DESCHUTES COUNTY

TRANSPORTATION SAFETY ACTION PLAN

March 2026

RESOLUTION NO. 2026-011

EXHIBIT "A"

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1 INTRODUCTION

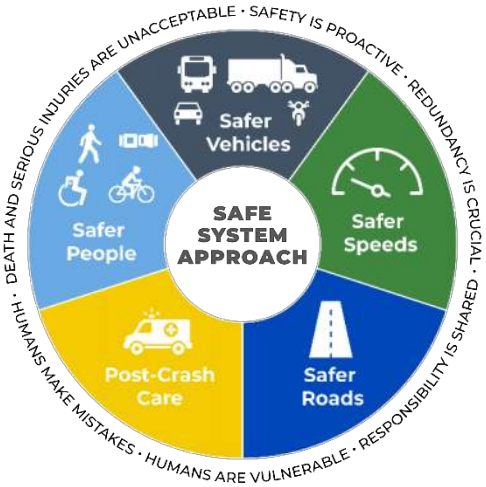
This document is the Deschutes County Transportation Safety Action Plan (TSAP). It replaces the prior version of this plan adopted in 2019. A TSAP helps an agency or community eliminate fatal and serious injury crashes on the transportation system through implementation of both systemic and site-specific countermeasures, as well as multidisciplinary actions. This plan also establishes performance measures to track implementation and progress made toward the County's ultimate goal of zero transportation-related fatalities and serious injuries on the Deschutes County road system. Unlike the 2019 TSAP, which included plans for La Pine, Sisters, and Redmond, this plan focuses exclusively on the county's unincorporated areas to target rural roadway safety needs.

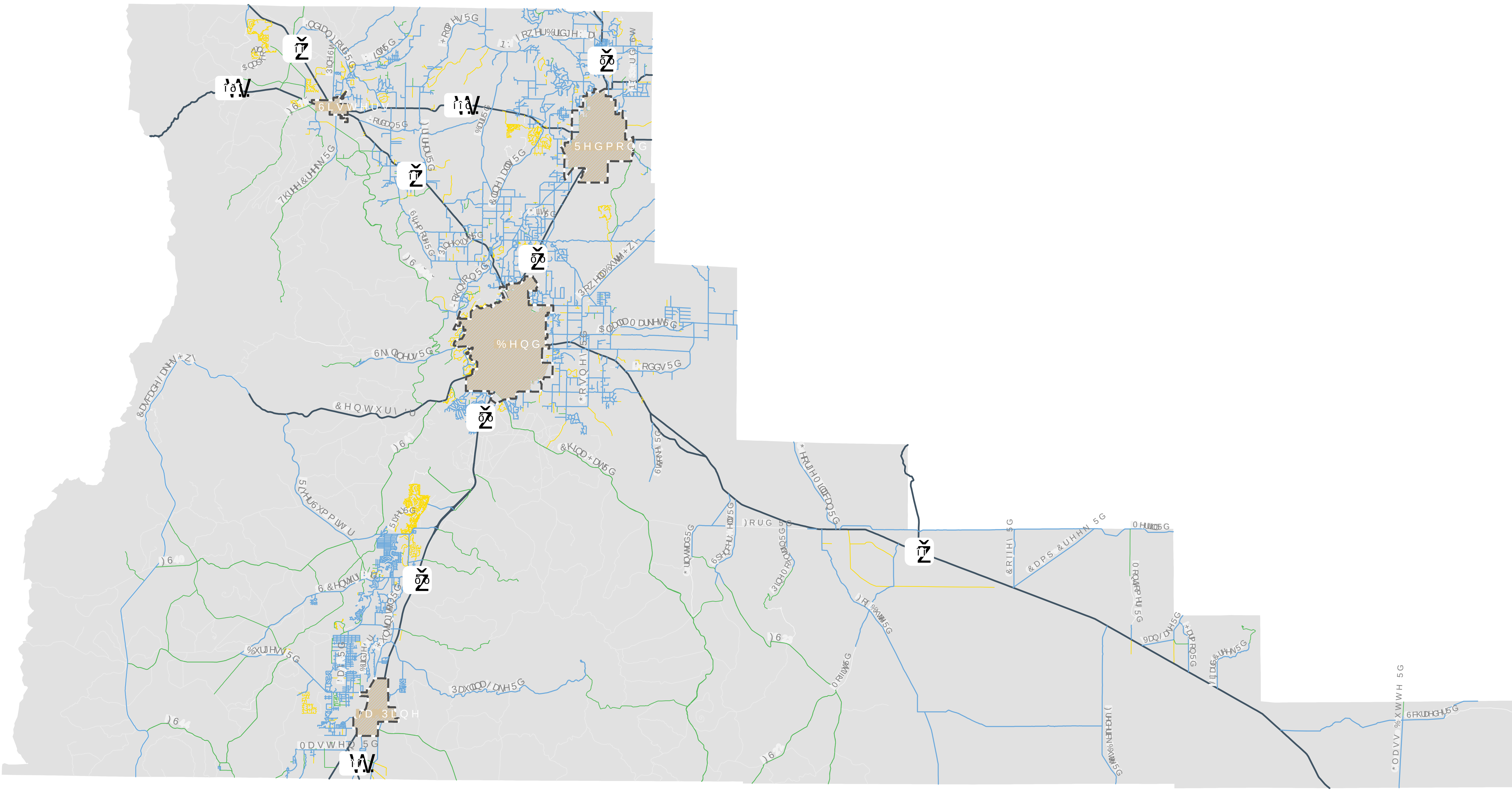
Study Area

Developed in coordination with the Oregon Department of Transportation (ODOT) and other regional partners, this TSAP provides a data-driven framework for decision making and resource allocation to improve transportation safety within unincorporated Deschutes County. While this process evaluated crashes on all public roads in the county, this plan reports safety findings and recommendations for the County's road system (**Figure 1-1**).

Safe System Approach

This TSAP follows the Federal Highway Administration's Safe System Approach, which aims to eliminate roadway deaths and serious injuries by accepting that road users are human beings and that human beings make mistakes. Unlike traditional safety approaches, which are reactive, the Safe System Approach layers multiple proactive and redundant measures so that when mistakes do happen, these protections help reduce harm. Many of the safety improvements presented in this document are designed to work together to form the layered, proactive protection of the Safe System Approach.





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TSAP Update Process

To update the TSAP, the project team followed a four-step process consistent with the Safe System Approach and the US Department of Transportation Safe Streets and Roads for All (SS4A) program, which provided partial funding for this plan. The overall process is rooted in data analysis, public outreach, and regional coordination. As a result, this plan provides a data-driven vision for Deschutes County that has been informed by, and coordinated with, the broader community.

The TSAP process is further described in the Safety Analysis Framework, including in Appendix A.

Related Plans and Policies

Federal, state, and local transportation agencies set planning requirements and guidance to promote consistent transportation safety planning. This TSAP update aligns with relevant requirements and guidance to support regional, state, and national transportation safety efforts and to support the County's pursuit of federal and state safety grant funding.

This plan was funded in part by an SS4A grant and meets the requirements of that program. This plan also meets the goals, policies, and strategies outlined in the 2021 Oregon TSAP. At the local level, this plan aligns with the transportation safety goals, objectives, and projects identified in the County's 2020–2040 Transportation System Plan (TSP) and carries forward the vision of its 2019 TSAP.

> **The Oregon TSAP focuses on changing safety culture and proactively planning, designing, operating, and maintaining a transportation system that eliminates fatalities and serious injuries by improving safety culture, improving infrastructure, facilitating health and livable communities, using best available technologies, communicating and collaborating, and investing strategically. Its emphasis areas target risky behaviors, infrastructure, vulnerable users, and improved systems.**

For more information about how this TSAP update aligns with federal, state, and local safety planning efforts, see Appendix A.

2 SAFETY GOAL AND POLICIES

Setting a clear safety goal and writing supportive policies gives Deschutes County a focused path to follow as it works to eliminate fatal and serious injury crashes on its roadway network.

The **goal** defines the community's desired outcomes for transportation safety.

The **policies** form the long-term foundation for the TSAP and provide a consistent course of action to move the community toward its goal. These policies will guide work programs, long-range planning projects, funding pursuits, the budget, and capital improvement programs. Policies will be implemented through the County's land use regulations, such as the zoning ordinance, subdivision ordinance, and standards and specifications.

This goal and its associated policies were developed based on the goals and objectives of the County's TSP and it's 2019 TSAP and expanded to comply with objectives of the Oregon TSAP and the federal SS4A program.

DESCHUTES COUNTY'S SAFETY GOAL

> **Provide all roadway users—including the most vulnerable—with an accessible transportation system that strives to eliminate fatal and serious injury crashes.**

DESCHUTES COUNTY'S SAFETY POLICIES

- **Reduce transportation-related fatalities and serious injuries** through design, operation, maintenance, education, and enforcement, with the objective of zero serious injuries and fatalities.
- **Prioritize the needs and safety of all users** in transportation projects, programs, and funding decisions, with special attention to the needs of vulnerable users, which include (but are not limited to) pedestrians, bicyclists, motorcyclists, and people using mobility devices.
- **Design roadway environments to mitigate human mistakes** and account for human injury tolerances—recognizing the human body's limited ability to withstand crash forces—encouraging safer behaviors and facilitating safe travel by the most vulnerable users.
- **Establish and enforce appropriate motor vehicle travel speeds** for the safety of all roadway users.
- **Regularly coordinate with emergency service providers and other safety partners** to improve transportation planning, design, and maintenance activities.

3 COMMUNITY ENGAGEMENT

Community engagement is a core component of any transportation safety plan. To meaningfully engage community members during the planning process, this plan was developed with input from the community in two key phases, the first to inform transportation safety needs and the second to develop associated recommendations.

In addition, this plan relied on guidance from a **Project Management Team**, which was made up of key staff from Deschutes County, and a **Safety Working Group**, which included representatives from County community development, the Deschutes County Bicycle and Pedestrian Advisory Committee, Central Oregon Intergovernmental Council, health services, law enforcement, the district attorney's office, fire and emergency medical services, the Bend Metropolitan Planning Organization, and ODOT.

The Project Management Team met regularly to provide technical input, and the Safety Working Group met twice at key milestones to share input on the existing conditions analysis and policy, program, and project recommendations. The Safety Working Group also discussed and helped identify non-engineering solutions to support a multidisciplinary approach to reducing crashes, in support of the Safe System Approach.

Phase 1: Identify Safety Concerns

This phase sought resident input on transportation safety concerns in unincorporated Deschutes County. To reach the county's 214,000 residents, the County hosted a virtual open house featuring key crash history findings, and an interactive map and survey for submitting feedback. The County promoted the event through social media posts, local publications, and the Deschutes County website.

Phase 2: Present Safety Strategies

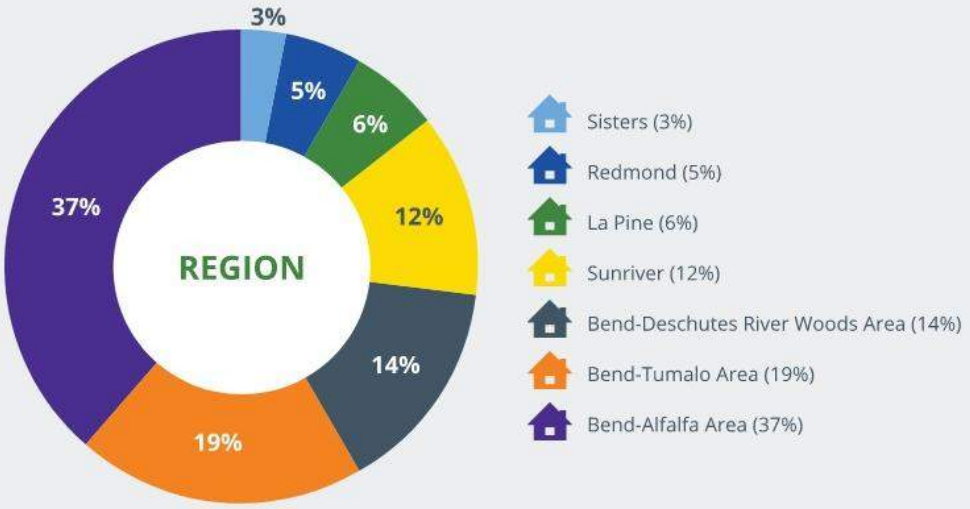
This phase gathered resident feedback on recommended strategies to address the county's crash history and previously identified transportation safety concerns. The County hosted another virtual open house—promoted with similar methods as Phase 1—that presented example graphics of proposed strategies and provided a survey for submitting feedback.

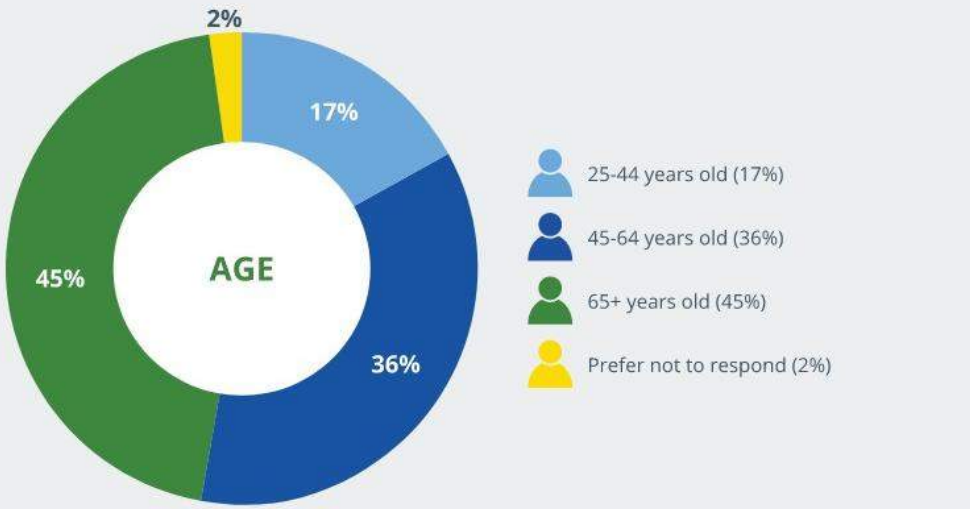
Key Engagement Findings

RESPONDENTS BY THE NUMBERS

100 survey, comment map, or email responses

RESPONDENTS BY AGE AND HOME REGION





Note: 1 star = No Alignment, 5 stars = Most Alignment

In addition to seeking guidance from the Safety Working Group and gathering input from the broader community on transportation safety, the County also met with various schools throughout their district to understand school-specific transportation safety needs. More information on this effort is provided in Chapter 4.

4 CRASH ANALYSIS

To effectively address fatal and serious injury crashes, an agency must understand what types of crashes are happening and where they occur. In unincorporated Deschutes County, the crash analysis used the most recent five years of crash data (2018–2022) to evaluate, chart, and map crash patterns and locations on roads under the County's jurisdiction.

> **From 2018–2022, 2,175 crashes were reported on County roads in unincorporated Deschutes County.**
> **172 of those crashes resulted in death or serious injury.**

The crash analysis also incorporated roadway context and existing intersection features to link roadway characteristics with crash data. Combined with community feedback, this information helped identify the county's key crash patterns, contributing factors, and priority locations for safety improvements.

Methodology

To support a comprehensive, systematic, and objective safety program for Deschutes County, the crash analysis investigated crashes through two primary methods:

- A **crash pattern assessment**, which examined historical crash patterns on County roads, specifically for characteristics like crash severity and location, temporal trends (e.g., time of day/year), collision types (e.g., run-off-the-road), contributing factors, road features (e.g., narrow shoulders, minimal signage), driver behavior (e.g., speeding), and external conditions (e.g., low lighting, weather). Information from this assessment revealed *what kind of crashes are happening in Deschutes County and its* ***Emphasis Areas***.
- A **network screening evaluation**, which searched for intersections and corridors with higher concentrations of crashes, especially serious ones. Information from this assessment revealed *where fatal and serious injury crashes are happening in Deschutes County and its* ***High Injury Network***.

For detailed results of these two analyses, see Appendix A. This appendix also includes a crash analysis of the entire county, including crashes reported on state highways.

UNDERSTANDING CRASH SEVERITY

The severity of a crash is based on the most serious injury of a person involved in that crash. There are five crash severity categories:

- **Fatal** (**K**): Any injury that results in death within 30 days of the crash.
- **Suspected Serious Injury** (**A**): Typically life-altering injuries such as broken or dislocated limbs, severe lacerations, paralysis, or organ damage. This category also includes unconsciousness, head injuries, and significant blood loss.
- **Suspected Minor Injury** (**B**): Other visible injuries evident at the crash scene, including minor lacerations, bruises, and rashes.
- **Possible Injury** (**C**): Any injury that is not fatal, serious, or minor. Includes complaint of nonvisible pain or injury, such as confusion, limping, or soreness.
- **Property Damage Only** (**O**): A collision without injury or complaint of pain but resulting in property damage to a vehicle or another object.

Crash Pattern Assessment

The crash pattern assessment reviewed the more than 2,000 crashes reported in unincorporated Deschutes County between 2018 and 2022 by severity, time, and location, as well as collision type, contributing factors, road features, driver behavior, and external conditions like weather. It then used this data to determine what crash types, causal factors, behaviors, and demographic features were of most concern.

Many characteristics were studied during the course of this analysis, but this plan presents only the issues and characteristics most critical for reducing fatal and serious injury crashes in unincorporated Deschutes County. For complete findings from the crash pattern assessment, including categories and characteristics like bicycle and pedestrian crashes, see Appendix A.

CRASH TYPES

The top five crash types in unincorporated Deschutes County, contributing to 85% of all crashes, are fixed object, turning, rear-end, non-collision (overturning), and angle (**Figure 4-1**). These top five crash types are the same for all crash severities and fatal and serious injury crashes. Fixed object and turning related crashes are the top two crash types, contributing to 32% and 19% of fatal and serious injury crashes, respectively (**Figure 4-2**). But non-collision (overturning) and angle crashes make up larger proportions of fatal and serious injury crashes as compared to total crashes of the same type.

> **Nearly 85% of all crashes in unincorporated Deschutes County involve a vehicle leaving the roadway, turning at or crossing intersections, or rear-ending another vehicle.**

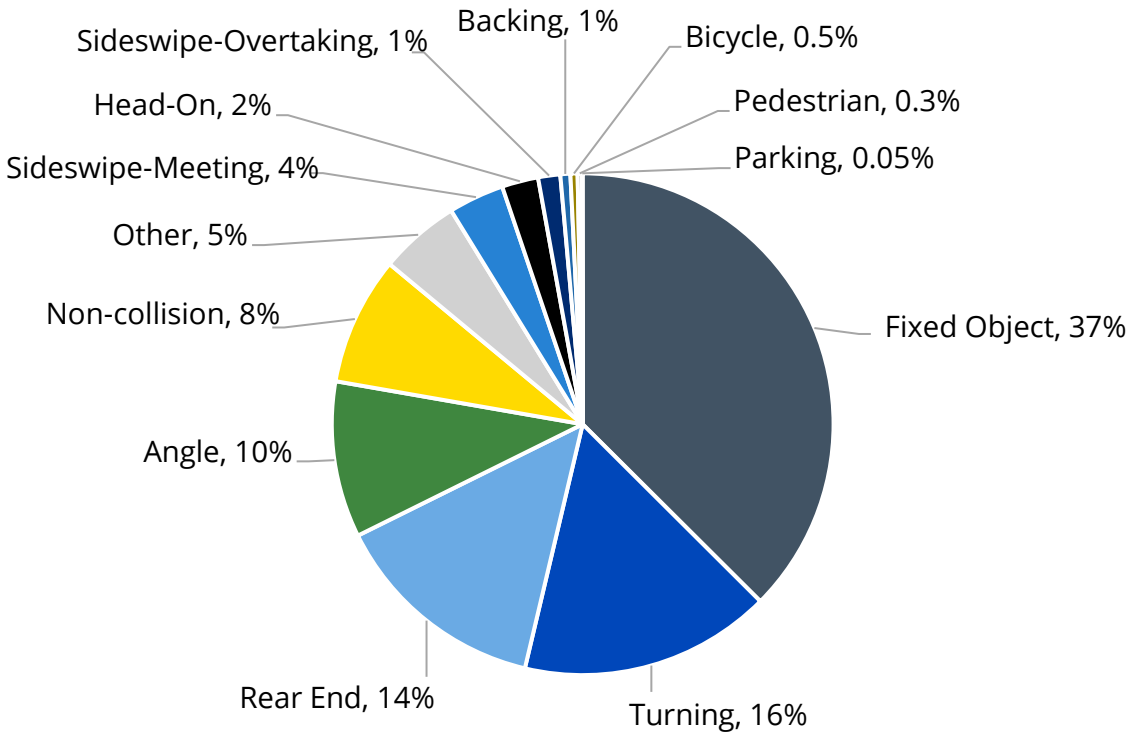


Figure 4-1. All Crashes by Crash Type

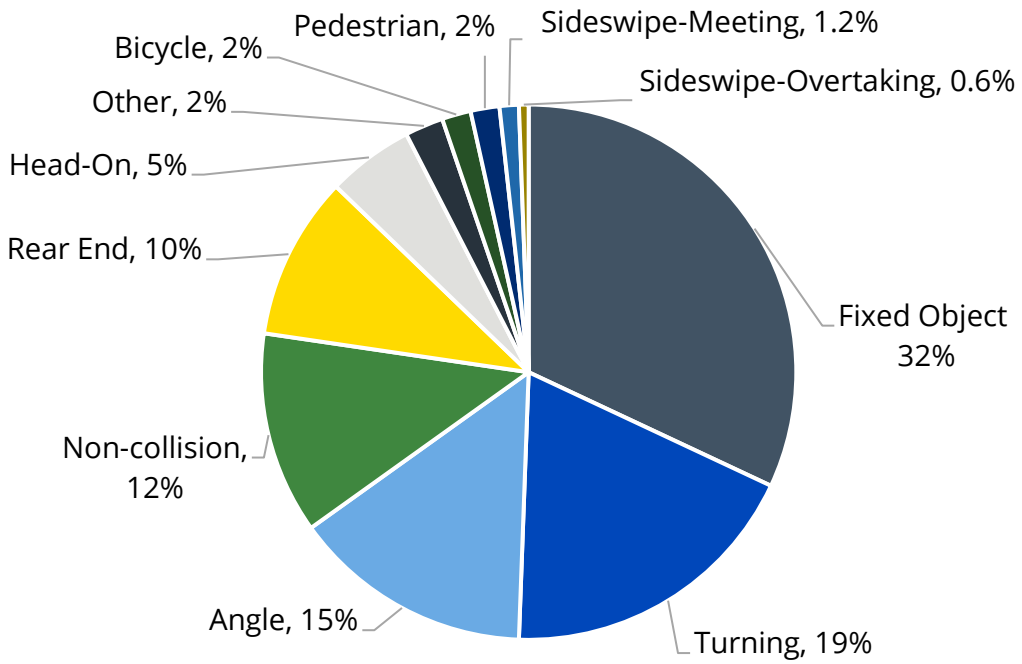
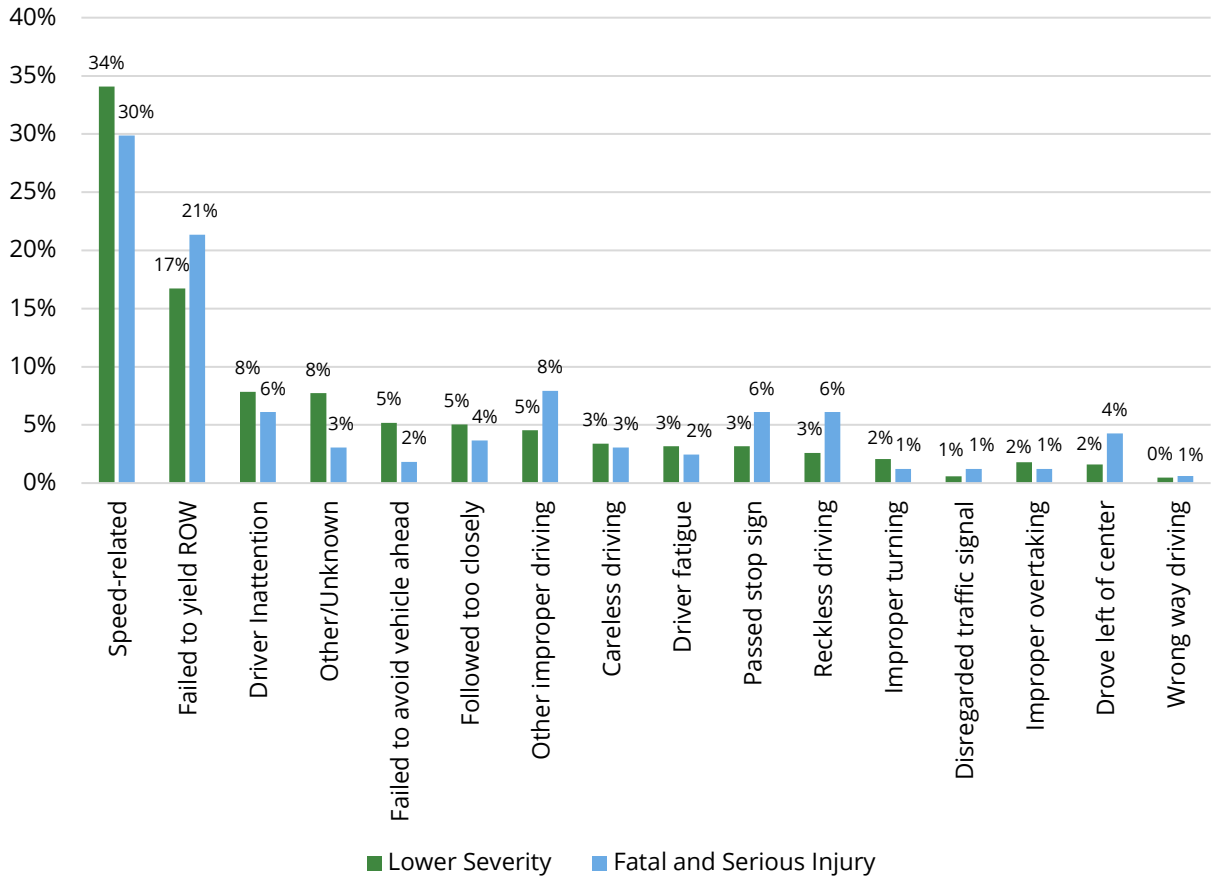


Figure 4-2. Fatal and Serious Injury Crashes by Crash Type

CAUSAL FACTORS

The most commonly reported crash cause was speed-related, representing 34% of lower severity crashes and 30% of fatal and serious injury crashes (**Figure 4-3**). Other common factors in fatal and serious injury crashes were failure to yield the right-of-way (21% of fatal and serious injury crashes); other improper driving (8% of fatal and serious injury crashes); and driver inattention, running a stop sign, and reckless driving (each 6% of fatal and serious injury crashes).

> **Speed-related factors and failure to yield were the most common reported causes of fatal and serious injury crashes in unincorporated Deschutes County.**



Note: Only causes reported in 10 or more crashes are shown.

Figure 4-3. Percentage of Crashes by Reported Crash Cause and Severity

BEHAVIOR

In unincorporated Deschutes County, speeding and driving while under the influence of drugs or alcohol were the most common behaviors that contributed to fatal and serious injury crashes.

SPEEDING

Speed contributed to crashes both when drivers exceeded the posted speed limit and when drivers drove too fast for road conditions. Speed was flagged as a contributor in approximately 37% of all reported crashes and 35% of fatal and serious injury crashes.

> **More than 1/3 of Deschutes County's fatal and serious injury crashes involved driving over the speed limit or too fast for road conditions.**

IMPAIRED DRIVING

Driving while impaired means driving while under the influence of drugs, alcohol, marijuana, or a combination thereof. In unincorporated Deschutes County, driving while impaired specifically by alcohol contributed to approximately 20% of fatal and serious injury crashes and 9% of all crashes. Nearly one-quarter (24%) of fatal and serious injury crashes involved some sort of impairment—and more than half (55%) of fatal crashes involved impaired driving (**Figure 4-4**). It should be noted that under certain circumstances, impairment is not investigated in single-occupant fatal crashes unless evidence is present at the crash scene.

> **More than half of all fatal crashes in Deschutes County involved impaired driving.**

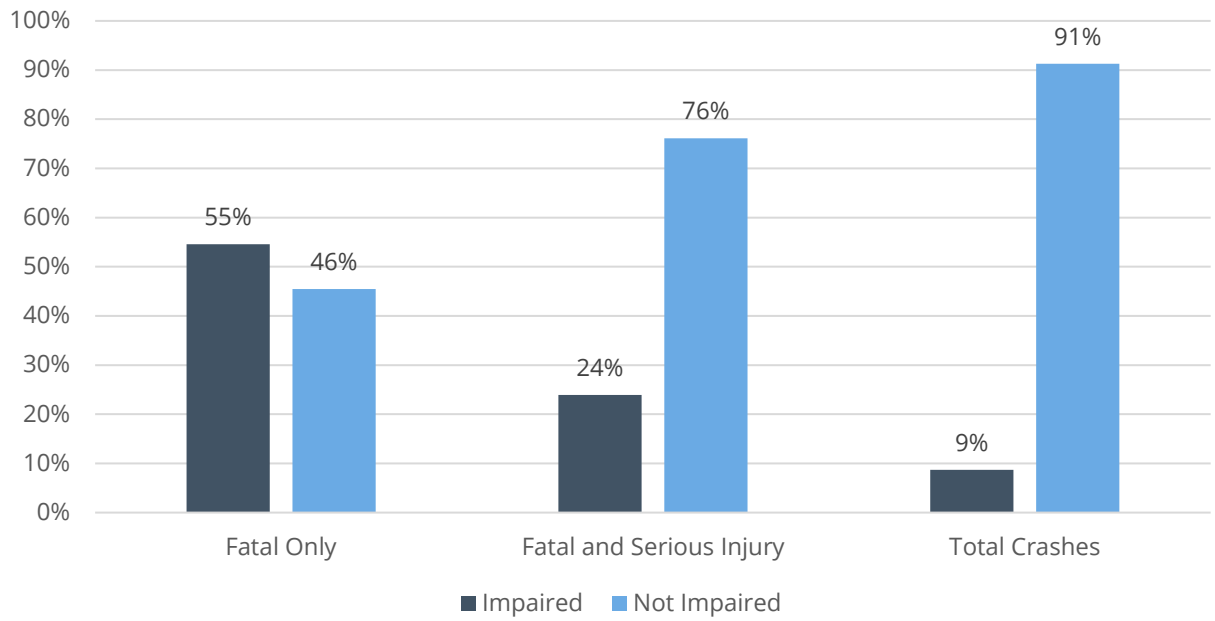


Figure 4-4. Percentage of Crashes Involving Impaired Driving

MOTORCYCLES

Although there were 76 crashes in unincorporated Deschutes County that involved a motorcycle (just 3% of all crashes), motorcycles were linked to 21% of all fatal and 20% of all serious injury crashes in the county (**Figure 4-5**). Of all crashes that involved a motorcycle, just under half (46%) resulted in a fatality or serious injury. As with other vulnerable road users like bicyclists and pedestrians, motorcyclists lack protection of a

vehicle and have a higher likelihood of serious injury or death when they are involved in crashes.

> **Almost half of all motorcycle crashes in unincorporated Deschutes County resulted in a fatality or serious injury.**

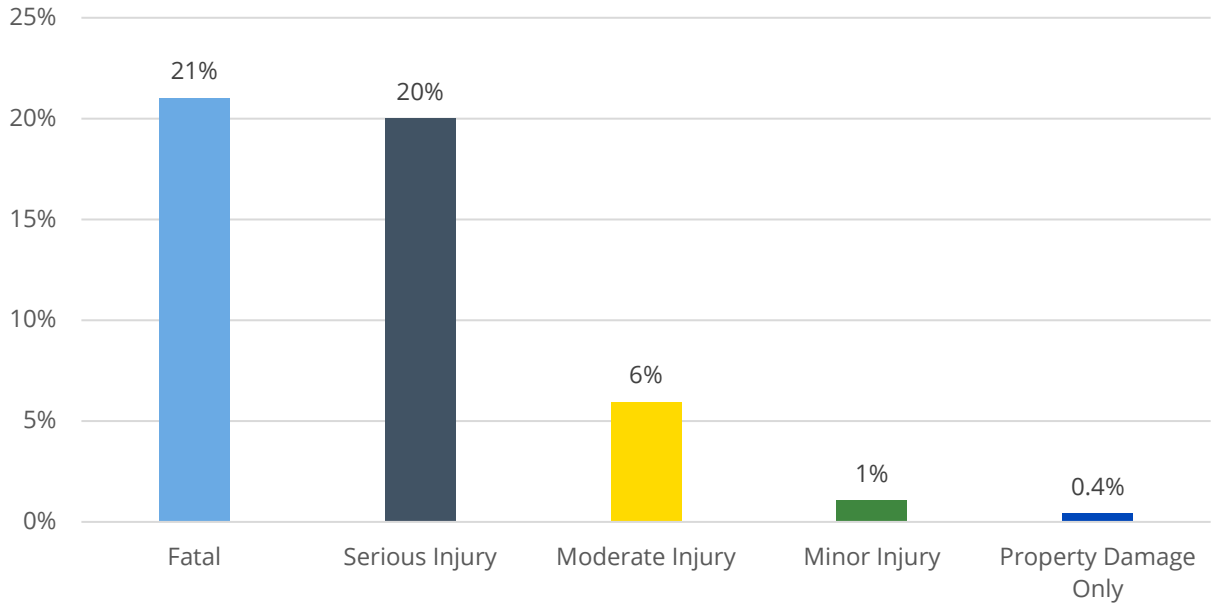


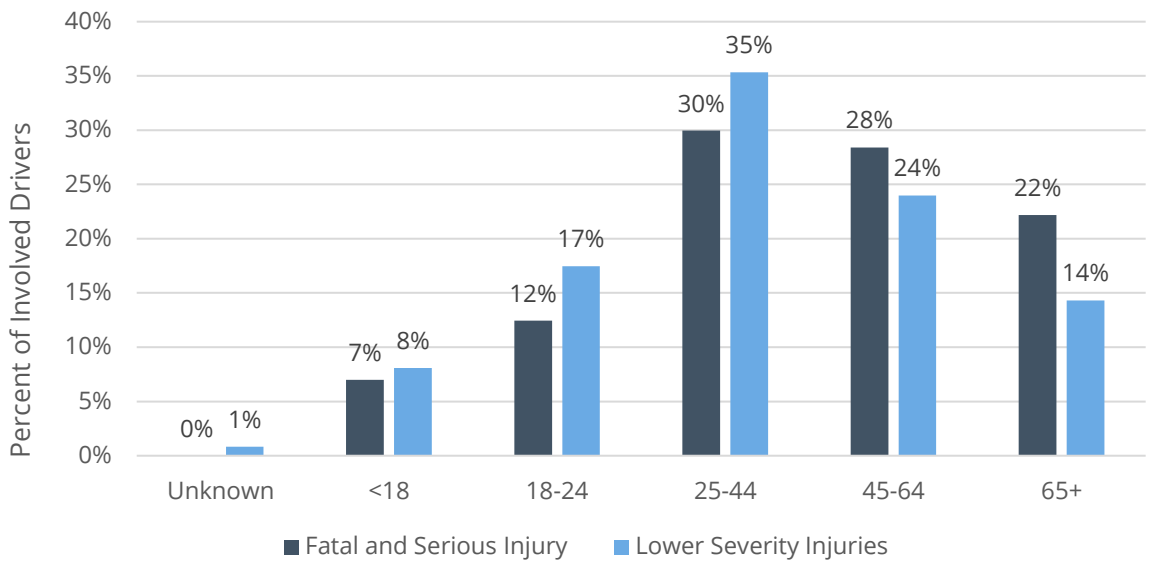
Figure 4-5. Crash Share Involving Motorcycles

DRIVER AGE

Whether young or old, driver age is correlated with crash severity and cause (**Figure 4-6** and **Figure 4-7**). Drivers aged 45–64 and drivers 65 and over were involved in a higher proportion of fatal and serious injury crashes. Drivers under 25 were most often involved in crashes where driving too fast for conditions is the primary cause. Drivers over 25 were most commonly involved in crashes where there was a failure to yield.

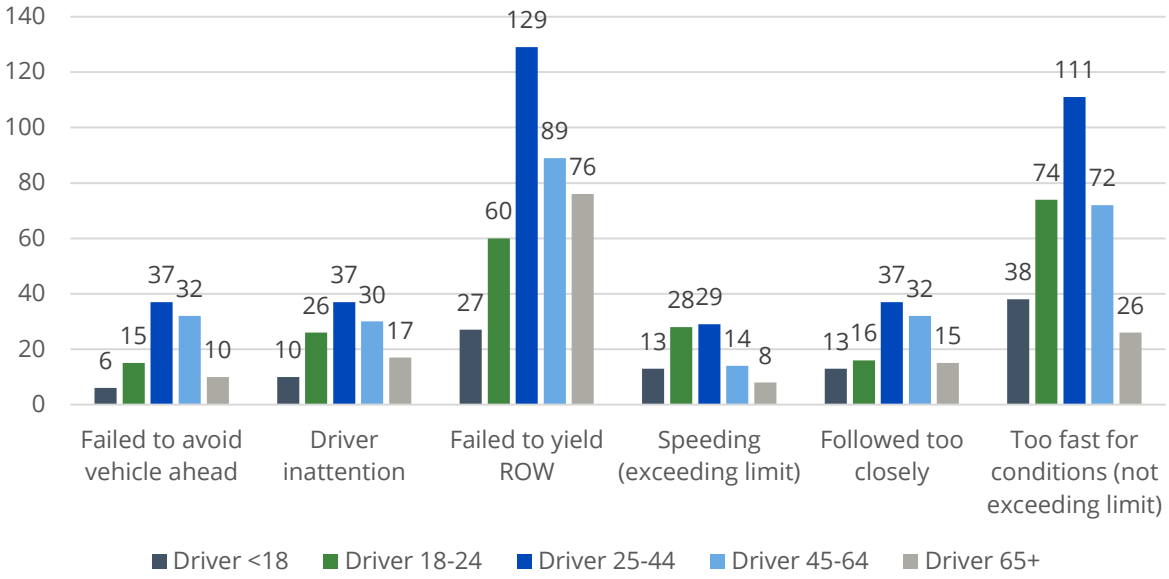
> **In unincorporated Deschutes County, older drivers were more likely to be involved in fatal and serious injury crashes, and younger drivers were more likely to be involved in crashes where speed is the primary cause.**

Note that because age is typically not reported for crashes that only result in property damage, age-related findings only apply to fatal and injury crashes.



Note: Excludes PDO Crashes

Figure 4-6. Share of Drivers by Age Group and Crash Severity



Note: Top six causes only. Excludes PDO crashes

Figure 4-7. Number of Crashes by Age Group and Cause

EMPHASIS AREAS

Emphasis areas help an agency know what types of crashes or types of crash locations to focus their safety efforts. To determine where Deschutes County should focus its safety efforts, the crash pattern assessment flagged attributes of crashes that met certain proportion or severity criteria, consistent with the 2021 Oregon TSAP:

- **Flag 1—Predominant Crash Attribute:** The crash attribute is present in more than 10% of fatal and serious injury crashes in unincorporated Deschutes County.
- **Flag 2—More Prevalent than Statewide:** The proportion of fatal and serious injury crashes for the given attribute in unincorporated Deschutes County is greater than the one attribute statewide in the Oregon TSAP.
- **Flag—3 High Severity Indicator:** The crash attribute has a higher share of fatal and serious injury crashes in unincorporated Deschutes County than its overall share of total crashes. For example, head-on crashes contribute to 11% of all fatal and serious injury crashes but only 3% of all crashes.

The emphasis areas represent the crash attributes that received two or more of the flags described above. For a complete discussion of this screening process and emphasis area selection, see Appendix A.

EMPHASIS AREAS

- **Roadway and Lane Departures***
- **Speeding**
- **Impaired Driving***
- **Motorcyclists***
- **Older Drivers (Age 65 and Over)** *
- **Younger Drivers (Age 15-25)** *
- **Intersection Crashes***

**Indicates an attribute received more than two flags*

These Emphasis Areas and their associated crash statistics previously presented guided the development of Systemic Treatments and Multidisciplinary Actions presented in Chapters 5, 6, and 8 of this plan.

Network Screening Evaluation

The network screening evaluation searched the unincorporated Deschutes County transportation network to locate intersections and roadways with the greatest need for site-specific safety improvements. The evaluation applied the *Highway Safety Manual* Equivalent Property Damage Only (EPDO) performance measure to locate system intersections and roadways with higher concentrations of crashes, particularly those resulting in fatal or serious injuries.

For a complete discussion of the network screening process, see Appendix A.

EPDO PERFORMANCE MEASURE

Fatal and serious injury crashes have clear and monumental costs to human life and health. The EPDO performance measure assigns weights to the five crash severity categories based on their estimated societal costs. These costs might include things like the cost of infrastructure repair, emergency response costs, medical costs, work-loss costs, and the value of quality of life. Fatal and serious injury crashes naturally receive the highest weights, while property damage only crashes receive the lowest weight:

- **Fatal (K) and Suspected Serious Injury (A) Crashes:** Weight of 100
- **Suspected Minor Injury (B) and Possible Injury (C) Crashes:** Weight of 10
- **Property Damage Only (O) Crashes:** Weight of 10

This weighting of crashes across unincorporated Deschutes County's transportation network revealed the county's High Injury Network and locations that it could prioritize for safety intervention.

