory and also provides a *"Before and After"* assessment of the safety and traffic improvements due to the construction of passing/climbing lanes.

DATA COLLECTION

ADOT's GIS section, Bridge group, and Traffic Records Division now manage a robust and more accurate repository of transportation databases than what was available during the previous study. At the onset of the study, the study team met with the GIS Section and ADOT PM to obtain the data identified in Table 3.1. Each database was reviewed for quality and the data was adjusted where appropriate.

Table 3.1: Data Items and Sources

Dataset	Source
Accident Location Information and Surveillance System (ALISS) Crash Database	ADOT Traffic Records
Striping plans (Passing distance lengths)	ADOT Traffic Records
Traffic volumes (AADT) - Current and past 5 years - Vehicle classification, K & D factors - Seasonal adjustment factors	ADOT GIS section
Future traffic volumes	ADOT GIS section
Functional classification	ADOT GIS section
Highway video log	ADOT GIS section
Highway centerline GPS data	ADOT GIS section
Highway log - Shoulders - Median type - Lane width - Grade/Terrain - Speed - Traffic Signals	ADOT GIS section
ATIS Dataset	ADOT GIS section
Statewide Transportation Improvement Program (STIP)	ADOT MPD
Highway Performance Monitoring System (HPMS) - Beginning MP, Ending MP - Ownership - Lanes - Access Center Lane - Median and median width - Curve and Curve Length - Horizontal Alignment - Vertical Alignment - Urban and Rural	ADOT GIS section
Transportation Data Management System (TDMS)	ADOT GIS section
Bridges and Structures	ADOT Bridge Group
As-built drawings	ADOT ROW

EXISTING PASSING AND CLIMBING LANES INVENTORY

Compiling a comprehensive inventory of existing passing/climbing lane locations is an essential first step before evaluating the need for new passing/climbing lanes. ADOT's existing passing and climbing lanes data set was used as the starting point. Each passing/climbing lane location and length was verified against aerial imagery. Table 3.2 provides a summary of the number of passing and climbing lanes in each ADOT District. Approximately 169 passing/climbing lanes currently exist on two-lane highways and the length of the passing lanes varies from 0.25 miles to over a mile. Shorter passing lanes are typically less effective than longer passing lanes especially on highways with higher traffic volume levels.

On multilane highways, "no passing" zones is not an issue; extended upgrade locations coupled with high truck traffic warrant the need for climbing lanes on multilane highways. Currently, only four climbing lanes exist on Arizona's multilane highways however, a few are now under construction and a few more are in the design stage.

Figures 3.1 to 3.8 illustrate the locations of existing passing and climbing lanes in each ADOT District.

Table 3.2: Passing and Climbing Lanes by ADOT Districts

ADOT District	Passing/Climbing Lanes on Two-Lane Highways				Climbing Lanes on Multilane Highways
	< 0.5 mile	0.5 - 1 mile	> 1 mile	Total	> 1 mile
Flagstaff	1	15	16	32	2
Globe	7	23	21	51	0
Holbrook	2	0	10	12	0
Kingman	1	8	7	16	2
Prescott	21	12	6	39	0
Safford	1	5	3	9	0
Tucson*	0	0	0	0	0
Yuma	0	5	5	10	0
Total	**33**	**68**	**68**	**169**	**4**

** Based on the inventory review, Tucson District did not have any passing or climbing lanes*

Figure 3.1: Existing Passing and Climbing Lanes in the Flagstaff District

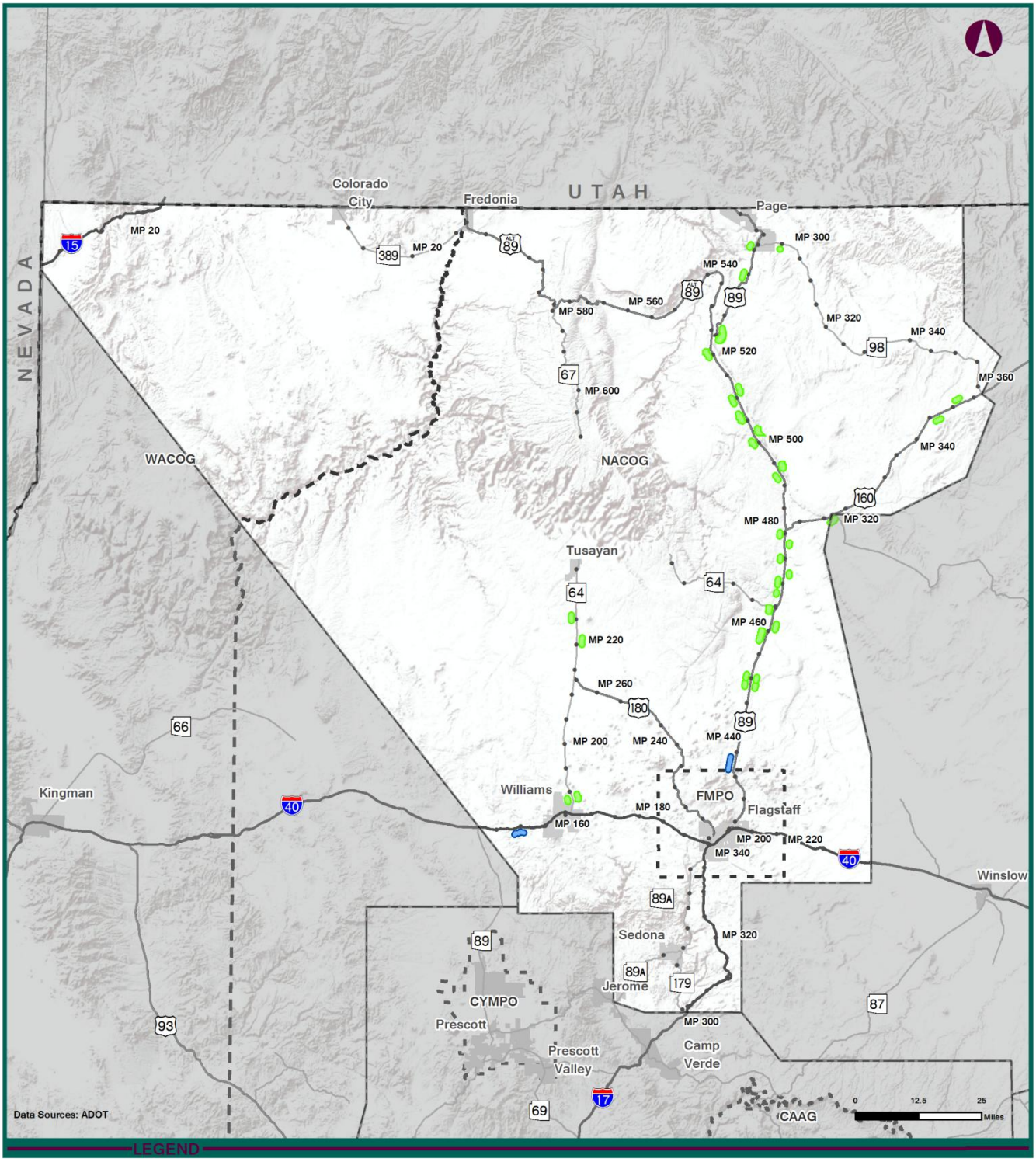


Figure 3.2: Existing Passing and Climbing Lanes in the Globe District

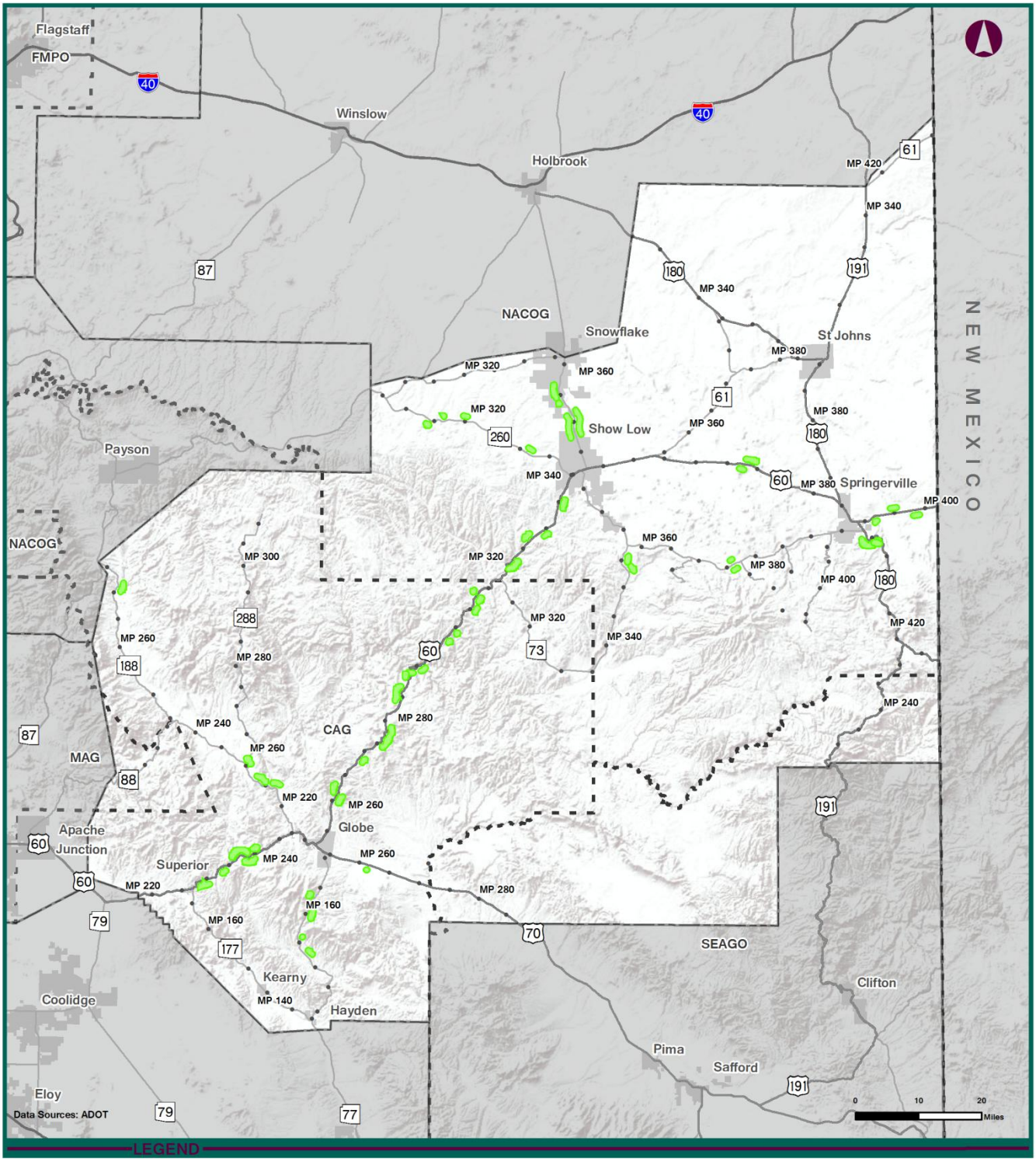


Figure 3.3: Existing Passing and Climbing Lanes in the Holbrook District

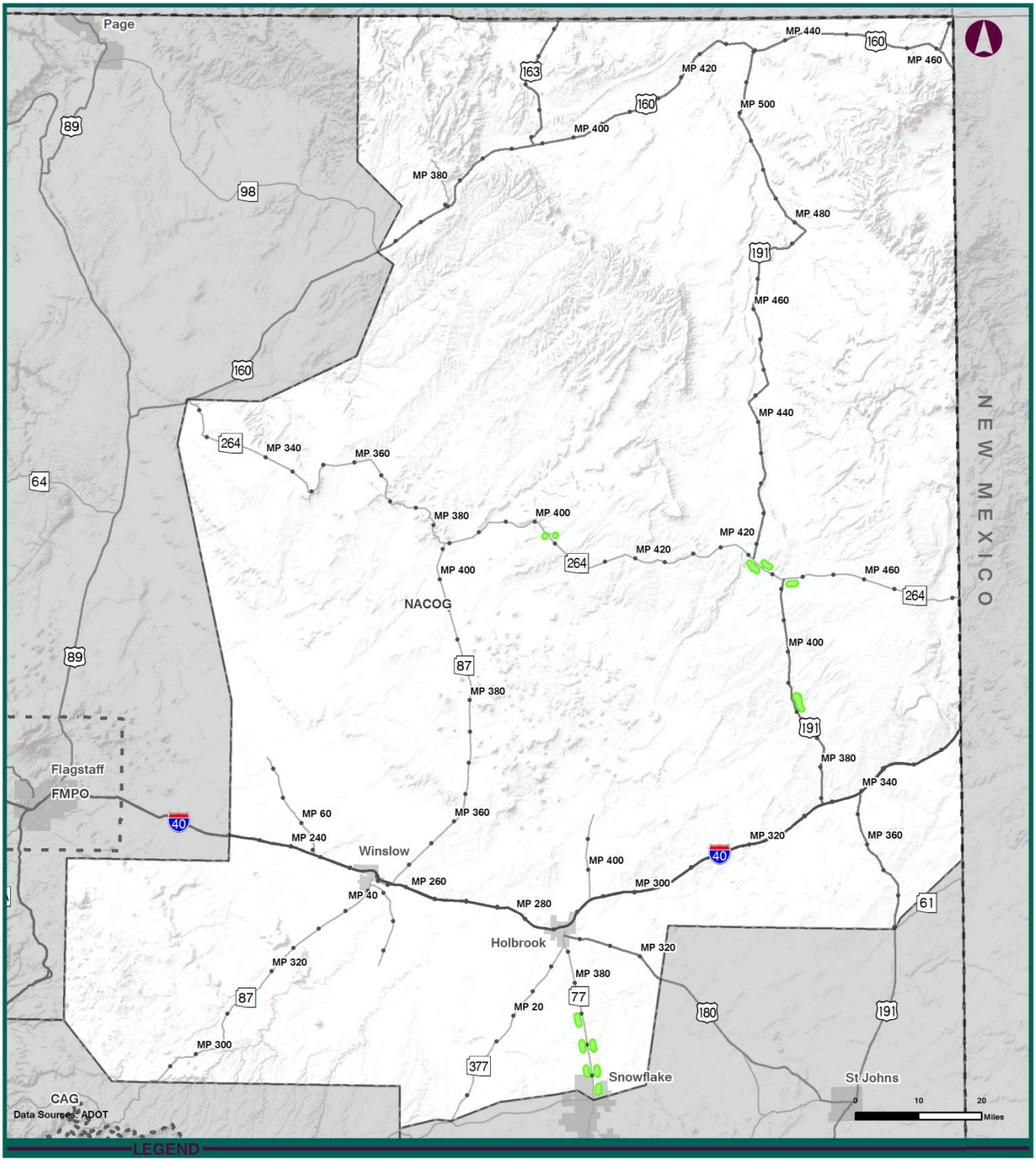


Figure 3.4: Existing Passing and Climbing Lanes in the Kingman District

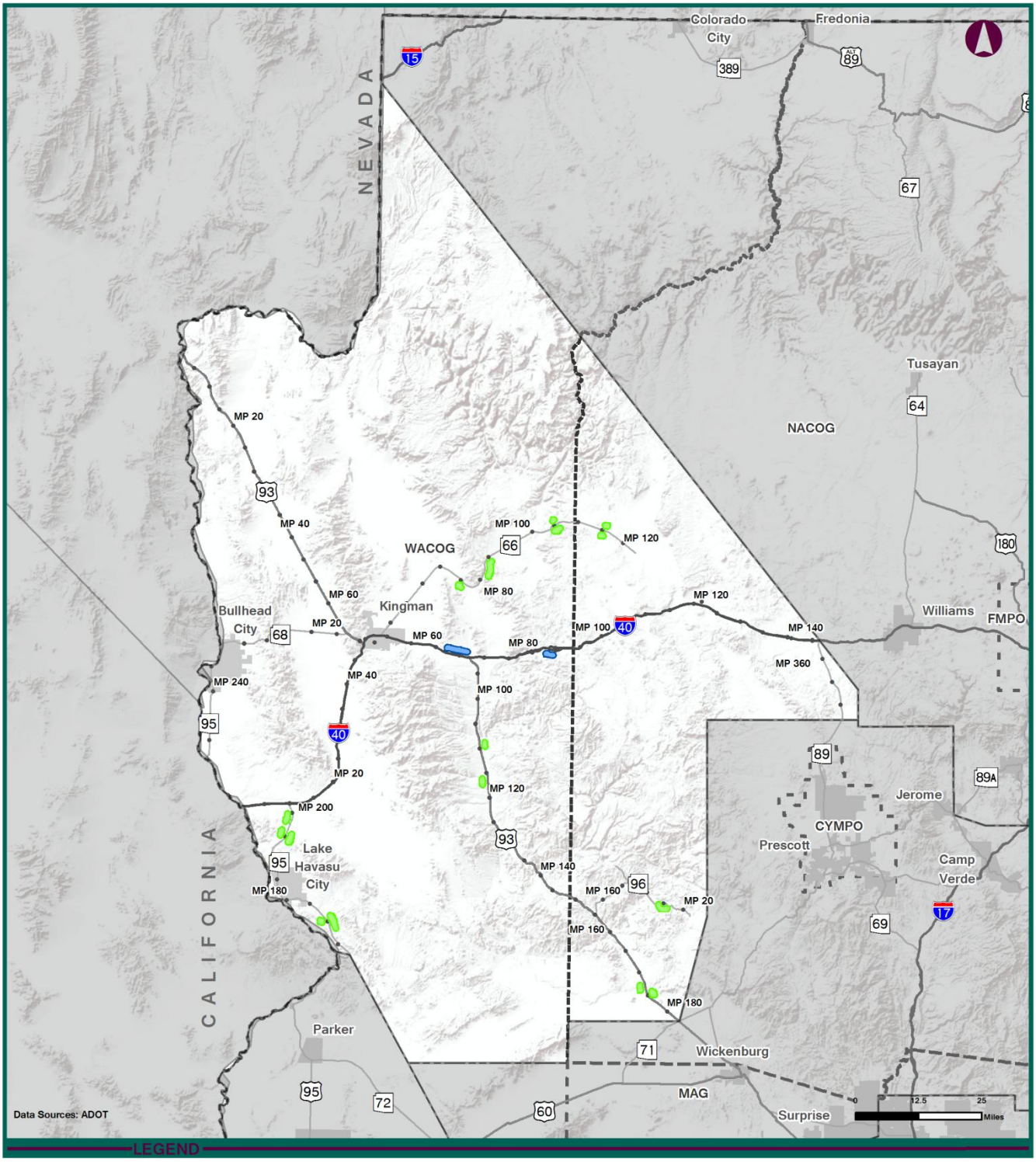


Figure 3.5: Existing Passing and Climbing Lanes in the Prescott District

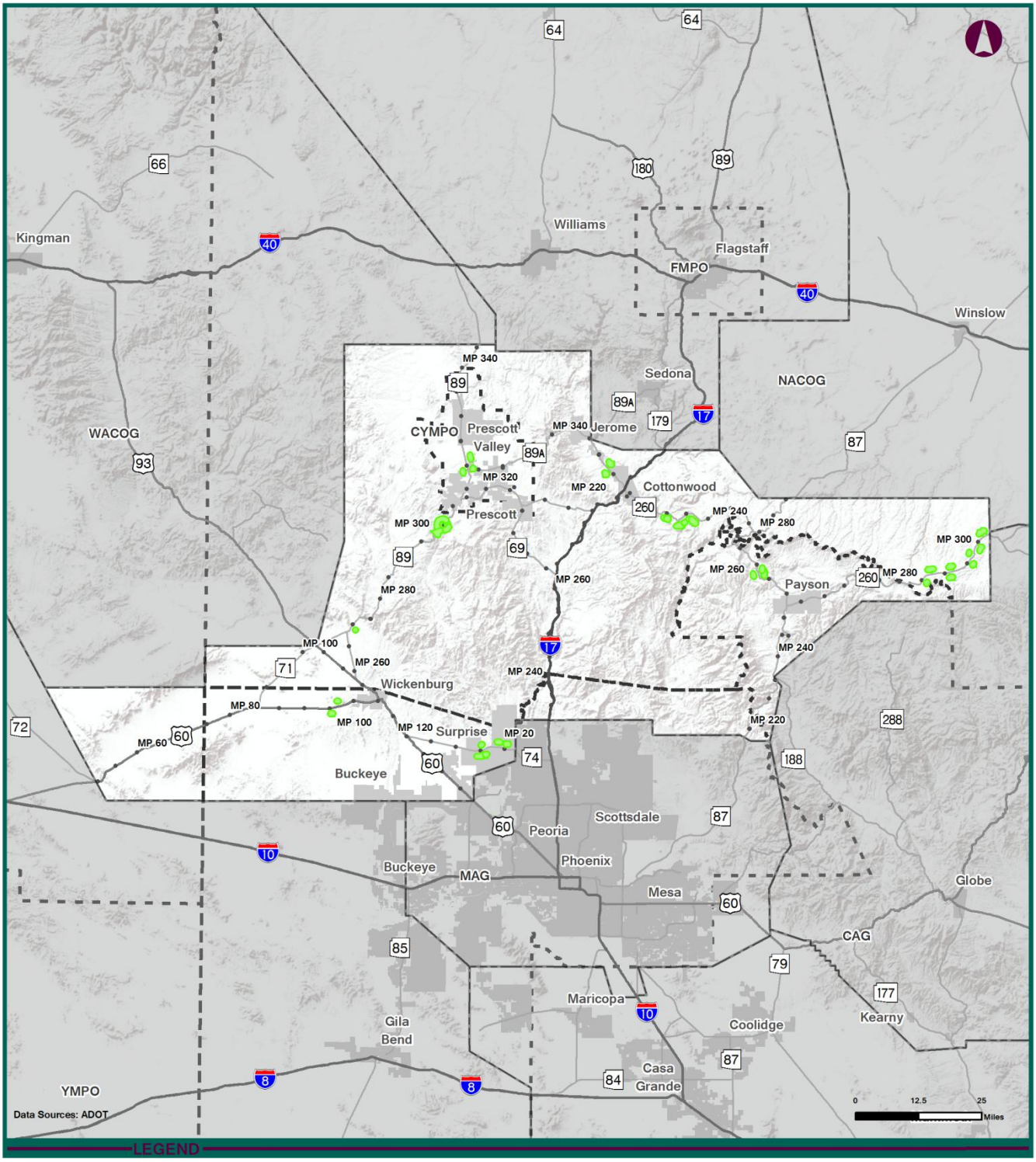


Figure 3.6: Existing Passing and Climbing Lanes in the Safford District

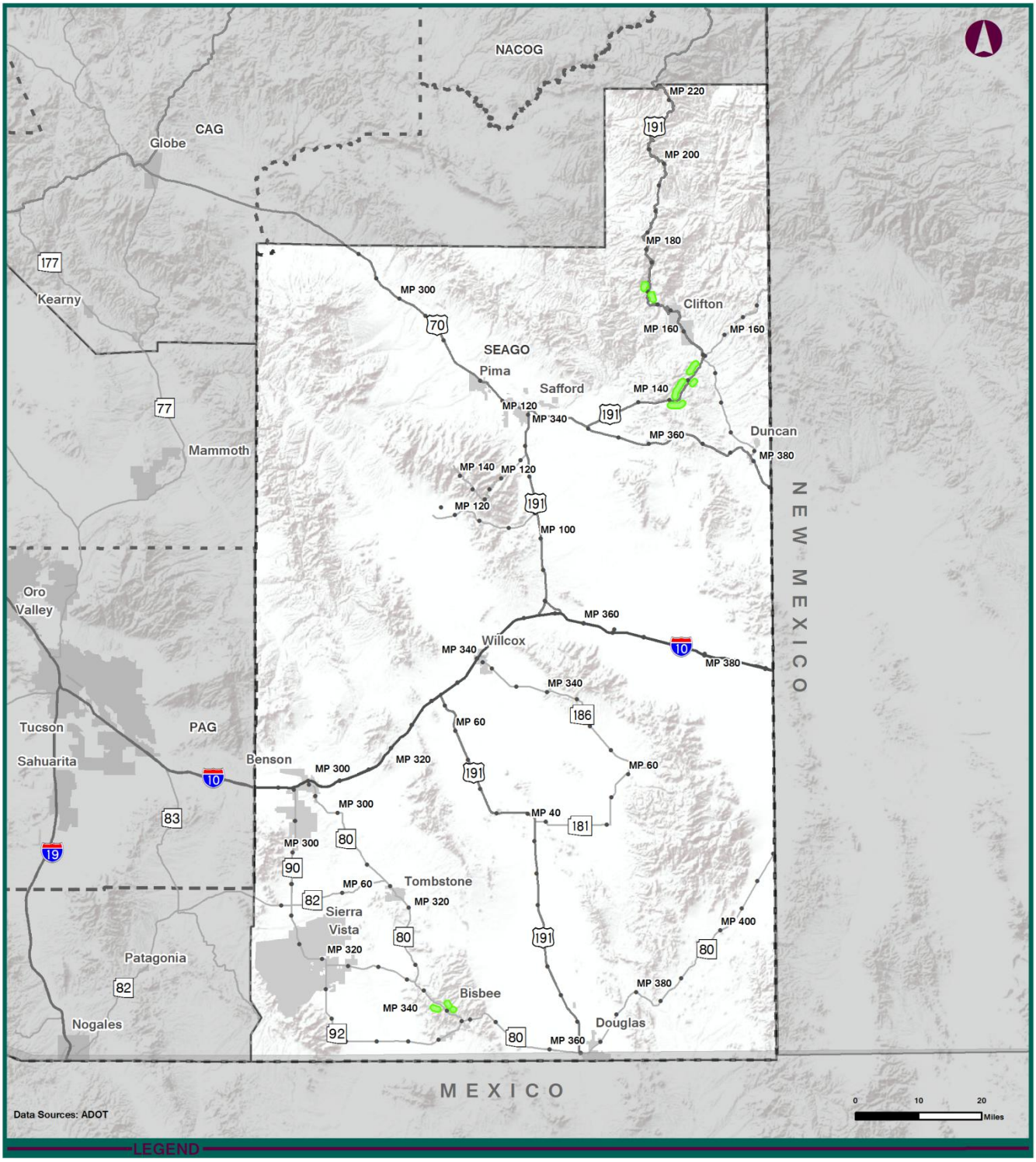


Figure 3.7: Existing Passing and Climbing Lanes in the Tucson District

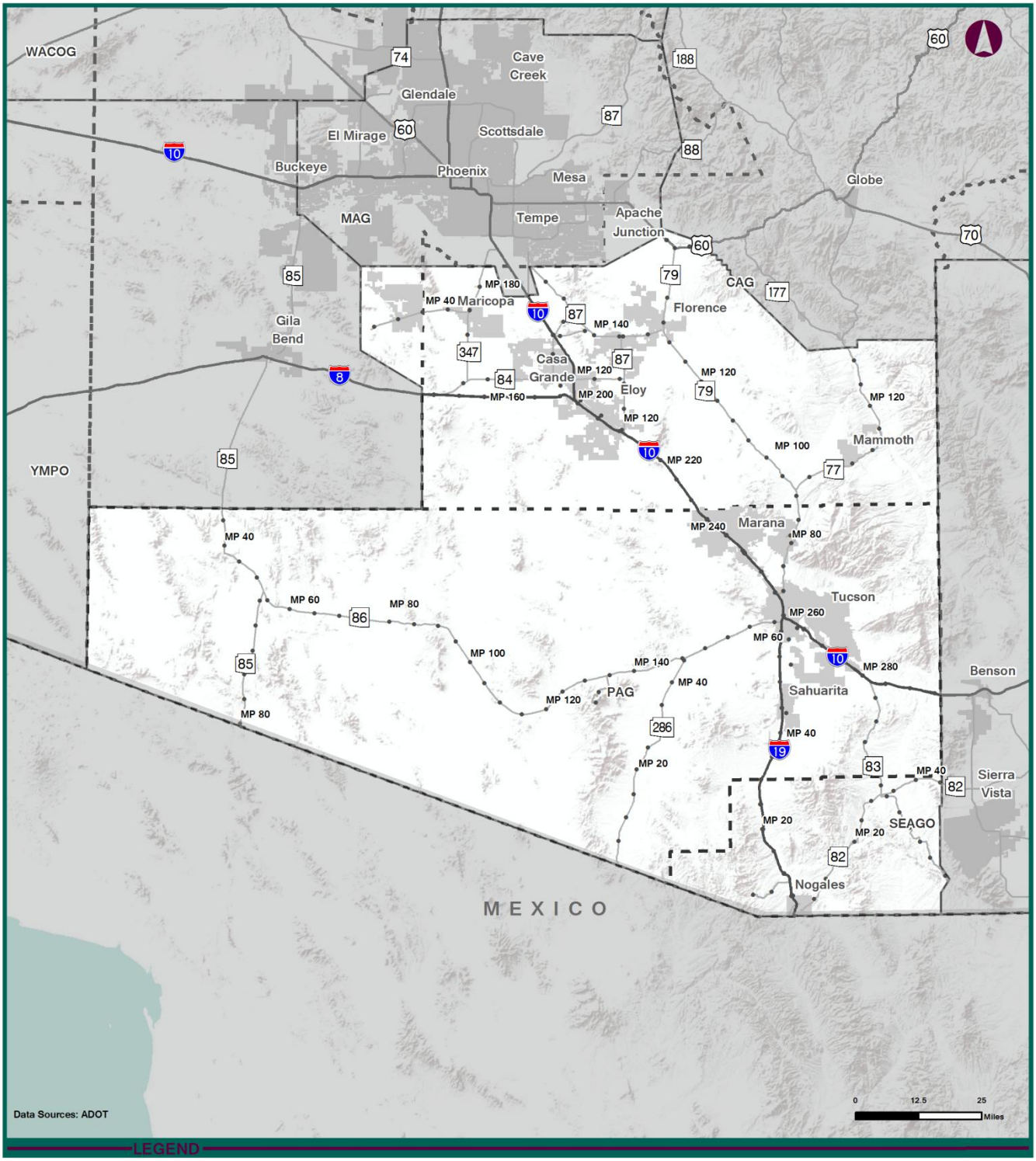
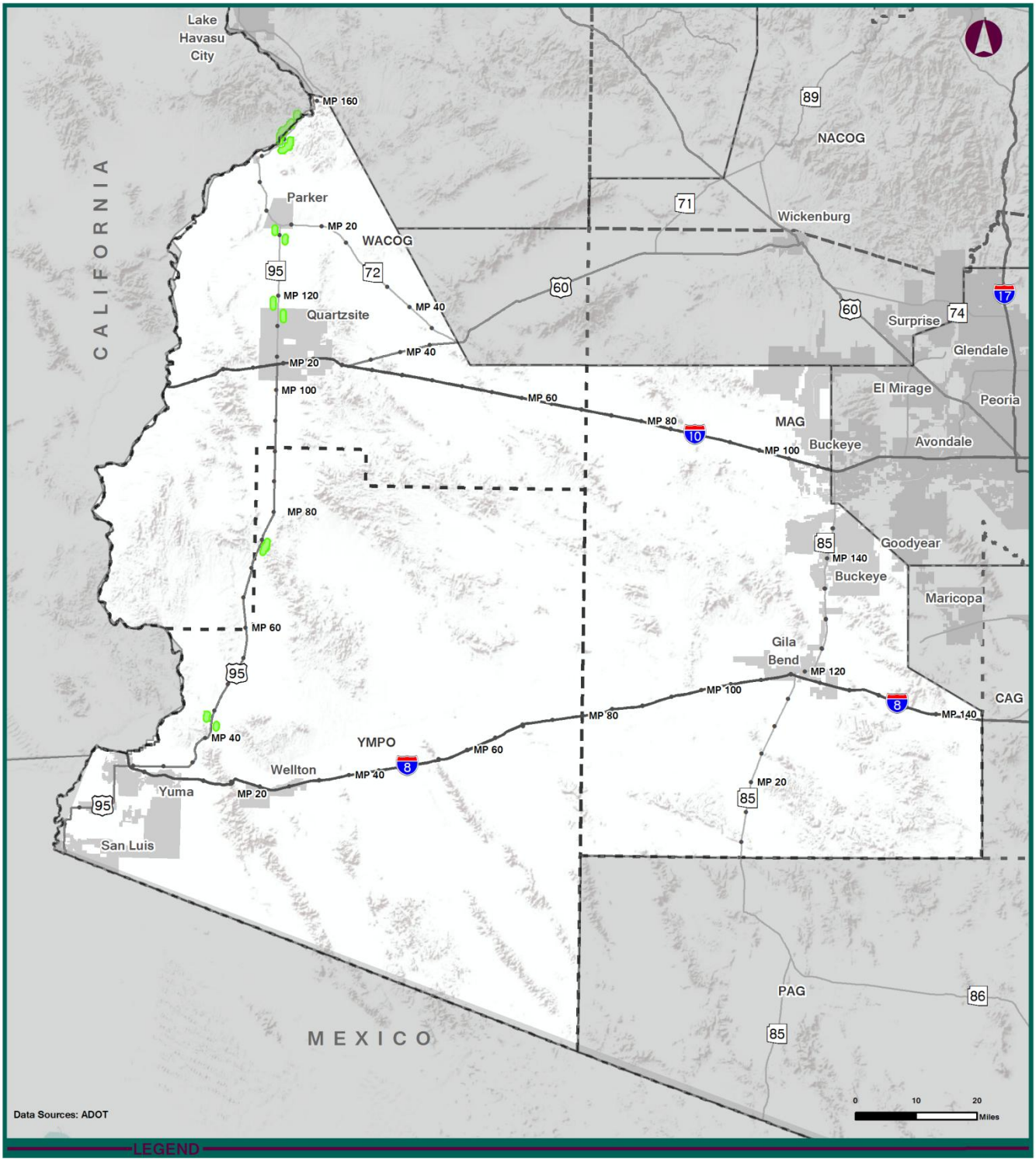


Figure 3.8: Existing Passing and Climbing Lanes in the Yuma District



EVALUATION OF EXISTING PASSING/CLIMBING LANES – *"BEFORE AND AFTER"* COMPARISON

To assess the benefits of passing/climbing lanes, crash history and traffic operational performance was evaluated for the *"Before and After"* conditions for twelve existing passing/climbing lanes. Crash data was collected for two years before construction and two years after construction of the passing/climbing lane. To account for the influence of the passing/climbing lane, crashes within five miles downstream were also included in the analysis. Number of crashes, crash rate, injury crash rate, and number of *equivalent* property damage only crashes (EPDO: Equivalent Property Damage Only) were estimated for each location. EPDO represents the relative number of Property Damage Only (PDO) or non-injury crashes. It takes into account the number of crashes and the severity of the crashes. Each crash is converted to an equivalent PDO using a multiplier for each crash type. Table 3.3 lists the multipliers used to derive the EPDO value.

Table 3.3: EPDO Conversion Factors

Crash Type	Equivalent PDO Crashes (multiplier)
Non-injury or Property Damage Only (PDO)	1
Possible Injury	2
Minor Injury	4
Severe Injury	7
Fatal	12

After a passing/climbing lane was constructed on two-lane highways:

- Number of crashes decreased by 33%
- Crash rate decreased by 31%
- Injury crash rate decreased by 46%
- EPDO measure decreased by 36%

After a climbing lane was constructed on multilane highways:

- Number of crashes decreased by 37%
- Crash rate decreased by 51%
- Injury crash rate decreased by 74%
- EPDO measure decreased by 48%

Crash rates are expressed as crashes per million Vehicle Miles Traveled (VMT). Crash data for years 2008-2012 was used during this analysis.

Only two locations were available to evaluate the before/after conditions for climbing lanes on multilane lanes. Table 3.4 includes a summary of crash data analysis for climbing lanes on multilane lanes.

Table 3.4: "*Before and After*" Crash Analysis

Route	Dir	BMP	EMP	Total Crashes		Percent Change in Crashes	Crash Rate Before / After		Injury Crash Rate Before / After		Crash EPDO**	
				Before	After		Before	After	Before	After	Before	After
SR 64	NB	188.26	189.22	23	7	-70%	2.9	0.67	0.94	0.1	47	10
SR 64	NB	220.01	221.51	12	14	17%	1.16	1.28	0.77	0.18	54	20
SR 64	SB	224.84	225.91	14	11	-21%	1.45	1.08	0.41	0.1	40	14
SR 95	SB	170.67	171.32	23	11	-52%	0.93	0.51	0.44	0.28	59	43
US 160	EB	320.82	322.48	6	8	33%	0.15	0.18	0.07	0.14	19	35
SR 77	NB/SB	365.12	370.51	20	14	-30%	0.83	0.64	0.21	0.18	34	22
SR 260	WB	316.21	316.87	27	16	-41%	1.97	2.03	0.29	0.25	36	22
US 89	SB	500.15	501.12	4	2	-50%	0.48	0.26	0.12	0	7	2
US 89	NB	501.77	502.65	5	4	-20%	0.61	0.52	0.12	0.39	6	16
US 60	EB	238.71	239.52	25	19	-24%	2.19	1.63	1.05	0.77	64	53
SR 87	SB	205.39	206.96	25	11	-56%	1.56	0.58	0.62	0.1	60	15
I- 40	WB	66.87	71.29	51	37	-27%	0.45	0.4	0.14	0.1	104	70

** EPDO: Equivalent Property Damage Equivalent Only Value*

Level of service (LOS) for each location was determined *before and after* the passing/climbing lane was constructed. After a passing/climbing lane was constructed, LOS for each assessed location improved by at least one level for both two-lane highways. Table 3.5 summarizes the level of service analysis.

Table 3.5: "*Before and After*" Level of Service Comparison

Route	Direction	BMP	EMP	LOS	
				Before	After
SR 64	NB	188.26	189.22	C	B
SR 64	NB	220.01	221.51	C	B
SR 64	SB	224.84	225.91	C	B
SR 95	SB	170.67	171.32	D	C
US 160	EB	320.82	322.48	C	B
SR 77	NB/SB	365.12	370.51	C	B
SR 260	WB	316.21	316.87	B	A
US 89	SB	500.15	501.12	B	A
US 89	NB	501.77	502.65	B	A
US 60	EB	238.71	239.52	C	B

4. ROUND ONE STAKEHOLDER OUTREACH

Round one of stakeholder outreach included individual meetings with each ADOT District staff and email outreach to the Council of Governments (COGs) and Metropolitan Planning Organizations (MPOs). Meetings with the Districts were conducted between August 12 – 20, 2013. The primary purpose of these meetings was to obtain feedback from each District about their preferred locations for passing/climbing lanes based on their understanding of the area's travel patterns, crash history, and roadway improvement needs. District staff input was vital to understanding the unique needs and concerns in each District.

Based on lessons learned from the previous studies, a comparison of the subjective analysis/feedback from each District against the data-driven technical analysis results is essential to

- Validate the methodology to identify and prioritize passing/climbing lane locations
- Identify any inconsistencies or errors in the background data
- Identify reasons when District recommendations do not match technical analysis results
- Obtain Districts consensus' on the methodology and study results

Tables 4.1 to 4.8 summarize each District's suggested preliminary locations for passing and climbing lanes on two-lane and multilane highways based on their understanding of the District roadways and Figures 4.1 to 4.8 display the tabular information. *The beginning and ending milepost ranges in each table represent the general problem area and not the exact location and length of the desired passing/climbing lane location.*

Once the Districts feedback was obtained, and email was sent to each COG/MPO requesting their feedback with respect to the District's preference and preliminary methodology for identifying and prioritizing passing/climbing lanes. Very little feedback was received from the COGs and MPOs.

Table 4.1: Passing/Climbing Lane Candidate Locations Suggested by Flagstaff District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 15	NB	2.09	4.08	CL	Flagstaff	
I 15	NB	14.02	25.95	CL	Flagstaff	DCR Underway.
I 15	SB	21.91	20.04	CL	Flagstaff	
I 17	NB	311.5	314.1	CL	Flagstaff	I17 DCR Project #2A - High Priority
I 17	NB	299	302	CL	Flagstaff	I17 DCR Project #2E (High Priority)
I 17	NB	304	311.5	CL	Flagstaff	I17 DCR Project #2D (303.1 - 306.0), #2C (306.0 - 307.0), #2B (307.0 - 311.5) - High Priority
I 40	EB	149.6	153	CL	Flagstaff	Ash Fork to Williams
I 40	EB	155.5	160.2	CL	Flagstaff	High Priority
I 40	WB	162.72	161.1	CL	Flagstaff	
I 40	EB	178.44	179.93	CL	Flagstaff	
I 40	EB	188	189	CL	Flagstaff	
I 40	WB	195.03	191	CL	Flagstaff	
I 40	WB	206.21	205.09	CL	Flagstaff	
S 64	EB	196.3	198.2	PL	Flagstaff	High Priority
S 64	WB	200.3	202.3	PL	Flagstaff	
S 64	EB	202.5	204.7	PL	Flagstaff	
S 64	EB	213.5	218.5	PL	Flagstaff	
S 64	WB	215.5	220.5	PL	Flagstaff	
S 89A	NB	390	399	CL	Flagstaff	
S 89A	SB	390	399	CL	Flagstaff	
U 160	EB	312	313	CL	Flagstaff	
U 160	EB	314.5	319.5	PL	Flagstaff	
U 160	EB	336.5	341.5	PL	Flagstaff	High Priority
U 160	WB	338.5	343.5	PL	Flagstaff	High Priority
U 89	NB	452.7	453.8	PL	Flagstaff	In FY14 - 18 Program (FY15 H7056 S. of Gray Mountain project)
U 89	SB	453.5	455.05	PL	Flagstaff	
U 89	NB	477.7	478.4	PL	Flagstaff	Pending (FY14 H8116 Moenkopi Wash - Hidden Springs project)
U 89	SB	479	480.21	PL	Flagstaff	
U 89	SB	500	501.19	PL	Flagstaff	
U 89	SB	510	510.6	PL	Flagstaff	(Project extension)
U 89	NB	510.75	512.2	PL	Flagstaff	Pending (FY14 H7866 Gray Hills Wash - N. Red Hill project)
U 89A	NB	550	551	CL	Flagstaff	
U 89A	NB	566.3	571.3	PL	Flagstaff	

Table 4.2: Passing/Climbing Lane Candidate Locations Suggested by Globe District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
U 60	WB	265.00	266.00	PL	Globe	
U 60	EB	305.00	307.00	PL	Globe	
U 60	EB	346.00	348.00	PL	Globe	High accident area, potential conflicts with turn lanes at Bourden Ranch Rd.
U 70	EB	268.00	270.00	PL	Globe	Also need WB Climbing Lane.
U 70	WB	268.00	270.00	CL	Globe	

Table 4.3: Passing/Climbing Lane Candidate Locations Suggested by Holbrook District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 40	WB	234	237.6	CL	Holbrook	Medium Priority
I 40	WB	252.1	255.8	CL	Holbrook	Medium Priority
I 40	EB	252.1	255.8	CL	Holbrook	Medium Priority
I 40	EB	285.2	289.5	CL	Holbrook	Medium Priority
S 264	WB	388	395	PL	Holbrook	Medium Priority
S 264	EB	388	395	PL	Holbrook	Medium Priority
S 264	EB	376	379.5	PL	Holbrook	Low Priority (Arch and topo issues)
S 264	EB	402.5	403.5	PL	Holbrook	Low Priority
S 264	EB	454.5	460	PL	Holbrook	High Priority (shoulder work MP450-465)
S 87	NB	290	295	PL	Holbrook	Medium Priority
S 87	SB	290	295	PL	Holbrook	Low Priority
U 160	EB	362	374	PL	Holbrook	Medium Priority
U 160	WB	362	374	PL	Holbrook	Medium Priority
U 160	EB	374	384	PL	Holbrook	Low Priority
U 160	WB	374	384	PL	Holbrook	Low Priority
U 160	EB	384	393	PL	Holbrook	Low Priority- (Rock cut and washes)
U 160	WB	460.8	463	PL	Holbrook	Medium Priority
U 191	SB	354	355	PL	Holbrook	Low Priority (Light traffic)
U 191	NB	375.5	377	PL	Holbrook	Low Priority
U 191	NB	420	424	PL	Holbrook	Medium Priority
U 191	SB	443	447	CL	Holbrook	High Priority (#1 Climbing Lane for District)
U 191	NB	450	456	PL	Holbrook	High Priority
U 191	SB	450	456	PL	Holbrook	High Priority

Table 4.4: Passing/Climbing Lane Candidate Locations Suggested by Kingman District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 40	EB	45.25	48.85	CL	Kingman	Medium Priority - widen to median.
I 40	EB	48.85	51.50	CL	Kingman	Low Priority
I 40	EB	57.37	59.73	CL	Kingman	High Priority
I 40	WB	75.00	71.40	CL	Kingman	Low Priority

Table 4.4: Passing/Climbing Lane Candidate Locations Suggested by Kingman District (Continued)

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 40	EB	75.38	77.80	CL	Kingman	Medium Priority - part of location on previous list (MP75.39-87.90) - split to smaller length and avoids bridge widening
I 40	EB	79.80	81.70	CL	Kingman	Medium Priority - part of location on previous list (MP75.39-87.90) - split to smaller length and avoids bridge widening
I 40	EB	82.30	84.30	CL	Kingman	Medium Priority - part of location on previous list (MP75.39-87.90) - split to smaller length and avoids bridge widening
I 40	EB	85.00	86.00	CL	Kingman	Medium Priority - part of location on previous list (MP75.39-87.90) - split to smaller length and avoids bridge widening
I 40	EB	87.00	88.00	CL	Kingman	Medium Priority - part of location on previous list (MP75.39-87.90) - split to smaller length and avoids bridge widening
I 40	EB	93.00	96.77	CL	Kingman	Low Priority
I 40	WB	114.50	110.00	CL	Kingman	Medium Priority - 110.26 -112.00 and 113 - 114 to avoid bridges.
I 40	EB	124.74	130.83	CL	Kingman	Low Priority
I 40	WB	136.49	132.00	CL	Kingman	Low Priority
S 89	NB	353.30	354.00	PL	Kingman	Low Priority - New location
S 89	NB	356.50	360.50	PL	Kingman	Low Priority - New location
S 89	NB	358.00	360.50	PL	Kingman	Low Priority - New location
S 89	SB	362.95	359.67	PL	Kingman	Low Priority - New location
S 95	NB	161.00	167.30	PL	Kingman	Medium Priority - past bridge
S 95	NB	162.00	163.00	PL	Kingman	Low Priority - New location
S 95	NB	163.00	164.00	PL	Kingman	Medium Priority - part of location on previous list (MP163.5-168.5) - split to a smaller length
S 95	NB	165.60	167.00	PL	Kingman	Medium Priority - part of location on previous list (MP163.5-168.5) - split to a smaller length
S 95	NB	172.13	173.50	PL	Kingman	Low Priority - New location
S 95	SB	173.00	177.00	PL	Kingman	Medium Priority
S 95	NB	194.50	196.23	PL	Kingman	High Priority - Existing passing lanes in both directions were only added by restriping the roadway. No shoulders in this area. Recommend widening to add the proper shoulders
U 93	SB	161.25	164.16	PL	Kingman	Medium Priority - New location-need and timing depends on the Big Jim Wash Section as identified in the Santa Maria to Wickenburg DCR
U 93	NB	165.45	164.00	PL	Kingman	Low Priority - New location
U 93	SB	165.55	167.80	PL	Kingman	Low Priority - New location
U 93	SB	169.00	172.50	PL	Kingman	Low Priority - New location

Table 4.5: Passing/Climbing Lane Candidate Locations Suggested by Prescott District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 17	SB	239.61	237.01	CL	Prescott	Medium Priority
I 17	NB	239.73	240.98	CL	Prescott	Medium Priority
I 17	NB	244.71	251	CL	Prescott	High Priority - #1 for Divided

Table 4.5: Passing/Climbing Lane Candidate Locations Suggested by Prescott District (Continued)

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 17	NB	256.14	259.87	CL	Prescott	Medium Priority
I 17	NB	269.68	274.9	CL	Prescott	Medium Priority
I 17	NB	278.38	280	CL	Prescott	Medium Priority
I 17	SB	287.97	281.26	CL	Prescott	I-17 SB (281 - 283) has been constructed, need I-17 (283-285) High Priority.
I 17	NB	288.45	289.69	CL	Prescott	Medium Priority
I 17	NB	292.05	296.4	CL	Prescott	Medium Priority
I 17	SB	293.94	291.7	CL	Prescott	Medium Priority
S 169	EB	5	12	PL	Prescott	Low priority EB & WB
S 260	EB	232.88	233.33	PL	Prescott	Low priority - connects other passing lanes
S 87	SB	254.5	259.5	PL	Prescott	Low priority
S 87	NB	264	265	PL	Prescott	High Priority
S 87	SB	264	265	PL	Prescott	Low priority
S 87	SB	269	270.4	PL	Prescott	High Priority - #1 for SR 87
S 87	NB	269	270.4	PL	Prescott	High Priority
S 87	NB	274	278.8	PL	Prescott	Medium Priority
S 87	SB	274	278.8	PL	Prescott	Medium Priority
S 89	NB	298	302	PL	Prescott	Low priority
S 89	SB	298	302	PL	Prescott	Low priority
S 89	SB	330	333	PL	Prescott	
S 89	NB	330	333	PL	Prescott	
S 89A	SB	345	350	PL	Prescott	Low priority

Table 4.6: Passing/Climbing Lane Candidate Locations Suggested by Safford District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 10	WB	304.71	302.8	CL	Safford	High Priority
I 10	EB	309.8	312	CL	Safford	High Priority #1 for District.
I 10	EB	316.01	317.26	CL	Safford	Medium Priority
I 10	WB	323.96	320.86	CL	Safford	Medium Priority
S 80	EB	335	337	PL	Safford	Low Priority - Near Bisbee, blasting will be required.
S 80	WB	348	346.6	PL	Safford	
U 191	NB	138.5	143.5	PL	Safford	Medium Priority
U 70	WB	283.65	283.2	PL	Safford	
U 70	WB	287.8	287	PL	Safford	

Table 4.7: Passing/Climbing Lane Candidate Locations Suggested by Tucson District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 10	EB	286.82	292.53	CL	Tucson	Low Priority
S 77	NB	91.21	92.13	PL	Tucson	Medium Priority
S 77	NB	94.13	95.35	PL	Tucson	Medium Priority

Table 4.7: Passing/Climbing Lane Candidate Locations Suggested by Tucson District (Continued)

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
S 79	NB	92.00	107.00	PL	Tucson	This stretch of highway has many horizontal curves (left/right) with very few passing zones in either NB or SB direction.
S 79	SB	92.00	107.00	PL	Tucson	This stretch of highway has many horizontal curves (left/right) with very few passing zones in either NB or SB direction.
S 83	WB	47.00	53.00	PL	Tucson	While this stretch also seems to have continuous horizontal curves (left/right) with some minor grade, there are very few passing opportunities throughout this stretch from MP 53 – MP 41. Focus on MP 47 – MP 53
S 83	EB	47.00	53.00	PL	Tucson	While this stretch also seems to have continuous horizontal curves (left/right) with some minor grade, there are very few passing opportunities throughout this stretch from MP 53 – MP 41. Focus on MP 47 – MP 53
S 86	WB	82.00	93.00	PL	Tucson	This stretch of highway has continuous horizontal curves (left/right) and has very few passing zones in either the EB or WB direction.
S 86	EB	82.00	93.00	PL	Tucson	This stretch of highway has continuous horizontal curves (left/right) and has very few passing zones in either the EB or WB direction.

