



PART III

CHAPTER 5-6



CHAPTER III

The toolbox provides a plethora of options that transportation professionals can use to effectively improve safety by mitigating risk and improving the overall performance of the transportation system.



PART III: IMPLEMENTATION PLAN

INTRODUCTION

Part III of this report details recommendations, countermeasures, and policies that should be implemented to enhance safety in the County. Specifically, **Chapter 5** outlines targeted recommendations for the selected study corridors while also providing systemic countermeasures that could be implemented on any roads in the network. Recommended policies and programs organized by the Six E's of Safety are located in **Chapter 6**.

Chapter 5: Countermeasures

- › Systemic Countermeasures
- › Targeted Recommendations

Chapter 6: Implementation Plan

- › Education
- › Encouragement
- › Enforcement
- › Engineering
- › Equity
- › Evaluation
- › Annual Reporting & Transparency

CHAPTER 5. COUNTERMEASURES

Chapter 5 summarizes the countermeasures and targeted recommendations selected during this planning process. Since targeted recommendations were only identified for the three chosen study corridors, a systemic countermeasure toolbox was created. The toolbox consists of FHWA proven safety countermeasures that can be implemented on any roadway in the county based on safety needs. Implementing these countermeasures and recommendations are a big step towards creating a safer transportation network for all.

SYSTEMIC COUNTERMEASURE TOOLBOX

A countermeasure toolbox is a comprehensive collection of engineering interventions designed to address specific safety issues. The toolbox provides a plethora of options that transportation professionals can use to effectively improve safety by mitigating risk and improving the overall performance of the transportation system.

Table 12 summarizes all the countermeasures in the Toolbox, their crash modification factor (CMF), and what safety issue it would best solve. The CMF for each countermeasure shows the proportion of crashes that would be expected after a countermeasure is implemented. For example, if a corridor experienced 100 crashes in 5 years and then rumble strips were implemented, it is expected that in the next five years 80 crashes could occur. The following sections will provide further details about each countermeasure in the toolbox, and where its implementation would be most appropriate. Although these countermeasures can be used on any road in the network, priority for implementation should be given to roads on the HIN.



TABLE 12. SYSTEMIC COUNTERMEASURE TOOLBOX

COUNTERMEASURES	CMF	ROADWAY & LANE DEPARTURE	SPEED RELATED	INTERSECTION RELATED	VULNERABLE ROAD USERS	DISTRACTED DRIVING	IMPAIRED DRIVING	OCCUPANT PROTECTION
Corridor Treatments:								
Bike lanes	0.435		×		×			
Corridor Access Management	0.93			×				
High Contrast Lane Markings	0.75	×				×	×	
Raised Median	0.29	×	×		×	×	×	×
Roadway Reconfiguration	0.53		×		×			×
Rumble Strips (Longitudinal)	0.839 – 0.89	×				×	×	
SafetyEdge SM	0.774	×						
Sidewalks	0.598				×			
Speed Feedback Signs	0.95	×	×		×	×	×	
Wider Edge Lines	0.635	×				×	×	

COUNTERMEASURES	CMF	ROADWAY & LANE DEPARTURE	SPEED RELATED	INTERSECTION RELATED	VULNERABLE ROAD USERS	DISTRACTED DRIVING	IMPAIRED DRIVING	OCCUPANT PROTECTION
Intersection Treatments:								
Improved Signing & Visibility at Signals	0.732			×	×	×	×	
Rectangular Rapid Flashing Beacon	0.31		×	×	×	×		
Retroreflective Backplates	0.85			×		×	×	
Roundabouts	0.59		×	×	×			×
Rumble Strips (Transverse)	0.745			×		×	×	
Systemic Countermeasures at Stop-Controlled Intersections	0.748			×	×	×	×	



CORRIDOR TREATMENTS

Bike Lanes

Most fatal and suspected serious injury bicyclist crashes do not occur at intersections rather they mostly occur when motorists are overtaking bicyclists according to the FHWA. Installing bike lanes would not only provide dedicated spaces for bicyclist but could also encourage other people to bicycle because of the comfort a bike lane provides (**Figure 17**). Bike lanes mitigate and prevent interactions, conflicts, and crashes between bicyclists and motor vehicles. Additionally, they can be deployed to help narrow the pavement width in a roadway with excess space to mitigate speeding. The FHWA provides resources ([Bikeway Selection Guide and Incorporating On-Road Bicycle Network into Resurfacing Projects](#)) that can aid with deciding what type of bike facilities would be most appropriate for implementation in the County.

CMF: 0.435

Cost Rating: Medium

Safety Rating: High

Safety Emphasis Area Addressed:

- Speed Related
- Vulnerable Road Users

FIGURE 17. BIKE LANES



Source: Wyoming Pathways

Corridor Access Management

Access management pertains to the planning, implementation, and regulation of access points along a road, encompassing intersections with other roads and driveways serving nearby properties. The thoughtful practice of access management along a corridor can enhance safety for all modes, decrease turning movement conflicts, and reduce congestion. There are several access management strategies that can be used to enhance safety such as reducing driveway density, limiting allowable movements at driveways, provide turning lanes, managing the spacing of intersections, and implementing raised medians. **Figure 18** provides an example of corridor access management elements.

CMF: 0.93

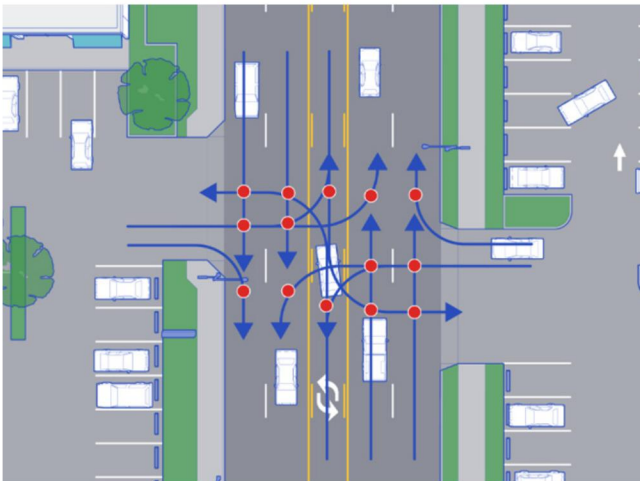
Cost Rating: Medium: High

Safety Rating: Low

Safety Emphasis Area Addressed:

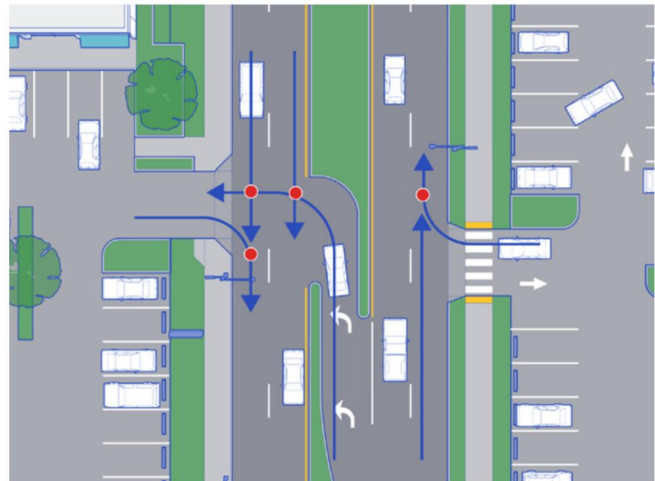
- Intersection Related

FIGURE 18. CORRIDOR ACCESS MANAGEMENT



Before Access Management

Source: FHWA



After Access Management

High Contrast Lane Markings

High contrast lane markings as shown in are road markings that are designed to be easily distinguished from the surrounding pavement by utilizing both black and white paint. The contrast is either created from contrasting colors, materials, or design as shown in **Figure 19**. Implementing high contrast lane markings is meant to improve visibility of lane lines particularly in situations like adverse weather conditions, poor lighting, or when there is glare.

CMF: 0.75

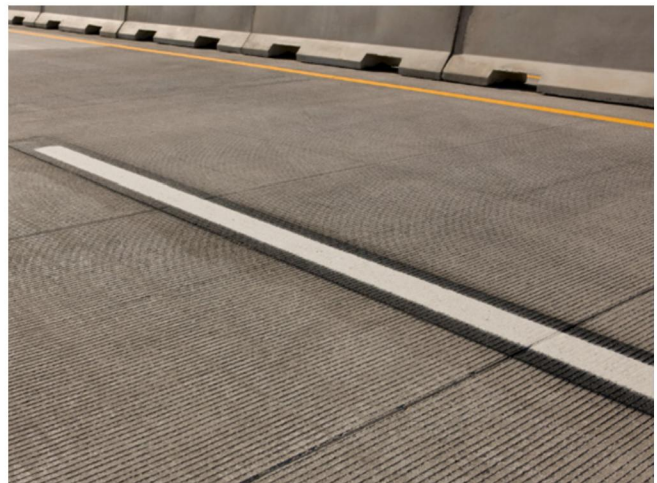
Cost Rating: Low

Safety Rating: Low

Safety Emphasis Area Addressed:

- Roadway & Lane Departure
- Distracted Driving
- Impaired Driving

FIGURE 19. HIGH CONTRAST LANE MARKINGS EXAMPLES



Source: Indiana Department of Transportation and Illinois Center for Transportation

Raised Median

Median barriers are longitudinal barriers that separate opposing traffic from one another and are designed to keep reducing the number of cross-median crashes (also known as head on collisions). The best locations for raised medians are typically divided highways due to the relatively high speeds they experience which is attributed to head-on collisions (FHWA). There are several types of medians that can be utilized depending on the needs of the County such as cable barriers, metal-beam guardrails, and concrete barriers (**Figure 20**). If raised medians are implemented to aid in decreasing head on collisions, the county should consider a systemic approach to implementation based on hot spots and head-on collision risk factors (volumes, vertical and horizontal alignments, median terrain configuration, and vehicle classifications).

CMF: 0.29

Cost Rating: Medium

Safety Rating: High

Safety Emphasis Area Addressed:

- Roadway & Lane Departure
- Speed Related
- Vulnerable Road Users
- Distracted Driving
- Impaired Driving
- Occupant Protection

FIGURE 20. RAISED MEDIAN



Source: Missouri Department of Transportation



Roadway Reconfiguration

Roadway Reconfiguration also known as road diets, as shown in **Figure 21**, bring several benefits such as calming traffic, provide better mobility and access to all users, and enhance the overall quality of life (FHWA). This treatment is commonly used in urban or suburban areas due to their needs of drivers maintaining more consistent speeds to create a safer environment for vulnerable road users. While roadway reconfigurations provide a plethora of opportunities to better vulnerable road users' safety, it also creates safety benefits for drivers such as a reduction in rear-end and left-turn crashes because of the dedicated left-turn lane and fewer right-angle crashes due to decreased crossing distance cars must travel. Road diets can be low-cost if planned in conjunction with an overlay.

CMF: 0.53

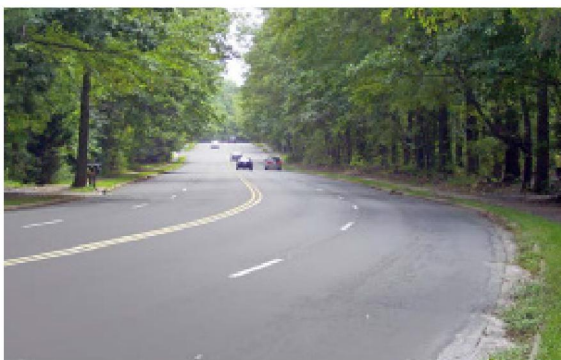
Cost Rating: Low

Safety Rating: High

Safety Emphasis Area Addressed:

- Speed Related
- Vulnerable Road Users
- Occupant Protection

FIGURE 21. ROADWAY RECONFIGURATION



BEFORE



AFTER

Source: FHWA

Rumble Strips

Rumble strips, both longitudinal and transverse, create several safety benefits to the transportation network. Longitudinal rumble strips, such as the one shown in **Figure 22**, are milled or raised elements on the pavement that alert drivers through both vibration and sound when they are leaving their designated travel lane. Similarly, transverse rumble strips use both sound and vibration to catch drivers' attention but serve a slightly different purpose since they are placed perpendicularly to the road (**Figure 23**). Transverse rumble strips are typically installed to alert drivers of an incoming change to the environment such as a stop-controlled intersection or two-way stop-controlled intersection. Both types of rumble strips are designed to address roadway/lane departure and intersection-related crashes by alerting distracted, drowsy, or otherwise inattentive drivers.