HIGH INJURY NETWORK

A high injury network (HIN) represents areas that see a disproportionately high number of crashes, especially fatal and serious injury crashes. Agencies use a HIN to determine where to target safety improvements. The HIN for unincorporated Deschutes County is identified with red and orange locations, representing intersections and roadways that have the most frequent and serious crashes (**Figure 4-8**).

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5HGPRQG
/D 3LQH
0LOHV
+LJK ,QMXU\ 1HWZRUN
7RS ,QWHUVH
7RS ˘ ,QWHUVH
7RS 5RDGZD\
7RS ˘ 5RDGZD\
&LW\ /LPLWV ([FOXGHG IURP 3ODQ
8UEDQ *URZWK %RXQGDULHV
0HGLXP 'LVWULFW
+LJK 'LVWULFW
)LJXUH
+LJK ,QMXU\ 1H
'HVFKXWHV &RXQ

SAFETY FOR ALL

ODOT's Social Equity Index (SEI) can help us understand how area crashes may be impacting historically underserved communities in unincorporated Deschutes County. The SEI uses demographic data from the American Community Survey to identify areas where residents may be transportation disadvantaged. ODOT has found that areas with a higher SEI (meaning higher disadvantage) experience a higher rate of injuries. This plan takes these areas into account by identifying equity disparity across the county as it relates to the HIN (**Figure 4-8**) and prioritizing locations for improvement near areas with higher SEI (see Chapter 7).

Deschutes County selected 10 HIN locations to address their crash history with capital improvements and systemic treatments. These 10 locations were selected based on their crash history, proximity to transportation disadvantaged communities, and public input.

PRIORITY CRASH LOCATIONS IN DESCHUTES COUNTY

1. US 97 / Jackpine Loop (North)
2. US 20 / Pinehurst Road
3. US 20 / Gerking Market Road
4. US 20 / Erickson Road-Torkelson Road
5. Day Road / Amber Lane / 5th Street
6. State Recreation Road / Huntington Road
7. Bear Creek Road / Ward Road
8. NE Smith Rock Way / 33rd Street
9. NE Smith Rock Way / NE 1st Street
10. NW Ice Avenue / NW 43rd Street

For more on these locations, including their site-specific projects, see Chapter 7.

School Safety Audits

The analysis for this plan included School Safety Audits at key schools either located within the unincorporated areas of the county or along County-owned and maintained roads within urban areas (specifically within La Pine) to evaluate walking, biking and to assess infrastructure gaps. Audits were conducted at the following schools:

- Three Rivers School
- La Pine Elementary, Middle, and High Schools
- Rosland Elementary School
- Buckingham Elementary School
- Tumalo Community School
- Terrebonne Community School

Common issues at these schools included congestion during the pickup hour, a lack of marked crossings, and discontinuous sidewalks. Several schools also expected to see more pedestrian activity due to nearby development. New sidewalks, crosswalk striping, and enhanced crossings, as well as school zone signage reviews, could help support safe walking, biking, and driving near these schools. These audits and their recommendations add an extra layer of safety evaluation and intervention in the county, focusing on school-age children who are among the most vulnerable road users walking and biking to school.

For complete information on each school's challenges and recommended improvements, see Appendix C.

5 SYSTEMIC TREATMENTS

Because crashes tend to occur throughout a transportation network, their locations can seem random. But a closer look often reveals predictable contributing factors. Proactively applying systemic countermeasures, most of which have relatively low costs, can help reduce the likelihood of seemingly random fatal and serious injury crashes.

This chapter presents engineering treatments that Deschutes County could apply across its transportation system based on site conditions and needs. The list of treatments was informed by the results from the crash pattern assessment, agency input, community feedback, and ODOT's crash reduction factor list. Many of these treatments are also Proven Safety Countermeasures, FHWA's collection of countermeasures and strategies that are effective at reducing roadway fatalities and serious injuries. Many of these treatments can be incorporated into ongoing maintenance efforts to maximize their cost-effectiveness.

Treatments have been organized into five groups:

- **Roadway and lane departure countermeasures**, which are treatments that help reduce crashes from drivers departing the travel lane or roadway.
- **Corridor access management countermeasures**, which are treatments designed to reduce crashes related to driveways.
- **Pedestrian and bicycle countermeasures**, which are treatments that address crashes involving vulnerable road users like people walking and biking.
- **Intersection countermeasures**, which are treatments that can be applied at County Road intersections to reduce intersection-related crashes.
- **Speed management strategies**, which are treatments designed to reduce speeding-related crashes. (These strategies are presented as a Speed Management Toolbox in Chapter 6).

Within each group, strategies have been organized into tiers based on cost and barriers to implementation. Each treatment includes a description, what types of crashes it addresses, its documented effectiveness (when available), and an estimate of its planning-level cost.

SYSTEMIC TREATMENT IMPLEMENTATION TIERS

- **Tier 1 Countermeasures** have a low cost and low barriers to implementation.
- **Tier 2 Countermeasures** have a medium cost and medium barriers to implementation.
- **Tier 3 Countermeasures** have a high cost and high barriers to implementation.

Roadway and Lane Departure Countermeasures

This group of countermeasures includes treatments to help reduce crashes from drivers departing the travel lane or roadway.

TIER 1 COUNTERMEASURES

Install Chevron Signs on Horizontal Curves		
Chevron signs along horizontal curves provide a visual cue to alert and guide motorists through an approaching curve. Chevron signs alert drivers to reduce speeds and prepare to enter a curve. Chevron placement also helps guide drivers through the curve by providing a visual cue to the approaching curve's radius.		
Applicable Collision Types	Run-off-the-road injury crashes	 *Source: Deschutes County*
Potential Collision Reduction	16%	
Planning-Level Cost	$750 per sign	

Install Recessed Pavement Markers

Recessed pavement markers are installed along the edge and centerline of the roadway to increase reflectivity and visibility during night-time conditions.

Applicable Collision Types	Nighttime crashes
Potential Collision Reduction	15%
Planning-Level Cost	$20–$23 each $2,500–$3,000 per lane mile

Source: Deschutes County

Install Post-Mounted Delineators (Curve Application)

Post mounted delineators can be installed adjacent to the roadway to provide better delineation for drivers to see where the edge of the roadway is, particularly during low-visibility conditions.

Applicable Collision Types	Nighttime curve crashes
Potential Collision Reduction	30%
Planning-Level Cost	$90 each

Source: Deschutes County

Install Oversized or Doubled Up Advanced Curve Warning Signs

Oversized or doubled up warning signs can be installed in advance of curves to provide additional warning.

Applicable Collision Types	Run-off-the-road crashes
Potential Collision Reduction	20%
Planning-Level Cost	$1,500 each

Source: FHWA

Install Retroreflective Strips on Sign Posts Advanced Warning Signs

The posts on any sign, but particularly curve warning signs can be upgraded to install retroreflective strips on the post or additional emphasis on curves to provide additional warning to motorists.

Applicable Collision Types	Run-off-the-road crashes
Potential Collision Reduction	Not Available
Planning-Level Cost	$30 per post

Source: Deschutes County

Install LED Flashing Curve Signs/Chevrons

Upgrade existing curve warning signs and/or chevrons to LED flashing outlined sign at curves to provide additional warning to motorists.

Applicable Collision Types	Curve crashes
Potential Collision Reduction	10%
Planning-Level Cost	$1,000–$2,000 per sign

Source: DKS

Install Edgeline Striping (4”)

Stripe edgelines to delineate the traveled way and improve visibility for drivers. Edgelines help define the edge of the roadway. This increased visibility of the roadway edge can reduce the occurrence of vehicles leaving the roadway.

Applicable Collision Types	Run-off-the-road crashes
Potential Collision Reduction	11%
Planning-Level Cost	$0.25–1.50 per foot (thermoplastic); $0.15–0.75 per foot (paint)

Source: Texas A&M Transportation Institute

Install Wider Edgelines (8”)		
Restripe edgelines to increase their width to improve visibility for drivers. Wider edge-lines more clearly define the edge of the roadway. This increased visibility of the edge of roadway can reduce the incidence of vehicles leaving the roadway.		
Applicable Collision Types	All crashes	 *Source: Google (Deschutes County)*
Potential Collision Reduction	14%	
Planning-Level Cost	$2.50–3.00 per foot (thermoplastic); $2.00 per foot (paint)	

TIER 2 COUNTERMEASURES

Install Dynamic Feedback Sign on Curves		
Dynamic speed warning signs alert drivers of their speed into the approach of a curve when their speed is above the curve design speed. Dynamic speed warning signs can reduce curve-related crashes by providing visual feedback to the driver that speeds should be reduced when approaching a curve.		
Applicable Collision Types	All crashes	 *Source: FHWA*
Potential Collision Reduction	5%	
Planning-Level Cost	$20,000 per sign	

Install Shoulder Rumble Strips

Shoulder rumble strips provide auditory and tactile feedback to motorists when they begin to exit the outside of the travel lane. Shoulder rumble strips can help reduce run-off-the-road crashes by alerting drivers that they are traveling beyond the designated lane. Consideration should be given to bicycle traffic when determining where to place rumble strips and how to accommodate bicyclists on the shoulder.

Applicable Collision Types	Run off the road crashes
Potential Collision Reduction	22%
Planning-Level Cost	$3,000 per mile (both sides)

Source: FHWA

Install Shoulder Sinusoidal Rumble (Mumble) Strips

Shoulder rumble strips provide auditory and tactile feedback to motorists when they begin to exit the outside of the travel lane. Mumble strips reduce the amount of noise to nearby land uses while providing tactile feedback to the motorist. They are also more compatible with narrow paved shoulders. Consideration should be given to bicycle traffic when determining where to place rumble strips and how to accommodate bicyclists on the shoulder.

Applicable Collision Types	Run off the road collisions
Potential Collision Reduction	22%
Planning-Level Cost	$2,000 per mile

Source: Caltrans

Install Centerline Rumble Strips

Centerline rumble strips provide auditory and tactile feedback to motorists when they have begun to cross over the centerline of the roadway. Centerline rumble strips can reduce head-on and other crossover crash types on horizontal curves of undivided roadway segments by alerting drivers they are crossing over the centerline into the opposing direction of traffic.

Applicable Collision Types	All injury crashes; head-on and sideswipe meeting injury crashes
Potential Collision Reduction	12%; 45%
Planning-Level Cost	$2,000 per mile

Source: Deschutes County

Increase Pavement Friction (Segment or Curve Application)

High friction surface treatments apply aggregate to the pavement to increase or maintain the pavement friction at a site. Increasing or maintaining appropriate pavement friction through a curve can reduce the potential for motorists to lose control of their vehicle or skid when navigating a curve. Increased pavement friction has been shown to reduce crash frequency during wet conditions and in locations with high friction demand caused by vehicle speeds or roadway geometrics.

Applicable Collision Types	Run-off-the-road crashes (curves); Wet road crashes (segments)
Potential Collision Reduction	72% (curves); 57 (wet segments)%
Planning-Level Cost	$40 per square yard

Source: FHWA

Upgrade Guardrail End Treatments

Upgrading guardrail end treatments ensure that errant motorists who strike the leading end of a guardrail will strike an energy absorbing system that will minimize the risk of injury to the motorist.

Applicable Collision Types	Run-off-the-road crashes
Potential Collision Reduction	Not available
Planning-Level Cost	Varies

Source: Deschutes County

Review Pass/No Pass Markings

Systematically review Pass/No Pass Markings on two lane roads to ensure that passing zones are marked correctly and motorists have adequate sight distance to safely pass based on the posted or operating speeds. The review can be completed using traditional methods or by using LiDAR.

Applicable Collision Types	Head-on crashes; Side-swipe meeting crashes
Potential Collision Reduction	Varies
Planning-Level Cost	Varies

Source: ODOT

TIER 3 COUNTERMEASURES

Widen Paved Shoulder by 1–3 Feet

Widen the paved shoulder adjacent to travel lanes. Paved shoulders may increase safety performance when navigating horizontal curves by providing a paved recovery area for motorists who have left the travel lane. The shoulder can help a driver maintain control and correct the vehicle path. Widening the outside shoulder of a curve provides the greatest benefit on roads where existing space is limited. This treatment also benefits bicyclists by providing more dedicated space for the bicyclists separate from motor vehicle traffic.

Applicable Collision Types	All collisions
Potential Collision Reduction	6% (by 1 foot); 13% (by 2 feet); 18% (by 3 feet)
Planning-Level Cost	Varies

Source: Deschutes County

Install New Guardrail

Install guardrail where lane departure crashes strike object in the clear zone or where vehicles tend to roll over because of non-recoverable slopes in the clear zone.

Applicable Collision Types	Run-off-the-road injury crashes
Potential Collision Reduction	47%
Planning-Level Cost	$2,000 per lineal foot

Source: Deschutes County

Remove, Relocate, or Protect Fixed Objects Adjacent to Road		
Remove or relocate fixed objects adjacent to the roadway to increase the unpaved shoulder clear zone. Clearing or moving fixed objects away from the roadway can reduce fixed-object crashes by providing a clear zone that gives drivers more space and time to correct their path should they leave the road.		
Applicable Collision Types	All crashes	 *Source: Deschutes County*
Potential Collision Reduction	22% (from 3 feet to 16 feet); 44% (from 16 feet to 30 feet)	
Planning-Level Cost	Varies	

Corridor Access Management Countermeasures

This countermeasure group includes a single treatment to reduce driveway related crashes.

TIER 3 COUNTERMEASURES

<table>
<tr><th colspan="3">Close, Consolidate, or Relocate Urban Driveways (Access Management)</th></tr>
<tr><td colspan="3">Access management refers to the control of entry and exit points along a roadway. Access management treatments can include closing, consolidating, or relocating driveways or restricting certain movements in and out of driveways. This treatment can enhance safety for all modes, facilitate walking and biking, reduce trip delay and congestion, and decrease vehicle conflicts.</td></tr>
<tr><td>Applicable Collision Types</td><td>All injury crashes</td><td rowspan="3"> 
Source: Deschutes County</td></tr>
<tr><td>Potential Collision Reduction</td><td>25% (10–24 driveways to less than 10 per mile); 29% (48 driveways to 26–48 per mile); 31% (26–48 driveways to 10–24 per mile)</td></tr>
<tr><td>Planning-Level Cost</td><td>Varies</td></tr>
</table>

Pedestrian and Bicyclist Countermeasures

This group of countermeasures includes treatments to reduce crashes involving vulnerable road users such as bicyclists and pedestrians.

TIER 1 COUNTERMEASURES

Install Green Bike Lanes at Conflict Points		
On-street bike lanes may be painted green to designate a high conflict location. This can include intersections where there are large volumes of right-turning vehicles, segments where there are many driveways or where the bicycle lane must cross over a motor vehicle lane. For example, when a right turn lane is developed, the through bicycle lane must cross it.		
Applicable Collision Types	Bicycle crashes	 *Source: Deschutes County*
Potential Collision Reduction	39%	
Planning-Level Cost	$10 per square foot (pavement markings only)	

Install Buffered Bike Lanes

Bike lanes are on-street facilities. This facility type includes bike lanes with a painted buffer (stripe) but no physical (horizontal and vertical) separation between vehicle travel lanes and bicycle travel lanes. The class II designation includes buffered bike lanes, which provide extra lateral separation visually but without vertical elements. In general, a buffer is preferred where possible. When bicycle lanes are installed on roads with on-street parking, the buffer should be wide enough to prevent "dooring" bicycle crashes. Buffered bicycle lanes are limited to roadways with a minimum of 36' of width as 18' per side is the minimum necessary to accommodate an 11' travel lane, 2' buffer and a 5' bike lane.

Applicable Collision Types	Bicycle injury crashes
Potential Collision Reduction	47%
Planning-Level Cost	$20,000–$30,000 per mile (striping only)

Source: City of Corvallis

Install Shared Roadway Features

Bike routes (which may be designated as "bicycle boulevards" or "urban greenways") provide shared use of right-of-way among bicyclists and motorists, as designated by signs or permanent markings along a route. Roadways designated as Class III bike routes should have enough width to accommodate motorists and bicyclists together. Shared-lane markings ("sharrows") can be used to alert users of the shared roadway environment. Because the right-of-way is shared, speed management on Class III bikeways is essential (see the Speed Management Toolbox later in this memorandum).

Applicable Collision Types	Bicycle crashes
Potential Collision Reduction	TBD
Planning-Level Cost	$500 per pavement marking

Source: NACTO

Install Shared Roadway Features

At locations with physical constraints, such as bridges and tunnels, active warning beacons, signage, and pavement markings may be used to alert drivers that bicyclists are on the roadway. It may be appropriate to reduce vehicle speeds through reduced posted or advisory speed limits and traffic calming measures to increase bicyclist comfort.

Applicable Collision Types	Bicycle crashes
Potential Collision Reduction	Not available
Planning-Level Cost	$10,000

Source: Deschutes County

TIER 2 COUNTERMEASURES

Install Pedestrian Refuge Island

Median refuge islands are physical crossing enhancements that allow for two-stage crossings (where people only need to cross one direction of travel at a time). This effectively shortens the crossing distance and reduces exposure to vehicles. Median refuge islands are most suitable for locations where pedestrians must cross three or more vehicle travel lanes (but may also be considered in other locations, space permitting). Medians may also support speed management on high-speed roadways at uncontrolled or midblock crossing locations.

Applicable Collision Types	Pedestrian crashes
Potential Collision Reduction	31%
Planning-Level Cost	$25,000

Source: New York City DOT

Install Urban Curb Extensions

Curb extensions visually and physically narrow the roadway at pedestrian crossing locations and provide additional space to wait at street corners while reducing crossing distances for pedestrians. Curb extensions increase visibility of pedestrians by bringing the crossing further into the roadway. This is especially beneficial with the presence of on-street parking at the approach to the crossing. Curb extensions can also serve as transit stop locations to support bus priority in not leaving the traffic stream.

Applicable Collision Types	All crashes
Potential Collision Reduction	30%
Planning-Level Cost	$25,000

Source: FHWA

TIER 3 COUNTERMEASURES

Install Raised or Tabletop Urban Crosswalks

At locations with high volumes of pedestrians or where pedestrians mix with higher speed traffic, raised crosswalks elevate the visibility of pedestrians while ensuring drivers reduce their speeds. Typically, they are flush with the adjacent sidewalk. Drainage can be issue. Generally, this countermeasure would only be implemented in urbanized environments and are not applicable to rural highways. They also complicate winter maintenance efforts (snow plowing).

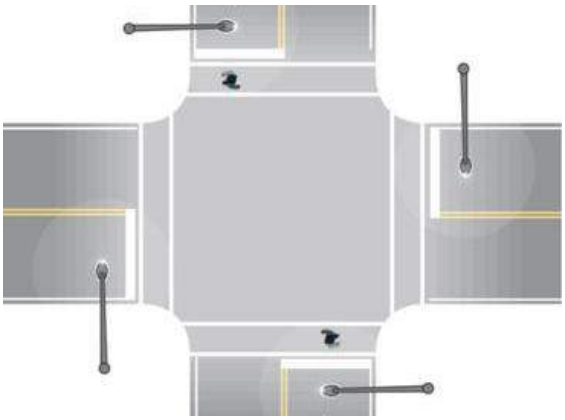
Applicable Collision Types	Bicycle and pedestrian crashes
Potential Collision Reduction	30%
Planning-Level Cost	$31,000

Source: FHWA

Install Intersection Lighting (Pedestrians/Bicyclists)

Adding intersection lighting for signalized and non-signalized intersections helps improve the visibility of the intersection and potential conflicts. Intersection illumination, including pedestrian crossings, helps illuminate crossing pedestrians for approaching motorists and assists pedestrians in navigating the crossing.

Applicable Collision Types	Nighttime pedestrian and bicycle injury crashes
Potential Collision Reduction	42%
Planning-Level Cost	$8,500 per pole



Source: FHWA

Install Rectangular Rapid Flashing Beacons

Rectangular Rapid Flashing Beacons (RRFBs) are pedestrian-actuated warning signs supplemented with high-visibility LED lights. When activated, RRFBs flash a high-visibility strobe-like light warning drivers when pedestrians are crossing. RRFBs have shown to reduce pedestrian collisions by up to 47%. RRFBs should be used in locations with high pedestrian safety issues as over-use may diminish their effectiveness. Installing median pedestrian islands with RRFBs can also reduce crashes at pedestrian crossings with more than two lanes.

Applicable Collision Types	Pedestrian crashes	 *Source: Deschutes County*
Potential Collision Reduction	10% (2-lane road or 3-lane+ road without median); 56% (3-lane+ with median)	
Planning-Level Cost	$20,000 - $50,000	

Intersection Countermeasures

This group of countermeasures includes treatments to help reduce crashes involving motor vehicles at intersections.

TIER 1 COUNTERMEASURES

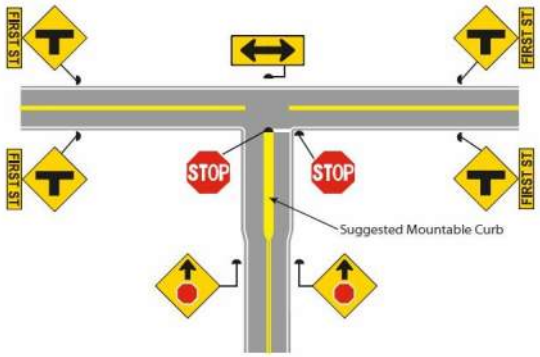
Increase Intersection Warning with Signing and Striping

Implementing a package of low-cost treatments can be used to increase intersection warning and improve safety performance at unsignalized intersections. The improvements may include:

- Doubled (left and right) oversize warning signs
- Doubled STOP signs
- A raised splitter island on the stop approach (if feasible)
- Street name signs
- Stop bars
- Removing any limitations to sight distance
- Double warning arrow at the stem of T-Intersections

This set of enhancements combines multiple treatments to make the approach of two-way stop-controlled intersections more visible to the driver and increase awareness and visibility of potential conflicts. These treatments can help slow approaching vehicles and increase stop compliance on the controlled approaches. The County and cities should determine which treatments are appropriate at the individual locations where they are applied; some of the treatment options may not be applicable at every location.

Applicable Collision Types	All collisions
Potential Collision Reduction	20% (1–2 treatments); 25% (3–4 treatments); 30% (5–7 treatments)
Planning-Level Cost	Varies: $750 per new sign; $1,500 per oversized sign; $1,200 per Stop Ahead legend



Source: FHWA

Install Transverse Rumble Strips on Stop-Controlled Approaches

Transverse rumble strips create an audible warning to attract the attention of a driver and alert them to a possible change of conditions, such as an upcoming stop control or curve. Transverse rumble strips should be used in conjunction with advance signing to warn of the intersection ahead. Care should be taken to avoid installing transverse rumble strips near residences and businesses due to the noise generated by the vehicles when driving over the strips. In locations with bicycle lanes or wide paved shoulders, these should not extend into the bicyclist's area. Breaks in the rumble strips may allow motorcycles to avoid them. The rumble strips may be ground into the pavement as shown in the photograph below or can be raised thermoplastic strips.

Applicable Collision Types	All fatal & serious injury crashes
Potential Collision Reduction	25%
Planning-Level Cost	$4 per foot

Source: FHWA

Install "Stop Ahead" Pavement Markings

Stop ahead pavement markings are used to alert drivers of the presence of an intersection and that stopping is required. These markings provide a supplementary message and should be used in conjunction with additional regulatory warning and stops signs.

Applicable Collision Types	All collisions
Potential Collision Reduction	31%
Planning-Level Cost	$1,200 each

Source: Deschutes County

Install Flashing LED Stop Sign[1]

Flashing LED stop signs help draw motorists' attention to an upcoming intersection, particularly in low light.

Applicable Collision Types	Angle crashes
Potential Collision Reduction	41%
Planning-Level Cost	$1,000 per sign

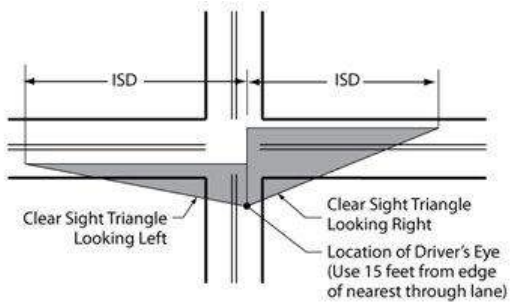
Source: Deschutes County

[1] FHWA Crash Modification Factor (CMF) Clearinghouse, CMF ID 6602

Increase Triangle Sight Distance

Increasing intersection sight distance may involve a variety of actions to increase the line of sight including clearing vegetation and embankments, relocating objects, implementing parking restrictions. By increasing intersection sight distance, drivers are provided with a greater distance to see potential conflicts and complete maneuvers to avoid potential collisions.

Applicable Collision Types	All injury crashes
Potential Collision Reduction	48%
Planning-Level Cost	Varies



Source: FHWA

TIER 2 COUNTERMEASURES

Install Raised Divider on Stop Approach (Splitter Island)[1]

Installing a raised divider (with mountable curb) on a stop-controlled approach to an intersection can reduce approach speeds by reducing the available and perceived width for motorists on approach. It may also allow for warning signs on the left as well as the right.

Applicable Collision Types	All crashes	 *Source: FHWA*
Potential Collision Reduction	Not available	
Planning-Level Cost	$7-10 per square foot	

[1] *FHWA, "Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections," (2014)*

Install Raised Divider on Major (Uncontrolled) Approach (Splitter Island)[1]

Installing a raised divider (with mountable curb) on a stop-controlled approach to an intersection can reduce approach speeds by reducing the available and perceived width for motorists on approach. It may also allow for warning signs on the left as well as the right.

Applicable Collision Types	All crashes	 *Source: FHWA*
Potential Collision Reduction	Not available	
Planning-Level Cost	$7-10 per square foot	

[1] *FHWA, "Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections," (2014)*

TIER 3 COUNTERMEASURES

Convert Minor Road Stop-Controlled Intersection to Compact or Mini Roundabout[1]

Compact and min-roundabouts feature channelized approaches and a traversable central island to move traffic through an intersection. As at typical roundabouts, entering traffic yields to vehicles already circulating, leading to improved operational performance. Mini roundabouts have an inscribed circular diameter (ICD) between 45 and 80 feet while compact roundabouts have an ICD between 70 to 110 feet. Both mini and compact roundabouts often fit within the footprint of the existing intersection. Mini roundabouts are more appropriate for lower speed environments such as urban or suburban areas. An Intersection Control Evaluation should be completed before install a compact or mini-roundabout.

Applicable Collision Types	All injury crashes
Potential Collision Reduction	61%
Planning-Level Cost	$100,000–$800,000

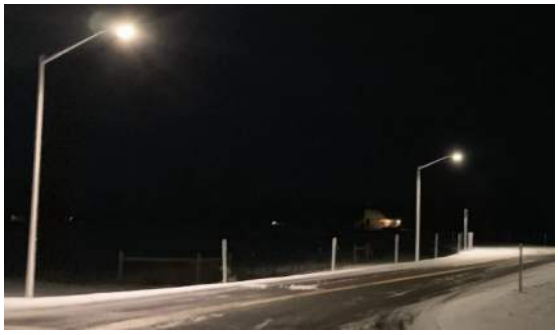
Source: Deschutes County

[1] *FHWA CMF Clearinghouse, CMF ID 11241*

Install Intersection Lighting (Motorists)

Adding intersection lighting for signalized and non-signalized intersections helps improve the visibility of the intersection and potential conflicts. Intersection illumination, including pedestrian crossings, helps illuminate crossing pedestrians for approaching motorists and assists pedestrians in navigating the crossing.

Applicable Collision Types	Nighttime crashes
Potential Collision Reduction	38%
Planning-Level Cost	$8,500 per pole



Source: Deschutes County

Convert Minor Road Stop-Controlled Intersection to Roundabout

Roundabouts feature channelized approaches and a central island to move traffic through an intersection. At roundabouts, entering traffic yields to vehicles already circulating, leading to improved operational performance. Single-lane roundabouts are typically designed so that drivers must approach the intersection at speeds below 25 miles per hour. The approach speed can reduce the severity of crashes when compared to other intersection forms. Roundabouts can be used in place of a two-way and all-way stop-controlled intersection, and potentially traffic signals depending on volume. Replacing a rural two-way stop-controlled intersection with a single-lane roundabout has been shown to reduce injury crashes as much as 82 percent.

Applicable Collision Types	All injury crashes
Potential Collision Reduction	82%
Planning-Level Cost	$2.5M - $3M

Source: Deschutes County

Reduce the Skew Angle of an Intersection

A skewed intersection has an angle of less than 90 degrees between the intersecting streets. Intersections with severe skews reduce sight distance for approaching drivers. They are especially problematic for older drivers who have reduced neck mobility.

Applicable Collision Types	All crashes
Potential Collision Reduction	Varies by skew angle
Planning-Level Cost	Varies

Source: Google (Deschutes County)

Install Left-Turn Lanes on Major Roads at Stop-Controlled Intersections

Left-turn lanes provide physical separation between turning vehicles and through traveling vehicles, thus separating the slowing vehicles from the rest of traffic and reducing the risk for rear-end crashes. Left-turn lanes allow drives to continue through the intersection without having to stop for traffic making left turns.

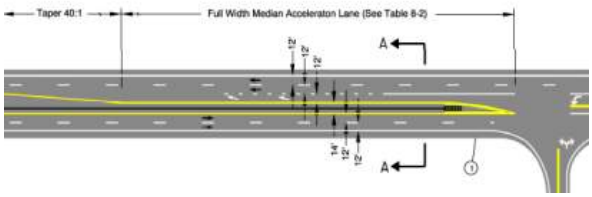
Applicable Collision Types	All crashes
Potential Collision Reduction	44% (3-leg intersection); 48% (4-leg intersection)
Planning-Level Cost	Varies

Source: Deschutes County

Install Rural Median Acceleration Lane

Rural median acceleration lanes allow vehicles turning from the side street onto the major street to complete a two-stage left-turn. Vehicles must wait for a gap in one direction of traffic before turning into the acceleration lane, where they are able to accelerate and merge into the travel lane at full speed.

Applicable Collision Types	All injury crashes
Potential Collision Reduction	45%
Planning-Level Cost	Varies



Source: ODOT APM

6 SPEED MANAGEMENT TOOLBOX

Because higher speeds increase the risk of fatal or serious injuries when a crash occurs—especially when a person walking or biking is involved—speed management is a top priority for Deschutes County.

This section presents treatments that can help reduce speeding-related crashes by preventing speeding and communicating to drivers that they need to slow down ahead of roadway changes, such as intersections or curves. These speed management strategies are low-cost treatments that can be implemented systemwide.

Some of the systemic treatments presented in Chapter 5 also function as speed management tools. For example, lane narrowing is an intersection-specific crash countermeasure that can also reduce speeds of motorists. These kinds of treatments have not been repeated in this chapter.

Speed management treatments have been are organized into three groups:

- **Pavement markings**
- **Physical roadway improvements**
- **Signing**

Each group has been further organized by implementation cost, and each treatment includes a description and guidance for typical application.

SPEED MANAGEMENT IMPLEMENTATION TIERS

- **Tier 1 Countermeasures** have a low cost.
- **Tier 2 Countermeasures** have a medium cost.

Tier 1 Countermeasures

Transverse Lane Marking

Description: Transverse lane markings are horizontal markings placed on the roadway. There are many types of transverse lane markings including optical bars and chevron marking. They may extend partially into a lane or be placed fully across the lane.

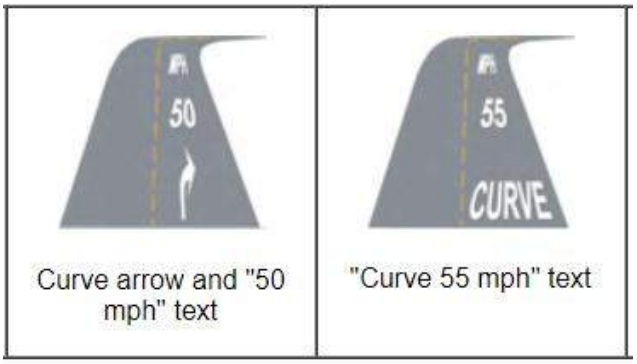
Application Guidance: Transverse markings are especially useful for transition zones and can be used in locations where there is an approaching change in roadway character such as an intersection or curve. Markings may be spaced increasingly closer on the approach to an intersection to give the appearance of increased speed so a driver is more aware of their speed. Transverse lane markings support decreased speeds on intersection approaches or other roadway transition. Optical speed bars are an additional type of transverse marking. *The Manual of Uniform Traffic Control Devices* (*MUTCD*) Section 3B.22 provides guidance on placement of optical speed bars.

Source: Deschutes County

Speed Advisory Markings in Lane ("Slow", "Curve", or "Speed Limit XX")

Description: Advisory markings provide information before curves and other advisory zones. Markings may include the speed limit or a warning of an approaching curve.

Application Guidance: NCHRP Report 600: Human Factors Guidelines for Road Systems contains guidelines for effective markings. The report found that usage of speed advisory markings may lower speeds by up to 4 mph and showed an 11% reduction in vehicles exceeding the speed limit. Speed advisory markings can supplement other signage such as curve advisory signs. *MUTCD* Section 3B.20 provides design and placement criteria for pavement advisory markings.



Source: FHWA

Narrow Travel Lanes on the Approach to Intersection

Description: Narrowing travel lanes on the approach to an intersection provided a visual cue to motorists to reduce speeds on the approach.

Application Guidance: Narrower lanes can be installed on the approach to signalized, stop controlled or uncontrolled approaches. The lanes may be narrowed by creating a media, a wider shoulder (or bicycle lane), or both. Narrower lanes may be supplemented by the addition of splitter islands, rumble strips, tubular markers, recessed pavement markers or buffered bike lanes depending on site conditions.

Source: FHWA

Centerline Delineator Posts

Description: Vertical centerline posts are a type of vertical treatment that delineates the centerline. This treatment is also known as a longitudinal channelizer.

Application Guidance: Vertical delineators can be used for lane narrowing. Delineators may be between 18 and 36 inches tall and spaced 32 inches apart. Posts should only be applied where there is enough room in the roadway to accommodate larger vehicles. This treatment can help reduce speed along long straight roadways. Centerline vertical delineators placed on rural roads have been shown to reduce average speed by as much as 3 mph. Delineators also have the benefit of separating oncoming traffic and potentially reducing the risk of head-on collisions.

Source: Iowa State University, Speed Management Toolbox for Rural Communities

LEDs in Pavement Markings or Signs

Description: LEDs can be embedded in delineators or any warning or regulatory sign. *MUTCD* Section 2A.08 contains guidance on the installation of signage with embedded LEDs.

Application Guidance: LEDs can draw driver attention and improve comprehension of signage on curves. This treatment has also been applied LEDs experimentally by placing LEDs in the roadway serving the function of roadway advisory pavement markings. LEDs may also be embedded in speed limit signs. LEDs on speed limit signs have been shown to reduce the number of vehicles that were traveling over the speed limit.

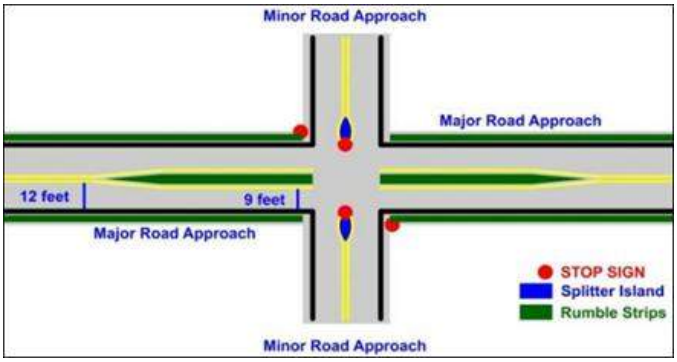
Source: Deschutes County

Tier 2 Countermeasures

Splitter Islands at Intersections

Description: Splitter islands are a treatment for stop-controlled intersections that may be located on the approach to an intersection to increase the intersection visibility and allow space to add a left-side stop sign. They can also be used to provide deflection on the intersection approach to support speed reduction. They help channelize and guide turning vehicles from the major roadway.

Application Guidance: Splitter islands have been shown to be effective at decreasing traffic speed and reducing intersections crashes. Splitter islands can be combined with doubled-up stop signs for increased visibility. *NCHRP Report 279* covers splitter island design and placement.



Source: FHWA

Horizontal Deflections

Description: Horizontal deflections are a type of physical roadway or curb enhancement to narrow or otherwise break up a roadway's straight design character. A horizontal deflection requires the motorist to navigate a curvilinear alignment stay on the roadway path.

Application Guidance: Horizontal deflections can provide a visual endpoint for the roadway along curves. Lateral shifts, chicanes, and roundabouts are examples of horizontal deflections. Horizontal deflections are more common in populated areas and can be integrated as a part of other roadway infrastructure such as medians, pedestrian islands, or curb extensions. Center islands are an additional type of horizontal defection that provides separation from traffic and can reduce the risk of a head-on collision occurring.

Source: Deschutes County

Dynamic Speed Displays and Vehicle-Actuated Signs / Speed Trailers

Description: Dynamic speed feedback signs display the speed of approaching vehicles. Dynamic signs can display other information or signage that is triggered by an approaching vehicle.

Application Guidance: Dynamic speed feedback signs on rural roadways may reduce 85th percentile speeds by 2–7 mph. Typical applications include paring a dynamic speed feedback sign with a speed limit sign or curve advisory sign.

Source: Deschutes County

7 SITE-SPECIFIC PROJECTS

In addition to systemic treatments, agencies can target specific locations that see high numbers of crashes, particularly fatal and serious injury crashes. This section presents locations on Deschutes County's HIN where the County could apply more extensive safety treatments to help eliminate fatal and serious injury crashes.

Deschutes County identified 10 priority locations for capital safety projects (typically representing more costly improvements that often require extensive planning and distinct funding sources) and systemic treatments (lower-cost interventions that can be incorporated into maintenance activities). The County selected these locations based on their crash history, proximity to transportation disadvantaged communities, and public input.

The recommendations presented in this section will continue to be refined by the County and its partners through further analysis, design, and community input.

Inclusion of a project in this plan does not represent a commitment by the County or ODOT to fund, permit, or construct the project. Projects on the State Highway System that are contained in the TSAP are note considered "planned" projects until they are programmed into the Statewide Transportation Improvement Program (STIP). As such, projects proposed in this plan that are located on a State Highway cannot be considered mitigated for future development or land use actions until they are programmed into an adopted STIP or ODOT provides a letter indicated that the project is "reasonably likely" to be funded in the STIP. State Highway projects that are programmed to be constructed may have to be altered or cancelled at a later time to meet changing budgets or unanticipated conditions such as environmental constraints.

Priority Locations

Deschutes County's priority locations include two intersections and a set of curves located just outside of La Pine, four intersections just outside of Bend, and three intersections north of Redmond (**Figure 7-1**). Some of these locations are near areas where people may have been historically underserved by the transportation system.

%HQG
5HGPRQG
/D 3LQH
%HQG
5HGPRQG
/D 3LQH
3ULRULW\ /RFDWLRQV
&DSLWDO 3URMHFW
6\VWHPLF 7UHDWPHQW
+,1 ,QWHUVHFWLRQV
7RS
7RS
(TXLW\ 'LVSDULW\
&RQFHQWUDWHG
/RZ 0HGLXP 'LVSDULW\
0HGLXP +LJK 'LVSDULW\
+LJK 'LVSDULW\
&LW\ /LPLWV
8UEDQ *URZWK %RXQGDULHV
0LOHV
)LJXUH ^
3ULRULW\ /RFDWLRQV IRU &DSLWDO DQ
'HVFKXWHV &RXQ

Recommended Improvements

Potential improvements have been recommended for each priority location. Conceptual layouts have been developed for five locations with capital project recommendations, and systemic treatments, without conceptual layouts, are recommended for the remaining five.

PRIORITY LOCATIONS WITH CONCEPTUAL LAYOUTS

- US 97 / Jackpine Loop (North)
- US 20 / Pinehurst Road
- US 20 / Gerking Market Road
- US 20 / Erickson Road-Torkelson Road
- Day Road / Amber Lane / 5th Street

PRIORITY LOCATIONS WITH SYSTEMIC TREATMENTS

- State Recreation Road / Huntington Road
- Bear Creek Road / Ward Road
- NE Smith Rock Way / NE 33rd Street
- NE Smith Rock Way / NE 1st Street
- NW Ice Avenue / NW 43rd Street

The recommendations presented in this section adhere to the design principles rooted in the Safe System Approach to address crash histories and patterns:

Projects range from increased signing and striping to access control and fixing intersection skews. Treatments were developed based on the detailed crash history at each site (e.g., types, severities, crash concentrations, other unique factors, etc.), the existing characteristics of the intersection or roadway (e.g., traffic control, direction of travel,

geometry, roadway space, visibility, etc.), and predominantly ODOT's crash reduction factor list.

Projects that are recommended at the County's five priority locations with conceptual layouts are presented in **Figure 7-2** through **Figure 7-6**. Short descriptions of these priority location are provided below.