Table 4.8: Passing/Climbing Lane Candidate Locations Suggested by Yuma District

ROUTE	DIR	BMP	EMP	Type	DISTRICT	COMMENTS
I 8	EB	17.12	19.11	CL	Yuma	Medium Priority
I 8	WB	20.95	18.84	CL	Yuma	High Priority
S 95	NB	133.00	138.00	PL	Yuma	Medium Priority
S 95	SB	133.00	138.00	PL	Yuma	Low Priority
U 95	NB	77.00	82.00	PL	Yuma	Low Priority
U 95	SB	77.00	82.00	PL	Yuma	Low Priority
U 95	NB	82.00	87.00	PL	Yuma	Medium Priority
U 95	SB	82.00	87.00	PL	Yuma	Medium Priority
U 95	NB	89.00	94.00	PL	Yuma	Medium Priority
U 95	SB	89.00	94.00	PL	Yuma	Medium Priority
U 95	NB	94.00	99.00	PL	Yuma	Medium Priority
U 95	SB	94.00	99.00	PL	Yuma	Medium Priority

Figure 4.1: Passing/Climbing Lane Candidate Locations Suggested by Flagstaff District

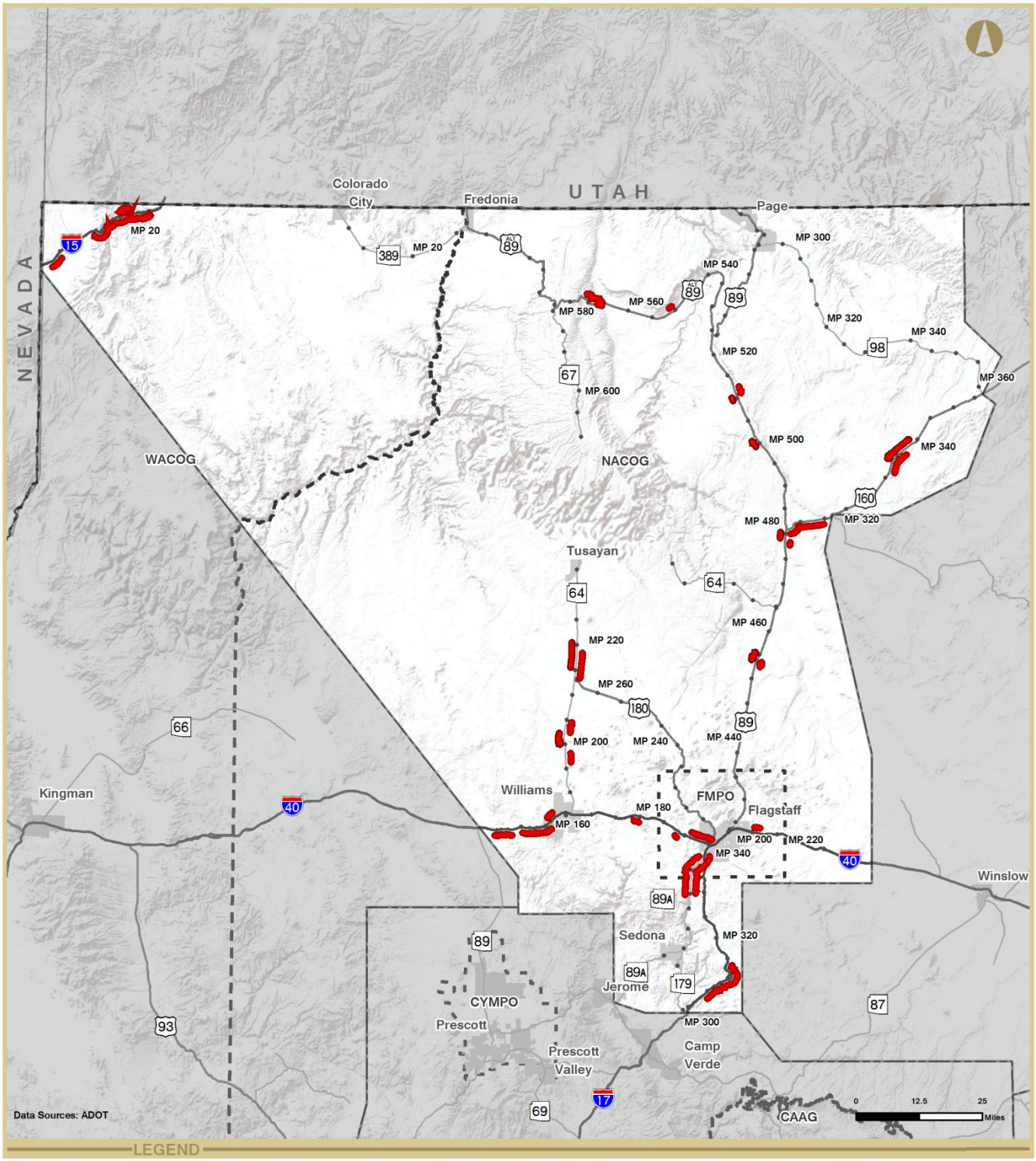


Figure 4.2: Passing/Climbing Lane Candidate Locations Suggested by Globe District

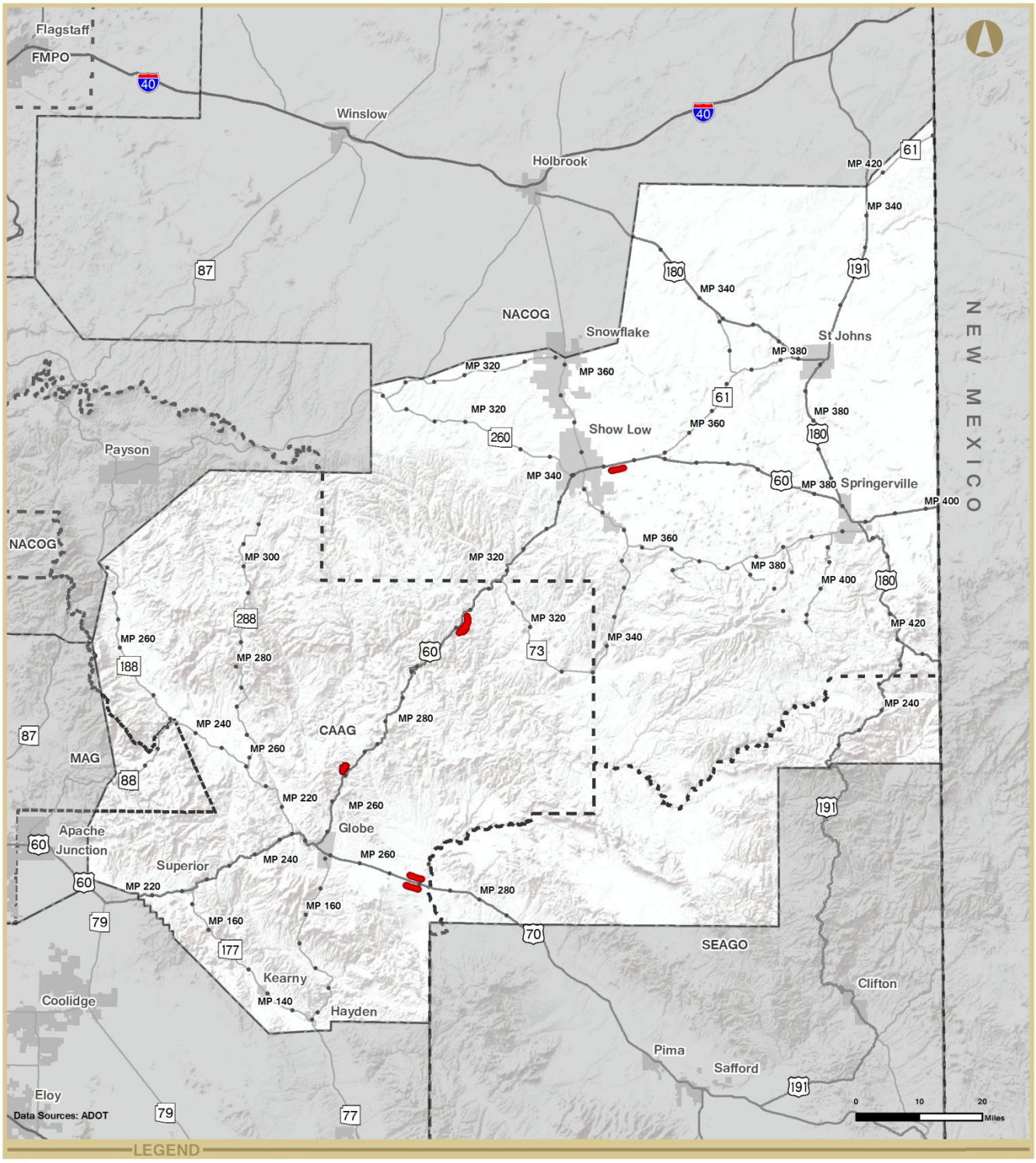


Figure 4.3: Passing/Climbing Lane Candidate Locations Suggested by Holbrook District

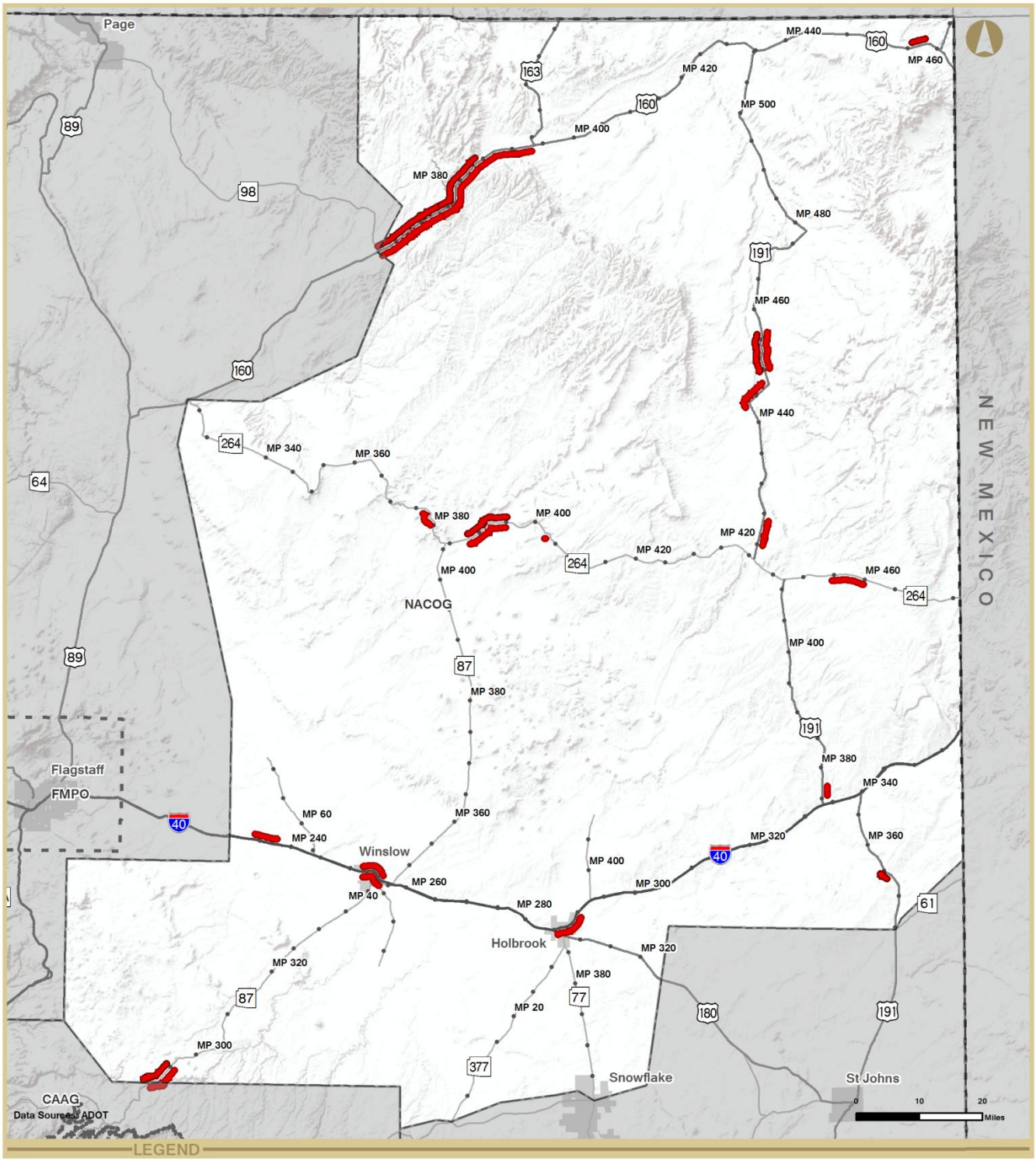


Figure 4.4: Passing/Climbing Lane Candidate Locations Suggested by Kingman District

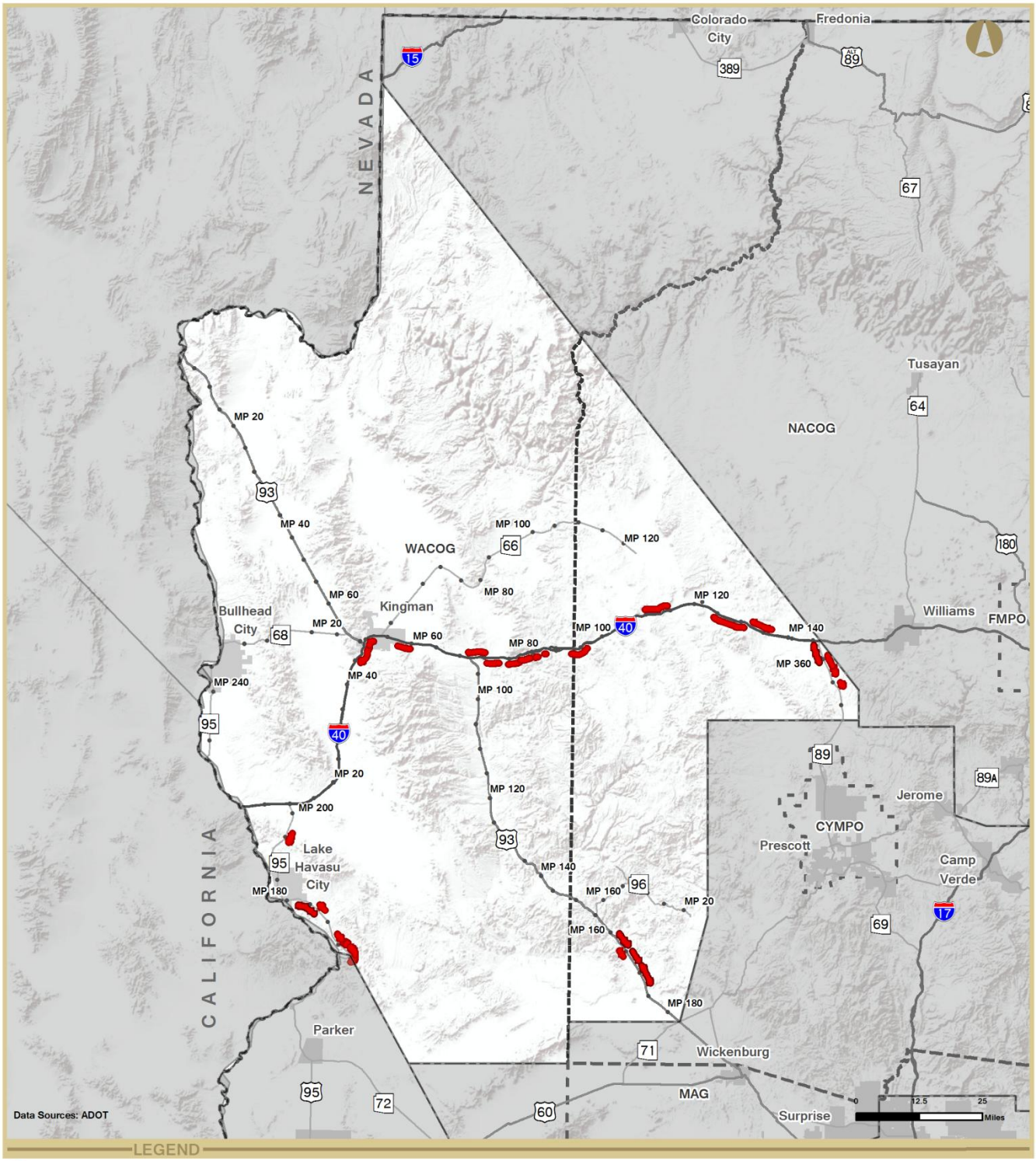


Figure 4.5: Passing/Climbing Lane Candidate Locations Suggested by Prescott District

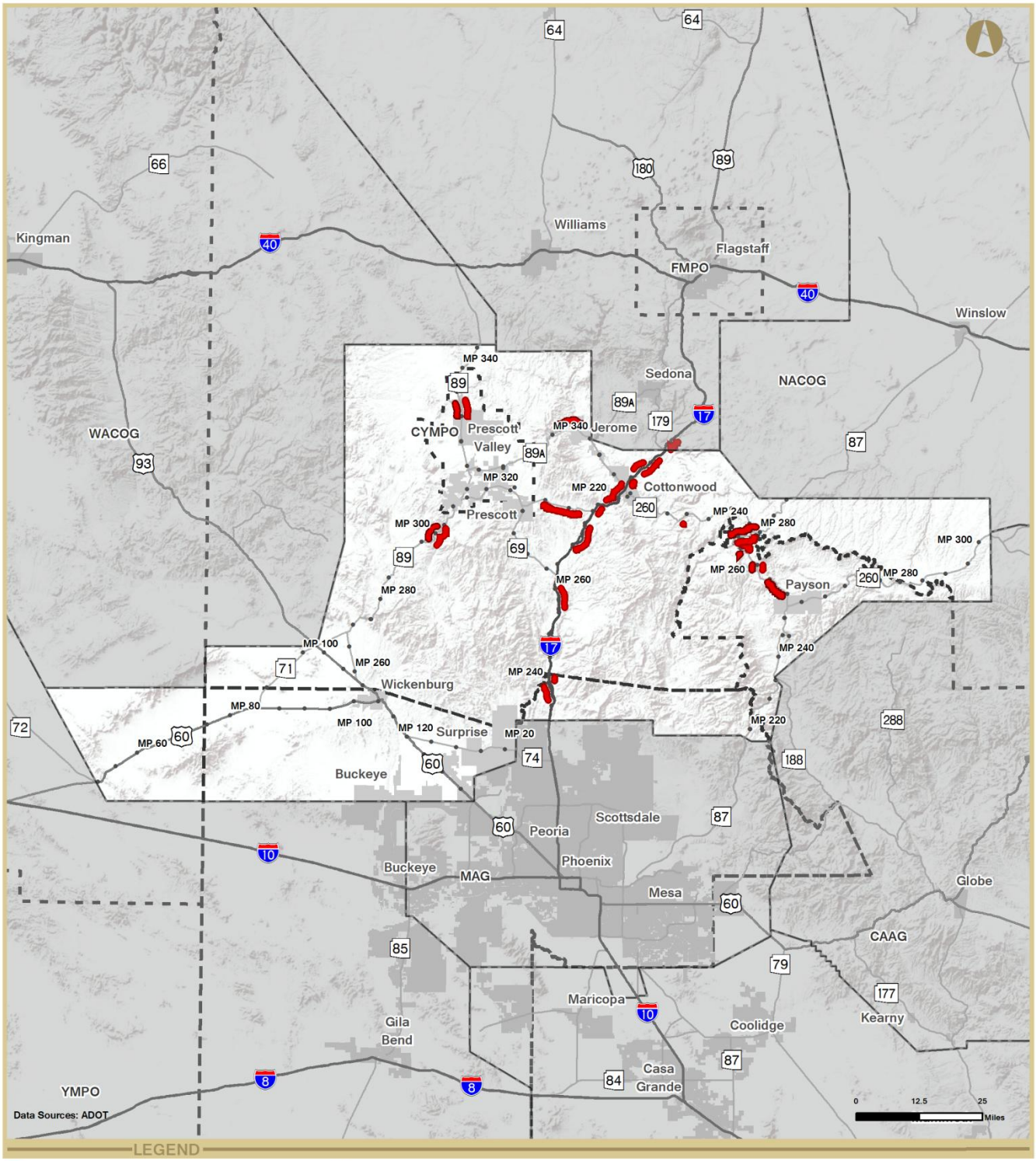


Figure 4.6: Passing/Climbing Lane Candidate Locations Suggested by Safford District

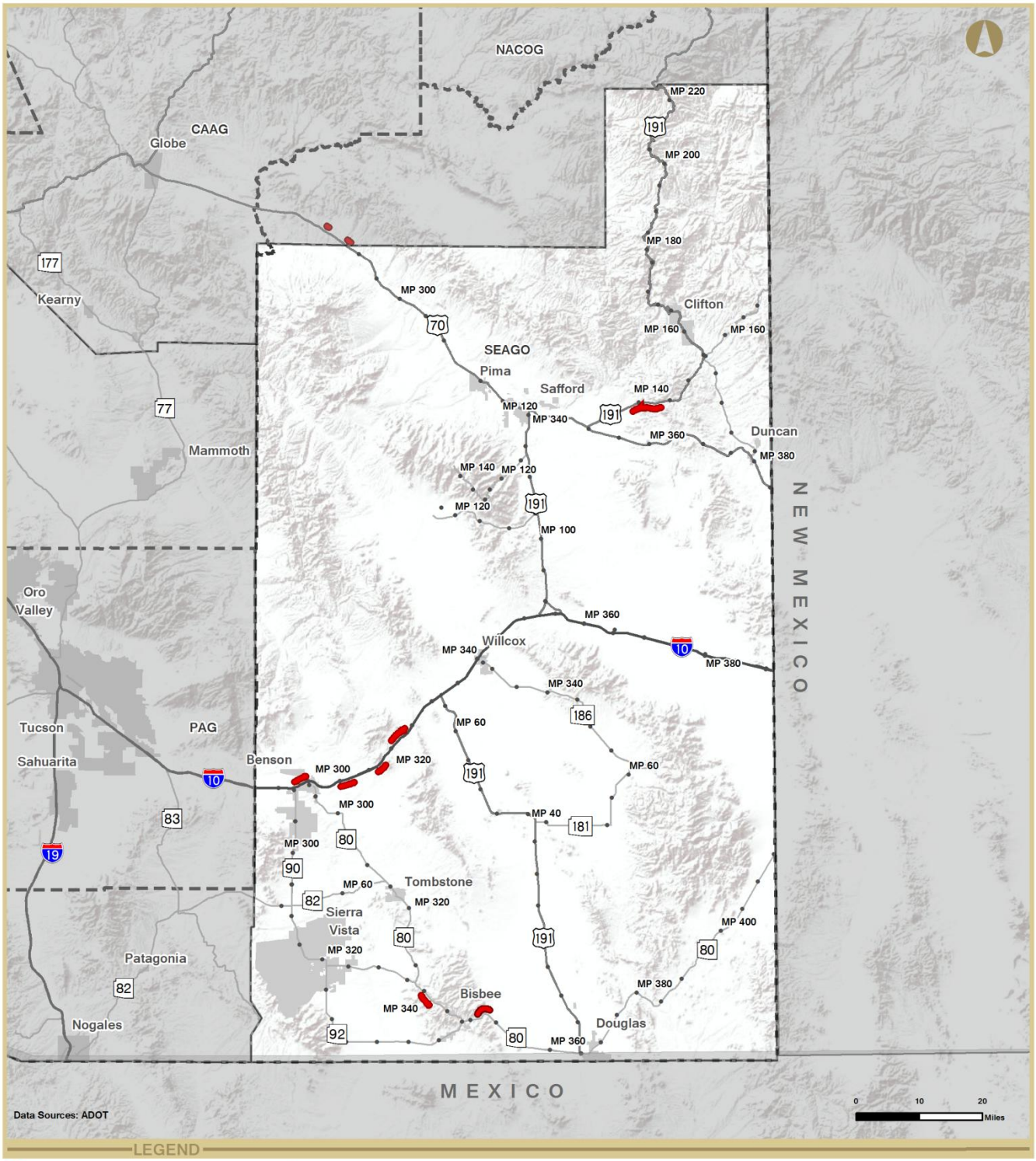


Figure 4.7: Passing/Climbing Lane Candidate Locations Suggested by Tucson District

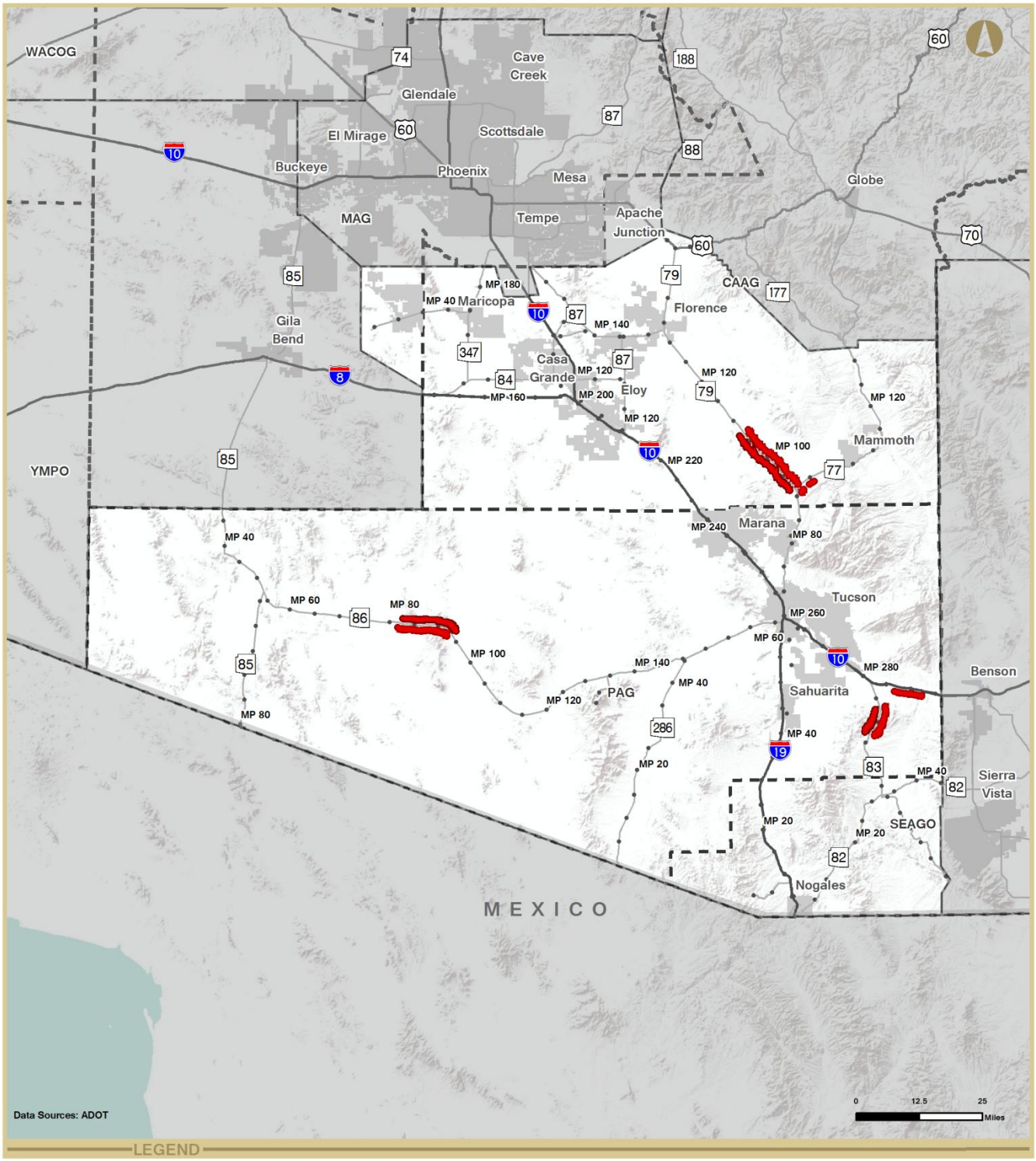
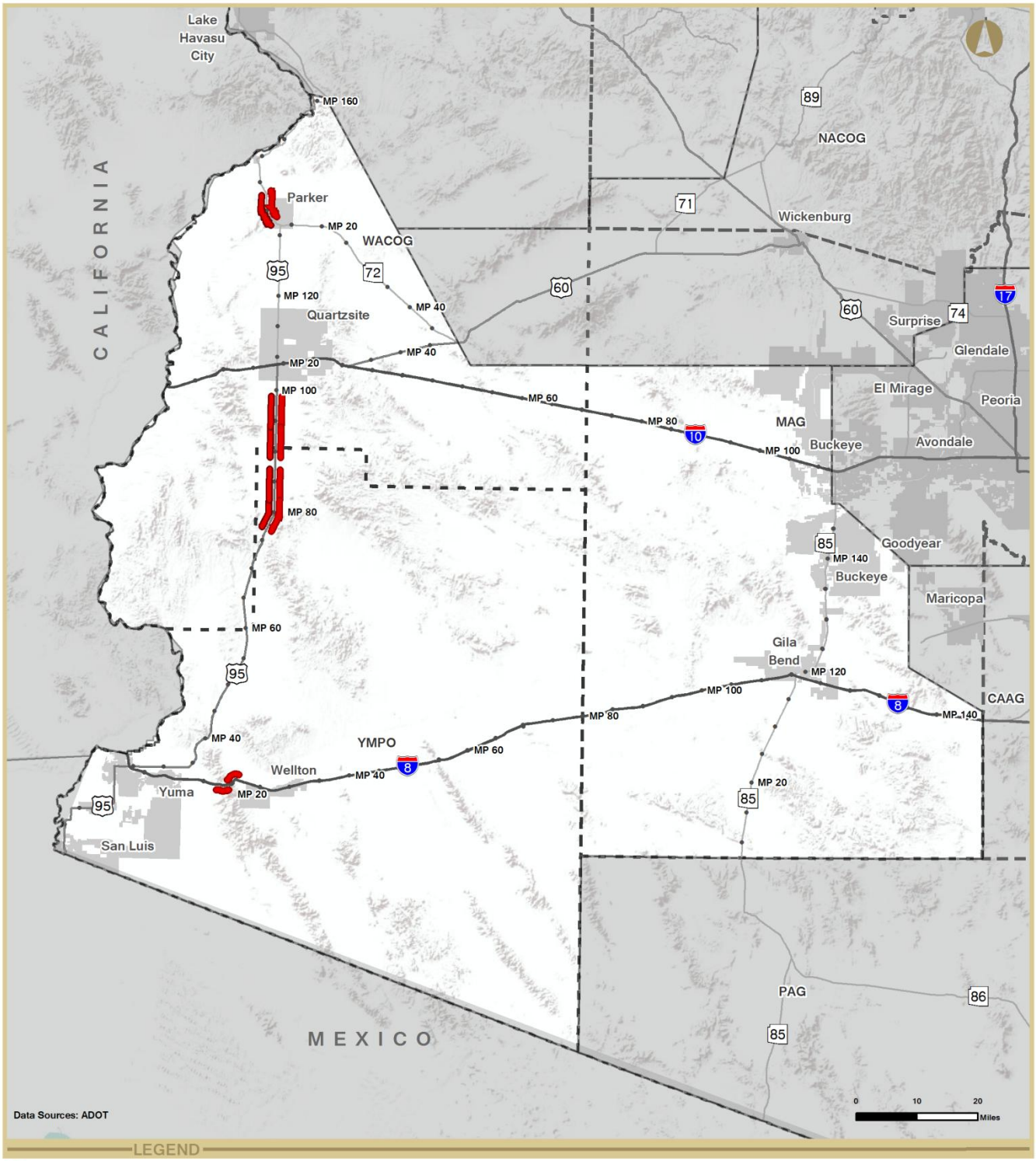


Figure 4.8: Passing/Climbing Lane Candidate Locations Suggested by Yuma District



5. IDENTIFICATION AND PRIORITIZATION METHODOLOGY

Based on lessons learned from the previous study, state-of-the-practice research, TAC feedback, and Districts recommendations, separate methodologies were developed for identifying and prioritizing:

- Passing lanes on two-lane highways
- Climbing lanes on two-lane highways
- Climbing lanes on multilane highways

METHODOLOGY FOR PASSING LANES ON TWO-LANE HIGHWAYS

Figure 5.1 illustrates the steps utilized to identify potential candidate locations for passing lanes on two-lane highways and Figure 5.2 illustrates the steps for prioritization of the candidate locations. Once a preliminary list of potential candidates was identified, three different prioritization methods (Table 5.1) were evaluated:

- Option 1 – Subjective Rating Method: In this method, each prioritization criteria was assigned a weight and a maximum number of points based on discussions with TAC and Districts.
- Option 2 – Z Score Method: In this method, each prioritization criteria is given the same weight. However, the points/score are determined using a z score value that is based on each record's relative distance from the mean of all records. This method is based solely on technical analysis.
- Option 3 – Combined Method: This method represents a combination of subjective and technical analysis. In this method, the z score from Option 2 is multiplied by weights used in Option 1.

Figure 5.1: Identification Process for Passing Lanes on Two-Lane Highways

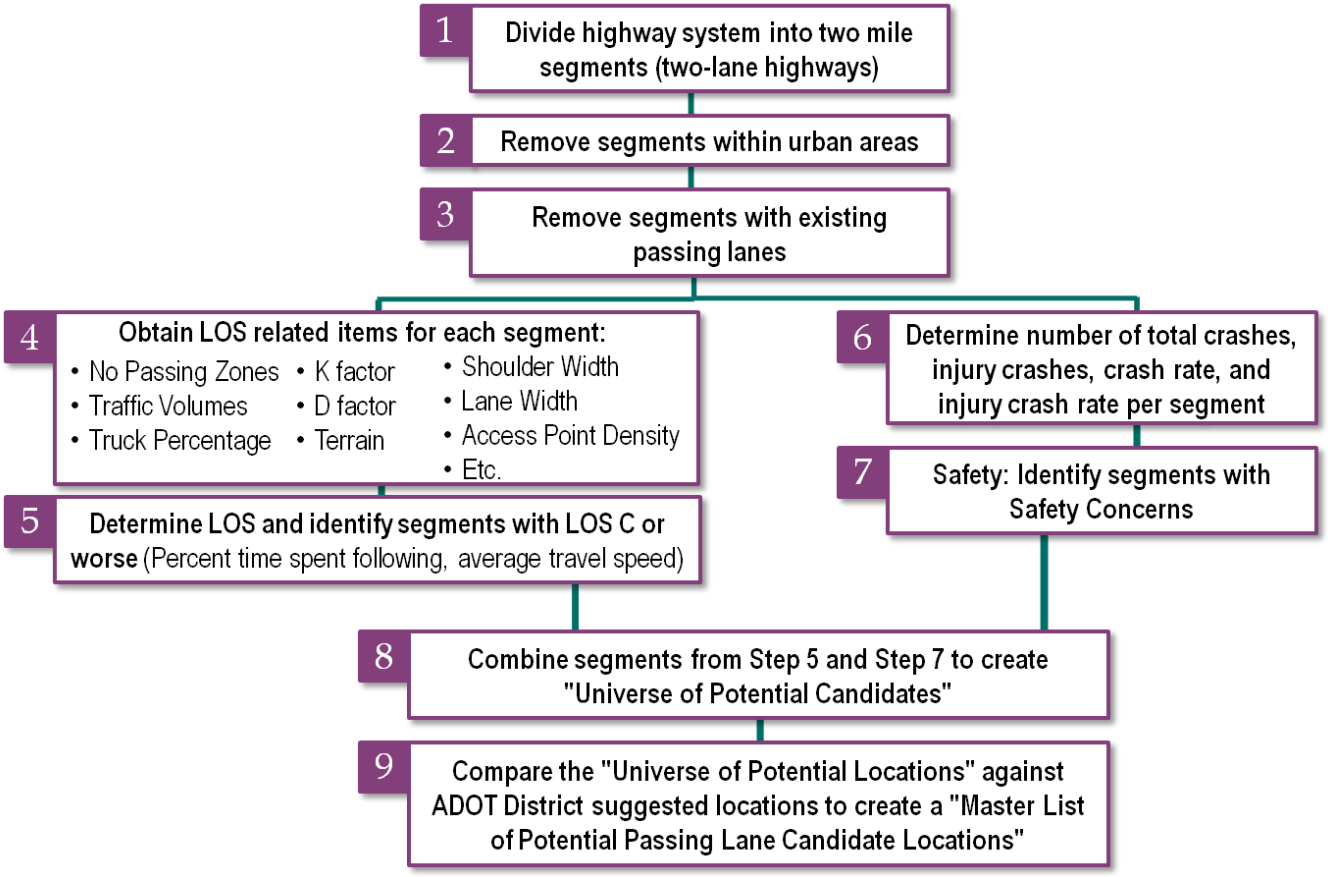


Figure 5.2: Prioritization Process for Passing Lanes on Two-Lane Highways

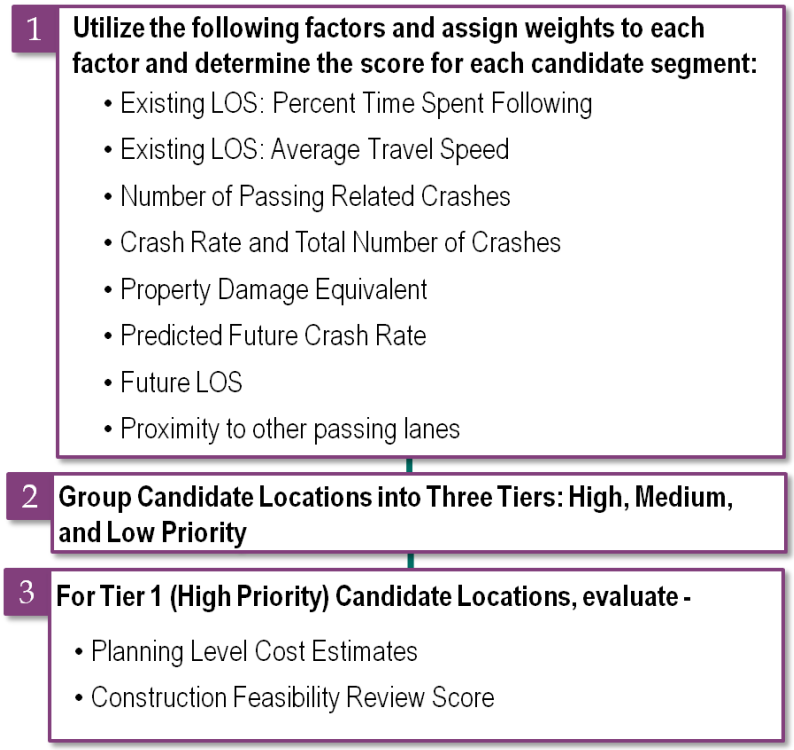


Table 5.1: Prioritization Criteria for Passing Lanes on Two-Lane Highways

Criteria	Option 1: Subjective Rating Method		Option 2: Z Score Method	Option 3: Combined Method	
	Points	Overall Percent	Z Score (From Analysis)	Z Score (From Analysis)	Overall Percent
Mobility	**14**	**35%**			**35%**
Existing LOS: PTSF – Percent Time Spent Following	4	10%			10%
Existing LOS: PFFS – Percent of Free Flow Speed	4	10%			10%
Proximity to Adjacent Passing/Climbing Lanes	2	5%			5%
Future LOS: PTSF – Percent Time Spent Following	2	5%			5%
Future LOS: PFFS – Percent of Free Flow Speed	2	5%			5%
Safety	**20**	**50%**			**50%**
Existing Crash Rate	5	13%			13%
Existing Crash Severity (EPDO)	7	18%			18%
Existing Passing Related Crash Rate	4	10%			10%
Future Crash Severity (Future EPDO)	4	10%			10%
Construction Feasibility	**6**	**15%**			**15%**
Cost per Lane Mile (Low, Med, or High - Assessed Based on Physical Constraints)	3	7.5%			7.5%
Bridge Widening Cost (Low, Medium, High - Assessed based on additional SQFT)	3	7.5%			7.5%
Total Points	**40**	**100%**			**100%**

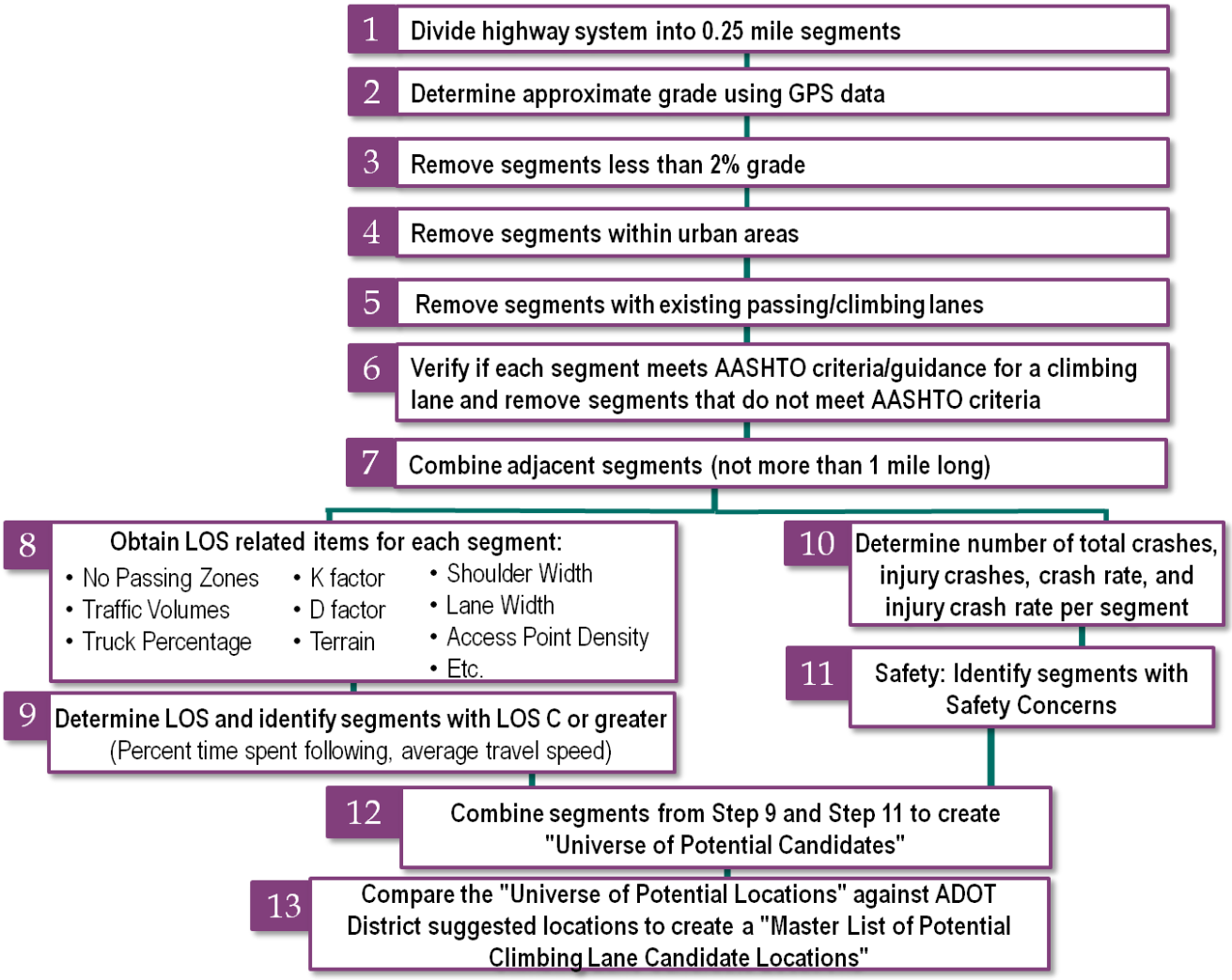
In this method, each prioritization criteria is given the same weight. However, the points/score are determined using a z score value that is based on each record's relative distance from the mean of all records.

METHODOLOGY FOR CLIMBING LANES ON TWO-LANE HIGHWAYS

Figure 5.3 illustrates the steps utilized to identify potential candidate locations for climbing lanes on two-lane highways. The prioritization process for climbing lanes is the same as that for passing lanes on two-lane highways and illustrated in Figure 5.2. Once a preliminary list of potential candidates was identified, similar to passing lanes, three different prioritization methods (Table 5.1) were evaluated:

- Option 1 – Subjective Rating Method: In this method, each prioritization criteria was assigned a weight and a maximum number of points based on discussions with TAC and Districts.
- Option 2 – Z Score Method: In this method, each prioritization criteria is given the same weight. However, the points/score are determined using a z score value that is based on each record's relative distance from the mean of all records. This method is based solely on technical analysis.
- Option 3 – Combined Method: This method represents a combination of subjective and technical analysis. In this method, the z score from Option 2 is multiplied by weights used in Option 1.

Figure 5.3: Identification Process for Climbing Lanes on Two-Lane Highways



METHODOLOGY FOR CLIMBING LANES ON MULTILANE HIGHWAYS

Figure 5.4 illustrates the steps utilized to identify potential candidate locations for climbing lanes on multilane highways and Figure 5.5 illustrates the steps for prioritization of the candidate locations. Once a preliminary list of potential candidates was identified, three different prioritization methods (Table 5.2) were evaluated:

- Option 1 – Subjective Rating Method: In this method, each prioritization criteria was assigned a weight and a maximum number of points based on discussions with TAC and Districts.
- Option 2 – Z Score Method: In this method, each prioritization criteria is given the same weight. However, the points/score are determined using a z score value that is based on each record's relative distance from the mean of all records. This method is based solely on technical analysis.
- Option 3 – Combined Method: This method represents a combination of subjective and technical analysis. In this method, the z score from Option 2 is multiplied by weights used in Option 1.

Figure 5.4: Identification Process for Climbing Lanes on Multilane Highways

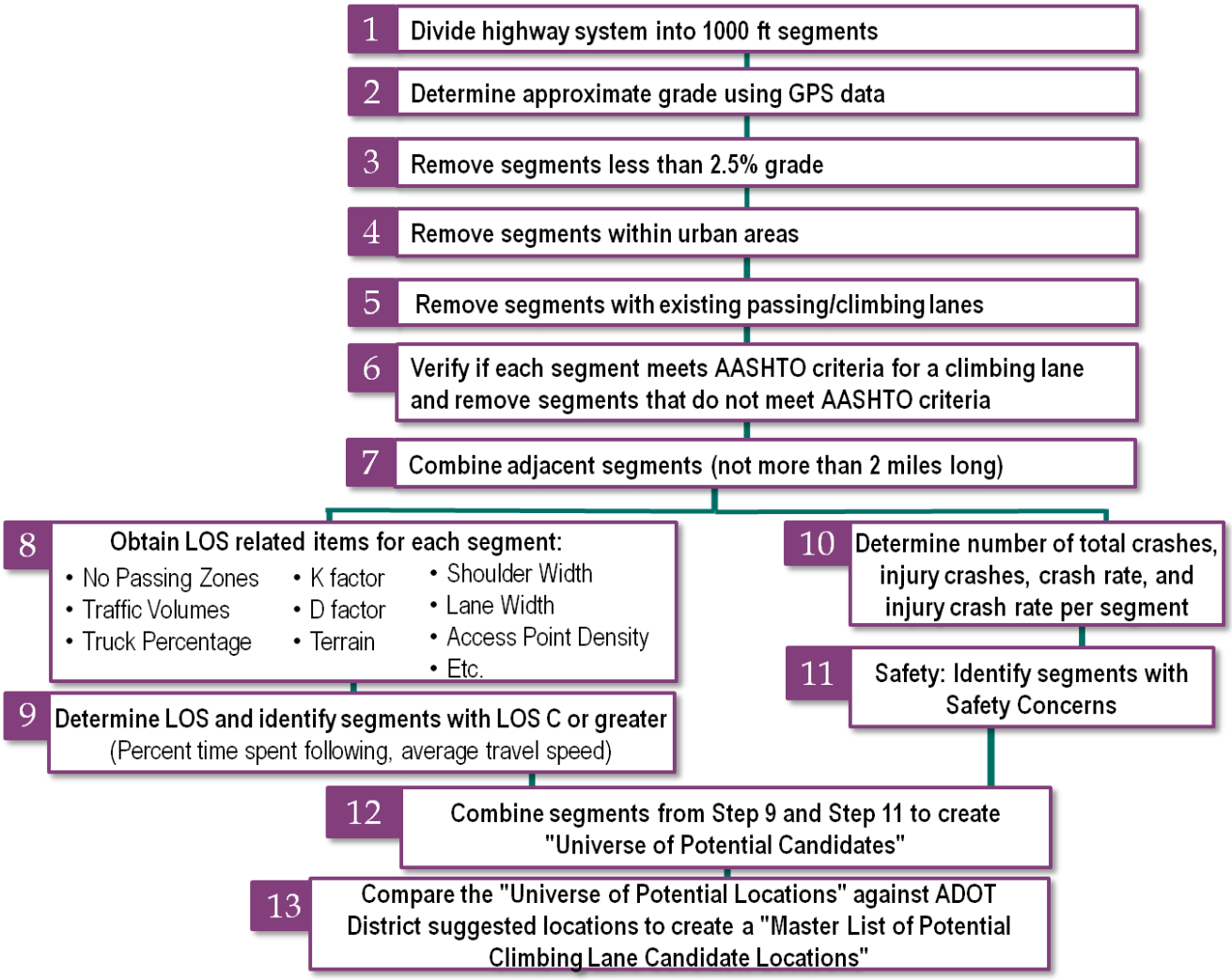


Figure 5.5: Prioritization Process for Climbing Lanes on Multilane Highways

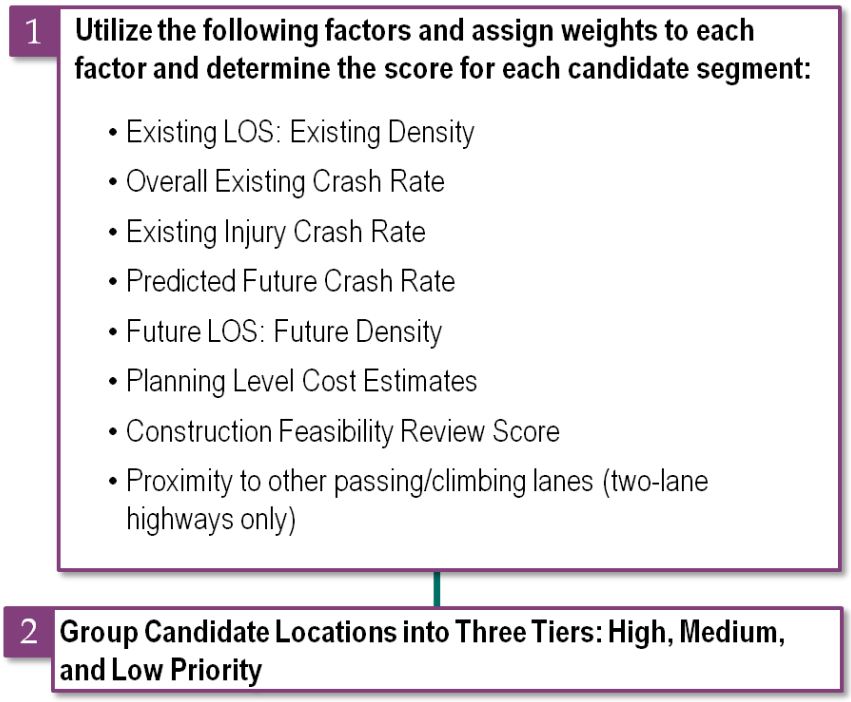


Table 5.2: Prioritization Criteria for Climbing Lanes on Multilane Highways

Criteria	Option 1: Subjective Rating Method		Option 2: Z Score Method	Option 3: Combined Method	
	Points	Overall Percent	Z Score (From Analysis)	Z Score (From Analysis)	Overall Percent
Mobility	**14**	**35%**			**35%**
Existing LOS: Existing Density	8	20%			10%
Proximity to Adjacent Passing/Climbing Lanes	2	5%			5%
Future LOS: Future Density	4	10%			5%
Safety	**20**	**50%**			**50%**
Existing Crash Rate	5	13%			13%
Existing Crash Severity (EPDO)	7	18%			18%
Existing Passing Related Crash Rate	4	10%			10%
Future Crash Severity (Future EPDO)	4	10%			10%
Construction Feasibility	**6**	**15%**			**15%**
Cost per Lane Mile (Low, Medium, or High - Assessed Based on Physical Constraints)	3	7.5%			7.5%
Bridge Widening Cost (Low, Medium, High - Assessed based on additional SQFT)	3	7.5%			7.5%
Total Points	**40**	**100%**			**100%**

ROUND TWO STAKEHOLDER OUTREACH

Round two of stakeholder outreach included individual meetings with each ADOT District staff and email outreach to the COGs and MPOs. Meetings with the Districts were conducted between February 20 – 28, 2014. The primary purpose of these meetings was to review the analysis results and obtain feedback regarding the prioritization methodology and ranking of the candidate locations.

TAC and the Districts felt that the results from Option 1 and Option 3 were reasonable, however, the overall consensus was to utilize results from Option 1 for the final recommendations.

Once the TAC and Districts feedback was obtained, and email was sent to each COG/MPO requesting their feedback with respect to the study results. Very little feedback was received from the COGs and MPOs.

6. SUMMARY RESULTS – PASSING LANES ON TWO-LANE HIGHWAYS

Table 6.1 presents the list of candidate locations for passing lanes on two-lane highways. The candidate locations are ranked at the statewide and district level and grouped into three tiers – high, medium, and low priority. Figure 6.1 illustrates the statewide location of the passing lanes. Figures 6.2 to 6.9 illustrate the passing lane locations in each District followed by project summary sheets for the Tier 1 locations. Table A1 in Appendix A lists the candidate locations, ranking, tier level, and also includes detailed information about evaluation criteria and scoring.

Locations identified for passing lanes in Table 6.1 represent only the general problem area and not the exact location and length of the passing lanes.

Table 6.1: Prioritized List of Passing Lanes on Two-Lane Highways

ADOT DISTRICT	PASSING LANE LOCATION (VICINITY)	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Flagstaff	SR 64 EB: MP223 - MP226	25.99	14	1	1
Flagstaff	SR 67 NB: MP586 - MP583	23.82	31	2	2
Flagstaff	US 180 EB: MP238 - MP236	23.59	33	3	2
Flagstaff	SR 64 WB: MP220 - MP213	23.53	34	4	2
Flagstaff	US 160 WB: MP343 - MP337	23.23	36	5	2
Flagstaff	SR 64 EB: MP195 - MP204	23.19	37	6	2
Flagstaff	SR 64 WB: MP204 - MP201	21.91	47	7	2
Flagstaff	US 89 NB: MP463 - MP 466	21.64	50	8	2
Flagstaff	US 160 EB: MP311 - MP320	21.37	53	9	2
Flagstaff	US 89 SB: MP456 - MP453	19.63	62	10	2
Flagstaff	US 89 SB: MP480 - MP477	19.41	63	11	2
Flagstaff	US 89 NB: MP451 - MP460	17.80	71	12	3
Flagstaff	US 89 NB: MP477 - MP480	17.31	77	13	3
Flagstaff	US 89 NB: MP509 - MP512	16.95	81	14	3
Flagstaff	SR 64 EB: MP211 - MP218	16.85	83	15	3
Flagstaff	US 160 EB: MP335 - MP341	16.75	85	16	3
Flagstaff	US 89 SB: MP502 - MP499	16.27	89	17	3
Flagstaff	US 89 SB: MP512 - MP509	13.55	98	18	3
Globe	US 60 WB: MP348 - MP345	26.98	6	1	1
Globe	US 60 WB: MP294 - MP296	26.26	9	2	1
Globe	US 60 EB: MP345 - MP348	25.67	15	3	1
Globe	US 60 EB: MP357 - MP360	24.76	20	4	1
Globe	US 70 WB: MP288 - MP281	21.81	48	5	2
Globe	US 70 EB: MP267 - MP270	21.38	51	6	2
Globe	US 70 WB: MP270 - MP267	21.38	51	6	2
Globe	US 60 EB: MP304 - MP307	19.27	64	8	2
Globe	US 60 WB: MP266 - MP263	15.18	95	9	3
Holbrook	US 191 SB: MP442 - MP451	25.01	17	1	1

Table 6.1: Prioritized List of Passing Lanes on Two-Lane Highways (Continued)

ADOT DISTRICT	PASSING LANE LOCATION (VICINITY)	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Holbrook	US 191 NB: MP448 - MP455	24.96	18	2	1
Holbrook	SR 264 EB: MP453 - MP460	23.92	30	3	2
Holbrook	US 160 WB: MP377 - MP381	21.36	54	4	2
Holbrook	US 191 SB: MP455 - MP452	20.70	57	5	2
Holbrook	SR 87 NB: MP293 - MP296	18.60	68	6	2
Holbrook	SR 87 NB: MP296 - MP293	18.03	70	7	3
Holbrook	US 160 EB: MP377 - MP383	17.65	73	8	3
Holbrook	US 160 EB: MP361 - MP367	17.41	75	9	3
Holbrook	US 160 WB: MP361 - MP367	17.00	80	10	3
Holbrook	SR 264 EB: MP376 - MP378	16.29	88	11	3
Holbrook	US 160 EB: MP385 - MP391	16.25	90	12	3
Holbrook	US 160 WB: MP458 - MP463	15.89	91	13	3
Holbrook	US 160 WB: MP369 - MP375	15.80	92	14	3
Holbrook	US 191 NB: MP422 - MP425	15.43	93	15	3
Holbrook	US 160 EB: MP369 - MP375	14.58	96	16	3
Holbrook	SR 264 EB: MP401 - MP404	13.36	100	17	3
Holbrook	SR 264 EB: MP387 - MP394	12.83	101	18	3
Holbrook	SR 264 WB: MP387 - MP394	12.14	102	19	3
Kingman	US 93 NB: MP167 - MP165	24.78	19	1	1
Kingman	SR 95 NB: MP194 - 201	23.27	35	2	2
Kingman	US 93 SB: MP165 - MP172	23.06	38	3	2
Kingman	SR 95 SB: MP166 - MP175	23.00	39	4	2
Kingman	SR 89 NB: MP352 - MP358	18.18	69	5	3
Kingman	SR 89 SB: MP358 - MP364	17.52	74	6	3
Kingman	SR 95 NB: MP166 - MP173	17.17	78	7	3
Kingman	SR 89 NB: MP360 - MP362	16.40	87	8	3
Prescott	SR 87 SB: MP273 - MP279	30.73	1	1	1
Prescott	SR 89 NB: MP302 - MP304	30.00	3	2	1
Prescott	SR 89 NB: MP330 - MP334	28.66	4	3	1
Prescott	SR 89 SB: MP330 - 335	28.12	5	4	1
Prescott	SR 87 SB: MP264 - MP271	26.64	7	5	1
Prescott	SR 89 SB: MP302 - 306	26.45	8	6	1
Prescott	SR 89 NB: MP295 - MP302	26.20	11	7	1
Prescott	SA 89 SB: MP344 - MP347	26.17	12	8	1
Prescott	SR 89 SB: MP295 - MP302	25.43	16	9	1
Prescott	SR 87 NB: MP262 - MP271	24.59	21	10	1
Prescott	SR 87 NB: MP273 - MP279	24.46	23	11	2
Prescott	SR 169 NB: MP4 - MP10	24.44	24	12	2
Prescott	SR 87 NB: MP281 - MP287	24.01	28	13	2

Table 6.1: Prioritized List of Passing Lanes on Two-Lane Highways (Continued)

ADOT DISTRICT	PASSING LANE LOCATION (VICINITY)	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Prescott	SR 87 SB: MP258 - MP263	23.96	29	14	2
Prescott	SR 87 SB: MP289 - MP291	19.75	61	15	2
Prescott	SR 87 NB: MP289 - MP291	17.67	72	16	3
Safford	SR 80 WB: MP349 - MP346	22.13	44	1	2
Safford	US 191 NB: MP138 - MP145	20.06	60	2	2
Tucson	SR 83 NB: MP43 - MP50	30.11	2	1	1
Tucson	SR 86 EB: 161 - MP164	26.24	10	2	1
Tucson	SR 86 WB: MP161 - MP164	26.12	13	3	1
Tucson	SR 86 WB: MP153 - MP156	24.51	22	4	1
Tucson	SR 77 NB: MP91 - MP94	24.40	25	5	2
Tucson	SR 79 NB: MP93 - MP99	24.12	26	6	2
Tucson	SR 79 SB: MP103 - MP97	24.04	27	7	2
Tucson	SR 83 SB: MP45 - MP54	23.78	32	8	2
Tucson	SR 287 NB: MP137 - MP140	22.51	40	9	2
Tucson	SR 86 EB: MP153 - MP156	22.42	42	10	2
Tucson	SR 87 SB: MP138 - MP140	22.25	43	11	2
Tucson	SR 87 NB: MP152 - MP160	22.11	45	12	2
Tucson	SR 87 SB: MP152 - MP160	21.95	46	13	2
Tucson	SR 86 WB: MP85 - MP91	20.91	55	14	2
Tucson	SR 79 NB: MP101 - MP107	20.80	56	15	2
Tucson	SR 83 NB: MP49 - MP54	20.21	58	16	2
Tucson	SR 287 NB: MP142 - MP139	20.16	59	17	2
Tucson	SR 95 SB: MP95 - MP93	19.27	65	18	2
Tucson	SR 87 NB: MP138 - MP141	18.96	67	19	2
Tucson	SR 79 SB: MP107 - MP105	17.33	76	20	3
Tucson	SR 86 EB: MP85 - MP91	15.38	94	21	3
Yuma	SR 95 NB: MP158 - MP161	22.45	41	1	2
Yuma	SR 95 NB: MP132 - MP139	21.74	49	2	2
Yuma	SR 95 SB: MP132 - MP139	18.98	66	3	2
Yuma	US 95 NB: MP88 - MP90	17.10	79	4	3
Yuma	SR 95 NB: MP152 - MP155	16.89	82	5	3
Yuma	US 95 NB: MP92 - MP98	16.79	84	6	3
Yuma	US 95 SB: MP92 - MP98	16.74	86	7	3
Yuma	US 95 SB: MP84 - MP90	14.57	97	8	3
Yuma	US 95 NB: MP76 - MP82	13.40	99	9	3
Yuma	US 95 SB: MP76 - MP82	12.05	103	10	3

Note:
Statewide Rank = Projects ranking statewide
District Rank = Projects ranking within District only
Tier Level = High, medium, and low priority