CMF: 0.745 – 0.839 (depending on the type)

Cost Rating: Low

Safety Rating: Medium

Safety Emphasis Area Addressed:

- Roadway & Lane Departure
- Intersection Related
- Distracted Driving
- Impaired Driving

FIGURE 22. CENTERLINE RUMBLE STRIP



Source: FHWA

FIGURE 23. TRANSVERSE RUMBLE STRIP



Source: Adobe Stock



SafetyEdgeSM Treatment

Rural road crashes involving edge drop-offs are 2-4 times more likely to include a fatality than other crashes on the same roads, according to the FHWA. Vertical exposed pavement can cause vehicles to become unstable and prevent vehicles from safely returning to the roadway. Implementing safetyedgeSM treatments will give drivers the opportunity to return to the travel lane while maintaining control of their vehicles. SafetyEdgesSM are pavement edges that are shaped at approximately 30 degrees from the pavement cross slope during the pavement process (**Figure 24**). In addition to the safety benefits to drivers, including a safetyedgeSM can improve pavement durability by reducing edge raveling of the asphalt. This treatment can be low cost when paired with an overlay project; additional information can be found in the [TxDOT Roadway Design Manual](#).

CMF: 0.774

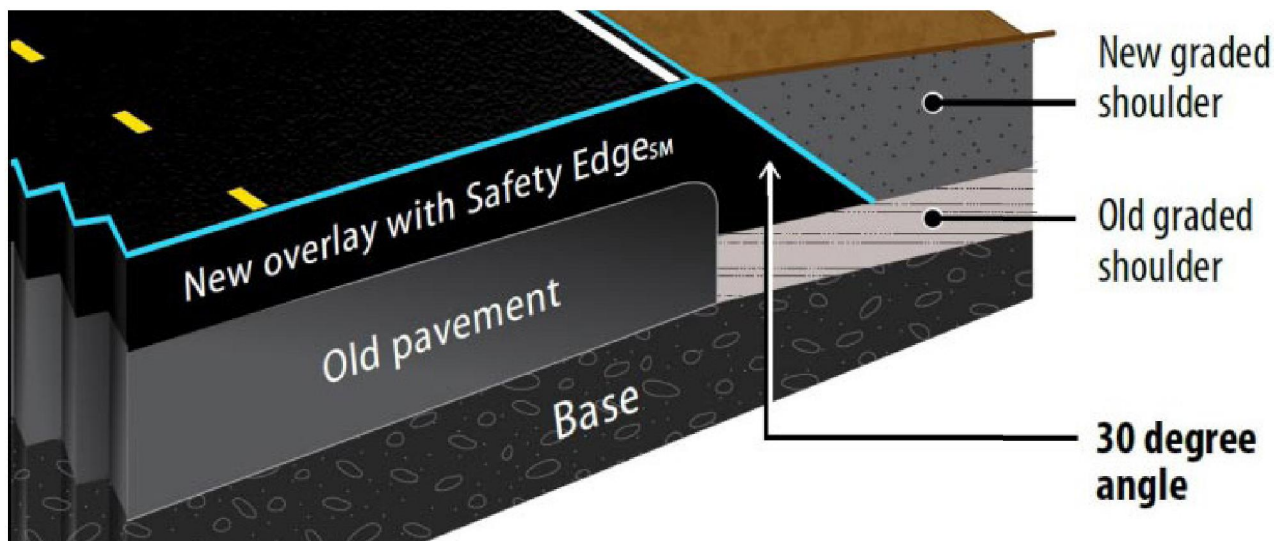
Cost Rating: Low

Safety Rating: Medium

Safety Emphasis Area Addressed:

- Roadway & Lane Departure

FIGURE 24. SAFETYEDGESM



Source: FHWA

Sidewalks

A sidewalk is any type of defined space or pathway that is dedicated for non-motorized users (**Figure 25**). Sidewalks enhance pedestrian safety by separating pedestrians from vehicles, promoting walking as a mode of transportation, and providing accessible routes for people of all ages. While sidewalks may already exist, it is important that sidewalks are in good condition and connected to ensure a comfortable and safe experience for vulnerable road users.

CMF: 0.598

Cost Rating: High

Safety Rating: High

Safety Emphasis Area Addressed:

- Vulnerable Road Users

FIGURE 25. SIDEWALK



Source: pedbikeimages.org/ Dan Burden



Speed Feedback Signs

Speed feedback signs show drivers their speeds (**Figure 26**) and can encourage drivers to slow down by implying that speeds are being monitored or enforced by law enforcement. These feedback signs operate using radar detection can be either permanent installations or portable based on the needs of the County; a portable option allows the sign to be in rotation between various locations with speeding issues. Traditional locations for speed feedback signs include work zones, school zones, speed limit transitional zones, and near curves, but do not need to be limited to these locations (NHTSA).

CMF: 0.95

Cost Rating: Low

Safety Rating: Low

Safety Emphasis Area Addressed:

- Roadway & Lane Departure
- Speed Related
- Vulnerable Road Users
- Distracted Driving
- Occupant Protection

FIGURE 26. SPEED FEEDBACK SIGN



Source: FHWA

Wider Edge Lines

To aid drivers with clearly identifying the edge of travel lanes, wider edge lines should be implemented. Wider edge lines enhance the visibility of travel lane boundaries compared to traditional edge lines (FHWA). Traditionally edge lines are approximately four inches while wide edge lines are six inches as shown in **Figure 27**. Although edge lines are most effective on rural two-lane highways, they can be implemented and create safety benefits in both urban and rural areas. If implemented systemically, the county should prioritize roadways on the HIN and other rural roads that include the following risk factors for roadway and lane departure crashes: existing shoulder widths, curve presence, volumes, and history of crashes in poor lighting (FHWA).

CMF: 0.635

Cost Rating: Low

Safety Rating: Low

Safety Emphasis Area Addressed:

- Roadway & Lane Departure
- Distracted Driving
- Impaired Driving

FIGURE 27. WIDER EDGE LINES



Source: Adobe Stock



INTERSECTION TREATMENTS

Improve Signing and Visibility at Signals

Intersections are locations with the most conflict points between vehicles and non-motorists. To remind drivers of the presence and right of way of vulnerable road users, several signage and visibility improvements can be implemented to protect and enhance awareness of both parties at an intersection. Minimum improvements at a signalized intersection to improve vulnerable road user safety should be to include high contrast crosswalks, pedestrian signal heads and push buttons, and ADA compliant ramps (**Figure 28**). Additionally, to increase awareness and visibility of the traffic signal itself this countermeasure recommends refreshing pavement markings and installing advance warning signs when appropriate.

CMF: 0.732

Cost Rating: Medium

Safety Rating: High

Safety Emphasis Area Addressed:

- Intersection Related
- Vulnerable Road Users
- Distracted Driving
- Impaired Driving

FIGURE 28. INTERSECTION WITH HIGH CONTRAST CROSSWALKS



Source: achdidaho.org

Rectangular Rapid Flashing Beacon (RRFB)

Although marked crosswalks and pedestrian warning signs can improve pedestrian crossing safety, some crossings may require an extra level of enhancement to guarantee that drivers can visibly locate crossing locations and yield to pedestrians. Rectangular rapid flashing beacons (RRFB) can accompany a pedestrian warning signs to enhance pedestrian visibility by increasing driver awareness at uncontrolled crossings. RRFBs are made up of two, rectangular-shaped yellow indications each with a LED-array-based light source as depicted in **Figure 29**. The flashing pattern can be activated with either a pushbutton or passive pedestrian detection and should be unlit when not in use. Research shows that RRFBs can result in driver yielding rates up to 98% at marked crosswalks.

CMF: 0.31

Cost Rating: Medium

Safety Rating: High

Safety Emphasis Area Addressed:

- Speed Related
- Intersection Related
- Vulnerable Road Users
- Distracted Driving

FIGURE 29. RRFB



Source: Kimley-Horn



Retroreflective Backplates

Retroreflective backplates on traffic signal heads improve the visibility of the lights by creating a controlled-contrast background with a 1 or 3-inch yellow retroreflective border as shown in **Figure 30**. Adding this feature to traffic signals make them more visible in both nighttime and daytime conditions as well as bring benefits to older drivers or those with color deficient vision. The implementation of this countermeasure can be fairly low cost depending on the method used; adding retroreflective tape on existing backplates or purchasing new backplates with retroreflective borders already incorporated.

CMF: 0.85

Cost Rating: Low

Safety Rating: Medium

Safety Emphasis Area Addressed:

- Intersection Related
- Distracted Driving
- Impaired Driving

FIGURE 30. RETROREFLECTIVE BACKPLATES



Source: Nevada Department of Transportation

Roundabouts

Roundabouts are a non-signalized intersection control type that is an alternative to stop-controlled intersections. A roundabout is an intersection with a circular configuration that enhances safety while still efficiently moving traffic. Roundabouts have channelized, curved approaches that reduce vehicle speed, entry yield control that gives right-of-way to circulating traffic, and counterclockwise flow around a central island that minimizes conflict points (FHWA), as shown in **Figure 31**. Due to the lower speeds and reduction in conflict points, the number of crashes and crash severities are reduced. Although roundabouts are typically thought of only being used in an urban context, there are significant safety benefits of roundabouts on high-speed facilities (TxDOT). TxDOT cites several locations where high-speed roundabouts have been implemented and are successfully enhancing safety in their [“Innovative Intersections Design Aids”](#).

CMF: 0.59

Cost Rating: High

Safety Rating: High

Safety Emphasis Area Addressed:

- Speed Related
- Intersection Related
- Vulnerable Road Users
- Occupant Protection

FIGURE 31. ROUNDABOUT



Source: Columbus Dispatch



Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections

Creating a package of multiple low-cost countermeasures to then be implemented on stop-controlled intersection within the County would increase intersection safety. The low-cost countermeasures should include enhanced signing and pavement markings to aid increasing driver awareness and recognition of the upcoming intersections (**Figure 32**). Depending on the approach at the stop-controlled intersection, there are several enhancements possible such as doubled-up, oversized advanced intersection warning signs on the through approach and doubled-up, oversized stop signs at the stop approach. Ultimately, the main purpose of the countermeasure included in this approach should increase driver awareness to ensure appropriate behavior at the intersection.

CMF: 0.748

Cost Rating: Low

Safety Rating: Medium

Safety Emphasis Area Addressed:

- Intersection Related
- Vulnerable Road Users
- Distracted Driving
- Impaired Driving

FIGURE 32. LOW-COST SIGNAGE AND PAVEMENT MARKINGS



Source: MUTCD

TARGETED RECOMMENDATIONS

Part of the CSAP included selecting road locations that received more detailed analysis and targeted recommendations aimed at improving safety. Field observations were completed to gather an understanding of the existing conditions and crash locations. A memorandum with the in-depth observations, field photos, and preliminary recommendations from the field observations can be found in **Appendix C**.

The following sections will summarize the crash history and recommendations, both at a corridor and intersection level, for each of the three corridors.