- **US 97 / Jack Pine Loop (North) [Figure 7-2]:** Jackpine Loop, south of La Pine, intersects US 97 in two places, where the northern intersection provides access to nearby properties and shows notable highway-related crashes. This three-leg, two-way stop-controlled intersection lacks turn lanes, lighting, and warning signs for motorists on US 97, contributing to overtaking and turning crashes. The recommended improvement would close the intersection, reroute traffic to the US 97 / Masten Road intersection, and extend Pierce Road.
- **US 20 / Pinehurst Road [Figure 7-3]:** Pinehurst Road, west of Tumalo, supports east-west travel and access to nearby properties, but is a skewed two-way stop-controlled intersection with US 20. The location lacks lighting and turn lanes, and its history of rear-end and turning crashes indicates recurring safety issues. The recommended improvement is to separate the existing four-leg intersection into two three-leg intersections and add left-turn lanes on US 20.
- **US 20 / Gerking Market Road [Figure 7-4]:** Gerking Market Road, also west of Tumalo, is a three-leg, two-way stop-controlled, skewed intersection at US 20 with no turn lanes. US 20 has a westbound passing lane merging through the intersection. The recommended improvement focuses on reducing the skew and adding turn lanes on US 20 to address the history of rear-end and turning crashes.
- **US 20 / Erickson Road-Torkelson Road [Figure 7-5]:** Erickson Road, east of Bend, is a four-leg, two-way stop-controlled intersection at US 20 with intersection warning signs. The location lacks turn lanes and lighting, and may have visibility challenges. The recommended improvement would restrict side-street movements to right-in/right-out with a raised median and enhance intersection warning to address the history of angle crashes.
- **Day Road / Amber Lane / 5th Street [Figure 7-6]:** The Day Road / Amber Lane / 5th Street area, northwest of La Pine, consists of several closely spaced intersections and sharp curves that experience run-of-the-road crashes despite existing warning devices. The area also lacks lighting. The recommended improvement focuses on flattening the curves, widening shoulders, and enhancing curve warning speed feedback signs.

Table 7-1 and **Table 7-2** describe the recommended systemic treatments at the remaining five priority locations.

More details on the crash history, road characteristics, and treatments for the priority locations are available in Appendix C.

An implementation plan for the recommended projects is presented later in this, including planning-level cost estimates, implementation timeframes, and the criteria used to prioritize implementation.

Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change

Create a two-way stop-controlled intersection

Pierce Road No 2

Remove curve and create a 3-leg intersection

6th Street

Pierce Road

Construct an extension of Pierce Road to County standards

Masten Road

Construct an extension of Pierce Road to County standards

Jackpine Loop

Disconnect Jackpine Loop from US 97

See Figure 4 for intersection details

US 97

Coordinate with ODOT on possible installation of median barrier on US 97

OR 31

Upgrade southbound intersection warning signs to indicate the presence of Masten Road and OR 31

La Pine

Legend

Existing Roadway

Scale: 1" = 600'

600 300 0 600

The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 7-3A: US 97 and Jackpine Loop

Deschutes County, Oregon

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Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change

Upgrade existing stop ahead warning sign to doubled up signs

Pierce Road

US 97

Install and synchronize doubled up stop signs with LED flashing borders

Reduce skew of intersection

Masten Road

Improve lighting at intersection

Install STOP AHEAD pavement markings

Coordinate with ODOT on possible installation of median barrier on US 97

N

Scale: 1" = 60'

60 30 0 60

The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 7-3B: US 97 and Masten Road

Deschutes County, Oregon

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Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change

Improve lighting at intersection

Install left turn lanes on northbound and southbound approaches with raised median

Smokey Butte Road

Improve lighting at intersection

Install doubled up intersection warning sign

Install doubled up stop signs

Install northbound splitter island

Coordinate culvert installation with utility

Install doubled up stop ahead warning signs

Install stop sign

Install southbound splitter island

Install doubled up stop signs

Install STOP AHEAD pavement markings

Install doubled up stop ahead warning signs

Pinehurst Road

Remove trees to increase triangle sight distance

Realign roadway

Install STOP AHEAD pavement markings

Coordinate culvert installation with utility

Install doubled up intersection warning sign

Improve lighting at intersection

US 20

Pinehurst Road

Legend

Existing Roadway

N

Scale: 1" = 150'

150 75 0 150

The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 7-4: US 20 and Pinehurst Road

Deschutes County, Oregon

\\kittelson.com\SA\pt_Projects\30\30431 - Deschutes County TSAP\design\Exhibits\Intersection Exhibits.dwg Feb 11, 2026 - 3:31pm eandrews Layout Tab: 7-4 US 20 and Pinehurst

Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change

Gerking Market Road

Install STOP AHEAD pavement markings

Install doubled up stop signs

Explore relocating the merge lane

Install doubled up intersection warning signs

Install eastbound left turn lane

Improve lighting at intersection

Install doubled up stop ahead warning signs

Install southbound splitter island

Install channelized right turn lane

Install doubled up intersection warning signs

US 20

N

Scale: 1" = 150'

150 75 0 150

The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 7-5: US 20 and Gerking Market Road

Deschutes County, Oregon

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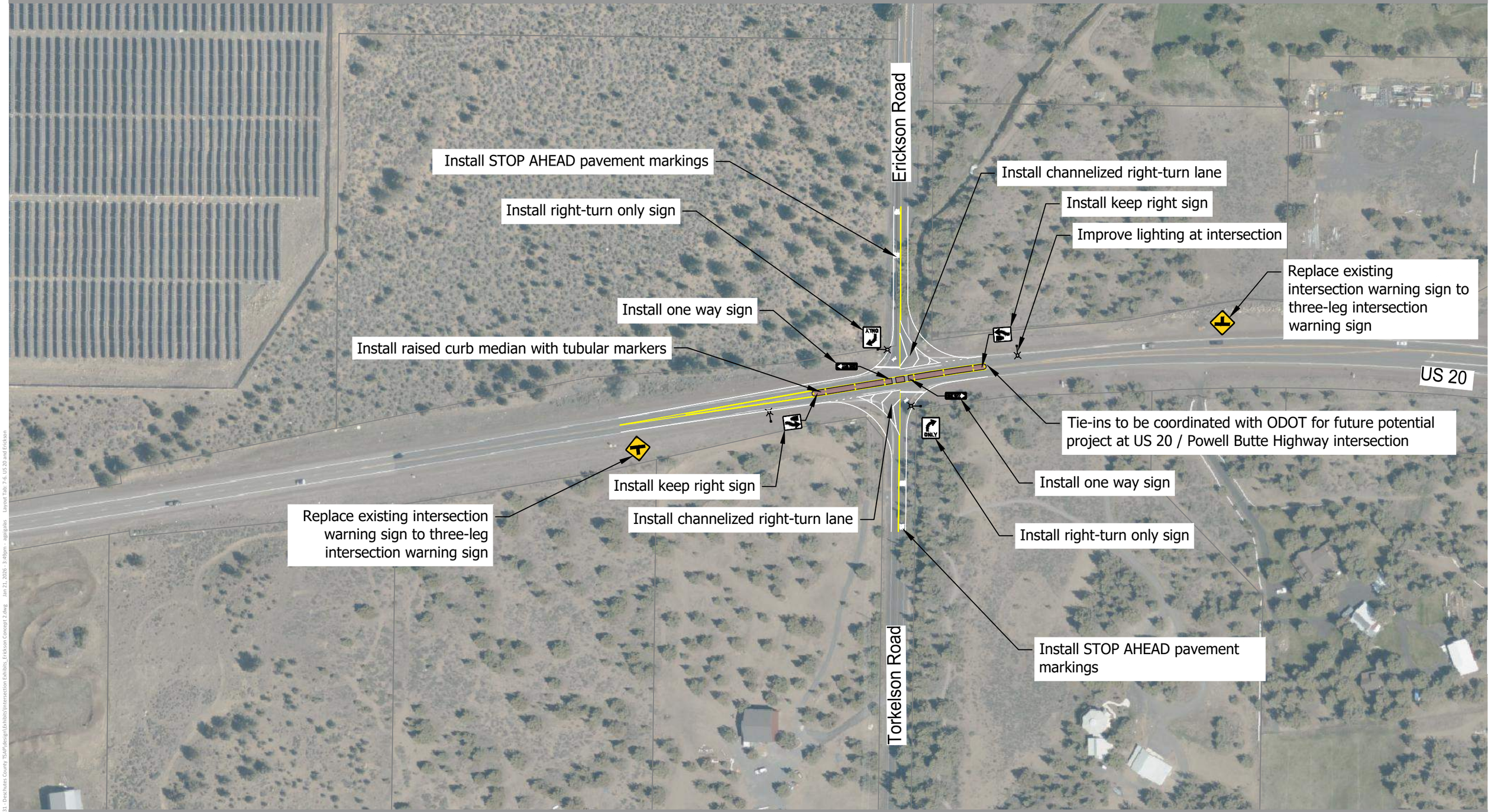
Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change



N

Scale: 1" = 150'

150 75 0 150

The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 7-6: US 20 / Erickson Road / Torkelson Road

Deschutes County, Oregon

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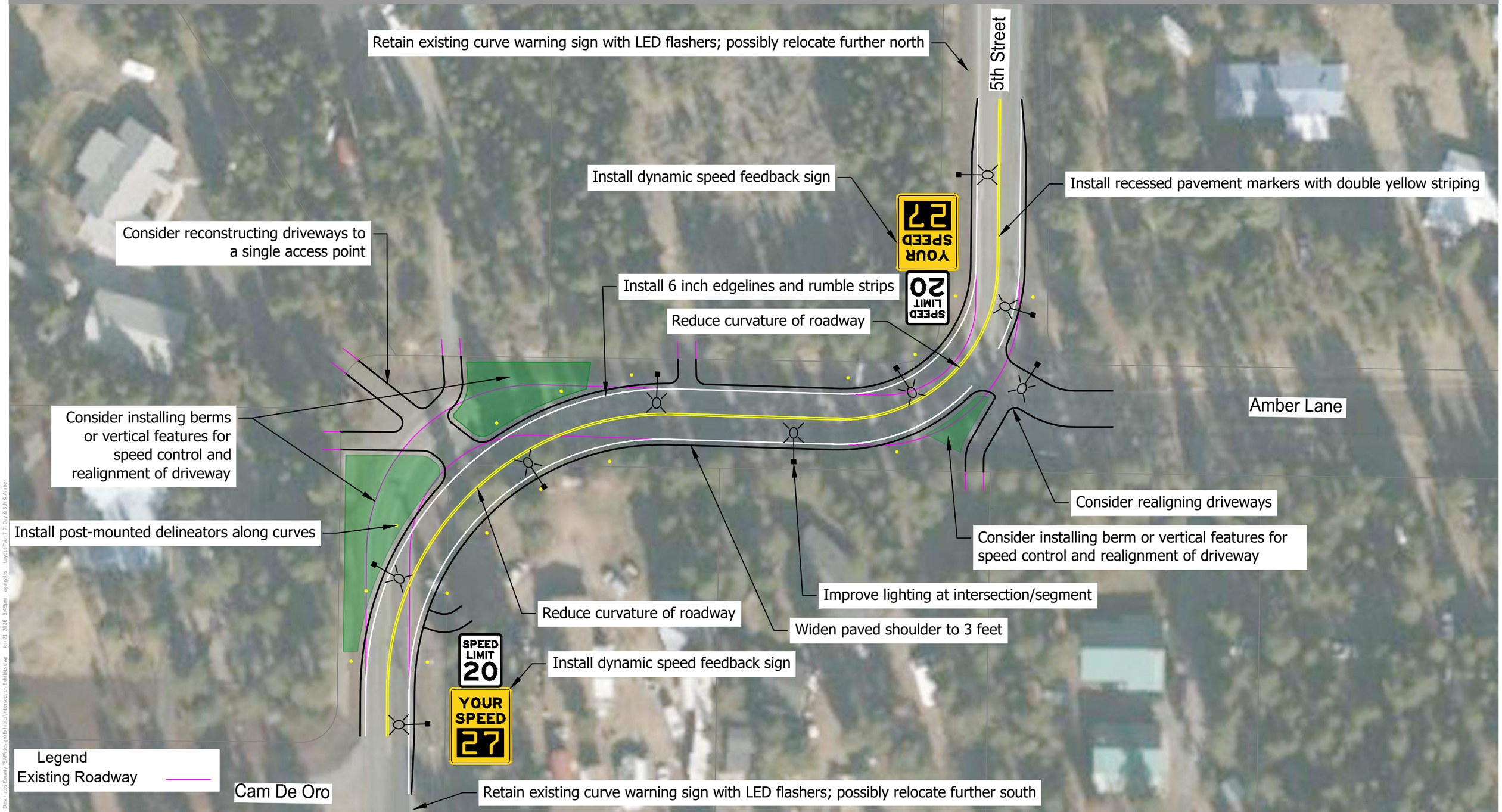
Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change



N

Scale: 1" = 50'

50 25 0 50

The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 7-7: Day Road / 5th Street /Amber Lane

Deschutes County, Oregon

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PRIORITY LOCATIONS WITH SYSTEMIC TREATMENTS

This section presents the recommended modifications for the remaining five priority locations with systemic treatments. Given that many of the systemic treatments recommended at these priority locations are similar, the treatments for each location are presented in a matrix, including their potential crash reduction (**Table 7-1**).

Implementation Plan

The implementation plan presented in this section provides a roadmap for the County to develop and construct the high priority location projects according to a recommended timeline. These recommended timelines were determined by prioritizing each project based on the following criteria:

- Frequency and severity of crashes;
- Effects on transportation disadvantaged populations;
- Planning-level cost estimates;
- Community input;
- Potential environmental and right-of-way impacts; and,
- Multijurisdictional coordination.

Given that intersections and roadway segments differ in function, quantity of crashes, and implementation cost, projects for these facility types are prioritized separately from each other. The implementation plan is presented in **Table 7-2**. The cost estimates are planning level and do not account for design details such as right-of-way acquisition and environmental constraints or major structures like retaining walls. These should be identified through project development. The implementation timeframes are Near-Term (1-5 years), Mid-Term (5-10 years), and Long-Term (10-20 years). These priorities are intended to be flexible and adapt to changing priorities of the community and local agencies.

Details on the prioritization process as well as the cost estimate worksheets are included in Appendix E.

Table 7-1. Recommended Systemic Treatments at Priority Locations

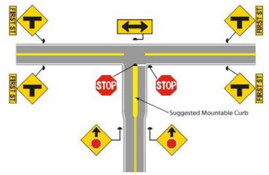
Treatment		State Rec Rd /Huntington Rd	Bear Creek Rd/ Ward Rd	NE Smith Rock Way/ NE 33rd St	NE Smith Rock Way/ NE 1st St	NW Ice Ave/NW 43rd St
Increase intersection warning with pavement markings and additional signage (CRF = 20-30%).		✓		✓	✓	✓
Provide flashing LED stop signs at stop-controlled approaches (CRF = 41%).		✓		✓	✓	✓
Double up stop signs with LED lights (CRF = 41%).			✓			
Install transverse rumble strips on the stop-controlled approaches (CRF = 25%).		✓				
Install 6-foot or greater raised dividers on the uncontrolled approaches with tubular markers.		✓	✓	✓	✓	✓
Install flashing beacons on intersection warning signs.			✓			
Install intersection lighting (CRF = 38%).			✓			

Table 7-2. Site-Specific Projects - Implementation Plan

Priority Location	Types of Improvements	Planning-Level Cost	Implementation Timeframe
US 97 / Jackpine Loop (N)	• Access consolidation • Local route improvements • Increased intersection warning	$3.8M	Mid-Term (5-10 Years)
US 20 / Pinehurst Road	• Intersection skew correction • Highway turn lanes • Increased intersection warning	$2.4M	Long-Term (10-20 Years)
US 20 / Gerking Market Road	• Intersection skew correction • Highway turn lanes • Channelization • Increased intersection warning	$2.0M	Long-Term (10-20 Years)
US 20 / Erickson Road-Torkelson Road	• Access control • Increased intersection warning	$900K	Mid-Term (5-10 Years)
Day Road / Amber Lane / 5th Street	• Horizontal curve flattening • Shoulder widening • Rumble strips • Increased curve warning	$700K	Long-Term (10-20 Years)
State Recreation Road / Huntington Road	• Increased intersection warning / LED-flashing stop signs • Transverse rumble strips • Raised dividers	See Section 5 for Unit Costs	Near-Term (1-5 Years)

Priority Location	Types of Improvements	Planning-Level Cost	Implementation Timeframe
Bear Creek Road / Ward Road	• Increased intersection warning • LED-flashing stop signs. • Flashing beacons on intersection warning signs • Lighting • Raised dividers	See Section 5 for Unit Costs	Near-Term (1-5 Years)
NE Smith Rock Way / NE 33rd Street	• Increased intersection warning • LED-flashing stop signs • Raised dividers	See Section 5 for Unit Costs	Near-Term (1-5 Years)
NE Smith Rock Way / NE 1st Street	• Increased intersection warning • LED-flashing stop signs • Raised dividers	See Section 5 for Unit Costs	Near-Term (1-5 Years)
NW Ice Avenue / NW 43rd Street	• Increased intersection warning • LED-flashing stop signs • Raised dividers	See Section 5 for Unit Costs	Mid-Term (5-10 Years)

Other Past & Ongoing Safety Projects

Other safety projects across Deschutes County have either been identified by past planning efforts or were being developed in concurrence with the TSAP through ongoing separate evaluation. These include the 2020 Deschutes County TSP and remaining projects from the previous version of this TSAP (2019). The recommendations within this plan either expand upon or incorporate the projects identified in these other plans. It is recommended that Deschutes County partner together and with the State to implement the projects in these other plans to strengthen the countermeasures developed in this document. Details on those additional projects are provided in Appendix F.

8 MULTIDISCIPLINARY ACTIONS

In addition to engineering treatments, agencies can use partnerships, polices, educational programs, and other community-oriented strategies to add additional safety layers to their transportation systems.

This chapter offers multidisciplinary actions Deschutes County can use to build redundant protections into its rural network. Generated through the crash pattern analysis, network screening, and community feedback, these actions bring together different agencies and community organizations and cover all five Safe System Approach objectives. These strategies are especially important for addressing behavior-related emphasis areas such as impaired driving or speeding.

> **Transportation safety is a community effort. County staff, elected officials, law enforcement, educators, emergency responders, and public health providers all have important roles to play in preventing fatal and serious injury crashes.**

Table 8-1. Multidisciplinary Action Items

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A1	Support the Regional Transportation Safety Committee facilitated by Central Oregon Intergovernmental Council (COIC), which meets regularly to coordinate transportation safety efforts and carry out the Action Items identified in the TSAP. The committee should include representatives from outreach and advocacy groups to support community engagement, as well as City and County staff from departments such as police, streets, capital projects, engineering, and community development to promote resource sharing, data coordination, and unified safety strategies.	Safety Culture	ODOT, Deschutes County, Bend, Bend MPO, Redmond, Sisters, La Pine, Police, Sheriff, District Attorney's office, Emergency Services, OLCC, Department of Public Health, COIC	$$$
A2	Consider staffing needs or a consultant position to lead the Regional Transportation Safety Committee and lead implementation of the Action Items in the TSAP. Staff may be part of Deschutes County or ODOT to better serve the full region. Seek funding for this position. Collaborate with COIC on staffing needs or a consultant position to lead the Regional Transportation Safety Committee and TSAP Action Item implementation. Seek and develop a sustainable funding model for this position.	Safety Culture	ODOT, Deschutes County, COIC	$$
A3	Support the 2024 COIC Safety Communications Plan, including an education and public outreach system, that promotes a roadway safety culture that emphasizes attentive driving, sober driving, calm driving, driving at appropriate speeds, and awareness of individual impact on roadway safety. This should be a comprehensive and ongoing program.	Safety Culture, Aggressive Driving	ODOT, Deschutes County, Bend MPO, City of Bend, COIC	$$
A4	Develop a Safety Communications Calendar that provides monthly messages to emphasize in Deschutes County. Develop a plan for recurring educational events throughout the year(s). Provide educational programs at community events. Align Deschutes County safety messaging and recurring events with COIC's regional efforts.	Safety Culture	Deschutes County, ODOT, COIC	$$
A5	Provide educational materials to visitors through partnerships with Visit Bend, Visit Central Oregon, and local hotels/resorts. Expand upon ongoing efforts with COIC.	Safety Culture	Deschutes County, Bend MPO, City of Bend, Visit Bend, COIC	$$
A6	Develop and maintain policies to support the actions identified in the TSAP and to better incorporate safety into long-range planning and the project development process.	Safety Culture	Deschutes County	$
A7	Increase enforcement during highest risk times, based on the reported crash data patterns, and at locations identified in the TSAP based on reported crash data.	Safety Culture, Enforcement	Police/Sheriff, Deschutes County	$$
A8	Evaluate the need to increase sheriff staffing to increase enforcement. Explore funding opportunities to increase enforcement.	Safety Culture, Enforcement	Police/Sheriff, Deschutes County	$$
A9	Provide bystander training courses to the public to educate residents how to respond in an emergency event.	Emergency Response	Police, EMS, Hospitals	$$
A10	Reduce (optimize) response time to crashes. Work with the EMS Council and Oregon Area Trauma Advisory Board to complete this.	Emergency Response	EMS, Police	$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A11	Develop criteria for identifying and designating safety corridors within the County.	Aggressive Driving, Safety Culture	Deschutes County, ODOT	$
A12	Encourage employers and families to institute policies related to driving safely, including attentive driving, by sharing the National Safety Council's sample contract in its Distracted Driving Toolkit. Expand upon ongoing efforts with COIC.	Safety Culture, Distracted Driving	Deschutes County, Employers, Local cities, COIC	$
A13	Educate youth and adults on the importance of paying attention when using the transportation system. Expand upon ongoing efforts with COIC.	Safety Culture, Distracted Driving	Deschutes County, COIC	$
A14	Continue to implement an unmarked car distracted driving program. Consider partnering with the City of Bend to expand the program.	Safety Culture, Distracted Driving, Enforcement	County Sheriff, Police, City of Bend	$$
A15	Develop an educational campaign to promote sober driving. Provide educational posters, social media posts, and public service announcements to inform the public about the dangers of impaired driving, including alcohol and drugs. Work in schools to educate students on the consequences of impaired driving. Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Deschutes County, ODOT, Bend MPO, Schools, COIC	$
A16	Increase Driving Under the Influence and impaired driving enforcement through data-driven saturation patrols and provide officers with Drug Recognition Expert Training and standardized field sobriety tests training.	Impaired Driving, Enforcement	Police, County Sheriff, Deschutes County	$$
A17	Focus on programs and partnerships, such as he Shared Future Coalition, to increase education and awareness around impaired driving for all drivers. Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Deschutes County (Shared Future Coalition), COIC	$$
A18	Develop repeat DUI driver offender programs focused on treating the causes of DUI.	Impaired Driving	District Attorney's Office	$
A19	Support the City of Bend in formalizing rideshare locations in the downtown area and near locations with multiple restaurants, bars, and pubs to encourage greater use of cabs and rideshare options. Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Bend MPO, City of Bend, Downtown Bend, Restaurants and Bars, Cab and Rideshare companies, Deschutes County, COIC	$$
A20	Coordinate with local bars, businesses, and rideshare companies to develop and offer a program that provides users with a discount for taking a cab or rideshare to or from drinking establishments or special events (such as Bit of Bend, Summerfest, etc.). Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Bend MPO, City of Bend, Downtown Bend, Restaurants and Bars, Cab and Rideshare companies; Deschutes County, COIC	$
A21	Report matter-of-fact crash statistics in a manner meant to inform potential riders of the risks associated with choosing the motorcycle as a mode of transportation. Expand upon ongoing efforts with COIC.	Safety Culture; Motorcycles	Deschutes County, ODOT, Bend MPO, City of Bend, COIC	$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A22	Conduct targeted outreach using various means, relationships, and venues to encourage a change in safety culture to convince motorcyclists to enact safe riding practices. Work with motorcycle shops to educate riders about the behaviors associated with higher risk such as discouraging group rides. Provide educational posters, social media posts, and educational placards to inform motorcyclists of the consequences of crashes and promote safe riding practices, safety equipment, gear choice (full face helmets, full gloves, appropriate jackets and pants, boots, etc. and All the Gear All the Time (ATGATT)), importance of lights or reflective gear at night, the importance of not riding the wrong way, the importance of not riding impaired, and motorcycle handling skills and maintenance. Expand upon ongoing efforts with COIC.	Safety Culture, Motorcycles	Deschutes County, ODOT, COIC	$
A23	Encourage more education programs for riders who have taken a break from riding. Work with motorcycle retailers to encourage education for new riders and continued training after receiving their endorsement. Expand upon ongoing efforts with COIC.	Safety Culture, Motorcycles	Deschutes County, ODOT, COIC	$
A24	Continue partnership with Commute Options and Pedestrian Advisory Committee (BPAC).	Safety Culture, Pedestrians / Bicyclists	Deschutes County, BPAC	$
A25	Continue to provide local educational programs at schools and other venues (safety fairs, community events, etc.) for both students and parents, including: educate parents about traffic safety, including safe parking locations when lining up for school pick-up; educate students and parents about the importance of reflective clothing when walking or biking at night; educate students and parents on safe pedestrian and bicycle practices including safe crossing practices and not playing behind vehicles or near streets; educate about the importance of adult supervision; provide educational materials for students to share with parents about the risks associated with distracted driving, including distracted pedestrians.	Safety Culture, Pedestrians / Bicyclists	Commute Options, Schools	$$
A26	Collaborate with the Department of Public Health to work on active transportation, safe routes to school, health impact assessments, and rural access to health care. Include transportation safety in public health education programming.	Safety Culture	Deschutes County Health Department	$
A27	Commute Options is a community group that administers the “Friendly Driver Course.” Support this group to continue the course for truck drivers and expand it beyond truck drivers to include drivers associated with businesses and business activities. This program currently educates truck drivers on how to operate in the presence of people walking and biking. Offer incentive programs to encourage businesses to expand this program beyond truck drivers.	Safety Culture; Pedestrians/ Bicyclists	Commute Options, Local Businesses, Deschutes County	$$
A28	Evaluate where opportunities exist for new educational and promotional programs for pedestrians and bicyclists over time.	Safety Culture; Pedestrians/ Bicyclists	Commute Options, Deschutes County	$
A29	Conduct adult pedestrian and bicycle outreach, such as safe crossing practices and new pedestrian/bicycle infrastructure education. Expand upon ongoing efforts with COIC.	Safety Culture; Pedestrians/ Bicyclists	Commute Options, Deschutes County, COIC, City of Bend	$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A30	Educate drivers and bicyclists about bicycle transportation, including proper driver and bicyclist behavior and rules of the road for bicyclists, when to dismount, how to use sidewalks and crosswalks, how to ride through roundabouts, common crash types, etc.	Safety Culture; Pedestrians/ Bicyclists	Deschutes County, Bend MPO, ODOT, Commute Options, COIC, City of Bend	$
A31	Coordinate with BPAC to reintroduce placards with rules for bicyclists, pedestrians, and motor vehicle drivers.	Safety Culture; Pedestrians/ Bicyclists	BPAC	$
A32	Develop a countywide bicycle route map that identifies the preferred bicycle routes (lower volume, lower speed, and available shoulders) and provide wayfinding to direct cyclists to these routes. Illuminate pedestrian crossings near schools in the County.	Pedestrians/ Bicyclists	Deschutes County	$$
A33	Provide transportation options through infrastructure that allows for transit, walking, and other forms of transportation, where possible. Partner with transportation assistance programs to promote non-driving options for seniors. Expand upon ongoing efforts with CET.	Senior Drivers	COIC, CET, Deschutes County, ODOT, COIC	$$
A34	Support driver education programs and safety education for younger drivers in rural areas. Support peer-based safe driving marketing efforts and outreach programs in high schools to provide driver and non-motorized travel safety education. Support family-based driver education to leverage parental influence. Expand upon ongoing efforts with COIC.	Safety Culture; Young Drivers	ODOT, Commute Options, COIC	$
A35	Begin safety education before young people reach driving age, as early as preschool. Partner with groups such as Safety Towns and school districts.	Safety Culture; Young Drivers	Commute Options, Safety Towns, School District, Central Oregon Health Council	$
A36	Seasonally educate drivers about proper driving behavior and vehicle preparations for winter conditions. Expand upon ongoing efforts with COIC.	Safety Culture; Winter Driving	ODOT, Deschutes County, Deschutes County, COIC, City of Bend	$
A37	Evaluate options to collect and use traffic volume, near-misses, and other data to understand where perceived safety issues may exist	Technology	Deschutes County, ODOT	$$
A38	Evaluate the ability to use crowdsourcing technology to identify risks and locations for additional assessment	Technology	Deschutes County, ODOT	$$
A39	Update the TSAP every 3 to 5 years.	Monitoring	Deschutes County	$

9 PERFORMANCE MONITORING

Performance measures help agencies evaluate their progress toward eliminating fatal and serious injury crashes on their road networks. This section offers information on how the County can track outcomes of its TSAP and what measures it can use to do so.

Helpful tracking measures include:

- The total number of fatal and serious injury crashes within the rural County.
- The number of fatal and serious injury crashes on all rural roads by emphasis area.

The County should report fatal and serious injury crashes annually, and assess performance based on the latest five-year annual average. Averaging helps help account for year-to-year fluctuations. Crash data can be accessed from ODOT.

To work toward its goal of zero transportation-related fatalities and serious injuries, Deschutes County has set a benchmark to reduce fatal and serious injury crashes (both in total and for each emphasis area) by 50% by the year 2050. **Table 9-1** compares current crash levels with 2050 benchmarks.

Table 9-1. Serious Crash Benchmark for Unincorporated Deschutes County

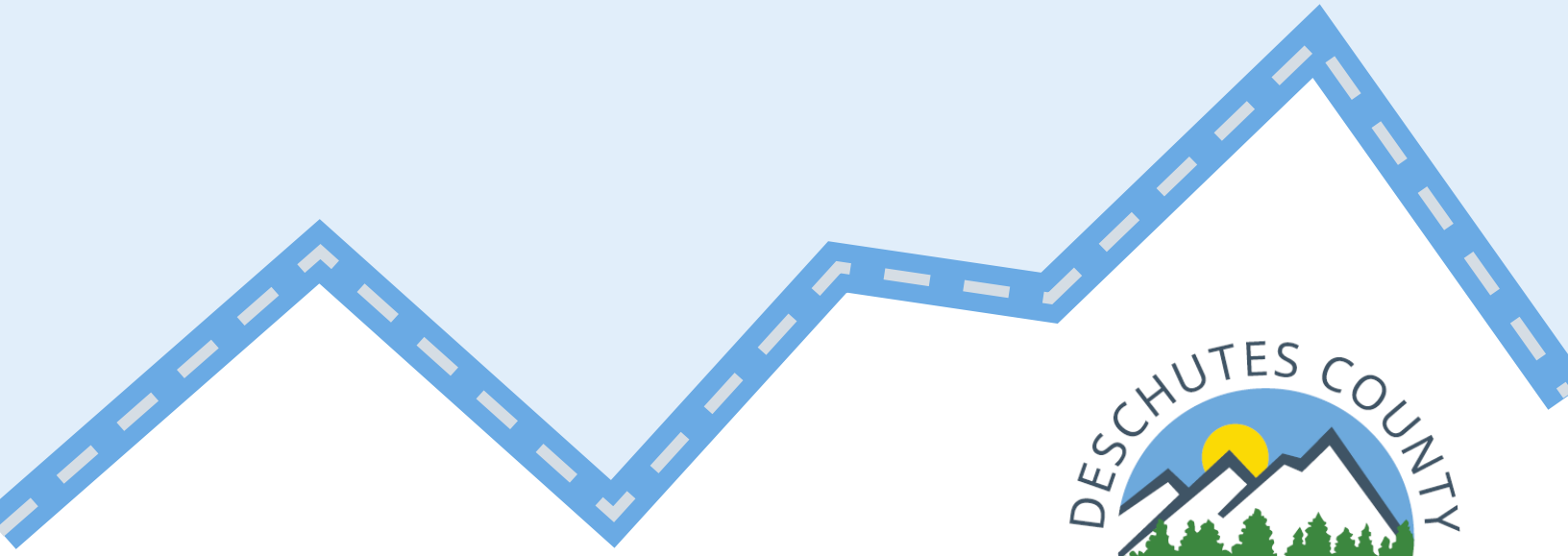
Performance Measure	**Reported Fatal and Serious Injury Crashes** (2018–2022)	**2050 Benchmark** (50% Reduction)
All Fatal and Serious Injury Crashes	172	86
Fatal or Serious Injury Crashes Involving:		
Roadway or Lane Departures	75	37
Speeding	61	30
Impaired Driving	36	18
Motorcyclists	35	17
Older Drivers (Age 65 and Over)	34	17
Younger Drivers (Age 15–25)	40	20
Intersections	76	38

Note: One fatal or serious injury crash may include multiple categories listed above. For example, a younger motorcyclist could crash while speeding. As a result, the sum of the crashes for these individual categories exceeds the total quantity of fatal and serious injury crashes.

DESCHUTES COUNTY

TRANSPORTATION SAFETY ACTION PLAN

Technical Appendix



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APPENDIX A–EXISTING CONDITIONS MEMORANDUM

Technical Memorandum

Date:	July 10, 2025	Kittelson Project No: 30431
To:	Project Management Team	
From:	Matt Kittelson, PE, Miranda Barrus, PE, Eza Gaigalas; Joel McCarroll; Lacy Brown, PhD, PE, RSP_2; Sylinda Villado	
Subject:	Final Tech Memo #1: Existing Conditions	

Introduction

Deschutes County is updating its 2019 Transportation Safety Action Plan (TSAP) for its unincorporated areas. The purpose of the TSAP is to help the County eliminate fatal and serious injury crashes from the transportation system through site-specific and systemic countermeasures and multidisciplinary actions. This memorandum summarizes existing conditions across the county as they relate to current safety plans and policies and crash history. The document is organized into the following four sections:

- **Existing Plans and Policies Review:** summarizes federal, state, and local transportation safety planning requirements and guidance to promote consistent transportation safety planning across the county.
- **Deschutes County TSAP Draft Goal and Policies:** recommends a draft goal and associated policies that move the region toward zero transportation-related deaths and serious injuries, in support of and coordination with the 2019 TSAP and Transportation System Plan (TSP).
- **Safety Analysis Framework:** describes the methodology and assumptions for the crash data analysis.
- **Crash Data Analysis:** summarizes the crash history in unincorporated Deschutes County, including crash patterns and locations where crashes may be concentrating, to identify crash emphasis areas (e.g., speeding, substance use, age of road user) and specific locations that could be prioritized for individual safety projects; it also assesses the effectiveness of safety projects that the County has implemented from its 2019 TSAP.

The information contained in this memorandum, in combination with input from the County and community, will serve as the basis for developing systemic, site-specific, and non-infrastructure strategies.

Existing Plans and Policies Review

A review of existing plans and policies is intended to guide development of the TSAP in accordance with federal, state, and local transportation safety objectives. Therefore, this section summarizes key information that is relevant to the TSAP from the following:

- The US Department of Transportation's (USDOT's) safety planning regulations as well as the requirements of its Safe Streets and Roads for All (SS4A) Grant Program;
- Oregon transportation planning rules and the goals, policies, and strategies of the Oregon TSAP; and,
- Current transportation safety goals, objectives, and projects identified in the County's 2019 TSAP and 2020-2040 Transportation System Plan (TSP).

Federal Regulations and Guidance

Federal transportation safety planning regulations were introduced in 1998 with the Transportation Equity Act for the 21st Century (TEA-21) and they have been carried forward through multiple federal transportation bills, including to the present-day Infrastructure Investment and Jobs Act (IIJA). In 2005, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) replaced TEA-21 and included the requirement that each state had to develop a Strategic Highway Safety Plan (SHSP) to address fatalities and serious injury crashes on all public roads. This SHSP requirement for states has been carried forward since 2005.

Oregon's TSAP, described later in this memorandum, is the state's SHSP. Within the SHSP, the state must establish annual targets for the following performance measures and monitor and report on them annually:

- Number of roadway fatalities
- Number of roadway serious injuries
- Roadway fatalities per vehicle miles traveled (fatality rate)
- Roadway serious injuries per vehicle miles traveled (serious injury rate)
- Combined nonmotorized fatalities / serious injuries
- High-Risk Rural Roads special rule (two-year fatality rate on rural collectors/local roads)
- Fatalities / serious injuries of aging drivers / pedestrians over two-year period (age > 65 years)

Although there are no federal requirements for local governments to have a SHSP or performance measures and targets, the federal requirements for the state have implications for Deschutes County. The state relies on partnerships with local jurisdictions to help reach state and national safety goals by reducing fatalities and serious injuries on their local transportation systems.

Additionally, the Deschutes County TSAP Update is funded by the Safe Streets and Roads for All (SS4A) Grant Program under the IIJA, which has its own specific set of requirements that the TSAP should meet. Information on those requirements and other details of the program that are useful for future grant pursuits by the County are summarized in the following section.

Safe Streets and Roads for All (SS4A) Grant Program

The IIJA was signed into law in November 2021 and continues previous requirements for states to have a SHSP. A SHSP must:

- Incorporate input from a range of partners from diverse disciplines;
- Address all roadway users on all public roads;
- Be data driven;
- Include measurable objectives; and,
- Identify how progress will be evaluated (Reference 1 – Oregon TSAP).

The IIJA established the new SS4A grant program with $5 billion in appropriated funds over five (5) years (Fiscal years 2022-2026) to prevent roadway deaths and serious injuries through planning, demonstration, and implementation grants ($1 billion is generally preserved for each year). Planning and demonstration grants fund the development or completion of an Action Plan, supplemental planning activities, and/or demonstration activities that will inform the development of an Action Plan. Implementation grants fund projects and strategies identified in a qualifying Action Plan (planning, design, and development activities), as well as supplemental planning and demonstration activities (Reference 2 – USDOT SS4A Grant Program).

The components of a qualifying SS4A Action Plan that the Deschutes County TSAP Update needs to include are summarized in Table 1.

Table 1. SS4A Action Plan Components

Component	Description
Leadership Commitment and Goal Setting	Official public commitment (e.g., resolution, policy, ordinance) by a high-ranking official and/or government body (e.g., County Board) to an eventual goal of zero roadway fatalities and serious injuries. Commitment must either include a target date for achieving zero roadway fatalities and serious injuries and/or an ambitious percentage reduction of roadway fatalities and serious injuries by a specific date with an eventual goal of eliminating them.
Planning Structure	A committee, task force, implementation group, or similar body charged with oversight of the Action Plan development, implementation, and monitoring.

Component	Description
Safety Analysis	Analysis of existing conditions and historical trends that provide a baseline level of fatal and serious injury crashes across a jurisdiction, locality, Tribe, or region, without regard to road ownership. Includes analysis of crash locations, severities, types, and contributing factors by relevant road users (motorists, pedestrians, transit users, etc.). Analysis of systemic and specific safety needs is also performed, as needed (e.g., high-risk road features, specific safety needs of relevant road users, public health approaches, analysis of the built environment, demographics, and structural issues). Analysis should include a geospatial identification of higher-risk locations (a High-Injury Network or equivalent).
Engagement and Collaboration	Robust engagement with the public and relevant stakeholders, including the private sector and community groups, that allows for both community representation and feedback. Information received from engagement and collaboration is analyzed and incorporated into the Action Plan. Overlapping jurisdictions are included in the process. Plans and processes are coordinated and aligned with governmental plans and planning processes to the extent practicable.
Equity Considerations	Plan development conducts inclusive and representative processes. Underserved communities are identified through data and other analyses in collaboration with appropriate partners. Analysis includes both population characteristics and initial equity impact assessments of the proposed projects and strategies.
Policy and Process Changes	Assessment of current policies, plans, guidelines, and/or standards (e.g., manuals) to identify opportunities to improve how processes prioritize transportation safety. The Action Plan discusses implementation through the adoption of revised or new policies, guidelines, and/or standards, as appropriate.
Strategy and Project Selections	Identification of a comprehensive set of projects and strategies – shaped by data, the best available evidence and noteworthy practices, and stakeholder input and equity considerations – that will address the safety problems described in the Action Plan. These strategies and countermeasures focus on a Safe System Approach (*described later in this memorandum*) and effective interventions and consider multidisciplinary activities. To the extent practicable, data limitations are identified and mitigated. Once identified, the projects and strategies are prioritized in a list that provides time ranges for when the strategies and countermeasures will be deployed (e.g., short-, mid-, and long-term timeframes). The list should include specific projects and strategies, or descriptions of programs of projects and strategies, and explain prioritization criteria used. The list should contain interventions focused on infrastructure, behavioral, and/or operational safety.
Progress and Transparency	Document of the method to measure progress over time after an Action Plan is developed or updated, including outcome data. A means to ensure ongoing transparency is established with residents and other relevant stakeholders. The approach must include, at a minimum, annual public and accessible reporting on progress toward reducing roadway facilities and serious injuries and public posting of the Action Plan online.

Source: 2024 SS4A Notice of Funding Opportunity

The USDOT has five (5) selection criteria for its Implementation Grant that the County should consider in developing its TSAP:

1. Safety Impact
2. Equity, Engagement, and Collaboration
3. Effective Practices and Strategies
4. Other USDOT Strategic Goals
5. Supplemental Planning and Demonstration Activities

These selection criteria are considered in numeric order of most to least important (e.g., Safety Impact is the most important and will be weighed more heavily). Criterion #5 only applies if the applicant requests funding for supplemental planning and/or demonstration activities in its grant application. In addition to these criteria, the USDOT will also evaluate "Project Readiness" and other considerations (Reference 3 – 2024 SS4A Notice of Funding Opportunity).