Figure 6.1: Statewide Ranking of Passing Lanes

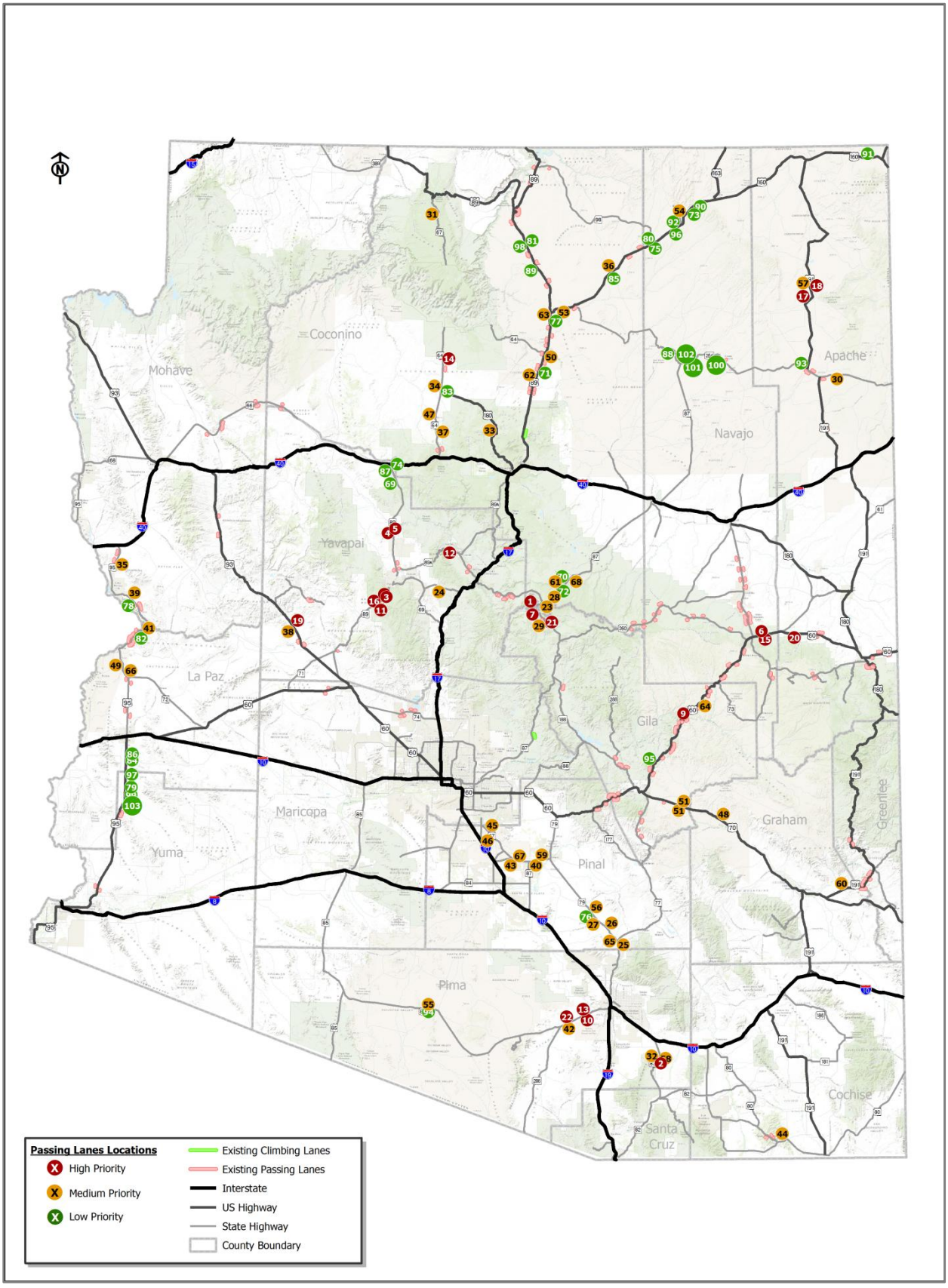


Figure 6.2: Passing Lane Rankings - Flagstaff District

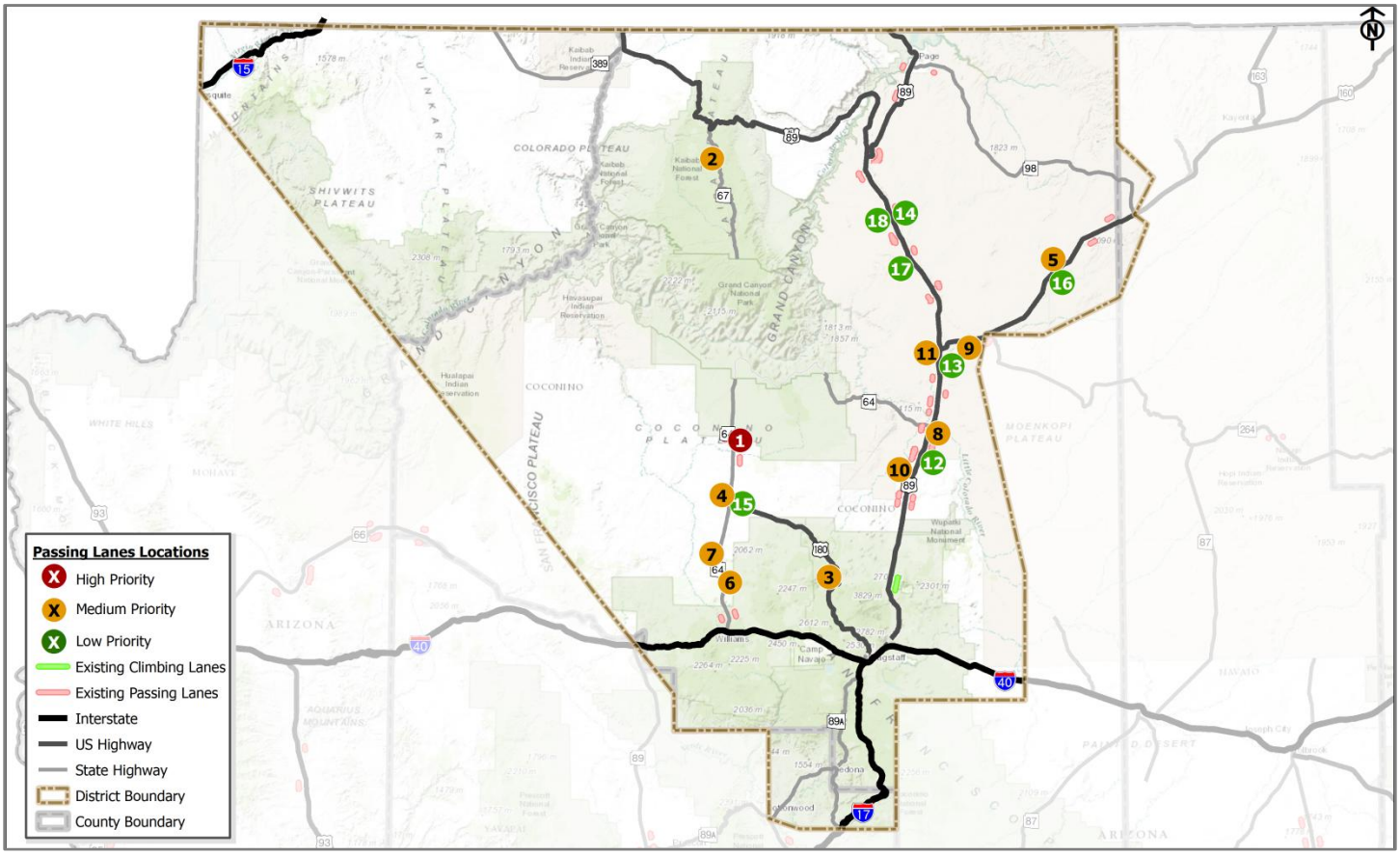


Figure 6.3: Passing Lane Rankings - Globe District

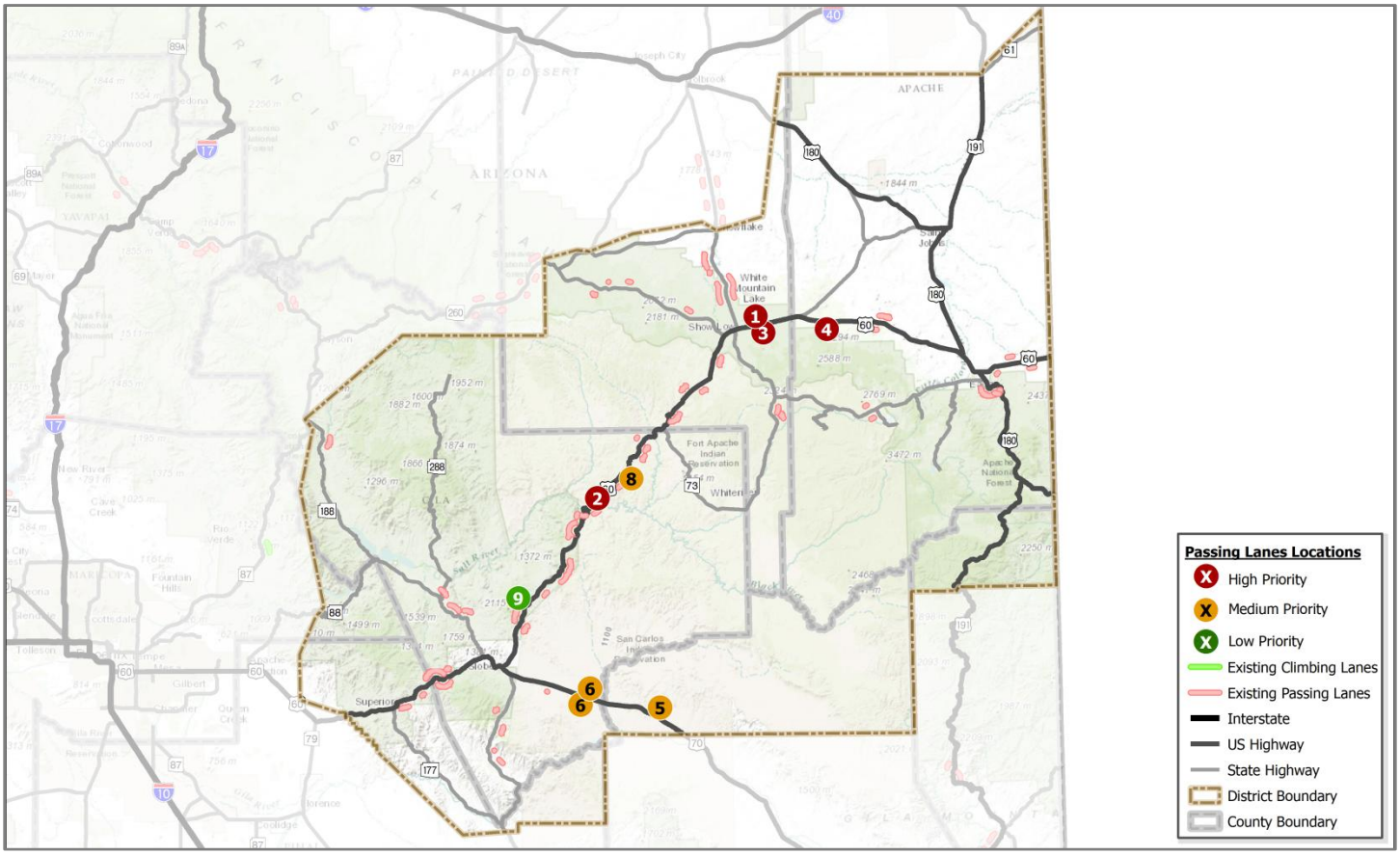


Figure 6.4: Passing Lane Rankings - Holbrook District

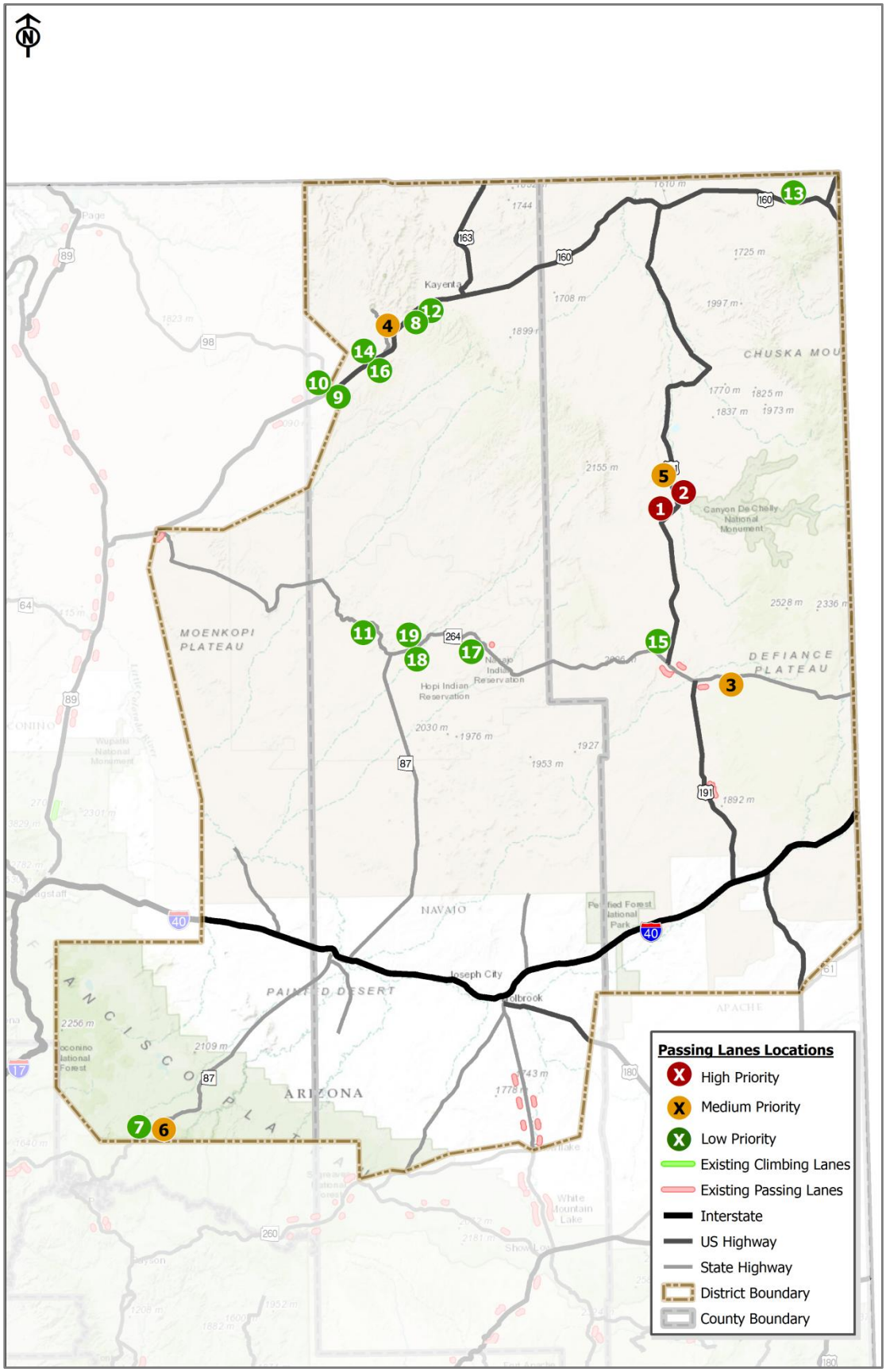


Figure 6.5: Passing Lane Rankings – Kingman District

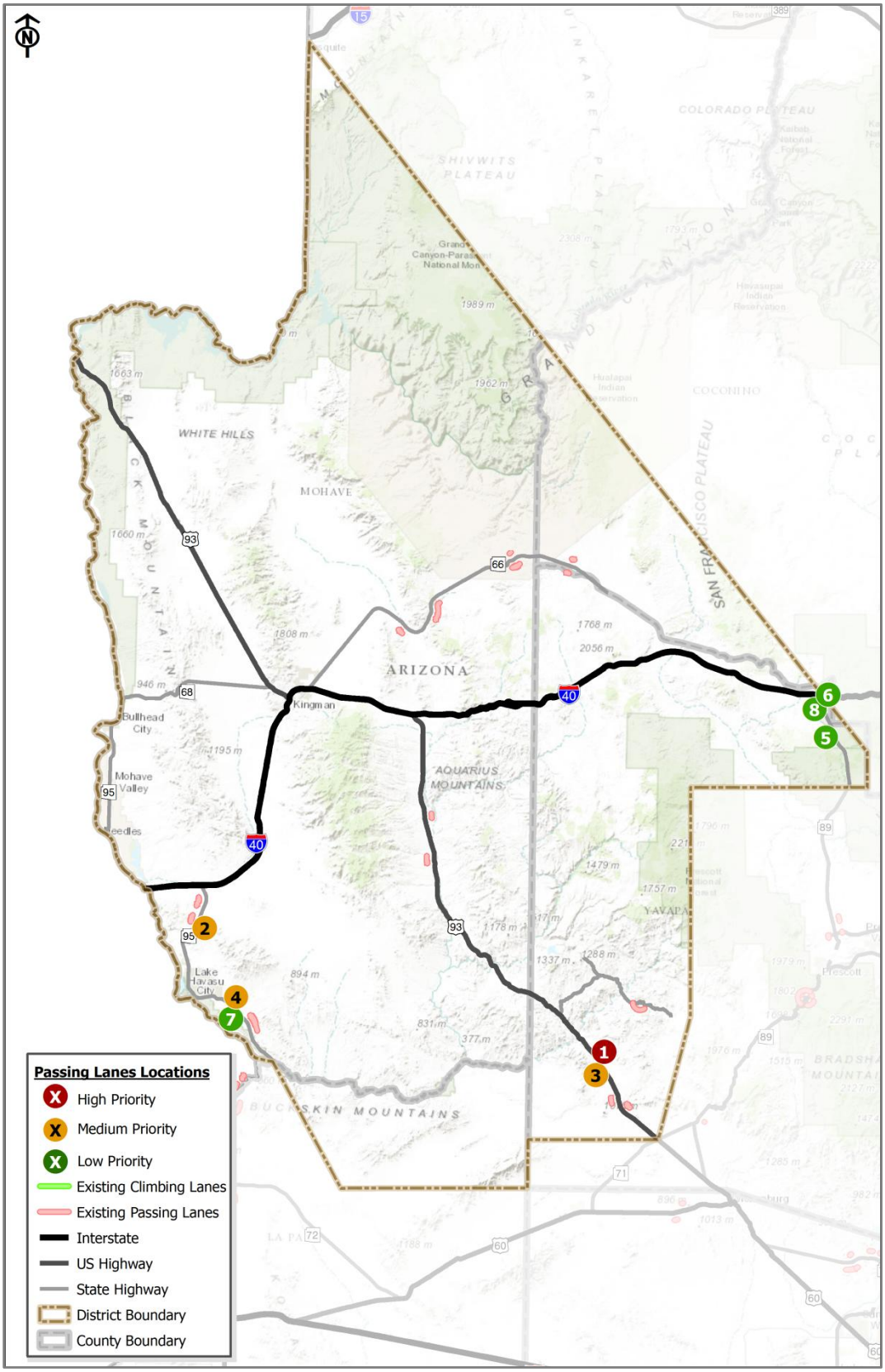


Figure 6.6: Passing Lane Rankings - Prescott District

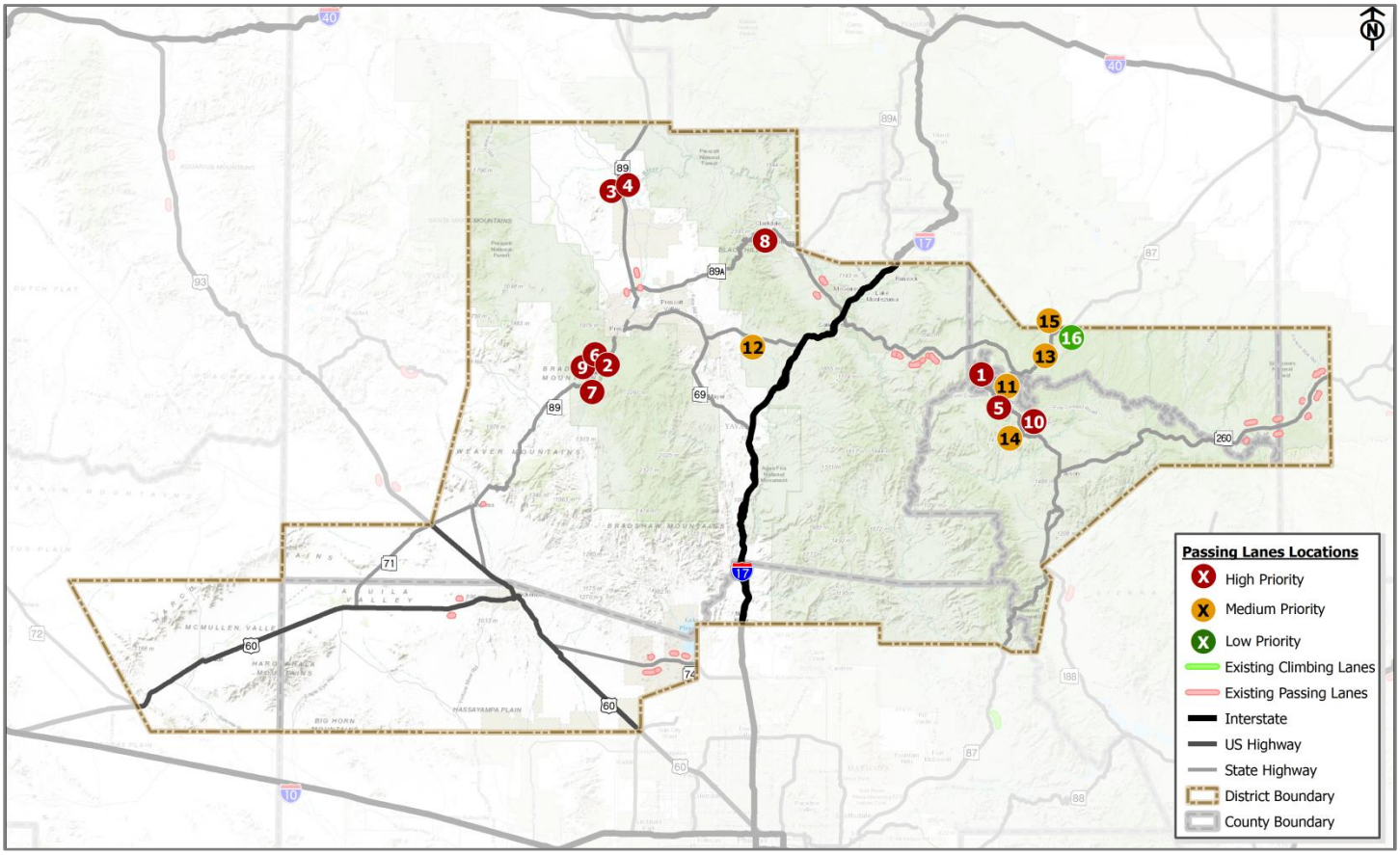


Figure 6.7: Passing Lane Rankings - Safford District

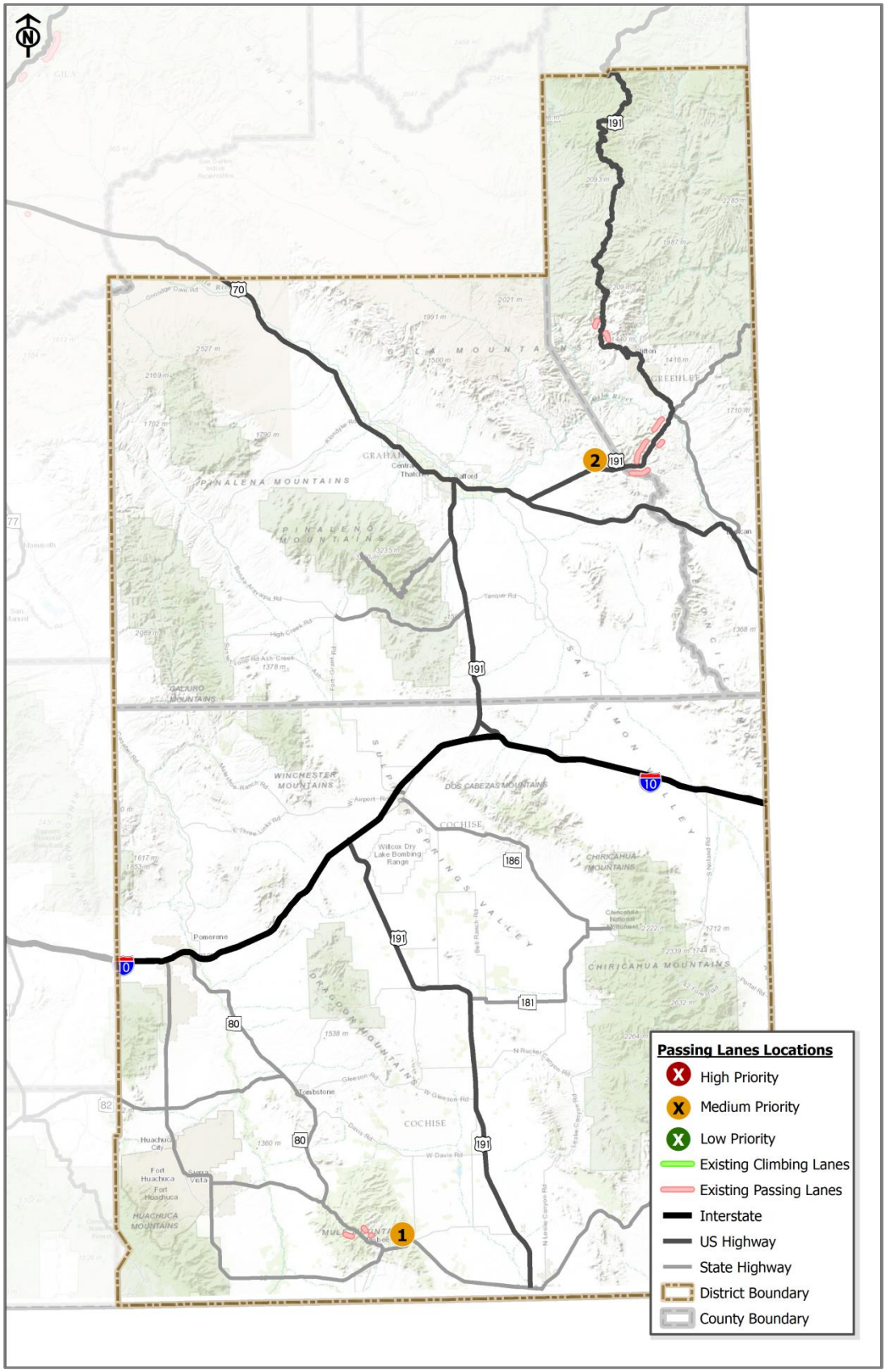


Figure 6.8: Passing Lane Rankings - Tucson District

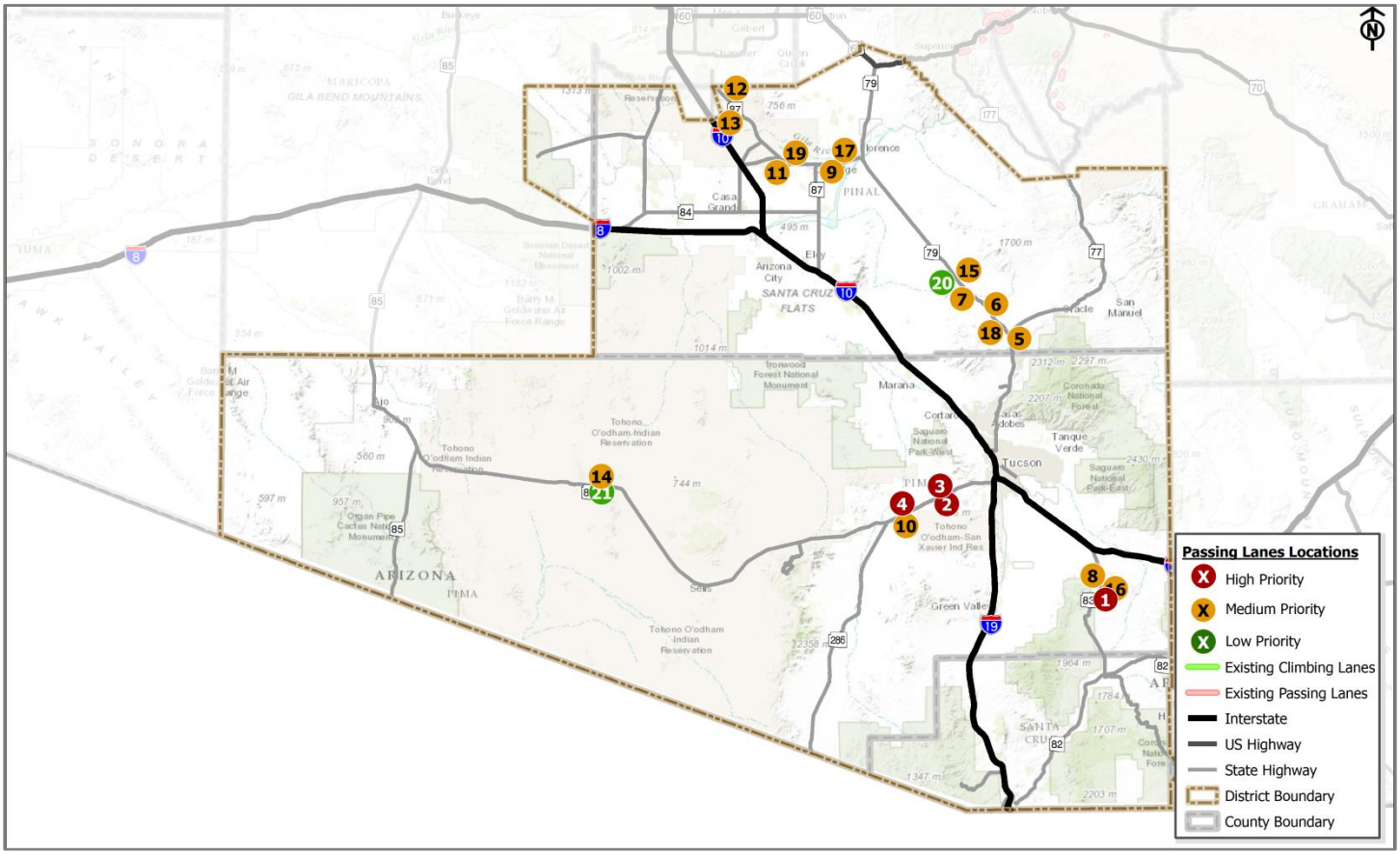
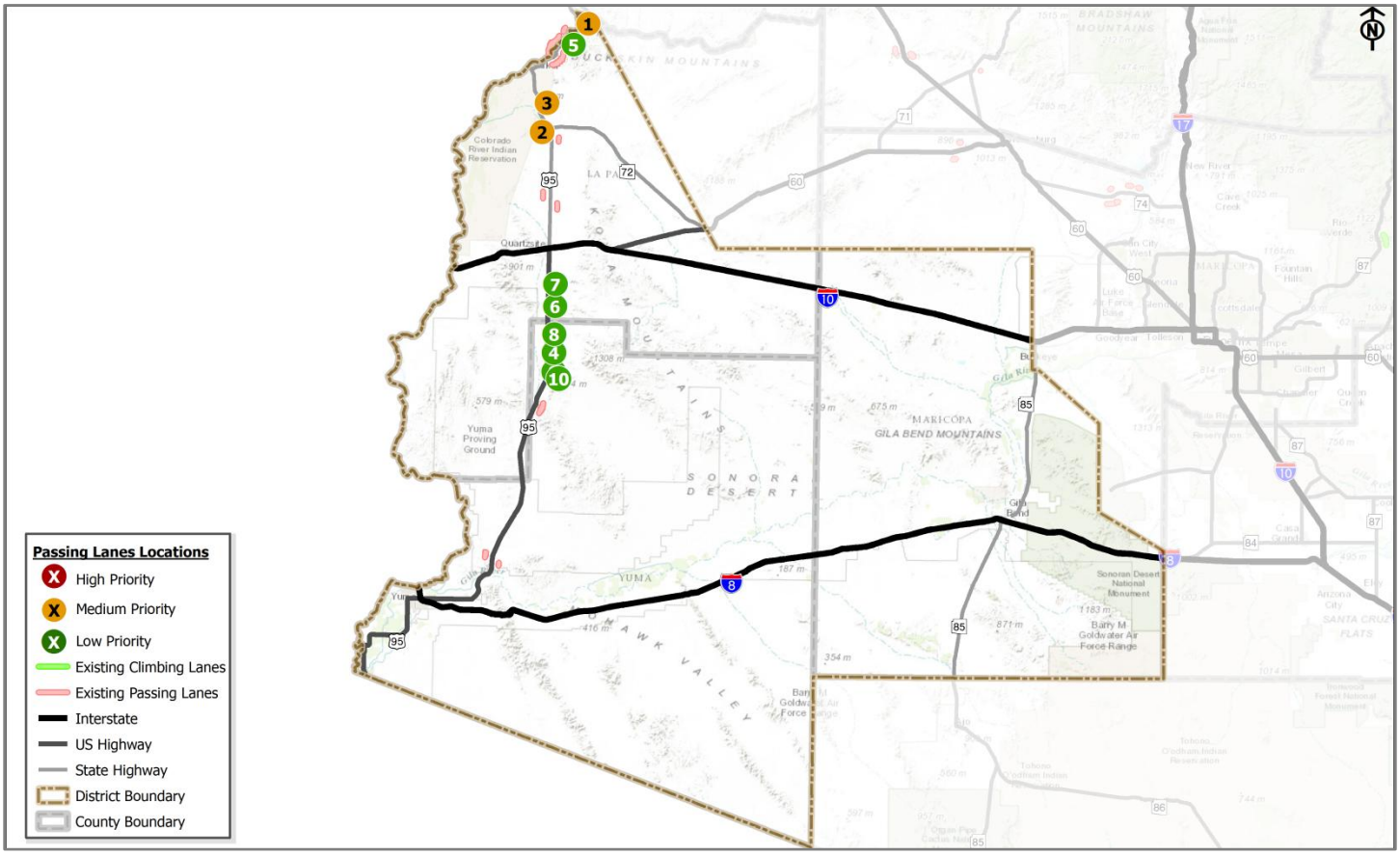


Figure 6.9: Passing Lane Rankings – Yuma District



SR 87 SB: MP 273 - MP 279

Statewide Passing Lane Rank: 1

Project Details

Route: S 087
Direction: SB
BMP: 273
EMP: 279
District: Prescott
County: Coconino
Ranking: 1
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.17
Speed Limit (MPH): 55
Directional Split: 62/38
Existing AADT: 2,029
Future AADT: 2,800
Existing LOS: C
Future LOS: C
Truck %: 11%

Safety Analysis

Total Number of Crashes	46
Number of Fatal Crashes	3
Injury & Possible Injury Crashes	28
Non-Injury Crashes	15
Average Crash Rate	6.21 *per million vehicle miles traveled*
Equivalent Property Damage Value	173

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: The segment has turns which prevent vehicles from passing. Passing areas are minimal

Number of Bridges:
Cost to Widen Bridges: $0.00

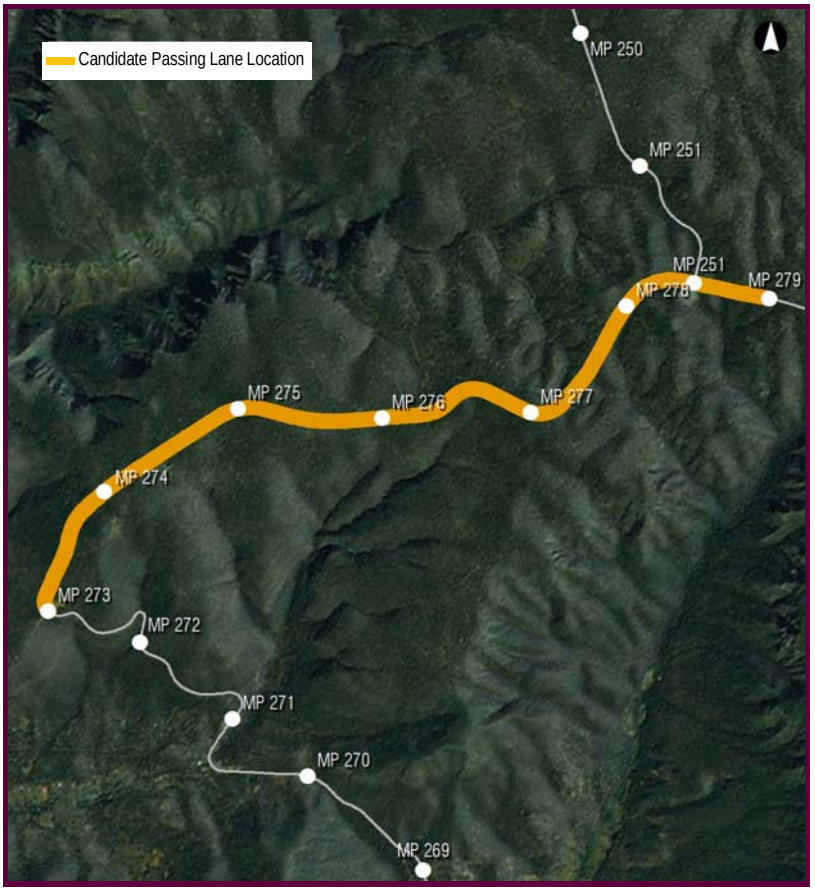
Environmental Overview

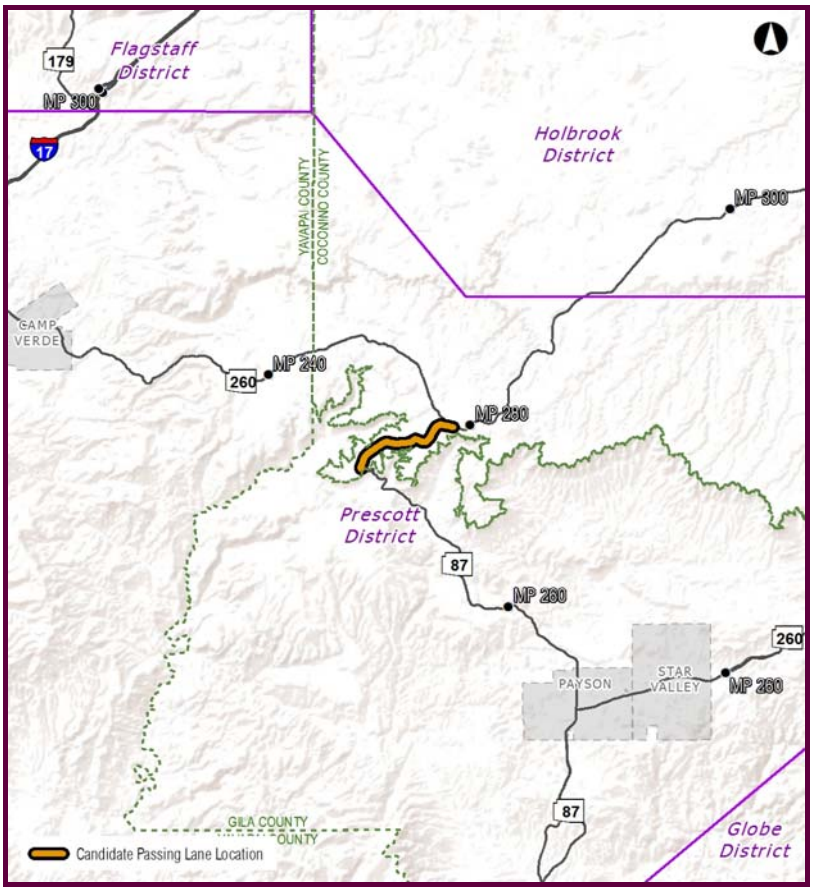
Land Ownership: Coconino National Forest; Coconino National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; Leaking Underground Storage Tank

Cultural Resources

Number of Cultural Sites: 1
Eligible Sites (AZSITE): 1
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 5
Cultural Resource Density: Low





SR 83 NB: MP 43 - MP 50

Statewide Passing Lane Rank: 2

Project Details

Route: S 083 **Direction:** NB
BMP: 43 **EMP:** 50
District: Tucson **County:** Pima
Ranking: 2 **Tier:** 1

Roadway Characteristics

Terrain/Max Slope: Rolling **K-Factor:** 0.15
Speed Limit (MPH): 55 **Directional Split:** 76/24
Existing AADT: 2,009 **Future AADT:** 2,900
Existing LOS: C **Future LOS:** D
Truck %: 7%

Safety Analysis

Total Number of Crashes	35
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	23
Non-Injury Crashes	11
Average Crash Rate	4.77 *per million vehicle miles traveled*
Equivalent Property Damage Value	125

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No physical constraints. Segment has many high speed turns (45mph)

General Location Assessment: Minor passing opportunities before segment. High speed turns within segment, with no passing opportunities. Some passing opportunity after segment is available.

Number of Bridges:

Cost to Widen Bridges: $0.00

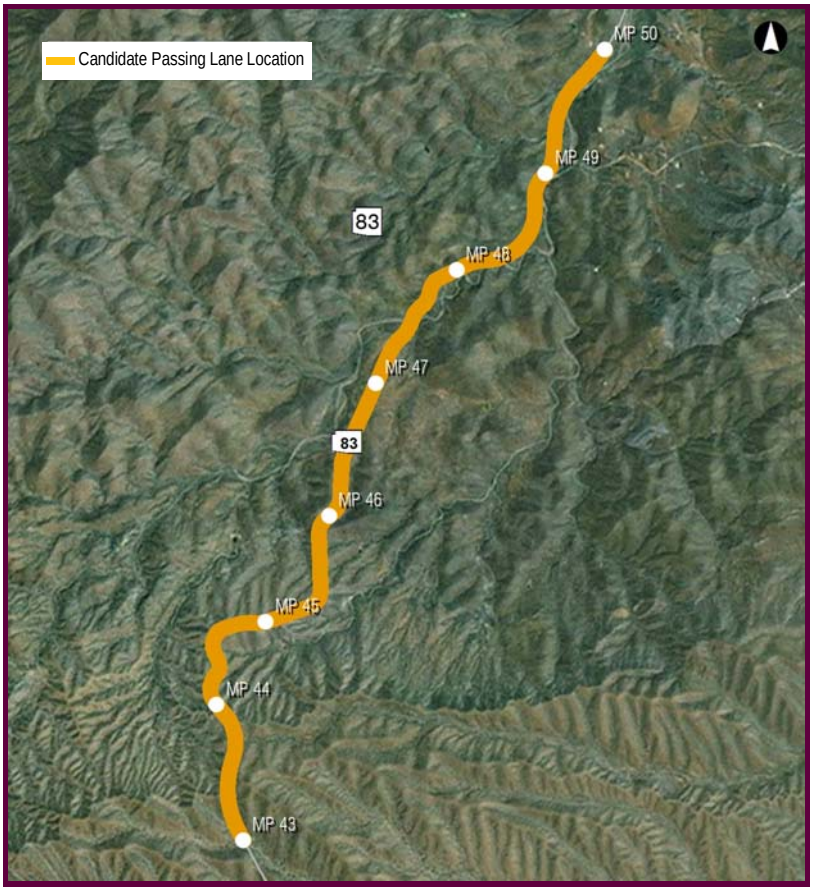
Environmental Overview

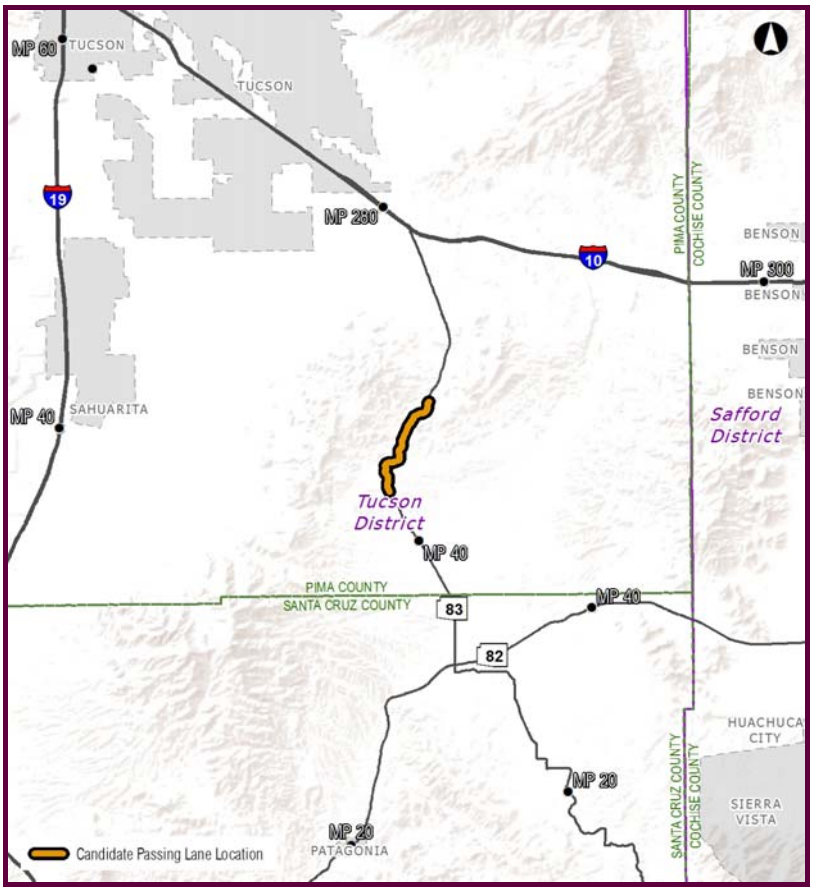
Land Ownership: Private Land; State Trust Land; Coronado National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; 100-Year Floodplain

Cultural Resources

Number of Cultural Sites: 36
Eligible Sites (AZSITE): 20
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 59
Cultural Resource Density: High





SR 89 NB: MP 302 - MP 304

Statewide Passing Lane Rank: 3

Project Details

Route: S 089
Direction: NB
BMP: 302
EMP: 304
District: Prescott
County: Yavapai
Ranking: 3
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Mountainou
K-Factor: 0.1
Speed Limit (MPH): 35
Directional Split: 59/41
Existing AADT: 1,054
Future AADT: 1,600
Existing LOS: B
Future LOS: B
Truck %: 12%

Safety Analysis

Total Number of Crashes	42
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	21
Non-Injury Crashes	21
Average Crash Rate	10.92 *per million vehicle miles traveled*
Equivalent Property Damage Value	121

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Rock formations at the side of the road and steep cliffs.

General Location Assessment: Many turns and elevation changes warrant a passing lane. There is a short passing lane at the end of the segment which could be extended. High number of crashes.

Number of Bridges:
Cost to Widen Bridges: $0.00

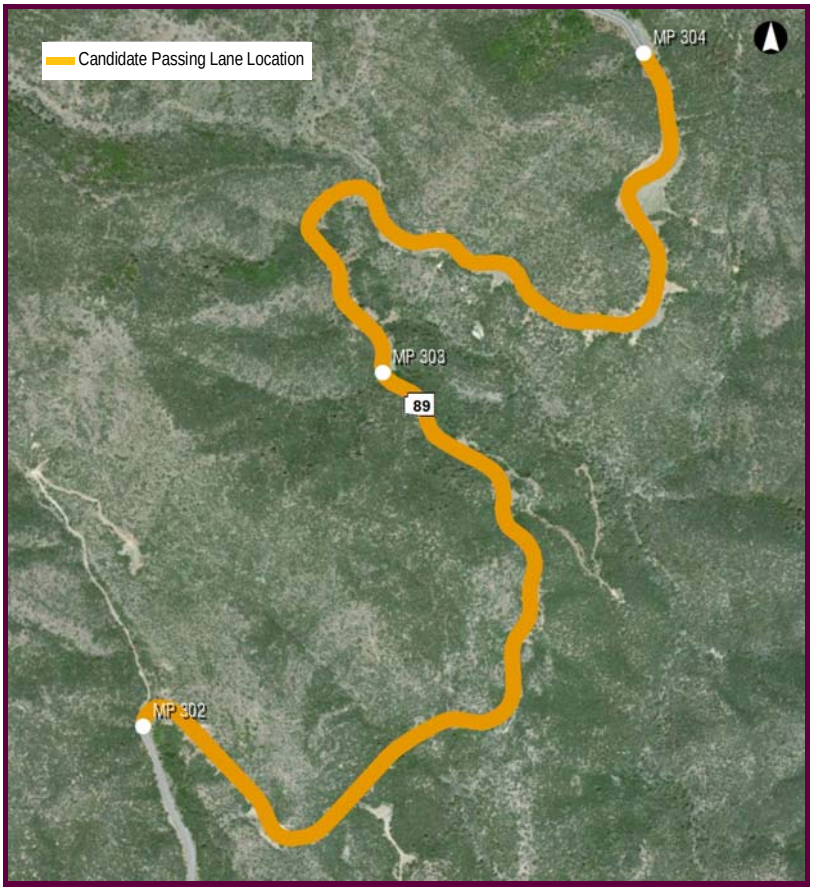
Environmental Overview

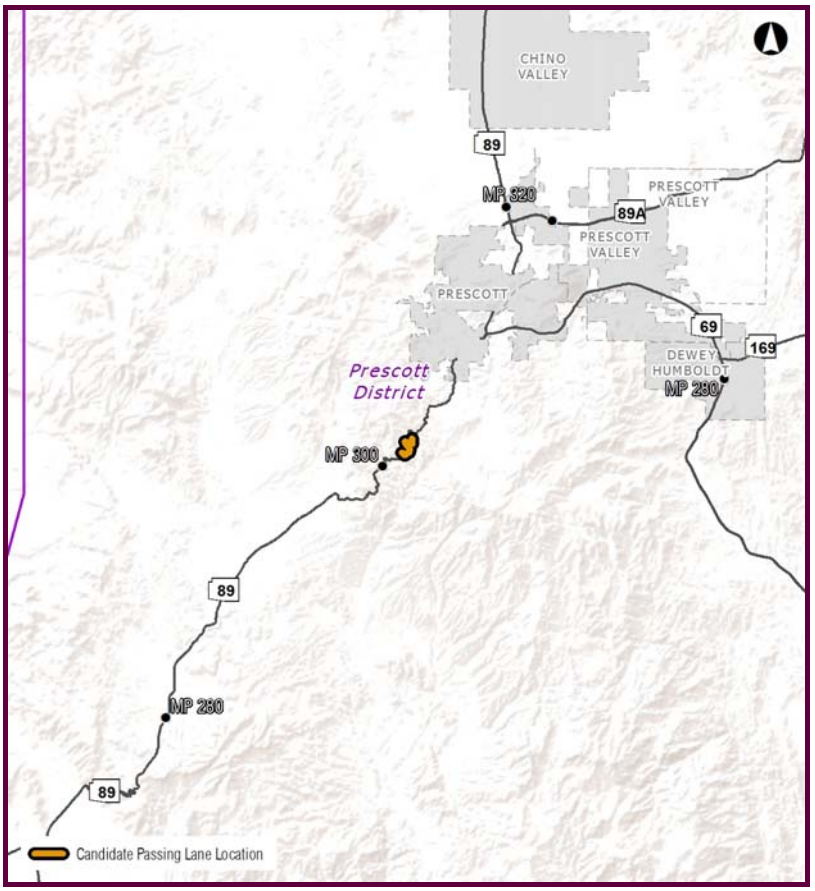
Land Ownership: Private Land; Prescott National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: No environmental issues identified

Cultural Resources

Number of Cultural Sites: 1
Eligible Sites (AZSITE): 1
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 4
Cultural Resource Density: Low





SR 89 NB: MP 330 - MP 334

Statewide Passing Lane Rank: 4

Project Details

Route: S 089
Direction: NB
BMP: 330
EMP: 334
District: Prescott
County: Yavapai
Ranking: 4
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Level
K-Factor: 0.1
Speed Limit (MPH): 55
Directional Split: 61/39
Existing AADT: 7,879
Future AADT: 11,500
Existing LOS: C
Future LOS: D
Truck %: 10%

Safety Analysis

Total Number of Crashes	37
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	15
Non-Injury Crashes	22
Average Crash Rate	2.00 *per million vehicle miles traveled*
Equivalent Property Damage Value	85

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: Segment is straight and flat with long passing area through a populated area. High volumes and high crashes

Number of Bridges:
Cost to Widen Bridges: $0.00

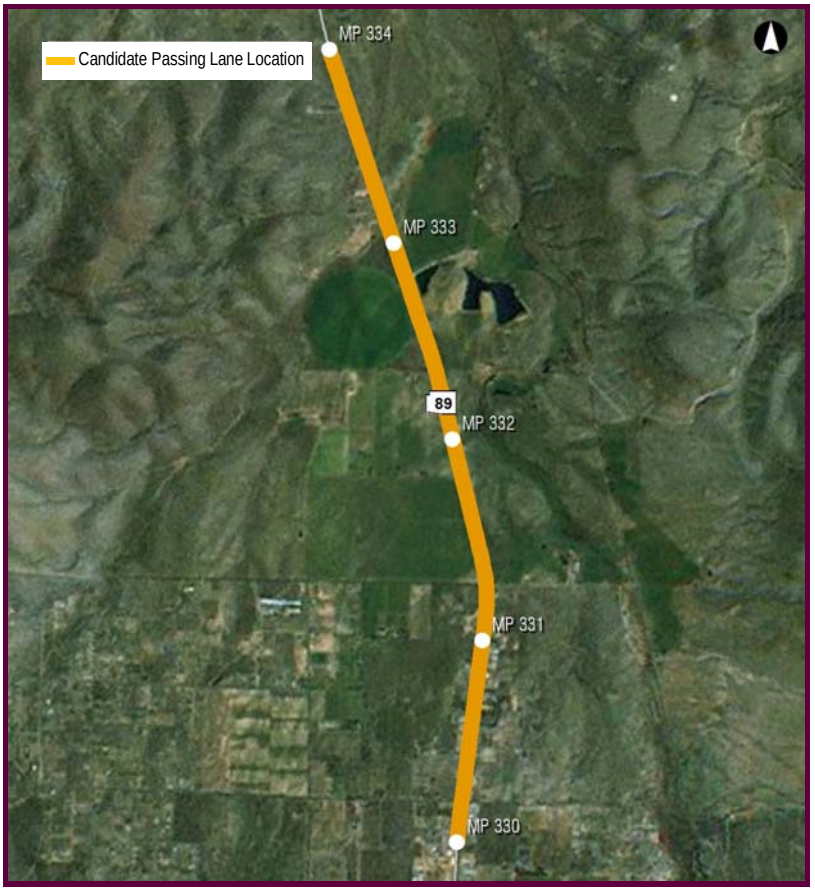
Environmental Overview

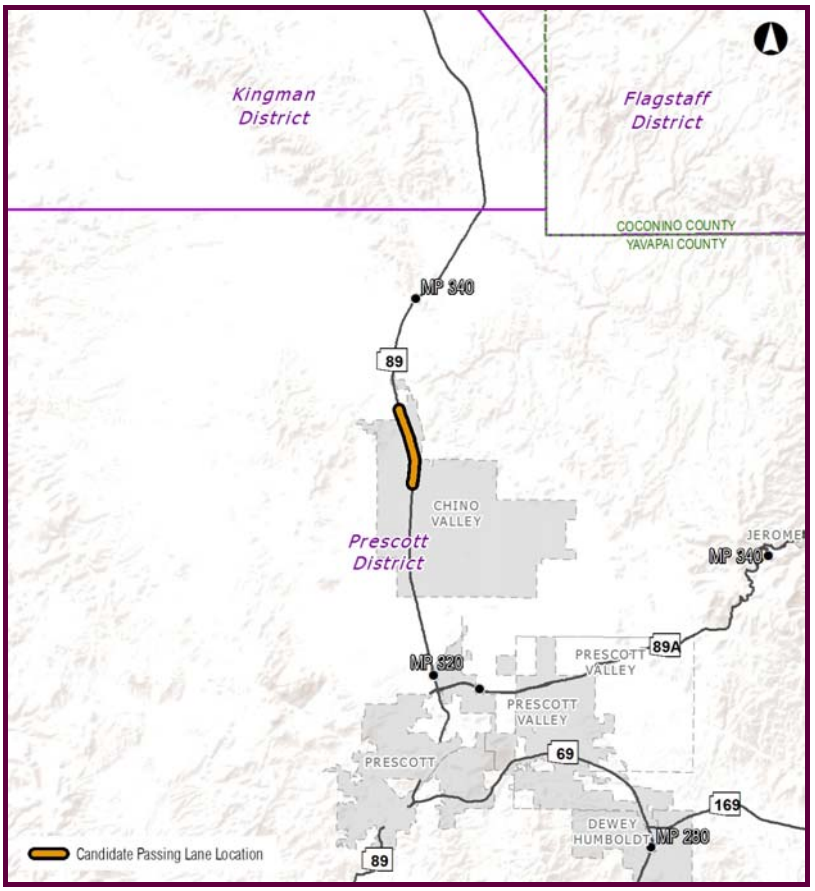
Land Ownership: Private Land; State Trust Land

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; 100-Year Floodplain; Large Quantity Generator

Cultural Resources

Number of Cultural Sites: 5
Eligible Sites (AZSITE): 3
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 11
Cultural Resource Density: Low





SR 89 SB: MP 330 - MP 335

Statewide Passing Lane Rank: 5

Project Details

Route: S 089
Direction: SB
BMP: 330
EMP: 335
District: Prescott
County: Yavapai
Ranking: 5
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Level
K-Factor: 0.1
Speed Limit (MPH): 55
Directional Split: 61/39
Existing AADT: 7,879
Future AADT: 11,500
Existing LOS: C
Future LOS: D
Truck %: 10%

Safety Analysis

Total Number of Crashes	18
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	5
Non-Injury Crashes	13
Average Crash Rate	0.97 *per million vehicle miles traveled*
Equivalent Property Damage Value	37

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: Segment is straight and flat with long passing area through a populated area. High volumes

Number of Bridges:
Cost to Widen Bridges: $0.00

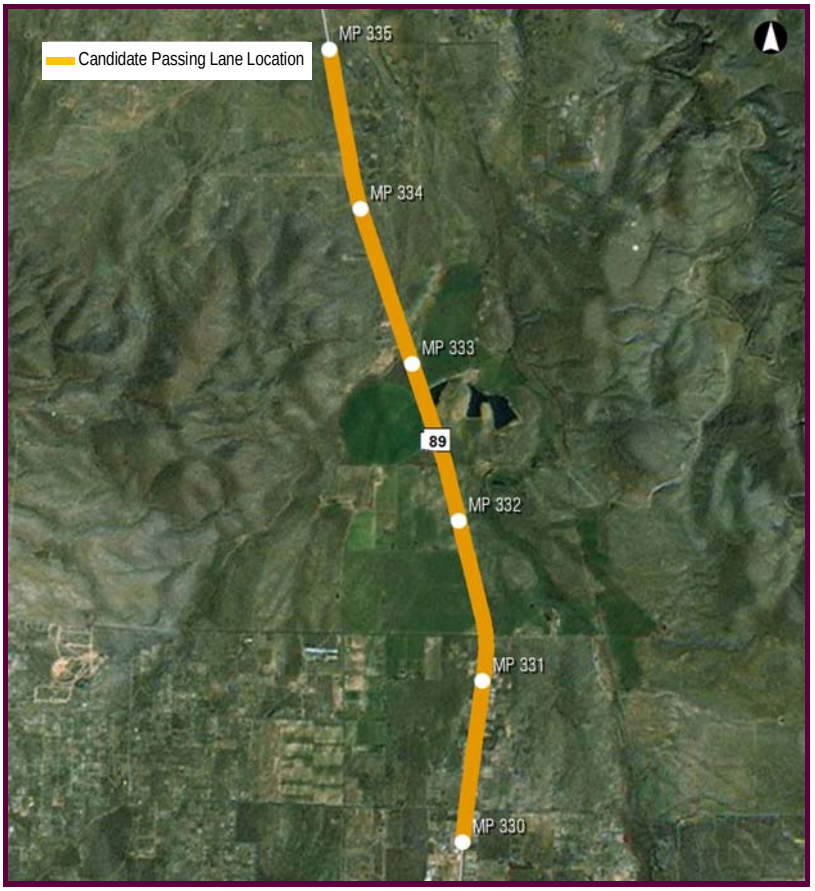
Environmental Overview

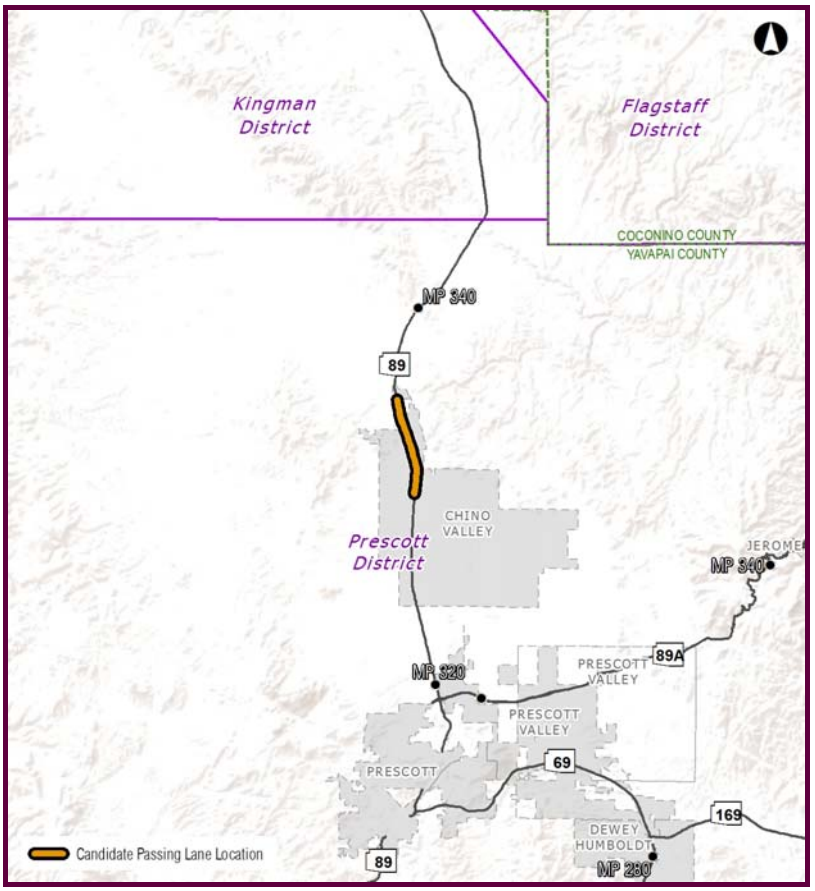
Land Ownership: Private Land; State Trust Land

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; 100-Year Floodplain; Large Quantity Generator

Cultural Resources

Number of Cultural Sites: 5
Eligible Sites (AZSITE): 3
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 11
Cultural Resource Density: Low





US 60 WB: MP 348 - MP 345

Statewide Passing Lane Rank: 6

Project Details

Route: U 060
Direction: WB
BMP: 348
EMP: 345
District: Globe
County: Navajo
Ranking: 6
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.11
Speed Limit (MPH): 65
Directional Split: 61/40
Existing AADT: 5,361
Future AADT: 9,150
Existing LOS: D
Future LOS: D
Truck %: 12%

Safety Analysis

Total Number of Crashes: 23
Number of Fatal Crashes: 2
Injury & Possible Injury Crashes: 9
Non-Injury Crashes: 12
Average Crash Rate: 1.18 *per million vehicle miles traveled*
Equivalent Property Damage Value: 71

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: The road is straight and it is easy to see oncoming traffic. However, high traffic volumes limit passing

Number of Bridges: 1
Cost to Widen Bridges: $118,440.00

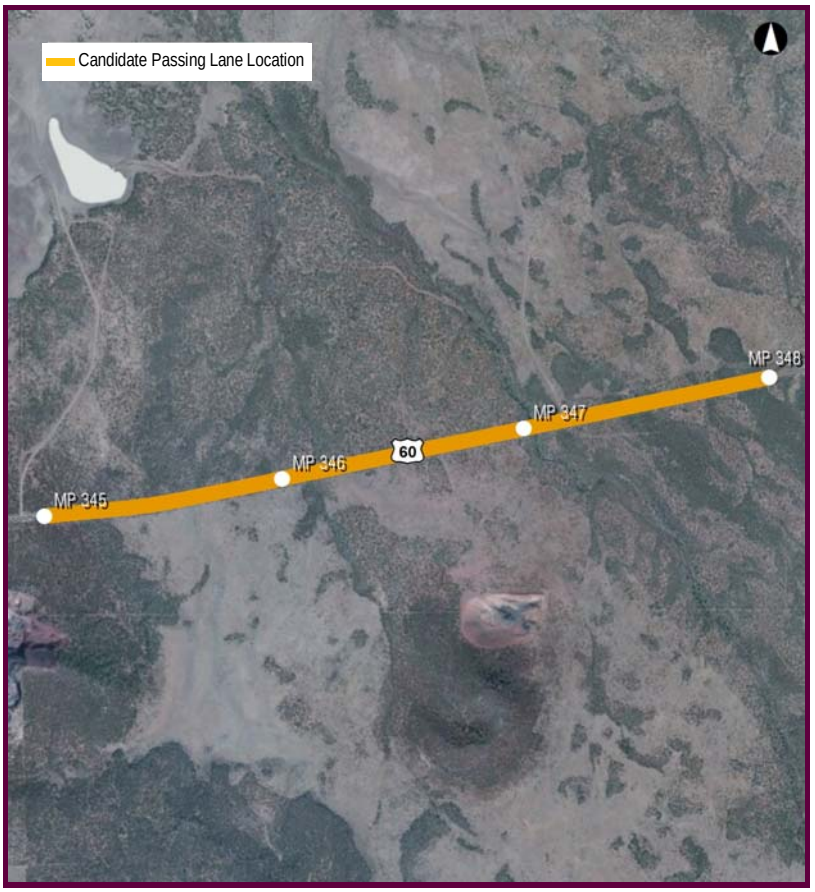
Environmental Overview

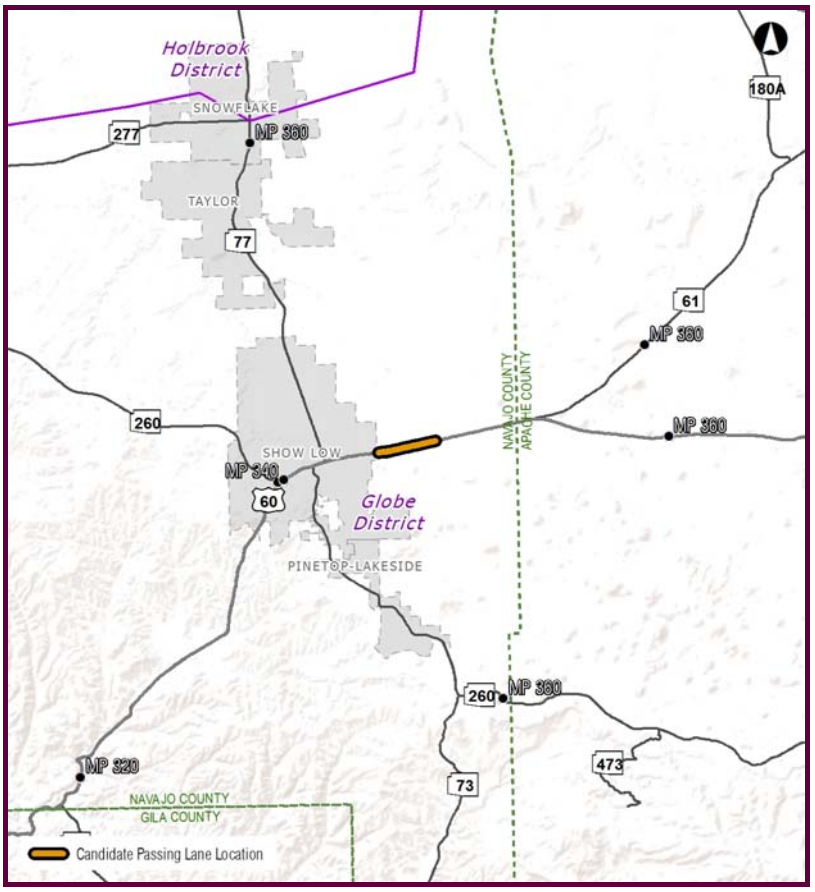
Land Ownership: Apache-Sitgreaves National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: No environmental issues identified

Cultural Resources

Number of Cultural Sites: 3
Eligible Sites (AZSITE): 1
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 7
Cultural Resource Density: Low





SR 87 SB: MP 264 - MP 271

Statewide Passing Lane Rank: 7

Project Details

Route: S 087
Direction: SB
BMP: 264
EMP: 271
District: Prescott
County: Gila
Ranking: 7
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.1
Speed Limit (MPH): 55
Directional Split: 54/46
Existing AADT: 3,888
Future AADT: 6,300
Existing LOS: C
Future LOS: C
Truck %: 12%

Safety Analysis

Total Number of Crashes	36
Number of Fatal Crashes	2
Injury & Possible Injury Crashes	15
Non-Injury Crashes	19
Average Crash Rate	2.54 *per million vehicle miles traveled*
Equivalent Property Damage Value	91

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: The segment has passing areas but also low sight distance due to turns and grade. Because of adjacent PL within 5 miles, segment might get lower priority.