Study Corridors

To aid the ZRDG Committee and the County in deciding what roadway segments should be selected to receive targeted recommendations, all segments on the HIN were scored based on equity, engagement, and feasibility. The specific criteria used for scoring are listed below:

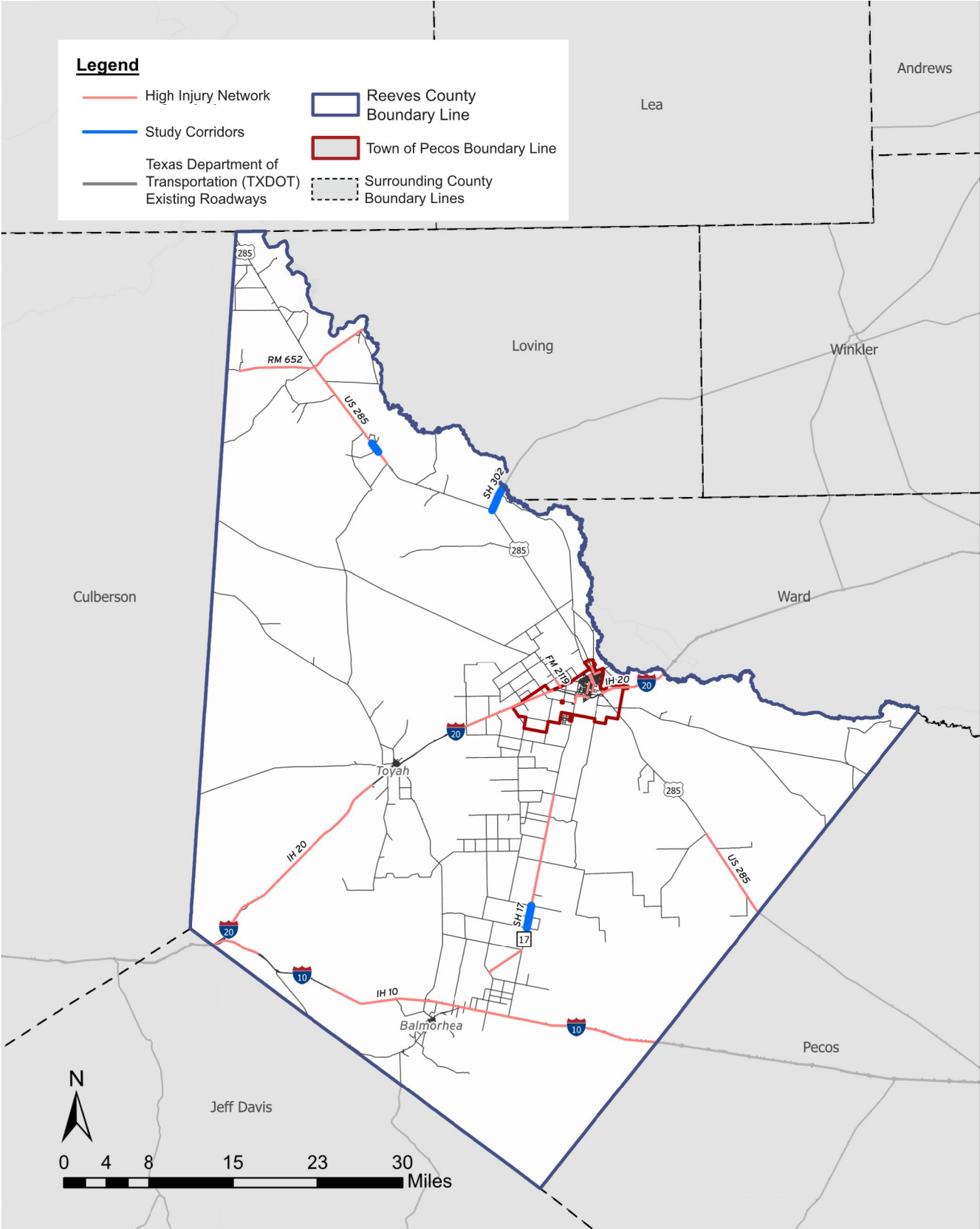
 EQUITY	 ENGAGEMENT	 FEASIBILITY
- Disadvantaged Areas (USDOT ETC Explorer) - Transportation Disadvantaged Areas (USDOT ETC Explorer)	- Social Pinpoint Map Survey Comments - Committee Comments on Study Area (Meeting 2) - Committee's Priority Corridors (Meeting 3)	- Current Improvements Projects - TxDOT On/Off System

The highest priority segments were those along the high injury network with the highest scores. Through coordination between the County and the ZRDG Committee, three study corridors were selected for detailed analysis and recommendations. Details regarding the three chosen corridors are listed below in **Table 13**. The corridors comprised 5.22 miles and capture 16 fatal and severe injury crashes. **Exhibit 12** shows the locations of the selected study corridors.

TABLE 13. STUDY CORRIDORS

STUDY CORRIDOR	LIMITS		FUNCTIONAL CLASS	LENGTH (MI.)	CRASHES			PEAK DAILY VOLUME
	From	To			K	A	Total	
SH 302	US 285	County Border	Major Collector	2.29	4	4	8	6,277
SH 17	Ranch Road 3334	County Road 331	Minor Arterial	2.00	1	2	3	2,980
US 285	County Road 433	1,900 ft South of County Road 436	Other Principal Arterial	0.93	1	4	5	7,900

EXHIBIT 12. STUDY CORRIDORS



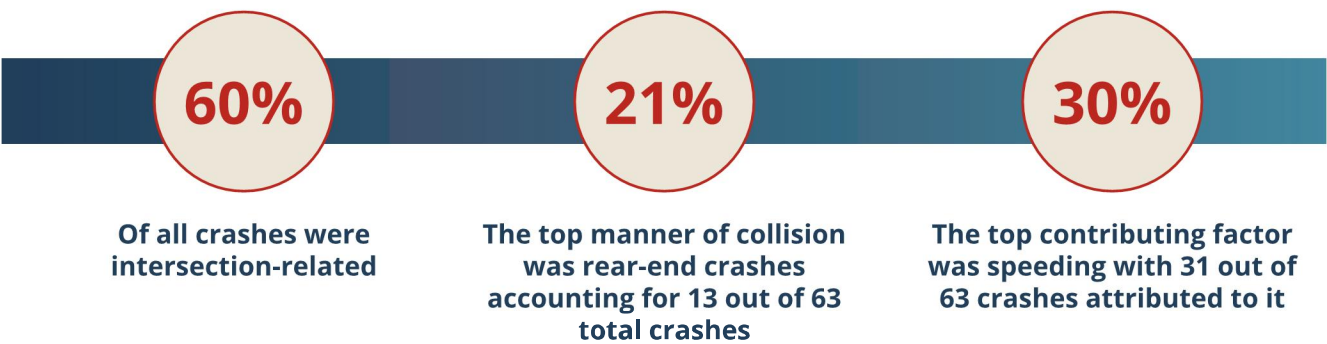
CORRIDOR 1: SH 302

Context

Corridor 1 is the portion of SH 302 from US 285 to the county border. The study corridor is approximately 2.29 miles of roadway with a speed limit 75 MPH. Most of the corridor is a three-lane roadway but widens into a four-lane closer to the US 285 and SH 302 intersection. The roadway widens to accommodate dedicated left and right turn lanes on the SH 302 approach. Additionally, the average daily traffic is approximately 6,300. Although this area is very rural, there are numerous industrial businesses along the corridor leading to an increased volume of heavy freight traffic. This section of SH 302 is the start of the state highway that runs parallel to I-20 and connects traffic from Reeves County to the Midland-Odessa Area without having to use I-20.

Crash History

The corridor experienced 63 total crashes from 2019 – 2023. Specifically, there were 4 fatal crashes, 4 suspected serious injury crashes, and 8 suspected minor injury crashes meaning 25% of all crashes within the corridor limits were severe. Other key takeaways about the crashes that occurred during the study period are the following:



Corridor Recommendations

Since the most common contributing factor to crashes was speeding it is recommended that more appropriate speeds be implemented along the corridor. The recommended speed limit is 65 MPH to match the context of the corridor just east of Reeves County into Mentone, TX. To aid driver visibility, lighting along the corridor should be implemented especially since 32% of crashes along the corridor occurred during dark lighting conditions. Additionally, to help reduce the frequency of roadway and lane departure crashes and their severity the paved shoulders should be expanded to 8 feet. The expansion would give drivers more room to safely correct their vehicles if they leave the designated travel lane instead of dropping off into an un paved space.

Intersection Recommendations

US 285

-  Add a right-turn wedge
-  Add intersection lighting
-  Stripe left turn arrows on the SH 302 approaching US 285
-  Stripe right turn arrows on the SH 302 approaching slip lane
-   Add transverse rumble strips and accompanying "Intersection Ahead" signs on US 285 approach
-   Add transverse rumble strips and accompanying "Intersection Ahead" signs on US 302 approach
-  Add flashing beacons onto the "Intersection Ahead" sign on SH 302
-  Long term project should be to construct a grade separated interchange

CR 425

-  Add intersection lighting

FIGURE 33. ARIAL VIEW OF THE SH 302 & US 285 INTERSECTION



Source: Reeves County



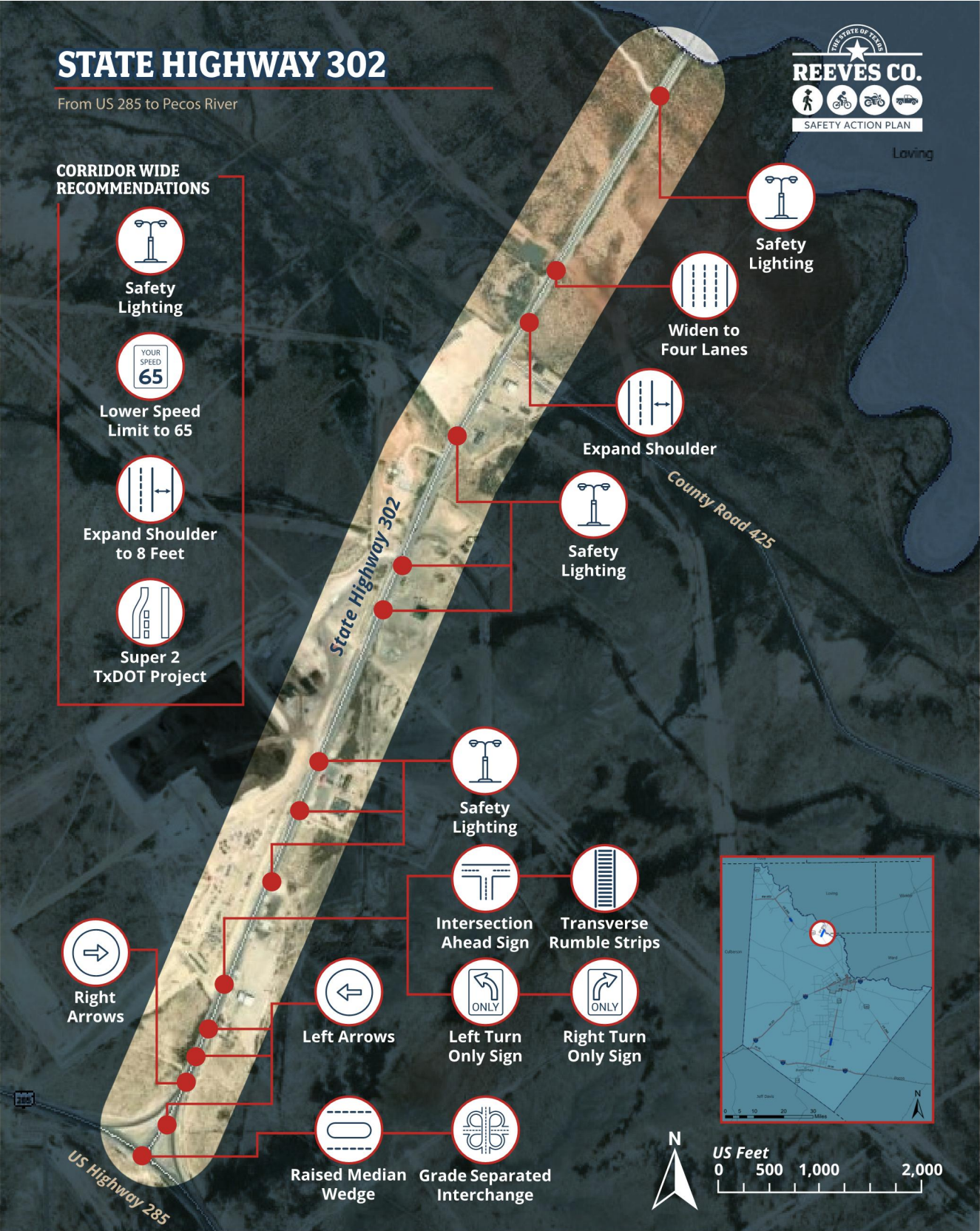
Table 14 summarizes the suggested countermeasures and crash modification factors (CMF). **Exhibit 13** shows all recommended countermeasures along SH 302.