Attachment A provides additional details about the SS4A grant program as a reference for the County, including how USDOT's five priorities are reflected in the Implementation Grant selection criteria (see Table A-1), and examples of eligible Implementation Grant activities (Reference 3 – 2024 SS4A Notice of Funding Opportunity).

The next section briefly describes State rules and objectives for transportation safety planning in Oregon.

State Rules and Objectives

The State of Oregon has 19 statewide land use planning goals and Goal 12 is Transportation, which is implemented by the Transportation Planning Rule (TPR). The TPR requires the Oregon Department of Transportation (ODOT) to have a Transportation System Plan (TSP) that identifies facilities and services to meet state transportation needs. ODOT's TSP is comprised of the Oregon Transportation Plan and adopted state-level multimodal, mode, topic, and facility plans, including Oregon's Transportation Safety Action Plan (TSAP). The TPR also requires local jurisdictions to plan their transportation systems consistent with the state TSP. As such, the Deschutes County TSAP Update should be consistent with the state TSP, including the Oregon TSAP.

Oregon Transportation Safety Action Plan (TSAP)

The Oregon TSAP serves as the foundation for integrating behavioral and infrastructure-related safety practices into all aspects of planning, programming, and policy activities in the state. These safety practices are multidisciplinary and are supported by engineering, emergency response, law enforcement, and education.

While there is no requirement for local jurisdictions to develop their own TSAPs, the 2021 Oregon TSAP does include this call to action for local jurisdictions in its first chapter:

> *The TSAP is a strategic safety plan for all users, all roadways, and all transportation agencies in Oregon. The plan outlines the vision, goals, policies, and strategies for long-term safety and action to achieve near-term opportunities for transportation Safety in Oregon. The broad reach of the plan is matched by the array of partners that will need to commit to implement plans, policies, and programs to save lives and prevent injuries. These partners include state, regional, Tribal, county, and city agencies, and the private and non-profit sectors (transportation planning/engineering organizations, enforcement agencies, emergency medical service [EMS] providers, education providers, public health agencies, safety advocacy groups, private employers, and the traveling public).*

Further, ODOT is charged under Oregon Revised Statutes (ORS) 802.310 and 802.329 with collaborating with local governments on plans and activities for safety, and local agencies are explicitly allowed to participate in highway safety programs. Traffic-related fatalities and serious injuries come at a cost to families, society, and the economy. The 2019 comprehensive costs of one fatal or serious injury crash in Oregon, which include both economic costs and the cost of lost quality of life, were estimated at $1.1 million for urban local roads and $1.9 million for rural local roads. It is expected that these costs have increased over the last six years. Oregon aims for zero fatalities and life-changing injuries on Oregon roadways by the year 2035 (Reference 1 – Oregon TSAP).

GOALS, POLICIES, & STRATEGIES

Goals, policies, and strategies in the Oregon TSAP focus on changing safety culture and proactively planning, designing, operating, and maintaining a transportation system that eliminates fatalities and serious injuries – this is only possible with the help of safe traveling behaviors of residents and visitors and decision-makers investing in safety programs, policies, and infrastructure projects. The Oregon TSAP's six goal areas include:

1. Improving Safety Culture
2. Improving Infrastructure
3. Facilitating Health and Livable Communities
4. Using Best Available Technologies
5. Communicating and Collaborating
6. Investing Strategically

This latest Oregon TSAP also emphasizes equitable transportation safety for all users and all modes so that burdens and benefits of movement do not disproportionately impact one

community over another. Oregon's goals, policies, and strategies could be implemented at the state, regional, Tribal, county, and city governmental levels to help the State achieve its long-term safety vision (Reference 1 – Oregon TSAP).

EMPHASIS AREA ACTIONS

Over the long-term, the Oregon TSAP is intended to provide guidance to policymakers, planners, and designers. In the near-term, it provides actions for reducing fatalities and life-changing injuries in the form of Emphasis Area Actions. The Emphasis Areas include:

- **Risky Behaviors** (recommends various actions for minimizing impaired, unbelted, speeding, and distracted driving crashes)
- **Infrastructure** (recommends various actions for minimizing intersection and roadway departure crashes)
- **Vulnerable Users** (recommends various actions for minimizing pedestrian, bicycle, motorcycle, and aging road user crashes with a focus on low-income communities and communities that have been historically excluded based on race and ethnicity)
- **Improved Systems** (recommends various actions to continually improve data, train and educate transportation and safety staff, support law enforcement and emergency responders, and minimize vehicle crashes)

These can be used to inform project, program, and policy concepts, evaluation, and decision-making at the state, regional, Tribal, county, and city level. Additional information on the specific actions can be found within the Oregon TSAP (Reference 1 – Oregon TSAP).

IMPLEMENTATION

The Oregon TSAP provides guidance on how it fits into practice and how it can be implemented across the state through various local partners:

- Evaluate local spot-specific and systemic safety needs; develop plans and programs to address needs.
- Collaborate with state, Metropolitan Planning Organization (MPO), and stakeholder partners to educate the public about county transportation safety-related behavior issues.
- Integrate safety programming, planning, and policy into local planning.
- Develop coalitions with enforcement and EMS providers to target and improve specific community needs.
- Use the TSAP as a resource for local goals, policies, strategies, and actions (Reference 1 – Oregon TSAP).

Local Goals, Policies, and Projects

Beyond federal and state transportation safety planning requirements, Deschutes County has also identified transportation safety goals, policies, and/or projects in its current (2019) TSAP and its 2020-2040 TSP that will be carried forward with the Deschutes County TSAP Update.

Deschutes County TSAP

The County's 2019 TSAP focuses on identifying and addressing regional safety issues to support the statewide goal of zero fatal and serious injuries on Oregon's transportation system by 2035. The plan highlights several systemic and site-specific safety projects, many of which the County has worked to implement since 2019. Figure 1 illustrates the priority locations that were identified in the 2019 TSAP and the completion status of their site-specific projects. The TSAP Update will consider incorporating recommendations from the 2019 plan if not completed already. The details about each project that has yet to be implemented or is partially completed are summarized in Attachment B.

Deschutes County TSP

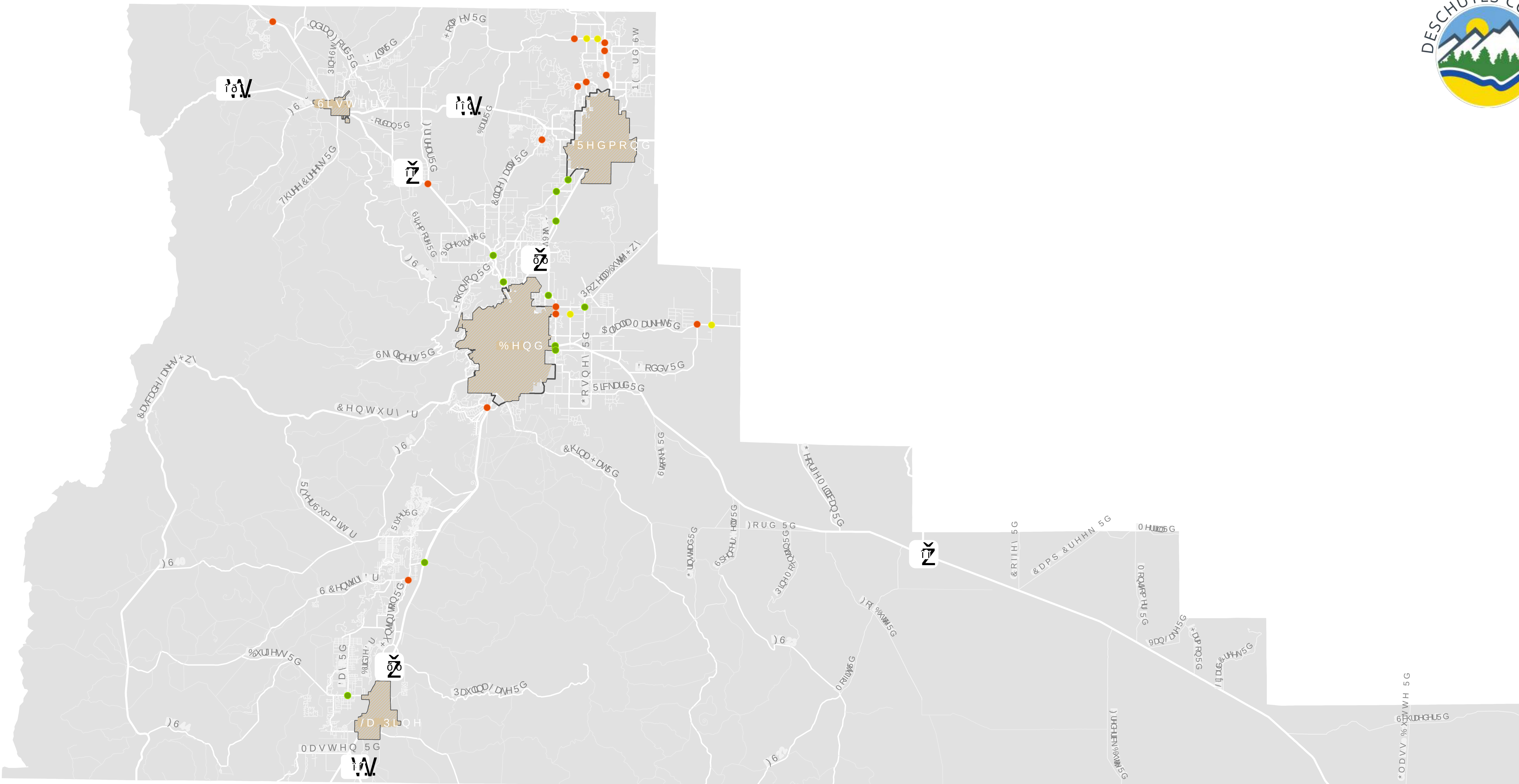
The 2020-2040 Deschutes County TSP, adopted in 2024, identifies seven goals for the County's transportation system and Goal 2 focuses on safety: "Provide a transportation system that promotes the safety of current and future travel by all users." Its associated policies include the following:

1. Design and maintain County roadways consistent with their expected use, vehicular travel speeds, and traffic volumes.
2. Incorporate the Transportation Safety Action Plan (TSAP) goals and action items into County planning projects and update the TSAP at appropriate intervals.
3. Coordinate with the Sheriff's Office to discuss enforcement activity on specific facilities in the County and jointly communicate safety issues when observed and encountered.
4. Continue the partnership with the County's Bicycle and Pedestrian Advisory Committee (BPAC) to promote education and outreach activities and to inform future County investment decisions in facilities for people riding bikes and walking.
5. Coordinate with the emergency service providers in the County to prioritize the maintenance and investment in key lifeline and evacuation routes.
6. Coordinate with ODOT, railroads, and local communities to prioritize safety investments at rail crossings.

7. Prioritize investments in key crossing locations for people walking and riding bikes across major County roadways and/or ODOT highways, especially at locations that serve vulnerable populations.

8. Coordinate with ODOT for planning for grade-separated wildlife crossings of State highways using relevant wildlife migration information, crash data, and best management practices.

DESCHUTES COUNTY



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Deschutes County TSAP Draft Goal and Policies

The following outlines a recommended safety goal and five supporting policies for inclusion in the updated Deschutes County TSAP. These were collectively developed based on the goals and objectives of the current County TSAP and TSP and have been expanded to comply with objectives of the Oregon TSAP and federal SS4A program.

> *Provide all roadway users – including the most vulnerable - with an accessible transportation system that strives to eliminate fatal and serious injury crashes.*

1. Deschutes County will reduce transportation-related fatalities and serious injuries through design, operation, maintenance, education, and enforcement, with the objective of zero serious injuries and fatalities.
2. Deschutes County will prioritize the needs and safety of all users in transportation projects, programs, and funding decisions, with special attention to the needs of vulnerable users.
3. Deschutes County will design their roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.
4. Deschutes County will establish and enforce appropriate motor vehicle travel speeds for the safety of all roadway users.
5. Deschutes County will regularly coordinate with emergency service providers and other safety partners to improve transportation planning, design, and maintenance activities.

The **goal** defines the community's desired outcomes for transportation safety.

The **policies** form the long-term foundation for the Deschutes County TSAP Update and provide a consistent course of action to move the community toward the goal. The policies will guide work programs, long-range planning projects, pursuit of funding opportunities and the budget and capital improvement programs. The policies are implemented through the County's land use regulations such as the zoning ordinance, subdivision ordinance, and standards and specifications.

The following section summarizes the safety analysis framework for the Deschutes County TSAP Update and its outcomes, which are described later in this memorandum.

Safety Analysis Framework

The safety analysis framework summarized in this section describes the safety analysis methodology for the Deschutes County TSAP Update that will support a prioritized list of projects, programs, and policies to reduce crash frequency and severity within the study area, shown in Figure 2. The study area includes all public roadways within the county, outside of all incorporated city boundaries.

Based on the desire of the County for a comprehensive, systematic, and objective safety program, the safety analysis framework summarized in the following sections builds upon statewide policies and applies crash analysis tools and methods from the Highway Safety Manual (Reference 4 – HSM) and other published resources from the Federal Highway Administration (FHWA) or National Cooperative Highway Research Program (NCHRP).

Coordination With Other Projects

The City of Bend TSAP, last adopted in 2019, is set for an update starting in 2025, with completion expected in 2026. The County will coordinate with the Bend Metropolitan Planning Organization (MPO) while the Deschutes County and Bend TSAPs are being updated. The County will also coordinate with the cities of La Pine, Sisters, and Redmond on any future safety action plans that they develop. Additionally, Jefferson and Crook counties are developing their own TSAPs. Given that several major roads cross county boundaries, future coordination with neighboring counties may be necessary to address shared safety concerns, such as joint grant applications to fund systemic improvements and/or safety culture campaigns for roads across jurisdictions.

Comprehensive Approach to Safety

A comprehensive approach to transportation safety acknowledges that policy, planning, programming, and projects are multidisciplinary. Recognizing this, USDOT has adopted the **Safe System Approach** to guide its roadway safety efforts based on six principles and five objectives, shown in the graphic to the right. The six Safe System Approach principles, shown on the outside ring of the graphic, encompass the fundamental beliefs upon which the approach is built. The five Safe System Approach objectives, shown in the middle ring of the figure, are conduits through which the approach is implemented (Reference 5 – USDOT Safe System Approach).

DESCHUTES COUNTY

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To achieve a multidisciplinary plan, input will be gathered by a variety of community interests throughout the plan development process:

- **Project Management Team (PMT)** – The PMT includes key staff from Deschutes County who meet regularly to provide technical input during key steps.
- **Safety Working Group (SWG)** – The SWG represents a wide range of interests (i.e., County public works and community development, Bend – La Pine Schools, bicycle/pedestrian advisory committee, transit services, health services, law enforcement, district attorney's office, fire and emergency medical services, Bend Metropolitan Planning Organization, and ODOT). This group will meet two times at key project milestones to provide input on the existing conditions analysis and the TSAP's policy, program, and project recommendations. This group will also discuss and identify non-engineering solutions to further support crash reductions through a multidisciplinary approach.
- **Community Engagement** – The planning process will include two rounds of public outreach at key milestones to inform transportation safety needs and develop associated recommendations.

Analysis Framework

The process, analysis tools, and methods that will be used to update the Deschutes County TSAP are organized into the four key phases that are summarized in Table 2.

Table 2. TSAP Update Process

Phase	Steps
#1 Due-Diligence	• Review inventory of existing data • Evaluate potential tools and methods
#2 Network Screening	• Identify reference populations • Establish data-driven emphasis areas • Establish thresholds for comparison • Identify sites for study within emphasis areas
#3 Countermeasure Development and Prioritization	• Diagnose identified sites • Identify contributing factors • Identify potential countermeasures • Calculate planning level project costs • Rank by relative priority and ease of implementation • Identify non-infrastructure countermeasures
#4 TSAP Implementation	• Develop performance measures • Develop annual update program

Details for phases #1 and #2 are described below as they are relevant to the crash analysis summarized later in this memo; phases #3 and #4 will be covered in a future memo.

Phase #1 – Due-Diligence

This first phase assesses the availability and quality of data and determines the best method for performing a Network Screening (Phase #2) with that data. Crash, volume, and roadway inventory data are typically needed to conduct an objective safety analysis, but the most critical data are reported crashes that are geospatially tied to the physical countywide roadway network. Other helpful data include more specific roadway characteristics like number of travel lanes, the presence of pedestrian and bicycle facilities and trails, transit centers, routes, and stops, freight routes, and streetlights. This secondary information is not necessary to complete the Network Screening but can be useful for detailed analyses and site diagnosis.

The data that is available for the Deschutes County TSAP Update and used in the crash analysis described later in this memo include:

- Reported Crash Data (January 1, 2018 to December 31, 2022) – provided by ODOT
- County Road & Local Access Road Network – provided by Deschutes County

Real-time data for fatal crashes are available from the National Highway Traffic Safety Administration's (NHTSA) Fatality Analysis Reporting System (SAS). These data fall outside of the study period of ODOT's reported crashes and is not be incorporated into the five-year crash analysis to prevent skewed results. However, fatal crashes from FARS that were reported more recent than the year 2022 are compared to the analysis results in Phase #2 later in this memorandum.

Phase #2 – Network Screening

This second phase screens the countywide roadway network to identify sites that have potential for reducing crash frequency or severity. Network screening methods applied to the Deschutes County TSAP Update are described in detail in Chapter 4 of the HSM and generally include the following steps:

1. **Establish Emphasis Areas**: safety trends (e.g., time of day, seasonal variability, driver age, crash types, crash causes, crash locations, speeding, pedestrian and bicycle crashes, roadway classifications, etc.) that the County will want to address with systemic treatments and multidisciplinary actions.
2. **Identify Reference Populations**: study area characteristics that, when organized into groups, help develop the most cost-effective projects at reducing crashes. These can include area types (e.g., urban, rural, suburban), traffic control (e.g., signalized, unsignalized, roundabout, etc.), number of approaches (e.g., three-leg or four-leg intersection), cross-section (e.g., number of through lanes and turning lanes), functional classification, and traffic volumes.

3. **Select Performance Measures**: applies a quantitative "score" to crash data across all sites. The HSM identifies 13 performance measures that can be used in network screenings. Based on available data, the Deschutes County TSAP Update applies the Equivalent Property Damage Only (EPDO) crash frequency performance measure to evaluate the study area (described later in this memo).
4. **Screen and Evaluate Results**: uses Geographic Information System (GIS) tools to perform the network screenings and rank roadways and intersections across the county based on their potential for reducing crash frequency and severity. Ten sites overall will be selected in the unincorporated county as priority for future improvement in coordination with the PMT; five of those locations will be identified for improvement concepts. In some situations, top-ranked sites based on score may not be selected as a priority (e.g., if another project is already planned at that location).

The following section summarizes the crash analysis performed for the Deschutes County TSAP Update based on the safety analysis framework described above.

Safety Walk Audits for Deschutes County Schools

As part of the existing conditions analysis, School Safety Audits will be conducted at key County schools to evaluate walking, biking, and driving needs and how they correlate with the crash data summarized in this memorandum. A separate memorandum will be prepared after the audits are complete that summarizes observations and findings. Recommendations will be developed as part of a future strategies memorandum. The team will consider the state's Safe Routes to School (SRTS) program requirements to ensure proposed recommendations are eligible for SRTS grants.

Crash Data Analysis

The crash data analysis summarized in the following sections evaluates historical crash patterns and locations where crashes have concentrated within the study area, with an emphasis on more serious injury crashes. This data may encompass crash information at locations where the County has since performed safety improvements. These instances will be identified starting with Table 8 accordingly.

The severity of a crash is determined based on the most serious injury of a person involved in the crash. Crash severities have five categories that are abbreviated as KABCO:

- **Fatal (K)**: Any injury that results in death within 30 days of the motor vehicle crash.
- **Suspected Serious Injury (A)**: Typically life-altering injuries such as broken limbs, dislocation, sever lacerations, paralysis, or organ damage, but also include unconsciousness, head injuries, and significant loss of blood.
- **Suspected Minor Injury (B)**: Other visible injuries that are evident at the scene of the crash, including minor lacerations, bruising, and rashes.
- **Possible Injury (C)**: Any injury that is not fatal, serious, or minor. Includes complaint of non-visible pain/injury, such as confusion, limping, and soreness.
- **Property Damage Only (O)**: A collision without injury or complaint of pain but resulting in property damage to a vehicle or another object, commonly referred to as a "fender bender."

Serious injuries and fatalities not only have life-changing impacts on people involved in and adjacent to these crashes, but they also impart a high cost on them and onto the overall region.

The crash analysis summarized herein investigates serious crashes through two primary methods:

1. **Crash Pattern Assessment** – identifies the history and patterns of crashes on all public roads, including characteristics like crash severity and location, temporal trends, collision types (e.g., rear-end, bicycle) and contributing factors, road features (e.g., lack of pedestrian infrastructure), driver behaviors (e.g., speeding), and external conditions (e.g., low lighting, weather). The results of this analysis help to identify Deschutes County's crash Emphasis Areas, presented later in this section.
2. **Network Screening Evaluation** – screens the transportation network for higher concentrations of crashes, particularly serious crashes, to identify Deschutes County's High Injury Network. The EPDO performance measure referenced previously assigns weights to the five crash severities ('100' for Injury K and A crashes, '10' for Injury B and C crashes, and '0' for Injury O crashes) to help locate intersections and street corridors within the entire system that exhibit the most frequent and serious crashes.

The crash analysis summarized herein focuses on crashes that have primarily been reported on roadways that are under the jurisdiction of Deschutes County. A broader crash analysis was completed for the entire county, including crashes reported on state highways, and the results of that analysis are contained in Attachments C through E for reference.

Crash Pattern Assessment

Based on the most recent five years of available crash data (2018-2022), 2,175 crashes were reported in unincorporated Deschutes County. The study area for crash patten assessment is defined as follows:

- Excludes crashes within the incorporated cities of Bend, Redmond, La Pine, and Sisters
- Includes crashes in the areas between city limits and Urban Growth Boundaries (UGBs)
- Excludes crashes on state highway segments[1]
- Excludes crashes at intersections of two state highways (where no County road is involved)[2]
- Includes crashes at intersections of a state highway and a County road

This section summarizes the historic crash patterns found in the county based on the categories below:

- Crash Location and Severity
- Temporal Trends
- Crash Types and Contributing Factors
- Roadway Characteristics
- Behavioral Characteristics
- Vulnerable Road Users

For the purposes of this section, “rural” areas or facilities are located outside of UGBs and “urban” areas or facilities are located outside of city limits but inside of UGBs.

Crash Location and Severity

In order to identify potential treatment types and where they would be most beneficial, it is important to determine where in the network fatal and serious crashes occur. Table 3 summarizes the crashes that occurred in the study area within the five-year period based on their severities, as compared to crashes that occurred countywide (including on State highways and USFS and BLM roads).

[1] Crash data analysis for the entire unincorporated county, including state highways, can be found in Attachment C.

Table 3. County Road System Crashes vs. Countywide System Crashes

Context	Fatal & Serious Injury	Moderate Injury	Minor Injury	PDO	Total Crashes
Deschutes County Road System Only	172	540	475	988	2,175
Countywide System	276	829	724	1,668	3,497

INTERSECTION AND SEGMENT CRASHES

Based on the five-year study data, segment crashes accounted for 56% of all crashes while intersections contributed to 44% of crashes. As shown in Chart 1 fatal and serious injuries occurred most often on rural roadway segments, followed by rural intersections, urban intersections, and urban segments, respectively. As shown in Table 4, crashes involving all modes are more likely to occur on segments, with the exception of bicycle-involved crashes, which occurred with more frequency at intersections than along segments.

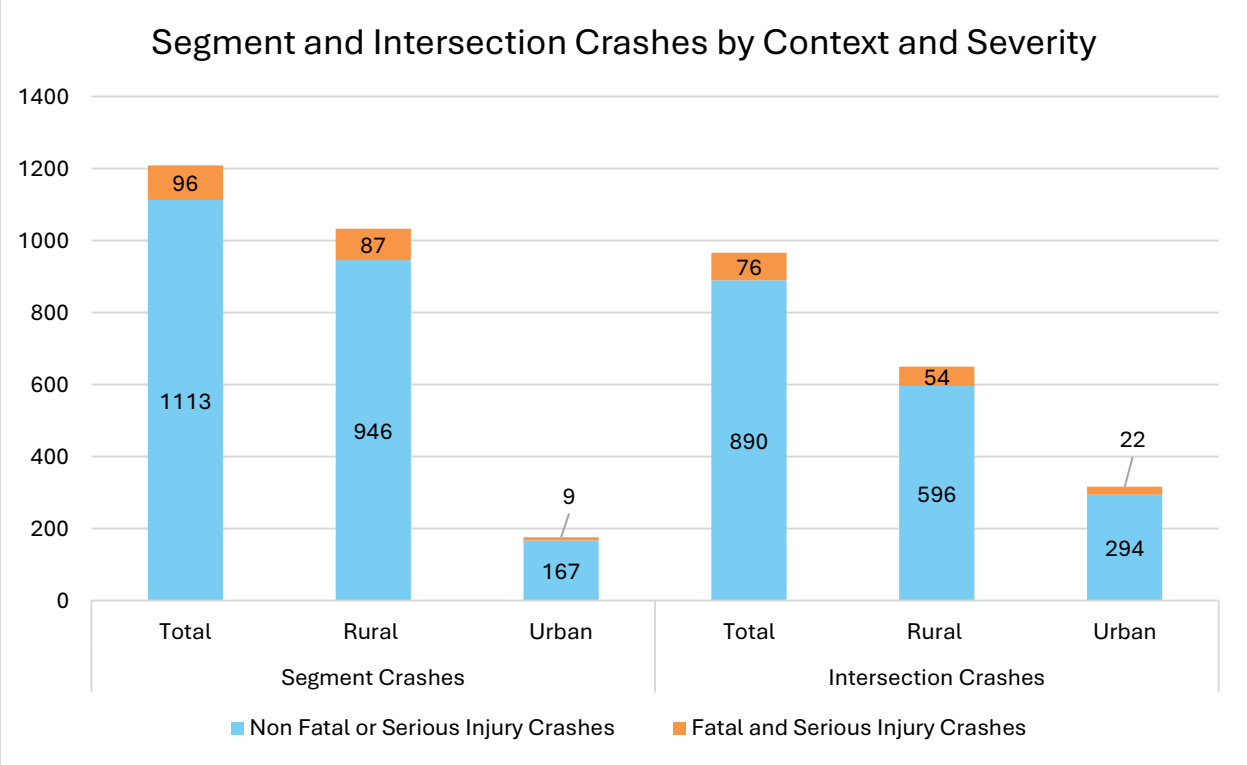

Chart 1. Segment and Intersection Crashes by Context

Table 4. Intersection and Segment Collisions by Mode

Mode	Intersections	Segments	Total
Pedestrian Crashes	1	7	8
Bicyclist Crashes	6	4	10
Motorcycle Crashes	28	48	76
Motor Vehicle-Only Crashes	931	1,150	2,081
Total Crashes	**966**	**1,209**	**2,175**
Percent of Total Crashes	**44.4%**	**55.6%**	**100%**

Temporal Trends

The following section summarizes temporal crash trends, describing reported crashes by year, month, and time of day within the five-year period.

CRASHES BY YEAR

The five-year period of 2,175 crashes is an average of 435 crashes per year. As shown in Chart 2, the total number of crashes has remained relatively constant since 2018, though the number and proportion of fatal and serious injury crashes has more than doubled. Fatal and serious injury crashes made up 6% of all crashes in 2018 compared to 11% of crashes in 2022.

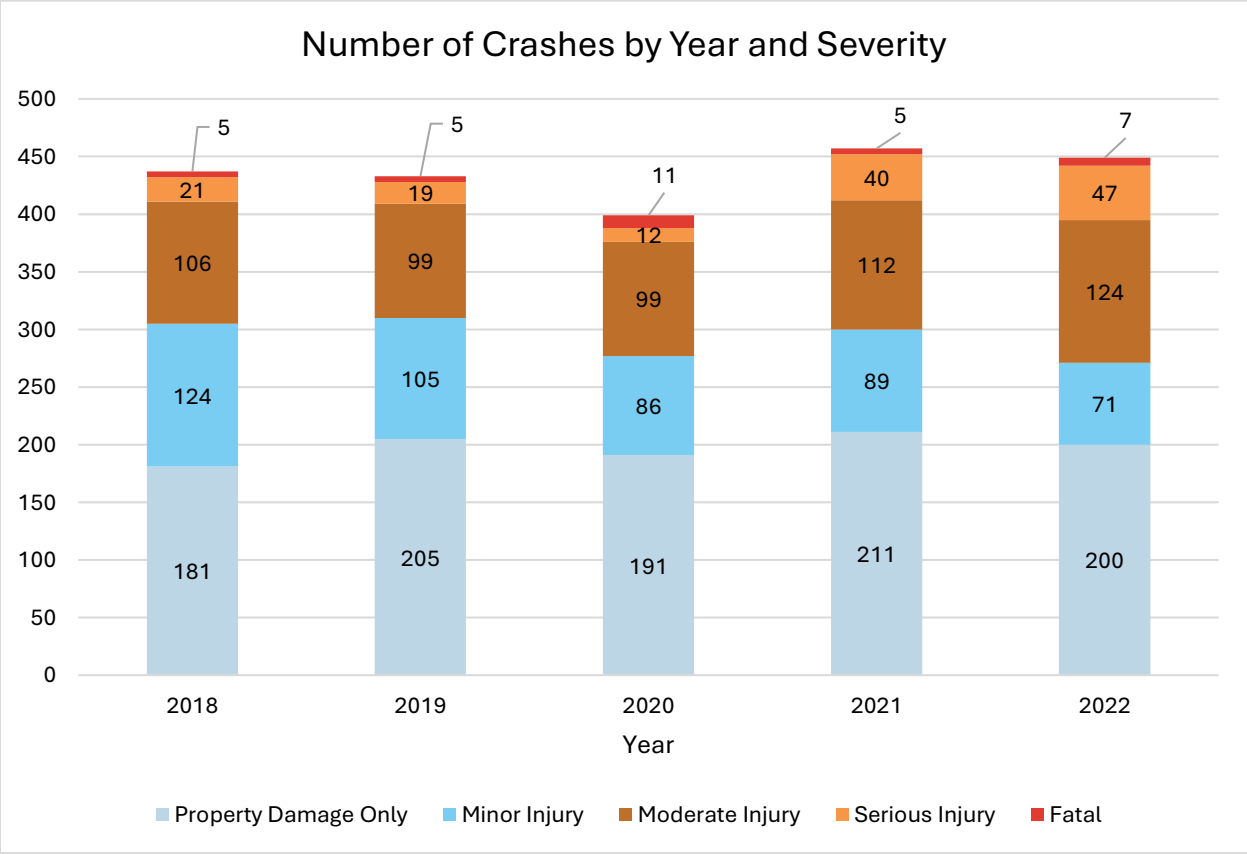

Chart 2. Number of Crashes by Year and Severity

CRASHES BY MONTH

As shown in Chart 3, the highest number of crashes occurred during the months of November, December, and January. December experienced the highest number of crashes (235), 7% of which were fatal or serious injury crashes. From November to February, 60% of crashes that occurred during those months were reported to occur on wet, snowy, or icy roads.

Notably, summer months (June to August) experienced the largest number of fatal and serious injury crashes ranging from 17 to 22 per month, which accounted for 9% to 14% of their total monthly crashes.

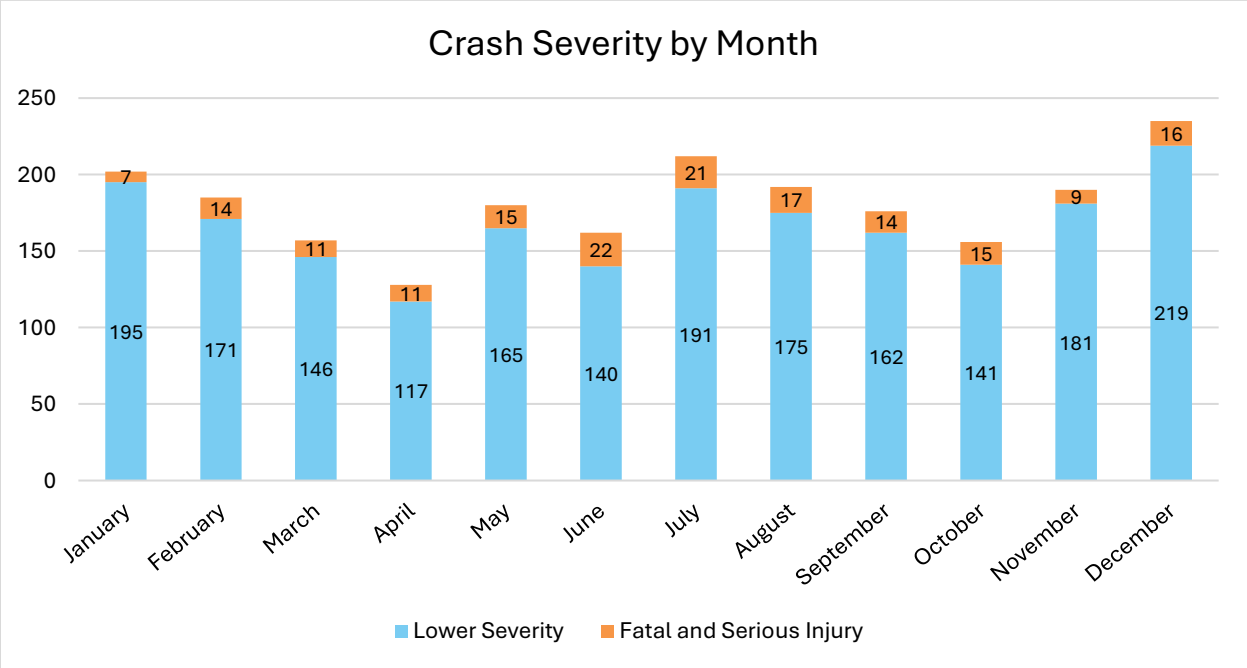

Chart 3. Number of Crashes by Month and Severity

CRASHES BY DAY

As shown in Chart 4 most crashes occurred mid-to-late week between Wednesday and Saturday, where Wednesday experienced the highest number of total crashes (371) and the highest number of fatal and serious injury crashes (32).

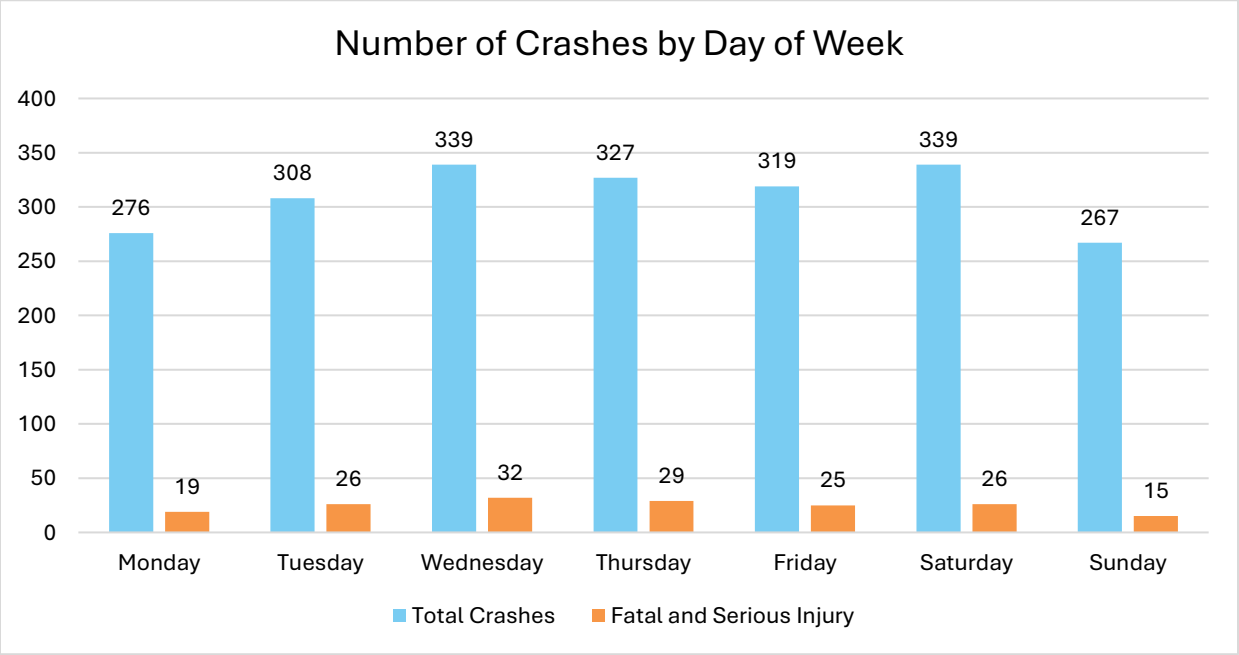

Chart 4. Number of Crashes by Day of Week and Severity

CRASHES BY TIME OF DAY

Chart 5 illustrates the number of crashes across a 24-hour day within the five-year study period. Crashes most often occurred from 3PM to 5PM (23%), consistent with typical afternoon commuter travel periods. However, fatal and serious injury crashes were more likely to occur in the earlier and later hours of the day.

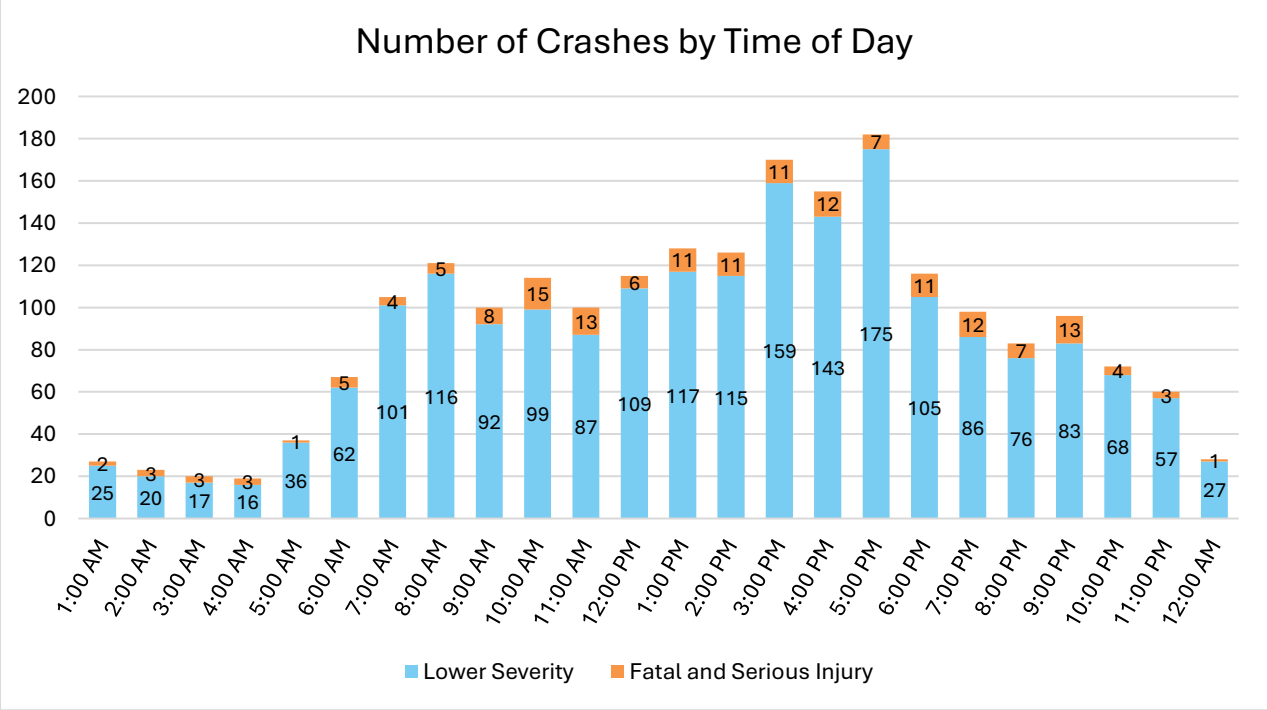

Chart 5. Number of Crashes by Time of Day and Severity

Crash Types and Contributing Factors

This section summarizes crash types, causes, and contributing factors to crashes reported in the study area over the five-year period.

CRASH TYPE

As shown in Chart 6 and Chart 7, the top five crashes types in Deschutes County, contributing to 86% of all crashes, are fixed object, turning, rear-end, non-collision (overturning), and angle. These top five crash types are the same when considering all crash severities or just fatal and serious injury crashes, but the individual proportions and order change. Fixed object and turning related crashes are the top two crash types across the board, contribtuing to 32% and 19% of fatal and serious injury crashes, respectively. Non-collision (overturning) and angle crashes make up larger proportions of fatal and serious injury crashes, while rear-end crashes make up a smaller proportion, as compared to total crashes.