Number of Bridges:
Cost to Widen Bridges: $0.00

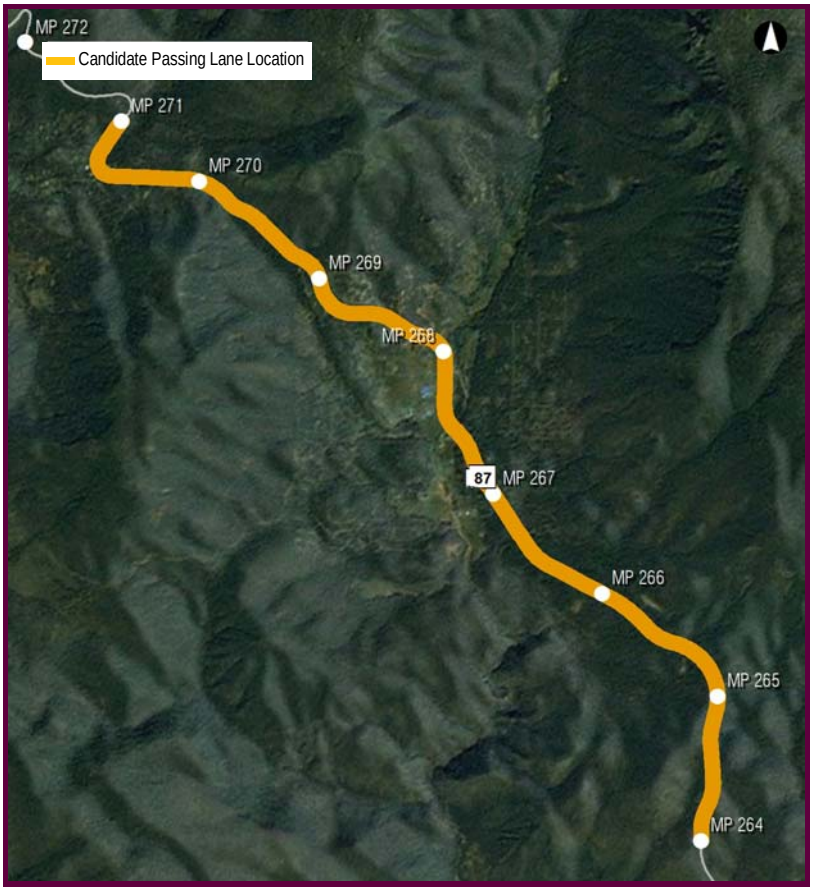
Environmental Overview

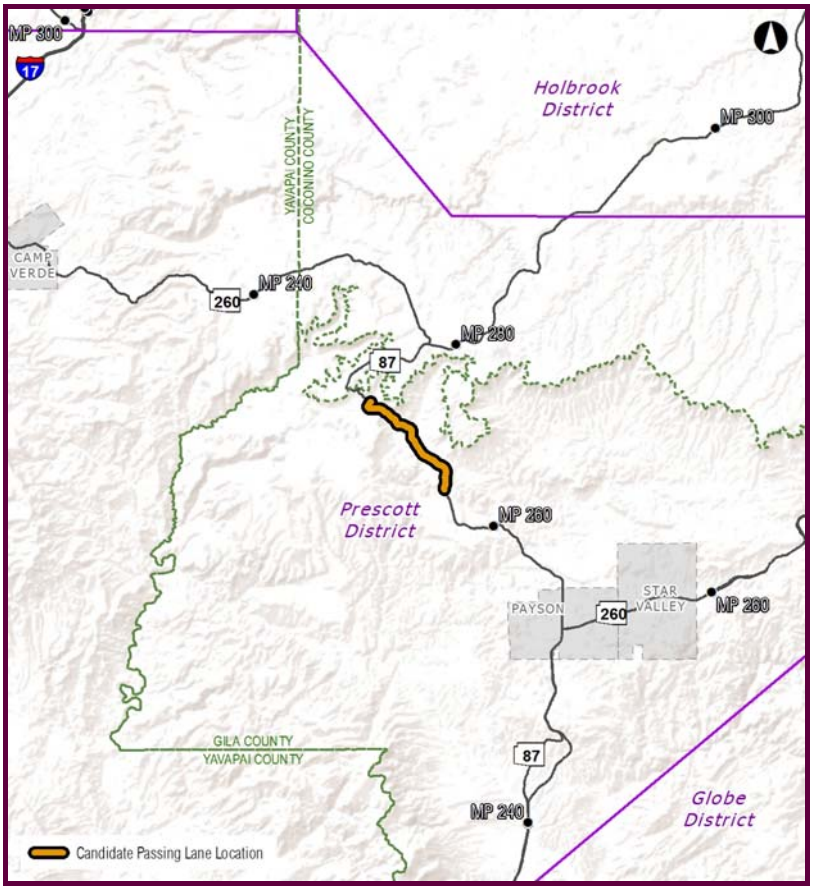
Land Ownership: Private Land; Tonto National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; 100-Year Floodplain; Leaking Underground Storage Tank

Cultural Resources

Number of Cultural Sites: 9
Eligible Sites (AZSITE): 4
Potential 4(f) Sites (AZSITE): 3
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 18
Cultural Resource Density: Low





SR 89 SB: MP 302 - MP 306

Statewide Passing Lane Rank: 8

Project Details

Route: S 089
Direction: SB
BMP: 302
EMP: 306
District: Prescott
County: Yavapai
Ranking: 8
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Mountainou
K-Factor: 0.1
Speed Limit (MPH): 35
Directional Split: 59/41
Existing AADT: 1,054
Future AADT: 1,600
Existing LOS: B
Future LOS: B
Truck %: 12%

Safety Analysis

Total Number of Crashes	29
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	14
Non-Injury Crashes	15
Average Crash Rate	7.54 *per million vehicle miles traveled*
Equivalent Property Damage Value	69

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Many rock formations at the side of the road.

General Location Assessment: Many turns and elevation changes warrant a passing lane.

Number of Bridges:
Cost to Widen Bridges: $0.00

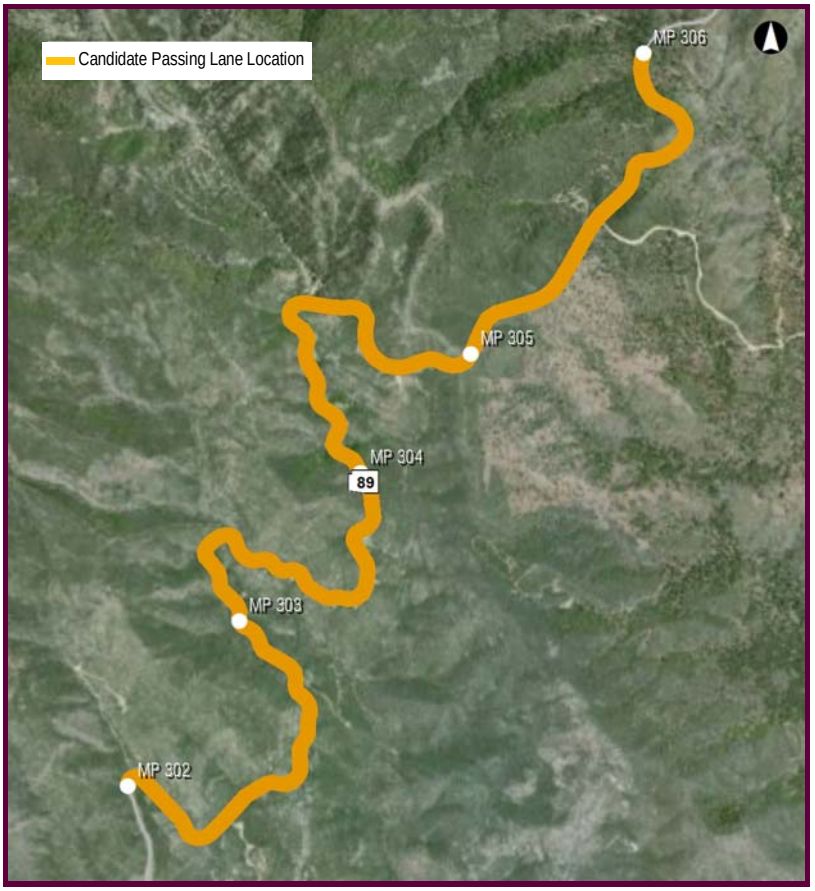
Environmental Overview

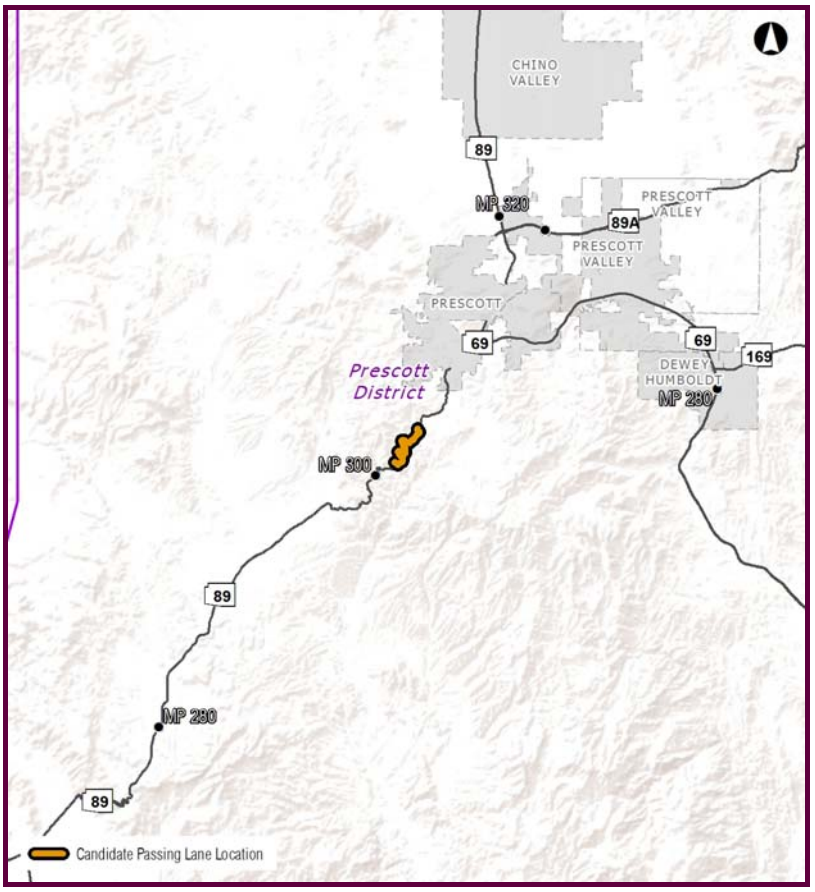
Land Ownership: Private Land; Prescott National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: No environmental issues identified

Cultural Resources

Number of Cultural Sites: 3
Eligible Sites (AZSITE): 1
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 6
Cultural Resource Density: Low





US 60 WB: MP 294 - MP 296

Statewide Passing Lane Rank: 9

Project Details

Route: U 060
Direction: WB
BMP: 294
EMP: 296
District: Globe
County: Gila
Ranking: 9
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Mountainou
K-Factor: 0.14
Speed Limit (MPH): 35
Directional Split: 57/43
Existing AADT: 2,365
Future AADT: 3,300
Existing LOS: B
Future LOS: C
Truck %: 11%

Safety Analysis

Total Number of Crashes	57
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	27
Non-Injury Crashes	29
Average Crash Rate	6.60 *per million vehicle miles traveled*
Equivalent Property Damage Value	150

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: On Side of mountain, would require wall cuts

General Location Assessment: Passing areas are minimal

Number of Bridges:

Cost to Widen Bridges:

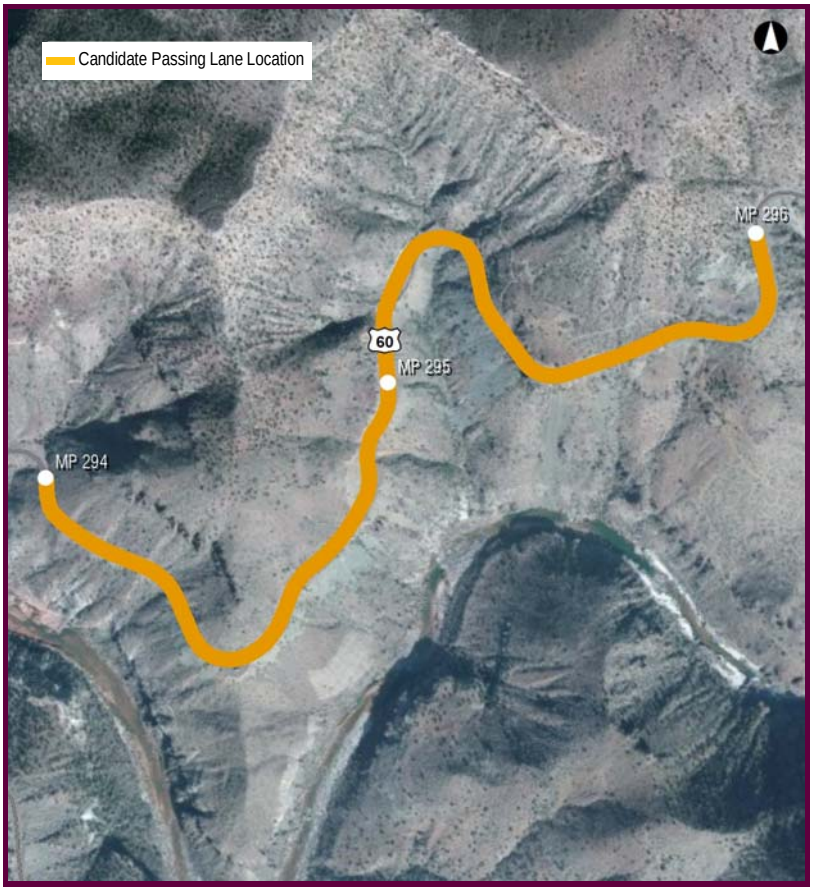
Environmental Overview

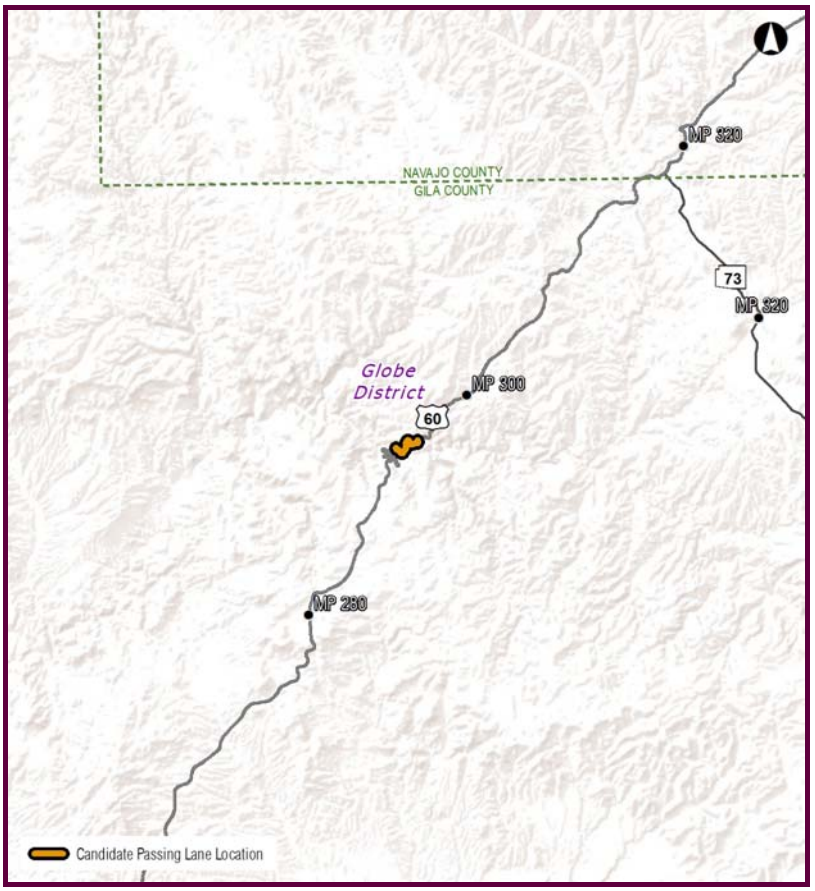
Land Ownership: White Mtn Apache Indian Res.; San Carlos Indian Res.

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Riparian Area - Flood Scoured; Riparian Area - Strand; Wetlands

Cultural Resources

Number of Cultural Sites: 0
Eligible Sites (AZSITE): 0
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 2
Cultural Resource Density: Low





SR 86 EB: MP 161 - MP 164

Statewide Passing Lane Rank: 10

Project Details

Route: S 086 **Direction:** EB
BMP: 161 **EMP:** 164
District: Tucson **County:** Pima
Ranking: 10 **Tier:** 1

Roadway Characteristics

Terrain/Max Slope: Level **K-Factor:** 0.08
Speed Limit (MPH): 65 **Directional Split:** 61/39
Existing AADT: 12,766 **Future AADT:** 14,950
Existing LOS: D **Future LOS:** D
Truck %: 6%

Safety Analysis

Total Number of Crashes	62
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	32
Non-Injury Crashes	29
Average Crash Rate	1.33 *per million vehicle miles traveled*
Equivalent Property Damage Value	158

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No physical constraints.

General Location Assessment: Plenty of passing opportunities and good sight distance before segment. Segment is mostly straight with good sight distance. Conditions after the segment are similar. High volumes

Number of Bridges: 3
Cost to Widen Bridges: $382,680.00

Environmental Overview

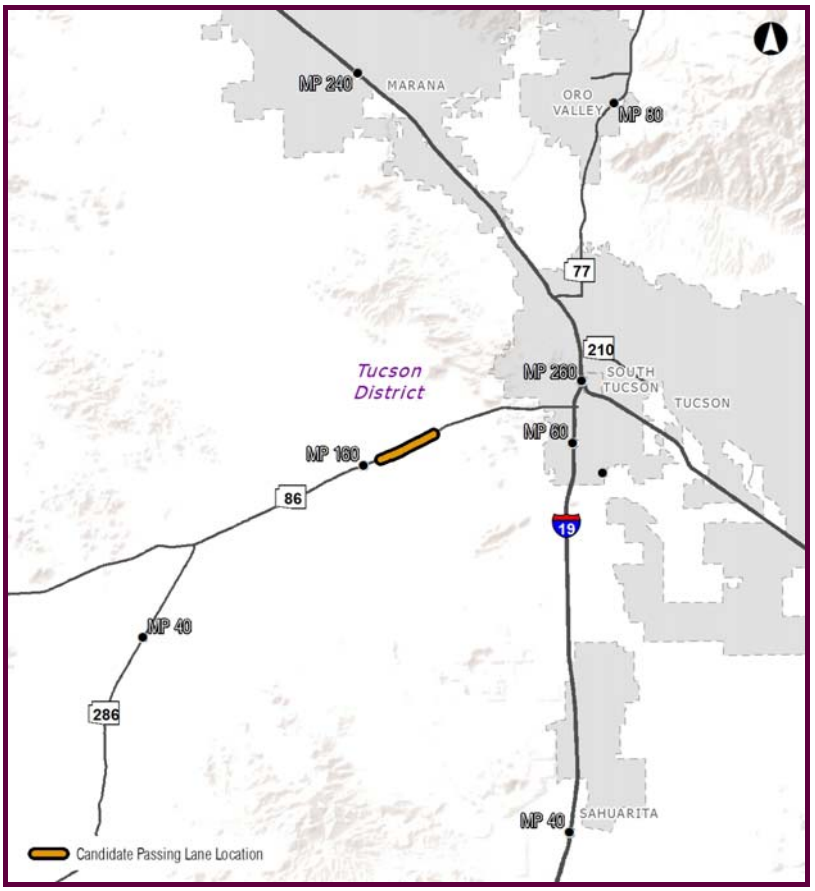
Land Ownership: Private Land; State Trust Land; Bureau of Land Management

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; 100-Year Floodplain; CO Maintenance Area; BLM VRM Class III

Cultural Resources

Number of Cultural Sites:	13
Eligible Sites (AZSITE):	6
Potential 4(f) Sites (AZSITE):	2
No. of Land Agencies (0.5 mile):	3
Total Cultural Sites:	24
Cultural Resource Density:	Medium





SR 89 NB: MP 295 - MP 302

Statewide Passing Lane Rank: 11

Project Details

Route: S 089
Direction: NB
BMP: 295
EMP: 302
District: Prescott
County: Yavapai
Ranking: 11
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.1
Speed Limit (MPH): 35
Directional Split: 59/41
Existing AADT: 1,054
Future AADT: 1,600
Existing LOS: B
Future LOS: B
Truck %: 12%

Safety Analysis

Total Number of Crashes	29
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	17
Non-Injury Crashes	12
Average Crash Rate	7.54 *per million vehicle miles traveled*
Equivalent Property Damage Value	75

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Rock formations present at the side of the road as well as steep drops.

General Location Assessment: No passing for the entire segment. There are many turns and grade changes. High number of crashes, though low volumes. Existing PL within 0.5 miles.

Number of Bridges: 1
Cost to Widen Bridges: $41,400.00

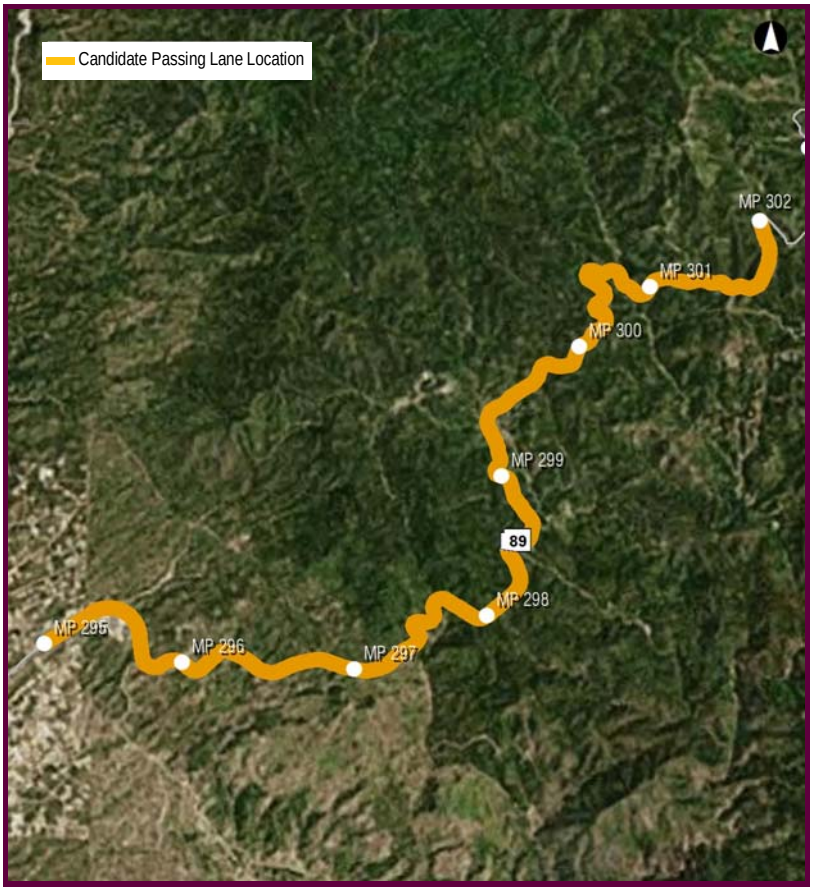
Environmental Overview

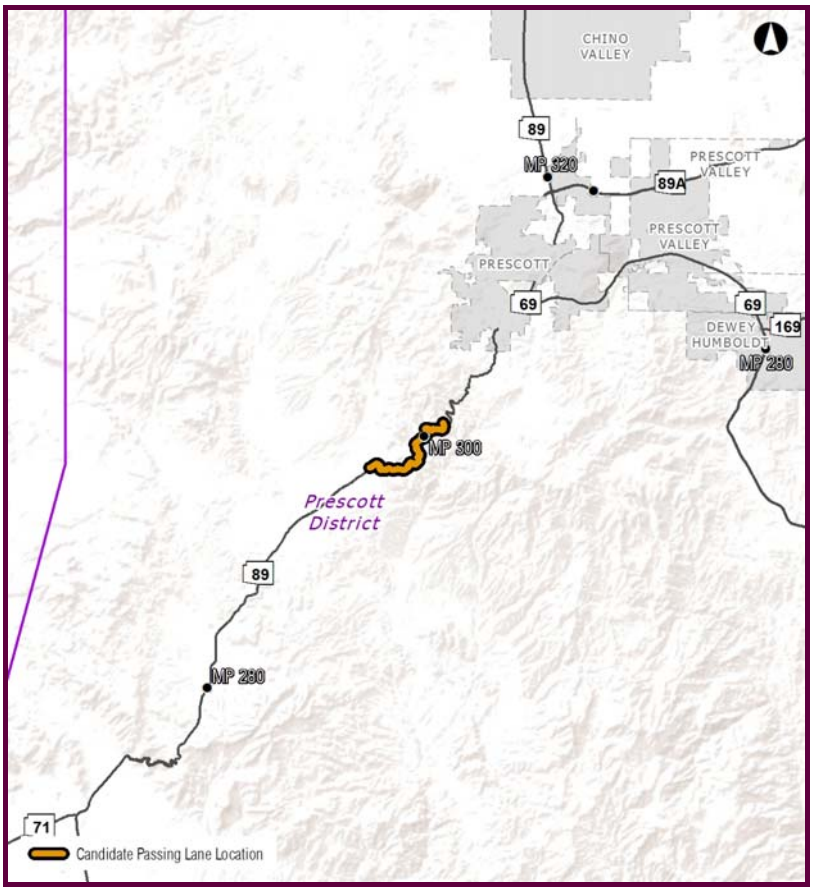
Land Ownership: Private Land; Prescott National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage

Cultural Resources

Number of Cultural Sites: 7
Eligible Sites (AZSITE): 1
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 11
Cultural Resource Density: Low





SA 89 SB: MP 344 - MP 347

Statewide Passing Lane Rank: 12

Project Details

Route: SA089
Direction: SB
BMP: 344
EMP: 347
District: Prescott
County: Yavapai
Ranking: 12
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Mountainou
K-Factor: 0.1
Speed Limit (MPH): 50
Directional Split: 58/42
Existing AADT: 3,517
Future AADT: 4,250
Existing LOS: C
Future LOS: C
Truck %: 11%

Safety Analysis

Total Number of Crashes	20
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	12
Non-Injury Crashes	8
Average Crash Rate	1.56 *per million vehicle miles traveled*
Equivalent Property Damage Value	68

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Rock formations throughout the segment built up infrastructure next to the road within Jerome.

General Location Assessment: There are no passing zones due to many turns and low sight distance. The segment is also at an incline. However this segment leads into Jerome and a passing lane may not be needed due to low vehicle speed.

Number of Bridges:

Cost to Widen Bridges: $0.00

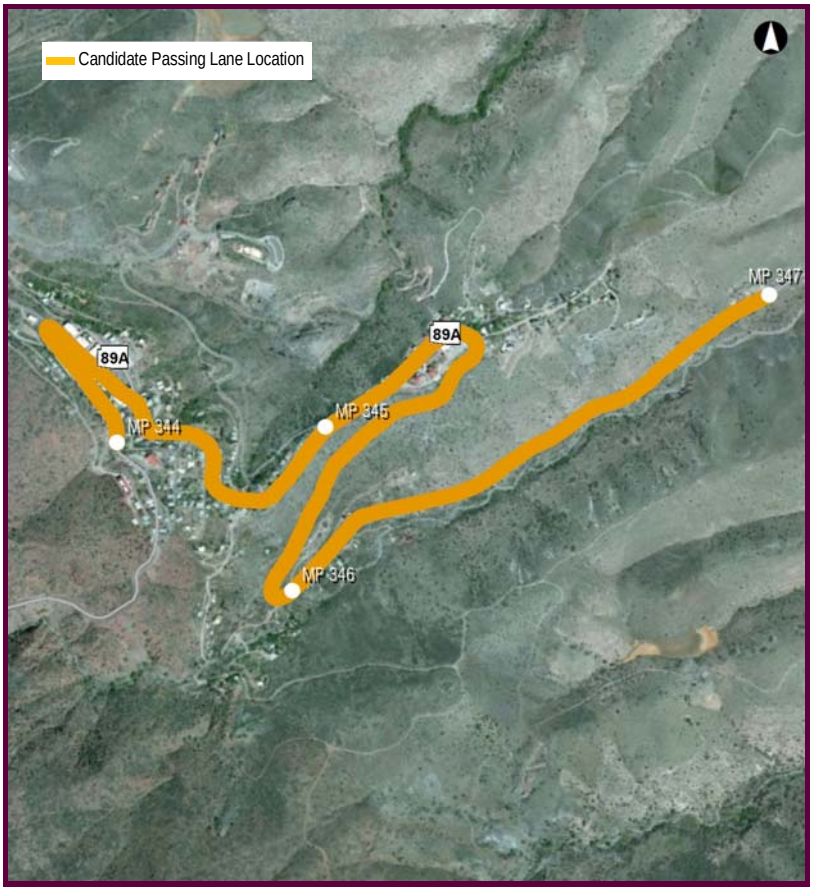
Environmental Overview

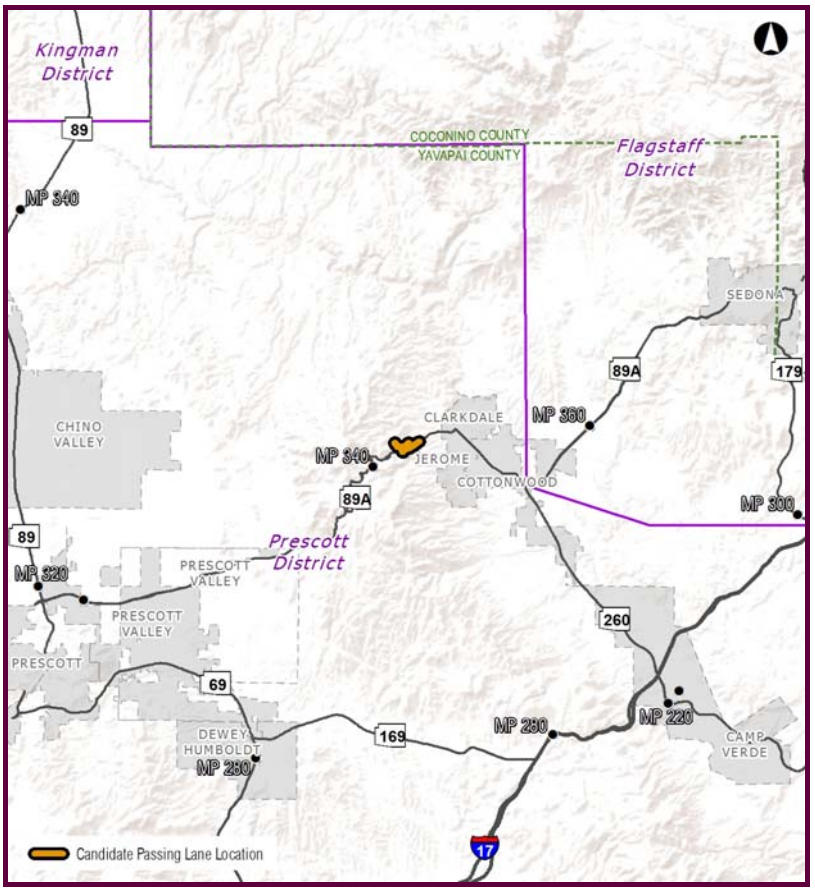
Land Ownership: Private Land; Jerome SHP

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage Leaking Underground Storage Tank

Cultural Resources

Number of Cultural Sites: 9
Eligible Sites (AZSITE): 8
Potential 4(f) Sites (AZSITE): 3
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 22
Cultural Resource Density: Medium





SR 86 WB: MP 161 - MP 164

Statewide Passing Lane Rank: 13

Project Details

Route: S 086
Direction: WB
BMP: 161
EMP: 164
District: Tucson
County: Pima
Ranking: 13
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Level
K-Factor: 0.08
Speed Limit (MPH): 65
Directional Split: 61/39
Existing AADT: 12,766
Future AADT: 14,950
Existing LOS: D
Future LOS: D
Truck %: 6%

Safety Analysis

Total Number of Crashes	54
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	30
Non-Injury Crashes	23
Average Crash Rate	1.16 *per million vehicle miles traveled*
Equivalent Property Damage Value	158

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No physical constraints. Two bridges around MP 162.25

General Location Assessment: Segment is straight and flat with good sight distance all along. High volumes

Number of Bridges: 3
Cost to Widen Bridges: $382,680.00

Environmental Overview

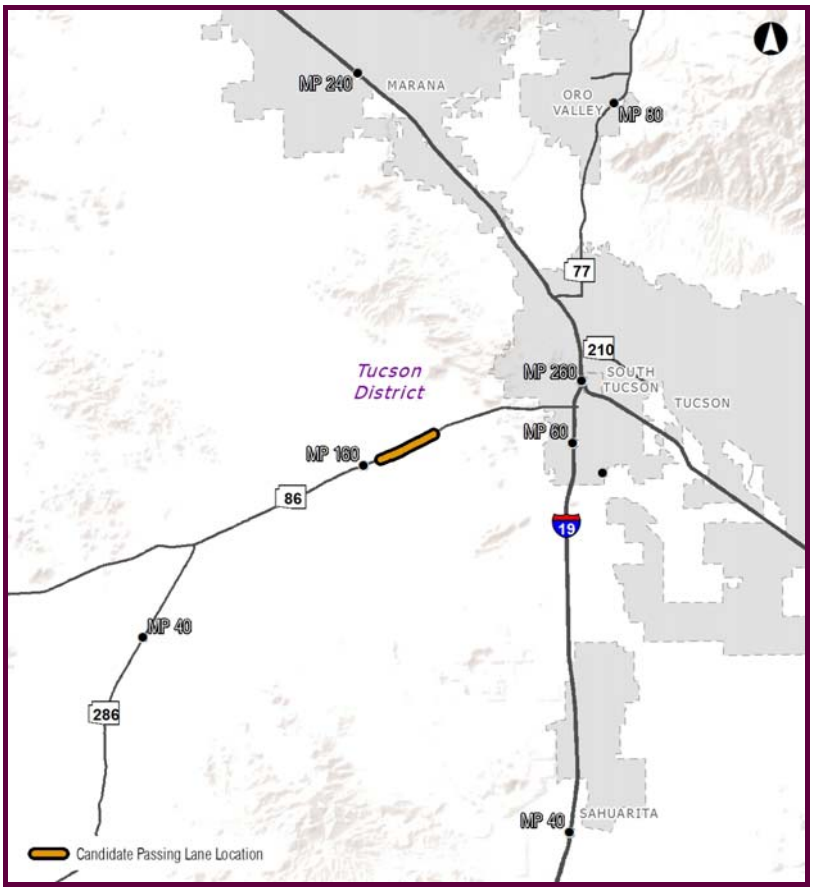
Land Ownership: Private Land; State Trust Land; Bureau of Land Management

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; 100-Year Floodplain; CO Maintenance Area; BLM VRM Class III

Cultural Resources

Number of Cultural Sites: 13
Eligible Sites (AZSITE): 6
Potential 4(f) Sites (AZSITE): 2
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 24
Cultural Resource Density: Medium





SR 64 EB: MP 223 - MP 226

Statewide Passing Lane Rank: 14

Project Details

Route: S 064
Direction: EB
BMP: 223
EMP: 226
District: Flagstaff
County: Coconino
Ranking: 14
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Level
K-Factor: 0.14
Speed Limit (MPH): 65
Directional Split: 54/46
Existing AADT: 4,594
Future AADT: 6,200
Existing LOS: D
Future LOS: D
Truck %: 9%

Safety Analysis

Total Number of Crashes: 27
Number of Fatal Crashes: 0
Injury & Possible Injury Crashes: 6
Non-Injury Crashes: 21
Average Crash Rate: 1.61 *per million vehicle miles traveled*
Equivalent Property Damage Value: 48

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints. Passing Lane in Opposite Direction (~MP 225)

General Location Assessment: There was a passing lane three miles prior, but it is very hard to see oncoming traffic

Number of Bridges:
Cost to Widen Bridges: $0.00

Environmental Overview

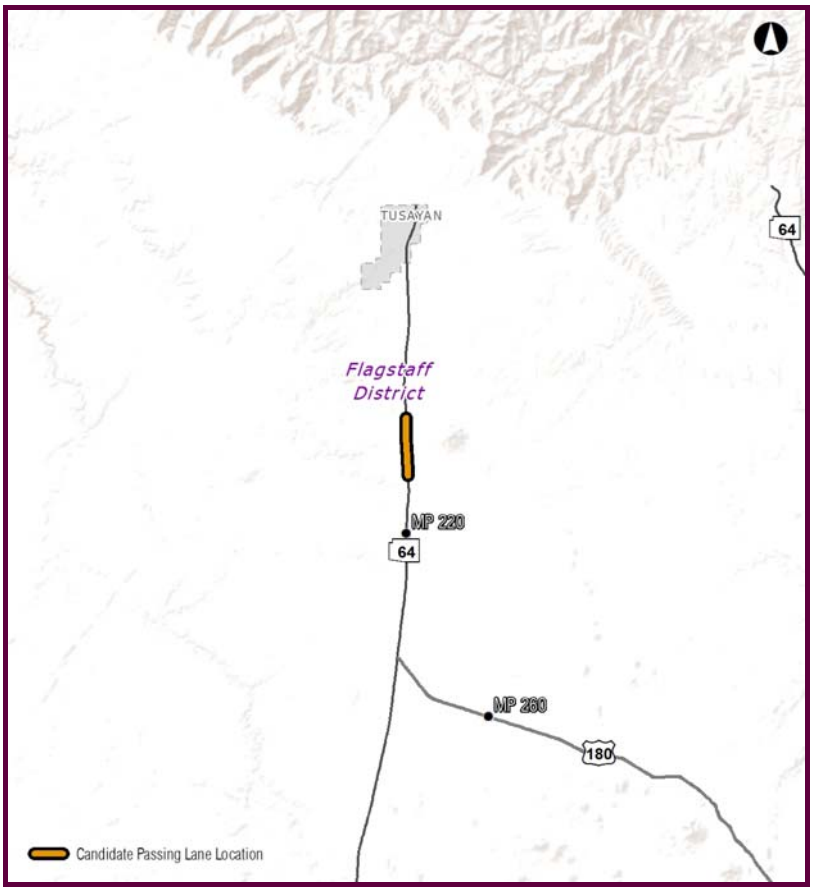
Land Ownership: State Trust Land; Kaibab National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage

Cultural Resources

Number of Cultural Sites: 9
Eligible Sites (AZSITE): 8
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 19
Cultural Resource Density: Low





US 60 EB: MP 345 - MP 348

Statewide Passing Lane Rank: 15

Project Details

Route: U 060
Direction: EB
BMP: 345
EMP: 348
District: Globe
County: Navajo
Ranking: 15
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.11
Speed Limit (MPH): 65
Directional Split: 61/40
Existing AADT: 5,361
Future AADT: 9,150
Existing LOS: D
Future LOS: D
Truck %: 12%

Safety Analysis

Total Number of Crashes: 18
Number of Fatal Crashes: 1
Injury & Possible Injury Crashes: 6
Non-Injury Crashes: 11
Average Crash Rate: 0.92 *per million vehicle miles traveled*
Equivalent Property Damage Value: 49

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: The road is straight and it is easy to see oncoming traffic. However, high traffic volumes limit passing

Number of Bridges: 1
Cost to Widen Bridges: $118,440.00

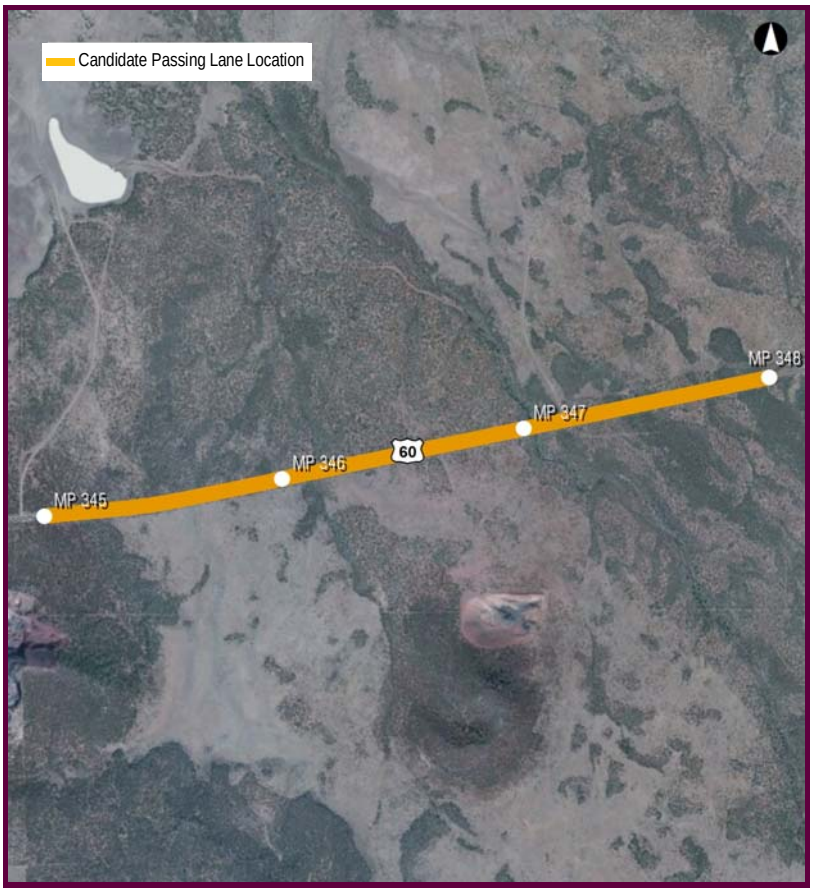
Environmental Overview

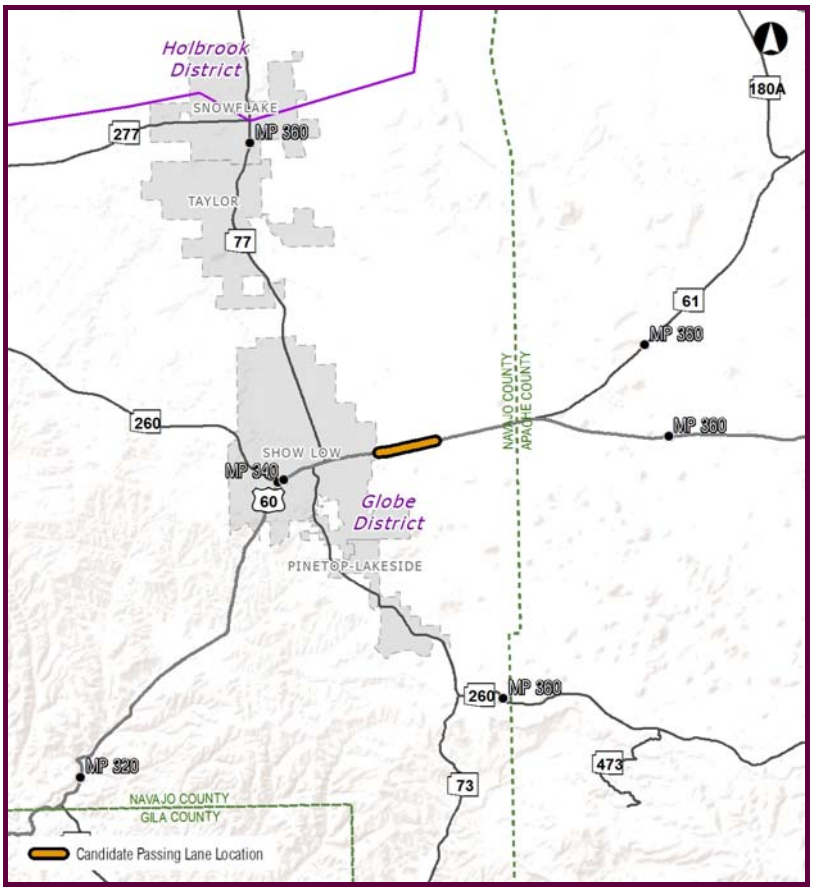
Land Ownership: Apache-Sitgreaves National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: No environmental issues identified

Cultural Resources

Number of Cultural Sites: 3
Eligible Sites (AZSITE): 1
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 7
Cultural Resource Density: Low





SR 89 SB: MP 295 - MP 302

Statewide Passing Lane Rank: 16

Project Details

Route: S 089
Direction: SB
BMP: 295
EMP: 302
District: Prescott
County: Yavapai
Ranking: 16
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.1
Speed Limit (MPH): 35
Directional Split: 59/41
Existing AADT: 1,054
Future AADT: 1,600
Existing LOS: B
Future LOS: B
Truck %: 12%

Safety Analysis

Total Number of Crashes	28
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	15
Non-Injury Crashes	12
Average Crash Rate	7.28 *per million vehicle miles traveled*
Equivalent Property Damage Value	96

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Rock formations present at the side of the road.

General Location Assessment: No passing for the entire segment. There are many turns and grade changes. High number of crashes, though low volumes

Number of Bridges: 1
Cost to Widen Bridges: $0.00

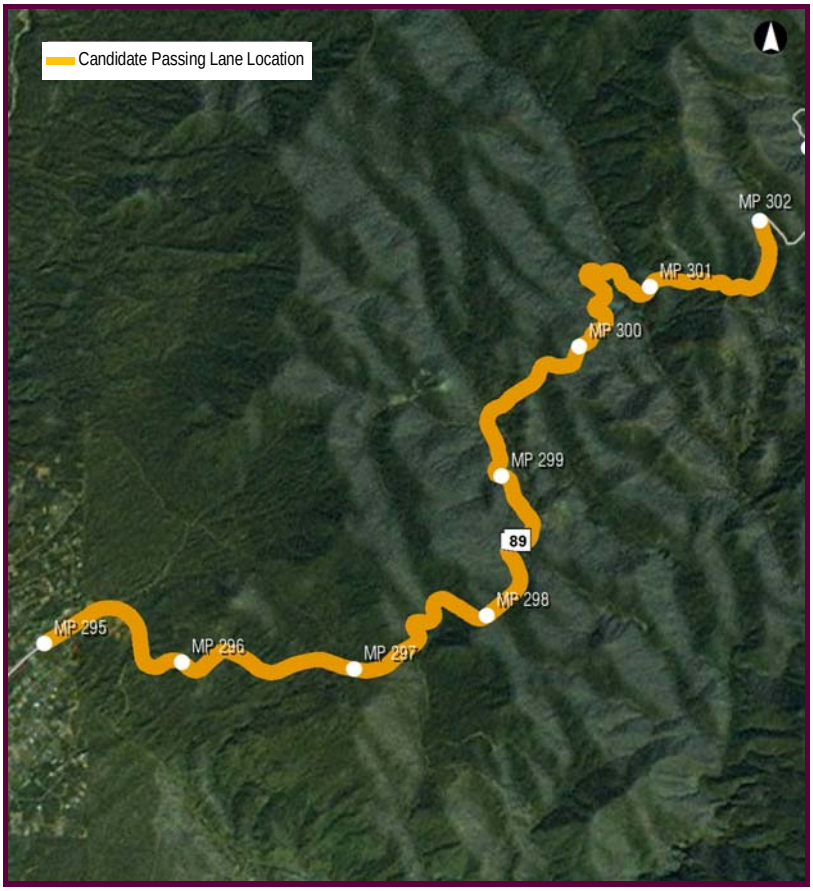
Environmental Overview

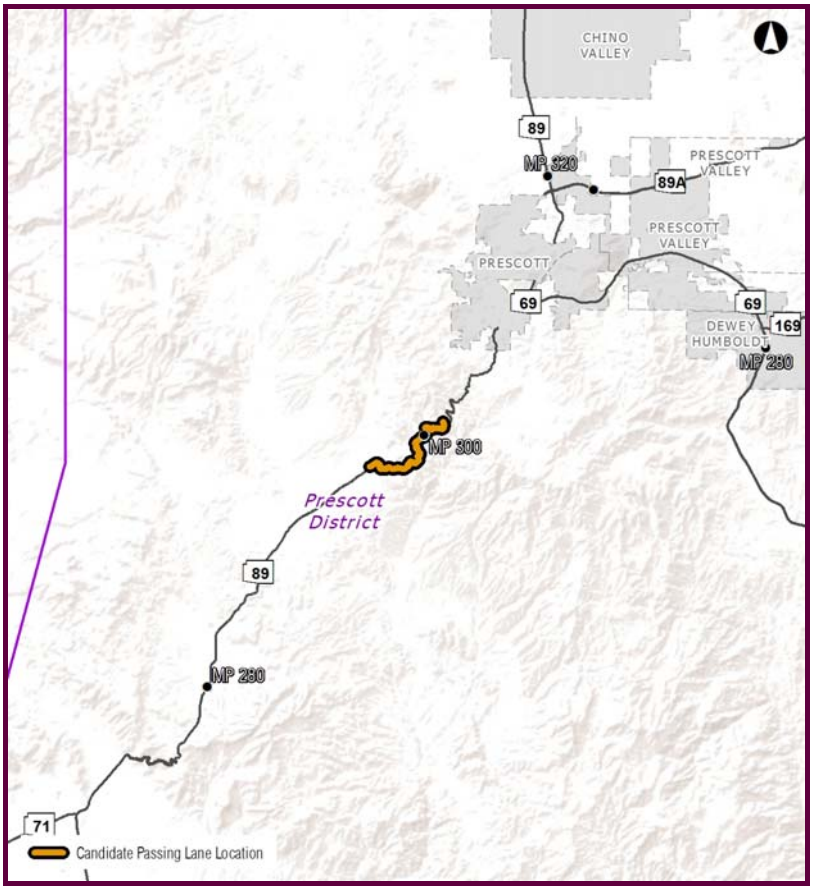
Land Ownership: Private Land; Prescott National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage

Cultural Resources

Number of Cultural Sites: 7
Eligible Sites (AZSITE): 1
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 11
Cultural Resource Density: Low





US 191 SB: MP 442 - MP 451

Statewide Passing Lane Rank: 17

Project Details

Route: U 191
Direction: SB
BMP: 442
EMP: 451
District: Holbrook
County: Apache
Ranking: 17
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Level
K-Factor: 0.09
Speed Limit (MPH): 65
Directional Split: 75/25
Existing AADT: 4,659
Future AADT: 4,800
Existing LOS: B
Future LOS: B
Truck %: 14%

Safety Analysis

Total Number of Crashes	34
Number of Fatal Crashes	2
Injury & Possible Injury Crashes	19
Non-Injury Crashes	13
Average Crash Rate	2.00 *per million vehicle miles traveled*
Equivalent Property Damage Value	115

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: The segment has a long passing area and is straight and flat. At the end it enters a reduced speed area with 2 lanes. Goes through Chinle area. Looks like most traffic is local

Number of Bridges:
Cost to Widen Bridges: $0.00

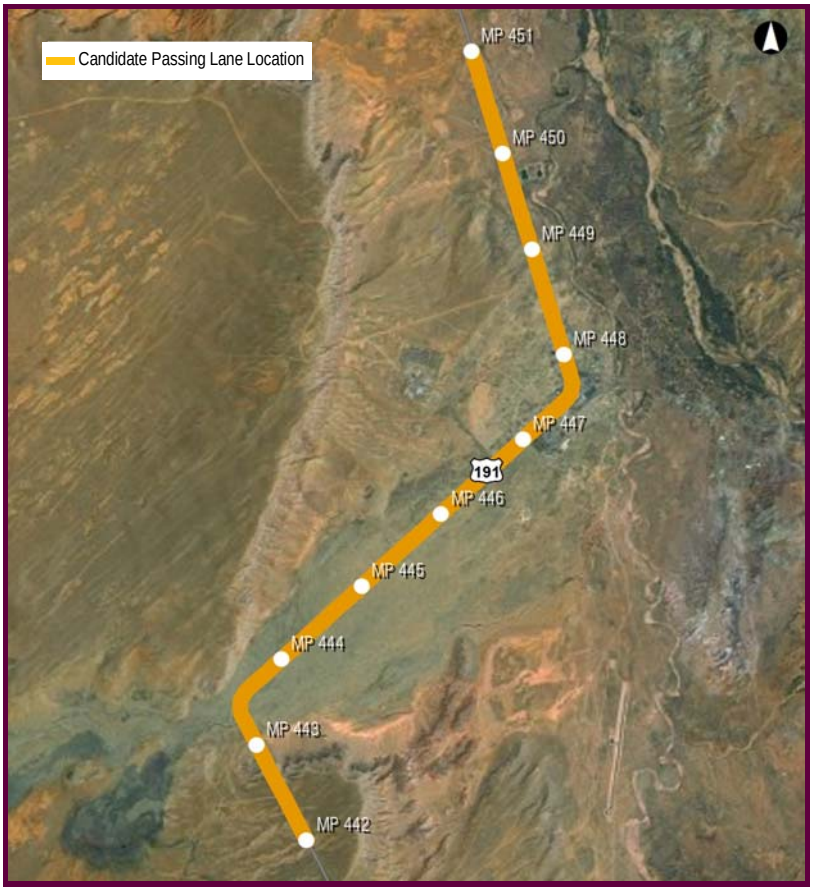
Environmental Overview

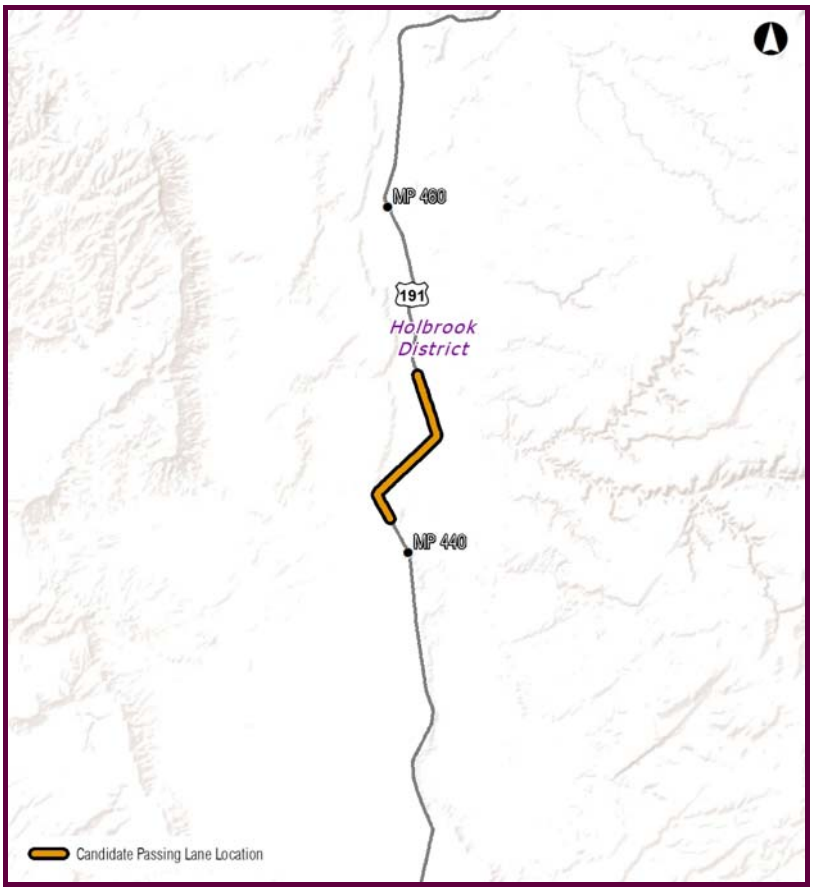
Land Ownership: Navajo Indian Res.