TABLE 14. RECOMMENDATIONS FOR CORRIDOR 1

ID	CONTEXT	LOCATION	RECOMMENDATION	CMF ID #	COUNTERMEASURE	CMF	CRASH TYPE	CMF CRASH SEVERITY
1.1	Corridor	Corridor	Add lighting	7776	Install Lighting	0.68	Night	All
1.2	Corridor	SH 302 - NE of CR 425	Expand shoulder to 8ft	6658	Widen shoulder	0.688	All	KABC
1.3	Corridor	Corridor	Lower speed limit to 65	11288	Lower Posted Speed	0.856	All	KABC
1.A.1	Intersection	SH 302 & US 285	Add wedge	351	Replace Direct Left-Turn with Right-Turn/U-Turn	0.8	All	All
1.A.2	Intersection	SH 302 & US 285	Add lighting	7776	Install Lighting	0.68	Night	All
1.A.3	Intersection	SH 302 & US 285	Add left turn arrows on SH 302 approaching US 285	8872	Implement systemic signing and marking improvements at stop-controlled intersections	0.748	All	All
1.A.4	Intersection	SH 302 & US 285	Add right turn arrows on SH 302 approaching slip lanes	8872	Implement systemic signing and marking improvements at stop-controlled intersections	0.748	All	All
1.A.5	Intersection	SH 302 & US 285	Add transverse rumble strips on US 285 with "Intersection Ahead" signs	2705	Install transverse rumble strips on stop controlled approaches in rural areas	0.745	All	KAB
1.A.6	Intersection	SH 302 & US 285	Add transverse rumble strips on SH 302 with "Intersection Ahead" signs	2705	Install transverse rumble strips on stop controlled approaches in rural areas	0.745	All	KAB
1.A.7	Intersection	SH 302 & US 285	Add flashing "Intersection Ahead" sign on SH 302	8872	Implement systemic signing and marking improvements at stop-controlled intersections	0.748	All	All
1.A.8	Intersection	SH 302 & US 285	Construct grade-separated interchange (long-term)	459*	Convert at-grade intersection into grade-separated interchange	0.58	All	All
1.B.1	Intersection	SH 302 & CR 425	Add lighting	7776	Install Lighting	0.68	All	All

* Treatment recommended in the HSM however the study lacks specification on multitude of sites, correlation of variables, and other scientific biases

EXHIBIT 13. CORRIDOR 1 RECOMMENDATIONS



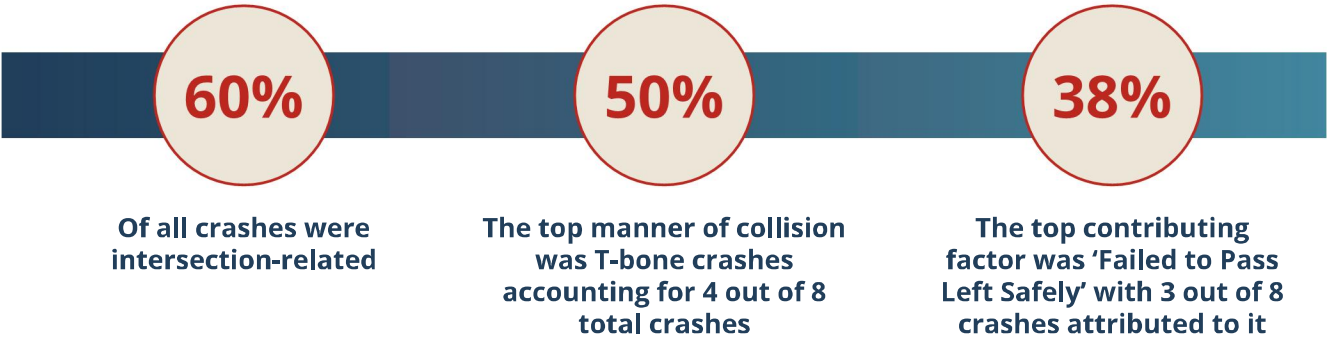
CORRIDOR 2: SH 17

Context

The SH 17 corridor (Corridor 2) is located between County Road 3334 and County Road 331, that is 2 miles in length. Corridor 2 is a two-lane roadway with a speed limit of 75 MPH and has a daily traffic volume of almost 3,000. The surrounding area along the roadway is mainly undeveloped with only a church at the start of the corridor and a caliche mine halfway through the corridor. Although the areas along SH 17 are not largely residential or occupied by businesses, SH 17 is pivotal to the transportation system in the County because it is a direct connection between Balmorhea, Saragosa, Verhalen, and Pecos City without using either interstate.

Crash History

Between 2019 – 2023, the corridor experienced 8 crashes with 38% being severe (KA). There was 1 fatal crash and 2 suspected serious injury crashes during the study period. The following are key takeaways from the crash trends seen:



Corridor Recommendations

To aid with the issue of driver passing when it is not safe, the centerline should be re-striped to be a double yellow line to remind drivers where passing is not permitted due to roadway geometry or sight distance issues. Additionally, a centerline rumble strip should be added to alert drivers of when they are veering into the opposing lane of traffic. Rumble strips should also be milled into the shoulders to notify drivers of their proximity to the road edge. Approximately 25% of crashes along the corridor involved speeding therefore speed feedback signs should be placed along this corridor to aid in safer speed behaviors by drivers. Finally, paved shoulders should be widened to allow for more area that drivers could use to correct any roadway departures they experienced, furthermore, wider shoulders grant a safe area for drivers to pull off for any reason.



Table 15 summarizes the suggested countermeasures and crash modification factors (CMF). **Exhibit 14** shows all recommended countermeasures along SH 17.

TABLE 15. RECOMMENDATIONS FOR CORRIDOR 2

ID	CONTEXT	RECOMMENDATION	CMF ID #	COUNTERMEASURE	CMF	CRASH TYPE	CMF CRASH SEVERITY
2.1	Corridor	Widen shoulders	7755	Widen shoulder	0.66	All	All
2.2	Corridor	Restripe centerline to double yellow	NS07	Upgrade Intersection Pavement Markings	0.75	All	All
2.3	Corridor	Add centerline rumble strips	3342	Install centerline rumble strips	0.89	All	All
2.4	Corridor	Upgrade shoulder rumble strips to be milled	9763	Install edge line or shoulder rumble strips	0.839	Roadway & Lane Departures	All
2.5	Corridor	Add speed feedback signs	6885	Install Dynamic Speed Feedback Sign	0.95	All	All

EXHIBIT 14. CORRIDOR 2 RECOMMENDATIONS



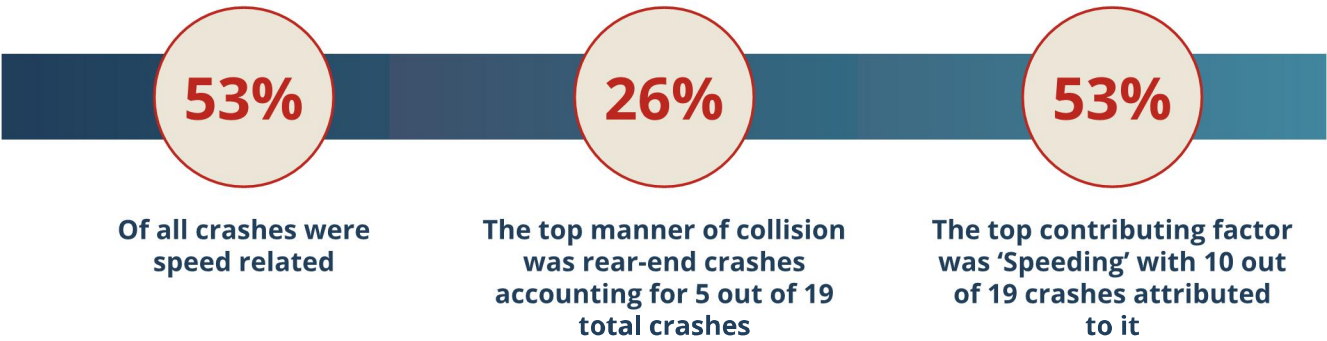
CORRIDOR 3: US 285

Context

Corridor 3 is US 285 from County Road 433 to 1,900 ft. South of County Road 436 (approximately a mile in length). Due to construction occurring in the surrounding areas, the speed limit is 55 MPH. The roadway is also two-lane undivided but could expect widening in the future. The average daily traffic is approximately 7,900. While most of US 285 mainly serves as a pass-through corridor, the section selected as the corridor does have a truck stop and corporate-owned residences for oil and gas industry employees. Additionally, Reeves County Emergency Service District 1 and 2's station is located at the northern most part of the corridor across the road from the truck stop and residential area. Because of the surrounding oil and gas fields and the corridor's provided connection between New Mexico and Texas, this corridor experiences heavy freight traffic.

Crash History

The one-mile corridor on US 285 experienced 19 crashes within the five-year study period. Of the 19 crashes, 50% were either fatal, suspected severe injury, or suspected minor injury crashes. Below are key takeaways from the crashes observed during the study period:



Corridor Recommendations

Since 26% of all crashes were rear-ends, this corridor should be reconfigured to be a Super Two. A Super Two is a roadway configuration in which there is a periodic, short-term passing lane that either alternates or is side by side at regular intervals along a roadway, typically a rural, two-lane highway (Texas Transportation Institute). This allows for drivers to pass slower vehicles safely. As an accompanying feature, the centerline should be re-striped to be a wide double yellow. With the wide double yellow line, a centerline rumble strip should be placed within the space between the yellow line to not only create a level of separation between the travel lanes but serve as a reminder to drivers when they are close to leaving their travel lanes. Rumble strips on the shoulder should also be milled to serve the same safety purposes.