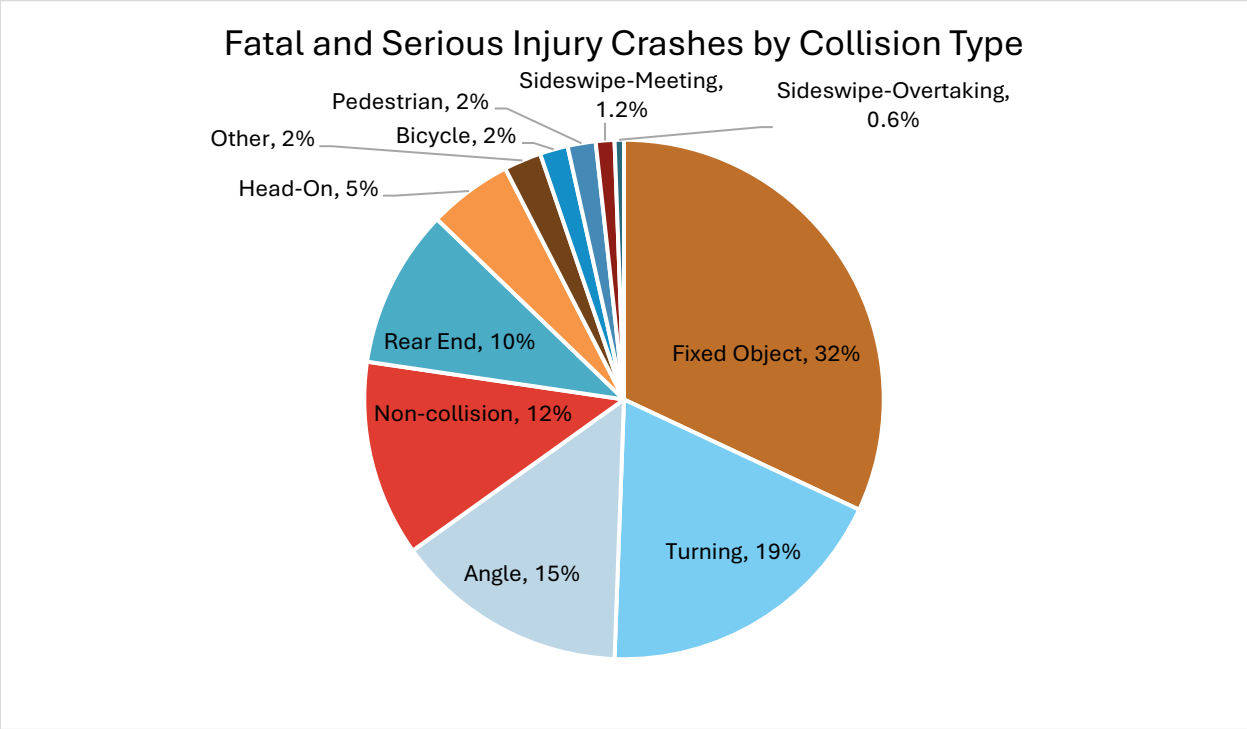

Chart 6. Fatal and Serious Injury Crashes by Collision Type

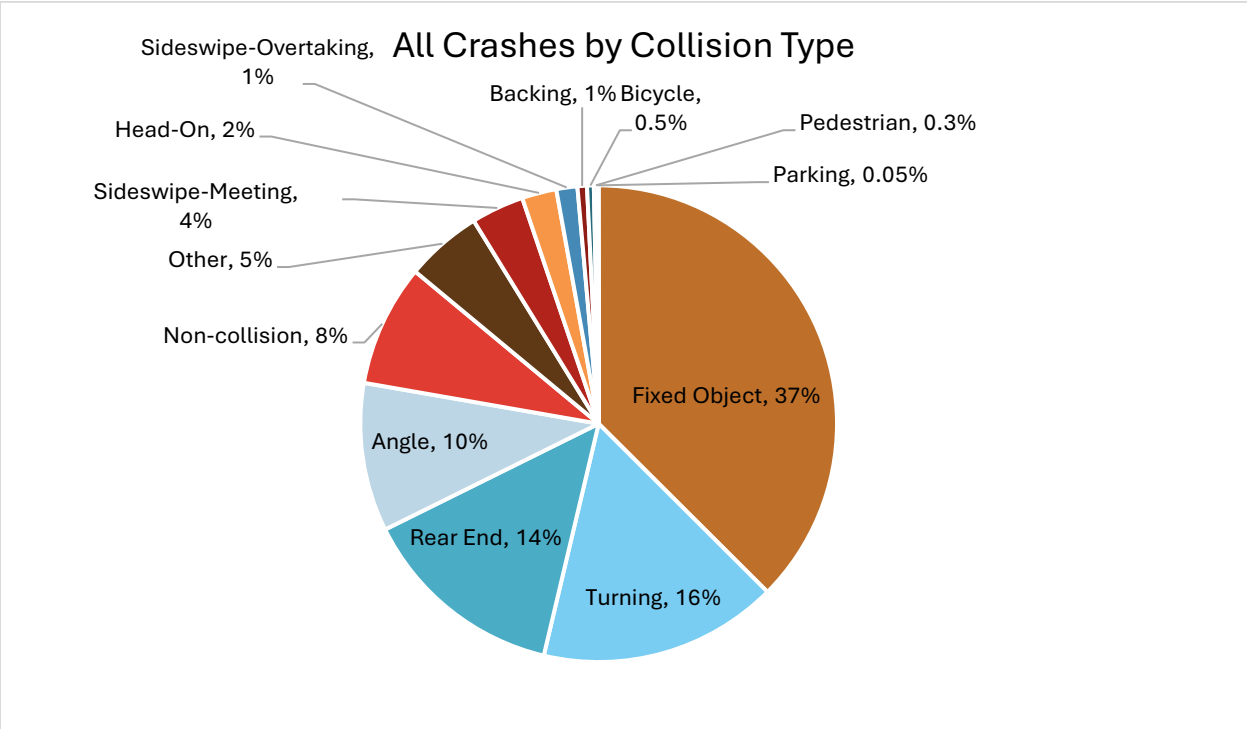

Chart 7. All Crashes by Collision Type

CRASH CAUSE

As shown in Chart 8, the most commonly reported crash cause was driving too fast for conditions but did not exceed the speed limit (29% of lower severity crashes, 24% of fatal and serious injury crashes). Other common contributing factors in fatal and serious injury crashes include failure to yield the right-of-way (21% of fatal and serious injury crashes), other improper driving (8% of fatal and serious injury crashes), and driver inattention, speeding (exceeding limit), passed stop sign, and reckless driving (6% of fatal and serious injury crashes).

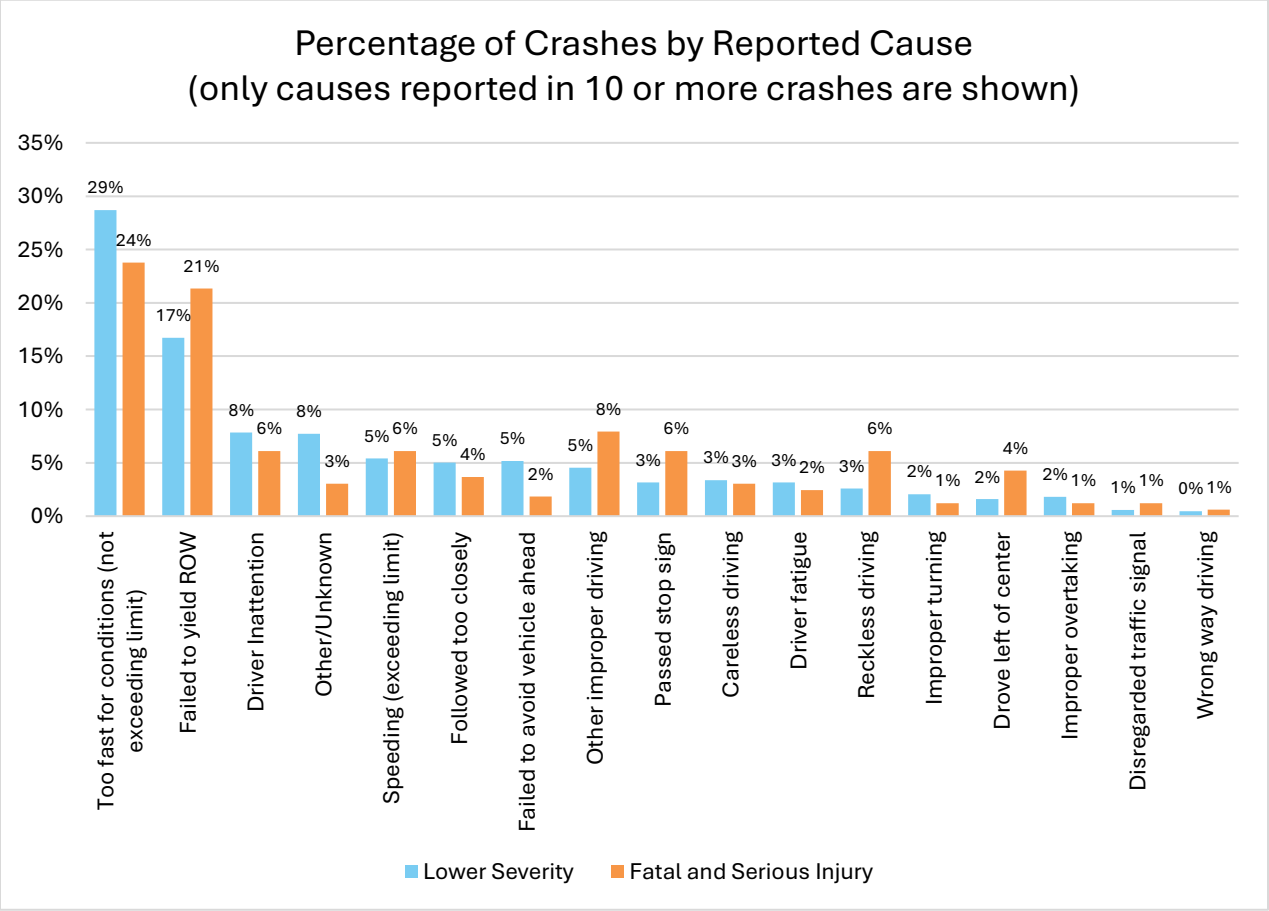

Chart 8. Number of Crashes by Reported Crash Cause and Severity

ROADWAY CONDITIONS

As shown in Chart 9 and Chart 10, the majority of crashes of all severity levels occurred in dry, clear conditions. Inclement weather, and more specifically a wet, snowy, or icy road surface was present during 27% of all crashes (622), compared to 15% of fatal and serious injury crashes (26). While this trend may be counterintuitive, it likely reflects a reduction in vehicle travel and lower vehicle speeds during inclement weather events, not a direct correlation between less severe outcomes and inclement weather.

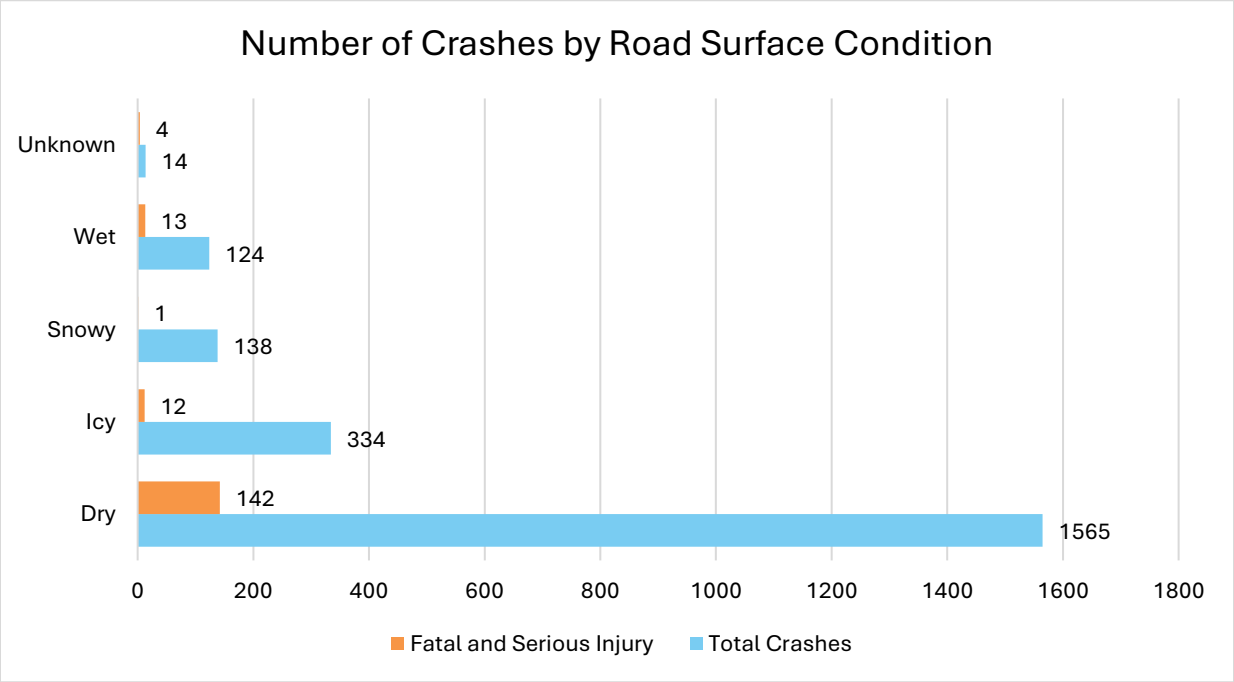

Chart 9. Number of Crashes by Road Surface Condition and Severity

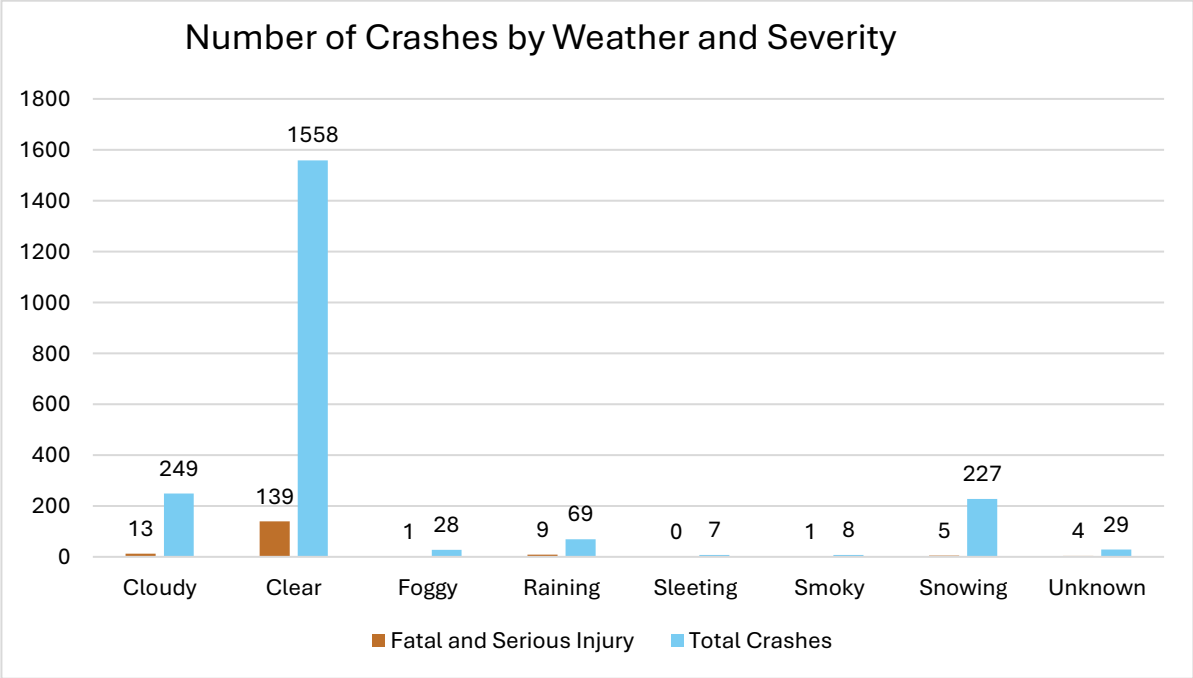

Chart 10. Number of Crashes by Weather Condition and Severity

Roadway Characteristics

This section summarizes roadway features and their corresponding crashes, including functional classification, traffic control devices, and lighting conditions.

FUNCTIONAL CLASSIFICATION

Throughout the five-year period, the largest plurality of crashes occurred on rural major collectors (Chart 11). Fatal and serious injury crashes that occurred on rural major collectors accounted for 30% of all fatal and serious injury crashes across all functional classification types. The roadway classifications are derived from ODOT's crash database and may not align with the County's classifications.

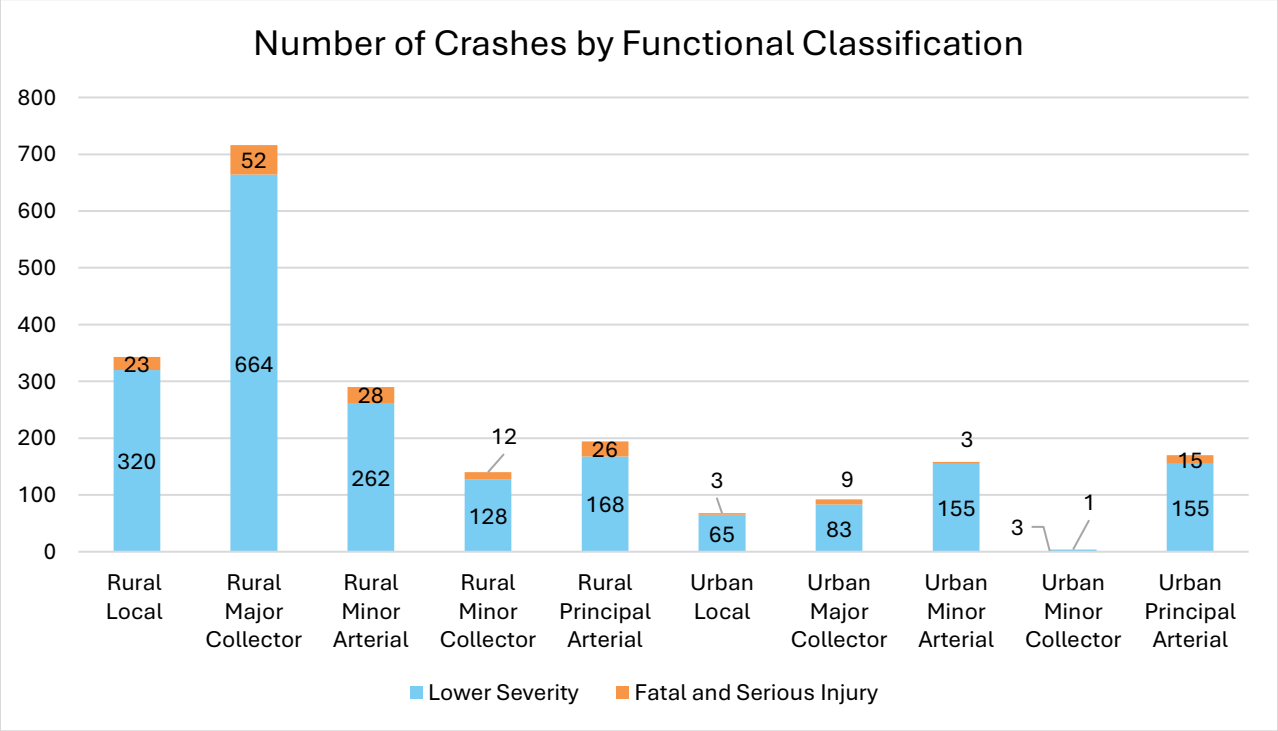

Chart 11. Crashes by Roadway Functional Classification and Severity

INTERSECTION TRAFFIC CONTROL

As shown in Chart 12, 68% of intersection crashes occurred at stop-controlled intersections. Other less-common traffic control types include yield control and traffic signals (there is one signalized intersection in the study area), as well as general warning signs (e.g., school crossing signs or curve warning signs). In many cases, locations coded as "no control" or "undefined" are rural intersections with no signing installed, where drivers are required to slow and yield to oncoming traffic.

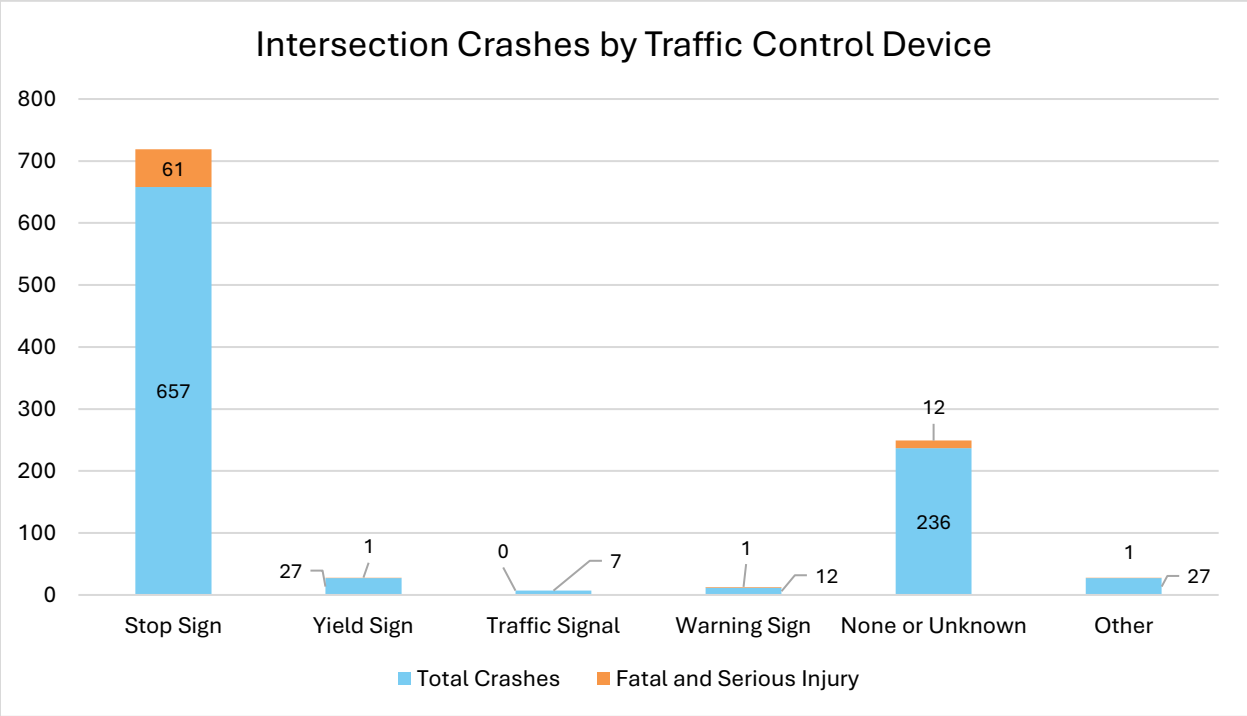

Chart 12. Intersection Crashes Traffic Control Devices and Severity

LIGHTING CONDITONS

As shown in Chart 13, crashes primarily occurred under daylight conditions, followed by darkness with no streetlights. The proportion of crashes occurring during dark (with or without street lights), dawn, and dusk conditions is similar when considering total crashes or just fatal and serious injury crashes (34% and 32%, respectively).

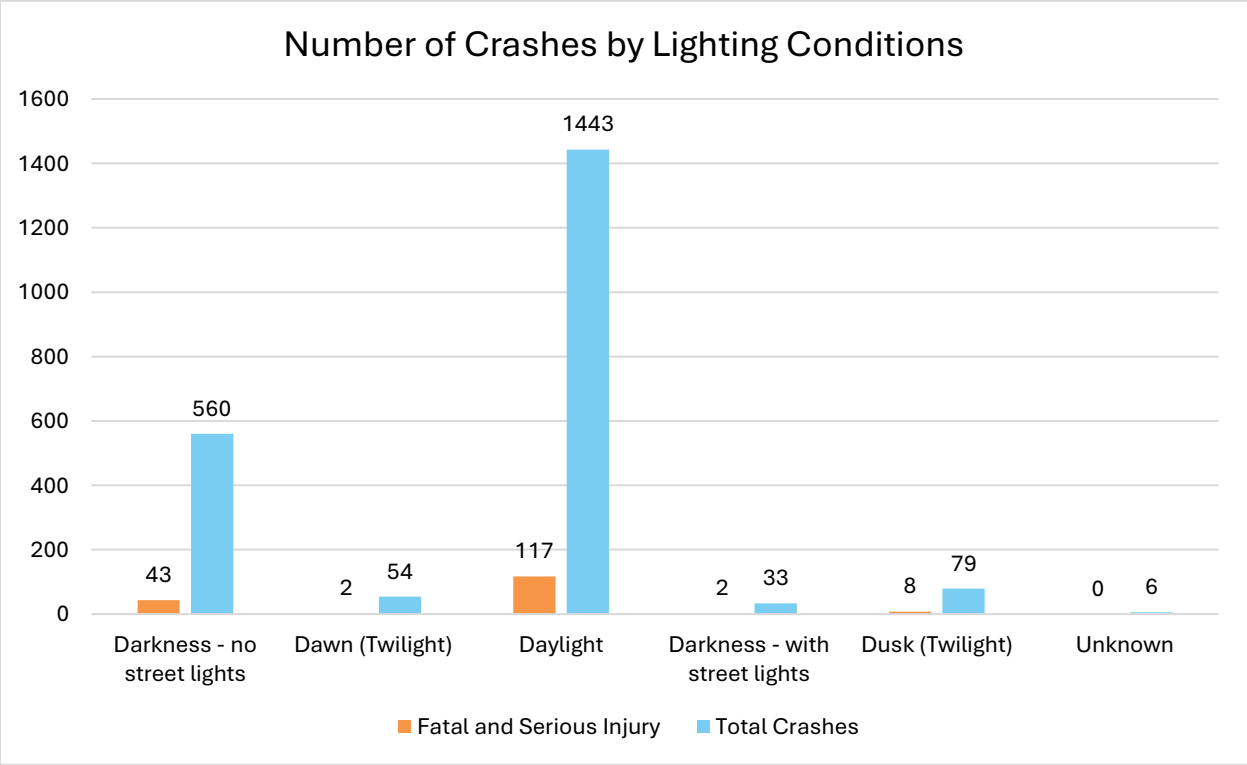

Chart 13. Number of Crashes by Lighting Conditions and Severity

Behavioral Characteristics

This section summarizes the driver behavioral characteristics reported in the five-year crash dataset, including speeding, impaired and/or distracted driving, and use of protective equipment.

SPEEDING

Crashes flagged as "speed-involved" include drivers who were exceeding the posted speed or driving too fast for conditions. Approximately 35% of fatal and serious injury crashes involved speeding, which is similar to the overall percentage of speed-involved crashes (37%).

IMPAIRED DRIVING

Impairment includes being under the influence of drugs, alcohol, and/or marijuana. Alcohol impairment is most prevalent, contributing to 19.8% of fatal and serious injury crashes and 8.6% of all crashes. As illustrated in Chart 14, nearly one-quarter (24%) of fatal and serious injury crashes involved some sort of impairment. That proportion more than doubles when considering fatal crashes only, of which 55% involved impaired driving.

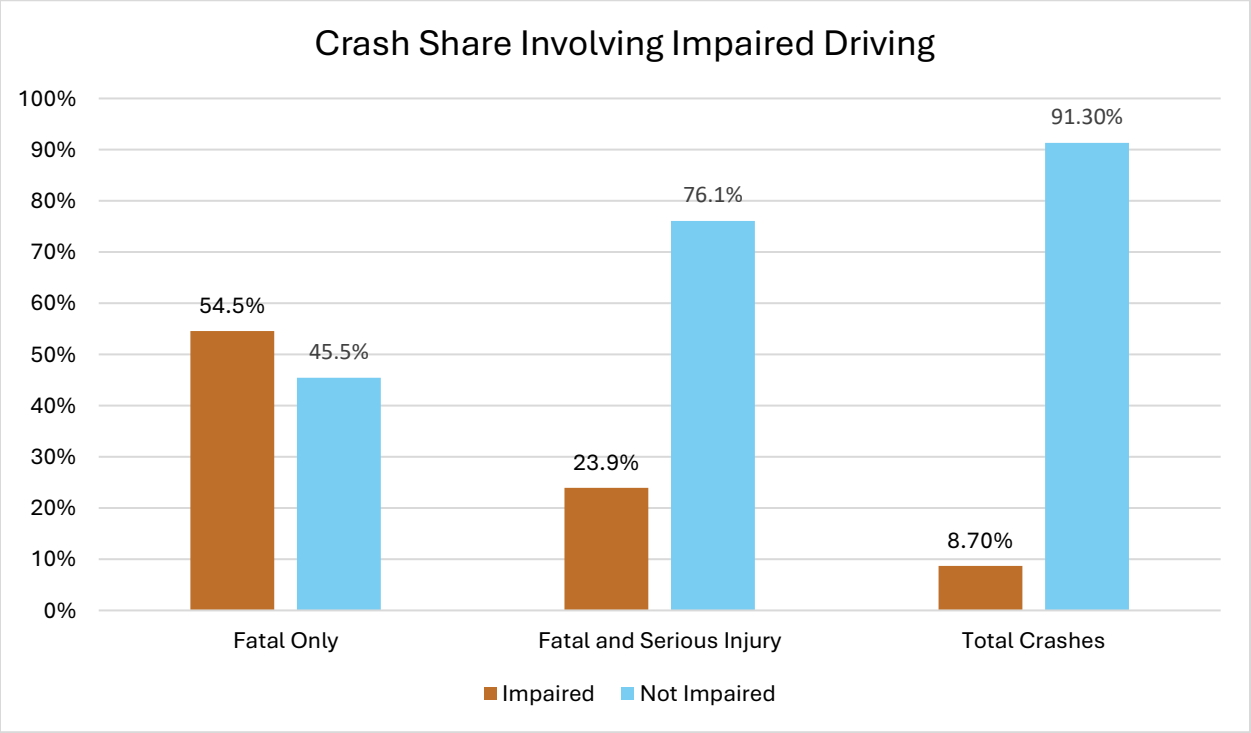

Chart 14. Crash Share Involving Impaired Driving

DISTRACTED DRIVING

Six percent (6%) of all fatal and serious injury crashes were reported to involve distracted driving. While distracted driving is a risky driving behavior nationwide, distracted driving often goes unreported (particularly in self-reporting states, like Oregon, where drivers must admit to distraction) and therefore these numbers may not accurately reflect distracted driving in the county.

PROTECTIVE EQUIPMENT USAGE

Protective equipment generally refers to the use of seatbelts by vehicle occupants but can also include non-motorists' safety equipment such as helmets. In most crashes, use of protective equipment is listed as "unknown" in crash reports, because it is difficult to verify usage after the crash, unless the person is still in the vehicle. A total of 67 crashes were confirmed to involve at least one person who was not properly using protective equipment, which is approximately 3% of all crashes. However, that percentage jumps to 24% in fatal crashes.

Vulnerable Road Users

Vulnerable road users are typically users that are at a greater risk of fatalities and serious injuries when involved in a roadway crash. For the purpose of this analysis, vulnerable road users include pedestrians, bicyclists, motorcyclists, people younger than 18, or people older than 65.

PEDESTRIAN AND BICYCLE CRASHES

Throughout the five-year period, 8 pedestrian crashes and 10 bicycle crashes were reported. As shown in Chart 15, 3 of the pedestrian crashes (38%) and 3 of the bicycle crashes (30%) resulted in fatal or serious injuries, amounting to 33% of all pedestrian and bicycle crashes. While crashes involving vulnerable road users are not common occurrences in the county, when they do occur, the outcome is likely to be severe.

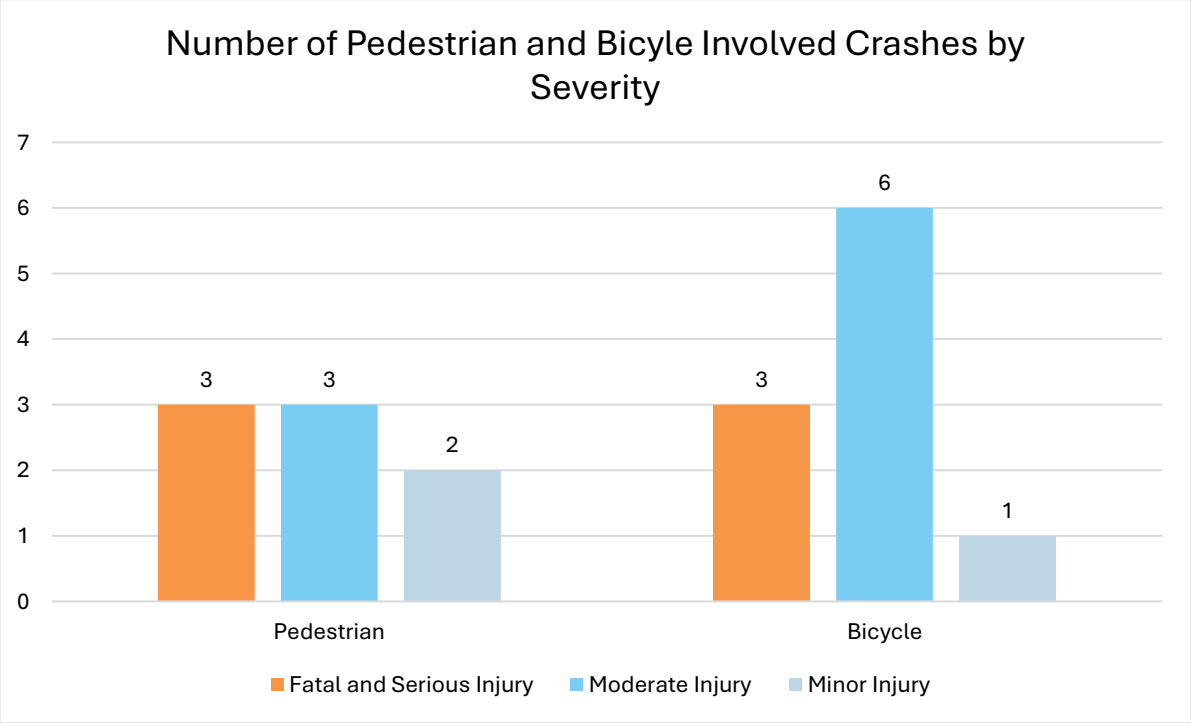

Chart 15. Pedestrian and Bicycle Involved Crashes by Severity

MOTORCYCLE CRASHES

Chart 16 summarizes motorcycle crashes compared to all other crashes and their share of each crash severity. Throughout the five-year period, 76 crashes were reported to involve a motorcycle, accounting for 3% of all crashes, but 20% of all fatal and serious injury crashes. Of the crashes that involved a motorcycle, 46% resulted in fatality or serious injury. As with other vulnerable road users, crashes involving motorcycles are a small portion of all crashes but when they do occur, they are likely to result in severe injuries.

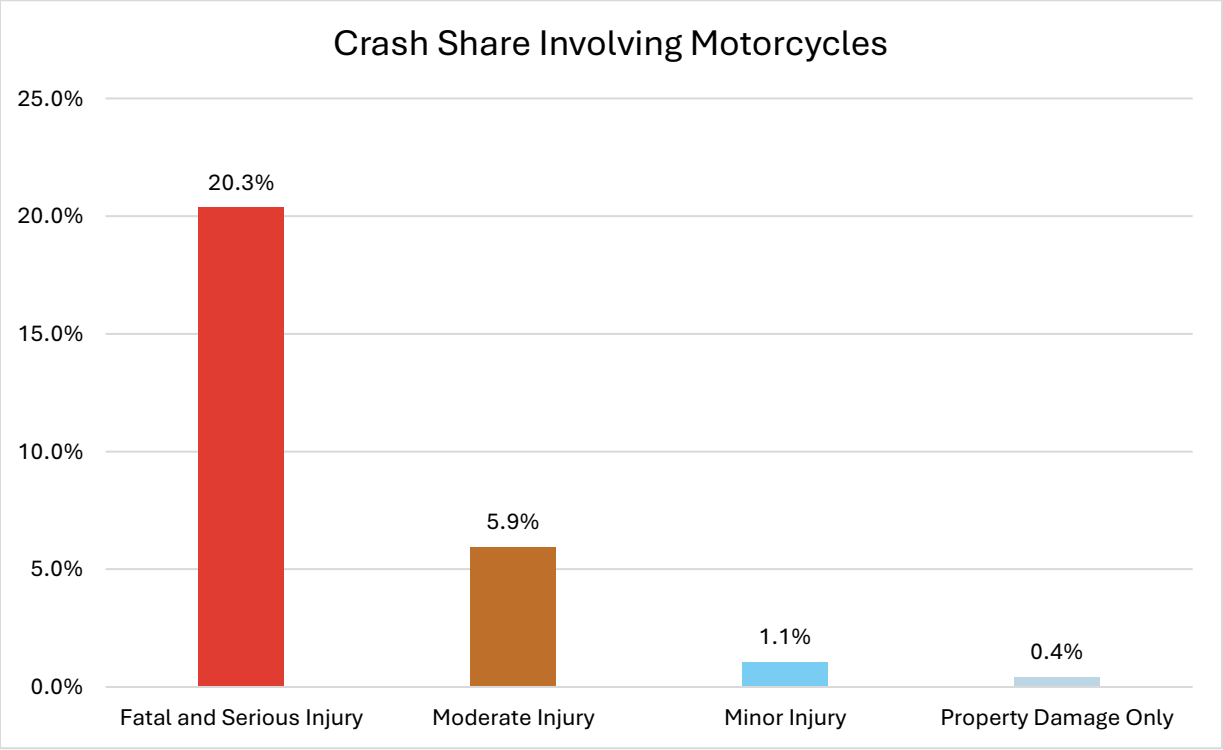

Chart 16. Crash Share Involving Motorcycles

DRIVER AGE

Participant-level information, like age, is not reported for property damage only (PDO) crashes. Therefore, the following key findings related to driver age apply only to fatal and injury crashes.

Chart 17 summarizes the share of drivers involved in crashes by age group and crash severity. This chart highlights that drivers in the 45-64 and 65+ age groups are involved in a higher proportion of fatal and serious injury crashes than the proportion of their involvement in total crashes (all severities).

When considering the primary contributing causes of crashes, speeding (too fast for conditions) is the most common among drivers younger than 25 years old. Drivers older than 25 are most commonly involved in crashes where there was a failure to yield (Chart 18).

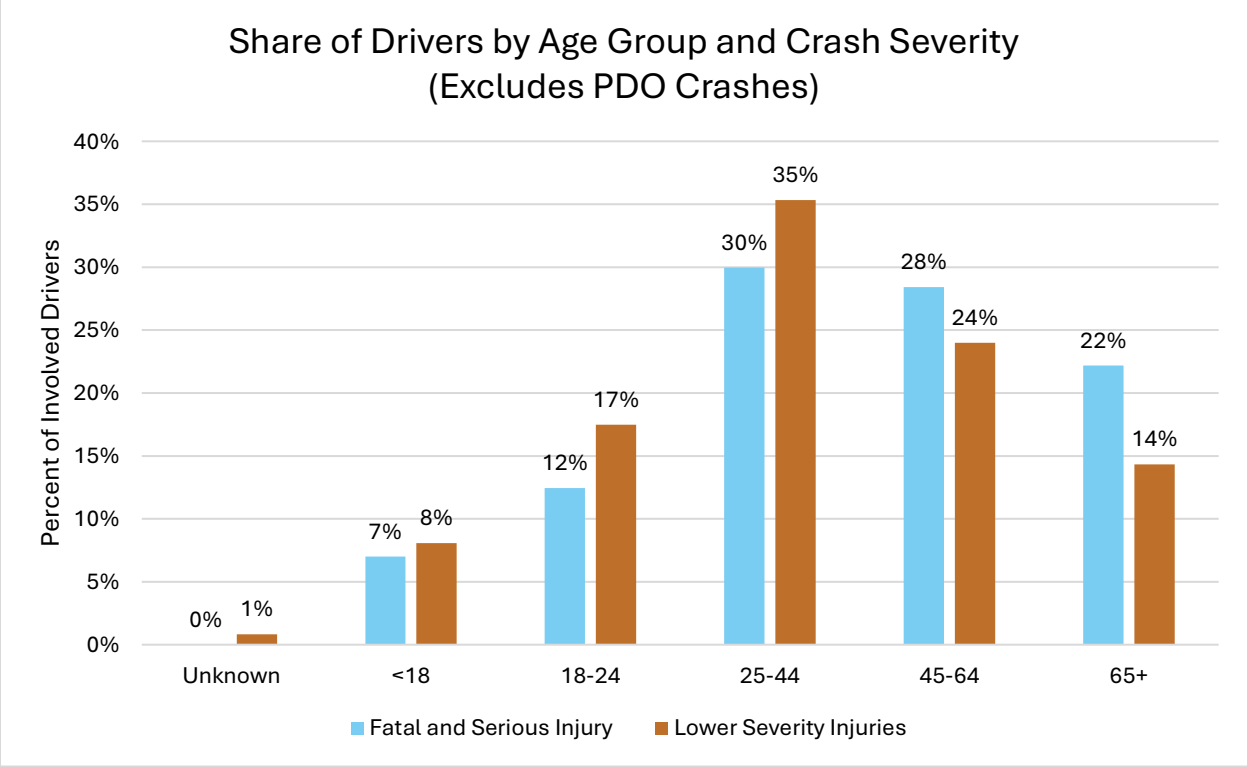

Chart 17. Percentage of Involved Drivers by Age Group and Severity

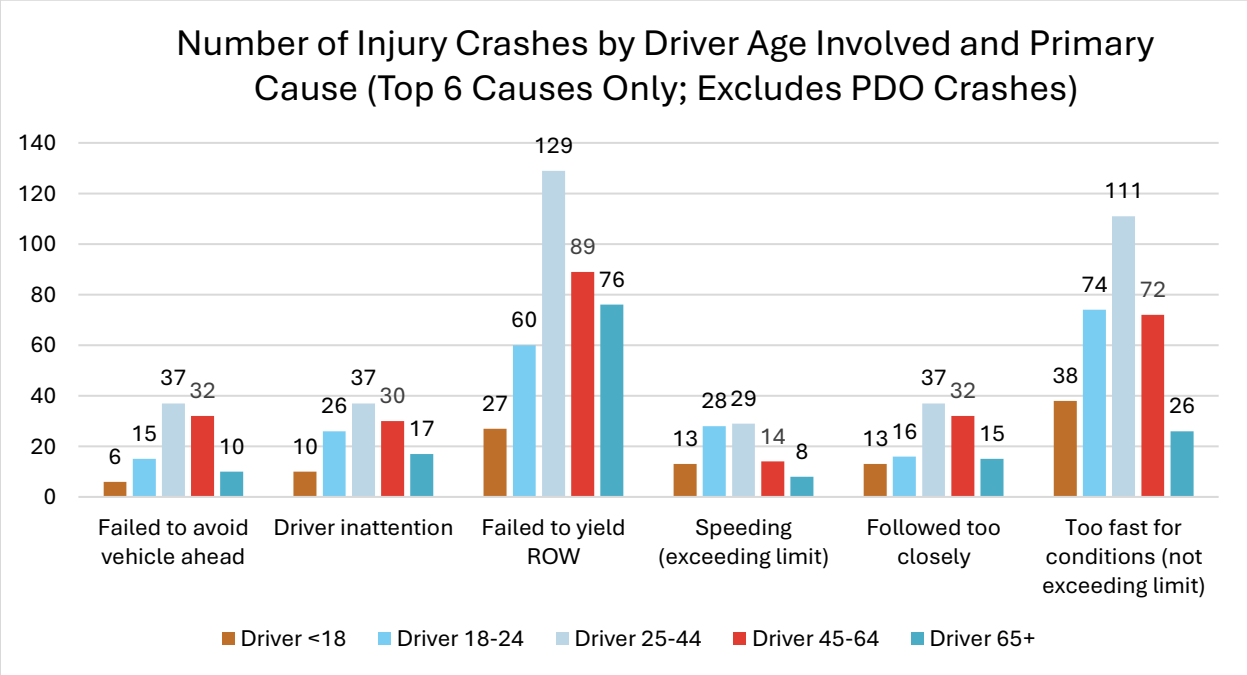

Chart 18. Number of Crashes by Age Group and Cause

Emphasis Areas

Emphasis areas are commonly developed by studying the crash characteristics that are most predominant or that are over-represented in fatal and serious injury crashes compared to lower severity crashes. For example, motorcycle-involved crashes may represent a small percentage of all crashes, but result in a much higher percentage of fatal and serious injuries. If so, an agency may choose to focus on motorcycle safety as an emphasis area as they are more likely to be seriously injured or killed when involved in a crash.