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands

Cultural Resources

Number of Cultural Sites: 0
Eligible Sites (AZSITE): 0
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 1
Total Cultural Sites: 1
Cultural Resource Density: Low





US 191 NB: MP 448 - MP 455

Statewide Passing Lane Rank: 18

Project Details

Route: U 191
Direction: NB
BMP: 448
EMP: 455
District: Holbrook
County: Apache
Ranking: 18
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Level
K-Factor: 0.09
Speed Limit (MPH): 65
Directional Split: 75/25
Existing AADT: 4,659
Future AADT: 4,800
Existing LOS: B
Future LOS: B
Truck %: 14%

Safety Analysis

Total Number of Crashes: 44
Number of Fatal Crashes: 4
Injury & Possible Injury Crashes: 24
Non-Injury Crashes: 16
Average Crash Rate: 2.59 *per million vehicle miles traveled*
Equivalent Property Damage Value: 170

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: Once the segment starts the road is straight and flat with plenty of opportunity for passing. Goes through Chinle area. Looks like most traffic is local

Number of Bridges:
Cost to Widen Bridges: $0.00

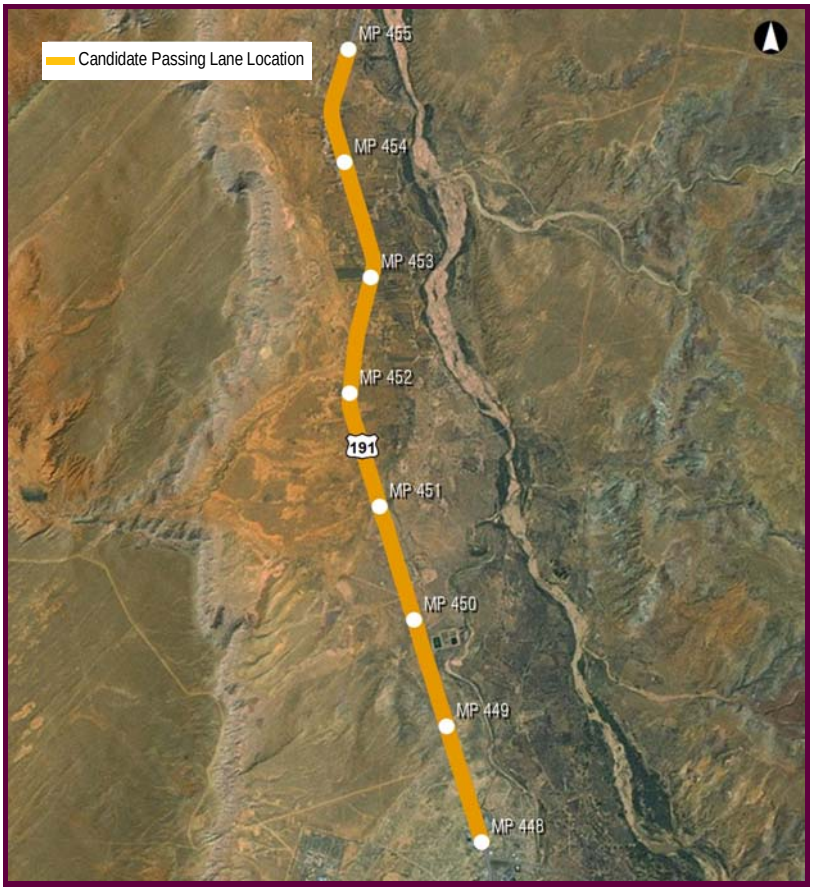
Environmental Overview

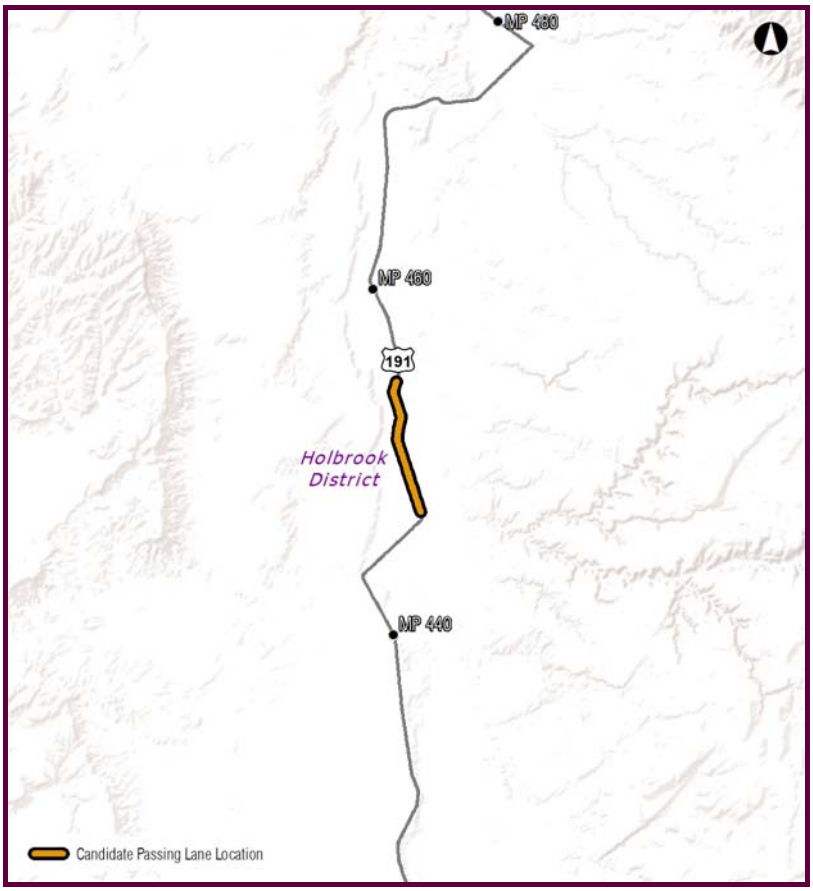
Land Ownership: Navajo Indian Res.

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands

Cultural Resources

Number of Cultural Sites: 0
Eligible Sites (AZSITE): 0
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 1
Total Cultural Sites: 1
Cultural Resource Density: Low





US 93 NB: MP 167 - MP 165

Statewide Passing Lane Rank: 19

Project Details

Route: U 093
Direction: NB
BMP: 167
EMP: 165
District: Kingman
County: Yavapai
Ranking: 19
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.11
Speed Limit (MPH): 65
Directional Split: 57/43
Existing AADT: 5,759
Future AADT: 6,700
Existing LOS: C
Future LOS: C
Truck %: 16%

Safety Analysis

Total Number of Crashes	19
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	7
Non-Injury Crashes	11
Average Crash Rate	0.90 *per million vehicle miles traveled*
Equivalent Property Damage Value	60

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints. Bridge at MP 165.40

General Location Assessment: The road is straight with good sight distance but has high traffic volumes.

Number of Bridges: 2
Cost to Widen Bridges: $48,240.00

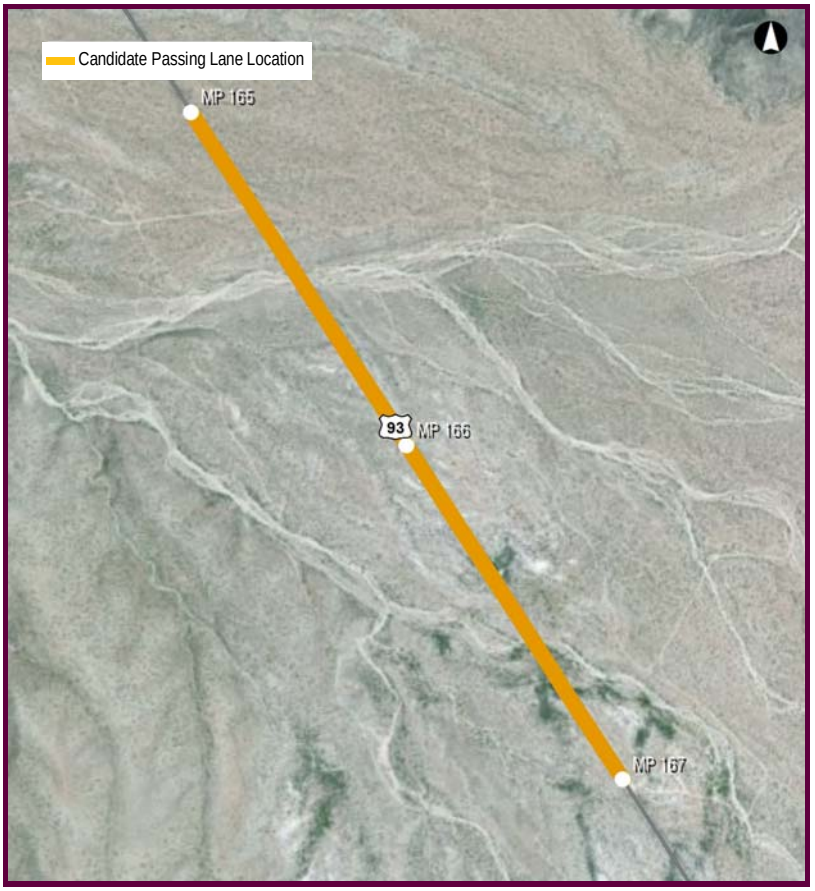
Environmental Overview

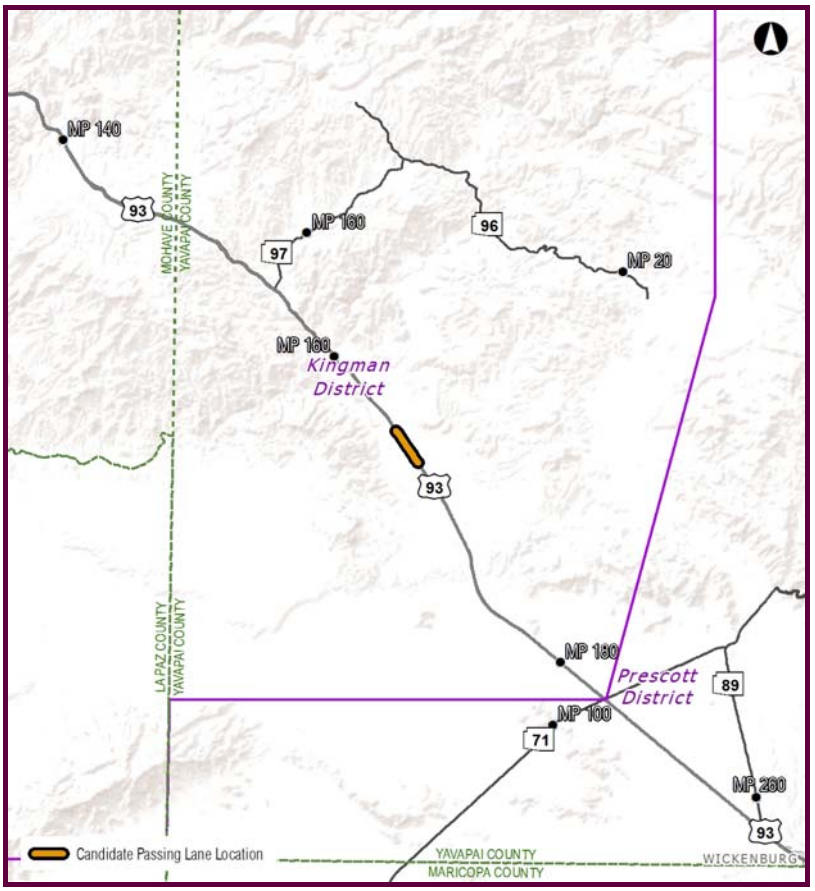
Land Ownership: Private Land; State Trust Land; Bureau of Land Management

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; 100-Year Floodplain

Cultural Resources

Number of Cultural Sites: 10
Eligible Sites (AZSITE): 8
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 21
Cultural Resource Density: Medium





US 60 EB: MP 357 - MP 360

Statewide Passing Lane Rank: 20

Project Details

Route: U 060
Direction: EB
BMP: 357
EMP: 360
District: Globe
County: Apache
Ranking: 20
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.11
Speed Limit (MPH): 65
Directional Split: 60/40
Existing AADT: 2,137
Future AADT: 3,100
Existing LOS: B
Future LOS: C
Truck %: 12%

Safety Analysis

Total Number of Crashes	33
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	8
Non-Injury Crashes	24
Average Crash Rate	4.23 *per million vehicle miles traveled*
Equivalent Property Damage Value	68

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: The road is mostly straight and it is easy to see oncoming traffic. High number of crashes (33)

Number of Bridges: 1
Cost to Widen Bridges: $26,280.00

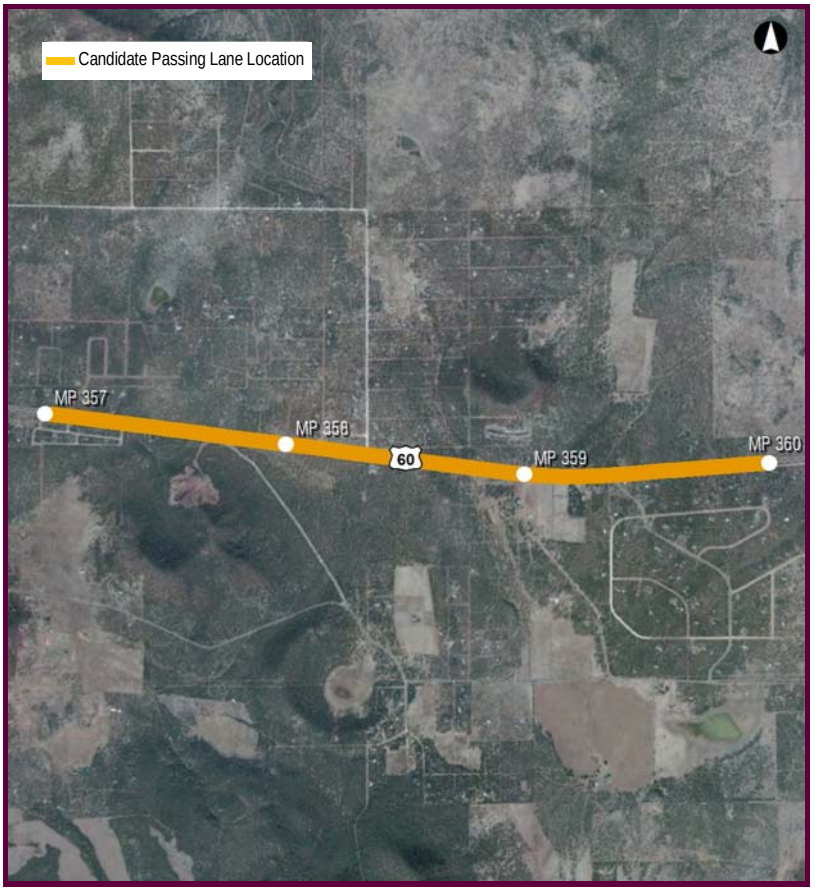
Environmental Overview

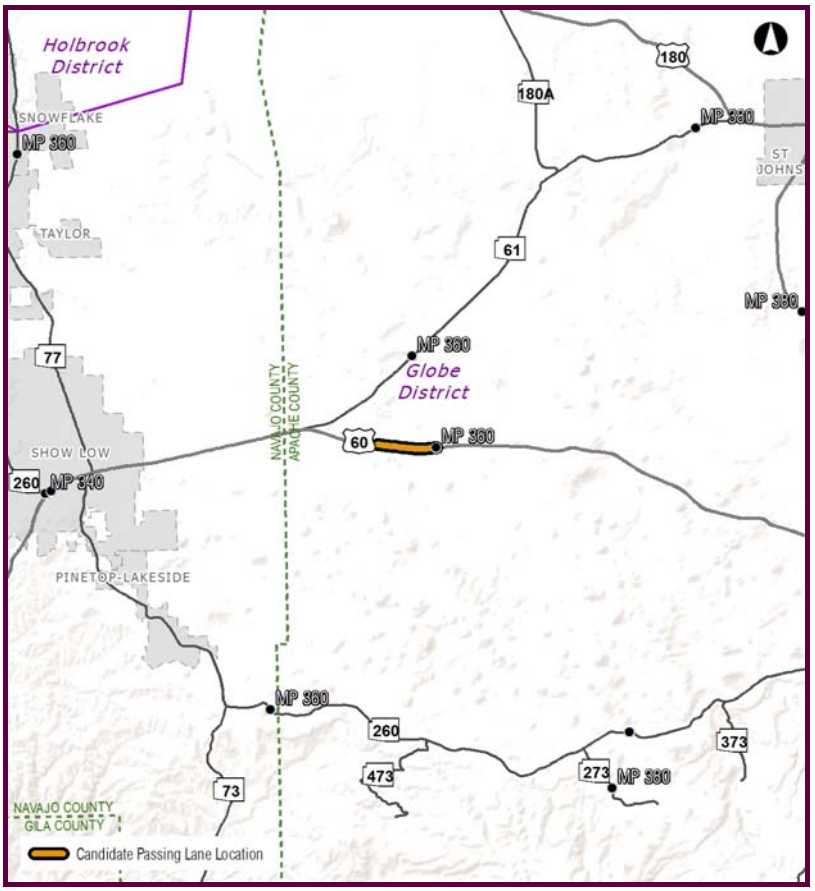
Land Ownership: Private Land; State Trust Land; County Land

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands

Cultural Resources

Number of Cultural Sites: 0
Eligible Sites (AZSITE): 0
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 2
Cultural Resource Density: Low





SR 87 NB: MP 262 - MP 271

Statewide Passing Lane Rank: 21

Project Details

Route: S 087
Direction: NB
BMP: 262
EMP: 271
District: Prescott
County: Gila
Ranking: 21
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Rolling
K-Factor: 0.1
Speed Limit (MPH): 55
Directional Split: 54/46
Existing AADT: 3,888
Future AADT: 6,300
Existing LOS: C
Future LOS: C
Truck %: 12%

Safety Analysis

Total Number of Crashes: 28
Number of Fatal Crashes: 0
Injury & Possible Injury Crashes: 8
Non-Injury Crashes: 20
Average Crash Rate: 1.97 *per million vehicle miles traveled*
Equivalent Property Damage Value: 40

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints.

General Location Assessment: No passing opportunities before the segment due to turns. Segment has low sight distance due to turns, grade, and left turn pockets. Because of adjacent PL within 5 miles, segment might get lower priority.

Number of Bridges:
Cost to Widen Bridges: $0.00

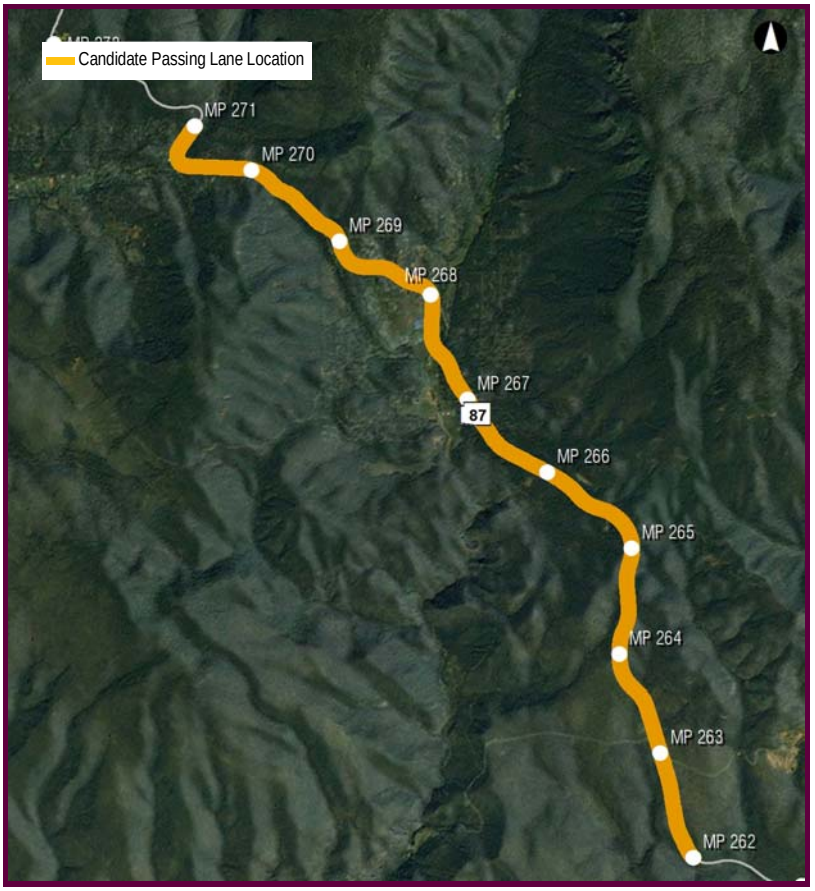
Environmental Overview

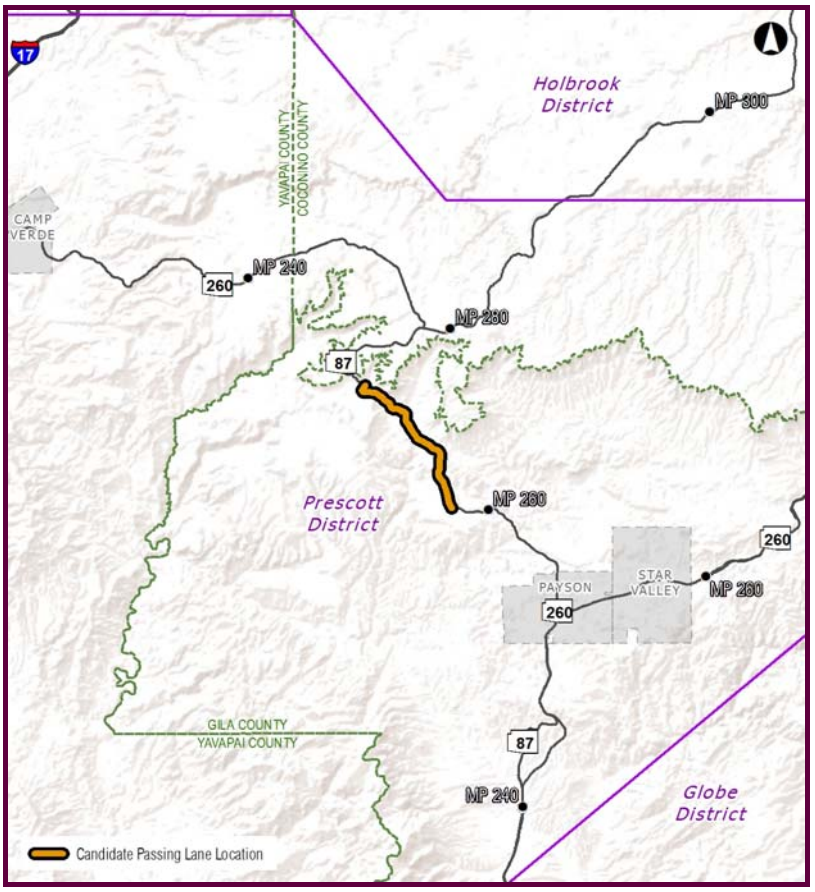
Land Ownership: Private Land; Tonto National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; 100-Year Floodplain; Leaking Underground Storage Tank; PM10 Maintenance Area

Cultural Resources

Number of Cultural Sites: 20
Eligible Sites (AZSITE): 6
Potential 4(f) Sites (AZSITE): 3
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 31
Cultural Resource Density: Medium





SR 86 WB: MP 153 - MP 156

Statewide Passing Lane Rank: 22

Project Details

Route: S 086
Direction: WB
BMP: 153
EMP: 156
District: Tucson
County: Pima
Ranking: 22
Tier: 1

Roadway Characteristics

Terrain/Max Slope: Level
K-Factor: 0.08
Speed Limit (MPH): 65
Directional Split: 62/38
Existing AADT: 7,842
Future AADT: 9,900
Existing LOS: D
Future LOS: D
Truck %: 8%

Safety Analysis

Total Number of Crashes	21
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	6
Non-Injury Crashes	15
Average Crash Rate	0.73 *per million vehicle miles traveled*
Equivalent Property Damage Value	48

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No physical constraints.

General Location Assessment: Road is straight before and within the segment. One small section at the end has a center left turn lane. High volumes

Number of Bridges: 5
Cost to Widen Bridges: $253,800.00

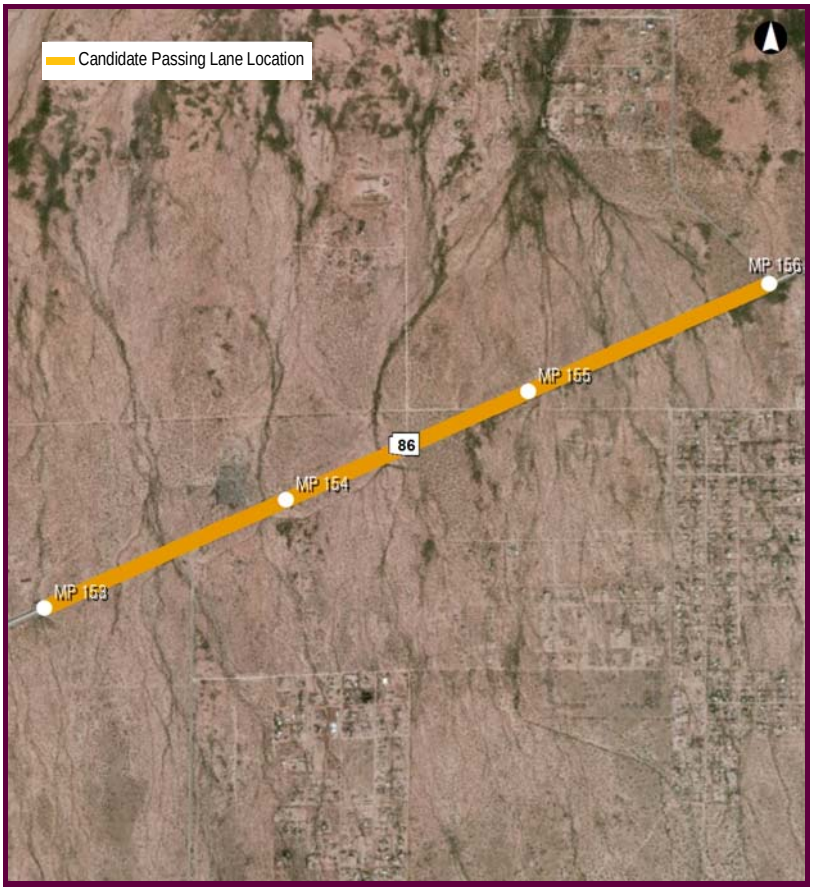
Environmental Overview

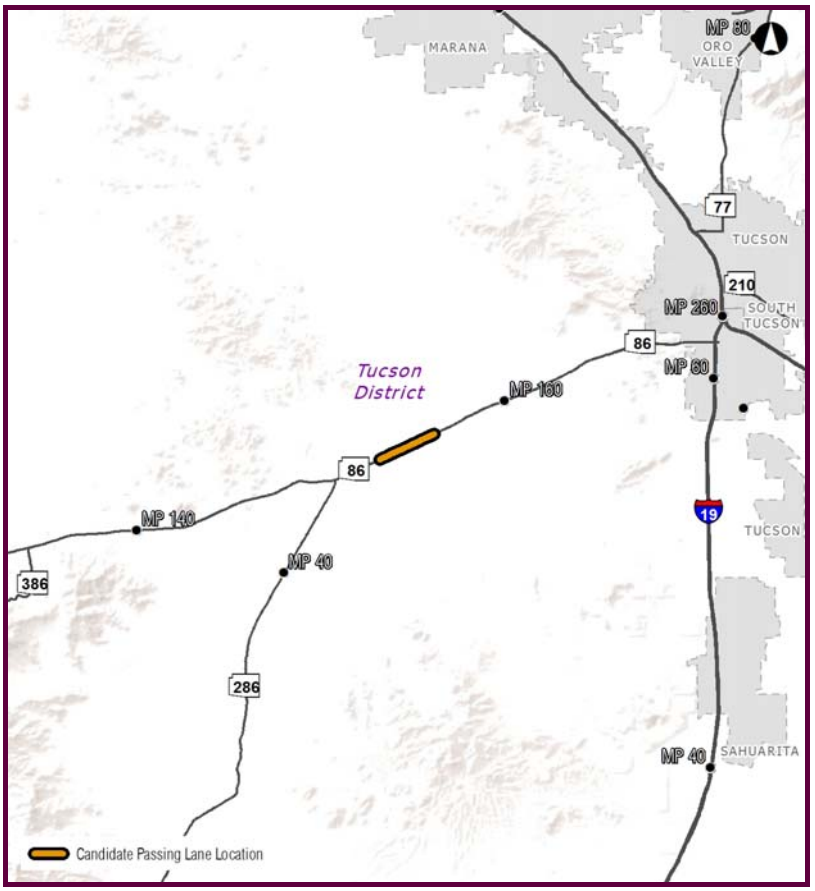
Land Ownership: Private Land; State Trust Land; Bureau of Land Management

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: 100-Year Floodplain; CO Maintenance Area; BLM VRM Class III

Cultural Resources

Number of Cultural Sites: 4
Eligible Sites (AZSITE): 3
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 11
Cultural Resource Density: Low





7. SUMMARY RESULTS – CLIMBING LANES ON TWO-LANE HIGHWAYS

Table 7.1 presents the list of candidate locations for climbing lanes on two-lane highways. The candidate locations are ranked at the statewide and district level and grouped into three tiers – high, medium, and low priority. Figure 7.1 illustrates the statewide location of the climbing lanes. Figures 7.2 to 7.8 illustrate the climbing lane locations in each District followed by project summary sheets for the Tier 1 locations. Table A2 in Appendix A lists the candidate locations, ranking, tier level, and also includes detailed information about evaluation criteria and scoring.

Locations identified for climbing lanes in Table 7.1 represent only the general problem area and not the exact location and length of the climbing lanes.

Table 7.1: Prioritized List of Climbing Lanes on Two-Lane Highways

ADOT DISTRICT	CLIMBING LANE LOCATION (VICINITY)	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Flagstaff	SR 67 NB: MP591 - MP589	24.25	9	1	2
Flagstaff	SR 64 SB: MP199 - MP197	23.44	11	2	2
Flagstaff	US 180 WB: MP219 - MP221	22.96	15	3	2
Flagstaff	SA 89 NB: MP392- MP398	22.93	16	4	2
Flagstaff	SR 64 EB: MP196 - MP198	22.66	18	5	2
Flagstaff	US 160 WB: MP345 - MP343	22.65	19	6	2
Flagstaff	UA 89 NB: MP566 - MP571	19.97	24	7	2
Flagstaff	US 89 NB: MP550 - MP552	18.44	30	8	3
Flagstaff	US 160 EB: MP312 - MP314	18.13	32	9	3
Flagstaff	US 89 SB: MP557 - MP555	17.29	33	10	3
Flagstaff	UA 89 NB: MP550 - MP551	13.67	44	11	3
Globe	US 60 EB: MP306 - MP307	23.02	14	1	2
Globe	US 70 WB: MP282 - MP288	22.00	21	2	2
Globe	US 70 EB: MP262 - MP264	19.06	28	3	2
Globe	US 60 WB: MP267 - MP266	14.20	41	4	3
Holbrook	SR 87 NB: MP295 - MP297	23.38	12	1	2
Holbrook	SR 264 EB: MP457 - MP461	23.19	13	2	2
Holbrook	SR 87 NB: MP290 - MP296	21.38	22	3	2
Holbrook	SR 87 SB: MP290 - MP296	19.81	26	4	2
Holbrook	US 160 WB: MP462 - MP460	17.25	34	5	3
Holbrook	US 160 EB: MP381 - MP384	16.65	35	6	3
Holbrook	US 191 SB: MP356 - MP354	16.52	36	7	3
Holbrook	US 191 SB: MP444 - MP442	15.58	38	8	3
Holbrook	SR 264 EB: MP377 - MP379	15.46	39	9	3
Holbrook	SR 264 EB: MP402 - MP404	12.66	45	10	3
Kingman	US 93 SB: MP161 - MP163	25.03	8	1	1
Kingman	SR 95 SB: MP177 - MP175	23.53	10	2	2
Prescott	SA 89 SB: MP339 - MP343	30.73	1	1	1

Table 7.1: Prioritized List of Climbing Lanes on Two-Lane Highways (Continued)

ADOT DISTRICT	CLIMBING LANE LOCATION (VICINITY)	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Prescott	SA 89 NB: MP334 - MP336	27.80	4	2	1
Prescott	SR 260 EB: MP288 - MP289	25.40	7	3	1
Prescott	SR 89 NB: MP339 - MP341	22.84	17	4	2
Prescott	SA 89 SB: MP348 - MP349	19.75	27	5	2
Prescott	SR 89 NB: MP344 - MP345	14.07	42	6	3
Prescott	SR 169 SB: MP9 - MP7	13.68	43	7	3
Safford	UX 191 NB: MP168 - MP171	28.23	3	1	1
Safford	UX 191 SB: MP169 - MP167	26.54	5	2	1
Safford	SR 90 WB: MP329 - MP327	25.93	6	3	1
Safford	SR 90 EB: MP335 - MP337	22.46	20	4	2
Safford	US 191 NB: MP139 - MP144	20.08	23	5	2
Safford	SR 80 EB: MP334 - MP338	18.14	31	6	3
Safford	SR 80 EB: MP314 - MP317	15.75	37	7	3
Safford	US 191 NB: MP147 - MP149	15.40	40	8	3
Tucson	SR 83 NB: MP43 - MP49	30.56	2	1	1
Tucson	SR 83 SB: MP54 - MP52	19.90	25	2	2
Tucson	SR 83 NB: MP52 - MP54	19.04	29	3	2

Note:
Statewide Rank = Projects ranking statewide
District Rank = Projects ranking within District only
Tier Level = High, medium, and low priority

In some instances, need for a climbing and passing lane may have been identified in the same vicinity. The TAC recommended leaving the overlaps/duplicates in place to illustrate that those locations were deemed warranted in both analysis.

Figure 7.1: Statewide Climbing Lane (Two-Lane Highways) Rankings

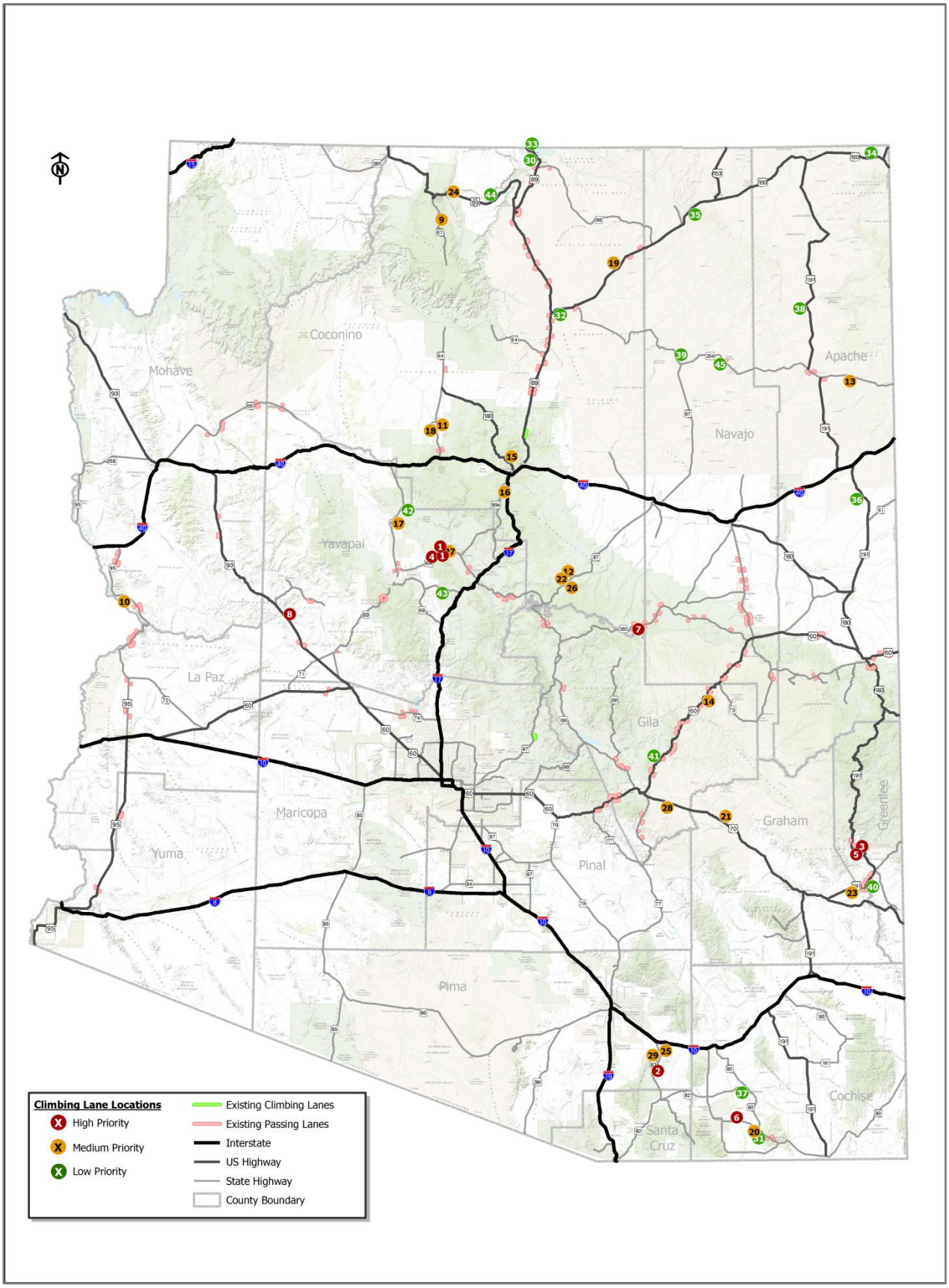


Figure 7.2: Climbing Lane (Two-Lane Highways) Rankings – Flagstaff District

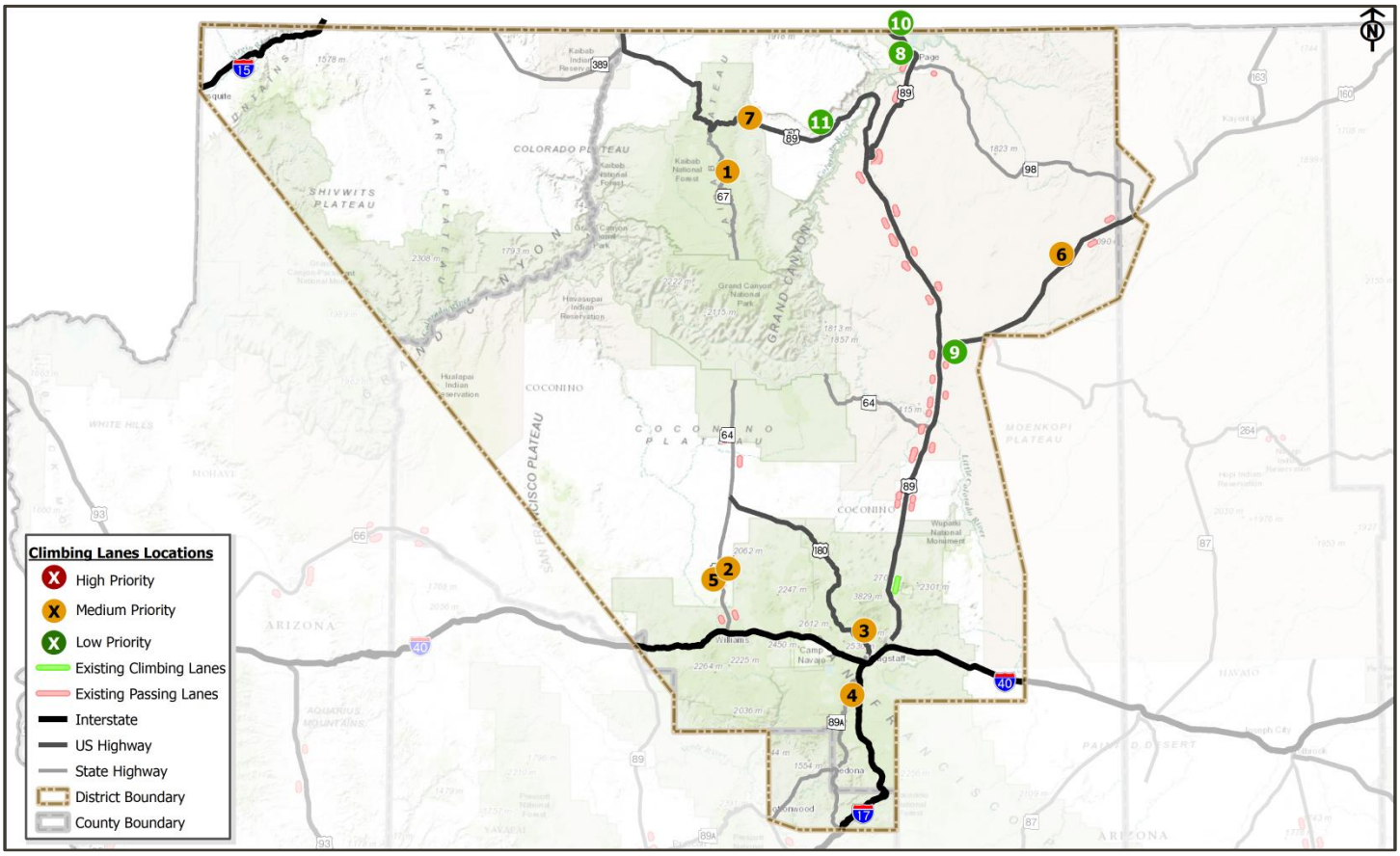


Figure 7.3: Climbing Lane (Two-Lane Highways) Rankings – Globe District

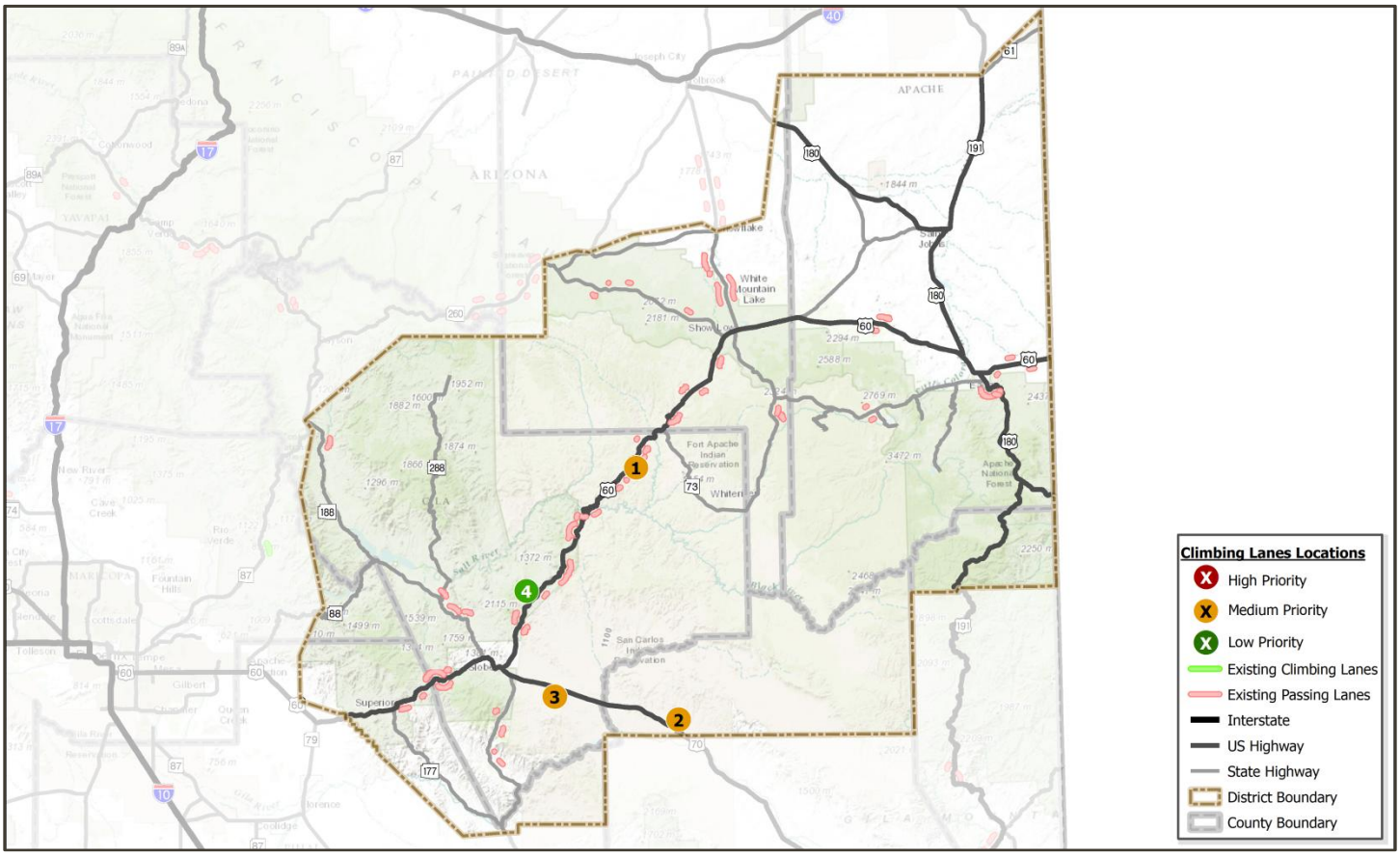


Figure 7.4: Climbing Lane (Two-Lane Highways) Rankings – Holbrook District

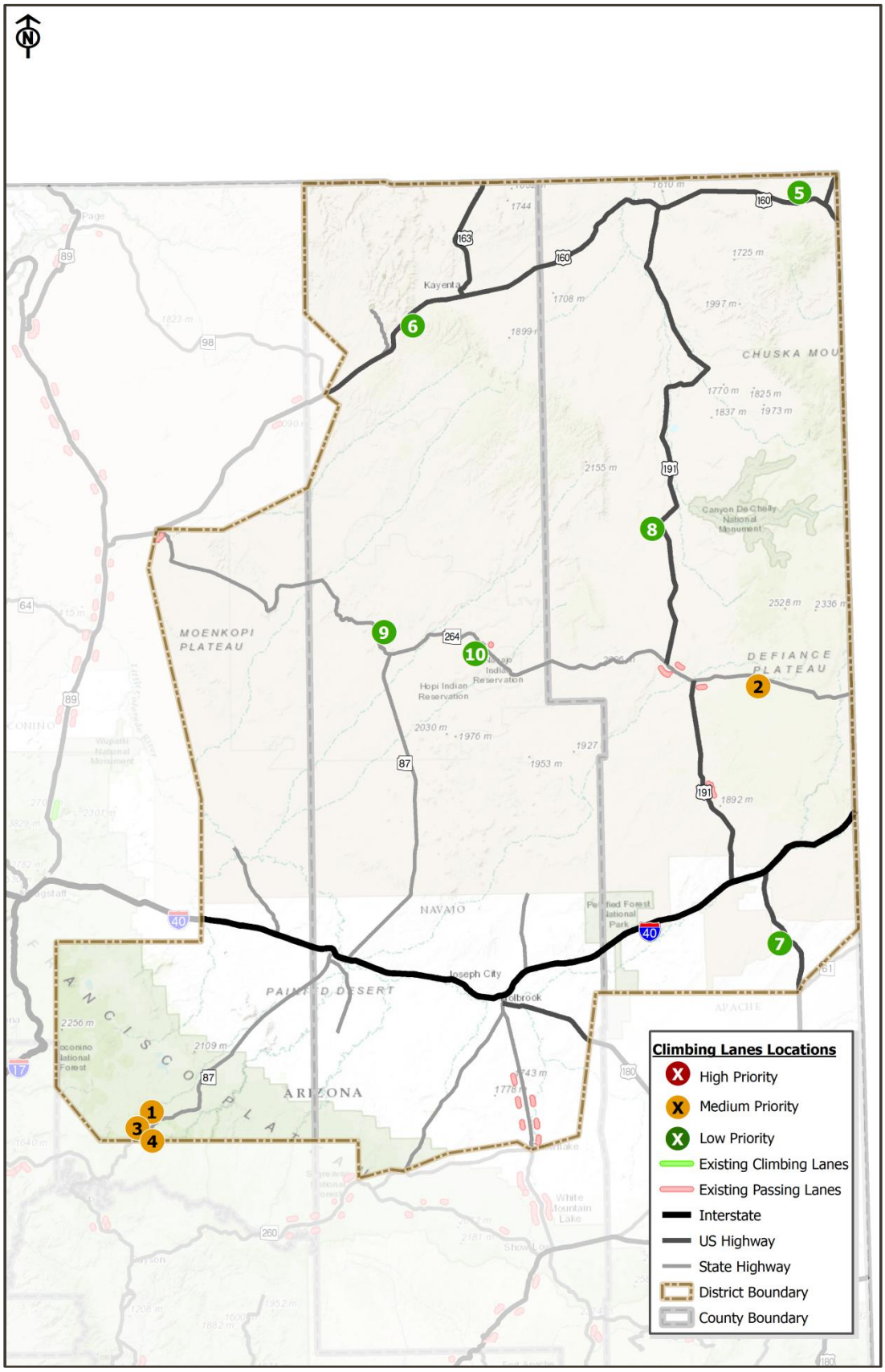


Figure 7.5: Climbing Lane (Two-Lane Highways) Rankings – Kingman District

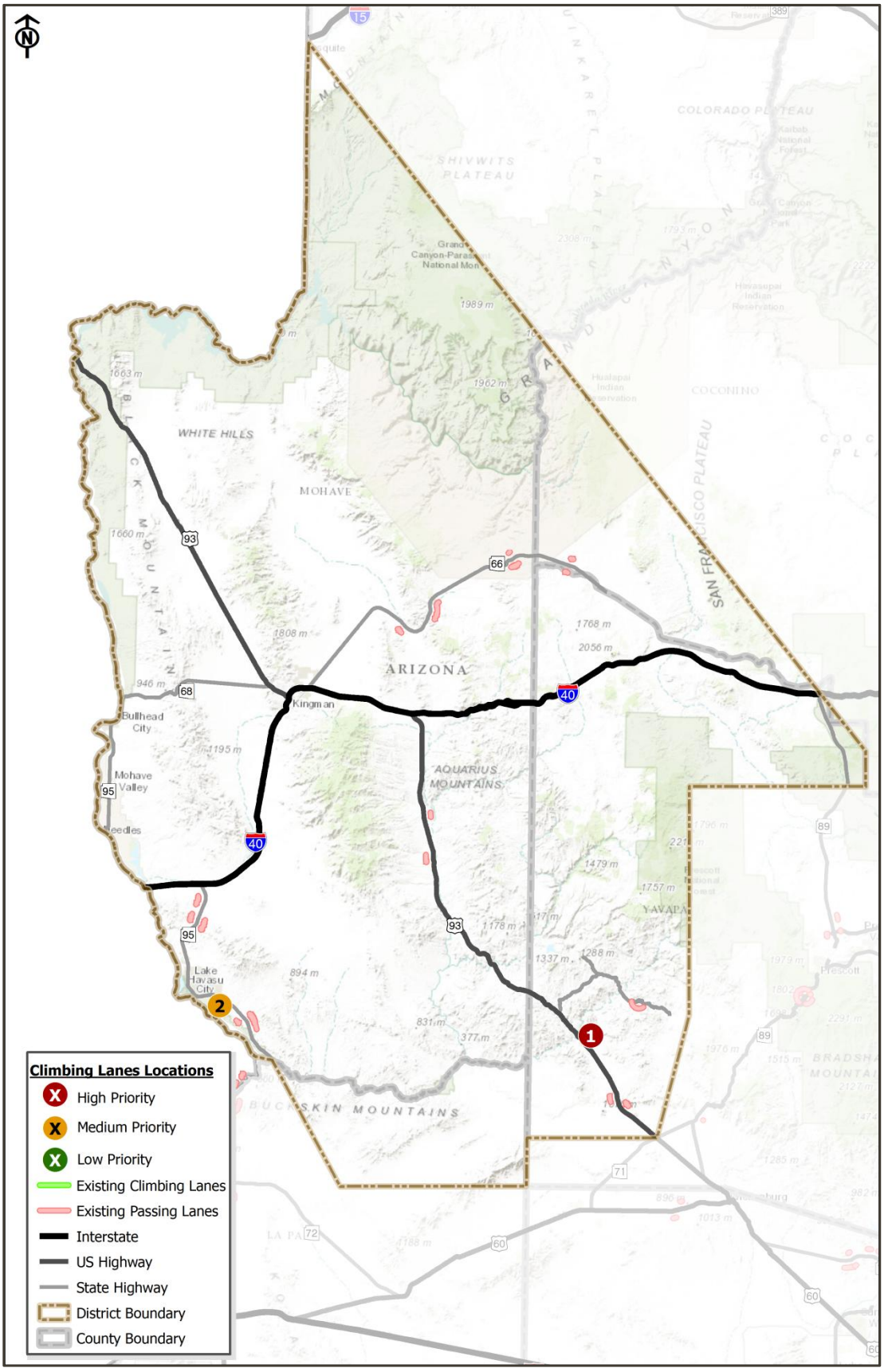


Figure 7.6: Climbing Lane (Two-Lane Highways) Rankings – Prescott District

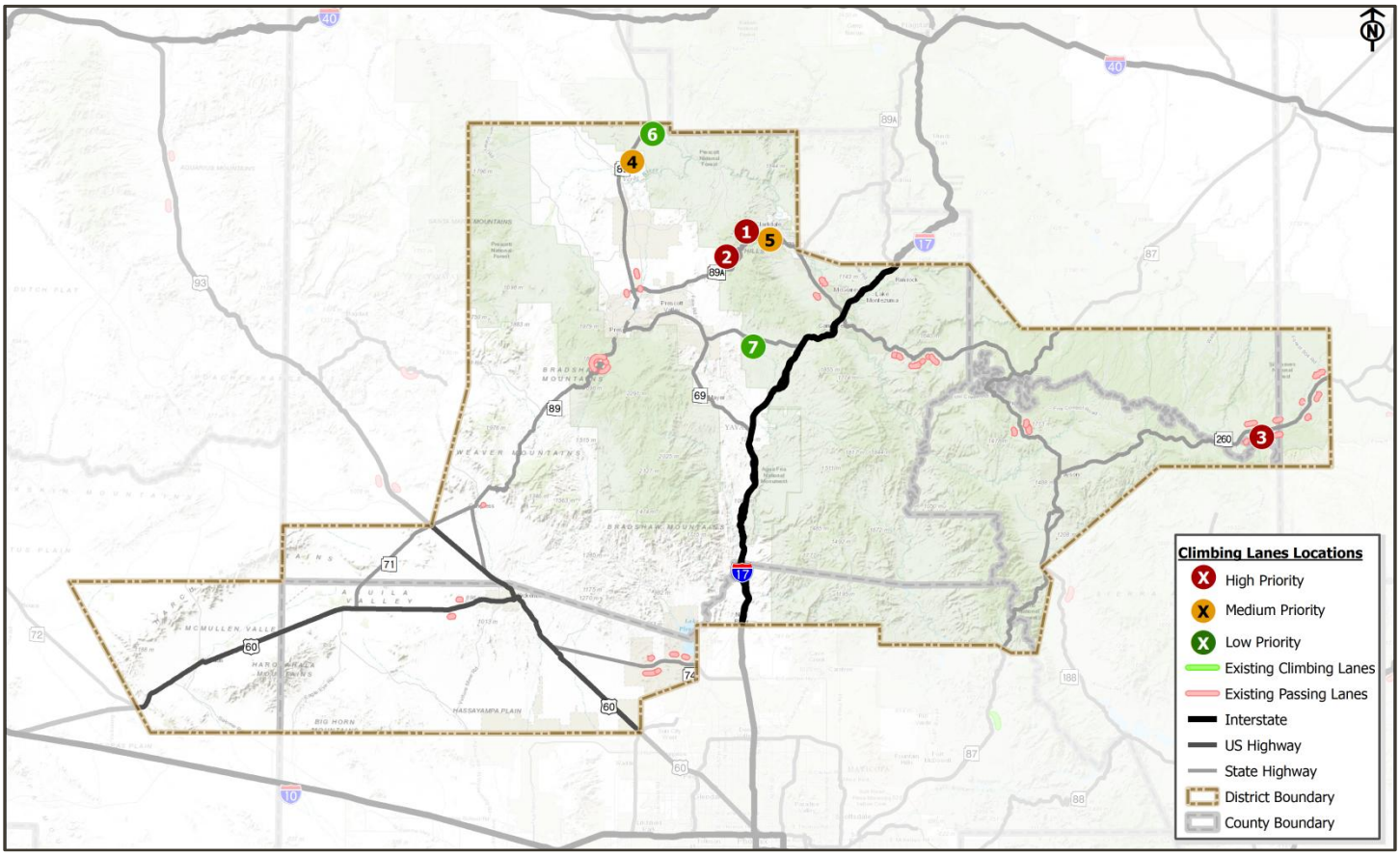


Figure 7.7: Climbing Lane (Two-Lane Highways) Rankings – Safford District

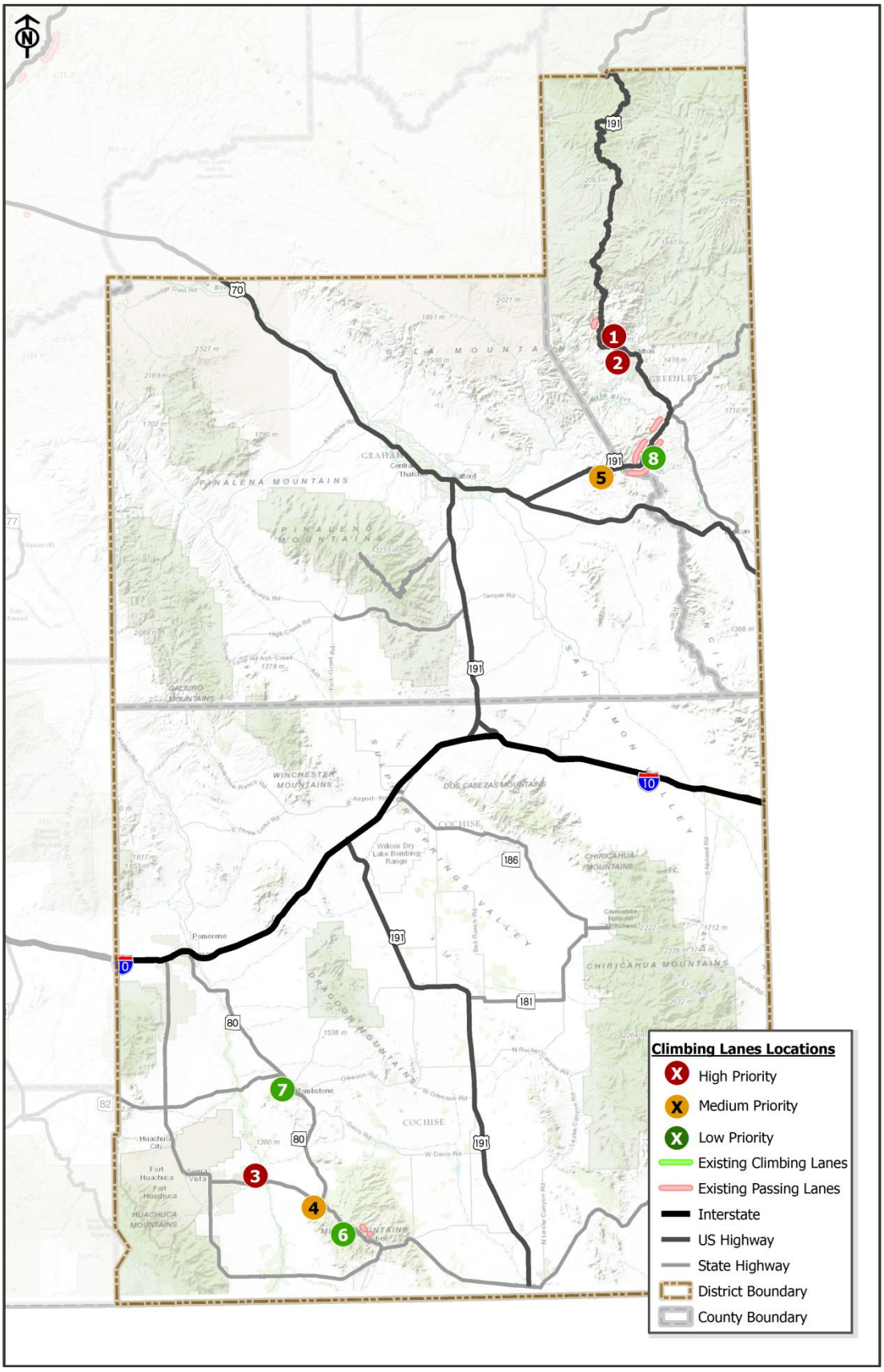
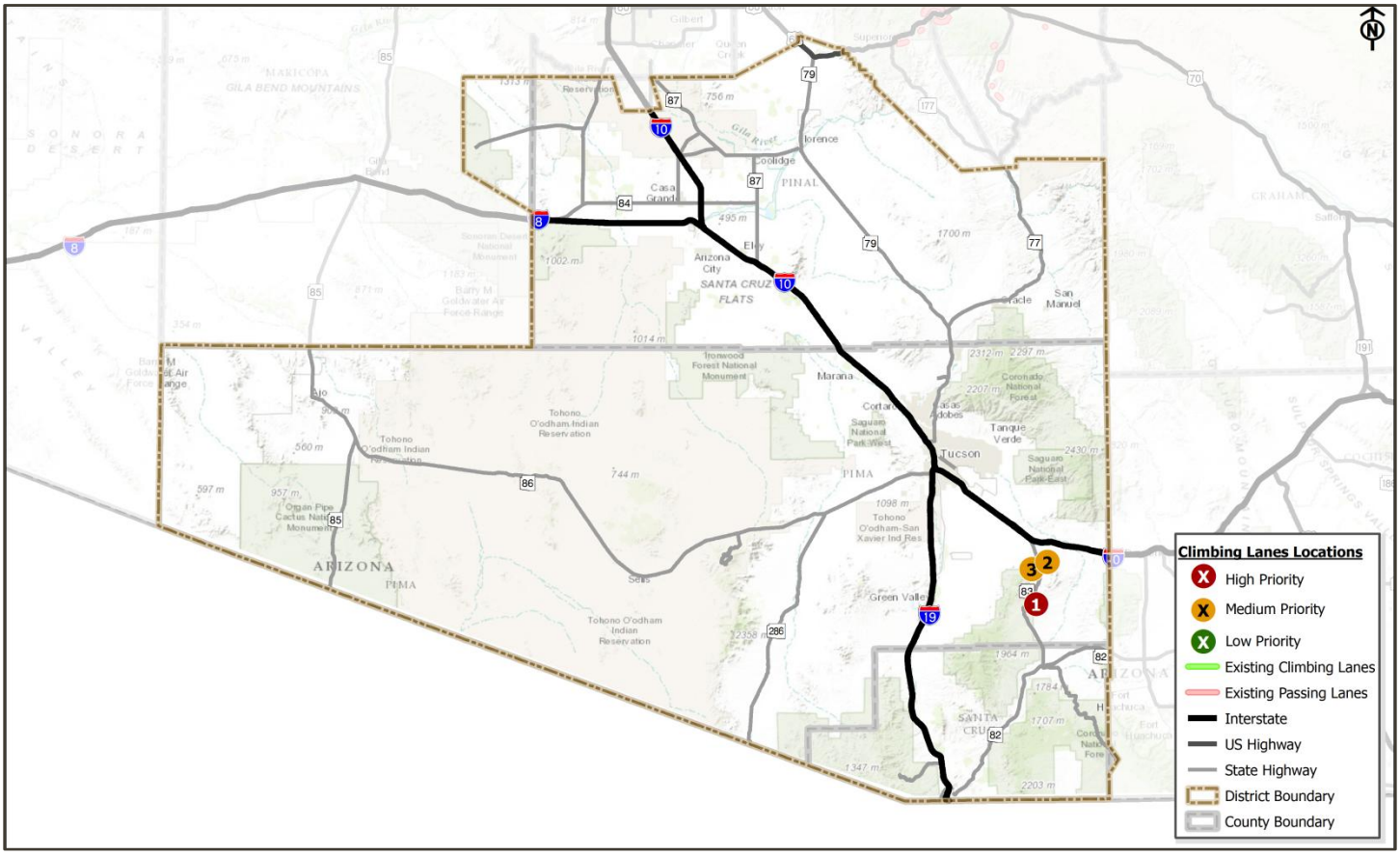