Intersection Recommendations

CR 433



Construct right-turn deceleration lanes



Construct acceleration lanes



Install intersection lighting

CR 436



Install intersection lighting



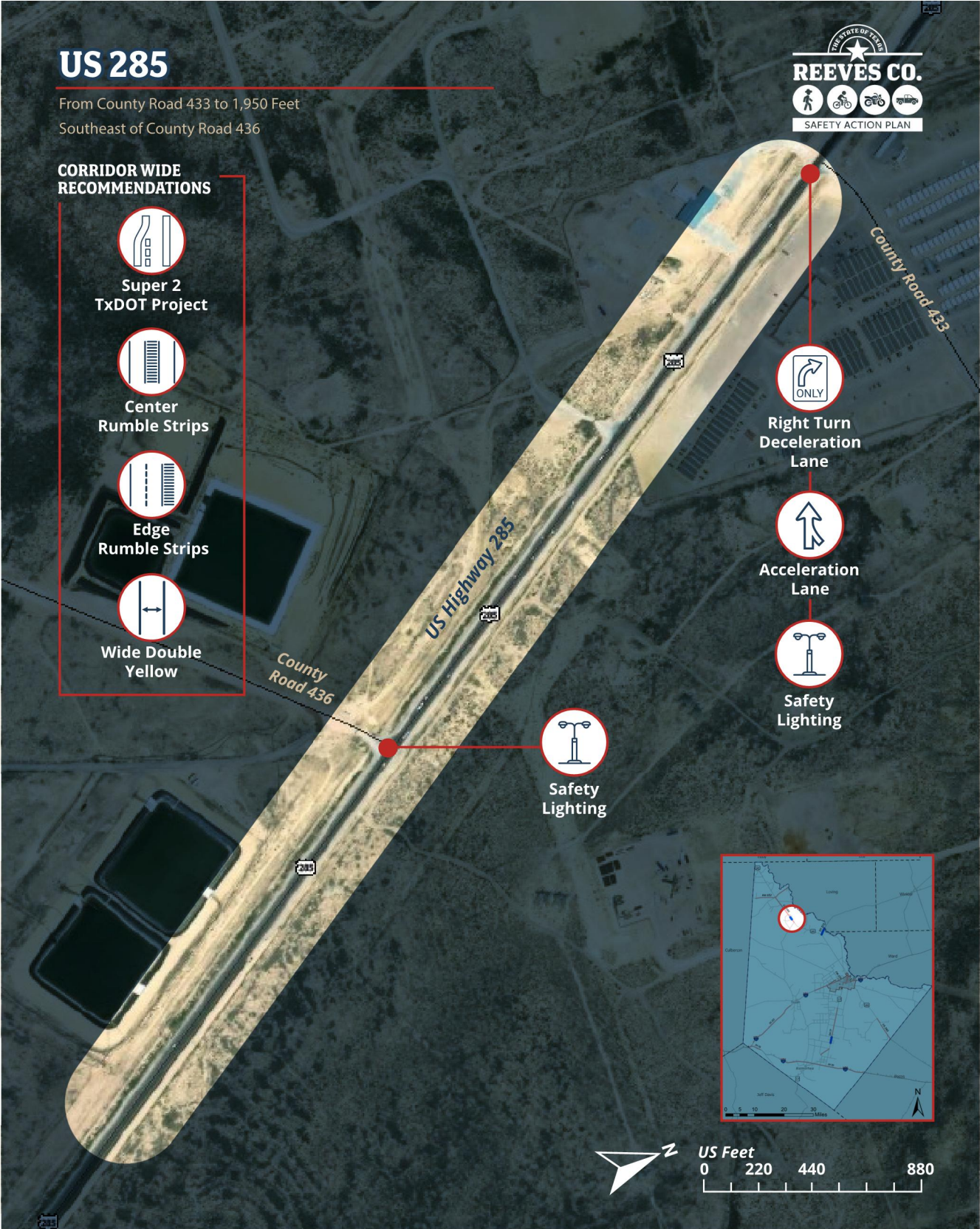
Table 16 summarizes the suggested countermeasures and crash modification factors (CMF). **Exhibit 15** shows all recommended countermeasures along US 285.

TABLE 16. RECOMMENDATIONS FOR CORRIDOR 3

ID	CONTEXT	LOCATION	RECOMMENDATION	CMF ID #	COUNTERMEASURE	CMF	CRASH TYPE	CMF CRASH SEVERITY
3.1	Corridor	Corridor	Construct Super Two (TxDOT project)	4082	Install periodic passing lanes on rural two-lane highways	0.65	Non-intersection	KABC
3.2	Corridor	Corridor	Restripe centerline to wide double yellow	NS07	Upgrade Intersection Pavement Markings	0.75	All	All
3.3	Corridor	Corridor	Add centerline rumble strips	3342	Install centerline rumble strips	0.89	All	All
3.4	Corridor	Corridor	Add milled shoulder rumble strips	9763	Install edge line or shoulder rumble strips	0.839	Roadway & Lane Departures	All
3.A.1	Intersection	US 285 & CR 433	Construct right turn deceleration lanes	475	Extend deceleration lane by approx. 100 ft	0.93	All	All
3.A.2	Intersection	US 285 & CR 433	Construct acceleration lanes	5215	Modify length of acceleration lane	0.67*	All	All
3.A.3	Intersection	US 285 & CR 433	Add lighting	7776	Install Lighting	0.68	All	All
3.B.1	Intersection	US 285 & CR 436	Add lighting	7776	Install Lighting	0.68	All	All

*Based on the addition of an 800-foot (0.15 mi.) acceleration lane

EXHIBIT 15. CORRIDOR 3 RECOMMENDATIONS



CHAPTER 6. IMPLEMENTATION PLAN

This chapter outlines a comprehensive set of recommended strategies addressing the non-construction aspects of the CSAP in Reeves County. An effective implementation plan not only delineates the necessary actions and their rationale but also details responsibility, timelines, and funding sources by identifying relevant partners, timeframes, and financial resources. The recommendations within this plan are methodically organized into six tables corresponding to the Six E's of safety.

Furthermore, to ensure the sustainability and relevance of the plan throughout its implementation phase, this chapter establishes annual reporting and updating procedures for the ZRDG Committee.

SIX E'S OF SAFETY AND SAFETY EMPHASIS AREAS

The policies and programs in the implementation plan are organized by the Six E's of Safety listed in **Table 17**, but include information on which TXDOT safety emphasis area would be most impact if implemented.

TABLE 17. SAFETY EMPHASIS AREAS AND SIX E'S OF SAFETY

SIX E'S OF SAFETY	SAFETY EMPHASIS AREAS
 Education	 Roadway and Lane Departure
 Encouragement	 Intersection Safety
 Enforcement	 Occupant Protection
 Engineering	 Speed-Related
 Equity	 Distracted Driving
 Evaluation	 Impaired Driving
	 Vulnerable Road Users
	 Post Crash Care

TIMEFRAME

An estimated timeframe is associated with each policy or program in the plan to ensure movement towards implementation is occurring. Additionally, including an estimated timeframe for completion can aid in decision-making by helping with prioritization based on timing. The timeframes assigned to actions are listed below:

- **Short (<2 yrs.):** Implementation can be done quickly and is a priority
- **Medium (2 – 5 yrs.):** Implementation will take longer than 2 years but can be completed prior to the next CSAP update

- **Long (>5 yrs.):** Implementation will take many years but will have a significant impact on safety
- **Ongoing:** This action should be an ongoing effort with no end date

IMPLEMENTATION PARTNERS

The following departments have been identified as partners that will play a crucial part in achieving the County's goal of creating a safer transportation network for all. Each recommended action has been assigned partner from the list below that were identified as needing to be a part of the implementation of said action.

- Reeves County Commissioners' Court (RCC)
- Emergency Management (EM)
- Sheriff's Office & Pecos Police Department (PD)
- Reeves County Road & Bridge (R&B)
- Reeves County Digital Media Department (DMD)
- The Town of Pecos City (PC)
- Pecos Chamber of Commerce (CoC)
- Texas Department of Transportation (TxDOT)
- Independent School Districts (ISD)
- Texas Department of Public Safety (DPS)
- Permian Road Safety Coalition (PRSC)
- Mothers Against Drunk Driving (MADD)
- Texas State Legislature (TXL)

FUNDING SOURCES

For each action outlined in this chapter, funding options have been listed since identifying funding sources is an essential part of an implementation plan. The matrices found in the following section will list how an action can be implemented.

- Existing Funds
- Reallocation of Funds
- Grant Acquisition

RECOMMENDED ACTIONS BY THE SIX E'S OF SAFETY

As discussed in **Chapter 1**, creating a safer transportation system requires interventions from several angles. With traffic safety issues being such complex problems, several different methods may be required to fix deficiencies. For example, unsafe speeding requires several efforts, such as setting appropriate speed limits, educational campaigns, and targeted enforcement efforts, working in tandem to create an environment where speeding is unacceptable. All actions are expanded upon under one of the Six E's of Safety listed below:

- **Education**
- **Encouragement**
- **Enforcement**
- **Engineering**
- **Equity**
- **Evaluation**
- **Education**





EDUCATION

An essential part of creating a safer transportation system is the education and raised awareness of users about safe transportation choices. **Table 18** lists the actions and programs recommended for the County to aid in achieving its goal. The actions and programs incorporate several different educational and awareness tactics such as targeted campaigns and strategic partnership plans.

TABLE 18. EDUCATION FOCUSED ACTIONS

ID	ACTION	EMPHASIS AREA	TIMEFRAME	PARTNERS	FUNDING
1	Utilize TxDOT and NHTSA educational materials on occupant protection and impaired driving prevention for disbursement at locations targeted to reach vulnerable age groups (children and elderly).	Occupant Protection	Short (<2 yrs)	DMD	Reallocation of Funds, Grants
2	Partner with TxDOT, NHTSA, and the Town of Pecos City to understand locations of existing safety billboards and expand on current efforts.	All	Medium (2 – 5 yrs)	TxDOT, NHTSA, PC	Reallocation of Funds, Grants
3	Acquire or expand on the County's dynamic message board inventory to provide real time data for drivers on delays or closures.	Intersection Related	Medium (2 – 5 yrs)	RCC, R&B	Reallocation of Funds, Grants
4	Partner with the police department and digital media director to develop a campaign that utilizes photos from real Reeves County Crashes.	Speed Related	Short (<2 yrs)	RCC, PC, pd, DMD	Reallocation of Funds, Grants
5	Partner with the Permian Road Safety Coalition to expand on safety trainings and education for professionals in the oil and gas industry.	Speed Related	Short (<2 yrs)	PRSC	Existing Funds

1. Safety Campaigns Targeted Towards Vulnerable Age Groups

Some of the most vulnerable populations in the community are children and the elderly. While children and young adults are beginning to learn how to navigate the transportation system, older adults must learn to navigate with new obstacles. Both TxDOT and the National Highway Traffic Safety Administration (NHTSA) offer educational materials over several topics such as impaired driving and occupant protection targeted at young adults and the elderly. **Figure 34** shows a poster urging young drivers not to drink and drive due to the consequences it could bring. Additionally, NHTSA provides various resources about [older driver safety](#) on their website that includes talking points, social media posts, and information flyers for medical professionals.

FIGURE 34. "DRIVE SOBER. NO REGRETS" CAMPAIGN POSTER FOR YOUNG ADULTS



Source: TxDOT

2. Billboard Inventory

To aid in the disbursement of safety messages, the County should partner with TxDOT, NHTSA, and the Town of Pecos City to identify existing billboards in the area that could be used for safety messaging. These boards could include dynamic message boards such as the left one displayed in **Figure 35** or a more traditional billboard. Depending on the traffic issues in the County the messaging on the billboards can be rotated to fit those needs, for example, to encourage the use of seatbelts "Click It or Ticket" campaigns could be run. The boards could also be used as a way to build a general awareness amongst residents of the growing traffic safety issue in the County by displaying a count of deaths occurring on their roadways as shown in **Figure 35**.

FIGURE 35. DYNAMIC AND TRADITIONAL MESSAGE BOARDS FOR SAFETY CAMPAIGNS



Source: TxDOT



3. Increase Number and Deployment of Dynamic Messaging Boards

While dynamic message boards can be used to disburse traffic safety campaign messages, these boards can also be used to communicate important traffic updates. If a major crash occurs, boards such as the one in **Figure 36** could be deployed to let road users know of the crash scene ahead or to take an alternative route to avoid it. Additionally, boards could display traffic delay times due to traffic to inform drivers of how delays will affect them. Dynamic message boards can aid not only in the post crash care of an incident, but also to set expectations for drivers. It is recommended that the County take an inventory of the dynamic message boards in their possession and acquire more if appropriate to help in messaging efforts.