The 2021 Oregon TSAP contains a comprehensive crash attribute table for the State of Oregon that was used as a comparison for Deschutes County crash patterns. The comparison was performed by assigning the following "flags" to crash attributes when they meet specific criteria.

- **Flag 1 – Predominant Crash Attribute:** The crash attribute is present in more than 10% of fatal and serious injury crashes in unincorporated Deschutes County.
- **Flag 2 – More Prevalent than Statewide:** The proportion of fatal and serious injury crashes for the crash attribute in unincorporated Deschutes County is greater than the proportion of fatal and serious injury crashes for the crash attribute statewide as reported in the Oregon TSAP.
- **Flag – 3 High Severity Indicator:** The crash attribute has a higher share of fatal and serious injury crashes in unincorporated Deschutes County than its overall share of total crashes (e.g., head-on crashes contribute to 11% of all fatal and serious injury crashes but only 3% of all crashes).

Table 5 below indicates whether the "flags" are true for each crash attribute in Deschutes County, with respect to the criteria listed above. The more flags a given attribute has, the more likely that attribute is contributing to fatal and serious injury crashes.

Table 5: Deschutes County Emphasis Area Screening Results

Crash Attribute	Flag 1: Predominant Crash Attribute	Flag 2: More Prevalent than Statewide	Flag 3: High Severity Indicator
Roadway / Lane Departures	✓	✓	✓
Alcohol and/or Drug Use	✓	✓	✓
Alcohol Use Only	✓	✓	✓
Speed	✓	✓	
Nighttime (Dark/Dawn/Dusk) Conditions	✓		

Crash Attribute	Flag 1: Predominant Crash Attribute	Flag 2: More Prevalent than Statewide	Flag 3: High Severity Indicator
Intersections	✓	✓	
Young Drivers (15-25)	✓		✓
Aging Drivers (65+)	✓	✓	✓
Bicyclists			✓
Pedestrians			✓
Motorcyclists	✓	✓	✓

Based on the screening summary above, the following potential emphasis areas represent the crash attributes that were flagged as contributing to a high proportion of fatal and serious injury crashes or are more likely to result in fatal or serious injuries when a crash occurs. Bold attributes were flagged three times, while non-bold attributes were flagged twice.

- **Roadway and Lane Departure Crashes**
- **Drug and Alcohol Impairment**
- **Aging Drivers (65+)**
- **Motorcyclists**
- Younger Drivers (15-25)
- Speeding
- Intersections

There is no requirement for emphasis areas to be derived solely from the crash data, and final selection of emphasis areas should reflect the priorities of County staff, the Safety Working Group, and the community. The selected emphasis areas will provide a guiding framework for the TSAP Update and, ultimately, the County's future investment in safety strategies and projects. It is recommended that between 4 and 6 emphasis areas be selected. Too many emphasis areas can dilute the value of the plan as too many strategies and actions can be infeasible to implement. However, too few emphasis areas can result in missed opportunities to reduce fatal and serious injury crash risks. The County may also elect to combine related emphasis areas into one (e.g., a "Risky Behaviors" emphasis area may include impairment, speeding, and distraction).

Comparison with the 2019 Deschutes County TSAP

Since the completion of the 2019 TSAP, the County has implemented numerous systemic and site-specific projects to improve regional transportation safety. The systemic projects have primarily included treatments aimed at reducing roadway and lane departure crashes, such as horizontal curve warning upgrades, rumble strips, delineators and pavement markers, and speed feedback signs. Since the available crash data summarized in this memo only encompasses years 2018-2022, the data is insufficient to accurately assess the safety benefit associated with these recently performed improvements, either individually or collectively. However, Table 6 provides an anecdotal comparison specifically related to the number and proportion of roadway and lane departure crashes, which should not be used to draw conclusions, and any interpretation should carefully consider the following:

- The 2019 TSAP data was obtained directly from the Existing Conditions Summary dated May 2019. The 2019 TSAP had a different study area boundary than the current effort, namely the inclusion of reported crashes within the Redmond, Sisters and La Pine city limits. This will likely result in a difference in crash frequency and proportions, even without safety interventions.

- Nearly all of the projects the County has implemented occurred within or after the current 2018-2022 dataset, and many were not in place long enough to have a relevant impact on the data.

- There are also numerous confounding factors at play including notable population growth in rural areas of the county as well as the national, regional, and local increase in risky behaviors and the resulting increase in high severity crashes after the COVID-19 pandemic.

Table 6. Roadway/Lane Departure Crash Patterns (2019 TSAP vs 2026 TSAP)

Non-State Highway Crashes	2019 TSAP (2012-2016 data)	2026 TSAP (2018-2022 data)[2]
Fatal Crashes	12	22
Fatal / Serious Injury Crashes	77	130
Fatal / Serious Injury Road/Lane Departure Crashes[1]	57	75
Percent of Road/Lane Departure Crashes	74.0%	57.7%

[1] Includes fixed-object, non-collision overturning, head-on, and sideswipe collisions
[2] Excludes crashes at intersections of County roads and State highways

Network Screening Evaluation

The network screening evaluation helps to identify intersections and segments within the unincorporated Deschutes County transportation network that have the greatest need for site-specific safety improvements. As indicated in the "Safety Analysis Framework" in this memo, the network screening evaluation applies an EPDO analysis of intersections and roadway segments, which is a performance measure from the *Highway Safety Manual* (*HSM*) used to identify intersections and segments within the system that have the highest overall crash severity, based on both their quantity and severity of crashes.

The following sections describe these analyses and present their results. This information helps to inform which locations within the study area should be prioritized for safety improvements. The following sections also compare the safety performance of today's unincorporated transportation system in the county with that of 2019, as documented in the current TSAP. This includes:

- Assessing 2019 TSAP priority locations where recommended strategies have been implemented and if those strategies have reduced crashes, as applicable; and,
- Evaluating today's most severe locations to understand if and how these have changed and if there is a relationship to safety projects implemented prior to this effort.

EPDO Analysis

The EPDO analysis was completed for all public road facilities within the study area using GIS software. The performance of intersections were evaluated separate from that of roadway segments. The EPDO analysis results in an overall crash severity score for intersections and roadway segments so that they can be ranked based on the frequency and severity of their crash histories. The crash severity scores are determined by weighting crashes according to their severity, as shown in Table 7.

Table 7. Analysis Weights by Crash Severity

Crash Severity	Crash Severity Score Weight
Fatal (K)	100
Serious Injury (A)	100
Major Injury (B)	10
Minor Injury (C)	10
PDO (O)	1

Source: ODOT Safety Priority Index System (SPIS)

These weights are estimated relative to the cost that a single property-damage-only (PDO) crash has on society (e.g., cost of infrastructure repair, medical costs, work-loss costs, value of quality of life, etc.), which is the lowest cost out of all the severities.

As shown in Table 7, serious injury and fatal crashes have the greatest cost to society and are weighed similarly. The weights prioritize fatal and serious injury crashes equally to recognize that a death versus a serious injury is often a function of the health of the individual involved and/or of the emergency response time. The following sections describe how the evaluation was completed for intersections and roadway segments separately.

INTERSECTIONS

Crashes were defined as intersection or segment related based on their proximity to an intersection. For this evaluation, an intersection crash is defined as any crash that occurred within 250 feet of an intersection. Where intersections were less than 500 feet from each other, crashes were assigned to the nearest of the two intersections. Crashes occurring outside of these parameters were used in the segment analysis summarized in the next section.

A crash severity score was calculated for each intersection in the roadway network by multiplying each weight and the total crashes for the associated severity (by intersection type) and summing the results, as follows:

$$\begin{aligned}\boldsymbol{Crash\ Severity\ Score} &= (Fatal\ Weight \times \#\ of\ Fatal\ Crashes) \\ &+ (Serious\ Injury\ Weight \times \#of\ Serious\ Injury\ Crashes) \\ &+ (Major\ Injury\ Weight \times \#of\ Major\ Injury\ Crashes) \\ &+ (Minor\ Injury\ Weight \times \#of\ Minor\ Injury\ Crashes) \\ &+ (PDO\ Weight \times \#of\ PDO\ Crashes)\end{aligned}$$

The crash severity score was annualized by dividing it by the number of years (five) of crash data used in the analysis. The intersection EPDO analysis results are summarized and illustrated under the High Priority Locations section below.

SEGMENTS

An EPDO analysis was completed for roadway segments based on reported crashes that occurred outside of the intersection boundaries described above. The street network was split into overlapping half-mile segments, spaced every quarter mile, or a ‘sliding window’. Because these segments were overlapping, each crash could be assigned to more than one segment. As with the intersection methodology described above, crashes were summarized by severity and crash totals were multiplied by the crash severity weights in Table 7. The weighted crash severity scores were totaled and annualized by the number of years of crash data (five) to generate an annualized crash severity score. The segment EPDO network screening results are summarized and illustrated under the High Priority Locations section below.

High Priority Locations

This section presents the results of the EPDO analysis described above, highlighting the intersections and segments with the highest crash severity scores that could serve as the basis for the County to select its top 10 locations, including five for site-specific treatments and improvement concepts in the TSAP Update.

INTERSECTIONS

The intersection EPDO analysis was performed for all public roads in unincorporated Deschutes County to understand countywide safety needs. However, to aid the County in selecting priority locations on its roadway facilities, Figure 3 and several accompanying tables summarize the EPDO analysis results at County intersections. The accompanying tables provide the following:

- Table 8 lists the intersections from Figure 3 that are in the top 1% of crash severity scores (all locations are unsignalized) and are ranked against all intersections in unincorporated Deschutes County. Table 8 also indicates if an improvement has already been implemented at an intersection that is expected to reduce its crashes and improve its crash severity score in the future. Rows are shaded in colors that coordinate with Figure 1 earlier in this memo. See Attachment D for the countywide map and list of all top 1% sites.

- Table 9 compares the intersections from Table 8 with their counterparts from the 2019 TSAP. Of the 40 intersections in the 2025 top 1% sites, 11 also appeared in the 2019 top 1%, shown in bold. The highest-ranked site remains the same in both years, but other rankings have shifted. Some intersections have dropped off the list, while new ones have been added. Similarly, this table highlights if intersections have been improved or plan to be improved.

- Table 10 identifies the 2019 TSAP priority locations where recommended strategies from the current plan have been implemented, either partially or in full. This is either to illustrate whether the strategies have had an impact on the safety performance of each location or to make note that future safety performance at these intersections should be monitored as newer reported crash data become available. Similarly, this table highlights if intersections have been improved or plan to be improved.

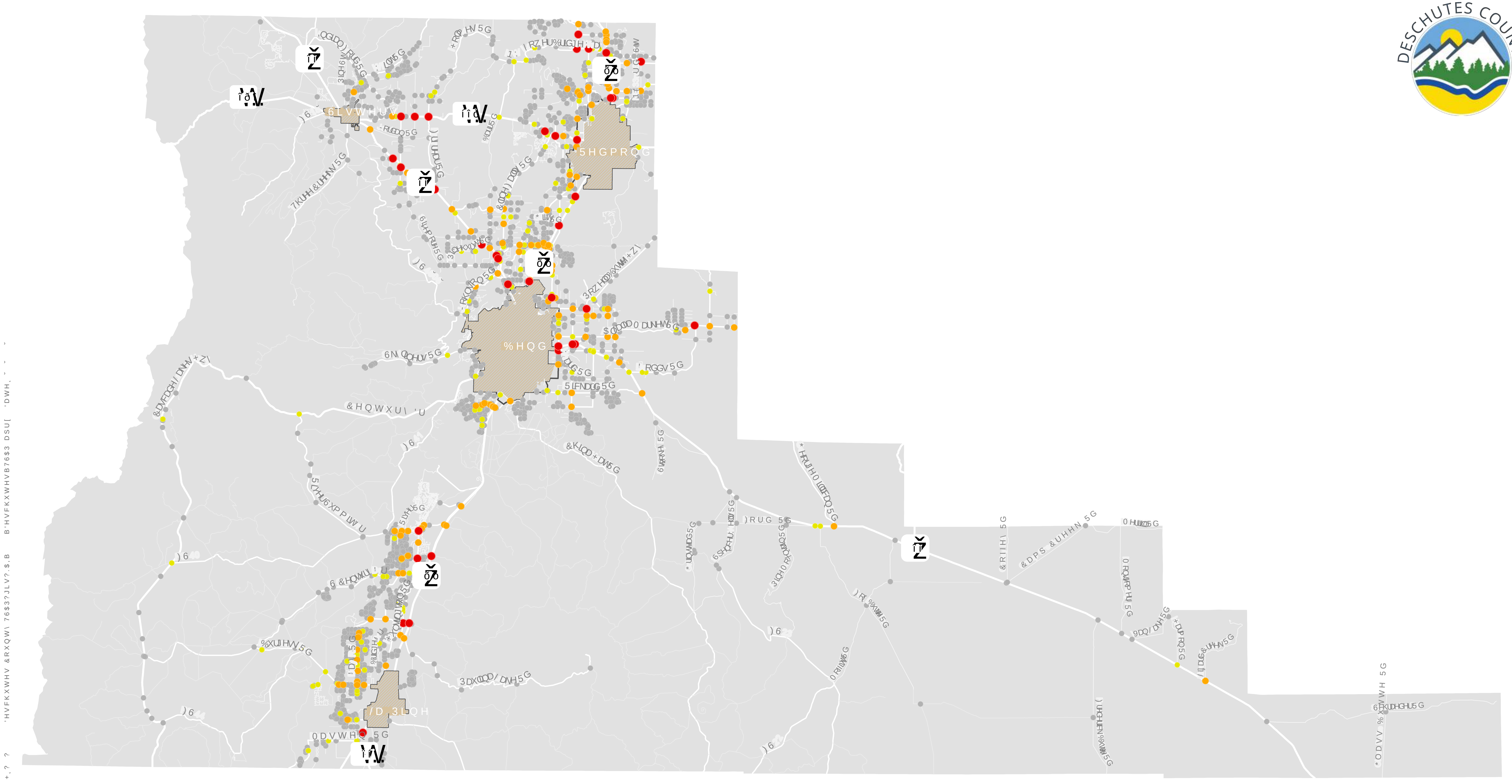

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Table 8. County Intersections with Highest Crash Severity Scores (Top 1% Sites)

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
1	US 20 / Hamby Rd	ODOT	97.8	3	18	9	Roundabout constructed in 2022.
2	SW Hemholtz Way / OR 126	ODOT	91.8	3	15	9	-
3	US 20 / Old Bend Redmond Hwy	ODOT	84.8	3	12	4	Roundabout constructed in 2023.
4	US 97 / Vandevert Rd	ODOT	81.4	3	10	7	Divided highway with merge lanes constructed in 2022.
5	US 20 / OB Riley Rd / Cook Ave	ODOT	73.0	2	16	5	Roundabout constructed in 2023.
6	Powell Butte Hwy / NE Butler Market Rd	County	71.0	3	5	5	Roundabout constructed in 2024.
7	US 97 / Jackpine Lp	ODOT	62.0	3	1	0	-
8	State Recreation Rd / US 97	ODOT	56.6	2	8	3	-
9	Huntington Road / State Recreation Rd	County	52.6	2	6	3	-
10	NW Lower Bridge Way / NW 31st St	County	50.6	2	5	3	Improvement is planned.

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
11	US 20 / Pinehurst Rd	ODOT	50.4	2	5	2	-
12	NE Oneil Way / US 97	ODOT	49.6	2	4	8	-
13	Bear Creek Rd / Ward Rd	County	49.0	2	4	5	-
14	Alfalfa Market Rd / Elk Ln	County	44.4	2	2	2	-
15	SW 61st St / US 97	ODOT	44.4	1	12	2	-
16	NE 33rd St / NE Smith Rock Way	County	44.2	2	2	1	-
17	NE Smith Rock Way / NE 1st St	County	42.2	2	1	1	-
18	US 20 / Erickson Rd	ODOT	38.4	1	9	2	-
19	NW Lower Bridge Way / US 97	ODOT	35.2	1	7	6	Interchange under construction.
20	Deschutes Market Rd / Hamehook Rd	County	34.4	1	7	2	Roundabout constructed in 2024.
21	US 97 / Bowery Ln	ODOT	30.6	1	5	3	-
22	Cloverdale Rd / OR 126	ODOT	30.4	1	5	2	-

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
24	SW Quarry Ave / US 97	ODOT	30.2	1	5	1	-
25	S Century Dr / Spring River Rd	County	28.6	1	4	3	Improvement is planned.
26	US 20 / Powell Butte Hwy	ODOT	28.6	1	4	3	-
27	NW Lower Bridge Way / NW 43rd St	County	28.4	1	4	2	Improvement is planned.
28	OR 126 / SW 67th St	ODOT	27.4	1	3	7	-
29	S Century Dr / Vandevert Rd	County	27.0	1	3	5	Improvement is planned.
30	OR 126 / Goodrich Rd	ODOT	26.4	1	3	2	-
31	Fryrear Rd / US 20	ODOT	26.2	1	3	1	-
32	Holmes Rd / OR 126	ODOT	26.0	1	3	0	-
33	NW Canal Blvd / NE Oneil Way	County	26.0	1	3	0	-
34	C Ave / US 97	ODOT	26.0	1	3	0	-
35	US 20 / 5th St	ODOT	25.2	1	2	6	-
36	NW 43rd St / NW Ice Ave	County	24.6	1	2	3	-

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
37	Gist Rd / US 20	ODOT	24.6	1	2	3	-
38	US 20 / Peterson Ridge Rd	ODOT	24.2	1	2	1	-
39	NW Oasis Dr / OR 126	ODOT	24.2	1	2	1	-

Table 9. Comparison of EPDO Scores from 2019 and 2025 for Top 1% Sites

2019 Top1% Sites				2025 Top1% Sites			
Rank	Intersection	Crash Severity Score	Intersection Improvement Status	Rank	Intersection	Crash Severity Score	Intersection Improvement Status
1	**US 20 / Hamby Rd-Ward Rd**	**111**	Roundabout constructed in 2022.	1	**US 20 / Hamby Rd-Ward Rd**	**97.8**	Roundabout constructed in 2022.
2	**US 97 / Vandevert Rd**	**56**	Divided highway with merge lanes constructed in 2022.	2	OR 126 / SW Hemholtz Way	91.8	-
3	**US 20 / Fryrear Rd**	**50**	-	3	**US 20 / Old Bend Redmond Hwy**	84.8	Roundabout constructed in 2023.
4	Burgess Rd / Day Rd-Pine Forest Dr	45	-	4	**US 97 / Vandevert Rd**	81.4	Divided highway with merge lanes constructed in 2022.
5	**Bear Creek Rd / Ward Rd**	**41**	-	5	**US 20 / OB Riley Rd-Cook Ave**	73.0	Roundabout constructed in 2023.
6	Alfalfa Market Rd / Dodds Rd	40	-	6	**Powell Butte Hwy / NE Butler Market Rd**	71.0	Roundabout constructed in 2024.
7	**US 20 / Old Bend Redmond Hwy**	**38**	Roundabout constructed in 2023.	7	US 97 / Jackpine Loop	62.0	-
8	**US 20 / OB Riley Rd-Cook Ave**	**37**	Roundabout constructed in 2023.	8	State Recreation Rd / US 97	56.6	-

2019 Top1% Sites				2025 Top1% Sites			
Rank	Intersection	Crash Severity Score	Intersection Improvement Status	Rank	Intersection	Crash Severity Score	Intersection Improvement Status
9	**SW 61st St / US 97**	**35**	-	9	Huntington Road / State Recreation Rd	52.6	-
10	US 97 / 11th St-Lower Bridge Way	33	-	10	**NW Lower Bridge Way / NW 31st St**	50.6	Improvement is planned.
11	Canal Blvd / 61st St-Quarry Ave	32	-	11	US 20 / Pinehurst Rd	50.4	-
12	Northwest Way / Coyner Ave	31	-	12	US 97 / NE Oneil Way	49.6	-
13	Alfalfa Market Rd / Walker Rd	28	Partial improvement.	13	**Bear Creek Rd / Ward Rd**	49.0	-
14	US 97 / Smith Rock Way-B Ave	28	-	14	Alfalfa Market Rd / Elk Ln	44.4	-
15	**Deschutes Market Rd / Hamehook Rd**	**27**	Roundabout constructed in 2024.	15	**US 97 / SW 61st St**	44.4	-
16	US 97 / Burgess Rd	27	-	16	NE 33rd St / NE Smith Rock Way	44.2	-
17	US 20 / Hawks Beard (Black Butte Ranch)	26	-	17	NE Smith Rock Way / NE 1st St	42.2	-
18	El Camino Ln / Helmholtz Way	26	-	18	US 20 / Erickson Rd	38.4	-

2019 Top1% Sites				2025 Top1% Sites			
Rank	**Intersection**	**Crash Severity Score**	**Intersection Improvement Status**	**Rank**	**Intersection**	**Crash Severity Score**	**Intersection Improvement Status**
19	Canal Blvd / Helmholtz Way	25	-	**19**	US 97 / NW Lower Bridge Way	35.2	Interchange under construction.
20	Dickey Rd / Nelson Rd	24	Partial improvement.	**20**	**Deschutes Market Rd / Hamehook Rd**	34.4	Roundabout constructed in 2024.
21	US 97 / Galloway Ave	24	-	**21**	US 97 / Bowery Ln	30.6	-
22	**Powell Butte Hwy / NE Butler Market Rd**	**7**	Roundabout constructed in 2024.	**22**	OR 126 / Cloverdale Rd	30.4	-
23	Butler Market Rd / Hamby Rd	7	-	**23**	US 97 / OR 31	30.4	-
24	Butler Market Rd / Hamehook Rd	6	-	**24**	US 97 / SW Quarry Ave	30.2	-
25	Baker Rd / Cinder Butte Rd	5	-	**25**	S Century Dr / Spring River Rd	28.6	Improvement is planned.
26	S Century Dr / Huntington Rd	5	-	**26**	US 20 / Powell Butte Hwy	28.6	-
27	Cline Falls Rd / Coopers Hawk Dr-Falcon Crest Dr	2	-	**27**	**NW Lower Bridge Way / NW 43rd St**	28.4	Improvement is planned.

2019 Top1% Sites				2025 Top1% Sites			
Rank	**Intersection**	**Crash Severity Score**	**Intersection Improvement Status**	**Rank**	**Intersection**	**Crash Severity Score**	**Intersection Improvement Status**
28	Lower Bridge Way / 19th St	2	-	28	OR 126 / SW 67th St	27.4	-
29	**Lower Bridge Way / 31st St**	**2**	Improvement is planned.	29	S Century Dr / Vandevert Rd	27.0	Improvement is planned.
30	**Lower Bridge Way / 43rd St**	**2**	Improvement is planned.	30	OR 126 / Goodrich Rd	26.4	-
				31	**US 20 / Fryrear Rd**	26.2	-
				32	OR 126 / Holmes Rd	26.0	-
				33	NW Canal Blvd / NE Oneil Way	26.0	-
				34	US 97 / C Ave	26.0	-
				35	US 20 / 5th St	25.2	-
				36	NW 43rd St / NW Ice Ave	24.6	-
				37	US 20 / Gist Rd	24.6	-
				38	US 20 / Peterson Ridge Rd	24.2	-
				39	NW Oasis Dr / OR 126	24.2	-

The Top 1% intersections in the 2019 TSAP included locations within incorporated Cities in the County. As the analysis for the update focuses only on unincorporated county, more intersections have been identified within unincorporated county that represents the new list of Top 1% sites.

Table 10. 2025 Safety Performance of 2019 Priority Locations After Strategy Implementation

Intersection	2012-2016 Reported Crashes[3]				Improvement (Year)	2018-2022 Reported Crashes			
	Fatal/ Serious Injury	Major/ Minor Injury	PDO	Total		Fatal/ Serious Injury	Major/ Minor Injury	PDO	Total
US 20 / Ward Road-Hamby Road[1]	4	15	2	**22**	2022	3	21	9	**33**
US 97 / Vandevert Road[1]	2	7	8	**17**	2022	3	10	7	**20**
Burgess Road / Day Road-Pine Forest Drive	1	12	7	**20**	2019	0	10	10	**20**
Bear Creek Rd / Ward Rd	1	10	3	**14**	2016	2	4	5	**11**
Canal Blvd / 61st St-Quarry Ave	1	5	11	**17**	2019	0	0	1	**1**
Alfalfa Market Rd / Walker Rd[1,2]	0	2	1	**7**	2022	1	2	0	**3**
El Camino Ln / Helmholtz Way	1	1	2	**4**	2020	1	0	0	**1**
Canal Blvd / Helmholtz Way	1	2	4	**7**	2020	0	6	4	**10**

[1] Improvement is in the final year of the analysis study period. Crash reductions may be reported in future crash datasets.
[2] A partial improvement has been completed at this intersection.

SEGMENTS

Similar to the intersection EPDO analysis, the segment EPDO analysis was also performed for all public roads in unincorporated Deschutes County to understand countywide safety needs. However, Figure 4 illustrates the results of the analysis for only County roadways. County roadway segments in the top 1% of crash severity scores shown in this figure are labeled in the map and summarized in Table 11. The rankings shown in the table are relative to a countywide network screening for all public roadways, including state highways (e.g., the County's highest ranked roadway segment is fifth behind the four most severe roadway segments across the county, and so on). Top 1% crash severity scores for roadway segments are not available in the 2019 TSAP, and therefore, comparison tables like those for highly-ranked intersections are not provided.

Attachment D provides a countywide EPDO analysis map and list of all top 1% sites.

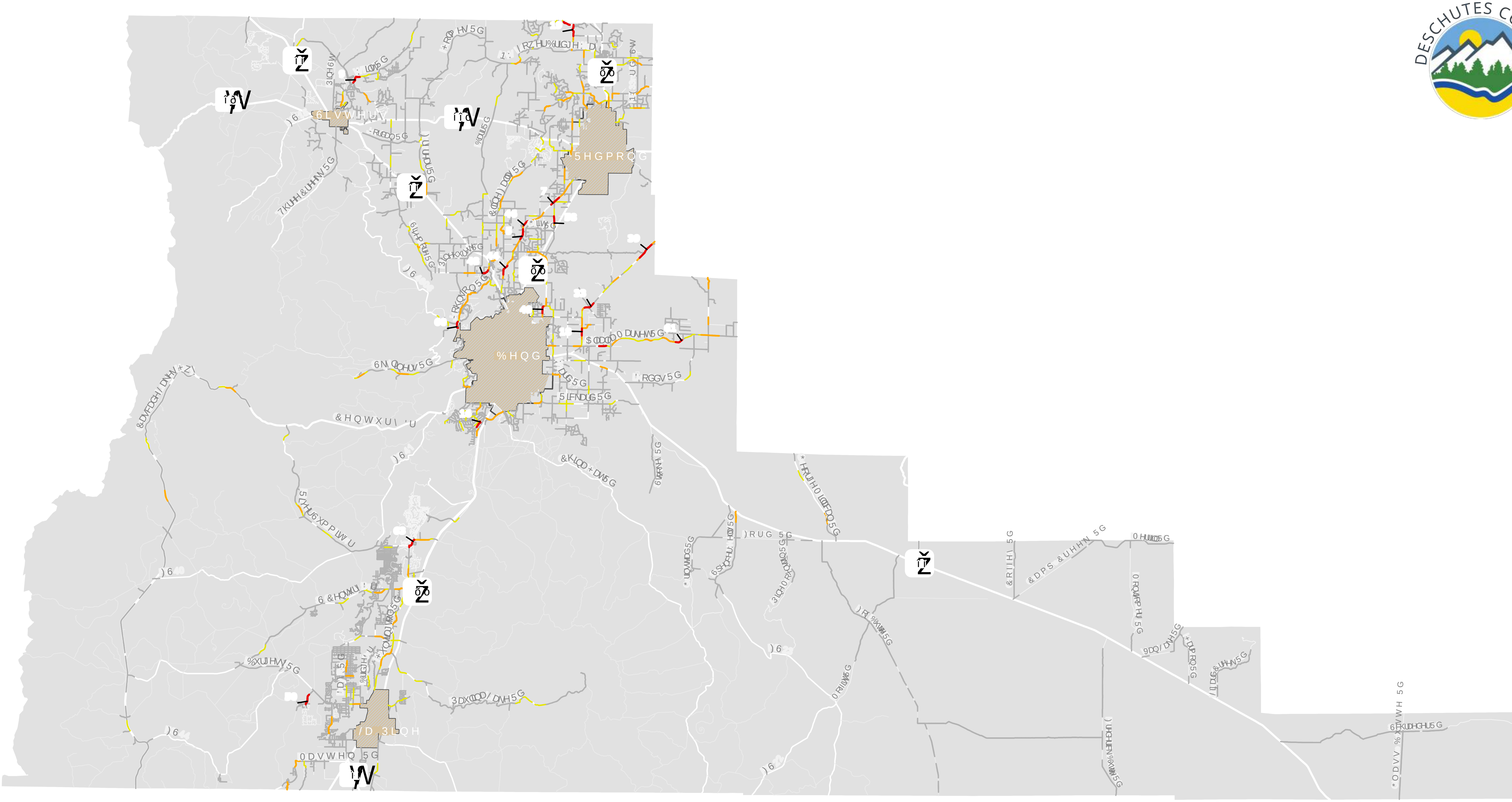

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Table 11. Roadway Segments with Highest Crash Severity Scores (Top 1% Sites – County Locations)

Rank	Roadway	Extents	Length (Miles)	Crash Severity Score	Total Crashes		
					Fatal / Serious Injury	Major / Minor Injury	PDO
5	Old Bend Redmond Hwy	MP 0.99 to MP 1.75	0.76	62.6	3	1	3
7	SW Canal Blvd	MP 2.80 to MP 4.49	1.69	50.2 - 30.2	2	5	1
9	Wilt Rd	MP 0.0 to MP 0.75	0.75	48.0 - 24.0	2	5	0
16	Navajo Rd	Cinder Butte Rd to Hopi Rd	0.57	42.4	2	1	2
18	Powell Butte Hwy	MP 0.75 to MP 1.25	0.50	40.0	2	0	0
19	NW 43rd St	MP 0.99 to MP 1.82	0.83	35.6 - 29.2	1	8	9
30	NW Chinook Dr	MP 0.0 to MP 0.75	0.75	26.6 - 26.2	1	3	3
33	Powell Butte Hwy	MP 2.75 to MP 3.51	0.76	26.4 - 24.4	1	3	3
34	SW Canal Blvd	MP 3.49 to MP 4.25	0.76	26.4 - 24.0	1	3	2
39	Powell Butte Hwy	MP 8.00 to MP 9.26	1.26	26.0 - 24.0	2	6	0
44	Old Bend Redmond Hwy	MP 1.18 to MP 1.93	0.75	24.4 - 24.0	1	3	2
46	Old Bend Redmond Hwy	MP 1.99 to MP 2.50	0.51	24.2	1	2	1
47	Alfalfa Market Rd	MP 1.00 to MP 1.75	0.75	24.2 - 24.0	1	2	1
48	Bailey Rd	MP 0.00 to MP 0.50	0.50	24.0	1	2	0
49	Deschutes Market Rd	MP 0.74 to MP 1.25	0.51	24.0	1	2	0

Rank	Roadway	Extents	Length (Miles)	Crash Severity Score	Total Crashes		
					Fatal / Serious Injury	Major / Minor Injury	PDO
50	Ponderosa Way	2,200 feet SW of Burgess Rd to 250 feet south of White Pine Way	0.76	24.0	1	2	0
58	61st St	MP 0.62 to MP 1.13	0.51	22.4	1	1	2
59	Deschutes Market Rd	MP 2.46 to MP 2.97	0.51	22.4	1	1	2
60	Shevlin Park Rd	MP 0.07 to MP 0.44	0.37	22.4	1	1	2
61	Alfalfa Market Rd	MP 7.00 to MP 7.50	0.50	22.4	1	1	2
62	Powell Butter Hwy	MP 0.0 to MP 0.48	0.48	22.4	1	1	2
63	South Century Drive	MP 18.22 to MP 18.92	0.70	22.4	1	1	2

Latest Data on Fatal Crashes

ODOT manages a website tool that provides preliminary information on fatal crashes in Oregon for the years 2023, 2024, and 2025. The information is subject to change daily as more information becomes available and is evaluated by ODOT. The current information on recent fatal crashes indicates that six have been reported on County roads in the last three years, beyond the study period for the TSAP. Those crashes are summarized in Table 12 as they relate to the crash pattern and EPDO analysis results summarized in previous sections of this memorandum.

Table 12. Reported Fatal Crashes from 2023 to 2025 (Subject to Change)

Year	Location	Key Crash Characteristics	Proximity to High-Crash Locations
2023	SW Canal Blvd between SW Helmholtz Way and SW McVey Ave	• Drugs / alcohol flagged • Head-on crash ('lane departure')	Crash was within a top 5% segment
2023	Knott Rd at China Hat Rd	• Drugs / alcohol flagged • Intersection related (angle crash) • 74 year-old	Crash was at a top 5% intersection
2023	Cascade Lakes Hwy near Sparks Lake	• Fixed-object crash ('roadway departure')	Crash was near top 5% and 10% segments
2024	Wilt Rd near Hinkle Butte Dr	• Drugs / alcohol flagged • 65 year-old • Fixed-object crash ('roadway departure')	Crash was near top 1% and 10% segments
2024	Knott Rd west of China Hat Rd	• Drugs / alcohol flagged • 64 year-old / 61 year-old • Sideswipe crash ('lane departure')	Crash was within a top 5% segment
2025	SW Canal Blvd near SW 61st St	• 16-year old • Head-on crash ('lane departure')	Crash was within a top 1% segment

Next Steps

This memorandum documents the crash patterns, emphasis areas, and potential priority locations for the Deschutes County TSAP Update based on the most recent five-year crash history in the county. Based on feedback from the Project Management Team (PMT) and Safety Working Group (SWG), this memorandum will be refined and serve as the basis for developing systemic safety countermeasures to address the emphasis areas across the study area, as well as potential project recommendations for priority locations selected by the PMT. Countermeasures will be developed from ODOT's crash reduction factor list to prepare for future funding through the All Roads Transportation Safety (ARTS) and Safe Streets and Roads for All (SS4A) grant programs.

References

1. Oregon Department of Transportation. Oregon Transportation Safety Action Plan. 2021. https://www.oregon.gov/odot/Safety/Documents/2021_Oregon_TSAP.pdf
2. U.S. Department of Transportation. Safe Streets and Roads for All (SS4A) Grant Program. 2024. https://www.transportation.gov/grants/SS4A
3. U.S. Department of Transportation. USDOT FY24 Safe Streets and Roads for All Funding. Notice of Funding Opportunity (NOFO). https://www.transportation.gov/sites/dot.gov/files/2024-04/SS4A-NOFO-FY24-Amendment1.pdf
4. American Association of State Highway and Transportation Officials (AASHTO). Highway Safety Manual. 2010.
5. U.S. Department of Transportation. Principles of a Safe System Approach. https://www.transportation.gov/NRSS/SafeSystem

Attachment A – SS4A Grant Program Details

Informational details about the SS4A grant program are provided below (Reference 2 – USDOT SS4A Grant Program). This information was gathered from USDOT's 2024 Notice of Funding Opportunity (NOFO) and is subject to change when the 2025 NOFO is released.

Table A-1. Implementation Grant Selection Criteria

Selection Criteria	Evaluation Parameters
#1: Safety Impact	**Safety Problem Description** • Description includes historical trends and crash locations/types/contributing factors by road user. • Crashes and/or crash risk are displayed in a High-Injury Network, hot spot analysis, or similar geospatial risk visualization. • Project and strategy locations are described in relation to the High-Injury Network and geospatial information. • Safety risk is summarized from risk models, hazard analysis, the identification of high-risk roadway features, road safety audits/assessments, near miss data, and/or other proactive safety analyses. **Safety Impact Assessment (Projects and Strategies)** • Align with and comprehensively address identified safety problems. • Primarily on a High-Injury Network or address high-risk roadway features correlated with severe crash types. • Use low-cost, high-impact strategies and projects over a wide geographical area. • Use evidence-based, Proven Safety Countermeasures or other effective safety countermeasures to significantly improve existing roadways. • Use evidence-based Countermeasures that work with four or five stars to address persistent behavioral safety issues and consider equity in their implementation. • Measure safety impact through models, studies, reports, proven noteworthy practices, Crash Modification Factors (CMF), and other information on project and strategy effectiveness. • Will have safety benefits that persist over time. **Implementation Costs** • Are itemized and summarized in a logical manner, including capital costs for infrastructure, behavioral, and operational safety improvements. • Fund locations with past traffic fatalities and serious injuries and is expected to prevent fatalities and serious injuries per funds requested. Injuries will be weighted and combined with fatalities to assess this figure in relation to the Federal funding request.

Selection Criteria	Evaluation Parameters
#2: Equity, Engagement, and Collaboration	**Projects and Strategies:** • Ensure equitable investment in underserved communities in preventing roadway fatalities and serious injuries. • Are designed to decrease existing disparities identified through equity analysis. • Consider key population groups (e.g., people in underserved communities, children, seniors, Black, Latino, Indigenous and Native Americans, Asian Americans and Pacific Islanders, other persons of color, persons with disabilities, and persons otherwise adversely affected by persistent poverty or inequality) to ensure the impact to these groups is understood and addressed. • Include equity analysis, both quantitative and qualitative, and stakeholder engagement in underserved communities as part of the development and implementation process. • Include meaningful engagement with the public, including public involvement for underserved communities, community benefit agreements, and relevant stakeholders such as private sector and community groups, as part of implementation. • Leverage partnerships within their jurisdiction, with other government entities, non-governmental organizations, the private sector, academic institutions, and/or other relevant stakeholders to achieve safety benefits while preventing unintended consequences for persons living in the jurisdiction. • Inform representatives from areas impacted on implementation progress and meaningfully engage over time to evaluate the impact of projects and strategies on persons living in the jurisdiction. • Align with equity analysis performed as part of the development of an existing Action Plan.
#3: Effective Practices and Strategies	**Projects and Strategies:** • Demonstrate how updated policies, guidelines, and standards improve safety decision making. • Are supported by an existing Complete Streets Policy that prioritizes safety in standard agency procedures and guidance, or other roadway safety policies that have eliminated barriers to prioritizing the safety of all users. • Incorporate practices that promote efficiency within the planning and road management lifecycle (e.g., dig once, etc.). • Consider the impacts of land use and the built environment to promote transportation efficient design. • Leverage a Safe System Approach that uses multiple activities and interventions to address safety problems. • Encompass at least three of the five Safe System Approach elements in the National Roadway Safety Strategy (Safer People, Safer Roads, Safer Speeds, Safer Vehicles, and Post-Crash Care) to address the identified safety problem. • Include a mix of infrastructure, behavioral, operational, and/or post-crash safety activities.