Figure 7.8: Climbing Lane (Two-Lane Highways) Rankings – Tucson District



SA 89 SB: MP 339 - MP 343 Climbing Lane (Two-Lane Highways) Statewide Rank: 1

Project Details

Route: SA089 **Direction:** SB
BMP: 339 **EMP:** 343
District: Prescott **County:** Yavapai
Ranking: 1 **Tier:** 1

Roadway Characteristics

Terrain/Max Slope: 5.64 **K-Factor:** 0.1
Speed Limit (MPH): 30 **Directional Split:** 58/42
Existing AADT: 1,520 **Future AADT:** 2,100
Existing LOS: C **Future LOS:** D
Truck %: 11%

Safety Analysis

Total Number of Crashes	37
Number of Fatal Crashes	0
Injury & Possible Injury Crashes	17
Non-Injury Crashes	20
Average Crash Rate	8.89 *per million vehicle miles traveled*
Equivalent Property Damage Value	96

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Major rockslide cliffs against road

General Location Assessment: Uphill, very curvy with very limited passing opportunities before/during/after. High crashes

Number of Bridges:
Cost to Widen Bridges: $0.00

Environmental Overview

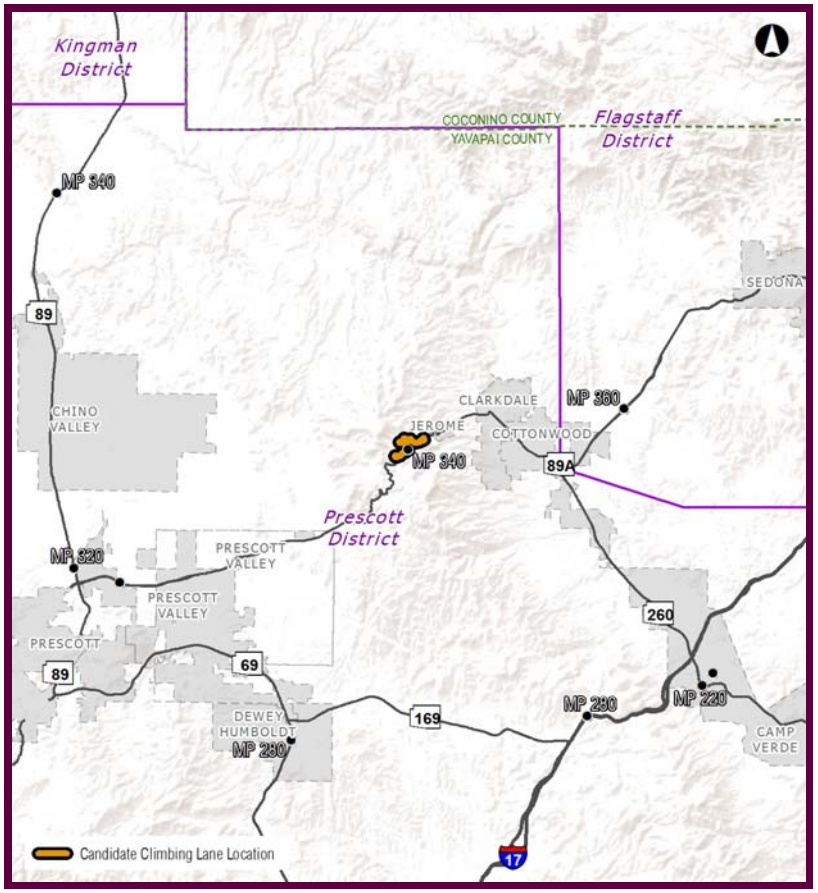
Land Ownership: Private Land; Prescott N.F

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands

Cultural Resources

Number of Cultural Sites: 3
Eligible Sites (AZSITE): 3
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 9
Cultural Resource Density: Low





SR 83 NB: MP 43 - MP 49 Climbing Lane (Two-Lane Highways) Statewide Rank: 2

Project Details

Route: S 083 **Direction:** NB
BMP: 43 **EMP:** 49
District: Tucson **County:** Pima
Ranking: 2 **Tier:** 1

Roadway Characteristics

Terrain/Max Slope: 6.24 **K-Factor:** 0.15
Speed Limit (MPH): 45 **Directional Split:** 76/24
Existing AADT: 2,009 **Future AADT:** 2,900
Existing LOS: C **Future LOS:** C
Truck %: 7%

Safety Analysis

Total Number of Crashes 33
Number of Fatal Crashes 1
Injury & Possible Injury Crashes 22
Non-Injury Crashes 10
Average Crash Rate 6.00 *per million vehicle miles traveled*
Equivalent Property Damage Value 117

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Minor hillside cliffs that need to be cut into

General Location Assessment: Long, curvy incline that would benefit from climbing lane

Number of Bridges:
Cost to Widen Bridges: $0.00

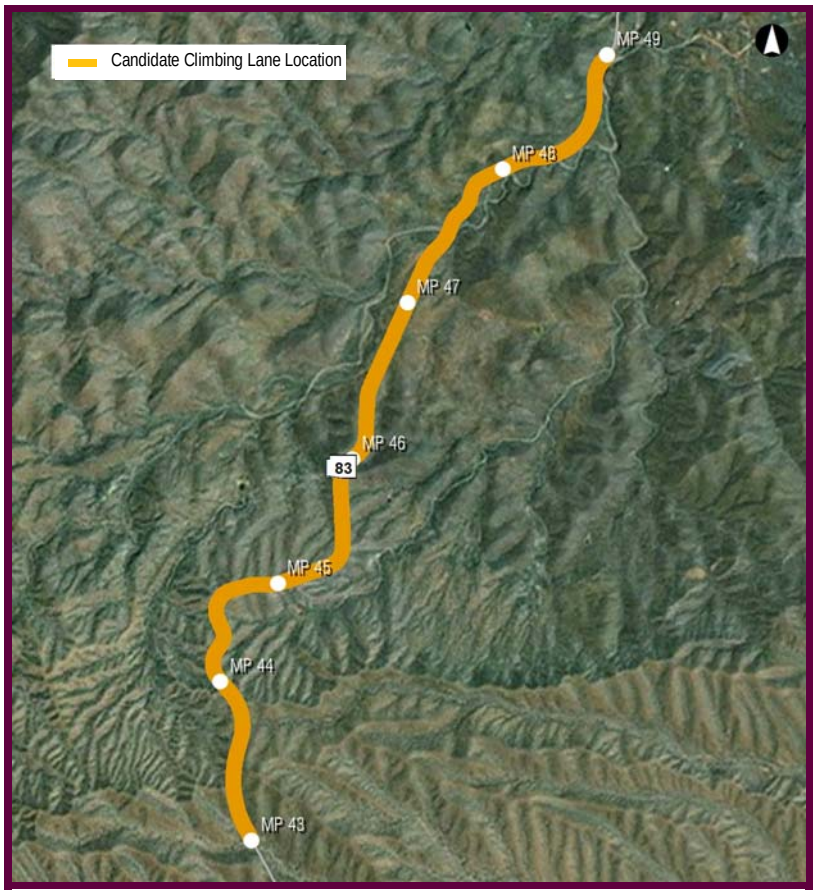
Environmental Overview

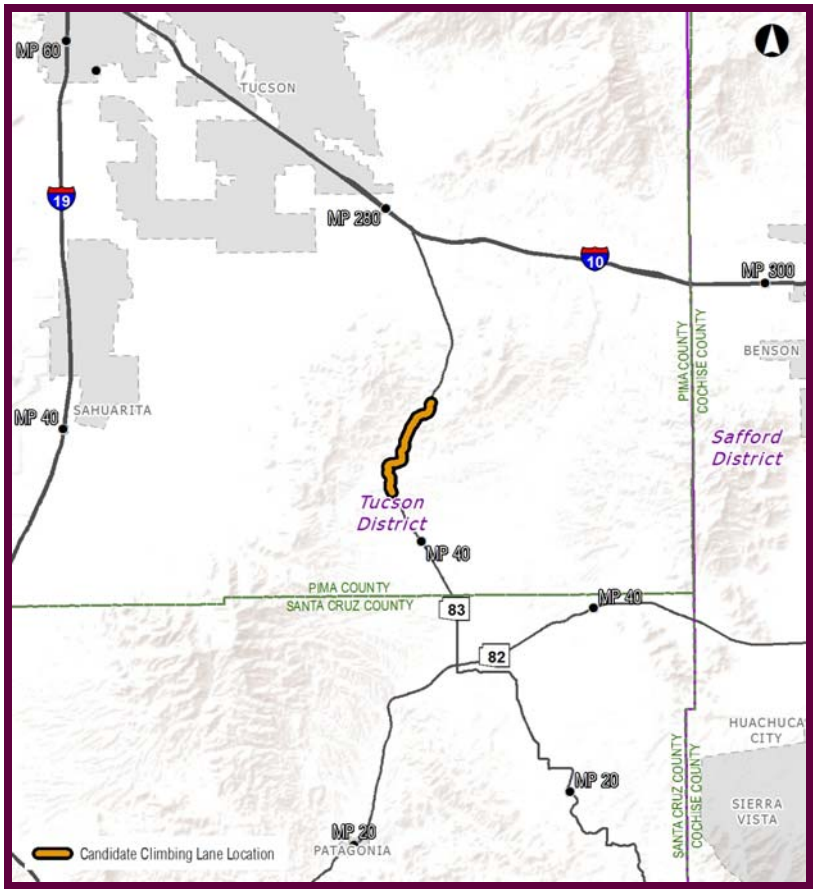
Land Ownership: Private Land; State Trust Land; Coronado N.F

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; 100-Year Floodplain

Cultural Resources

Number of Cultural Sites: 32
Eligible Sites (AZSITE): 17
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 53
Cultural Resource Density: High





UX 191 NB: MP 168 - MP 171 Climbing Lane (Two-Lane Highways) Statewide Rank: 3

Project Details

Route: UX191	**Direction:** NB
BMP: 168	**EMP:** 171
District: Safford	**County:** Greenlee
Ranking: 3	**Tier:** 1

Roadway Characteristics

Terrain/Max Slope: 7.46	**K-Factor:** 0.18
Speed Limit (MPH): 40	**Directional Split:** 65/35
Existing AADT: 5,184	**Future AADT:** 3,425
Existing LOS: E	**Future LOS:** E
Truck %: 14%	

Safety Analysis

Total Number of Crashes	27
Number of Fatal Crashes	2
Injury & Possible Injury Crashes	6
Non-Injury Crashes	19
Average Crash Rate	1.90 *per million vehicle miles traveled*
Equivalent Property Damage Value	68

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Steep shoulder drop off, intersection

General Location Assessment: Passing areas are minimal

Number of Bridges:

Cost to Widen Bridges: $0.00

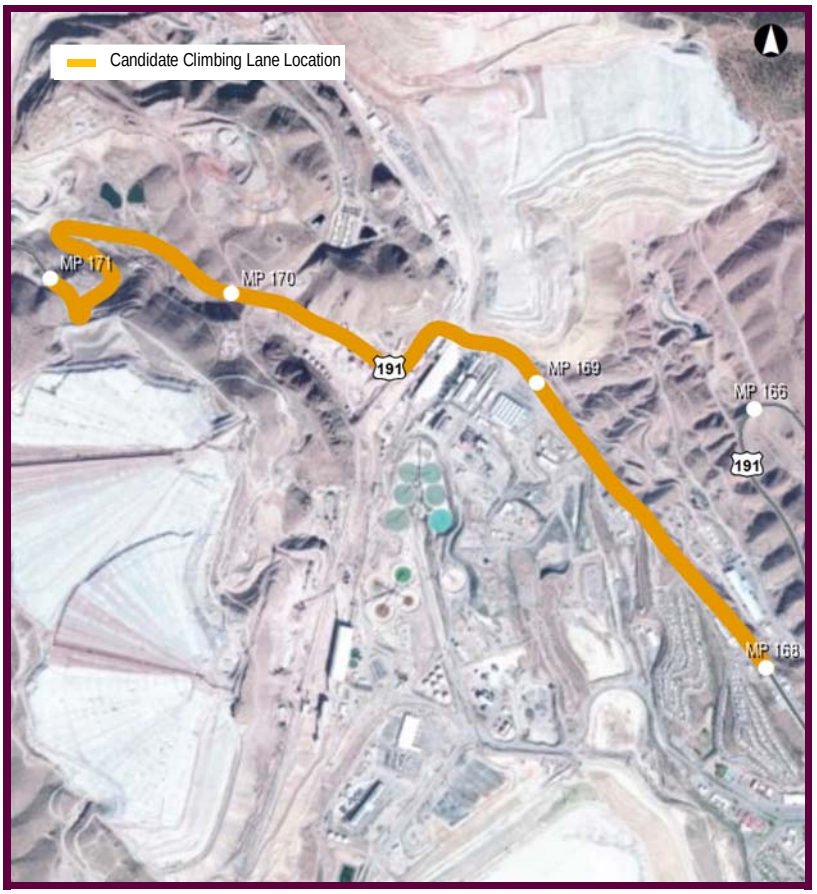
Environmental Overview

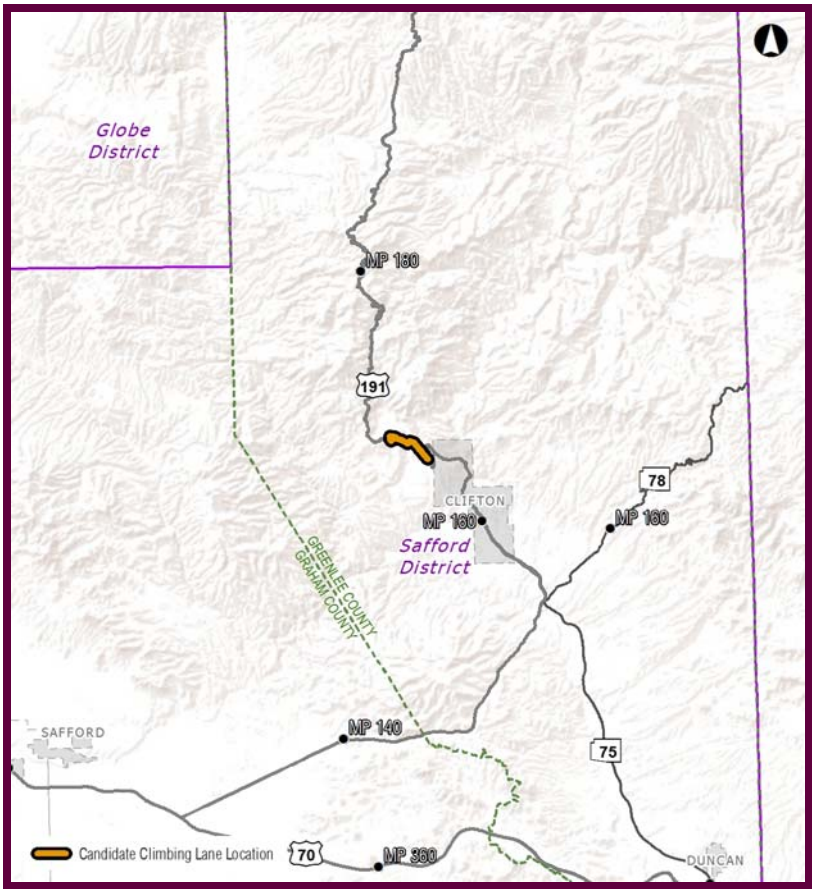
Land Ownership: Private Land

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Leaking Underground Storage Tank; Sulfur Dioxide Maintenance Area;

Cultural Resources

Number of Cultural Sites:	9
Eligible Sites (AZSITE):	3
Potential 4(f) Sites (AZSITE):	1
No. of Land Agencies (0.5 mile):	1
Total Cultural Sites:	14
Cultural Resource Density:	Low





SA 89 NB: MP 334 - MP 336 Climbing Lane (Two-Lane Highways) Statewide Rank: 4

Project Details

Route: SA089 Direction: NB
BMP: 334 EMP: 336
District: Prescott County: Yavapai
Ranking: 4 Tier: 1

Roadway Characteristics

Terrain/Max Slope: 6.13 K-Factor: 0.1
Speed Limit (MPH): 30 Directional Split: 58/42
Existing AADT: 1,520 Future AADT: 2,100
Existing LOS: D Future LOS: D
Truck %: 11%

Safety Analysis

Total Number of Crashes 28
Number of Fatal Crashes 1
Injury & Possible Injury Crashes 10
Non-Injury Crashes 17
Average Crash Rate 6.73 *per million vehicle miles traveled*
Equivalent Property Damage Value 70

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: steep downhill slope off shoulder

General Location Assessment: Uphill, very curvy with very limited passing opportunities before/during/after. High Crashes

Number of Bridges:
Cost to Widen Bridges: $0.00

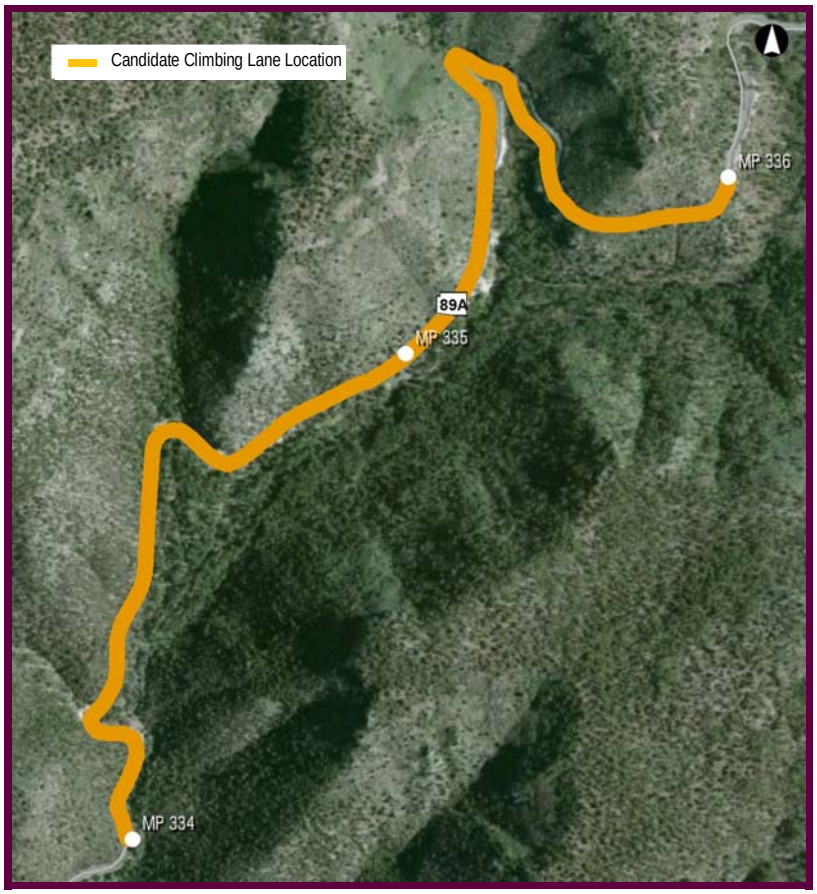
Environmental Overview

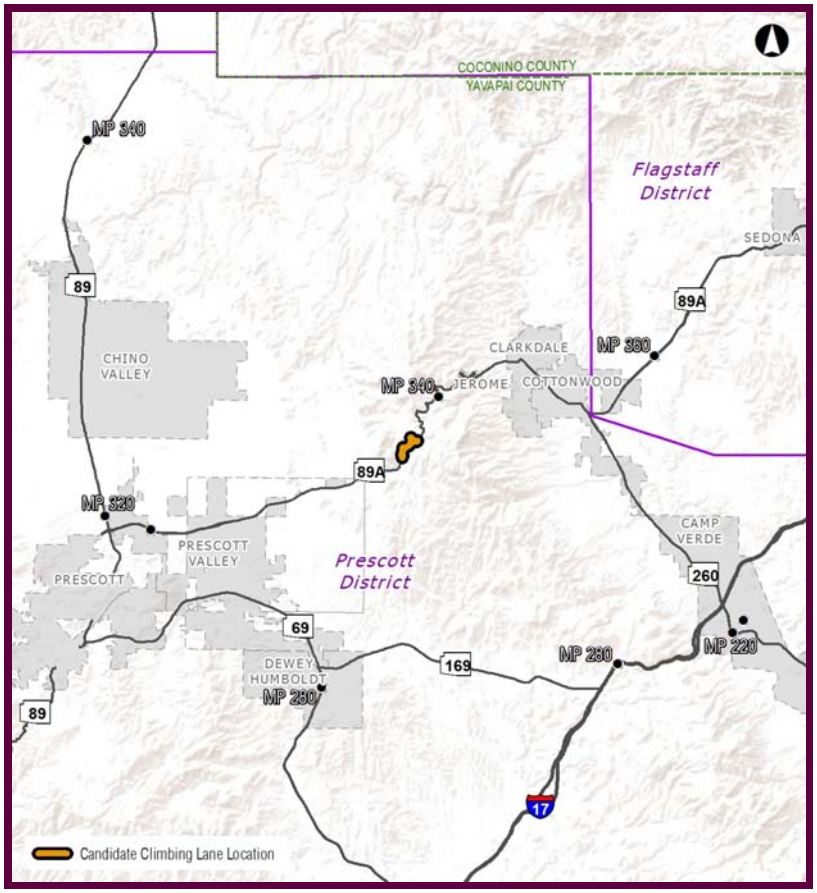
Land Ownership: Prescott N.F

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage

Cultural Resources

Number of Cultural Sites: 3
Eligible Sites (AZSITE): 3
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 1
Total Cultural Sites: 7
Cultural Resource Density: Low





UX 191 SB: MP 169 - MP 167 Climbing Lane (Two-Lane Highways) Statewide Rank: 5

Project Details

Route: UX191
Direction: SB
BMP: 169
EMP: 167
District: Safford
County: Greenlee
Ranking: 5
Tier: 1

Roadway Characteristics

Terrain/Max Slope: 5.71
K-Factor: 0.1
Speed Limit (MPH): 40
Directional Split: 71/30
Existing AADT: 7,753
Future AADT: 7,500
Existing LOS: E
Future LOS: E
Truck %: 14%

Safety Analysis

Total Number of Crashes: 20
Number of Fatal Crashes: 2
Injury & Possible Injury Crashes: 3
Non-Injury Crashes: 15
Average Crash Rate: 0.94 *per million vehicle miles traveled*
Equivalent Property Damage Value: 50

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Intersections, adjacent buildings

General Location Assessment: Passing areas are minimal

Number of Bridges:
Cost to Widen Bridges: $0.00

Environmental Overview

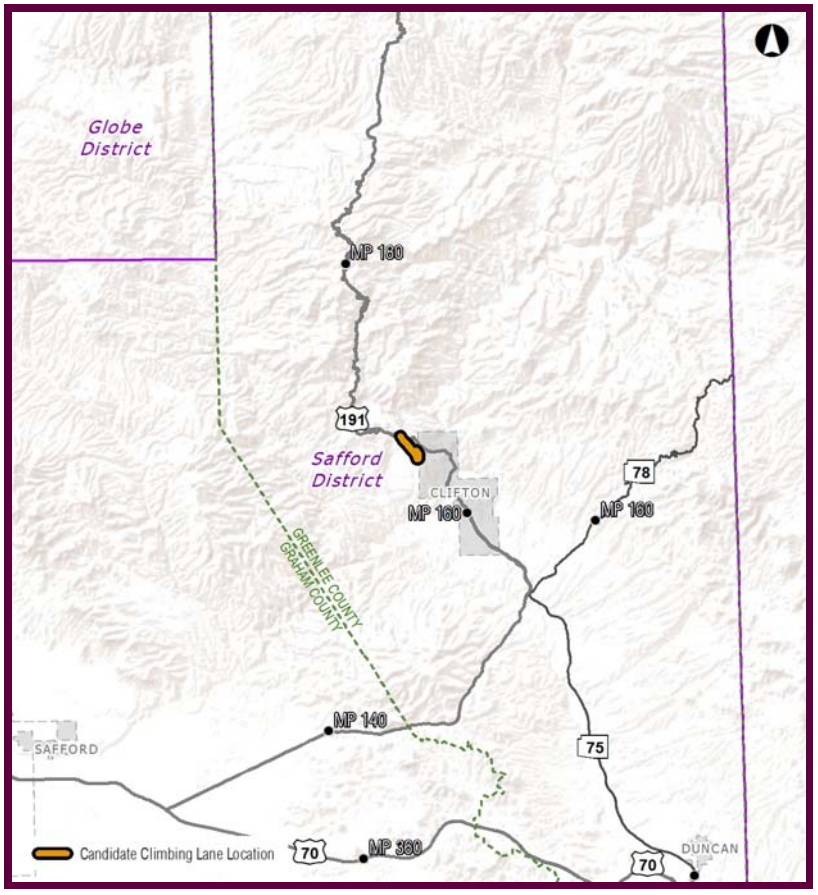
Land Ownership: Private Land

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Leaking Underground Storage Tank; Sulfur Dioxide Maintenance Area;

Cultural Resources

Number of Cultural Sites: 6
Eligible Sites (AZSITE): 3
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 1
Total Cultural Sites: 11
Cultural Resource Density: Low





SR 90 WB: MP 329 - MP 327 Climbing Lane (Two-Lane Highways) Statewide Rank: 6

Project Details

Route: S 090	**Direction:** WB
BMP: 329	**EMP:** 327
District: Safford	**County:** Cochise
Ranking: 6	**Tier:** 1

Roadway Characteristics

Terrain/Max Slope: 4.92	**K-Factor:** 0.1
Speed Limit (MPH): 65	**Directional Split:** 65/35
Existing AADT: 4,066	**Future AADT:** 5,600
Existing LOS: C	**Future LOS:** D
Truck %: 9%	

Safety Analysis

Total Number of Crashes	15
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	5
Non-Injury Crashes	9
Average Crash Rate	1.35 *per million vehicle miles traveled*
Equivalent Property Damage Value	42

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints

General Location Assessment: Passing areas are minimal

Number of Bridges:

Cost to Widen Bridges: $0.00

Environmental Overview

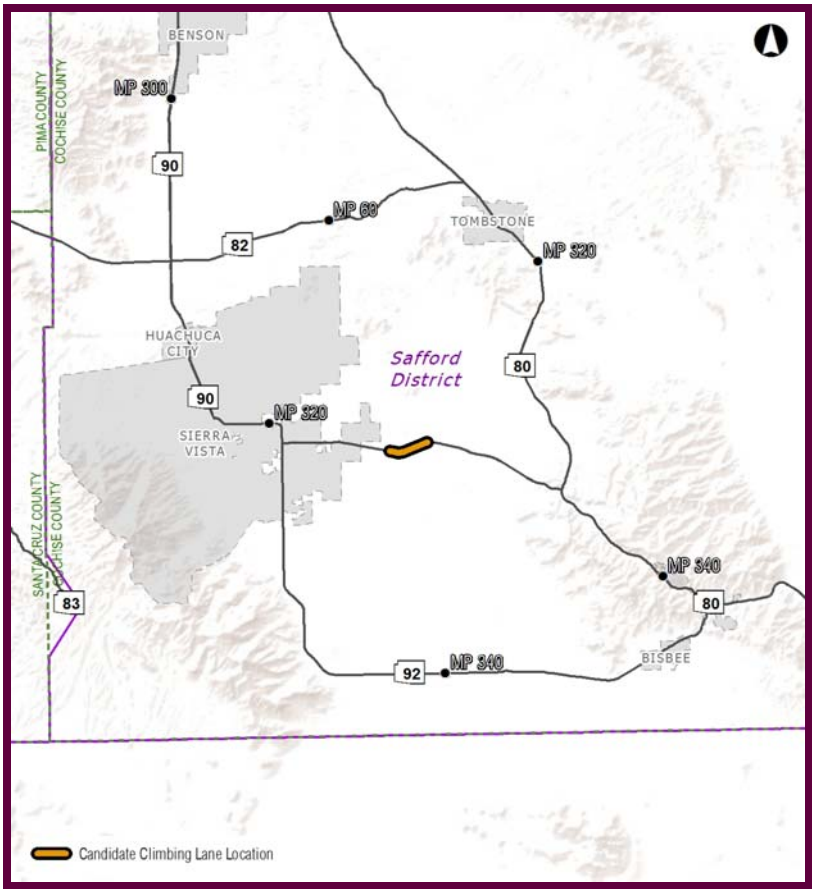
Land Ownership: Private Land; State Trust Land; Bureau of Land Mgmt.

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: San Pedro Riparian NCA; Riparian Area - Cottonwood Willow; Riparian Area - Mesquite; San Pedro River impaired stream; Wetlands; 100-Year Floodplain; BLM VRM Class I, Class II, and Class III

Cultural Resources

Number of Cultural Sites:	14
Eligible Sites (AZSITE):	6
Potential 4(f) Sites (AZSITE):	0
No. of Land Agencies (0.5 mile):	2
Total Cultural Sites:	22
Cultural Resource Density:	Medium





SR 260 EB: MP 288 - MP 289 Climbing Lane (Two-Lane Highways) Statewide Rank: 7

Project Details

Route: S 260	**Direction:** EB
BMP: 288	**EMP:** 289
District: Prescott	**County:** Coconino
Ranking: 7	**Tier:** 1

Roadway Characteristics

Terrain/Max Slope: 2.89	**K-Factor:** 0.1
Speed Limit (MPH): 50	**Directional Split:** 51/49
Existing AADT: 3,747	**Future AADT:** 6,900
Existing LOS: C	**Future LOS:** C
Truck %: 13%	

Safety Analysis

Total Number of Crashes	30
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	5
Non-Injury Crashes	24
Average Crash Rate	2.92 *per million vehicle miles traveled*
Equivalent Property Damage Value	54

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints

General Location Assessment: Gradual incline, but very limited passing opportunities before / during / after

Number of Bridges:

Cost to Widen Bridges: $0.00

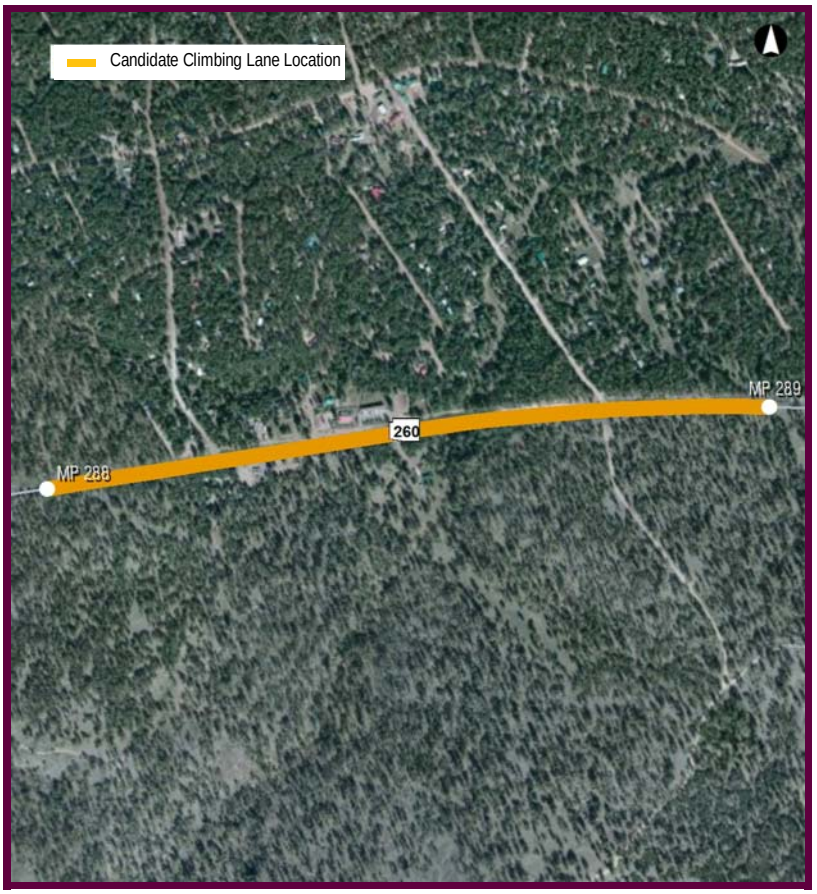
Environmental Overview

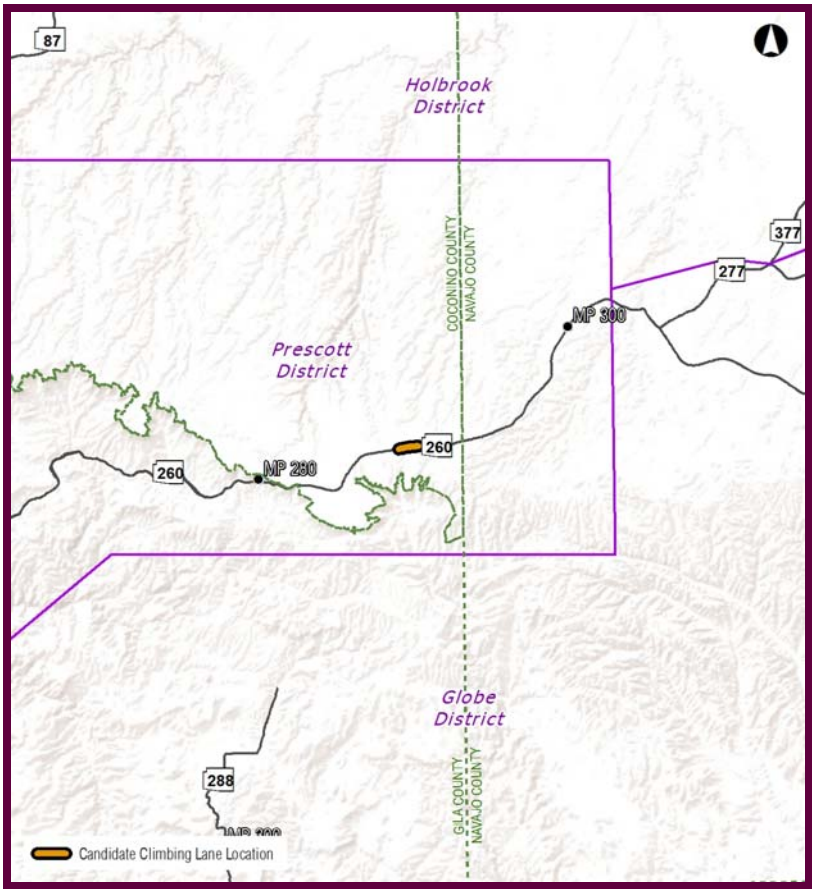
Land Ownership: Private Land; Apache-Sitgreaves N.F

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Leaking Underground Storage Tank

Cultural Resources

Number of Cultural Sites:	2
Eligible Sites (AZSITE):	2
Potential 4(f) Sites (AZSITE):	1
No. of Land Agencies (0.5 mile):	2
Total Cultural Sites:	7
Cultural Resource Density:	Low





US 93 SB: MP 161 - MP 163 Climbing Lane (Two-Lane Highways) Statewide Rank: 8

Project Details

Route: U 093 **Direction:** SB
BMP: 161 **EMP:** 163
District: Kingman **County:** Yavapai
Ranking: 8 **Tier:** 1

Roadway Characteristics

Terrain/Max Slope: 3.59 **K-Factor:** 0.11
Speed Limit (MPH): 65 **Directional Split:** 57/43
Existing AADT: 5,759 **Future AADT:** 6,700
Existing LOS: C **Future LOS:** C
Truck %: 16%

Safety Analysis

Total Number of Crashes	18
Number of Fatal Crashes	1
Injury & Possible Injury Crashes	4
Non-Injury Crashes	13
Average Crash Rate	1.14 *per million vehicle miles traveled*
Equivalent Property Damage Value	41

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: No major physical constraints

General Location Assessment: Large number of trucks and traffic along 93 would benefit from additional passing lanes

Number of Bridges:
Cost to Widen Bridges: $0.00

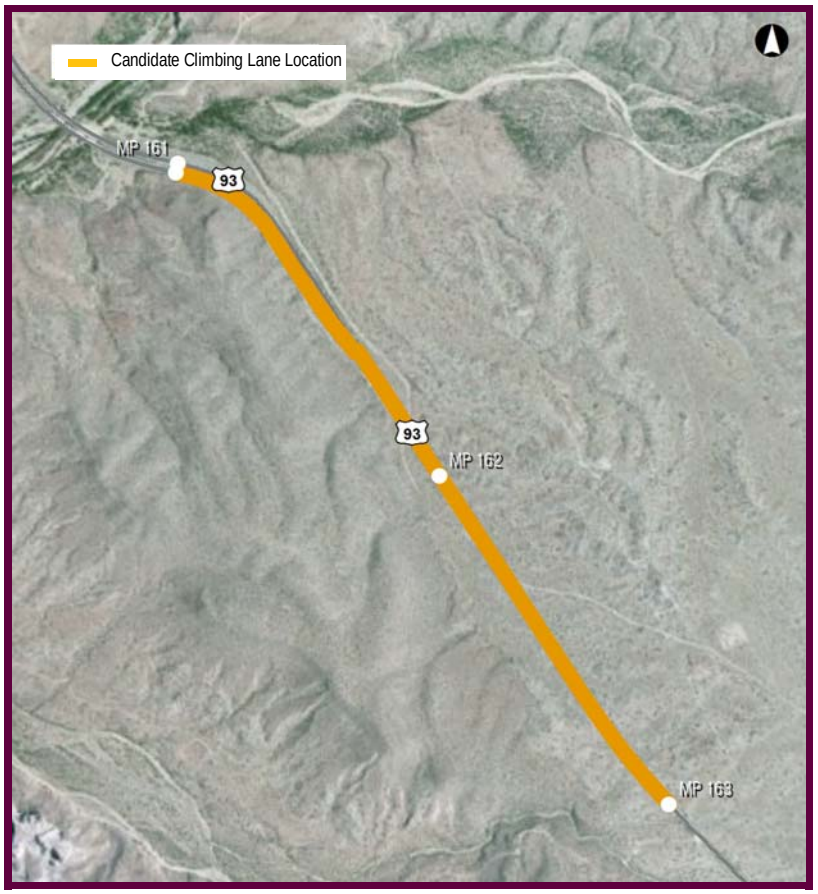
Environmental Overview

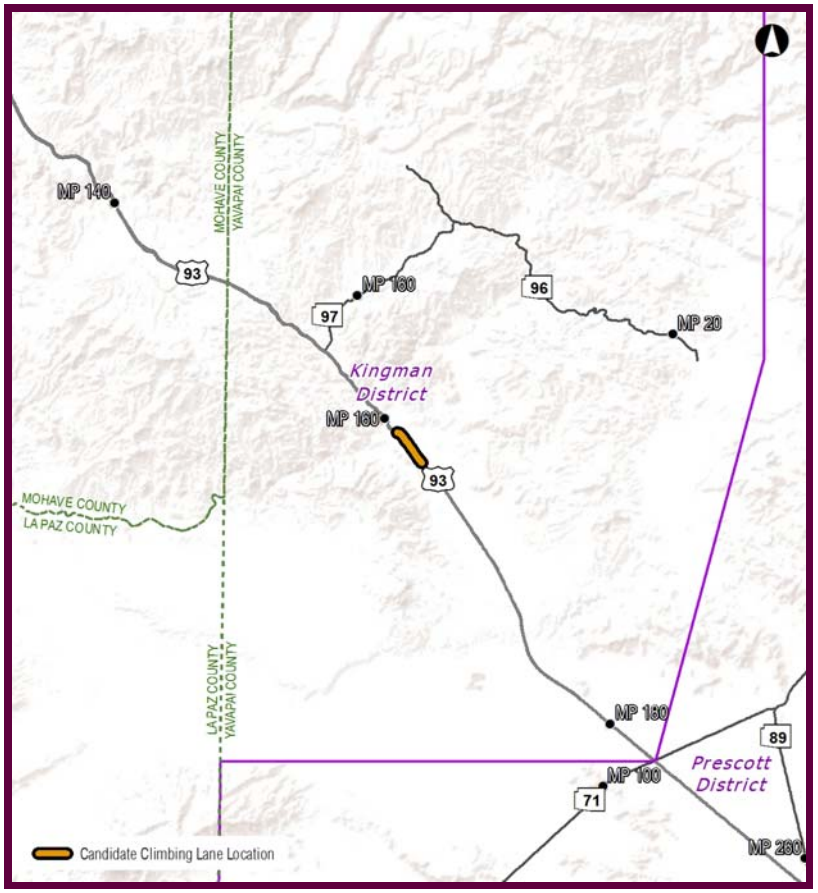
Land Ownership: Private Land; State Trust Land; Bureau of Land Mgmt.

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Riparian Area - Cottonwood Willow; Wetlands; 100-Year Floodplain; Leaking Underground Storage Tank

Cultural Resources

Number of Cultural Sites: 5
Eligible Sites (AZSITE): 4
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 3
Total Cultural Sites: 12
Cultural Resource Density: Low





8. SUMMARY RESULTS – CLIMBING LANES ON MULTILANE HIGHWAYS

Table 8.1 presents the list of candidate locations for climbing lanes on multilane highways. The candidate locations are ranked at the statewide and district level and grouped into three tiers – high, medium, and low priority. Figure 8.1 illustrates the statewide location of the climbing lanes. Figures 8.2 to 8.7 illustrate the climbing lane locations in each District followed by project summary sheets for the Tier 1 locations. Table A3 in Appendix A lists the candidate locations, ranking, tier level, and also includes detailed information about evaluation criteria and scoring.

Locations identified for climbing lanes in Table 8.1 represent only the general problem area and not the exact location and length of the climbing lanes.

Table 8.1: Prioritized List of Climbing Lanes on Multilane Highways

DISTRICT	CLIMBING LANE LOCATION (VICINITY)	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Flagstaff	I 40 EB: MP188 - MP190	32.45	2	1	1
Flagstaff	I 17 NB: MP307 - MP311	27.84	5	2	1
Flagstaff	I 17 SB: MP318 - MP316	24.15	8	3	2
Flagstaff	I 17 NB: MP299 - MP305	24.01	9	4	2
Flagstaff	I 40 WB: MP193 - MP191	20.43	12	5	2
Flagstaff	I 40 EB: MP151 - MP152	19.08	14	6	2
Flagstaff	I 15 NB: MP19 - MP25	18.59	16	7	3
Flagstaff	I 15 SB: MP21 - MP19	16.65	22	8	3
Flagstaff	I 40 EB: MP156 - MP159	14.19	25	9	3
Flagstaff	I 40 WB: MP163 - MP162	13.81	28	10	3
Kingman	I 40 EB: MP47 - MP49	25.35	7	1	2
Kingman	I 40 WB: MP132 - MP136	18.56	17	2	3
Kingman	I 40 EB: MP58 - MP60	17.30	20	3	3
Kingman	I 40 EB: MP81 - MP83	17.24	21	4	3
Kingman	I 40 EB: MP125 - MP128	16.32	23	5	3
Kingman	I 40 EB: MP76 - MP77	14.07	27	6	3
Kingman	I 40 WB: MP115 - MP114	12.09	30	7	3
Kingman	I 40 EB: MP93 - MP97	11.48	31	8	3
Prescott	I 17 NB: MP246 - MP250	33.07	1	1	1
Prescott	I 17 SB: MP281 - MP285	30.12	3	2	1
Prescott	I 17 NB: MP255 - MP256	27.27	6	3	1
Prescott	I 17 SB: MP293 - MP295	21.08	10	4	2
Prescott	I 17 SB: MP284 - MP286	20.19	13	5	2
Prescott	I 17 NB: MP294 - MP298	19.06	15	6	2
Prescott	I 17 SB: MP240 - MP238	17.86	18	7	3
Prescott	I 17 NB: MP270 - MP275	14.09	26	8	3
Safford	I 10 WB: MP306 - MP302	29.51	4	1	1
Safford	I 10 EB: MP315 - MP317	17.55	19	2	3
Safford	I 10 EB: MP309 - MP311	12.10	29	3	3

Table 8.1: Prioritized List of Climbing Lanes on Multilane Highways (Continued)

DISTRICT	CLIMBING LANE LOCATION (VICINITY)	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Tucson	I 10 EB: MP286 - MP291	21.01	11	1	2
Yuma	I 8 EB: MP18 - MP20	15.70	24	1	3

Note:
Statewide Rank = Projects ranking statewide
District Rank = Projects ranking within District only
Tier Level = High, medium, and low priority