FIGURE 36. DYNAMIC MESSAGE BOARD

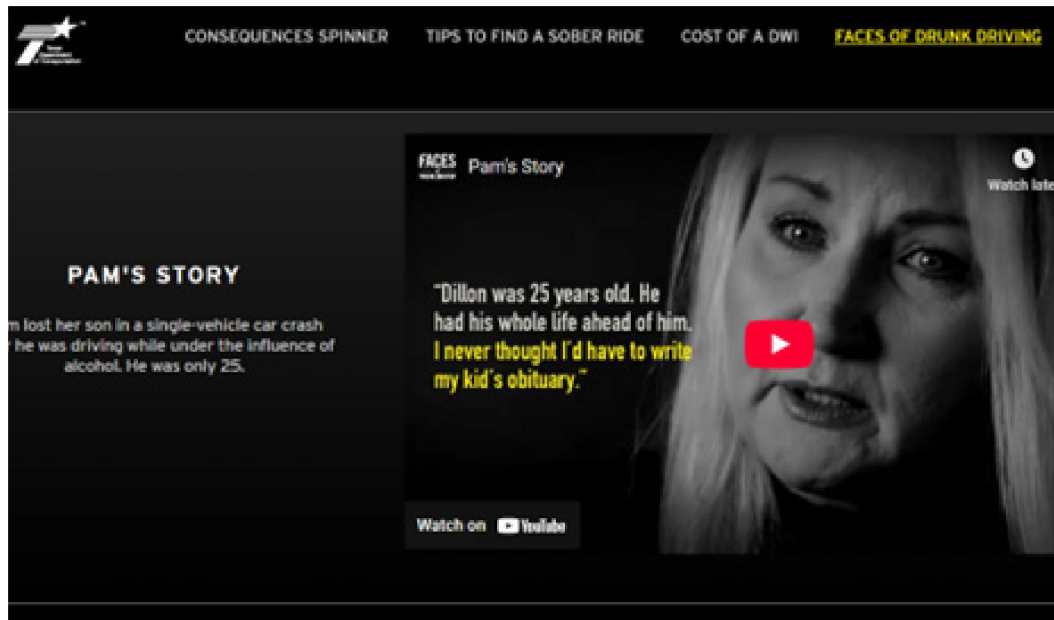


Source: Indiana Department of Transportation

4. New Safety Campaign Specific to Reeves County

Crashes can often be common incidences that occur, but by putting a face and story to the crash people can be reminded of the very real impacts they cause within the community. The County should partner with the Sheriff's and Pecos Police Departments and the Digital Media Department to develop a traffic safety campaign that utilizes Reeves County crashes to spread awareness on how to work towards a safer transportation network. Creating a campaign such as this would require a strong relationship between the partnering organizations as well as the victims of the crashes to ensure they give permission for their stories to be utilized. TxDOT's "Faces of Drunk Driving" (**Figure 37**) is an ongoing campaign against drunk driving that could be used as a reference when developing the County's campaign. Although developing a campaign such as this can be complex, the impact it can create is significant because it will remind community members of the lasting consequences crashes create for its victims and their loved ones.

FIGURE 37. TXDOT'S FACES OF DRUNK DRIVING



Source: TXDOT

5. Safety Trainings for Oil and Gas Professionals

The County should partner with the Permian Road Safety Coalition (PRSC) to expand on its existing safety trainings and education resources for professionals in the oil and gas industries as well as ensure those resources reach local businesses in the County. The PRSC is a coalition that convenes private sector companies, researchers, agencies, and concerned citizens to collaborate on solutions on how to make roads safer and road infrastructure better across West Texas and Southeast New Mexico. Due to the coalition's strong partnership with oil and gas companies in the region, partnering with PRSC would ensure a more streamlined development and deployment of safety trainings and education.





ENCOURAGEMENT

Encouraging roadway users to practice safe behaviors whether they are drivers, pedestrians, or bicyclists is a critical part of achieving the County's goal of reducing roadway deaths through action. Educating residents about safe driving behaviors and the risks unsafe habits bring is important to the cause, but ensuring the practice of safe behaviors is imperative. The following actions and programs in **Table 19** detail different programs and activities that could help encourage the public to aid in creating a culture of safety in the county.

TABLE 19. ENCOURAGEMENT FOCUSED ACTIONS

ID	ACTION	EMPHASIS AREA	TIMEFRAME	PARTNERS	FUNDING
1	Partner with MADD to conduct impaired driving education assemblies/reenactments for high school students in the County.	Impaired Driving	Short (<2 yrs)	MADD, ISD	Existing Funds, Grants
2	Encourage local freight companies to establish a "How's My Driving" contact to advertise on their trucks.	Speed Related	Short (<2 yrs)	PRSC, CoC	Existing Funds
3	Partner with the Chamber of Commerce and state legislators to develop an incentive or program requirement for the usage of "How's My Driving" reporting services.	Speed Related	Medium (2 – 5 yrs)	CoC, TXL	Existing Funds
4	Encourage local insurance groups to advertise or establish safe driving discounts for customers.	Occupant Protection	Short (<2 yrs)	CoC	Existing Funds
5	Include messaging about the benefits of seeking medical care post crash into County safety messaging campaigns.	Impaired Driving	Short (<2 yrs)	DMD, EM, PD	Existing Funds, Grants

1. MADD Promposal Program

To encourage young drivers not to drive while impaired, it is recommended that the local ISDs partner with MADD to host [MADD's Promposal](#) program (**Figure 38**). This program provides a 30 – 45-minute presentation for high school students ahead of prom that provides education on the dangers of underage substance use and impaired driving. The program also empowers students with alternatives to driving while impaired such as planning a safe ride home or having a substance-free prom night. While the MADD program does not include a reenactment, a partnership between the ISDs and local law enforcement could be leveraged to develop this. A combination of the presentation and reenactment would aid in encouraging young drivers to avoid making these risky decisions.

FIGURE 38. MADD'S PROMPOSAL ADVERTISEMENT



Source: MADD

2. Encourage “How’s My Driving” Programs

The use of “How’s my driving” stickers (**Figure 39**) on commercial vehicles is one method to keeping commercial vehicle drivers accountable by the public. Other road users gain the opportunity to alert company safety managers of unsafe driving behaviors exhibited by their commercial drivers. Companies can use the information gathered by the reports created from callers to identify unsafe drivers or unsafe habits exhibited throughout their fleet that can be addressed with supplemental training. The implementation of these programs does require hiring a team that is responsible for answering the calls received and creating reports that would then be sent to safety managers for review. Based on the impacts a “How’s My Driving?” program could have on safety in the county, it should be encouraged that local freight companies consider implementing them.

FIGURE 39. MADD'S PROMPOSAL ADVERTISEMENT



Source: safetysalert.com



3. Partner with the Chamber of Commerce and state legislators to develop an incentive or program requirement for the usage of “How’s My Driving” reporting services.

Part of building a culture of safety is keeping all road users accountable. As previously mentioned, “How’s My Driving” stickers offer this opportunity by giving other road users the opportunity to comment on fleet drivers’ behaviors, good or bad. To see the implementation of this program be more widespread, the County should partner with the Chamber of Commerce and state legislators to create either an incentive or requirement program in which companies with a specific percentage of fleet vehicles must implement a “How’s My Driving” program. An incentives program could include tax write offs or reducing insurance rates if companies implement this program. The other option is to make having a “How’s My Driving” program a requirement for companies with a certain percentage of fleet vehicles. If a requirement program is chosen to increase implementation, companies would need a large amount of notice time to ensure they can effectively meet the requirements. While a requirement program would see more widespread implementation of this program, smaller companies may be at a disadvantage due to resources. An incentive or requirement program such as this has not been seen in the country before, so Reeves County has an opportunity to be at the forefront of this innovated safety effort. Ultimately, this program would help create a partnership between the public and private companies that helps create a safer network for all.

4. Safe Driving Insurance Discounts

Encouraging the public to practice safer driving habits could be aided through a partnership with local insurance groups to advertise existing or create policies that reward safe driving. Most auto insurance companies have “usage-based policies” that use either phone-based app or a plug-in device to monitor driving behavior. Based on the exhibited driving behavior insurance companies can then determine the cost of a driver’s insurance plan in accordance with several factors such as speed, braking, and acceleration habits (Texas Department of Insurance). By making drivers aware of the existence of these insurance options, a safer system could be created due to the financial incentive for drivers who practice safer driving habits.

5. Voluntary Medical Treatment Post-Crash

As part of the safety messaging efforts in the county, messages encouraging people to receive medical care post-crash should be included. It is important to receive medical care post-crash even if injuries do not seem serious because of the risk of having an unnoticeable injury such as a concussion or internal bleeding (**Figure 40**). Immediate treatment can also help prevent any medical complications that could lead to long-term damage. The County should partner with Reeves Regional Health, local insurance companies, and EMS to develop messages that would convey the importance of medical care after a crash. The cost of care should not be the reason victims do not accept help after a crash.

FIGURE 40. PARAMEDICS ADMINISTERING CARE POST CRASH



Source: Adobe Stock



ENFORCEMENT

Teaching and encouraging roadway users of safe driving habits as well as existing traffic safety laws is pivotal to creating a culture of safety, but enforcement ensures the consistent practice of those habits. Law enforcement plays a crucial role by ensuring that users are held accountable for the consequences of not following traffic safety laws. **Table 20** summarizes the actions and programs that should be implemented to enhance enforcement in the county to increase traffic safety.

TABLE 20. ENFORCEMENT FOCUSED ACTIONS

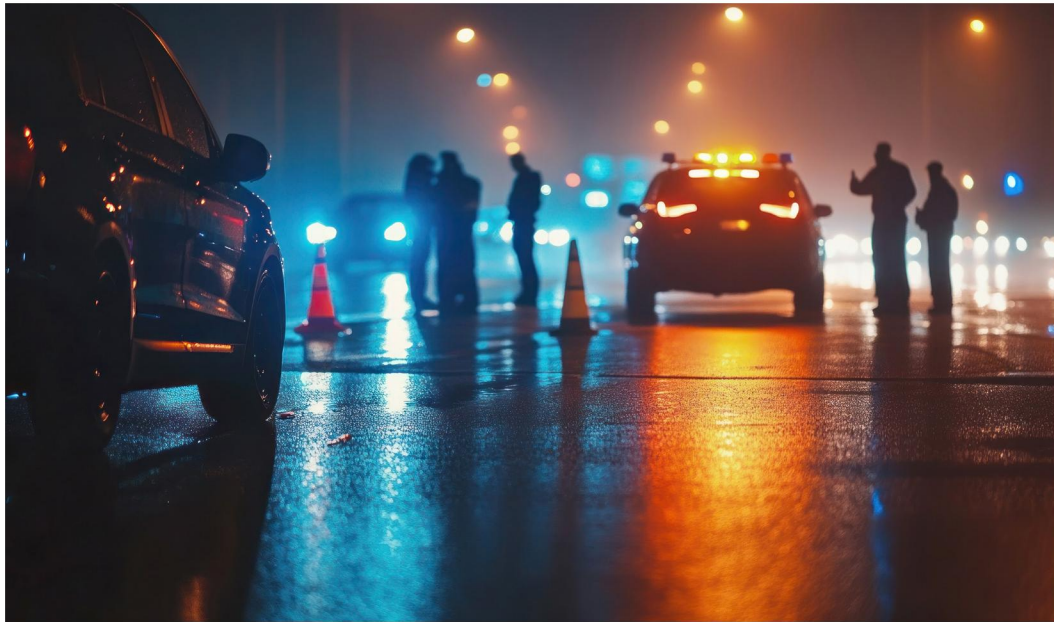
ID	ACTION	EMPHASIS AREA	TIMEFRAME	PARTNERS	FUNDING
1	Partner with local Texas legislative representatives to encourage the legalization of sobriety checkpoints in Texas.	Impaired Driving	Long (>5 yrs)	TXL, PD, RCC, PC	Existing Funds
2	Establish a targeted enforcement plan with the Sheriff's and Pecos Police Departments that focuses on impaired driving and speeding, acquiring STEP grants where necessary.	Impaired Driving	Short (<2 yrs)	PD	Reallocation of Funds, Grants
3	Partner with DPS to develop best practices for officers to enforce the recently implemented texting and driving ban at traffic stops.	Distracted Driving	Short (<2 yrs)	PD, DPS	Existing Funds, Reallocation of Funds



1. Sobriety Checkpoints

The use of DUI/DWI (sobriety) checkpoints by law enforcement is prohibited in 12 states, including Texas, because of its infringement on an individual's fourth amendment right. Due to this, law enforcement officers are not allowed to set up random sobriety checkpoints to check for impaired driving (**Figure 41**) instead there needs to be reasonable suspicion of driver impairment before they are pulled over and given sobriety test. Although prohibited, [publicized sobriety checkpoints](#) are a highly effective countermeasure for impaired driving according to NHTSA. A systematic review by the Center of Disease Control of 15 high quality studies found that checkpoints reduce alcohol related fatal crashes by 9%. Additionally, checkpoints reduced alcohol related crashes by 17% and all crashes by 10 – 15% (NHTSA). Publicized sobriety checkpoints create an increased perceived likelihood that impaired driving will be identified and penalized which leads to less incidences of it. According to NHTSA, research suggests that highly visible sobriety checkpoints deter drinking and driving within a community for approximately one week after the checkpoints. To add publicized sobriety checkpoints back into a tool that law enforcement officers can use to deter impaired driving, it is recommended that local PDs and the County work with the local Texas legislative representatives to encourage the legalization of publicized sobriety checkpoints in Texas.