Selection Criteria	Evaluation Parameters
	• Involve widely implemented improvements based on high-risk roadway features correlated with particularly severe crash types, including design features that reinforce appropriate motor vehicle speeds. • Incorporate technologies that promote safety and/or equity. • Improve safety for all road users along a roadway by providing accessible facilities (e.g., Public-Rights-of-Way Accessibility Guidelines [PROWAG]) and correcting barriers to individuals with disabilities. • Improve multimodal networks for people outside of a motor vehicle, including people who are walking, biking, rolling, public transit users, and people who have disabilities.
#4: Other DOT Strategic Goals	**Climate and Sustainability** • Reduce motor vehicle-related pollution such as air pollution and greenhouse gas emissions. • Increase safety of lower-carbon travel modes such as public transit, micromobility, and active transportation (e.g., people biking and walking). • Improve multimodal transportation systems that incorporate affordable transportation options such as public transit, micromobility, and active transportation (e.g., people biking and walking to transit stops and stations). • Reduce the lifecycle greenhouse gas emissions from the project materials such as the use of lower-carbon pavement and construction materials. • Support fiscally responsible land use and transportation efficient design that reduced greenhouse gas emissions through land use and zoning reform, rural main street revitalization, growth management, and equitable transit-oriented development. • Includes evidence-based climate resilience measures or features such as enhanced storm water management practices, upgrading infrastructure using the Federal Flood Risk Management Standard, and nature-based solutions that improve the built and/or natural environment. **Economic Competitiveness** • Lead to increased economic or business activity due to enhanced safety features for all road users. • Increase mobility and expand connectivity for all road users to critical community services such as education and healthcare, jobs, and business opportunities, especially for people in underserved communities. • Address the unique challenges rural and Tribal communities face related to mobility and economic development, including isolation and transportation cost burden.

Selection Criteria	Evaluation Parameters
	Workforce • For skilled construction labor needed on the project, incorporate strong labor standards (e.g., wages and benefits at or above prevailing; use of project labor agreements, registered apprenticeship programs). • For non-construction work on the project, commit to supporting training opportunities as part of the project, including pre-apprenticeship or apprenticeship readiness programs and youth service, with a description of how training and job opportunities on the project will lead into registered apprenticeship or good-paying jobs.
#5: Supplemental Planning and Demonstration Activities	**Supplemental Planning and Demonstration Activities:** • Lead to a significant reduction or elimination of roadway fatalities and serious injuries involving various roadway users. • Employ low-cost, high-impact strategies that can improve safety over a wider geographical area. • Involve engaging with a variety of public and private stakeholders. • Adopt innovative technologies to promote safety and equity. • Be evidence-based or build evidence around what works.
Project Readiness	**Applicant:** • Documents all applicable local, State, and Federal requirements. • Includes information on activity schedule, required permits and approvals, the National Environmental Policy Act (NEPA) class of action and status, State Transportation Improvement Program (STIP) and Transportation Improvement Program (TIP) status (if applicable), public involvement, right-of-way acquisition plans, procurement schedules, multi-party agreements, utility relocation plans and risk and mitigation strategies, as appropriate. • Is reasonably expected to begin any construction-related projects in a timely manner consistent with all applicable local, State, and Federal requirements.
Additional Considerations	• The percentage of Implementation Grant funds that will be spent in, and provide safety benefits to, locations in Census tracts designated underserved communities. • Whether the applicant is in a rural area. • Whether the applicant is identified as a priority community within the federal Thriving Communities Network. • Whether the applicant would enhance the geographic diversity of Implementation Grant award recipients. • Federal funding requests under $10 million.

- Eligible applicants can only apply for one of the two types of grants at a time, but grant recipients are not precluded from applying each year (i.e., SS4A award recipients from one year are still eligible to apply the following year).
- Applications have previously been due between May and July and awards are announced later in the year. Based on the 2024 implementation grant cycle, it is anticipated that SS4A Action Plans must be in place by April 2026 to be eligible to apply for 2026 grant funding. USDOT expects to obligate award funding within 12 months after awards have been announced.
- The minimum award for implementation grants is expected to be $2.5 million and the maximum to be $25 million.
- Per IIJA requirements, 40% of award funds will go toward Action Plans (Implementation Grants are highly competitive).
- The USDOT recommends that applicants use its Self-Certification Eligibility Worksheet to determine whether they and their projects are eligible in applying for an Implementation Grant. This worksheet asks questions of the applicant that align specifically to each of the Action Plan components from Table 1 (Reference 3 – 2024 SS4A Notice of Funding Opportunity)
- Eligible groups of applicants include:
    - A political subdivision of a State or territory, defined in the FY23 Notice of Funding Opportunity as a unit of government created under the authority of State law. This includes cities, towns, counties, special districts, certain transit agencies, and similar units of local government.
    - A federally recognized Tribal government.
    - Metropolitan planning organizations (MPOs).
    - A multijurisdictional group of entities from the ones described above (one lead applicant from group should be selected).
- Eligible applicants must meet at least one of these conditions:
    - Have ownership and/or maintenance responsibilities over a roadway network;
    - Have safety responsibilities that affect roadways; or,
    - Have agreement from the agency that has ownership and/or maintenance responsibilities for the roadway within the applicant's jurisdiction (defined as the US Census tracts where the applicant operates or performs their safety responsibilities) (Reference 3 – 2023 SS4A Notice of Funding Opportunity).
- The following SS4A discretionary program priorities support the USDOT's overall mission and are reflected in the grant selection criteria detailed in the following section:
    - Reduce or eliminate deaths and serious injuries from crashes on public roads;
    - Employ low-cost, high-impact strategies that can improve safety over a wide geographic area;
    - Ensure equitable investment in the safety needs of underserved communities;

  - Incorporate evidence-based projects and strategies and adopt innovative technologies and strategies;
  - Demonstrate engagement with a variety of public and private stakeholders; and,
  - Align with the USDOT's mission and Strategic Goals such as safety; climate change and sustainability; equity and environmental justice; and workforce development, job quality, and wealth creation.

- USDOT seeks to make Implementation Grant awards to projects and strategies that can be completed in full within five (5) years after the establishment of a grant agreement (Reference 3 – 2024 SS4A Notice of Funding Opportunity).
- Implementation Grant applicants may also "bundle" supplemental planning and demonstration activities with funding proposals for projects and strategies. These additional activities do not need to be in the same area as the projects and strategies and could be addressing a separate safety issue (Reference 2 – UDSOT SS4A Grant Program).
- Table A-2 provides illustrative examples of projects and strategies that could be conducted as part of an Implementation Grant. This list is not exhaustive and could include infrastructure, behavioral, and operational safety activities identified in an Action Plan. The following activities are not eligible:
  - Projects and strategies that do not primarily focus on roadway safety.
  - Projects and strategies for non-roadway transportation modes (e.g., air, rail, pipeline, etc.). Roadway intersections with other modes of transportation (e.g., at-grate highway rail crossings, etc.) are eligible activities.
  - Capital projects to construct new roadways for motor vehicles. New facilities exclusively for non-motorists (e.g., a shared use path) are eligible if the primary purpose is safety related.
  - Infrastructure projects primarily intended to increase capacity for motorists on an existing roadway (e.g., additional lanes).
  - Maintenance activities for an existing roadway primarily to maintain a state of good repair. Roadway modifications of an existing roadway in support of specific safety-related projects identified in an Action Plan are eligible.
  - Development or implementation of a public transportation agency safety plan, unless it identifies and addresses risks to pedestrians, bicyclists, personal conveyance and micromobility users, transit riders, and others that could inform Action Plan development (Reference 3 – 2024 SS4A Notice of Funding Opportunity).

Table A-2. Example Implementation Grant Projects and Strategies

Projects	Strategies
System-Wide Low-Cost Roadway Safety Treatments	• Left- and right-turn lanes at intersections • Centerline and shoulder rumble strips • Wider edge lines • High-friction surface treatments • Road diets • Better signage along high-crash corridors
Correction of Common Risks across a Network	• Pedestrian crosswalk improvements such as high-visibility pavement markers, lighting, and signage at transit stops, in a designated neighborhood, or along a busy public transportation route.
High-Injury Network Roadway Corridor Transformation	• Complete Street features to control speed, separate users, and improve visibility
Pedestrian Safety Enhancements	• Closing sidewalk network gaps • Rectangular Rapid Flashing Beacons (RRFBs) • Signal Improvements • Audible pedestrian signals
Bikeway Networks	• Bike lanes for different roadway volumes and speeds that are safe for people of all ages and abilities
Speed Management	• Traffic calming road design changes • Infrastructure to slow speeds on key corridors • Education and outreach • Appropriate speed limits • Speed safety cameras
Safe Routes to School / Public Transit Services	• Activities that lead to people safely walking, biking, and rolling in underserved communities
Innovative Technology / Strategy Promotion	• For safety and protection of vulnerable road users in high-traffic areas where commercial motor vehicles, pedestrians, bicyclists, motorcyclists, etc. interact
Education Campaigns on New/Innovation Infrastructure	• Roundabouts • Pedestrian hybrid beacons • Pedestrian-only zones

Projects	Strategies
Roadway Departure Crash Reduction	• Enhanced delineation • Shoulder widening • Rumble strips • Roadway safety improvements
Intersection Safety Improvements	• Innovative design changes • Improved delineation • Advanced warning

Attachment B – Local Safety Projects

Table B-1. Incomplete or Partially Complete 2019 Deschutes County TSAP Projects

The projects listed below were identified in the 2019 TSAP and are subject to change based on the findings from this TSAP Update. Projects shaded in yellow are either partially complete or in progress. The remaining projects are yet to be completed.

Project Name	Description
Site Specific Improvements	
US 20 / Fryrear Road	Install illumination and oversize advanced intersection warning signs as near-term treatments. Explore long-term improvements such as installing a roundabout, adding a left-turn lane for eastbound traffic, and using curb and gutter for raised channelization to improve intersection geometry.
Alfalfa Market Road / Dodds Road	Remove, relocate, or protect fixed objects adjacent to road for a low-cost treatment. (Pending All Roads Transportation Safety project.)
US 97 / 11th Street-Lower Bridge Way	Install a single-lane roundabout and flyover ramp.
Northwest Way / Coyner Ave	Improve intersection operations based on the results of a safety and capacity analysis. Reconfigure geometry to improve safety for vehicles and bicycles. Install new pavement markings and signage.
Alfalfa Market Road / Walker Road	Install illumination and implement intersection awareness treatments, such as post-mounted reflective delineators, oversized or doubled advanced warning signs, and enhanced edge-line and centerline markings.
US 97 / Smith Rock Way-B Ave	Improvements at this intersection have not yet been identified in any planning documents.
US 97 / Burgess Road	Install a traffic signal.
US 20 / Hawks Beard (Black Butte Ranch)	Improvements at this intersection have not yet been identified in any planning documents.
Dickey Road / Nelson Road	Install additional intersection ahead warning signs on the major approaches and assess sight lines.
US 97 / Galloway Avenue	Install a median barrier on US 97 from the O'Neil Junction to the Galloway Avenue intersection.

Project Name	Description
Butler Market Road / Hamby Road	In the near-term, delineate the nearby driveway with curb, install a raised median island to better delineate the right-turn, and provide signage to support stop-controlled conditions. Complete an operational analysis to determine if there are treatments such as converting the intersection to all-way stop-control or a mini-roundabout. Long-term, install a single lane roundabout and supplement intersection approaches with curb and gutter and raised channelization.
Butler Market Road / Hamehook Road	Install additional oversized advanced warning sign and complete an operational analysis to determine if there are treatments such as converting the intersection to all-way stop-control or a mini-roundabout in the near-term. Install a single lane roundabout and supplement intersection approaches with curb and gutter and raised channelization in the long-term.
Baker Road / Cinder Butte Road	In the near-term, improve the signing and striping and assess sight lines. In the long-term, square up the intersection and used raised channelization or install a roundabout.
S Century Drive / Huntington Road	Install a single-lane roundabout and illumination.
Cline Falls Road / Coopers Hawk Drive-Falcon Crest Drive	Shift stop bars on Coopers Hawk Dr/Falcon Crest Dr closer to Cline Falls Rd with painted right-turn islands to clarify turn movements. Realign the Cline Falls Rd bike crossing to be perpendicular, improving sight lines and reducing crossing distance. Adjust the northbound right-turn lane taper to begin after the bike crossing to eliminate ambiguity.
Lower Bridge Way / 19th Street	Install a left-turn lane, advance warning signs, and flashing LED stop signs. (Pending All Roads Transportation Safety project.)
Lower Bridge Way / 31st Street	Install a left-turn lane, advance warning signs, and flashing LED stop signs. (Pending All Roads Transportation Safety project.)
Lower Bridge Way / 43rd Street	Install a left-turn lane, advance warning signs, and flashing LED stop signs.

Attachment C – Countywide Crash Pattern Analysis Results

Based on the most recent five years of available crash data, 3,497 crashes were reported in unincorporated Deschutes County from 2018 to 2022 (many crashes may go unreported and therefore may not be tied to any dataset). The crash data analysis summarized in this attachment evaluates historical crash patterns within the study area, with an emphasis on more serious injury crashes. Serious injuries and fatalities not only have life-changing impacts on people involved in and adjacent to these crashes, but they also impart a high cost on them and onto the overall region.

Crash Pattern Assessment

The Crash Pattern Assessment identifies the history and patterns of crashes on all public roads, including characteristics like crash severity and location, temporal trends, collision types (e.g., rear-end, bicycle) and contributing factors, road features (e.g., lack of pedestrian infrastructure), driver behaviors (e.g., speeding), and external conditions (e.g., low lighting, weather).

This section summarizes the historic crash patterns found in the county based on the categories below:

- Crash Location and Severity
- Temporal Trends
- Crash Types and Contributing Factors
- Roadway Characteristics
- Behavioral Characteristics
- Vulnerable Road Users

For the purposes of this section, “rural” areas or facilities are located outside of Urban Growth Boundaries (UGBs) and “urban” areas or facilities are located outside of city limits but inside of UGBs.

Crash Location and Severity

In order to identify potential treatment types and where they would be most beneficial, it is important to determine where in the network fatal and serious crashes occur. Table 3 summarizes the crashes that occurred in the study area within the five-year period based on their severities, as

compared to crashes that occurred countywide (including on State highways and USFS and BLM roads).

Table 13. County Road System Crashes vs. Countywide System Crashes

Context	Fatal & Serious Injury	Moderate Injury	Minor Injury	PDO	Total Crashes
Deschutes County Road System Only	172	540	475	988	2,175
Countywide System	276	829	724	1,668	3,497

INTERSECTION AND SEGMENT CRASHES

Based on the five-year study data, segment crashes accounted for 72% of all crashes while intersections contributed to 28% of crashes. As shown in Chart 19 fatal and serious injuries occurred most often on rural roadway segments, followed by rural intersections, urban segments, and urban intersections, respectively. As shown in Table 14, crashes involving all modes are more likely to occur on segments, with the exception of bicycle-involved crashes, which occurred with the same frequency along segments and at intersections.

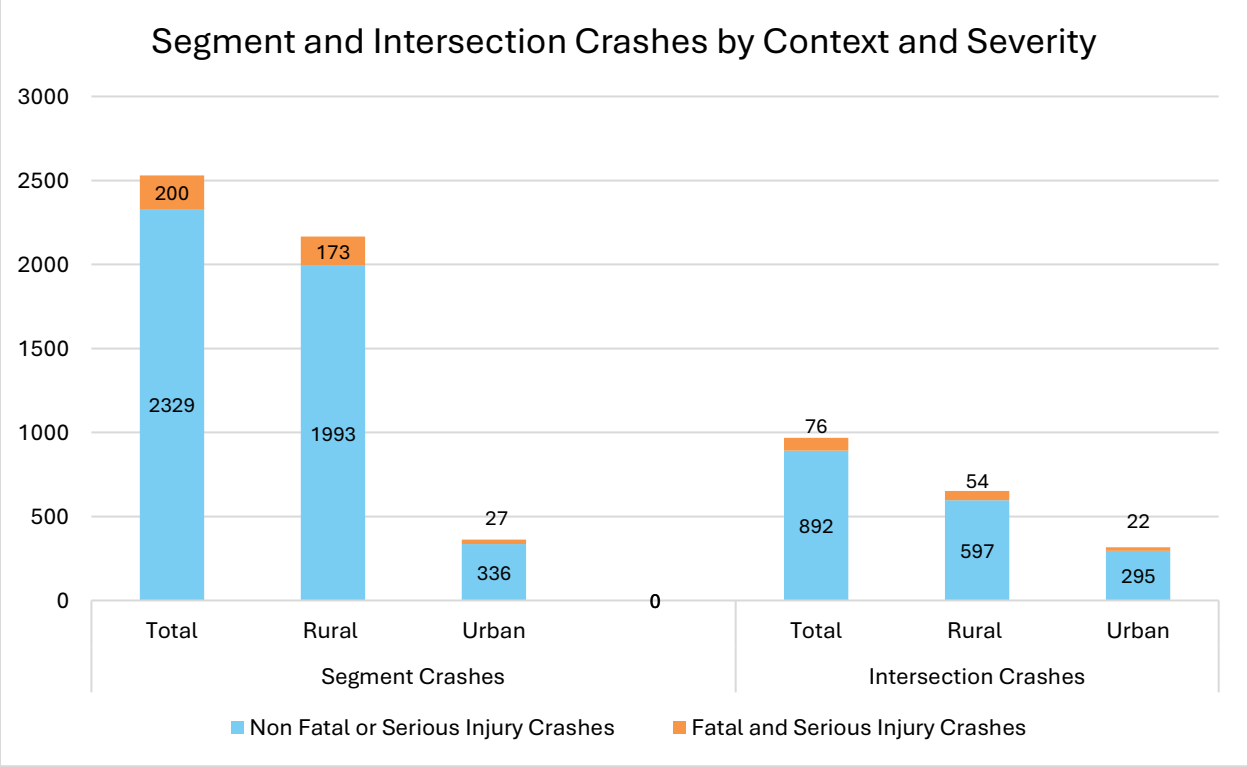

Chart 19. Segment and Intersection Crashes by Context

Table 14. Intersection and Segment Collisions by Mode

Mode	Intersections	Segments	Total
Pedestrian Crashes	1	10	11
Bicyclist Crashes	6	6	12
Motorcycle Crashes	28	71	99
Motor Vehicle-Only Crashes	933	2,442	3,375
Total Crashes	**968**	**2,529**	**3,497**
Percent of Total Crashes	**27.7%**	**72.3%**	**100%**

CRASHES BY ROADWAY OWNER

Within the study area, state highways and county-owned roads experienced a similar share of crashes, despite only 2.6% of road miles in the study area being state highways. Note that this comparison reflects the centerline miles of roadway and does not capture the differences in traffic volume (or vehicle miles travelled) on each roadway type. Regardless of the reason, the large

proportion of crashes occurring on state highways highlights the importance of coordination and partnership with ODOT as the County aims to improve safety for residents and visitors.

Table 15. Crashes by Roadway Owner

Roadway Owner	Number of Crashes (Percent of Total)	Road Miles (Percent of Total)	Crashes Per Road Mile
County	1,521 (43.5%)	1,279 (14.9%)	1.19
BLM / USFS / ODF / Unknown	262 (7.5%)	7,120 (82.6%)	0.04
State Highway	1,714 (49.0%)	216 (2.5%)	7.94
Total	**3,497 (100%)**	**8,615 (100%)**	**0.41**

Temporal Trends

The following section summarizes temporal crash trends, describing reported crashes by year, month, and time of day within the five-year period.

CRASHES BY YEAR

The five-year period of 3,497 crashes is an average of 699 crashes per year. As shown in Chart 20, the total number of crashes has remained relatively constant since 2018, though the number and proportion of fatal and serious injury crashes has more than doubled. Fatal and serious injury crashes made up 5.4% of all crashes in 2018 compared to 12.1% of crashes in 2022.

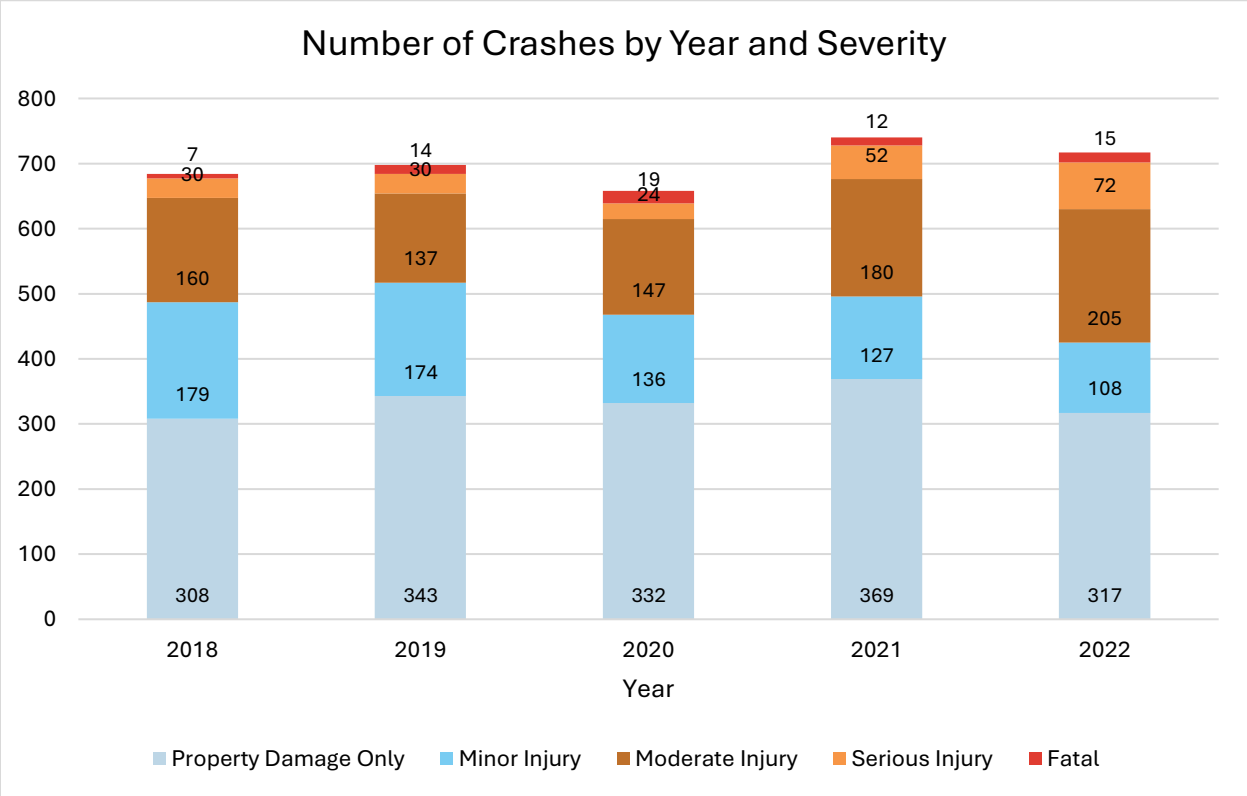

Chart 20. Number of Crashes by Year and Severity

CRASHES BY MONTH

As shown in Chart 21, the highest number of crashes occurred during the months of November, December, and January. December experienced the highest number of crashes (399), 6% of which were fatal or serious injury crashes. From November to January, 63% of crashes that occurred during those months were reported to have wet, snowy, or icy road conditions.

Notably, summer months (June to August) experienced the largest number of fatal and serious injury crashes ranging from 25 to 31 per month, which accounted for 9% to 10% of their total monthly crashes.

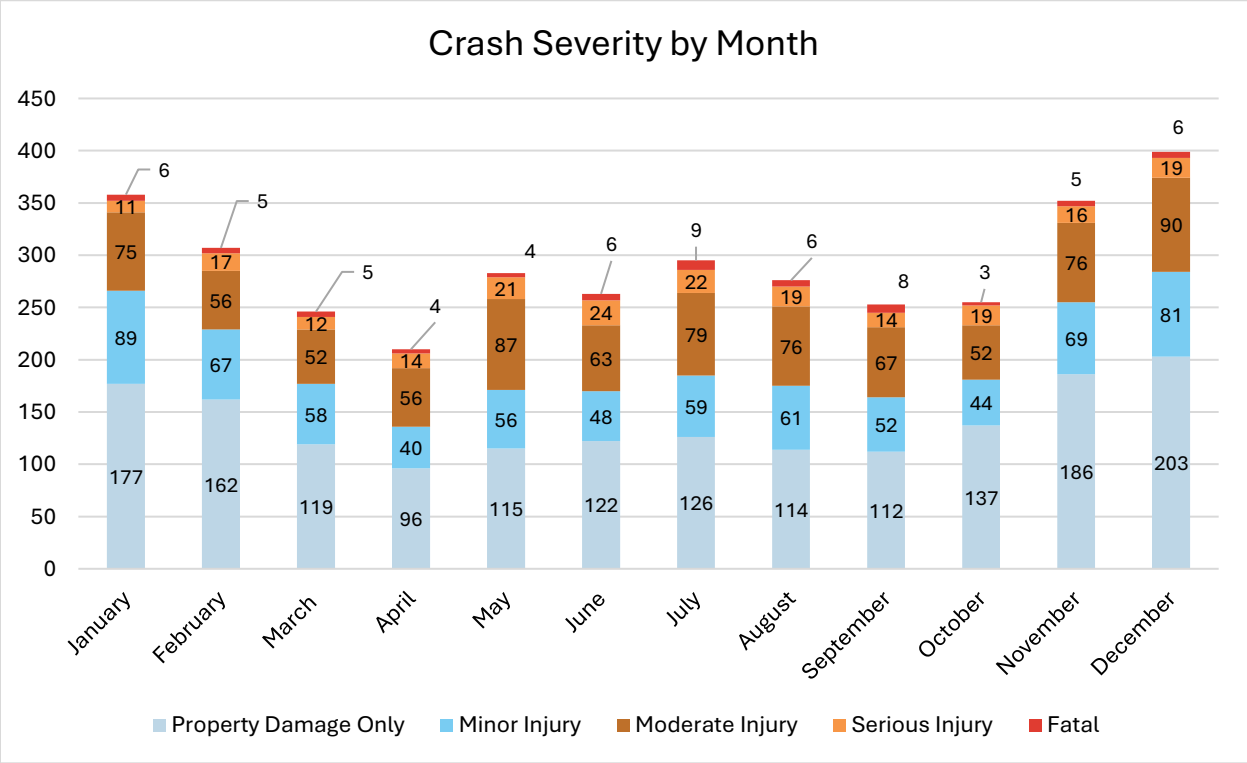

Chart 21. Number of Crashes by Month and Severity

CRASHES BY DAY

As shown in Chart 22, most crashes occurred mid-to-late week between Wednesday and Friday. Wednesday and Thursday experienced the same number of crashes (534), but Thursday experienced 13% more fatal and serious injury crashes than Wednesday. Friday experienced the highest number of total crashes (546), 2% more crashes than Wednesday and Thursday.

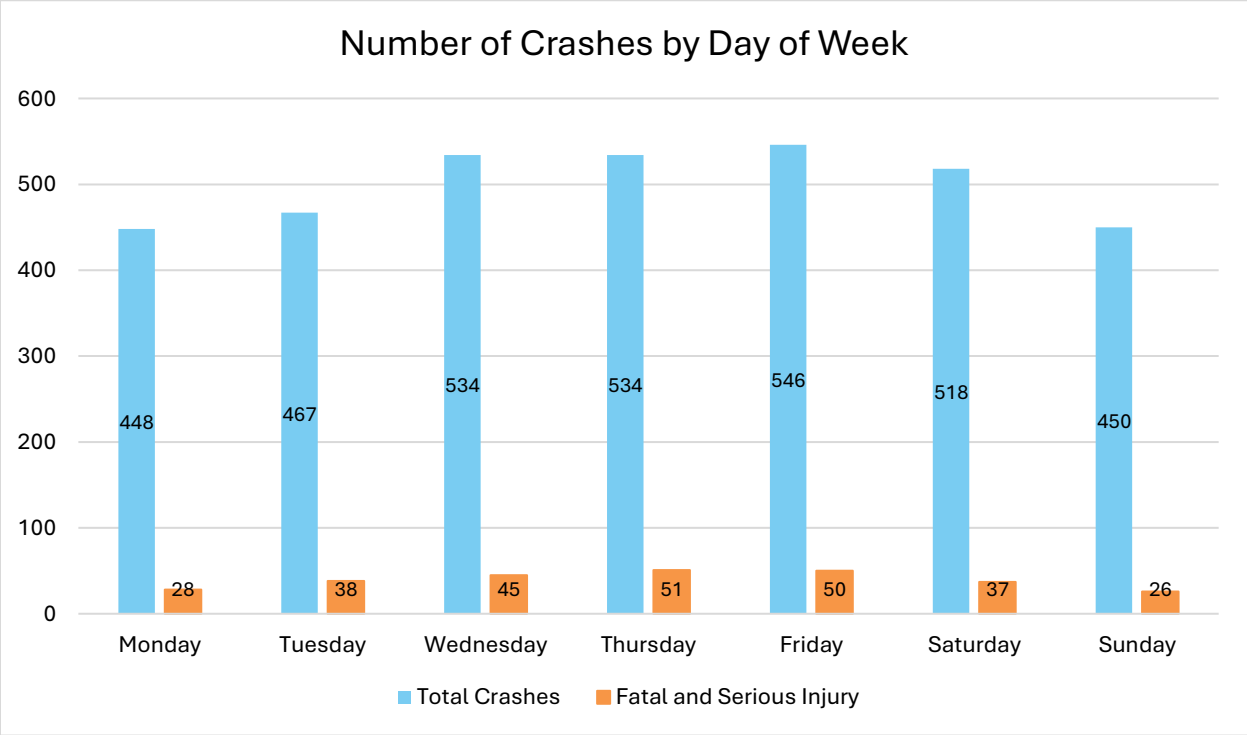

Chart 22. Number of Crashes by Day of Week and Severity

CRASHES BY TIME OF DAY

Chart 23 illustrates the number of crashes across a 24-hour day within the five-year study period. Crashes most often occurred from 3PM to 5PM (22%), consistent with typical afternoon commuter travel periods. Fatal and serious injury crashes were more frequent between the hours of 10AM to noon, 3PM to 5PM, and 7PM to 10PM.

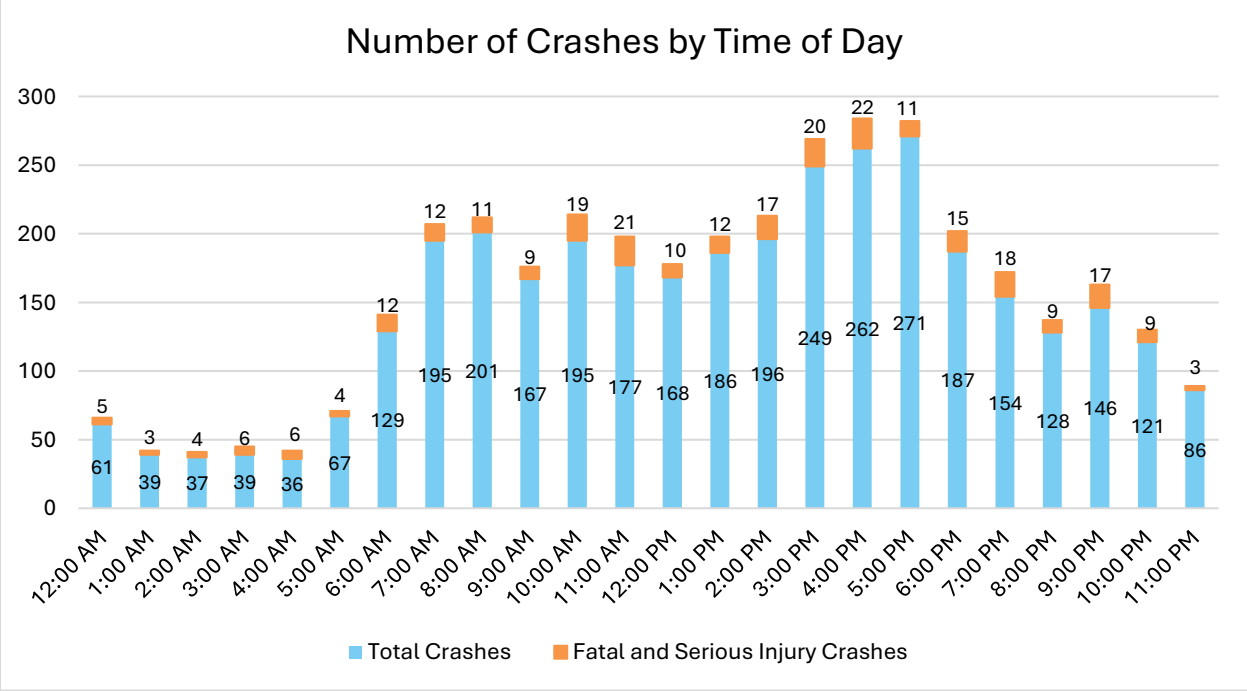

Chart 23. Number of Crashes by Time of Day and Severity

Crash Types and Contributing Factors

This section summarizes crash types, causes, and contributing factors to crashes reported in the study area over the five-year period.

CRASH TYPE

As shown in Chart 24, the most common collision types among fatal and serious injury crashes are fixed object (33%), turning (14%), non-collision/overturning[2] (12%), and head-on (11%). Among all crashes, fixed object (35%) and turning (12%) are accompanied by rear-end (15%) and "other" (11%)[3] as the top four collision types (Chart 25). Note that percentages shown as "0%" are collision types with at least one crash, but the proportion rounds to zero percent of the total.

[2] A non-collision crash initially involves only one vehicle, and cannot be classified as another collision. The most common non-collision crash type is an overturn (rollover). [2023 Motor Vehicle Traffic Crash Analysis and Code Manual]

[3] "Other" or "Miscellaneous" collisions include all animal crashes except animals drawing vehicles, and all crashes not classifiable under the other listed types. Examples include hitting a wild or domestic animal, lost load, or drive shaft fell from vehicle. [2023 Motor Vehicle Traffic Crash Analysis and Code Manual]

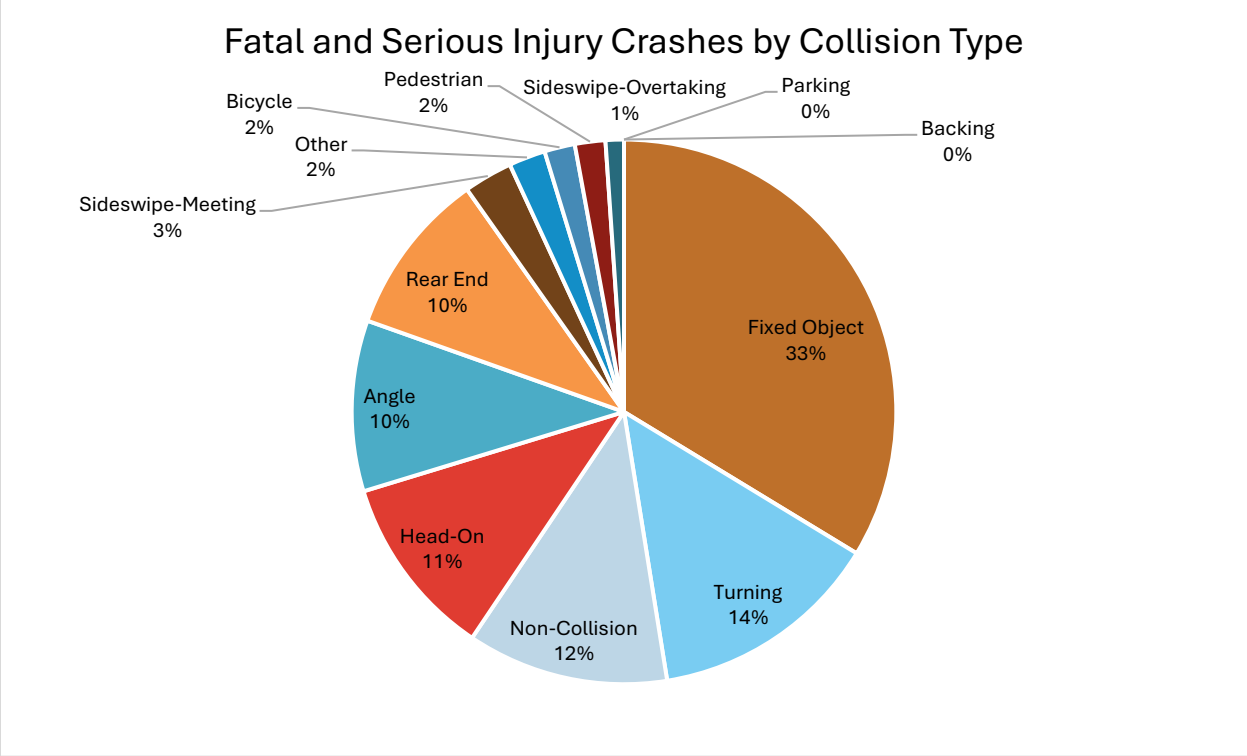

Chart 24. Fatal and Serious Injury Crashes by Collision Type

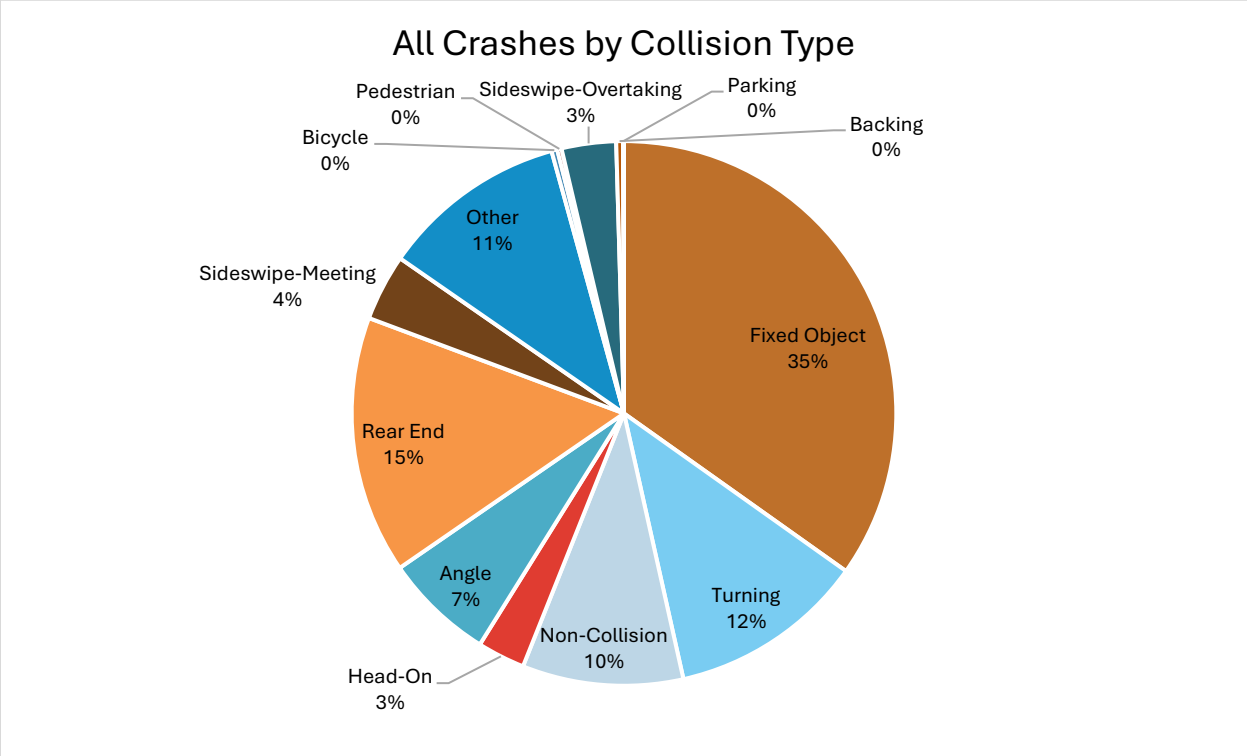

Chart 25. All Crashes by Collision Type

CRASH CAUSE

As shown in Chart 26, the most commonly reported crash cause was driving too fast for conditions but did not exceed the speed limit (29% of all crashes, 25% of fatal and serious injury crashes). Other common contributing factors in fatal and serious injury crashes include failure to yield the right-of-way (14%), other improper driving (8%), driving left-of-center (7%), and reckless driving (7%).