Figure 8.1: Statewide Ranking of Climbing Lanes on Multilane Highways

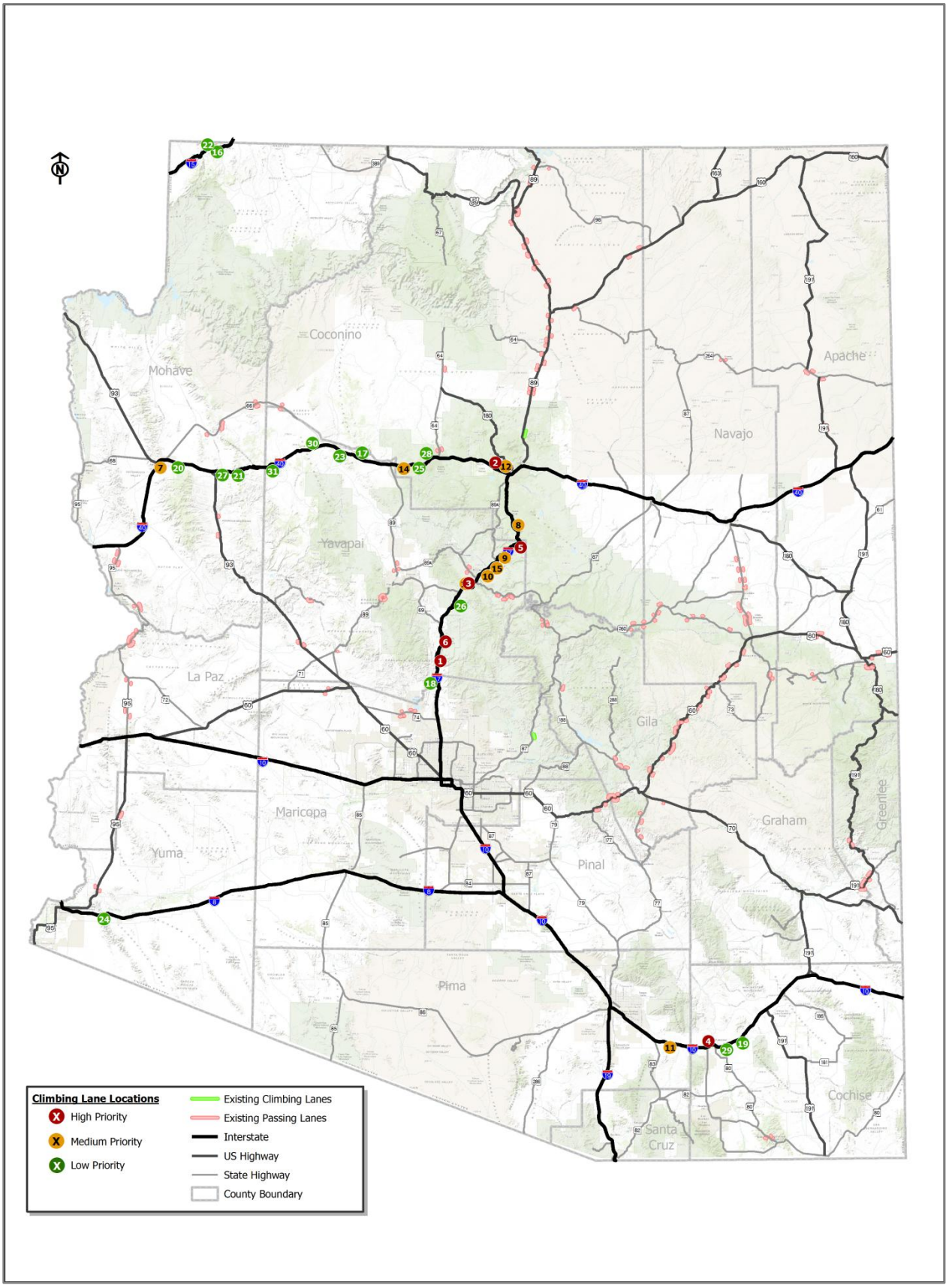


Figure 8.2: Climbing Lane (Multilane Highways) Rankings – Flagstaff District

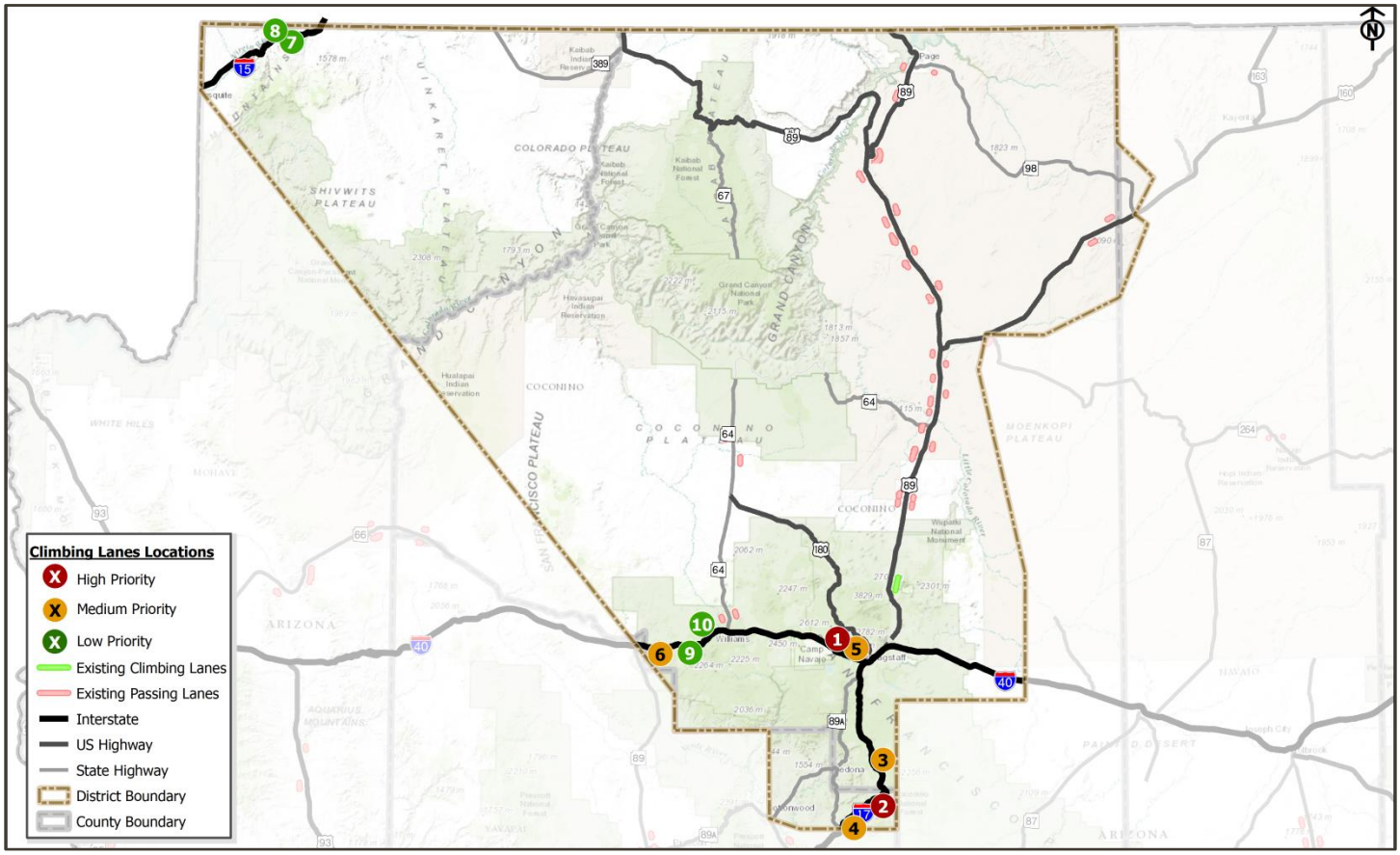


Figure 8.3: Climbing Lane (Multilane Highways) Rankings – Kingman District

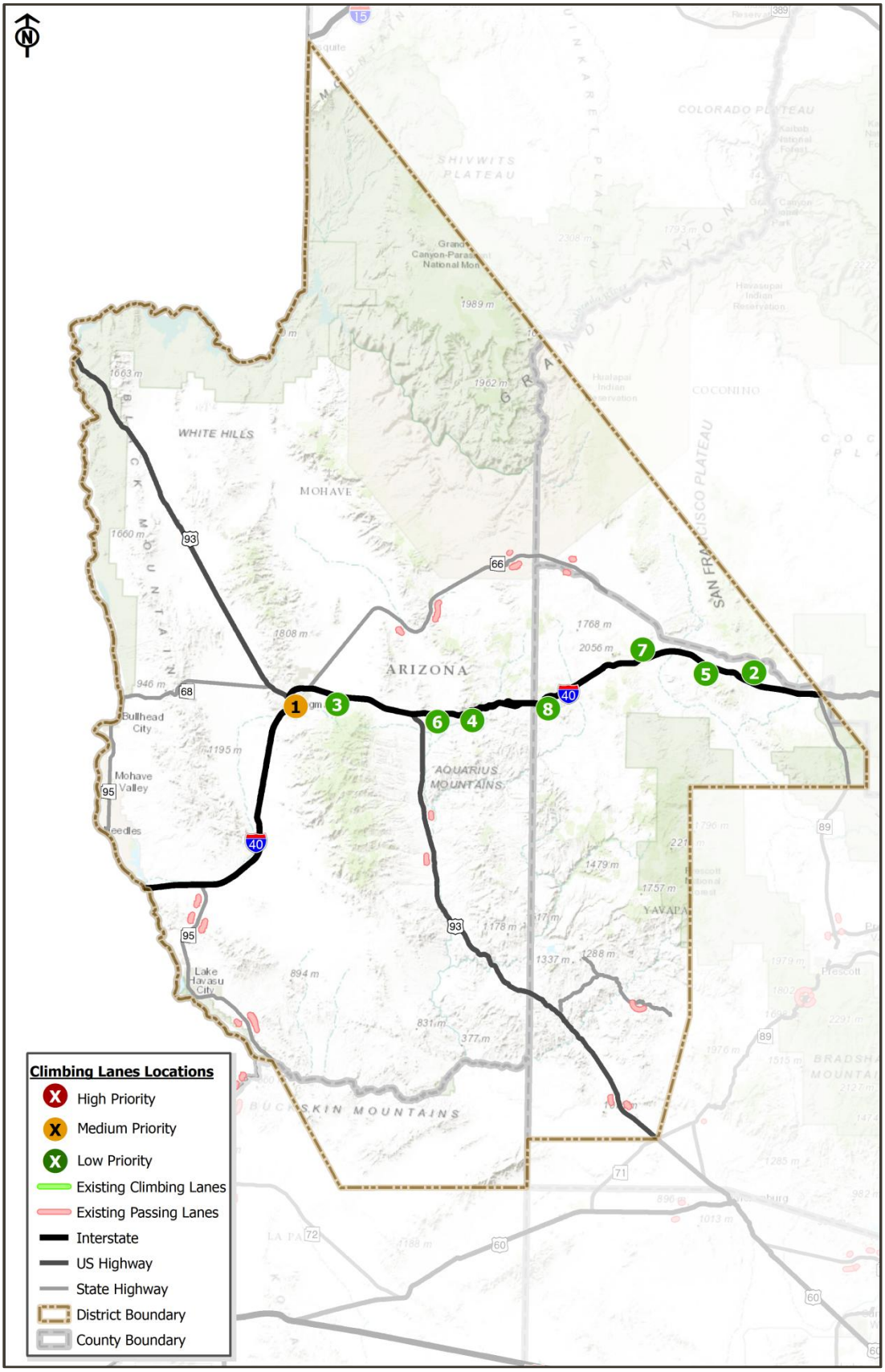


Figure 8.4: Climbing Lane (Multilane Highways) Rankings – Prescott District

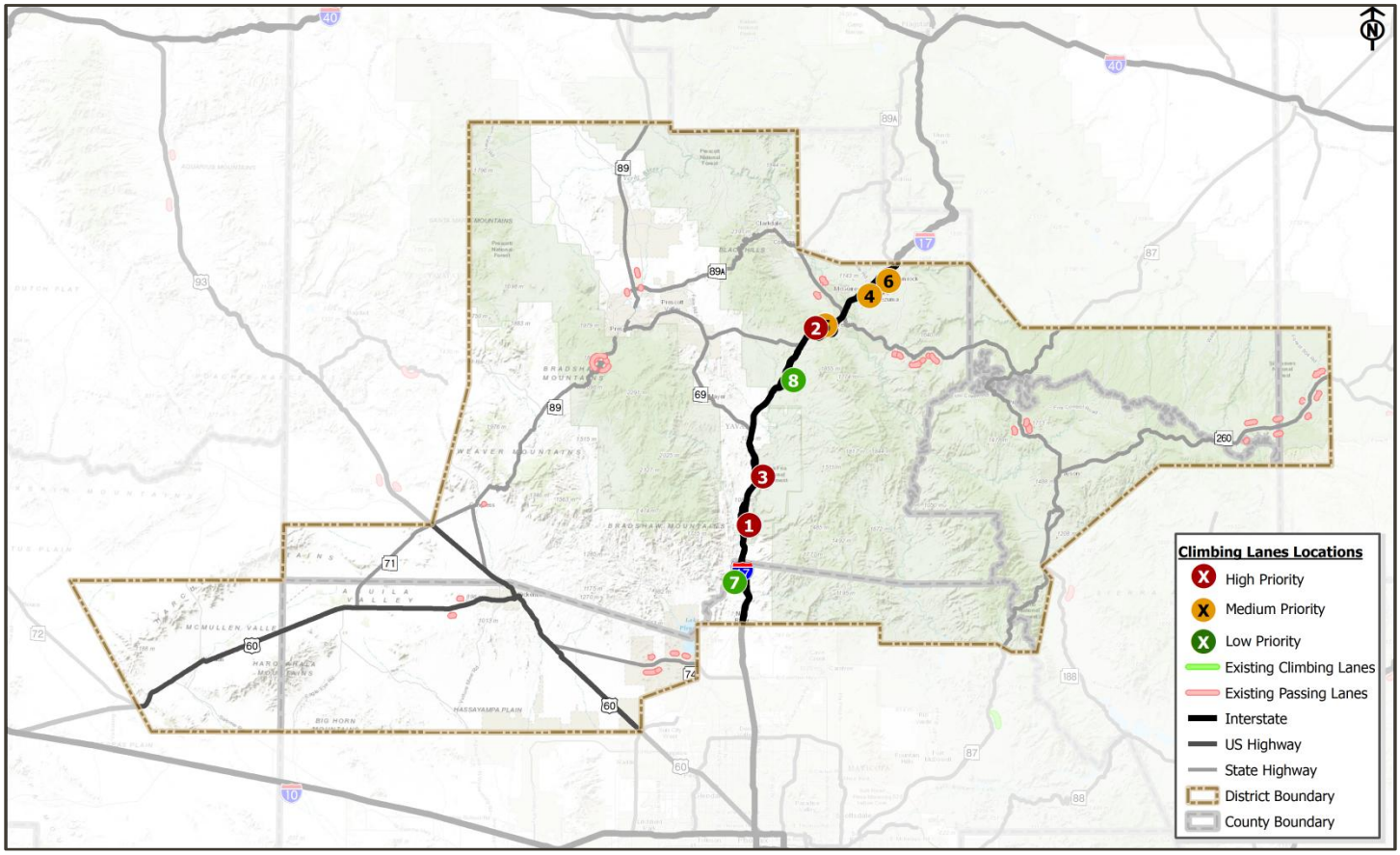


Figure 8.5: Climbing Lane (Multilane Highways) Rankings – Safford District

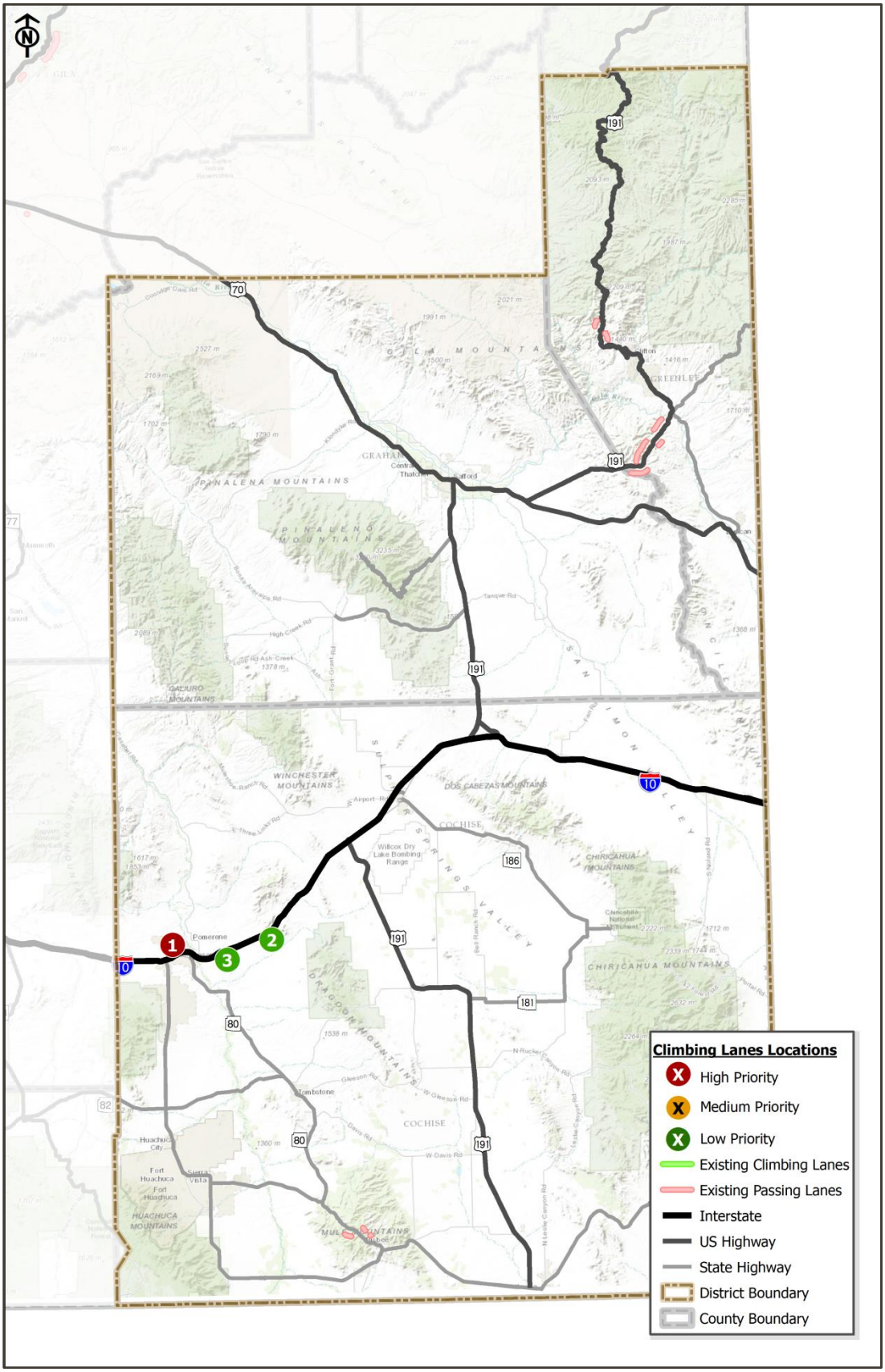


Figure 8.6: Climbing Lane (Multilane Highways) Rankings – Tucson District

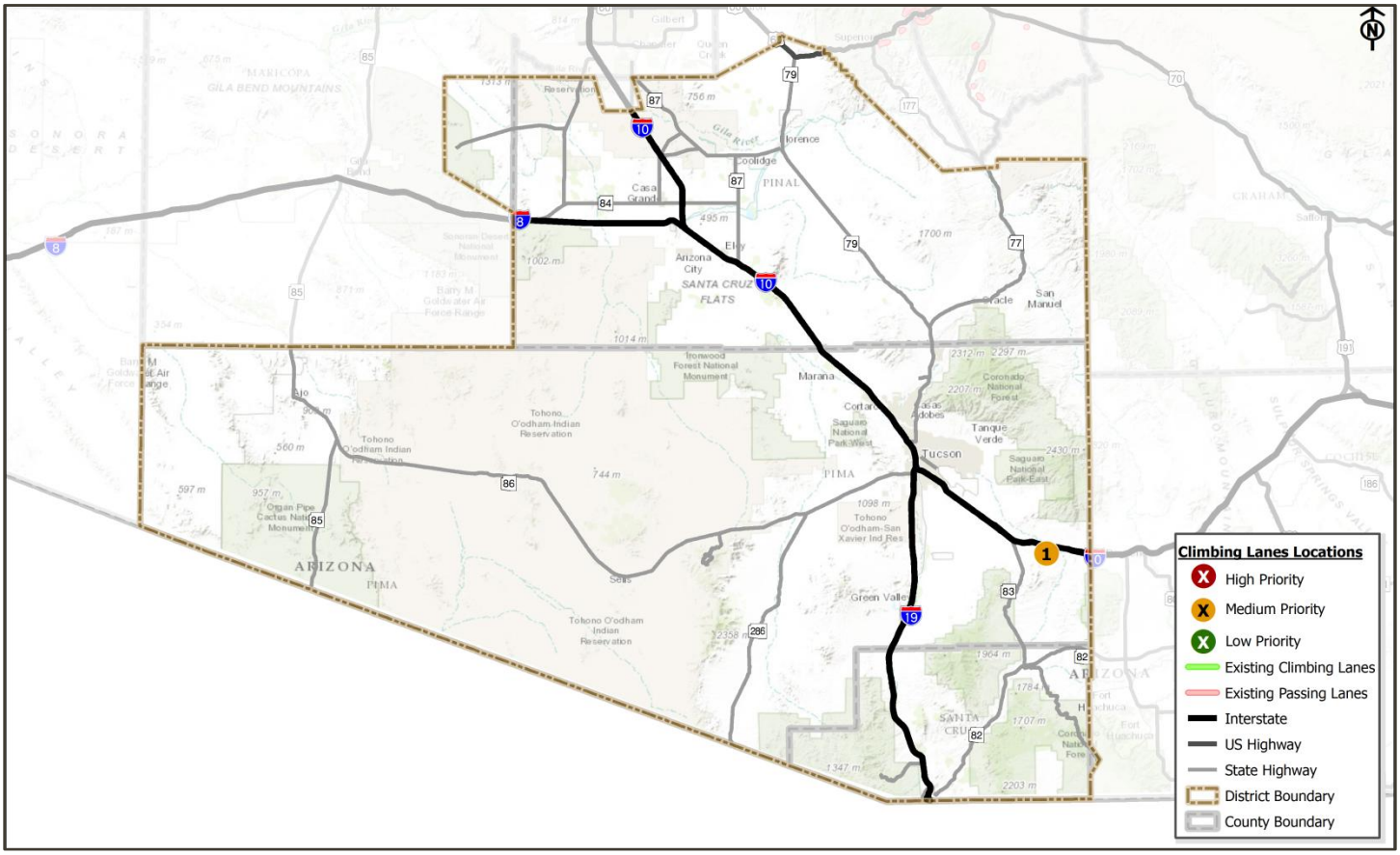
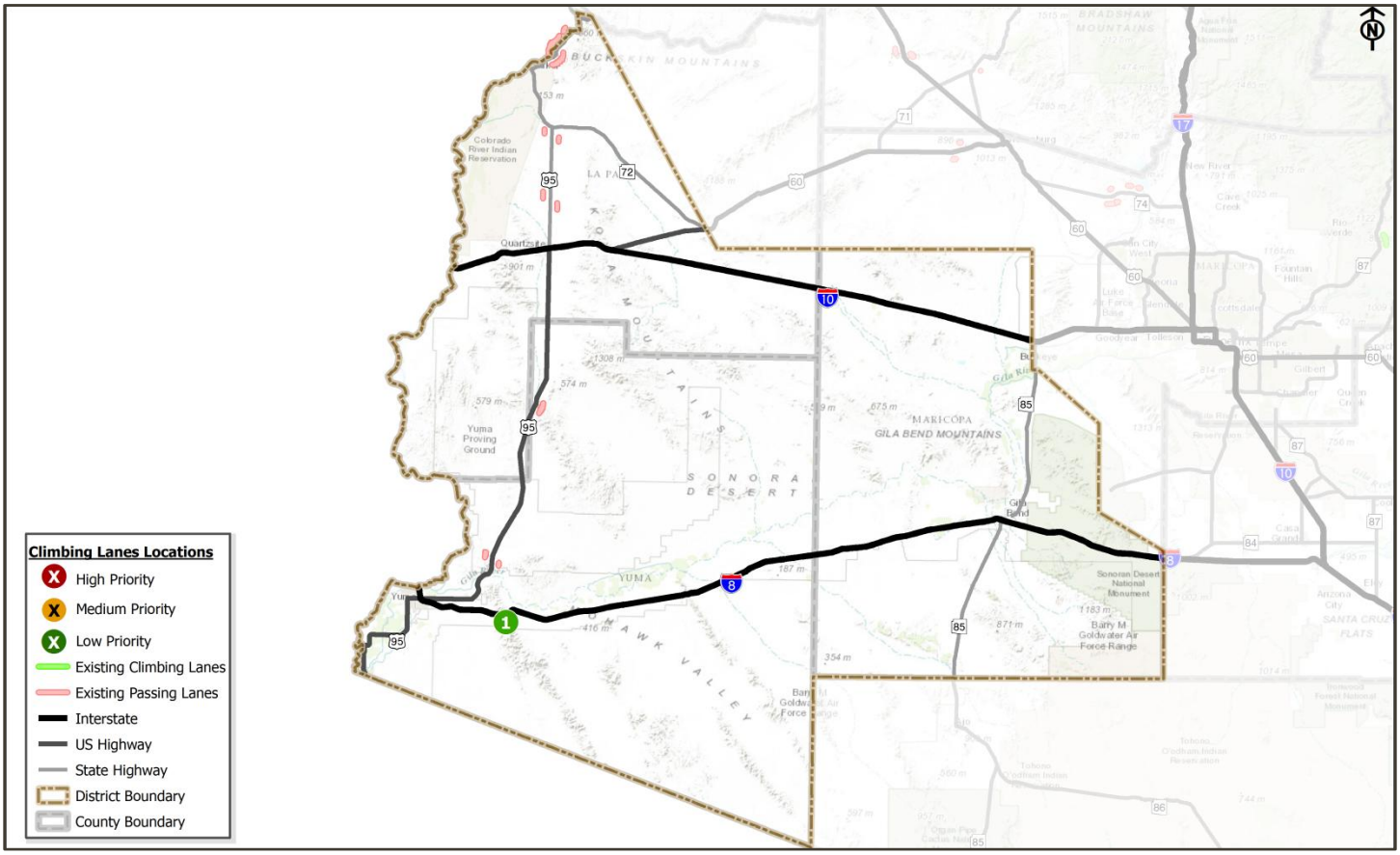


Figure 8.7: Climbing Lane (Multilane Highways) Rankings – Yuma District



I 17 NB: MP 246 - MP 250 Climbing Lane (Multilane Highways) Statewide Rank: 1

Project Details

Route: I 017 Direction: NB
BMP: 246 EMP: 250
District: Prescott County: Yavapai
Ranking: 1 Tier: 1

Roadway Characteristics

Terrain/Max Slope: 6.1 K-Factor: 0.1
Speed Limit (MPH): 65 Directional Split: 59/41
Existing AADT: 28,069 Future AADT: 37,000
Existing LOS: B Future LOS: C
Truck %: 11%

Safety Analysis

Total Number of Crashes 142
Number of Fatal Crashes 0
Injury & Possible Injury Crashes 24
Non-Injury Crashes 118
Average Crash Rate 1.85 *per million vehicle miles traveled*
Equivalent Property Damage Value 209

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Roadside cliffs that may need to be cut into

General Location Assessment: Long steady, curvy incline in which trucks need to slow down. Slow trucks can cause major safety issues

Number of Bridges:

Cost to Widen Bridges: $0.00

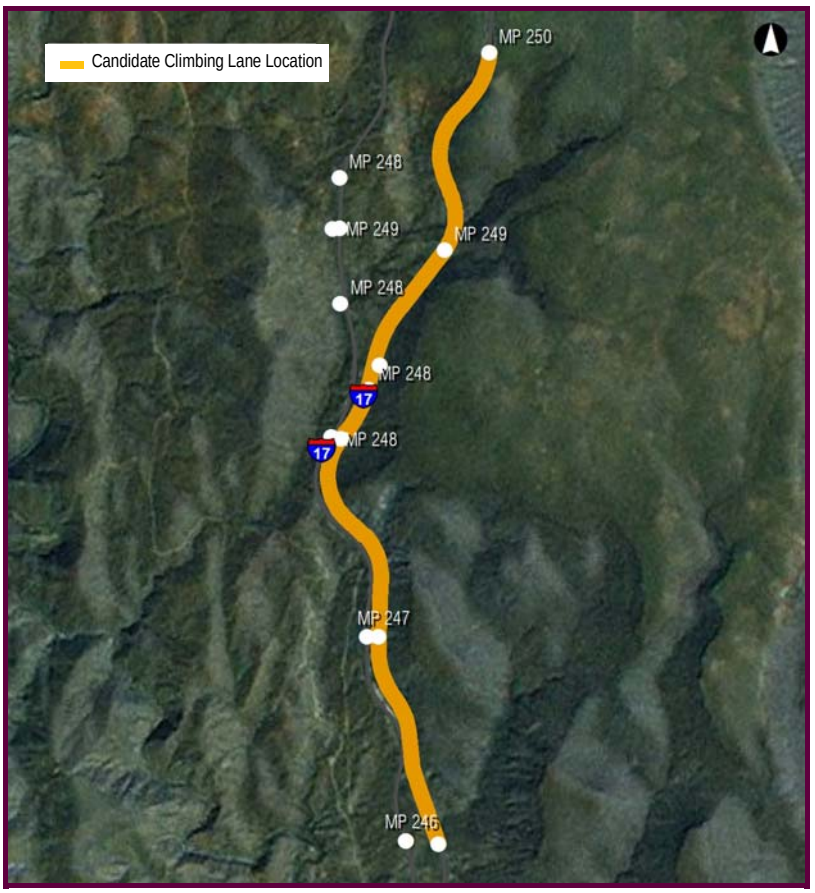
Environmental Overview

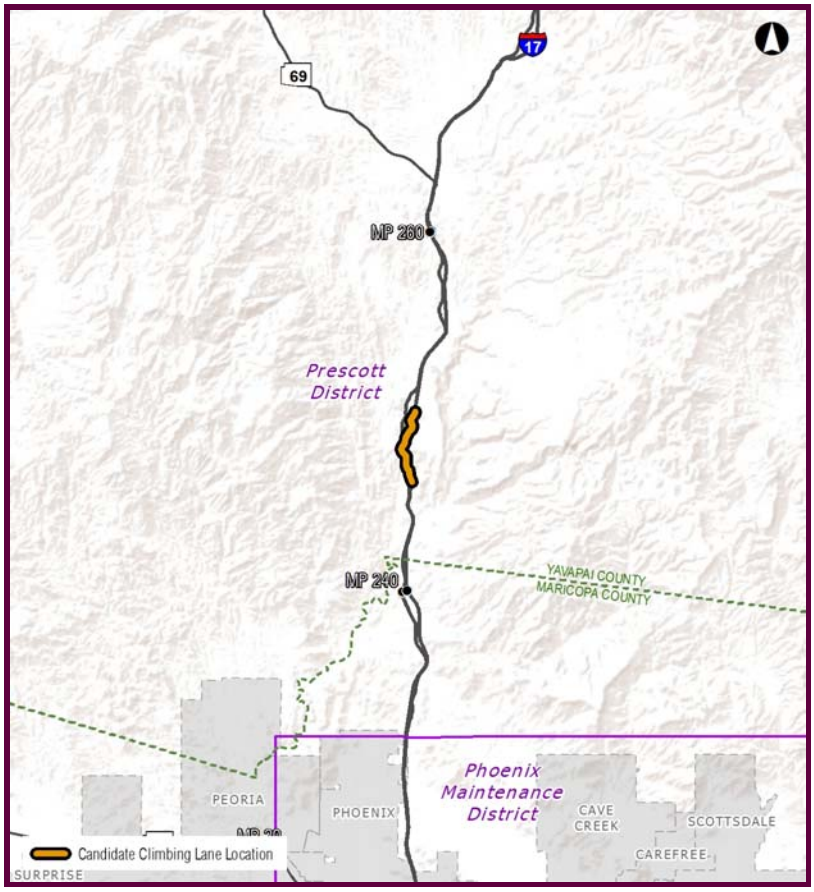
Land Ownership: Private Land; Bureau of Land Management

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Agua Fria NM; Desert Tortoise Suitable Habitat; BLM VRM Class II and Class III

Cultural Resources

Number of Cultural Sites: 20
Eligible Sites (AZSITE): 11
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 34
Cultural Resource Density: Medium





I 40 EB: MP 188 - MP 190 Climbing Lane (Multilane Highways) Statewide Rank: 2

Project Details

Route: I 040 Direction: EB
BMP: 188 EMP: 190
District: Flagstaff County: Coconino
Ranking: 2 Tier: 1

Roadway Characteristics

Terrain/Max Slope: 3.22 K-Factor: 0.21
Speed Limit (MPH): 75 Directional Split: 52/48
Existing AADT: 21,186 Future AADT: 24,000
Existing LOS: C Future LOS: C
Truck %: 31%

Safety Analysis

Total Number of Crashes 111
Number of Fatal Crashes 2
Injury & Possible Injury Crashes 35
Non-Injury Crashes 74
Average Crash Rate 1.91 *per million vehicle miles traveled*
Equivalent Property Damage Value 224

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: no major physical constraints

General Location Assessment: Grade doesn't look that steep and then goes into a downhill

Number of Bridges:

Cost to Widen Bridges: $0.00

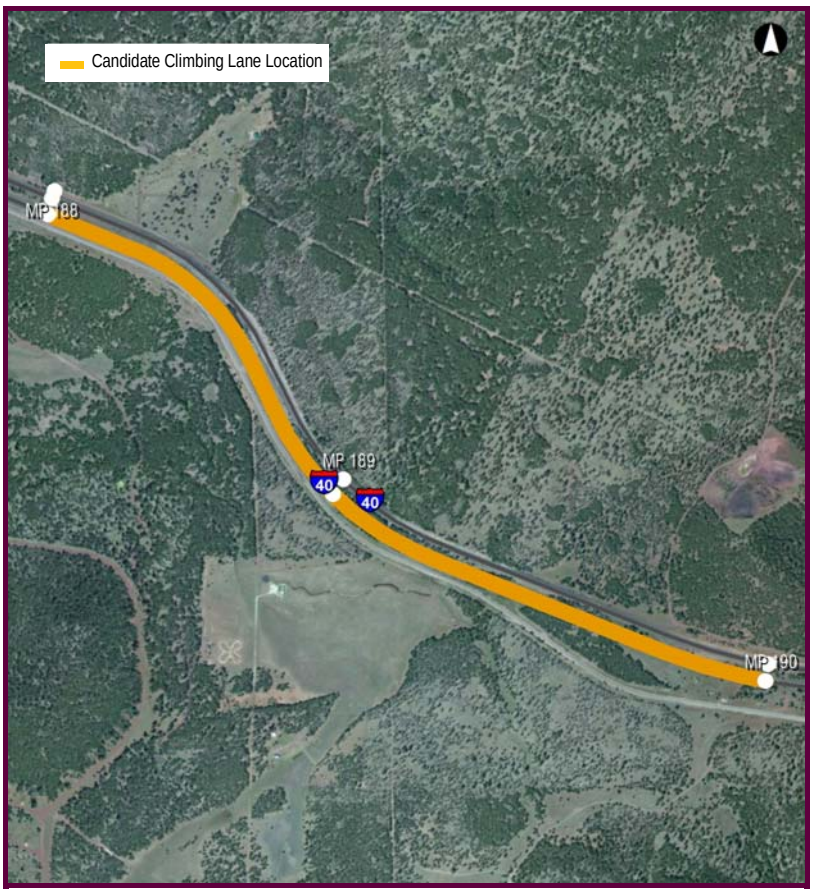
Environmental Overview

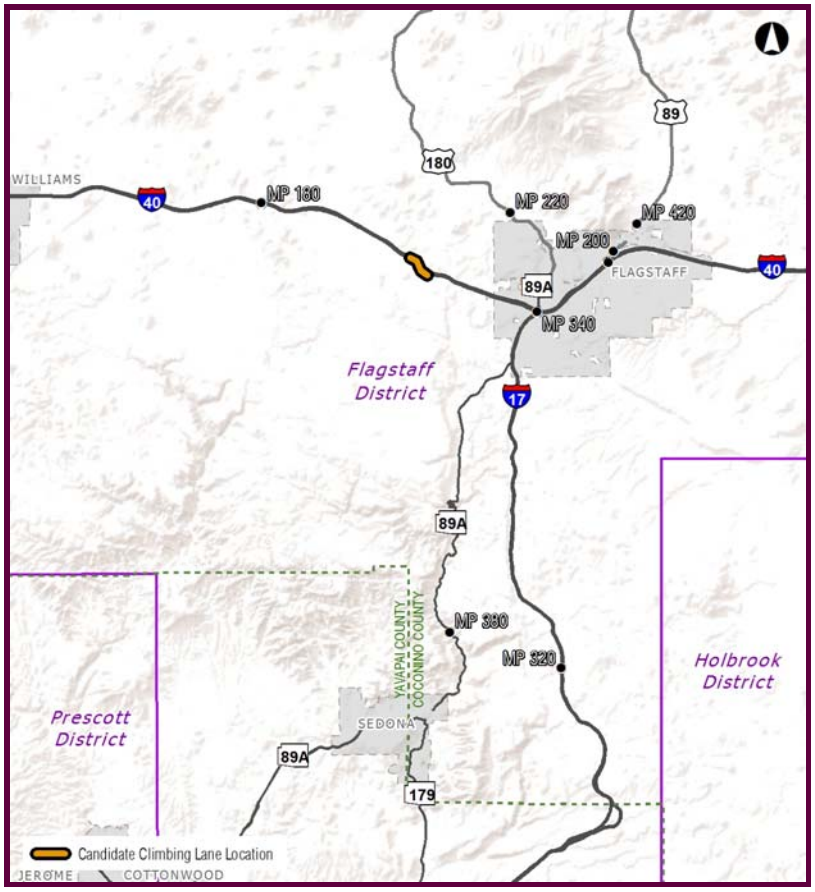
Land Ownership: Private Land; Coconino National Forest; Navajo Army Depot

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands; Camp Navajo Superfund Site

Cultural Resources

Number of Cultural Sites: 2
Eligible Sites (AZSITE): 2
Potential 4(f) Sites (AZSITE): 1
No. of Land Agencies (0.5 mile): 5
Total Cultural Sites: 10
Cultural Resource Density: Low





I 17 SB: MP 281 - MP 285 Climbing Lane (Multilane Highways) Statewide Rank: 3

Project Details

Route: I 017 Direction: SB
BMP: 281 EMP: 285
District: Prescott County: Yavapai
Ranking: 3 Tier: 1

Roadway Characteristics

Terrain/Max Slope: 6.08 K-Factor: 0.11
Speed Limit (MPH): 65 Directional Split: 62/38
Existing AADT: 26,171 Future AADT: 40,000
Existing LOS: C Future LOS: D
Truck %: 16%

Safety Analysis

Total Number of Crashes 103
Number of Fatal Crashes 1
Injury & Possible Injury Crashes 14
Non-Injury Crashes 88
Average Crash Rate 1.44 *per million vehicle miles traveled*
Equivalent Property Damage Value 153

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Roadside cliffs that may need to be cut into

General Location Assessment: Can't tell what the grade is, but it starts to go downhill at the end. Very curvy and would benefit from a passing lane

Number of Bridges:

Cost to Widen Bridges: $0.00

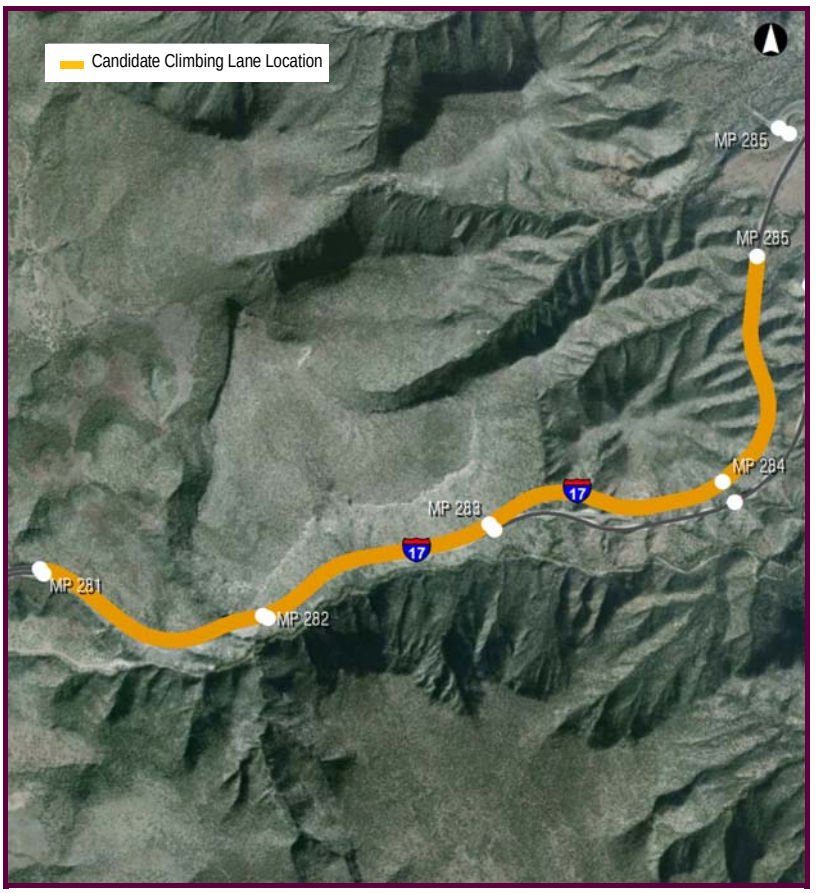
Environmental Overview

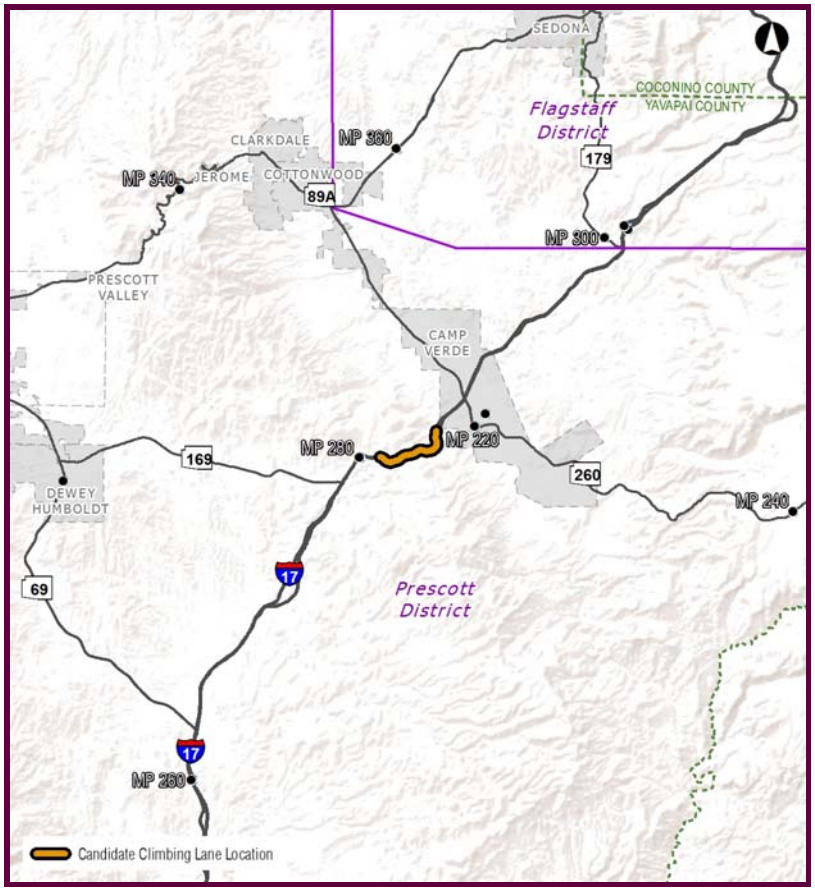
Land Ownership: Prescott National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Verde fault zone; Potential Wildlife Linkage; Wetlands

Cultural Resources

Number of Cultural Sites: 1
Eligible Sites (AZSITE): 0
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 1
Total Cultural Sites: 2
Cultural Resource Density: Low





I 10 WB: MP 306 - MP 302 Climbing Lane (Multilane Highways) Statewide Rank: 4

Project Details

Route: I 010 Direction: WB
BMP: 306 EMP: 302
District: Safford County: Cochise
Ranking: 4 Tier: 1

Roadway Characteristics

Terrain/Max Slope: 3.15 K-Factor: 0.09
Speed Limit (MPH): 35 Directional Split: 56/44
Existing AADT: 29,608 Future AADT: 40,750
Existing LOS: C Future LOS: D
Truck %: 22%

Safety Analysis

Total Number of Crashes 51
Number of Fatal Crashes 5
Injury & Possible Injury Crashes 19
Non-Injury Crashes 27
Average Crash Rate 0.63 *per million vehicle miles traveled*
Equivalent Property Damage Value 159

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Bridge at 302.5

General Location Assessment: Grade does not seem that steep. Appears they may be widening segment that could be used to add a climbing lane

Number of Bridges:

Cost to Widen Bridges: $0.00

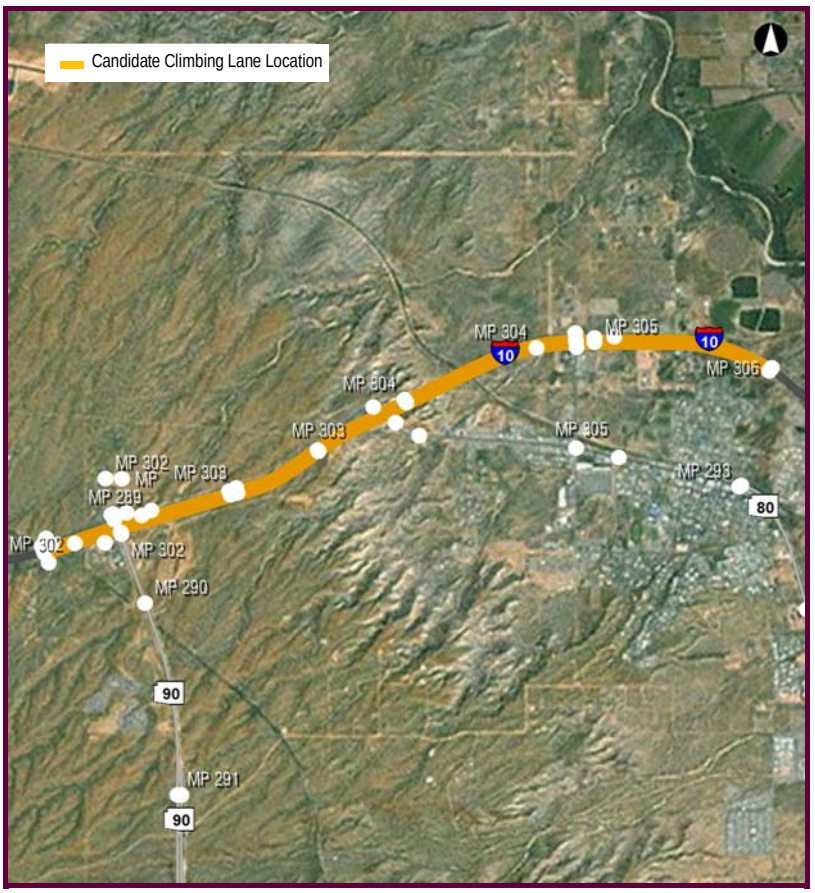
Environmental Overview

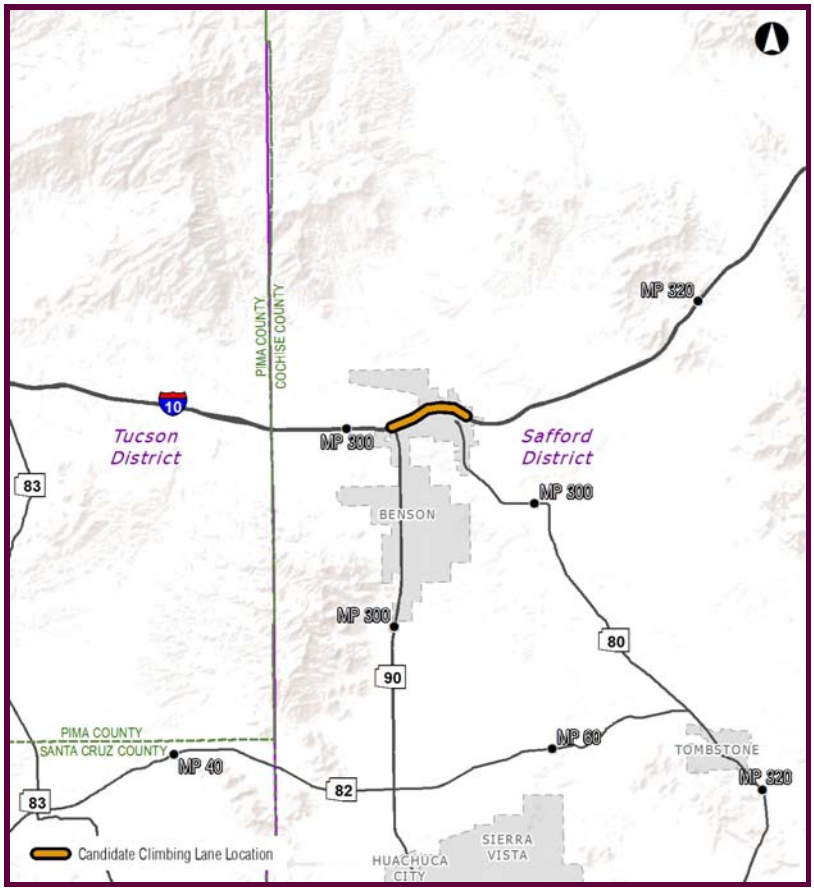
Land Ownership: Private Land

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Wetlands; Leaking Underground Storage Tank

Cultural Resources

Number of Cultural Sites: 14
Eligible Sites (AZSITE): 7
Potential 4(f) Sites (AZSITE): 3
No. of Land Agencies (0.5 mile): 2
Total Cultural Sites: 26
Cultural Resource Density: Medium





I 17 NB: MP 307 - MP 311 Climbing Lane (Multilane Highways) Statewide Rank: 5

Project Details

Route: I 017 Direction: NB
BMP: 307 EMP: 311
District: Flagstaff County: Yavapai
Ranking: 5 Tier: 1

Roadway Characteristics

Terrain/Max Slope: 6 K-Factor: 0.1
Speed Limit (MPH): 75 Directional Split: 58/42
Existing AADT: 16,050 Future AADT: 28,500
Existing LOS: A Future LOS: B
Truck %: 11%

Safety Analysis

Total Number of Crashes 76
Number of Fatal Crashes 0
Injury & Possible Injury Crashes 17
Non-Injury Crashes 59
Average Crash Rate 1.73 *per million vehicle miles traveled*
Equivalent Property Damage Value 131

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: no major physical constraints

General Location Assessment: Winding, long uphill climb

Number of Bridges:

Cost to Widen Bridges: $0.00

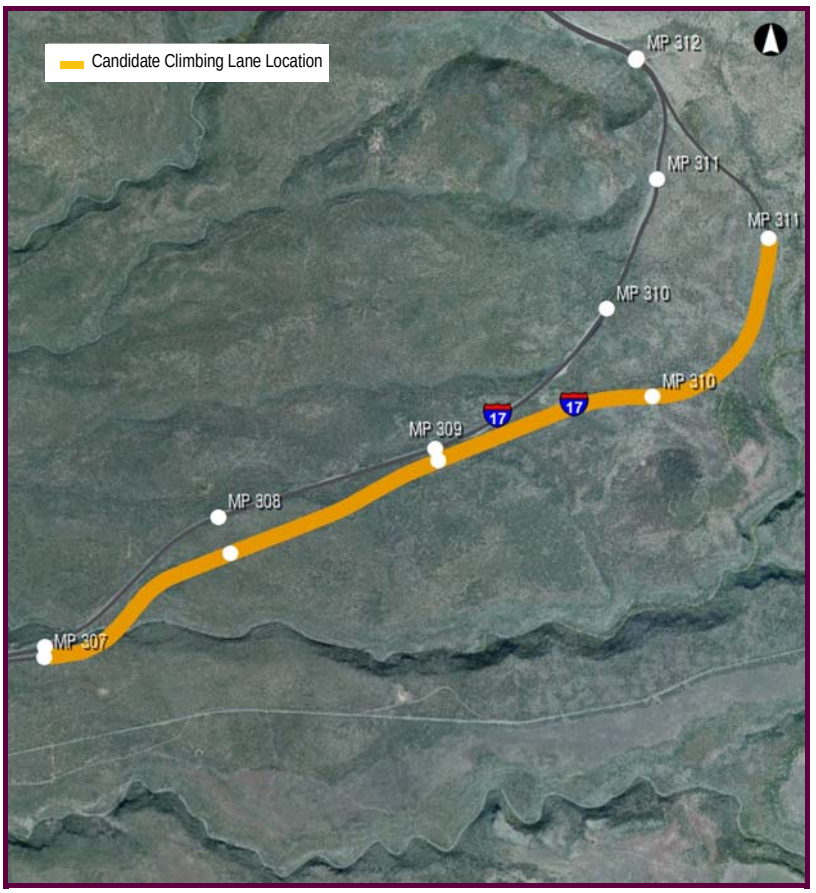
Environmental Overview

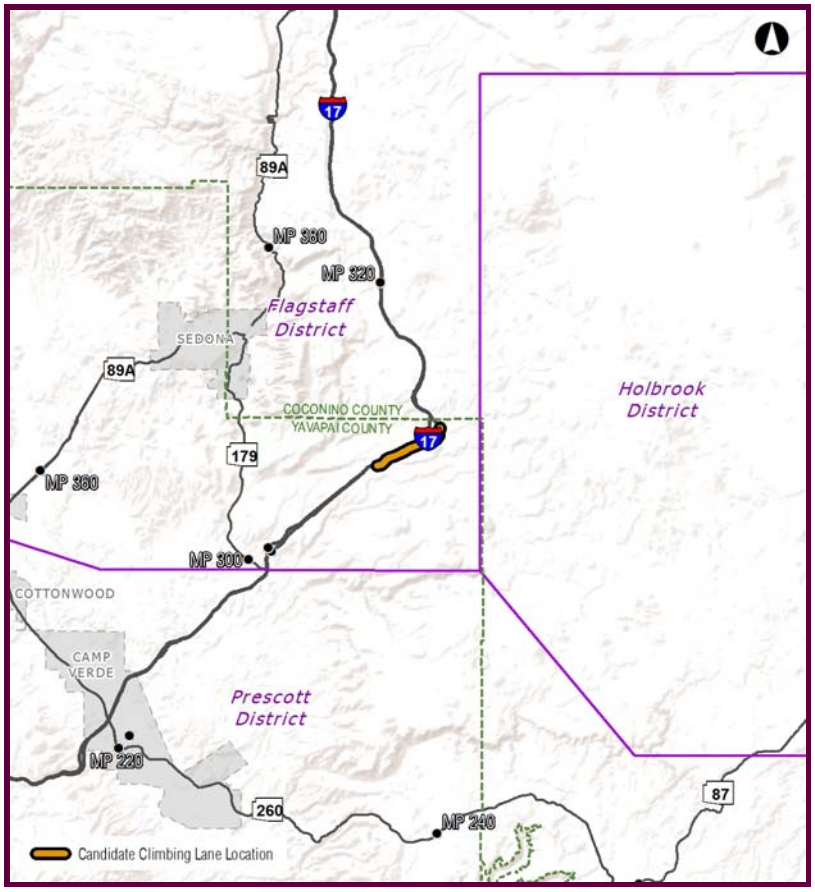
Land Ownership: Coconino National Forest

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Potential Wildlife Linkage; Wetlands

Cultural Resources

Number of Cultural Sites: 9
Eligible Sites (AZSITE): 5
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 1
Total Cultural Sites: 15
Cultural Resource Density: Low





I 17 NB: MP 255 - MP 256 Climbing Lane (Multilane Highways) Statewide Rank: 6

Project Details

Route: I 017 Direction: NB
BMP: 255 EMP: 256
District: Prescott County: Yavapai
Ranking: 6 Tier: 1

Roadway Characteristics

Terrain/Max Slope: 4.34 K-Factor: 0.1
Speed Limit (MPH): 75 Directional Split: 60/40
Existing AADT: 27,973 Future AADT: 38,500
Existing LOS: B Future LOS: C
Truck %: 11%

Safety Analysis

Total Number of Crashes 67
Number of Fatal Crashes 2
Injury & Possible Injury Crashes 28
Non-Injury Crashes 37
Average Crash Rate 0.87 *per million vehicle miles traveled*
Equivalent Property Damage Value 162

Source: Accident Location Information and Surveillance System (ALISS) 2008-2013

Construction Constraints/Feasibility

Constraints: Roadside cliffs that may need to be cut and a frontage rand turn off

General Location Assessment: Long steady, curvy incline in which trucks need to slow down. Slow trucks can cause major safety issues

Number of Bridges:

Cost to Widen Bridges: $0.00

Environmental Overview

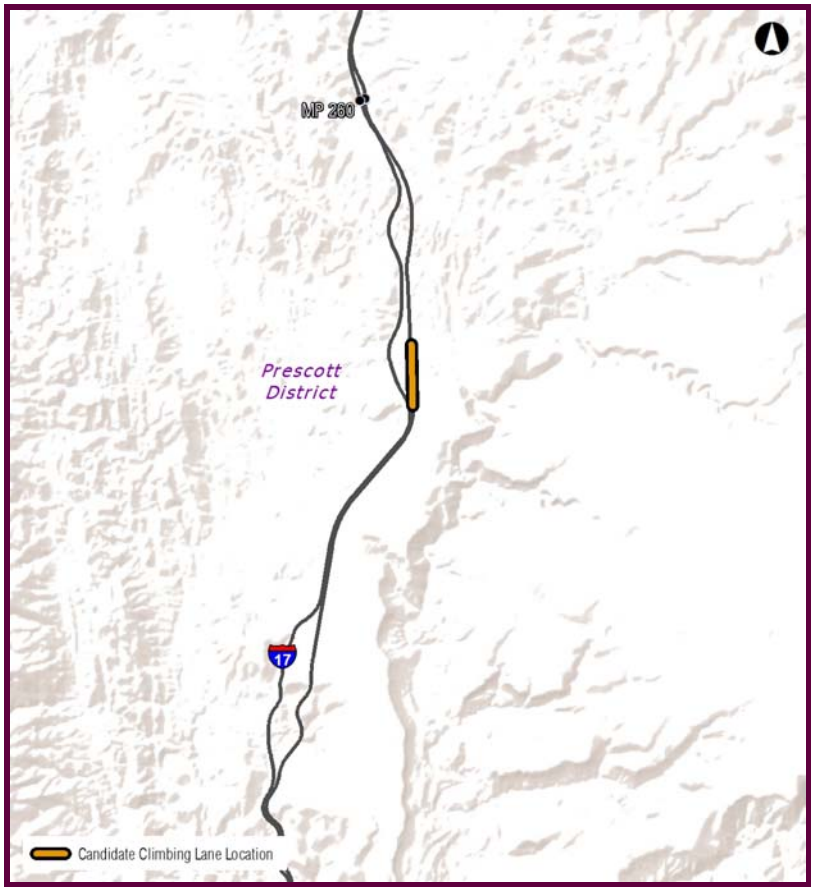
Land Ownership: Bureau of Land Management

Potential Environmental Constraints: Based on a broad GIS analysis of readily available data, within a quarter-mile of the proposed project area the following environmental constraints may be present: Agua Fria NM; Potential Wildlife Linkage; Wetlands; BLM VRM Class II and Class III

Cultural Resources

Number of Cultural Sites: 13
Eligible Sites (AZSITE): 10
Potential 4(f) Sites (AZSITE): 0
No. of Land Agencies (0.5 mile): 1
Total Cultural Sites: 24
Cultural Resource Density: Medium





APPENDIX A

Table A1: Passing Lanes on Two-Lane Highways – Criteria and Ranking Details

ADOT DISTRICT	PASSING LANE LOCATION (VICINITY)	TERRAIN	SHOULDER WIDTH (FT)	EXISTING AADT	K-FACTOR	DIRECTIONAL SPLIT	TRUCK PERCENT	PERCENT NO-PASSING	SPEED LIMIT (MPH)	EXISTING OVERALL LOS	TOTAL CRASHES	CRASH RATE	FUTURE AADT	FUTURE OVERALL LOS	NUMBER OF BRIDGES	BRIDGE WIDENING COST (000's)	EXISTING PTSF	EXISTING PTSF POINTS	EXISTING PFFS	EXISTING PFFS POINTS	PROXIMITY TO EXISTING PL: LENGTH (MI)	PL PROXIMITY POINTS	FUTURE PTSF	FUTURE PTSF POINTS	FUTURE PFFS	FUTURE PFFS POINTS	EXISTING CRASH RATE	EXISTING CRASH RATE POINTS	EXISTING EPDO*	EXISTING EPDO/MILE/YEAR	EXISTING EPDO POINTS	EXISTING PASSING RELATED CRASH RATE	EXISTING PASSING RELATED CRASH RATE POINTS	FUTURE EPDO*	FUTURE EPDO/MILE/YEAR	FUTURE EPDO* POINTS	COST PER LANE MILE	COST PER LANE MILE POINTS	BRIDGE WIDENING COST POINTS	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Flagstaff	SR 64 EB: MP223 - MP226	Level	5	4,594	0.14	54/46	9%	78%	65	D	27	1.61	6,200	D		$0	67	3.09	87	2.50	2.16	0.86	61	1.40	85	0.93	1.61	0.74	48	2.40	6	0.24	0.46	4.12	4.12	4	Low	3	3.00	25.99	14	1	1
Flagstaff	SR 67 NB: MP586 - MP583	Rolling	2	1,154	0.12	65/35	16%	75%	50	B	21	4.99	1,400	B		$0	45	1.36	91	1.32	>10mi	2.00	33	0.39	90	1.55	4.99	2.28	38	1.90	5	0.47	0.91	3.17	3.17	3	Low	3	3.00	23.82	31	2	2
Flagstaff	US 180 EB: MP238 - MP236	Rolling	4	1,626	0.13	55/45	31%	49%	55	B	26	4.38	1,800	B		$0	42	1.11	89	1.77	>10mi	2.00	31	0.32	89	1.38	4.38	2.01	53	2.65	6	0.00	0.00	3.58	3.58	3	Low	3	3.00	23.59	33	3	2
Flagstaff	SR 64 WB: MP220 - MP213	Level	5	4,594	0.14	54/46	9%	25%	65	C	15	0.89	6,200	D		$0	61	2.64	88	2.04	>10mi	2.00	57	1.27	86	1.07	0.89	0.41	42	2.10	5	0.06	0.11	2.29	2.29	3	Low	3	3.00	23.53	34	4	2
Flagstaff	US 160 WB: MP343 - MP337	Level	5	4,066	0.11	51/49	9%	31%	65	C	9	0.61	5,500	C		$0	52	1.93	90	1.52	>10mi	2.00	46	0.87	89	1.37	0.61	0.28	66	3.30	7	0.13	0.26	1.38	1.38	2	Low	3	3.00	23.23	36	5	2
Flagstaff	SR 64 EB: MP195 - MP204	Rolling	5	3,909	0.11	58/42	16%	68%	65	C	16	1.12	4,100	C		$0	61	2.66	86	2.64	>10mi	2.00	50	1.01	86	1.10	1.12	0.51	34	1.70	4	0.14	0.27	1.90	1.90	3	Low	3	3.00	23.19	37	6	2
Flagstaff	SR 64 WB: MP204 - MP201	Rolling	5	3,909	0.11	58/42	16%	66%	65	C	13	0.91	4,100	C		$0	61	2.65	87	2.58	>10mi	2.00	50	1.01	86	1.12	0.91	0.42	20	1.00	3	0.07	0.13	1.55	1.55	3	Low	3	3.00	21.91	47	7	2
Flagstaff	US 89 NB: MP463 - MP 466	Level	8	6,642	0.09	55/46	15%	100%	65	D	13	0.54	8,050	D		$0	67	3.06	87	2.33	1.49	0.59	56	1.21	86	1.13	0.54	0.25	43	2.15	6	0.04	0.08	1.78	1.78	2	Med	2	3.00	21.64	50	8	2
Flagstaff	US 160 EB: MP311 - MP320	Level	5	5,173	0.10	53/47	9%	21%	65	C	5	0.40	8,300	D		$0	55	2.14	90	1.57	>10mi	2.00	55	1.19	86	1.13	0.40	0.18	21	1.58	5	0.08	0.15	1.36	1.36	2	Low	3	3.00	21.37	53	9	2
Flagstaff	US 89 SB: MP456 - MP453	Level	8	6,171	0.11	52/48	14%	32%	65	C	9	0.40	8,000	D		$0	63	2.75	88	2.20	2.31	0.92	58	1.27	86	1.05	0.40	0.18	23	1.15	3	0.13	0.26	1.32	1.32	2	Low	3	3.00	19.63	62	10	2
Flagstaff	US 89 SB: MP480 - MP477	Level	8	6,264	0.09	54/46	14%	76%	65	C	9	0.39	8,200	D	1	$69	65	2.95	88	2.24	0.10	0.04	57	1.23	86	1.10	0.39	0.18	29	1.45	4	0.09	0.17	1.33	1.33	2	Low	3	2.49	19.41	63	11	2
Flagstaff	US 89 NB: MP451 - MP460	Level	7	7,019	0.08	55/45	15%	100%	65	D	9	0.35	7,900	D		$0	67	3.08	87	2.34	1.42	0.57	55	1.18	87	1.17	0.35	0.16	22	1.10	3	0.16	0.30	1.14	1.14	1	Med	2	3.00	17.80	71	12	3
Flagstaff	US 89 NB: MP477 - MP480	Level	8	6,264	0.09	54/46	14%	76%	65	C	6	0.26	8,200	D	1	$69	65	2.95	88	2.24	0.00	0.00	57	1.23	86	1.10	0.26	0.12	23	1.15	3	0.09	0.17	0.89	0.89	1	Low	3	2.49	17.31	77	13	3
Flagstaff	US 89 NB: MP509 - MP512	Level	8	3,272	0.10	57/43	11%	100%	65	C	8	0.67	5,000	D	3	$105	57	2.30	90	1.47	0.00	0.00	50	1.01	88	1.31	0.67	0.31	14	0.70	3	0.17	0.32	1.39	1.39	2	Low	3	2.23	16.95	81	14	3
Flagstaff	SR 64 EB: MP211 - MP218	Level	5	4,252	0.13	56/44	12%	32%	65	C	5	0.32	5,150	C		$0	60	2.52	89	1.85	>10mi	2.00	51	1.04	88	1.30	0.32	0.15	5	0.25	1	0.00	0.00	0.68	0.68	1	Low	3	3.00	16.85	83	15	3
Flagstaff	US 160 EB: MP335 - MP341	Level	5	4,066	0.11	51/49	9%	4%	65	B	7	0.47	5,500	B		$0	40	0.95	91	1.30	>10mi	2.00	38	0.58	89	1.45	0.47	0.22	26	1.30	3	0.13	0.26	1.07	1.07	1	Low	3	3.00	16.75	85	16	3
Flagstaff	US 89 SB: MP502 - MP499	Rolling	8	3,272	0.10	57/43	11%	92%	65	C	8	0.67	5,000	D	2	$73	56	2.27	89	2.01	0.00	0.00	53	1.11	86	1.11	0.67	0.31	10	0.50	2	0.00	0.00	1.39	1.39	2	Low	3	2.46	16.27	89	17	3
Flagstaff	US 89 SB: MP512 - MP509	Level	8	3,272	0.10	57/43	11%	100%	65	C	6	0.50	5,000	D	3	$105	57	2.30	90	1.47	0.00	0.00	50	1.01	88	1.31	0.50	0.23	7	0.35	1	0.00	0.00	1.04	1.04	1	Low	3	2.23	13.55	98	18	3
Globe	US 60 WB: MP348 - MP345	Rolling	5	5,361	0.11	61/40	12%	48%	65	D	23	1.18	9,150	D	1	$118	67	3.07	86	2.75	>10mi	2.00	68	1.64	82	0.65	1.18	0.54	71	3.55	7	0.10	0.20	4.44	4.44	4	Low	3	2.13	26.98	6	1	1
Globe	US 60 WB: MP294 - MP296	Mountainous	4	2,365	0.14	57/43	11%	100%	35	B	57	6.60	3,300	C		$0	57	2.32	83	3.51	0.37	0.15	49	0.95	80	0.42	6.60	3.02	150	0.20	7	0.46	0.88	9.03	9.03	4	High	1	3.00	26.26	9	2	1
Globe	US 60 EB: MP345 - MP348	Rolling	5	5,361	0.11	61/40	12%	40%	65	D	18	0.92	9,150	D	1	$118	65	2.96	86	2.67	>10mi	2.00	67	1.61	83	0.67	0.92	0.42	49	2.45	6	0.10	0.20	3.47	3.47	4	Low	3	2.13	25.67	15	3	1
Globe	US 60 EB: MP357 - MP360	Rolling	1	2,137	0.11	60/40	12%	35%	65	B	33	4.23	3,100	C	1	$26	42	1.17	92	1.08	>10mi	2.00	38	0.57	89	1.46	4.23	1.94	68	3.40	6	0.38	0.74	5.43	5.43	4	Low	3	2.81	24.76	20	4	1
Globe	US 70 WB: MP288 - MP281	Rolling	5	2,576	0.10	58/42	12%	62%	65	C	17	1.81	3,700	C	1	$48	50	1.77	90	1.51	>10mi	2.00	43	0.77	88	1.28	1.81	0.83	52	0.00	6	0.00	0.00	2.77	2.77	4	High	1	2.65	21.81	48	5	2
Globe	US 70 EB: MP267 - MP270	Rolling	5	3,578	0.10	59/41	9%	0%	65	A	13	1.00	6,300	C		$0	35	0.56	91	1.37	>10mi	2.00	43	0.74	88	1.26	1.00	0.46	50	0.75	6	0.00	0.00	2.59	2.59	3	Low	3	3.00	21.38	51	6	2
Globe	US 70 WB: MP270 - MP267	Rolling	5	3,578	0.10	59/41	9%	0%	65	A	13	1.00	6,300	C		$0	35	0.56	91	1.37	>10mi	2.00	43	0.74	88	1.26	1.00	0.46	50	0.65	6	0.00	0.00	2.59	2.59	3	Low	3	3.00	21.38	51	6	2
Globe	US 60 EB: MP304 - MP307	Mountainous	5	2,365	0.14	57/43	11%	64%	55	C	7	0.81	3,300	C	1	$38	55	2.19	89	1.97	2.39	0.96	47	0.91	87	1.16	0.81	0.37	18	0.90	4	0.00	0.00	1.11	1.11	2	Low	3	2.72	19.27	64	8	2
Globe	US 60 WB: MP266 - MP263	Mountainous	8	2,365	0.14	57/43	11%	58%	65	C	5	0.58	3,300	C	1	$40	55	2.13	90	1.53	0.77	0.31	46	0.87	89	1.37	0.58	0.27	5	0.25	2	0.00	0.00	0.79	0.79	1	Low	3	2.70	15.18	95	9	3
Holbrook	US 191 SB: MP442 - MP451	Level	1	4,659	0.09	75/25	14%	9%	65	B	34	2.00	4,800	B		$0	49	1.65	92	0.95	>10mi	2.00	39	0.62	92	1.76	2.00	0.92	115	3.05	7	0.06	0.11	3.98	3.98	4	Low	3	3.00	25.01	17	1	1
Holbrook	US 191 NB: MP448 - MP455	Level	1	4,659	0.09	75/25	14%	5%	65	B	44	2.59	4,800	B		$0	46	1.42	92	0.95	>10mi	2.00	37	0.53	92	1.76	2.59	1.19	170	3.75	7	0.06	0.11	5.15	5.15	4	Low	3	3.00	24.96	18	2	1
Holbrook	SR 264 EB: MP453 - MP460	Rolling	1	5,001	0.10	60/40	16%	15%	65	C	20	1.10	5,500	C		$0	55	2.13	88	2.26	4.85	1.94	46	0.88	87	1.21	1.10	0.50	49	0.35	6	0.00	0.00	2.49	2.49	3	Low	3	3.00	23.92	30	3	2
Holbrook	US 160 WB: MP377 - MP381	Level	5	5,144	0.10	52/48	10%	59%	65	C	11	0.59	6,200	C		$0	61	2.64	88	2.08	>10mi	2.00	51	1.04	87	1.23	0.59	0.27	28	1.40	4	0.05	0.10	1.50	1.50	2	Low	3	3.00	21.36	54	4	2
Holbrook	US 191 SB: MP455 - MP452	Level	1	4,659	0.09	75/25	14%	11%	65	B	13	0.76	4,800	C		$0	50	1.76	92	0.95	>10mi	2.00	40	0.66	92	1.76	0.76	0.35	28	0.70	4	0.12	0.23	1.52	1.52	3	Low	3	3.00	20.70	57	5	2
Holbrook	SR 87 NB: MP293 - MP296	Rolling	2	817	0.11	58/42	14%	33%	55	A	11	3.69	1,300	A		$0	29	0.14	95	0.13	>10mi	2.00	23	0.04	94	1.95	3.69	1.69	28	1.40	4	0.34	0.65	2.18	2.18	2	Low	3	3.00	18.60	68	6	2
Holbrook	SR 87 NB: MP296 - MP293	Rolling	2	817	0.11	58/42	14%	28%	55	A	9	3.02	1,300	A		$0	28	0.00	95	0.00	>10mi	2.00	22	0.00	94	2.00	3.02	1.38	24	1.20	4	0.34	0.65	1.78	1.78	2	Low	3	3.00	18.03	70	7	3
Holbrook	US 160 EB: MP377 - MP383	Level	5	5,078	0.10	51/49	10%	36%	65	C	9	0.49	6,200	C		$0	57	2.28	89	1.79	>10mi	2.00	48	0.92	88	1.33	0.49	0.22	17	0.85	2	0.05	0.10	1.24	1.24	1	Low	3	3.00	17.65	73	8	3
Holbrook	US 160 EB: MP361 - MP367	Level	5	3,777	0.10	56/44	13%	23%	65	B	7	0.51	5,100	C		$0	48	1.61	91	1.16	>10mi	2.00	43	0.75	90	1.52	0.51	0.23	24	1.20	3	0.07	0.14	1.07	1.07	1	Low	3	3.00	17.41	75	9	3
Holbrook	US 160 WB: MP361 - MP367	Level	10	3,777	0.10	56/44	13%	29%	65	B	8	0.58	5,100	C		$0	50	1.73	91	1.24	3.69	1.47	44	0.79	90	1.50	0.58	0.27	26	1.30	3	0.00	0.00	1.22	1.22	1	Low	3	3.00	17.00	80	10	3
Holbrook	SR 264 EB: MP376 - MP378	Mountainous	1	2,169	0.10	58/42	15%	47%	65	B	3	0.38	3,100	C		$0	43	1.23	93	0.75	>10mi	2.00	36	0.49	91	1.64	0.38	0.17	12	0.60	3	0.00	0.00	0.49	0.49	1	Low	3	3.00	16.29	88	11	3
Holbrook	US 160 EB: MP385 - MP391	Level	5	5,210	0.10	53/47	10%	26%	65	C	2	0.11	6,200	C		$0	56	2.24	90	1.66	>10mi	2.00	48	0.92	89	1.39	0.11	0.05	2	0.10	1	0.00	0.00	0.27	0.27	1	Low	3	3.00	16.25	90	12	3
Holbrook	US 160 WB: MP458 - MP463	Rolling	5	2,059	0.09	57/43	14%	44%	65	B	5	0.67	4,000	C	1	$26	39	0.91	92	0.87	>10mi	2.00	40	0.63	88	1.36	0.67	0.30	9	0.45	3	0.00	0.00	1.10	1.10	1	Low	3	2.81	15.89	91	13	3
Holbrook	US 160 WB: MP369 - MP375	Level	5	4,162	0.10	55/45	12%	7%	65	B	6	0.39	5,500	B		$0	41	1.05	91	1.23	>10mi	2.00	38	0.59	90	1.50	0.39	0.18	8	0.40	2	0.13	0.25	0.90	0.90	1	Low	3	3.00	15.80	92	14	3
Holbrook	US 191 NB: MP422 - MP425	Level	2	3,278	0.10	63/37	11%	0%	65	A	4	0.33	3,300	A		$0	34	0.49	93	0.65	>10mi	2.00	24	0.08	93	1.90	0.33	0.15	17	0.85	3	0.08	0.16	0.46	0.46	1	Low	3	3.00	15.43	93	15	3
Holbrook	US 160 EB: MP369 - MP375	Level	5	4,162	0.10	55/45	12%	8%	65	B	4	0.26	5,500	C		$0	42	1.12	91	1.23	>10mi	2.00	39	0.61	90	1.50	0.26	0.12	6	0.30	1	0.00	0.00	0.60	0.60	1	Low	3	3.00	14.58	96	16	3
Holbrook	SR 264 EB: MP401 - MP404	Level	1	1,780	0.10	58/42	15%	67%	50	B	0	0.00	1,800	B		$0	44	1.27	92	1.05	>10mi	2.00	30	0.29	92	1.74	0.00	0.00	0	0.00	1	0.00	0.00	0.00	0.00	1	Med	2	3.00	13.36	100	17	3
Holbrook	SR 264 EB: MP387 - MP394	Rolling	4	2,247	0.10	58/42	15%	28%	55	A	3	0.37	2,400	A	1	$286	38	0.85	92	0.99	>10mi	2.00	28	0.22	92	1.72	0.37	0.17	4	0.20	2	0.00	0.00	0.40	0.40	1	Low	3	0.90	12.83	101	18	3
Holbrook	SR 264 WB: MP387 - MP394	Rolling	3	2,247	0.10	58/42	15%	37%	55	B	1	0.12	2,400	B	1	$286	41	1.08	91	1.17	>10mi	2.00	30	0.29	91	1.65	0.12	0.06	1	0.05	1	0.00	0.00	0.13	0.13	1	Low	3	0.90	12.14	102	19	3
Kingman	US 93 NB: MP167 - MP165	Rolling	5	5,759	0.11	57/43	16%	0%	65	C	19	0.90	6,700	C	2	$48	51	1.88	87	2.51	>10mi	2.00	47	0.89	86	1.07	0.90	0.41	60	3.00	7	0.19	0.37	2.50	2.50	3	Low	3	2.65	24.78	19	1	1
Kingman	SR 95 NB: MP194 - 201	Rolling	8	7,693	0.09	56/44	31%	95%	65	D	10	0.36	12,000	E		$0	70	3.33	83	3.54	2.44	0.97	69	1.67	80	0.39	0.36	0.16	42	2.10	5	0.11	0.21	1.76	1.76	2	Low	3	3.00	23.27	35	2	2