FIGURE 41. FIELD SOBRIETY TEST



Source: Adobe Stock

2. Targeted Enforcement Plans

While increased police presence can lead to a reduction in impaired driving and speed related crashes, due to resource shortages a general increase in enforcement is not sustainable. Instead, a targeted enforcement plan should be established with help from the Sheriff's and Pecos Police Departments to identify locations in the county where increased law enforcement presence would be most impactful. The first step of the planning process would require the departments to identify where there are an increased number of impaired driving and speed related crashes. This would guarantee that problem areas are being prioritized. Additionally, the Sheriff's and Pecos Police Departments should apply for STEP grants that would provide funding to pay for overtime for officers involved in these enforcement efforts.

3. Best Practices for Enforcing Texting and Driving Ban

In the county, approximately 12% of all fatal and severe injury crashes were attributed to distracted driving; only slightly lower than the state percentage of 15%. Although texting and driving has been illegal in Texas since 2017, law enforcement officers struggle to enforce it due to the burden of evidence required to cite a driver. Officers can have a hard time determining if drivers were reading, writing, or sending electronic messages while driving (**Figure 42**) or performing some other activity on their cell phone. Through a partnership with DPS, local law enforcement officers can identify and develop best practices officers can use to enforce the texting and driving ban at traffic stops. This would aid in decreasing the prevalence of distracted driving incidents in the county.

FIGURE 42. DRIVER TEXTING WHILE DRIVING



Source: Adobe Stock





ENGINEERING

Roadway safety can be built into our system through thoughtful engineering in which safety and efficiency are both prioritized. While roadway design may not be able to fully prevent crashes from occurring, specific design choices can lessen the severity of crashes when they occur. Below in **Table 21**, actions have been listed that could better engineering practices in the County to increase safety.

TABLE 21. ENGINEERING FOCUSED ACTIONS

ID	ACTION	EMPHASIS AREA	TIMEFRAME	PARTNERS	FUNDING
1	Revise county roadway design standards to enhance the use of rumble strips, widened shoulders, and more frequent striping maintenance practices.	Roadway & Lane Departure	Medium (2 – 5 yrs)	R&B, RCC	Existing Funds
2	Update design standards and policies to make it easier to implement roundabouts at intersections.	Intersection Related	Medium (2 – 5 yrs)	R&B, RCC	Existing Funds
3	Inventory major intersections along county roads to determine if possible upgraded traffic control would be appropriate.	Intersection Related	Short (<2 yrs)	R&B	Reallocation of Funds, Grants
4	Consider the adoption of impact/street maintenance fees to share the responsibilities of roadway maintenance with developments that create a larger stress on the network.	Vulnerable Road Users	Medium (2 – 5 yrs)	RCC, PC, R&B	Existing Funds

1. Revise Design Standards to Decrease Roadway & Lane Departure Crashes

Roadway and lane departure crashes accounted for 39% of all fatal and severe injury crashes in the County. To aid in decreasing the number or lessening the severity of this crash type it is recommended that County design standards be updated to enhance the use of rumble strips, widened shoulders, and more frequently striping maintenance. Longitudinal rumble strips (**Figure 43**) on the centerline and shoulders notify drivers when they are departing their travel lanes with enough time to correct. Additionally, wider shoulders provide several safety benefits. Wide paved shoulders not only give a safe area for vehicles to safely pull over if needed but also give enough space for driver to correct if they veer outside the travel lanes. Updating engineering standards to include these recommendations would aid in creating roads with features that help prevent or lessen the severity of roadway and lane departure crashes.

FIGURE 43. EXAMPLE OF LONGITUDINAL RUMBLE STRIP



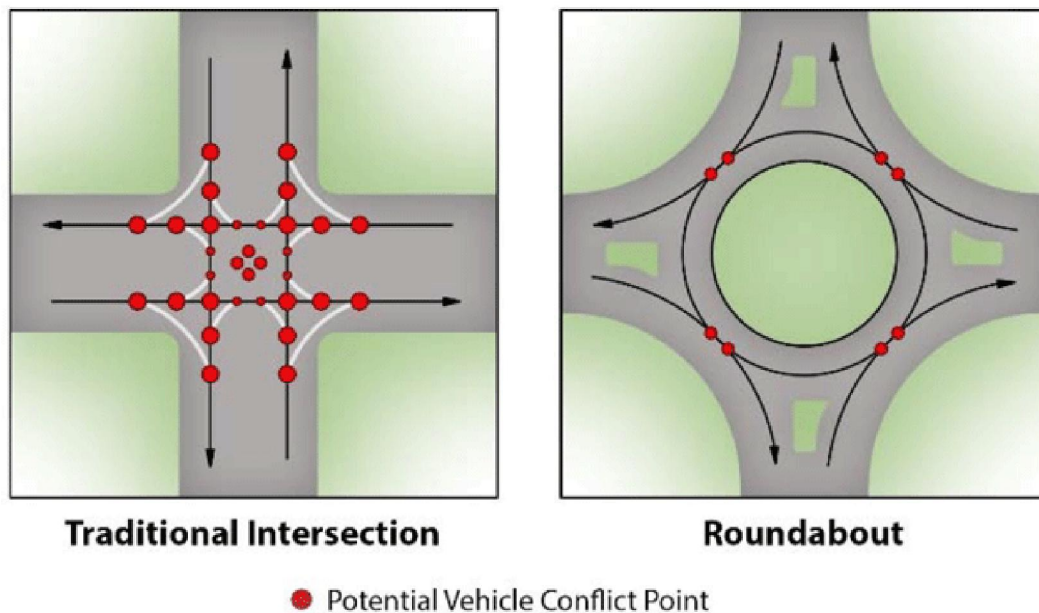
Source: Adobe Stock



2. Roundabouts

Roundabouts can be less common in rural areas but have been proven to significantly reduce crashes therefore it is recommended that design standards be updated to include roundabouts as an option of intersection control. While traditional intersections contain 32 conflict points, roundabouts only have 8 points of conflict and require drivers to slow down as shown in **Figure 44**. The inclusion of the roundabouts into standards shows the County's dedication to improving safety through innovative solutions. For more information regarding roundabouts in **Chapter 5**.

FIGURE 44. ROUNDABOUT



Source: FHWA

3. Intersection Inventory

Approximately 25% of all fatal and severe injury crashes were intersection related. Although this is less than the state of Texas with a percent of 32%, intersections should not be neglected. To take a proactive approach to intersection safety, an inventory and safety audit of all county-owned traffic signals and major intersections should be executed. Major intersection should be studied to determine if a possible upgrade to a traffic signal would be appropriate based on the history of the intersection (both by traffic volumes and crashes). Additionally, county-owned traffic signals should be studied to determine their crash histories, and if there are upgrades that should be made to enhance safety. These enhancements could include better lighting, the use of ITS technologies, and/or any of the countermeasures in the systemic countermeasure toolbox in **Chapter 5**.

4. Impact and Street Maintenance Fees

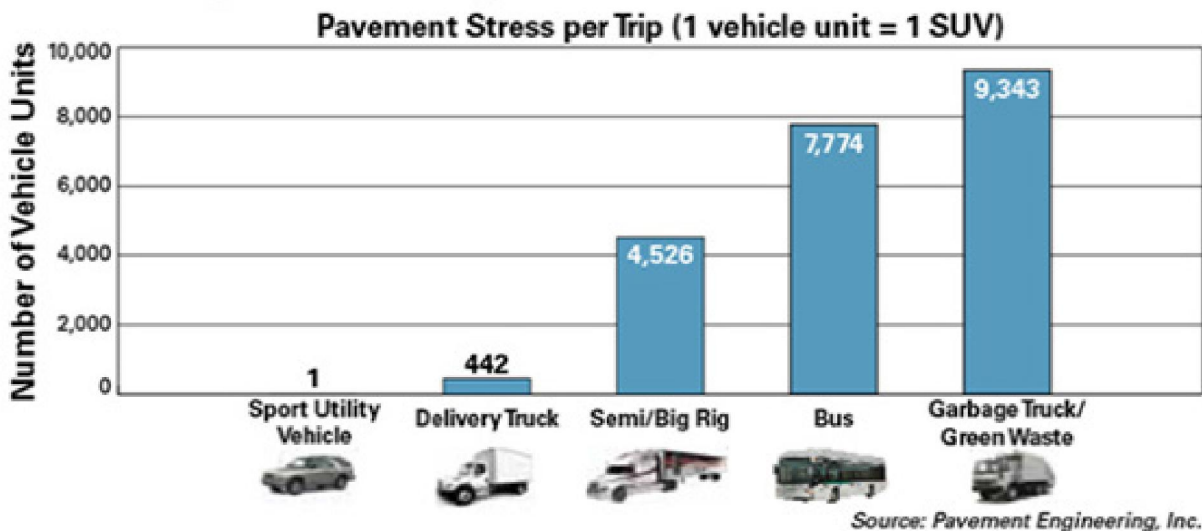
A common sentiment heard from both the committee and residents of the county was poor maintenance of some roadways. Residents expressed the safety concerns they feel based on their deterioration due to heavy traffic with maintenance not being able to catch up to the speed of deterioration. Since maintenance can be a large financial stress, it is recommended that Reeves County consider the adoption of impact or street maintenance fees that would produce additional funding for maintenance projects in the county.

Street maintenance fees are charged to property owners based on trip rates generated by their property and are used by the city or county to fund road maintenance projects like repairs or resurfacings. These fees are dependent on the land use context of the parcel where a property is located, and the volume of traffic generated by a property. For example, property owners of a shopping center would have a higher fee than a single-family homeowner since the shopping center generates large volumes of traffic. The funds from this fee would exclusively be utilized for road maintenance to address the safety concerns of the public.

Additionally, impact fees could also be adopted to address the impacts of future developments in the County. Impact fees charge incoming developments a fee based on the impact they would have on the existing network; the money from this fee is typically used to build new roads, widen existing ones, or install new traffic control to aid with the additional demand established from these developments.

Figure 45 shows the relative impact on pavement conditions based on the vehicle type with semi/big rigs having the same pavement stress as 4,526 sport utility vehicles (SUV).

FIGURE 45. RELATIVE IMPACT ON PAVEMENT CONDITIONS BY VEHICLE TYPE



Source: Pavement Engineering, Inc.





EQUITY

Part of creating a safer transportation system requires a conscious effort to acknowledge and rectify the imbalanced burdens experienced by disadvantaged populations in the County. In Reeves County, approximately 67% of the population lives within a disadvantaged census tract and 62% live specifically in a transportation disadvantaged census tract. Although **Table 22** lists the recommended action selected to ensure equitable access to the system by all mode users, an equitable transportation system can be created simply by making equitable decisions. This could be look like prioritizing safety improvement projects in disadvantaged census tracts.

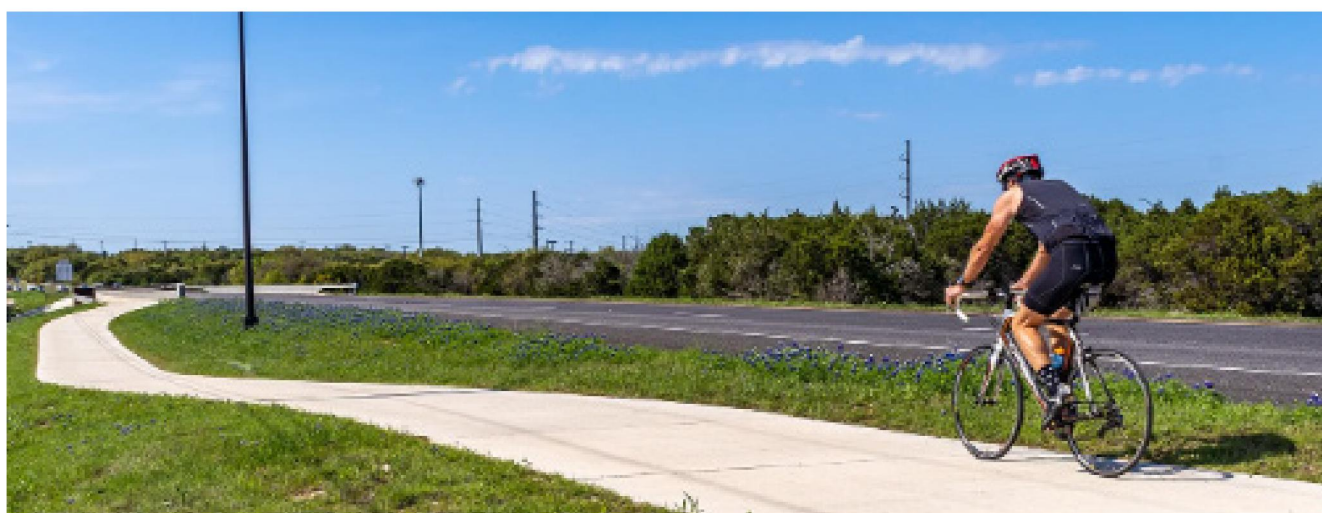
TABLE 22. EQUITY FOCUSED ACTION

ID	ACTION	EMPHASIS AREA	TIMEFRAME	PARTNERS	FUNDING
1	Develop an active transportation plan for Pecos City and Reeves County that plans future facilities, establishes design standards, and crossing treatment guidelines.	Vulnerable Road Users	Medium (2 – 5 yrs)	RCC, PC	Grants

1. Active Transportation Plan

Developing an active transportation plan for the County and Pecos City is a significant action towards ensuring the transportation system is for all roadway users not only those in a vehicle. An active transportation plan details various recommendations regarding the improvement of bicycling, walking, rolling, and other modes of transportation to create a system that is complete, connected, and comfortable for users. Although there is not a large volume of vulnerable road users in the County, the creation of active transportation infrastructure, such as multi-use paths (**Figure 46**), can cause a larger use of alternative transportation methods due to dedicated, safe infrastructure. Active transportation infrastructure creates many benefits within communities such as improved economic opportunity, improved human health, and reduced congestion. A safe transportation network should include space for its most vulnerable users.

FIGURE 46. MULTI-USE PATH



Source: TxDOT



EVALUATION

As the County works towards the goal of zero road deaths, an ongoing state of evaluation is critical. Continuing the examination of recent crash history will help the County and its residents understand if the goal of zero is being reached and if there are emerging safety issues that need to be addressed. Not only should crash information be examined on a regular basis, but so should the effectiveness of all safety efforts. The continuing evaluation of safety efforts will guarantee that the County is taking both a reactive and proactive approach towards safety efforts. **Table 23** summarizes the recommended evaluation efforts for this plan.

TABLE 23. EVALUATION FOCUSED ACTIONS

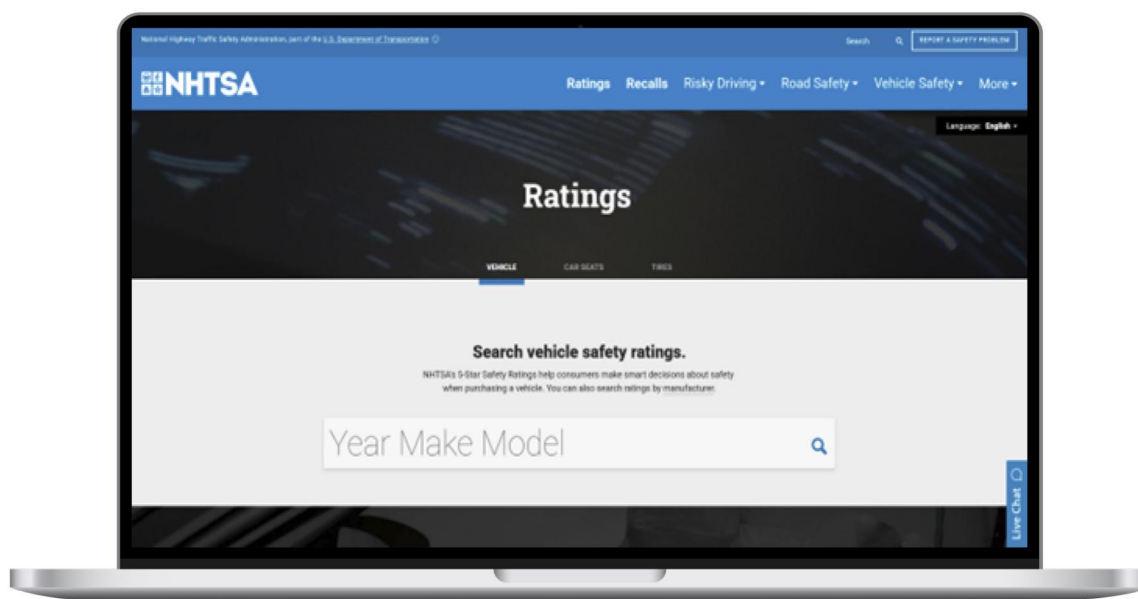
ID	ACTION	EMPHASIS AREA	TIMEFRAME	PARTNERS	FUNDING
1	Establish minimum safety standards for county-owned vehicles and develop a plan to replace vehicles not in compliance.	Distracted Driving	Long (> 5yrs)	RCC, R&B, PD	Reallocate Funding, Grants
2	Conduct road safety audits on the remaining HIN roadways that are owned by the County.	All	Medium (2 – 5 yrs)	R&B	Grants
3	Partner with TxDOT to evaluate HIN roadways that are on-system to ensure improvements are identified.	All	Long (> 5yrs)	TxDOT, R&B	Existing Funds
4	Submit annual safety reports to Commissioners' Court that compare County crash data against the CSAP implementation plan progress.	All	Ongoing	ZRDGC, PD, EM	Existing Funds



1. Minimum Safety Standards for Publicly Owned Vehicles

While improving driver behaviors will make a positive impact on road safety, using safer vehicles can aid in this effort. Safer vehicles refer to vehicles that either perform well during various crash tests or include driver assistance technologies (lane assistance, dynamic brake support, or crash imminent braking). The County should work to establish minimum safety standards for their county-owned fleet and develop a plan to replace existing vehicles that are not in compliance. This would also show the County's commitment to enhancing safety through different avenues. To aid in determining what the minimum safety standards should be, the County could reference NHTSA's "[5-Star Safety Ratings](#)" program. The program and its database (**Figure 47**) provide consumers with information about the crash protection and rollover safety of vehicles beyond what is required by federal law. Based on a vehicle's performance, it is given a star rating with one star being the lowest and five stars being the highest: more stars equal safer cars. Using the database from this program, the County could identify vehicles with high safety ratings that are also fiscally appropriate to ensure County employees have an extra layer of protection when working.

FIGURE 47. NHTSA'S "5-STAR SAFETY RATINGS" DATABASE



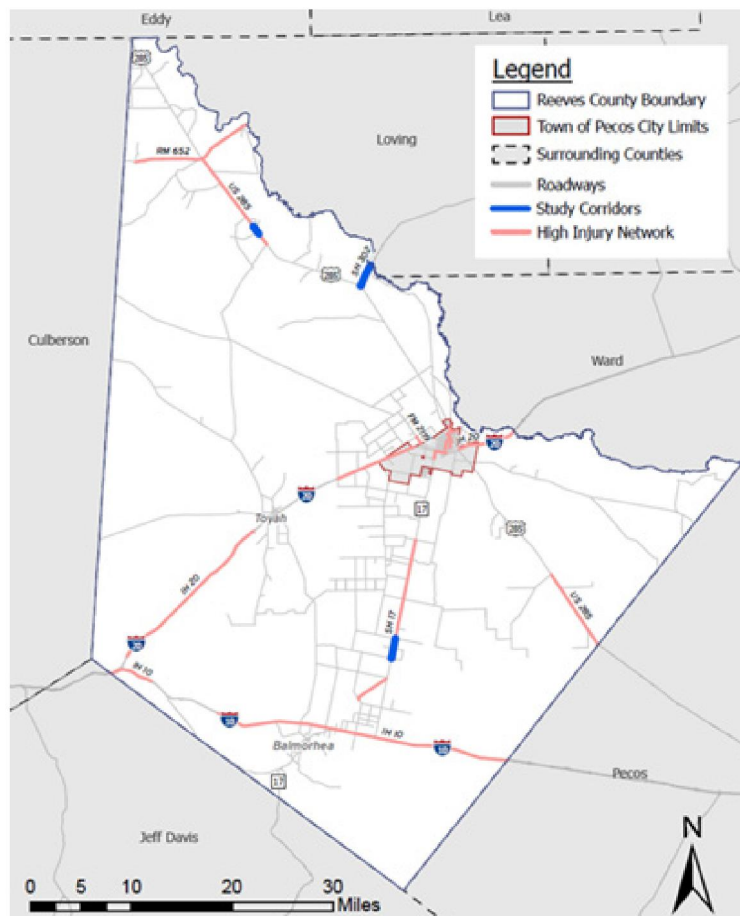
Source: NHTSA

2. Road Safety Audits

For this plan, targeted recommendations were developed for selected study corridors unfortunately the same analysis could not be conducted on the entire network. Road safety audits should be conducted on the rest of the roadways in the network with a prioritization on the roads on the high injury network.

Figure 48 shows the HIN and which segments have not been studied; only SH 302 and portions of US 285 and SH 17 were audited in this plan. The road safety audit should include determining the key safety issues on the roadway and then identifying countermeasures. Countermeasures could be selected from the systemic countermeasure toolbox in **Chapter 5** or from other resources based on the safety needs of the roadway.

FIGURE 48. REEVES COUNTY STUDY CORRIDORS VS. HIN SEGMENTS



Source: NHTSA



3. TxDOT On-System Roadway Improvements

Due to a large part of the of the HIN being owned by TxDOT, it is crucial to establish a strong partnership with them to ensure movement towards safety improvements on the most dangerous roadways in Reeves County. Through the partnership, the Road and Bridge Department and TxDOT should evaluate the roads on the HIN based on their crash histories and context to then identify countermeasures that should be implemented to enhance safety. With TxDOT covering a system as large as Texas's road network, it can be difficult for them to know of all problem locations in the network. By building a consistent and strong relationship with TxDOT, it will help keep a light on the needs of the county, so work towards improving roads on the HIN stays a priority.

4. Annual Safety Reports

To ensure that progress towards the zero road deaths goal is occurring, it is recommended that annual safety reports are submitted to the Commissioners' Court. The report should contain information comparing current crash data against the findings in this plan. Additionally, the report should include an update on the number of severe crashes and if there is any change in which safety emphasis area is most prevalent in the County. Having to submit these annual reports will not only hold all parties accountable to ensuring progress towards the goal is happening but will also give an opportunity to pivot existing efforts or create new ones if results are not promising. Ultimately, with a goal as ambitious as zero ongoing evaluation is necessary to make sure safety efforts are still gaining progress.

ANNUAL REPORTING & TRANSPARENCY

The Zero Road Death Goal Committee is responsible for implementing the actions outlined in this plan. To encourage accountability, the Committee should produce an Annual Vision Zero Progress Report. The annual progress reporting procedures were established in the Vision Zero Resolution passed by the County Commissioners' Court on Monday, June 9th. **Table 24** below details the procedures by how often each task should be completed by the Committee.

The annual reporting of Vision Zero efforts is a pivotal part in guaranteeing transparency, accountability, and effectiveness in the use of public resources allocated for community safety and improvement initiatives.

TABLE 24. PLAN UPDATES AND TIMEFRAME

PLAN UPDATE LEVEL	RECOMMENDED FREQUENCY	APPROVAL BY
Minor Revision – text or wording changes, not affecting the recommendations	As needed	Zero Roadway Deaths Goal Committee
Major Revision – any change that substantively changes a recommendation	As needed	Zero Roadway Deaths Goal Committee
Comprehensive Safety Action Plan Implementation Progress Report	Annual	County Commissioners Court
Full Plan Update	Every five years	County Commissioners Court