Table A1: Passing Lanes on Two-Lane Highways – Criteria and Ranking Details (Continued)

ADOT DISTRICT	PASSING LANE LOCATION (VICINITY)	TERRAIN	SHOULDER WIDTH (FT)	EXISTING AADT	K-FACTOR	DIRECTIONAL SPLIT	TRUCK PERCENT	PERCENT NO-PASSING	SPEED LIMIT (MPH)	EXISTING OVERALL LOS	TOTAL CRASHES	CRASH RATE	FUTURE AADT	FUTURE OVERALL LOS	NUMBER OF BRIDGES	BRIDGE WIDENING COST (000's)	EXISTING PTSF	EXISTING PTSF POINTS	EXISTING PFFS	EXISTING PFFS POINTS	PROXIMITY TO EXISTING PL: LENGTH (MI)	PL PROXIMITY POINTS	FUTURE PTSF	FUTURE PTSF POINTS	FUTURE PFFS	FUTURE PFFS POINTS	EXISTING CRASH RATE	EXISTING CRASH RATE POINTS	EXISTING EPDO*	EXISTING EPDO/MILE/YEAR	EXISTING EPDO POINTS	EXISTING PASSING RELATED CRASH RATE	EXISTING PASSING RELATED CRASH RATE POINTS	FUTURE EPDO*	FUTURE EPDO/MILE/YEAR	FUTURE EPDO* POINTS	COST PER LANE MILE	COST PER LANE MILE POINTS	BRIDGE WIDENING COST POINTS	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Kingman	US 93 SB: MP165 - MP172	Rolling	5	5,759	0.11	57/43	16%	0%	65	C	11	0.70	6,700	C		$0	51	1.88	87	2.51	3.15	1.26	47	0.89	86	1.07	0.70	0.32	39	2.59	7	0.06	0.12	1.92	1.92	2	Low	3	3.00	23.06	38	3	2
Kingman	SR 95 SB: MP166 - MP175	Rolling	5	5,173	0.16	68/32	20%	63%	65	D	9	0.48	7,700	E		$0	78	4.00	83	3.62	1.79	0.72	78	2.00	80	0.44	0.48	0.22	27	1.35	4	0.00	0.00	1.51	1.51	2	Low	3	3.00	23.00	39	4	2
Kingman	SR 89 NB: MP352 - MP358	Rolling	8	2,734	0.11	60/40	13%	26%	65	B	9	0.90	3,800	C	1	$41	45	1.38	91	1.16	>10mi	2.00	42	0.71	89	1.43	0.90	0.41	27	1.35	4	0.20	0.39	1.42	1.42	2	Med	2	2.70	18.18	69	5	3
Kingman	SR 89 SB: MP358 - MP364	Level	7	2,734	0.11	60/40	13%	68%	65	C	10	1.00	3,800	C	1	$72	55	2.14	91	1.24	>10mi	2.00	45	0.82	89	1.40	1.00	0.46	11	0.55	2	0.00	0.00	1.58	1.58	3	Med	2	2.47	17.52	74	6	3
Kingman	SR 95 NB: MP166 - MP173	Rolling	5	5,173	0.16	68/32	20%	55%	65	D	9	0.48	7,700	E		$0	78	3.94	83	3.57	0.00	0.00	78	1.98	81	0.46	0.48	0.22	13	0.65	1	0.00	0.00	1.51	1.51	2	High	1	3.00	17.17	78	7	3
Kingman	SR 89 NB: MP360 - MP362	Level	8	2,734	0.11	60/40	13%	42%	65	B	7	0.70	3,800	C		$0	50	1.73	92	0.94	>10mi	2.00	41	0.70	90	1.52	0.70	0.32	7	0.35	1	0.10	0.19	1.10	1.10	2	Low	3	3.00	16.40	87	8	3
Prescott	SR 87 SB: MP273 - MP279	Rolling	1	2,029	0.17	62/38	11%	75%	55	C	46	6.21	2,800	C		$0	59	2.48	86	2.64	>10mi	2.00	54	1.13	84	0.82	6.21	2.84	173	8.65	7	0.95	1.82	7.20	7.20	4	Low	3	3.00	30.73	1	1	1
Prescott	SR 89 NB: MP302 - MP304	Mountainous	4	1,054	0.10	59/41	12%	100%	35	B	42	10.92	1,600	B		$0	40	1.00	91	1.18	>10mi	2.00	30	0.30	90	1.52	10.92	5.00	121	6.05	7	2.08	4.00	7.94	7.94	4	High	1	3.00	30.00	3	2	1
Prescott	SR 89 NB: MP330 - MP334	Level	8	7,879	0.10	61/39	10%	0%	55	C	37	2.00	11,500	D		$0	61	2.62	85	3.12	>10mi	2.00	65	1.54	79	0.32	2.00	0.91	85	6.59	7	0.59	1.14	9.48	9.48	4	Low	3	3.00	28.66	4	3	1
Prescott	SR 89 SB: MP330 - 335	Level	8	7,879	0.10	61/39	10%	17%	55	C	18	0.97	11,500	D		$0	68	3.15	85	3.12	>10mi	2.00	69	1.67	79	0.32	0.97	0.45	37	2.87	7	0.22	0.42	4.61	4.61	4	Low	3	3.00	28.12	5	4	1
Prescott	SR 87 SB: MP264 - MP271	Rolling	1	3,888	0.10	54/46	12%	87%	55	C	36	2.54	6,300	C		$0	58	2.39	84	3.28	1.24	0.50	55	1.17	82	0.61	2.54	1.16	91	4.55	7	0.28	0.54	6.59	6.59	4	Low	3	3.00	26.64	7	5	1
Prescott	SR 89 SB: MP302 - 306	Mountainous	4	1,054	0.10	59/41	12%	100%	35	B	29	7.54	1,600	B		$0	40	1.00	91	1.18	>10mi	2.00	30	0.30	90	1.52	7.54	3.45	69	3.45	6	1.56	3.00	5.48	5.48	4	High	1	3.00	26.45	8	6	1
Prescott	SR 89 NB: MP295 - MP302	Rolling	4	1,054	0.10	59/41	12%	100%	35	B	29	7.54	1,600	B	1	$41	40	1.00	91	1.42	>10mi	2.00	31	0.32	88	1.32	7.54	3.45	75	3.75	6	1.56	3.00	5.48	5.48	4	High	1	2.70	26.20	11	7	1
Prescott	SA 89 SB: MP344 - MP347	Mountainous	0	3,517	0.10	58/42	11%	90%	50	C	20	1.56	4,250	C		$0	58	2.42	86	2.74	>10mi	2.00	47	0.90	84	0.89	1.56	0.71	68	3.40	7	0.78	1.50	2.74	2.74	4	High	1	3.00	26.17	12	8	1
Prescott	SR 89 SB: MP295 - MP302	Rolling	2	1,054	0.10	59/41	12%	100%	35	B	28	7.28	1,600	B	1	$0	40	1.00	90	1.50	>10mi	2.00	31	0.32	88	1.28	7.28	3.33	96	4.80	7	0.52	1.00	5.29	5.29	3	Med	2	3.00	25.43	16	9	1
Prescott	SR 87 NB: MP262 - MP271	Rolling	1	3,888	0.10	54/46	12%	86%	55	C	28	1.97	6,300	C		$0	58	2.39	84	3.27	1.44	0.58	55	1.16	82	0.61	1.97	0.90	40	2.00	5	0.35	0.68	5.13	5.13	4	Low	3	3.00	24.59	21	10	1
Prescott	SR 87 NB: MP273 - MP279	Rolling	4	1,713	0.14	60/40	11%	89%	55	B	21	3.36	2,600	C		$0	51	1.84	89	1.91	>10mi	2.00	45	0.82	86	1.04	3.36	1.54	48	2.40	5	0.16	0.31	3.62	3.62	4	Low	3	3.00	24.46	23	11	2
Prescott	SR 169 NB: MP4 - MP10	Rolling	5	5,544	0.09	59/41	12%	47%	65	C	21	1.04	7,250	D	1	$75	61	2.64	87	2.46	>10mi	2.00	54	1.16	86	1.06	1.04	0.48	38	1.90	5	0.10	0.19	3.10	3.10	4	Low	3	2.45	24.44	24	12	2
Prescott	SR 87 NB: MP281 - MP287	Mountainous	1	1,396	0.11	58/42	12%	83%	55	B	30	5.89	2,400	B		$0	42	1.17	92	1.05	>10mi	2.00	36	0.49	89	1.47	5.89	2.70	76	3.80	6	0.59	1.13	6.42	6.42	4	High	1	3.00	24.01	28	13	2
Prescott	SR 87 SB: MP258 - MP263	Mountainous	2	3,888	0.10	54/46	12%	100%	55	C	39	2.75	6,300	C		$0	59	2.44	86	2.65	0.00	0.00	55	1.18	84	0.89	2.75	1.26	124	6.20	7	0.28	0.54	7.14	7.14	4	High	1	3.00	23.96	29	14	2
Prescott	SR 87 SB: MP289 - MP291	Mountainous	2	1,107	0.11	58/42	13%	75%	55	A	13	3.22	1,850	B	1	$68	40	0.96	93	0.75	>10mi	2.00	32	0.36	91	1.69	3.22	1.47	28	1.40	4	0.00	0.00	2.71	2.71	3	Low	3	2.50	19.75	61	15	2
Prescott	SR 87 NB: MP289 - MP291	Mountainous	4	1,107	0.11	58/42	13%	82%	55	A	8	1.98	1,850	B	1	$68	40	0.98	93	0.72	>10mi	2.00	32	0.37	91	1.71	1.98	0.91	14	0.70	3	0.25	0.48	1.67	1.67	2	Low	3	2.50	17.67	72	16	3
Safford	SR 80 WB: MP349 - MP346	Rolling	7	4,804	0.10	52/48	9%	86%	65	C	20	1.14	6,350	D	1	$116	61	2.65	86	2.61	4.09	1.64	53	1.12	85	1.01	1.14	0.52	37	1.85	5	0.23	0.44	2.99	2.99	4	High	1	2.15	22.13	44	1	2
Safford	US 191 NB: MP138 - MP145	Rolling	7	3,073	0.12	71/29	16%	37%	65	C	9	0.80	4,500	D		$0	57	2.30	90	1.50	0.81	0.32	54	1.14	88	1.25	0.80	0.37	27	1.35	4	0.09	0.17	1.50	1.50	3	Low	3	3.00	20.06	60	2	2
Tucson	SR 83 NB: MP43 - MP50	Rolling	4	2,009	0.15	76/24	7%	96%	55	C	35	4.77	2,900	D		$0	63	2.78	89	1.89	>10mi	2.00	57	1.26	87	1.16	4.77	2.19	125	6.25	7	0.95	1.84	5.73	5.73	4	Low	3	3.00	30.11	2	1	1
Tucson	SR 86 EB: 161 - MP164	Level	8	12,766	0.08	61/39	6%	12%	65	D	62	1.33	14,950	D	3	$383	74	3.68	85	3.17	>10mi	2.00	69	1.68	82	0.66	1.33	0.61	158	7.90	7	0.13	0.25	8.20	8.20	4	Low	3	0.19	26.24	10	2	1
Tucson	SR 86 WB: MP161 - MP164	Level	2	12,766	0.08	61/39	6%	11%	65	D	54	1.16	14,950	D	3	$383	74	3.64	84	3.34	>10mi	2.00	69	1.66	82	0.59	1.16	0.53	158	7.90	7	0.09	0.17	7.15	7.15	4	Low	3	0.19	26.12	13	3	1
Tucson	SR 86 WB: MP153 - MP156	Level	5	7,842	0.08	62/38	8%	39%	65	D	21	0.73	9,900	D	5	$254	67	3.06	88	2.28	>10mi	2.00	60	1.35	86	1.07	0.73	0.34	48	2.40	6	0.14	0.27	3.00	3.00	4	Low	3	1.13	24.51	22	4	1
Tucson	SR 77 NB: MP91 - MP94	Rolling	7	7,906	0.08	61/39	9%	49%	55	C	17	0.59	10,000	D	1	$46	68	3.17	85	3.17	>10mi	2.00	61	1.40	83	0.72	0.59	0.27	37	1.85	5	0.00	0.00	2.43	2.43	3	Low	3	2.66	24.40	25	5	2
Tucson	SR 79 NB: MP93 - MP99	Rolling	3	2,634	0.13	73/27	6%	38%	65	C	19	1.98	3,200	C		$0	56	2.26	91	1.26	>10mi	2.00	49	0.97	90	1.52	1.98	0.91	58	2.90	6	0.10	0.20	2.62	2.62	3	Low	3	3.00	24.12	26	6	2
Tucson	SR 79 SB: MP103 - MP97	Rolling	3	2,634	0.13	73/27	6%	39%	65	C	20	2.08	3,200	C		$0	57	2.30	91	1.30	>10mi	2.00	49	0.98	90	1.51	2.08	0.95	37	1.85	5	0.00	0.00	2.76	2.76	4	Low	3	3.00	24.04	27	7	2
Tucson	SR 83 SB: MP45 - MP54	Rolling	2	2,009	0.15	76/24	7%	49%	55	C	14	1.91	2,900	C		$0	58	2.41	90	1.56	>10mi	2.00	54	1.13	88	1.29	1.91	0.87	46	2.30	5	0.27	0.52	2.29	2.29	3	Low	3	3.00	23.78	32	8	2
Tucson	SR 287 NB: MP137 - MP140	Level	8	10,642	0.09	56/44	11%	46%	55	D	14	0.36	15,500	D	1	$32	76	3.78	82	3.87	>10mi	2.00	75	1.88	77	0.00	0.36	0.17	19	0.95	2	0.03	0.05	2.30	2.30	3	Low	3	2.77	22.51	40	9	2
Tucson	SR 86 EB: MP153 - MP156	Level	8	7,842	0.08	62/38	8%	35%	65	D	17	0.59	9,900	D	5	$254	66	3.01	88	2.14	>10mi	2.00	59	1.34	86	1.13	0.59	0.27	42	2.10	5	0.21	0.40	2.43	2.43	3	Low	3	1.13	22.42	42	10	2
Tucson	SR 87 SB: MP138 - MP140	Level	2	7,091	0.10	54/47	14%	48%	65	D	17	0.66	10,250	D	1	$130	65	2.97	87	2.51	>10mi	2.00	63	1.45	84	0.84	0.66	0.30	30	1.50	4	0.08	0.15	2.78	2.78	3	Low	3	2.04	22.25	43	11	2
Tucson	SR 87 NB: MP152 - MP160	Level	6	6,632	0.10	61/39	14%	43%	65	D	12	0.67	9,400	D	1	$54	68	3.14	87	2.38	>10mi	2.00	65	1.55	85	0.91	0.67	0.31	17	1.14	3	0.11	0.21	2.59	2.59	3	Low	3	2.61	22.11	45	12	2
Tucson	SR 87 SB: MP152 - MP160	Level	7	6,632	0.10	61/39	14%	40%	65	D	13	0.72	9,400	D	1	$54	67	3.10	87	2.35	>10mi	2.00	65	1.54	85	0.92	0.72	0.33	16	1.08	3	0.06	0.11	2.81	2.81	3	Low	3	2.61	21.95	46	13	2
Tucson	SR 86 WB: MP85 - MP91	Rolling	2	1,149	0.15	55/45	4%	75%	55	B	11	2.62	1,000	A		$0	41	1.07	91	1.26	>10mi	2.00	27	0.19	92	1.74	2.62	1.20	42	2.10	5	0.24	0.46	1.19	1.19	2	Low	3	3.00	20.91	55	14	2
Tucson	SR 79 NB: MP101 - MP107	Rolling	3	2,634	0.13	73/27	6%	50%	65	C	16	1.66	3,200	C	2	$336	60	2.55	90	1.44	>10mi	2.00	52	1.06	89	1.45	1.66	0.76	40	2.00	5	0.00	0.00	2.21	2.21	3	Low	3	0.53	20.80	56	15	2
Tucson	SR 83 NB: MP49 - MP54	Mountainous	2	2,009	0.15	76/24	7%	73%	55	C	8	1.09	2,900	C	1	$48	62	2.73	90	1.54	>10mi	2.00	56	1.21	88	1.32	1.09	0.50	28	1.40	4	0.14	0.26	1.31	1.31	2	Med	2	2.65	20.21	58	16	2
Tucson	SR 287 NB: MP142 - MP139	Level	8	10,642	0.09	56/44	11%	17%	55	D	9	0.23	15,500	D		$0	72	3.47	83	3.63	>10mi	2.00	72	1.80	77	0.06	0.23	0.11	14	0.70	1	0.05	0.10	1.48	1.48	2	Low	3	3.00	20.16	59	17	2
Tucson	SR 95 SB: MP95 - MP93	Rolling	3	2,634	0.13	73/27	6%	32%	65	C	11	1.14	3,200	C		$0	55	2.12	92	1.13	>10mi	2.00	48	0.92	90	1.57	1.14	0.52	11	0.55	2	0.00	0.00	1.52	1.52	3	Low	3	3.00	19.27	65	18	2
Tucson	SR 87 NB: MP138 - MP141	Level	2	7,091	0.10	54/47	14%	48%	65	D	9	0.35	10,250	D	1	$130	65	2.97	87	2.51	>10mi	2.00	63	1.45	84	0.84	0.35	0.16	16	0.80	2	0.00	0.00	1.47	1.47	2	Low	3	2.04	18.96	67	19	2
Tucson	SR 79 SB: MP107 - MP105	Rolling	3	2,634	0.13	73/27	6%	21%	65	C	6	0.62	3,200	C	3	$165	51	1.86	92	0.89	>10mi	2.00	45	0.83	91	1.67	0.62	0.29	30	1.50	4	0.00	0.00	0.83	0.83	1	Low	3	1.79	17.33	76	20	3
Tucson	SR 86 EB: MP85 - MP91	Rolling	2	1,149	0.15	55/45	4%	78%	55	B	1	0.24	1,000	A		$0	41	1.08	91	1.27	>10mi	2.00	27	0.19	92	1.73	0.24	0.11	4	0.20	2	0.00	0.00	0.11	0.11	1	Low	3	3.00	15.38	94	21	3
Yuma	SR 95 NB: MP158 - MP161	6.00	6	5,224	0.13	65/35	19%	100%	55	D	17	0.89	6,600	D	1	$408	74	3.62	86	2.88	>10mi	2.00	69	1.67	84	0.87	0.89	0.41	37	1.85	5	0.00	0.00	2.43	2.43	3	Low	3	0.00	22.45	41	1	2
Yuma	SR 95 NB: MP132 - MP139	Rolling	5	5,311	0.14	58/42	16%	69%	55	D	9	0.46	6,900	D		$0	72	3.48	82	4.00	2.38	0.95	67	1.60	79	0.30	0.46	0.21	23	1.15	3	0.10	0.20	1.32	1.32	2	Low	3	3.00	21.74	49	2	2
Yuma	SR 95 SB: MP132 - MP139	Rolling	6	5,311	0.14	58/42	16%	64%	55	D	7	0.36	6,900	D		$0	72	3.46	82	3.85	1.10	0.44	67	1.60	80	0.36	0.36	0.17	19	0.95	2	0.05	0.10	1.03	1.03	1	Low	3	3.00	18.98	66	3	2

Table A1: Passing Lanes on Two-Lane Highways – Criteria and Ranking Details (Continued)

ADOT DISTRICT	PASSING LANE LOCATION (VICINITY)	TERRAIN	SHOULDER WIDTH (FT)	EXISTING AADT	K-FACTOR	DIRECTIONAL SPLIT	TRUCK PERCENT	PERCENT NO-PASSING	SPEED LIMIT (MPH)	EXISTING OVERALL LOS	TOTAL CRASHES	CRASH RATE	FUTURE AADT	FUTURE OVERALL LOS	NUMBER OF BRIDGES	BRIDGE WIDENING COST (000's)	EXISTING PTSF	EXISTING PTSF POINTS	EXISTING PFFS	EXISTING PFFS POINTS	PROXIMITY TO EXISTING PL: LENGTH (MI)	PL PROXIMITY POINTS	FUTURE PTSF	FUTURE PTSF POINTS	FUTURE PFFS	FUTURE PFFS POINTS	EXISTING CRASH RATE	EXISTING CRASH RATE POINTS	EXISTING EPDO*	EXISTING EPDO/MILE/YEAR	EXISTING EPDO POINTS	EXISTING PASSING RELATED CRASH RATE	EXISTING PASSING RELATED CRASH RATE POINTS	FUTURE EPDO*	FUTURE EPDO/MILE/YEAR	FUTURE EPDO* POINTS	COST PER LANE MILE	COST PER LANE MILE POINTS	BRIDGE WIDENING COST POINTS	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Yuma	US 95 NB: MP88 - MP90	Level	2	1,634	0.18	54/46	24%	5%	65	A	5	0.84	4,100	C		$0	31	0.27	93	0.72	>10mi	2.00	47	0.89	87	1.20	0.84	0.38	11	0.55	3	0.34	0.65	1.42	1.42	2	Low	3	3.00	17.10	79	4	3
Yuma	SR 95 NB: MP152 - MP155	Rolling	6	5,770	0.09	74/27	16%	95%	55	D	6	0.28	7,350	D		$0	72	3.52	85	2.99	2.57	1.03	62	1.43	83	0.71	0.28	0.13	15	0.75	2	0.05	0.09	0.86	0.86	1	High	1	3.00	16.89	82	5	3
Yuma	US 95 NB: MP92 - MP98	Level	6	1,634	0.18	54/46	24%	0%	65	A	5	0.84	4,100	C	1	$47	28	0.03	93	0.67	>10mi	2.00	45	0.82	87	1.24	0.84	0.38	17	0.85	4	0.00	0.00	1.42	1.42	2	Low	3	2.65	16.79	84	6	3
Yuma	US 95 SB: MP92 - MP98	Level	2	1,634	0.18	54/46	24%	11%	65	A	5	0.84	4,100	C	1	$54	35	0.55	93	0.70	>10mi	2.00	49	0.96	87	1.21	0.84	0.38	8	0.40	3	0.17	0.32	1.42	1.42	2	Low	3	2.61	16.74	86	7	3
Yuma	US 95 SB: MP84 - MP90	Level	4	1,634	0.18	54/46	24%	5%	65	A	2	0.34	4,100	C		$0	31	0.29	93	0.72	>10mi	2.00	47	0.89	87	1.20	0.34	0.15	5	0.25	2	0.17	0.32	0.57	0.57	1	Low	3	3.00	14.57	97	8	3
Yuma	US 95 NB: MP76 - MP82	Level	6	1,634	0.18	54/46	24%	5%	65	A	2	0.34	4,100	C	3	$105	31	0.26	93	0.67	4.95	1.98	47	0.88	87	1.24	0.34	0.15	5	0.25	2	0.00	0.00	0.57	0.57	1	Low	3	2.23	13.40	99	9	3
Yuma	US 95 SB: MP76 - MP82	Level	6	1,634	0.18	54/46	24%	0%	65	A	1	0.17	4,100	C	3	$105	28	0.03	93	0.63	>10mi	2.00	45	0.82	88	1.26	0.17	0.08	1	0.05	1	0.00	0.00	0.28	0.28	1	Low	3	2.23	12.05	103	10	3

Table A2: Climbing Lanes on Two-Lane Highways – Criteria and Ranking Details

ADOT DISTRICT	CLIMBING LANE LOCATION (VICINITY)	HIGHWAY CLASS	MAX GRADE	SHOULDER WIDTH (FT)	SEGMENT LENGTH (MI)	EXISTING AADT	K-FACTOR	DIRECTIONAL SPLIT	TRUCK PERCENT	PERCENT NO-PASSING	SPEED LIMIT (MPH)	EXISTING OVERALL LOS	TOTAL CRASHES	CRASH RATE	FUTURE AADT	FUTURE OVERALL LOS	NUMBER OF BRIDGES	EXISTING PTSF	EXISTING PTSF POINTS	EXISTING PFFS	EXISTING PFFS POINTS	PROXIMITY TO EXISTING PL: LENGTH (MI)	PL PROXIMITY POINTS	FUTURE PTSF	FUTURE PTSF POINTS	FUTURE PFFS	FUTURE PFFS POINTS	EXISTING CRASH RATE	EXISTING CRASH RATE POINTS	EXISTING EPDO	EXISTING EPDO/MILE/YEAR	EXISTING EPDO* POINTS	EXISTING EQUIVALENT PROPERTY DAMAGE ONLY VALUE POINTS	EXISTING PASSING RELATED CRASH RATE	EXISTING PASSING RELATED CRASH RATE POINTS	FUTURE EPDO/MILE/YEAR	FUTURE EPDO* POINTS	COST PER LANE MILE	COST PER LANE MILE POINTS	BRIDGE WIDENING COST	BRIDGE WIDENING COST POINTS	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Flagstaff	SR 67 NB: MP591 - MP589	2	3.36	2	1.00	1,154	0.12	65/35	16%	100%	50	B	14	4.43	1,400	B		46	1.67	90	0.71	>10mi	2.00	47.91	0.62	88.71	1.76	4.43	2.49	20	1.33	6.00	6	0.00	0.00	2.11	3	LOW	3	$0	3.00	24.25	9	1	2
Flagstaff	SR 64 SB: MP199 - MP197	1	4.73	5	1.00	3,909	0.11	58/42	16%	59%	65	C	10	0.93	4,100	C		61	2.65	84	1.32	>10mi	2.00	61.98	1.20	83.17	1.40	0.93	0.53	31	2.07	5.00	5	0.19	0.35	1.19	3	LOW	3	$0	3.00	23.44	11	2	2
Flagstaff	US 180 WB: MP219 - MP221	2	4.33	4	0.63	3,759	0.11	55/45	40%	75%	55	C	14	1.55	4,100	C		59	2.55	67	2.94	>10mi	2.00	61.28	1.17	65.32	0.22	1.55	0.87	18	1.37	3.00	3	0.11	0.21	1.98	4	LOW	3	$0	3.00	22.96	15	3	2
Flagstaff	SA 89 NB: MP392- MP398	2	3.22	1	1.00	4,983	0.10	58/42	14%	58%	55	C	13	0.95	6,500	C		65	2.90	80	1.70	>10mi	2.00	68.47	1.46	78.02	1.06	0.95	0.54	25	1.67	4.00	4	0.15	0.27	1.92	3	LOW	3	$0	3.00	22.93	16	4	2
Flagstaff	SR 64 NB: MP196 - MP198	1	3.32	5	1.00	3,909	0.11	58/42	16%	76%	65	C	12	1.12	4,100	C		62	2.72	83	1.34	>10mi	2.00	63.04	1.24	82.96	1.38	1.12	0.63	21	1.40	4.00	4	0.19	0.35	1.43	3	LOW	3	$0	3.00	22.66	18	5	2
Flagstaff	US 160 WB: MP345 - MP343	1	5.47	6	1.00	3,392	0.10	57/43	14%	65%	65	C	9	0.97	4,700	C	1	56	2.35	86	1.05	>10mi	2.00	63.01	1.24	83.43	1.42	0.97	0.55	59	3.93	7.00	7	0.11	0.20	1.42	3	MEDIUM	2	$95,400	1.85	22.65	19	6	2
Flagstaff	UA 89 NB: MP566 - MP571	2	5.49	0	1.00	306	0.16	63/37	15%	76%	55	A	5	5.97	1,300	B		37	1.09	92	0.47	>10mi	2.00	49.48	0.68	82.67	1.37	5.97	3.36	9	0.60	4.00	4	0.00	0.00	2.64	3	HIGH	1	$0	3.00	19.97	24	7	2
Flagstaff	US 89 NB: MP550 - MP552	1	5.66	5	1.00	5,822	0.07	52/48	15%	59%	65	C	8	0.50	4,900	C		56	2.37	84	1.27	>10mi	2.00	53.44	0.85	85.39	1.54	0.50	0.28	8	0.53	3.00	3	0.06	0.12	0.76	2	MEDIUM	2	$0	3.00	18.44	30	8	3
Flagstaff	US 160 EB: MP312 - MP314	1	6.04	5	1.00	5,173	0.10	53/47	9%	35%	65	C	7	0.49	8,300	D		58	2.47	81	1.55	3.08	1.00	69.14	1.49	78.28	1.08	0.49	0.28	26	1.73	4.00	4	0.14	0.26	1.27	2	HIGH	1	$0	3.00	18.13	32	9	3
Flagstaff	US 89 SB: MP557 - MP555	1	3.43	5	1.00	5,822	0.07	52/48	15%	77%	65	C	4	0.25	4,900	C		57	2.44	84	1.29	>10mi	2.00	54.46	0.89	85.24	1.53	0.25	0.14	4	0.27	2.00	2	0.00	0.00	0.38	1	LOW	3	$0	3.00	17.29	33	10	3
Flagstaff	UA 89 NB: MP550 - MP551	1	3.35	1	1.00	306	0.16	63/37	15%	14%	65	A	1	1.19	1,300	A		20	0.00	97	0.00	>10mi	2.00	32.96	0.00	92.31	2.00	1.19	0.67	1	0.07	2.00	2	0.00	0.00	0.53	1	LOW	3	$0	3.00	13.67	44	11	3
Globe	US 60 EB: MP306 - MP307	2	5.24	5	1.00	2,365	0.14	57/43	11%	43%	55	B	11	1.70	3,300	C		51	2.03	80	1.65	1.99	0.43	58.85	1.07	75.40	0.89	1.70	0.96	22	1.47	6.00	6	0.00	0.00	1.74	4	LOW	3	$0	3.00	23.02	14	1	2
Globe	US 70 WB: MP282 - MP288	1	3.91	5	1.00	2,576	0.10	58/42	12%	35%	65	B	12	1.70	3,700	C	1	44	1.54	90	0.66	>10mi	2.00	51.91	0.78	87.06	1.65	1.70	0.96	38	2.53	6.00	6	0.00	0.00	0.00	4	MEDIUM	2	$48,240	2.42	22.00	21	2	2
Globe	US 70 EB: MP262 - MP264	1	3.43	5	1.00	3,578	0.10	59/41	9%	0%	65	A	9	0.92	6,300	C	1	35	0.96	90	0.73	>10mi	2.00	52.09	0.79	85.46	1.55	0.92	0.52	37	2.47	5.00	5	0.00	0.00	0.20	3	MEDIUM	2	$40,320	2.51	19.06	28	3	2
Globe	US 60 WB: MP267 - MP266	1	3.26	8	1.00	2,365	0.14	57/43	11%	25%	65	B	3	0.46	3,300	C		46	1.71	89	0.76	3.02	0.97	54.70	0.90	86.38	1.61	0.46	0.26	3	0.20	2.00	2	0.00	0.00	0.48	1	MEDIUM	2	$0	3.00	14.20	41	4	3
Holbrook	SR 87 NB: MP295 - MP297	2	5.97	2	1.00	817	0.11	58/42	14%	88%	55	A	14	6.26	1,300	B		38	1.17	90	0.72	>10mi	2.00	41.85	0.37	86.31	1.61	6.26	3.52	40	2.67	6.00	6	0.00	0.00	2.77	4	HIGH	1	$0	3.00	23.38	12	1	2
Holbrook	SR 264 EB: MP457 - MP461	1	3.86	1	1.00	5,001	0.10	60/40	16%	38%	65	C	9	0.66	5,500	C		62	2.70	83	1.42	>10mi	2.00	63.47	1.26	81.68	1.30	0.66	0.37	40	2.67	6.00	6	0.07	0.14	0.50	2	LOW	3	$0	3.00	23.19	13	2	2
Holbrook	SR 87 NB: MP290 - MP296	2	5.75	2	1.00	817	0.11	58/42	14%	86%	55	A	10	4.47	1,300	B		38	1.17	92	0.47	>10mi	2.00	41.78	0.36	90.38	1.87	4.47	2.51	19	1.27	5.00	5	0.00	0.00	1.98	2	LOW	3	$0	3.00	21.38	22	3	2
Holbrook	SR 87 SB: MP290 - MP296	2	5.75	2	1.00	817	0.11	58/42	14%	70%	55	A	8	3.58	1,300	B		37	1.13	92	0.44	>10mi	2.00	41.22	0.34	90.63	1.89	3.58	2.01	12	0.80	4.00	4	0.00	0.00	1.58	2	LOW	3	$0	3.00	19.81	26	4	2
Holbrook	US 160 WB: MP462 - MP460	1	5.65	5	1.00	2,059	0.09	57/43	14%	35%	65	B	3	0.53	4,000	C		37	1.10	89	0.76	>10mi	2.00	50.97	0.74	82.32	1.34	0.53	0.30	17	1.13	5.00	5	0.00	0.00	0.66	2	HIGH	1	$0	3.00	17.25	34	5	3
Holbrook	US 160 EB: MP381 - MP384	1	3.80	5	1.00	5,144	0.10	52/48	10%	48%	65	C	5	0.36	6,200	C		60	2.58	84	1.26	>10mi	2.00	63.12	1.24	82.80	1.37	0.36	0.20	15	1.00	3.00	3	0.00	0.00	0.68	1	HIGH	1	$0	3.00	16.65	35	6	3
Holbrook	US 191 SB: MP356 - MP354	1	5.57	1	1.00	901	0.10	60/40	27%	58%	65	B	3	1.22	1,300	B		38	1.16	93	0.44	>10mi	2.00	40.86	0.33	90.90	1.91	1.22	0.68	3	0.20	2.00	2	0.00	0.00	0.54	2	LOW	3	$0	3.00	16.52	36	7	3
Holbrook	US 191 SB: MP444 - MP442	1	6.87	1	1.00	4,730	0.08	65/35	13%	31%	65	C	4	0.31	5,000	C	1	54	2.21	83	1.39	>10mi	2.00	55.21	0.92	82.06	1.32	0.31	0.17	10	0.67	2.00	2	0.00	0.00	0.36	2	HIGH	1	$36,360	2.56	15.58	38	8	3
Holbrook	SR 264 EB: MP377 - MP379	2	5.85	1	1.00	2,169	0.10	58/42	15%	100%	55	B	2	0.34	3,100	C		48	1.84	82	1.51	>10mi	2.00	55.86	0.94	76.65	0.97	0.34	0.19	5	0.33	3.00	3	0.00	0.00	0.32	1	HIGH	1	$0	3.00	15.46	39	9	3
Holbrook	SR 264 EB: MP402 - MP404	2	6.38	1	1.00	1,780	0.10	58/42	15%	87%	50	B	0	0.00	1,800	B		44	1.60	88	0.85	>10mi	2.00	44.61	0.48	88.24	1.73	0.00	0.00	0	0.00	1.00	1	0.00	0.00	0.00	1	HIGH	1	$0	3.00	12.66	45	10	3
Kingman	US 93 SB: MP161 - MP163	1	3.59	5	1.00	5,759	0.11	57/43	16%	0%	65	C	18	1.14	6,700	C		51	2.05	83	1.42	>10mi	2.00	56.75	0.98	82.37	1.35	1.14	0.64	41	2.73	6.00	6	0.32	0.59	2.37	4	LOW	3	$0	3.00	25.03	8	1	1
Kingman	SR 95 SB: MP177 - MP175	2	3.03	5	1.00	5,846	0.12	63/37	22%	50%	55	D	9	0.56	8,700	D		71	3.29	77	1.99	>10mi	2.00	81.44	2.00	72.70	0.71	0.56	0.32	36	2.40	5.00	5	0.12	0.23	1.51	2	LOW	3	$0	3.00	23.53	10	2	2
Prescott	SA 89 SB: MP339 - MP343	3	5.64	1	1.00	1,520	0.10	58/42	11%	100%	30	C	37	8.89	2,100	D		43	1.50	79	1.81	>10mi	2.00	47.68	0.61	74.27	0.81	8.89	5.00	96	6.40	7.00	7	2.16	4.00	6.36	4	HIGH	1	$0	3.00	30.73	1	1	1
Prescott	SA 89 NB: MP334 - MP336	3	6.13	1	1.00	1,520	0.10	58/42	11%	100%	30	D	28	6.73	2,100	D		43	1.50	75	2.16	>10mi	2.00	47.68	0.61	69.91	0.52	6.73	3.78	70	4.67	7.00	7	1.20	2.22	4.82	4	HIGH	1	$0	3.00	27.80	4	2	1
Prescott	SR 260 EB: MP288 - MP289	2	2.89	2	1.00	3,747	0.10	51/49	13%	100%	50	C	30	2.92	6,900	C		57	2.38	80	1.68	1.42	0.14	66.90	1.40	74.20	0.81	2.92	1.64	54	3.60	7.00	7	0.19	0.36	6.24	4	LOW	3	$0	3.00	25.40	7	3	1
Prescott	SR 89 NB: MP339 - MP341	1	3.05	8	1.00	3,174	0.10	59/41	13%	54%	65	C	15	1.73	6,000	D		54	2.19	88	0.90	>10mi	2.00	67.35	1.42	82.76	1.37	1.73	0.97	42	2.80	6.00	6	0.00	0.00	3.20	4	HIGH	1	$0	3.00	22.84	17	4	2
Prescott	SA 89 SB: MP348 - MP349	2	7.95	3	1.00	4,498	0.10	58/42	10%	55%	50	C	6	0.49	5,500	C		61	2.67	69	2.76	>10mi	2.00	65.79	1.35	65.57	0.24	0.49	0.27	18	1.20	3.00	3	0.24	0.45	0.83	1	LOW	3	$0	3.00	19.75	27	5	2
Prescott	SR 89 NB: MP344 - MP345	1	2.95	8	1.00	3,174	0.10	59/41	13%	3%	65	A	5	0.58	6,000	C	1	34	0.90	90	0.69	>10mi	2.00	51.96	0.78	84.46	1.48	0.58	0.32	16	1.07	2.00	2	0.12	0.21	1.07	1	MEDIUM	2	$27,360	2.67	14.07	42	6	3
Prescott	SR 169 SB: MP9 - MP7	1	3.97	5	1.00	4,997	0.08	63/37	15%	0%	65	B	7	0.51	7,400	C	1	39	1.23	87	0.95	>10mi	2.00	51.17	0.75	84.16	1.46	0.51	0.29	11	0.73	2.00	2	0.00	0.00	1.17	2	LOW	3	$248,760	0.00	13.68	43	7	3
Safford	UX 191 NB: MP168 - MP171	3	7.46	4	1.00	5,184	0.18	65/35	14%	100%	40	E	27	1.90	3,425	E		82	4.00	56	4.00	>10mi	2.00	72.74	1.64	63.89	0.13	1.90	1.07	68	4.53	7.00	7	0.21	0.39	2.02	4	HIGH	1	$0	3.00	28.23	3	1	1
Safford	UX 191 SB: MP169 - MP167	3	5.71	5	1.00	7,753	0.10	71/30	14%	100%	40	E	20	0.94	7,500	E		79	3.81	61	3.52	3.99	1.48	77.73	1.85	61.95	0.00	0.94	0.53	50	3.33	7.00	7	0.19	0.35	2.19	4	HIGH	1	$0	3.00	26.54	5	2	1
Safford	SR 90 WB: MP329 - MP327	1	4.92	5	1.00	4,066	0.10	65/35	9%	66%	65	C	15	1.35	5,600	D		63	2.81	86	1.04	>10mi	2.00	70.00	1.53	84.09	1.46	1.35	0.76	42	2.80	6.00	6	0.18	0.33	2.33	4	LOW	3	$0	3.00	25.93	6	3	1
Safford	SR 90 EB: MP335 - MP337	1	3.71	5	1.00	4,066	0.10	65/35	9%	100%	65	C	13	1.17	5,600	D		65	2.91	86	1.09	4.57	1.78	71.68	1.60	83.58	1.43	1.17	0.66	37	2.47	5.00	5	0.00	0.00	2.02	3	MEDIUM	2	$0	3.00	22.46	20	4	2
Safford	US 191 NB: MP139 - MP144	1	2.67	6	1.00	3,073	0.12	71/29	16%	39%	65	C	8	0.95	4,500	D		57	2.44	88	0.92	1.38	0.12	66.22	1.37	84.34	1.48	0.95	0.53	26	1.73	4.00	4	0.12	0.22	1.33	3	LOW	3	$0	3.00	20.08	23	5	2

Table A2: Climbing Lanes on Two-Lane Highways – Criteria and Ranking Details (Continued)

ADOT DISTRICT	CLIMBING LANE LOCATION (VICINITY)	HIGHWAY CLASS	MAX GRADE	SHOULDER WIDTH (FT)	SEGMENT LENGTH (MI)	EXISTING AADT	K-FACTOR	DIRECTIONAL SPLIT	TRUCK PERCENT	PERCENT NO-PASSING	SPEED LIMIT (MPH)	EXISTING OVERALL LOS	TOTAL CRASHES	CRASH RATE	FUTURE AADT	FUTURE OVERALL LOS	NUMBER OF BRIDGES	EXISTING PTSF	EXISTING PTSF POINTS	EXISTING PFFS	EXISTING PFFS POINTS	PROXIMITY TO EXISTING PL: LENGTH (MI)	PL PROXIMITY POINTS	FUTURE PTSF	FUTURE PTSF POINTS	FUTURE PFFS	FUTURE PFFS POINTS	EXISTING CRASH RATE	EXISTING CRASH RATE POINTS	EXISTING EPDO	EXISTING EPDO/MILE/YEAR	EXISTING EPDO* POINTS	EXISTING EQUIVALENT PROPERTY DAMAGE ONLY VALUE POINTS	EXISTING PASSING RELATED CRASH RATE	EXISTING PASSING RELATED CRASH RATE POINTS	FUTURE EPDO/MILE/YEAR	FUTURE EPDO* POINTS	COST PER LANE MILE	COST PER LANE MILE POINTS	BRIDGE WIDENING COST	BRIDGE WIDENING COST POINTS	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Safford	SR 80 EB: MP334 - MP338	2	3.39	5	1.00	5,295	0.09	53/47	10%	93%	55	C	14	0.97	6,200	C	1	62	2.74	82	1.51	2.43	0.66	64.97	1.32	80.38	1.21	0.97	0.54	24	1.60	4.00	4	0.07	0.13	1.85	3	HIGH	1	$81,000	2.02	18.14	31	6	3
Safford	SR 80 EB: MP314 - MP317	2	4.02	1	1.00	5,150	0.07	63/37	12%	100%	55	C	1	0.07	6,400	C		61	2.69	79	1.76	>10mi	2.00	66.15	1.37	75.41	0.89	0.07	0.04	1	0.07	1.00	1	0.00	0.00	0.14	1	MEDIUM	2	$0	3.00	15.75	37	7	3
Safford	US 191 NB: MP147 - MP149	2	3.62	8	1.00	3,073	0.12	71/29	16%	100%	55	C	2	0.24	4,500	D		65	2.92	84	1.26	1.15	0.00	72.91	1.65	80.36	1.21	0.24	0.13	3	0.20	1.00	1	0.12	0.22	0.33	1	LOW	3	$0	3.00	15.40	40	8	3
Tucson	SR 83 NB: MP43 - MP49	3	6.24	5	1.00	2,009	0.15	76/24	7%	100%	45	C	33	6.00	2,900	C		63	2.80	82	1.44	>10mi	2.00	70.69	1.56	77.74	1.04	6.00	3.37	117	7.80	7.00	7	1.27	2.35	5.41	4	MEDIUM	2	$0	3.00	30.56	2	1	1
Tucson	SR 83 SB: MP54 - MP52	2	3.49	4	1.00	2,009	0.15	76/24	7%	22%	55	B	6	1.09	2,900	C		50	1.92	91	0.57	>10mi	2.00	58.54	1.06	88.20	1.73	1.09	0.61	10	0.67	4.00	4	0.00	0.00	0.98	2	LOW	3	$0	3.00	19.90	25	2	2
Tucson	SR 83 NB: MP52 - MP54	2	3.49	4	1.00	2,009	0.15	76/24	7%	19%	55	B	6	1.09	2,900	C		48	1.81	91	0.55	>10mi	2.00	56.85	0.99	88.39	1.74	1.09	0.61	6	0.40	3.00	3	0.18	0.34	0.98	2	LOW	3	$0	3.00	19.04	29	3	2

Table A3: Climbing Lanes on Multilane Highways – Criteria and Ranking Details

DISTRICT	CLIMBING LANE LOCATION (VICINITY)	MAX SEGMENT SLOPE	SHOULDER WIDTH (FT)	EXISTING AADT	K-FACTOR	DIRECTIONAL SPLIT	TRUCK PERCENT	SPEED LIMIT (MPH)	EXIS LOS	TOTAL CRASHES	AVERAGE CRASH RATE	EQUIVALENT PROPERTY DAMAGE VALUE	FUTURE AADT	FUTURE LOS	NUMBER OF BRIDGES	EXISTING DENSITY	EXISTING DENSITY POINTS	Proximity to Passing Lane Value	PROXIMITY TO EXISTING PL OR CL: LENGTH (MI)	PL PROXIMITY POINTS	FUTURE DENSITY	FUTURE DENSITY POINTS	EXISTING CRASH RATE	EXISTING CRASH RATE POINTS	EXISTING EPDO*	EXISTING EPDO/MILE/YEAR	EXISTING EQUIVALENT PROPERTY DAMAGE ONLY VALUE POINTS	EXISTING PASSING RELATED CRASH RATE	EXISTING PASSING RELATED CRASH RATE POINTS	FUTURE EPDO/MILE/YEAR	FUTURE EPDO/MILE/YEAR POINTS	COST PER LANE MILE	COST PER LANE MILE POINTS	BRIDGE WIDENING COST	BRIDGE WIDENING COST POINTS	TOTAL POINTS	STATEWIDE RANK	DISTRICT RANK	TIER LEVEL
Flagstaff	I 40 EB: MP188 - MP190	3.22	10	21,186	0.21	52/48	31%	75	C	111	1.91	224	24,000	C		19	6.46	10.00	>10mi	2.00	21.08	2.28	1.91	3.72	224	14.93	7.00	0.17	1.99	17.69	3.00	LOW	3	$0	3.00	32.45	2	1	1
Flagstaff	I 17 NB: MP307 - MP311	6.00	10	16,050	0.10	58/42	11%	75	A	76	1.73	131	28,500	B		9	2.09	10.00	>10mi	2.00	15.63	1.36	1.73	3.27	131	8.73	7.00	0.18	2.12	18.80	4.00	LOW	3	$0	3.00	27.84	5	2	1
Flagstaff	I 17 SB: MP318 - MP316	3.81	10	11,975	0.08	56/44	17%	75	A	80	2.44	127	27,500	A	1	4	0.00	10.00	>10mi	2.00	9.41	0.31	2.44	5.00	127	8.47	7.00	0.18	2.13	25.60	4.00	LOW	3	$203,760	0.71	24.15	8	3	2
Flagstaff	I 17 NB: MP299 - MP305	5.97	8	17,146	0.10	60/40	10%	75	A	51	1.09	98	30,500	B		10	2.42	10.00	>10mi	2.00	16.95	1.59	1.09	1.70	98	6.53	6.00	0.28	3.31	12.64	3.00	HIGH	1	$0	3.00	24.01	9	4	2
Flagstaff	I 40 WB: MP193 - MP191	3.97	9	18,113	0.11	54/46	45%	75	A	36	0.87	66	27,500	B		10	2.44	10.00	>10mi	2.00	14.54	1.18	0.87	1.17	66	5.26	4.00	0.14	1.65	9.10	2.00	LOW	3	$0	3.00	20.43	12	5	2
Flagstaff	I 40 EB: MP151 - MP152	4.95	10	13,902	0.11	57/43	15%	75	A	42	1.10	73	19,000	B	1	8	1.92	1.29	1.29	0.00	11.48	0.66	1.10	1.74	73	4.87	6.00	0.08	0.82	8.07	3.00	LOW	3	$94,320	1.94	19.08	14	6	2
Flagstaff	I 15 NB: MP19 - MP25	2.93	4	17,912	0.10	58/42	23%	75	A	45	0.92	90	21,500	A		8	1.81	10.00	>10mi	2.00	9.81	0.38	0.92	1.29	90	6.00	5.00	0.10	1.11	7.60	3.00	HIGH	1	$0	3.00	18.59	16	7	3
Flagstaff	I 15 SB: MP21 - MP19	5.17	4	17,912	0.10	58/42	23%	55	B	26	0.53	42	21,500	B		15	4.74	10.00	>10mi	2.00	17.70	1.71	0.53	0.35	42	2.80	2.00	0.08	0.85	4.39	1.00	HIGH	1	$0	3.00	16.65	22	8	3
Flagstaff	I 40 EB: MP156 - MP159	3.88	10	13,361	0.11	58/42	16%	75	A	35	0.96	46	19,500	A		7	1.38	2.06	2.06	0.42	10.50	0.50	0.96	1.39	46	3.07	2.00	0.05	0.51	7.19	2.00	LOW	3	$0	3.00	14.19	25	9	3
Flagstaff	I 40 WB: MP163 - MP162	4.44	10	12,242	0.11	58/42	16%	75	A	33	0.98	57	19,500	A	1	6	0.83	10.00	>10mi	2.00	9.48	0.32	0.98	1.45	57	3.80	4.00	0.03	0.20	7.39	2.00	LOW	3	$267,480	0.00	13.81	28	10	3
Kingman	I 40 EB: MP47 - MP49	6.03	4	12,104	0.08	59/41	42%	75	A	70	2.11	128	24,000	B	1	6	0.79	10.00	>10mi	2.00	11.64	0.69	2.11	4.20	128	8.53	7.00	0.33	4.00	19.52	3.00	HIGH	1	$29,520	2.67	25.35	7	1	2
Kingman	I 40 WB: MP132 - MP136	2.93	10	12,234	0.10	56/44	32%	75	A	31	0.93	84	16,500	A		6	0.67	10.00	>10mi	2.00	7.56	0.00	0.93	1.31	84	5.60	6.00	0.06	0.58	5.88	2.00	LOW	3	$0	3.00	18.56	17	2	3
Kingman	I 40 EB: MP58 - MP60	3.70	10	21,073	0.10	57/44	28%	75	A	34	0.59	88	30,250	B	1	10	2.85	10.00	>10mi	2.00	15.07	1.27	0.59	0.49	88	5.87	5.00	0.02	0.04	6.80	1.00	MEDIUM	2	$31,680	2.64	17.30	20	3	3
Kingman	I 40 EB: MP81 - MP83	5.36	10	12,981	0.11	58/42	20%	75	A	29	0.82	63	17,500	B		9	1.99	10.00	>10mi	2.00	11.56	0.68	0.82	1.04	63	4.20	5.00	0.06	0.53	5.50	2.00	HIGH	1	$0	3.00	17.24	21	4	3
Kingman	I 40 EB: MP125 - MP128	4.05	10	12,234	0.10	56/44	32%	75	A	24	0.72	69	16,500	A		7	1.10	10.00	>10mi	2.00	8.85	0.22	0.72	0.80	69	4.60	5.00	0.03	0.20	4.55	1.00	LOW	3	$0	3.00	16.32	23	5	3
Kingman	I 40 EB: MP76 - MP77	4.11	10	13,875	0.11	58/42	22%	75	A	27	0.71	47	18,000	A		8	1.68	10.00	>10mi	2.00	10.21	0.45	0.71	0.79	47	3.13	3.00	0.03	0.16	4.93	2.00	HIGH	1	$0	3.00	14.07	27	6	3
Kingman	I 40 WB: MP115 - MP114	4.63	10	12,273	0.11	58/42	24%	75	A	18	0.54	31	15,500	A		7	1.30	10.00	>10mi	2.00	8.87	0.22	0.54	0.36	31	2.07	1.00	0.03	0.20	3.20	1.00	LOW	3	$0	3.00	12.09	30	7	3
Kingman	I 40 EB: MP93 - MP97	3.15	10	11,420	0.11	58/42	20%	75	A	19	0.61	44	15,500	A		6	0.66	3.25	3.25	1.06	7.57	0.00	0.61	0.54	44	2.93	2.00	0.03	0.23	3.63	1.00	LOW	3	$0	3.00	11.48	31	8	3
Prescott	I 17 NB: MP246 - MP250	6.10	10	28,069	0.10	59/41	11%	65	B	142	1.85	209	37,000	C		18	6.07	10.00	>10mi	2.00	23.38	2.67	1.85	3.56	209	13.93	7.00	0.23	2.77	26.08	4.00	MEDIUM	2	$0	3.00	33.07	1	1	1
Prescott	I 17 SB: MP281 - MP285	6.08	10	26,171	0.11	62/38	16%	65	C	103	1.44	153	40,000	D		20	7.28	10.00	>10mi	2.00	31.25	4.00	1.44	2.56	153	10.20	3.00	0.20	2.28	21.93	4.00	MEDIUM	2	$0	3.00	30.12	3	2	1
Prescott	I 17 NB: MP255 - MP256	4.34	10	27,973	0.10	60/40	11%	75	B	67	0.87	162	38,500	C		15	5.00	10.00	>10mi	2.00	21.10	2.29	0.87	1.19	162	10.80	6.00	0.16	1.80	12.85	4.00	MEDIUM	2	$0	3.00	27.27	6	3	1
Prescott	I 17 SB: MP293 - MP295	3.25	10	21,353	0.11	63/37	11%	75	B	48	0.82	82	29,500	B		12	3.71	10.00	>10mi	2.00	17.18	1.62	0.82	1.06	82	5.47	4.00	0.07	0.69	9.24	2.00	LOW	3	$0	3.00	21.08	10	4	2
Prescott	I 17 SB: MP284 - MP286	4.68	10	23,729	0.11	60/40	15%	65	B	42	0.65	75	35,500	C	1	16	5.48	10.00	>10mi	2.00	24.56	2.87	0.65	0.63	75	5.00	3.00	0.09	0.99	8.76	2.00	MEDIUM	2	$158,760	1.22	20.19	13	5	2
Prescott	I 17 NB: MP294 - MP298	3.47	10	21,353	0.11	63/37	11%	75	B	39	0.67	65	29,500	B		12	3.71	10.00	>10mi	2.00	17.18	1.62	0.67	0.68	65	4.33	3.00	0.02	0.04	7.51	2.00	LOW	3	$0	3.00	19.06	15	6	2
Prescott	I 17 SB: MP240 - MP238	3.74	4	35,035	0.10	58/42	11%	75	B	55	0.57	97	46,000	C	1	15	4.91	10.00	>10mi	2.00	19.85	2.08	0.57	0.45	97	6.47	2.00	0.06	0.61	10.06	3.00	MEDIUM	2	$195,120	0.81	17.86	18	7	3
Prescott	I 17 NB: MP270 - MP275	3.00	10	19,774	0.11	65/35	16%	75	A	21	0.39	50	25,500	B		11	2.97	10.00	>10mi	2.00	13.88	1.07	0.39	0.00	50	3.33	2.00	0.02	0.06	3.77	1.00	MEDIUM	2	$0	3.00	14.09	26	8	3
Safford	I 10 WB: MP306 - MP302	3.15	11	29,608	0.09	56/44	22%	35	C	51	0.63	159	40,750	D		22	8.00	10.00	>10mi	2.00	30.38	3.85	0.63	0.59	159	10.60	5.00	0.10	1.07	9.78	3.00	LOW	3	$0	3.00	29.51	4	1	1
Safford	I 10 EB: MP315 - MP317	4.69	10	17,166	0.09	60/40	15%	75	A	31	0.66	108	25,500	A		7	1.31	10.00	>10mi	2.00	10.45	0.49	0.66	0.66	108	7.20	6.00	0.02	0.09	6.42	1.00	LOW	3	$0	3.00	17.55	19	2	3
Safford	I 10 EB: MP309 - MP311	5.21	10	17,720	0.09	59/41	15%	75	A	22	0.45	29	26,500	B	1	8	1.69	10.00	>10mi	2.00	11.80	0.72	0.45	0.16	29	1.93	1.00	0.02	0.09	4.58	1.00	LOW	3	$49,320	2.45	12.10	29	3	3
Tucson	I 10 EB: MP286 - MP291	2.96	10	26,483	0.10	60/40	15%	75	B	57	0.79	155	41,000	C	1	12	3.47	10.00	>10mi	2.00	18.41	1.83	0.79	0.97	155	10.33	4.00	0.01	0.00	12.30	3.00	LOW	3	$23,040	2.74	21.01	11	1	2
Yuma	I 8 EB: MP18 - MP20	6.28	10	13587	0.08	52/48	16%	55	A	25	0.67	62	32,200	B		7	1.51	10.00	>10mi	2.00	15.44	1.33	0.67	0.69	62	4.13	4.00	0.03	0.16	7.18	2.00	HIGH	1	$0	3.00	15.70	24	1	3