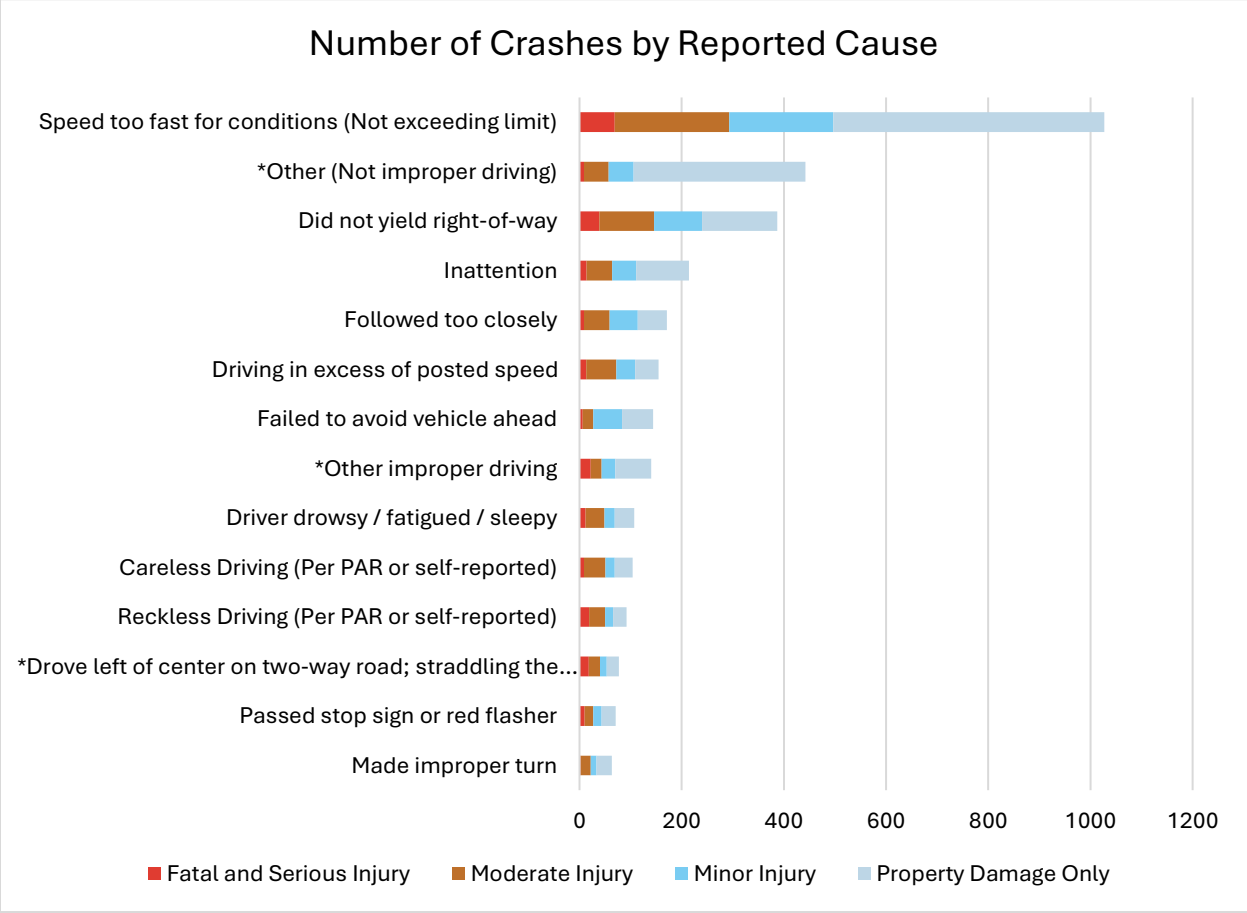

Chart 26. Number of Crashes by Reported Crash Cause and Severity

ROADWAY CONDITIONS

As shown in Chart 27 and Chart 28, the majority of crashes of all severity levels occurred in dry, clear conditions. Inclement weather, and more specifically a wet, snowy, or icy road surface was present during approximately 32% of all crashes, compared to just 21% of fatal and serious injury crashes. While this trend may be counterintuitive, it likely reflects a reduction in vehicle travel and lower vehicle speeds during inclement weather events, not a direct correlation between less severe outcomes and inclement weather.

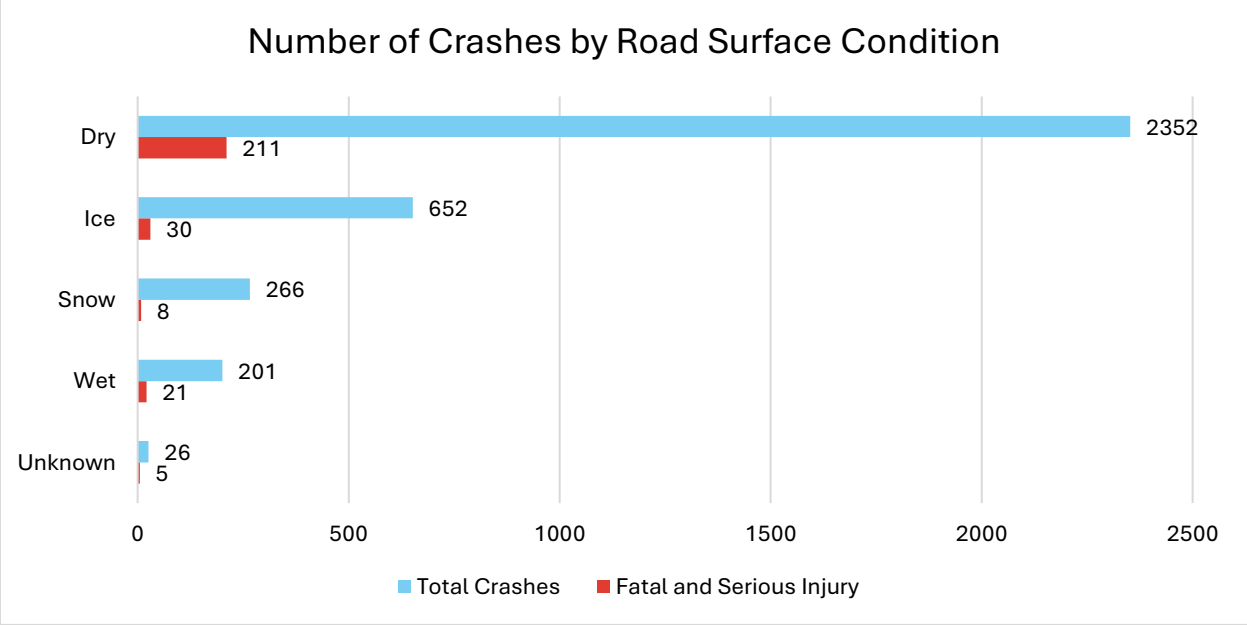

Chart 27. Number of Crashes by Road Surface Condition and Severity

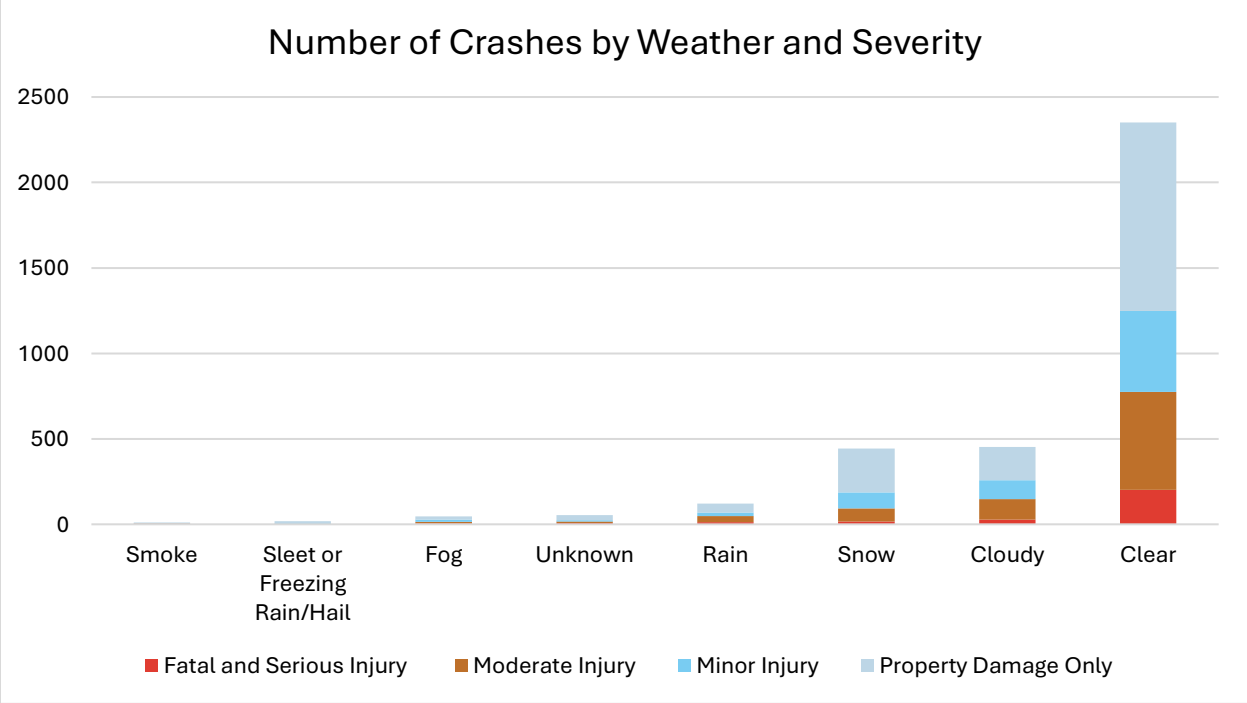

Chart 28. Number of Crashes by Weather Condition and Severity

Roadway Characteristics

This section summarizes roadway features and their corresponding crashes, including functional classification, traffic control devices, and lighting conditions.

FUNCTIONAL CLASSIFICATION

Throughout the five-year period, crashes overwhelmingly occurred on rural principal arterial roadways (Chart 29). Fatal and serious injury crashes that occurred on rural principal arterial roadways accounted for 37% of all fatal and serious injury crashes across all functional classification types.

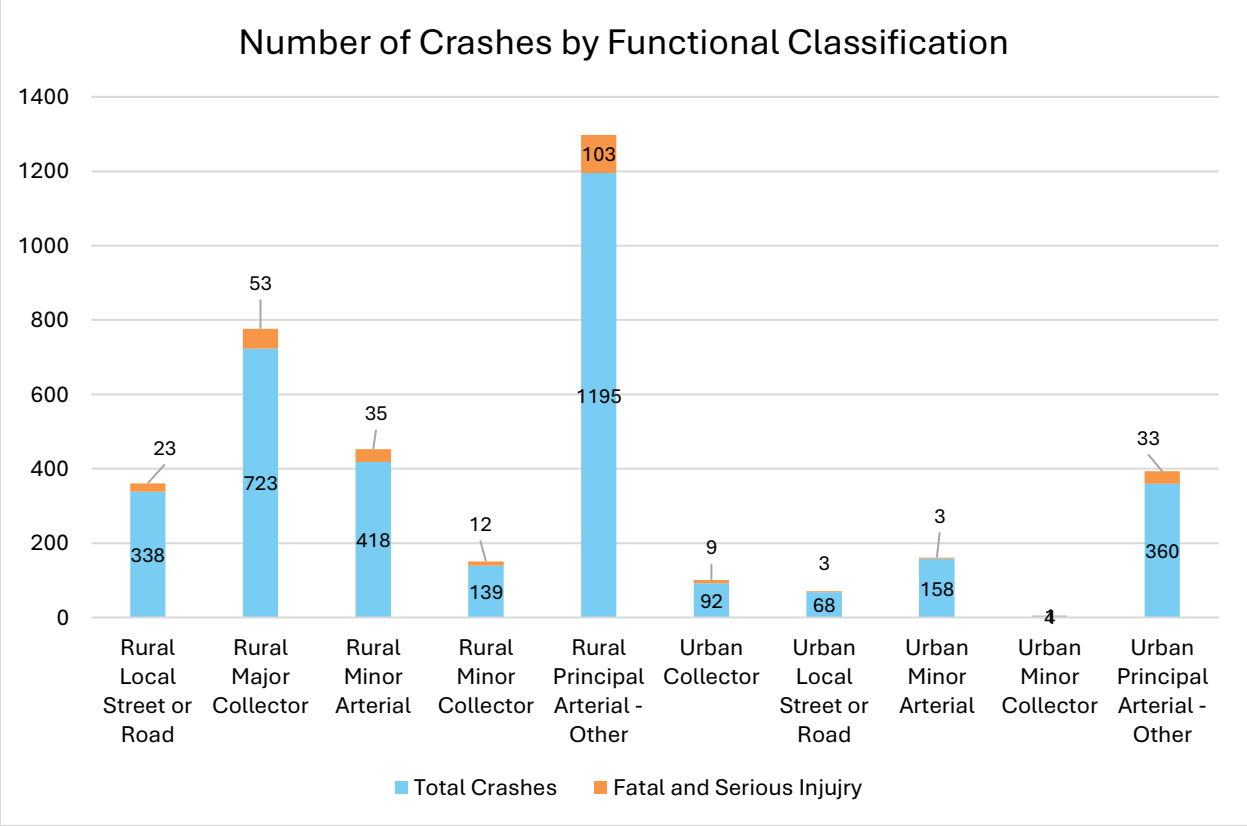

Chart 29. Crashes by Roadway Functional Classification and Severity

INTERSECTION TRAFFIC CONTROL

As shown in Chart 30, 68% of intersection crashes occurred at stop-controlled intersections. Other less-common traffic control types include yield control and traffic signals (there is one signalized intersection in the study area), as well as general warning signs (e.g., school crossing signs or curve warning signs). In many cases, locations coded as “no control” or “undefined” are rural intersections with no signing installed, where drivers are required to slow and yield to oncoming traffic.

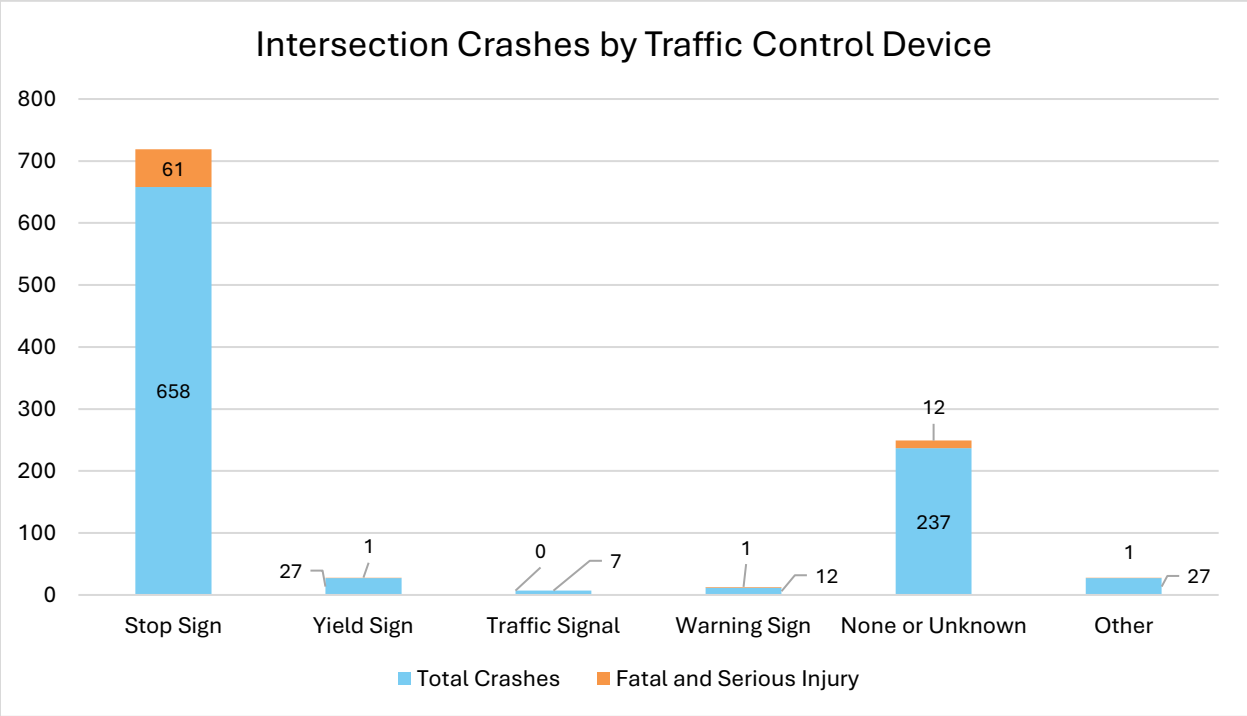

Chart 30. Intersection Crashes Traffic Control Devices and Severity

LIGHTING CONDITONS

As shown in Chart 31, crashes primarily occurred under daylight conditions, followed by darkness with no streetlights. While 64% of all crashes occurred in daylight conditions, 36% of fatal and serious injury crashes occurred in non-daylight conditions such as dawn, dusk, and darkness (with or without street lighting) conditions.

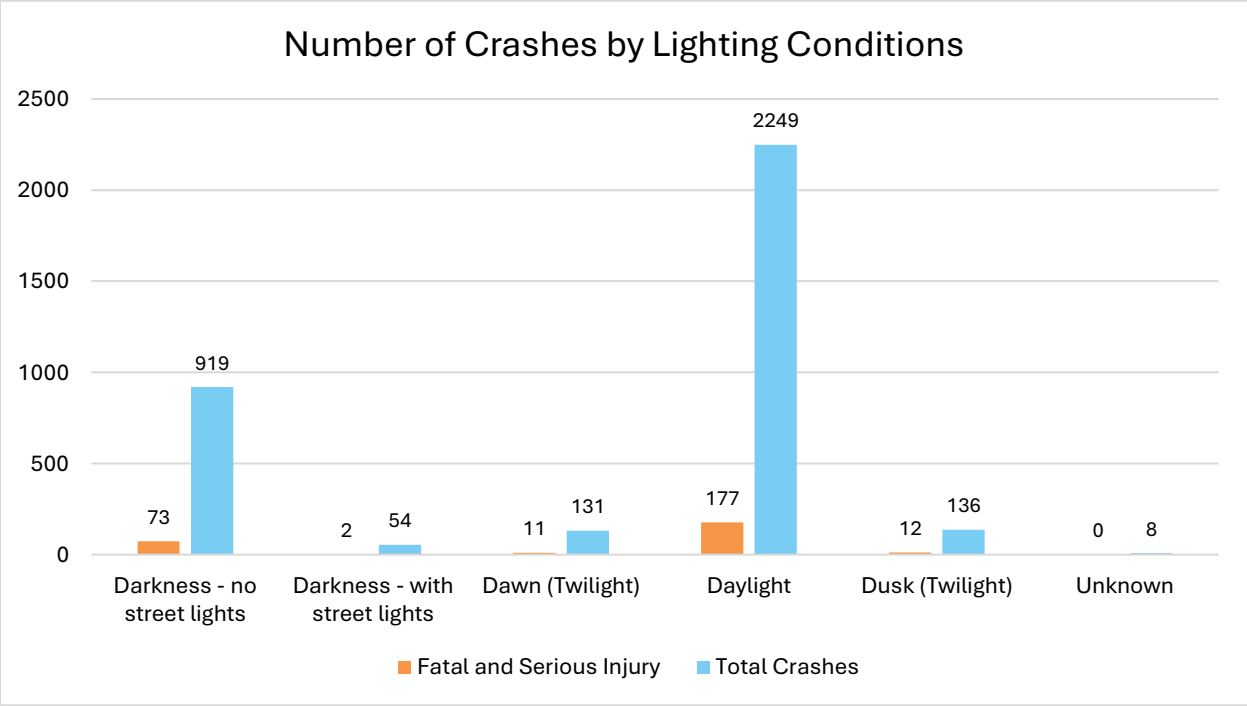

Chart 31. Number of Crashes by Lighting Conditions and Severity

Behavioral Characteristics

This section summarizes the driver behavioral characteristics reported in the five-year crash dataset, including speeding, impaired and/or distracted driving, and use of protective equipment.

SPEEDING

Crashes flagged as "speed-involved" include drivers who were exceeding the posted speed or driving too fast for conditions. Approximately 37% of fatal and serious injury crashes involved speeding, which is similar to the overall percentage of speed-involved crashes (39%). Notably, 33% of "too fast for conditions" crashes were during snowy weather conditions and 15% of those crashes resulted in a fatal or serious injury.

IMPAIRED DRIVING

Impairment includes being under the influence of drugs, alcohol, and/or marijuana. Alcohol impairment is most prevalent, contributing to 18% of fatal and serious injury crashes and 8% of all crashes. As illustrated in Chart 32, nearly one-quarter of fatal and serious injury crashes involved some sort of impairment. That proportion more than doubles when considering fatal crashes only, of which 49% involved impaired driving.

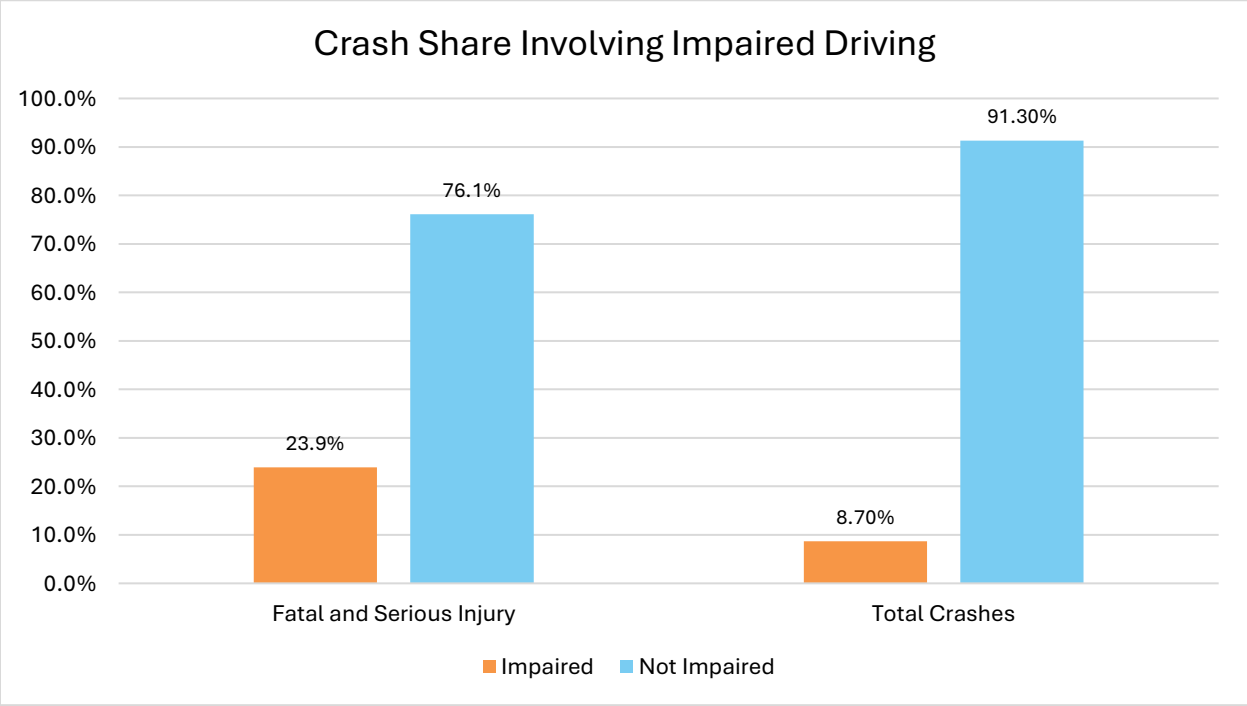

Chart 32. Crash Share Involving Impaired Driving

DISTRACTED DRIVING

Seven percent (7%) of all fatal and serious injury crashes were reported to involve distracted driving. While distracted driving is a risky driving behavior nationwide, distracted driving often goes unreported (particularly in self-reporting states, like Oregon, where drivers must admit to distraction) and therefore these numbers may not accurately reflect distracted driving in the county.

PROTECTIVE EQUIPMENT USAGE

Protective equipment generally refers to the use of seatbelts by vehicle occupants but can also include non-motorists' safety equipment such as helmets. In most crashes, use of protective equipment is listed as "unknown" in crash reports, because it is difficult to verify usage after the crash, unless the person is still in the vehicle. A total of 132 crashes were confirmed to involve at least one person who was not properly using protective equipment, which is approximately 4% of all crashes. However, that percentage jumps to 28% in fatal crashes.

Vulnerable Road Users

Vulnerable road users are typically users that are at a greater risk of fatalities and serious injuries when involved in a roadway crash. For the purpose of this analysis, vulnerable road users include pedestrians, bicyclists, motorcyclists, people younger than 18, or people older than 65.

PEDESTRIAN AND BICYCLE CRASHES

Throughout the five-year period, there were 11 pedestrian crashes and 12 bicycle crashes. As shown in Chart 33, 43% of these resulted in fatal or serious injuries. While crashes involving vulnerable road users are not common occurrences in the county, when they do occur, the outcome is likely to be severe.

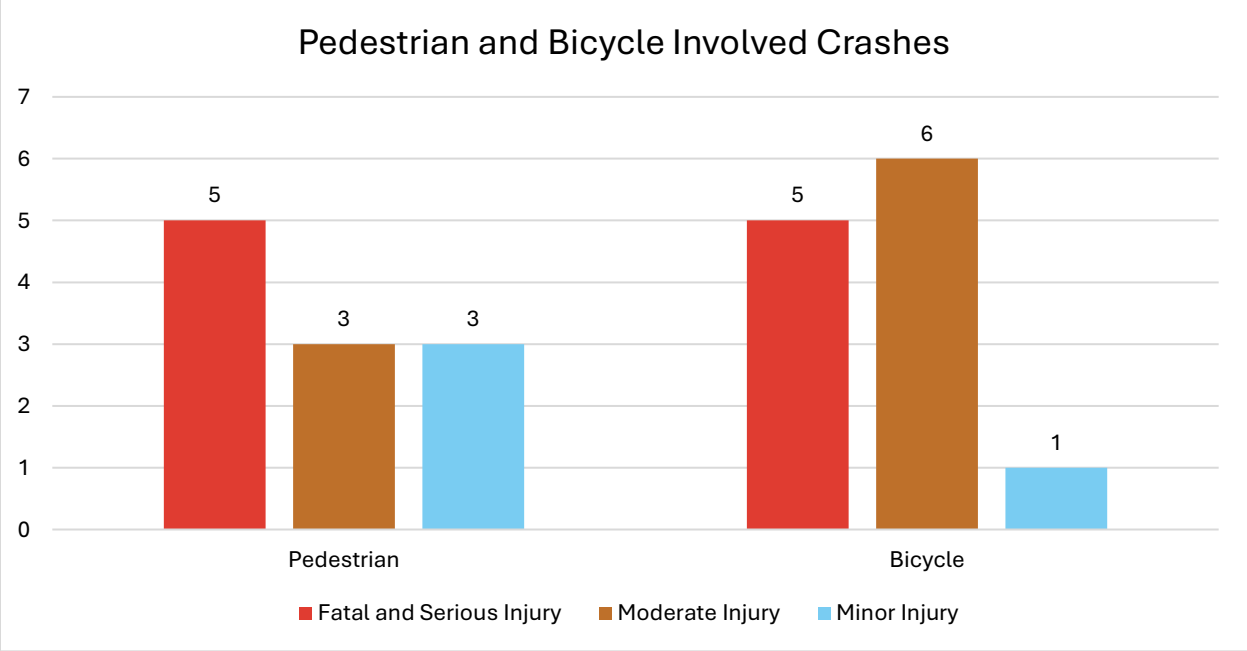

Chart 33. Pedestrian and Bicycle Involved Crashes by Severity

MOTORCYCLE CRASHES

Chart 34 summarizes motorcycle crashes compared to all other crashes and their share of each crash severity. Throughout the five-year period, 99 crashes were reported to involve a motorcycle, accounting for 3% of all crashes, but 15% of all fatal and serious injury crashes. Of the crashes that involved a motorcycle, 42% resulted in fatality or serious injury. As with other vulnerable road users, crashes involving motorcycles are a small portion of all crashes but when they do occur, they are likely to result in severe injuries.

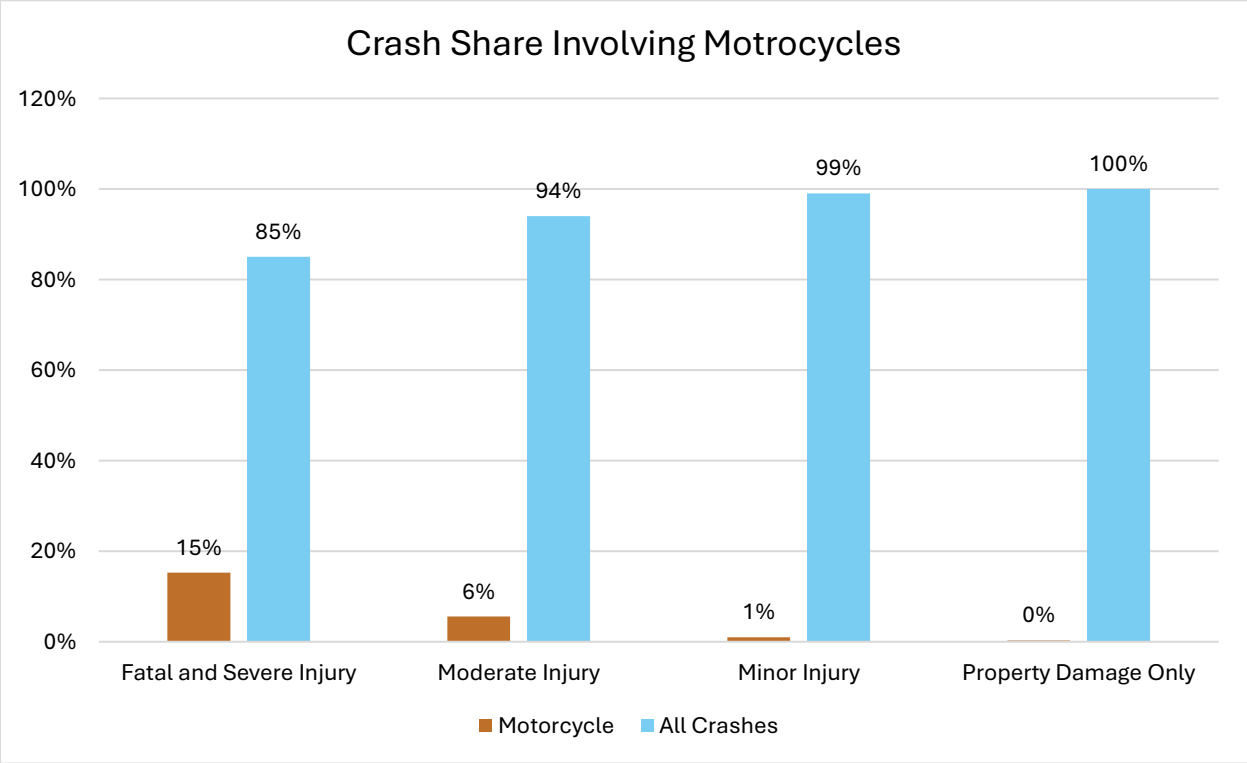

Chart 34. Crash Share Involving Motorcycles

DRIVER AGE

Participant-level information, like age, is not reported for property damage only (PDO) crashes. Therefore, the following key findings related to driver age apply only to fatal and injury crashes.

Chart 35 summarizes the share of drivers involved in crashes by age group and crash severity. This chart highlights that drivers in the 45-64 and 65+ age groups are involved in a higher proportion of fatal and serious injury crashes than the proportion of their involvement in total crashes (all severities).

When considering the primary contributing causes of crashes, speeding (too fast for conditions) is the most common across all age groups, except for drivers over the age of 65, who are most commonly involved in crashes where there was a failure to yield (Chart 36).

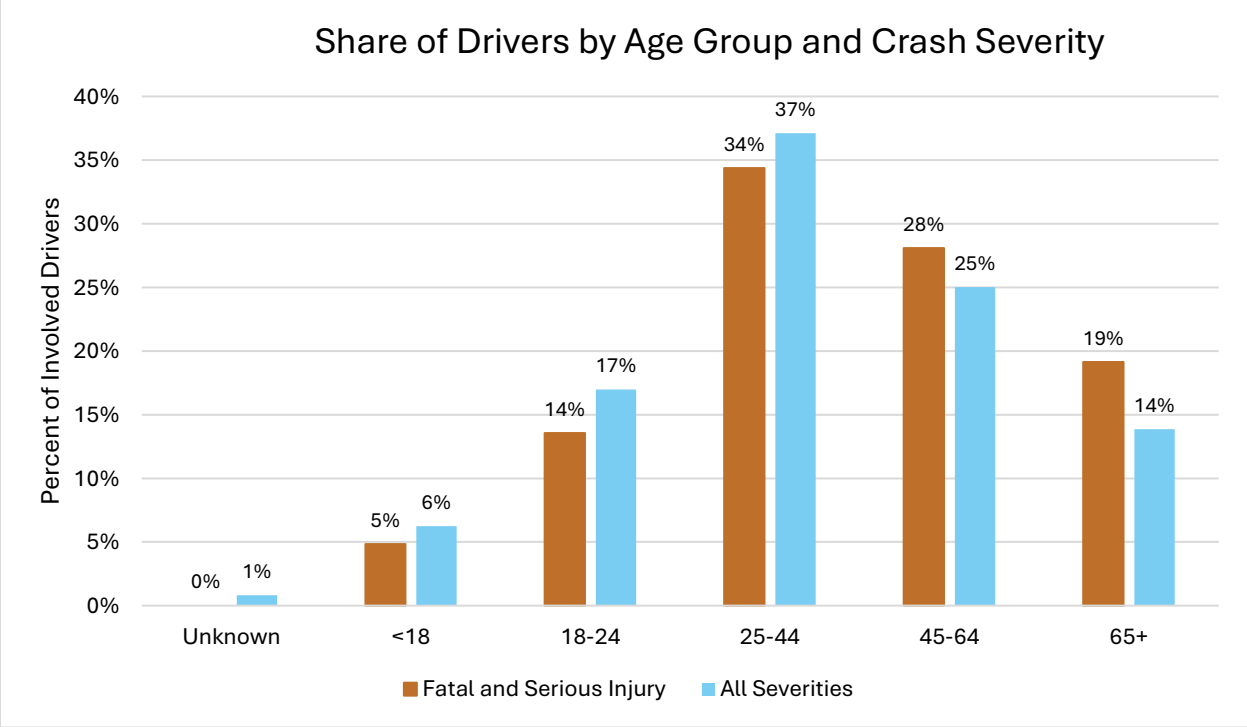

Chart 35. Percentage of Involved Drivers by Age Group and Severity

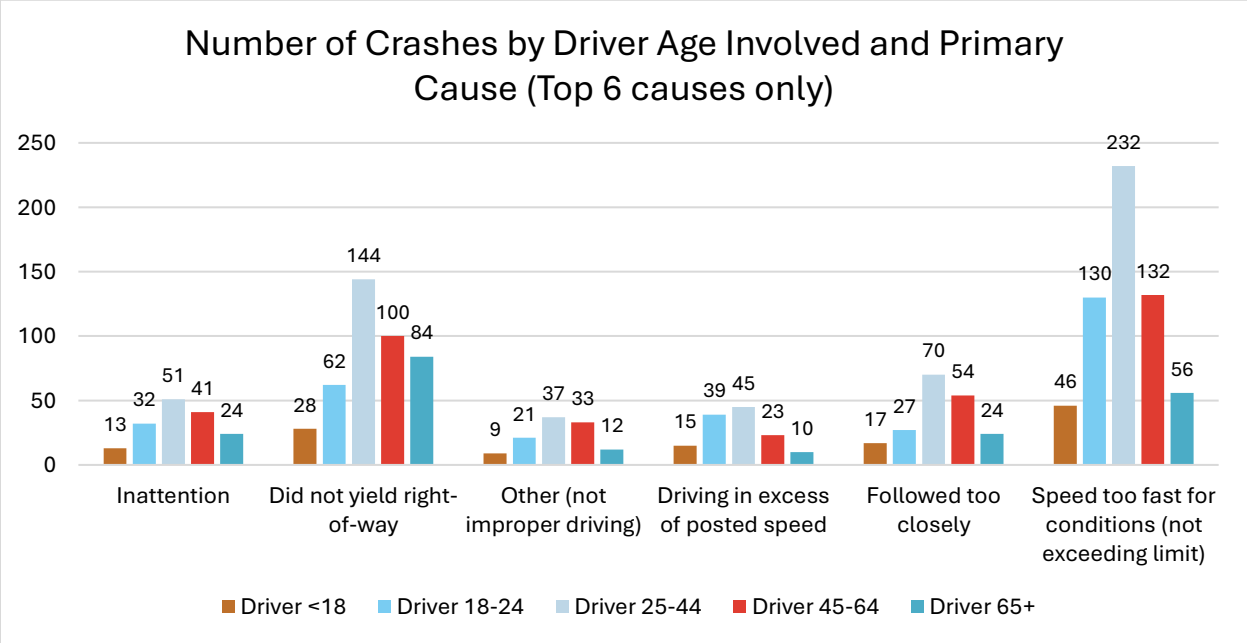

Chart 36. Number of Crashes by Age Group and Cause

Emphasis Areas

Emphasis areas are commonly developed by studying the crash characteristics that are most predominant or that are over-represented in fatal and serious injury crashes compared to lower severity crashes. For example, motorcycle-involved crashes may represent a small percentage of all crashes, but result in a much higher percentage of fatal and serious injuries. If so, an agency may choose to focus on motorcycle safety as an emphasis area as they are more likely to be seriously injured or killed when involved in a crash.

The 2021 Oregon TSAP contains a comprehensive crash attribute table for the State of Oregon that was used as a comparison for Deschutes County crash patterns. The comparison was performed by assigning the following "flags" to crash attributes when they meet specific criteria.

- **Flag 1 – Predominant Crash Attribute:** The crash attribute is present in more than 10% of fatal and serious injury crashes in unincorporated Deschutes County.
- **Flag 2 – More Prevalent than Statewide:** The proportion of fatal and serious injury crashes for the crash attribute in unincorporated Deschutes County is greater than the proportion of fatal and serious injury crashes for the crash attribute statewide as reported in the Oregon TSAP.
- **Flag – 3 High Severity Indicator:** The crash attribute has a higher share of fatal and serious injury crashes in unincorporated Deschutes County than its overall share of total crashes (e.g., head-on crashes contribute to 11% of all fatal and serious injury crashes but only 3% of all crashes).

Table 16 below indicates whether the "flags" are true for each crash attribute in Deschutes County, with respect to the criteria listed above. The more flags a given attribute has, the more likely that attribute is contributing to fatal and serious injury crashes.

Table 16: Deschutes County Emphasis Area Screening Results

Crash Attribute	Flag 1: Predominant Crash Attribute	Flag 2: More Prevalent than Statewide	Flag 3: High Severity Indicator
Roadway / Lane Departures	✓	✓	✓
Alcohol and/or Drug Use	✓	✓	✓
Alcohol Use Only	✓	✓	✓
Speed	✓	✓	✓
Distracted Driving			✓

Crash Attribute	Flag 1: Predominant Crash Attribute	Flag 2: More Prevalent than Statewide	Flag 3: High Severity Indicator
Nighttime (Dark/Dawn/Dusk) Conditions	✓	✓	✓
Intersections	✓		
Work Zones			
School Bus / School Zone			
Young Drivers (15-25)	✓		✓
Aging Drivers (65+)	✓	✓	✓
Bicyclists			✓
Pedestrians			✓
Motorcyclists	✓		✓

Based on the screening summary above, the following potential emphasis areas represent the crash attributes that were flagged as contributing to a high proportion of fatal and serious injury crashes or are more likely to result in fatal or serious injuries when a crash occurs. Bold attributes were flagged three times, while non-bold attributes were flagged twice.

- **Roadway and Lane Departure Crashes**
- **Drug and Alcohol Impairment**
- **Speeding**
- **Nighttime Crashes**
- **Aging Drivers (65+)**
- Younger Drivers (15-25)
- Motorcyclists

There is no requirement for emphasis areas to be derived solely from the crash data, and final selection of emphasis areas should reflect the priorities of County staff, the Safety Working Group, and the community. The selected emphasis areas will provide a guiding framework for the TSAP Update and, ultimately, the County's future investment in safety strategies and projects. It is recommended that between 4 and 6 emphasis areas be selected. Too many emphasis areas can

dilute the value of the plan as too many strategies and actions can be infeasible to implement. However, too few emphasis areas can result in missed opportunities to reduce fatal and serious injury crash risks. The County may also elect to combine related emphasis areas into one (e.g., a "Risky Behaviors" emphasis area may include impairment, speeding, and distraction).

Comparison with the 2019 Deschutes County TSAP

Since the completion of the 2019 TSAP, the County has implemented numerous systemic and site-specific projects to improve regional transportation safety. The systemic projects have primarily included treatments aimed at reducing roadway and lane departure crashes, such as horizontal curve warning upgrades, rumble strips, delineators and pavement markers, and speed feedback signs. Since the available crash data summarized in this memo only encompasses years 2018-2022, the data is insufficient to accurately assess the safety benefit associated with these recently-performed improvements, either individually or collectively. However, Table 17 provides an anecdotal comparison specifically related to the number and proportion of roadway and lane departure crashes, which should not be used to draw conclusions, and any interpretation should carefully consider the following:

- The 2019 TSAP data was obtained directly from the Existing Conditions Summary dated May 2019. The 2019 TSAP had a different study area boundary than the current effort, namely the inclusion of reported crashes within the Redmond, Sisters and La Pine city limits. This will likely result in a difference in crash frequency and proportions, even without safety interventions.

- Nearly all of the projects the County has implemented occurred within or after the current 2018-2022 dataset, and many were not in place long enough to have a relevant impact on the data.

- There are also numerous confounding factors at play. Most notable is the national, regional, and local increase in risky behaviors and the resulting increase in high severity crashes after the COVID-19 pandemic.

Table 17. Roadway/Lane Departure Crash Patterns (2019 TSAP vs 2026 TSAP)

Non-State Highway Crashes	2019 TSAP (2012-2016 data)	2026 TSAP (2018-2022 data)
Fatal / Serious Injury Crashes	77	130
Fatal / Serious Injury Road/Lane Departure Crashes[1]	57	86
Percent of Road/Lane Departure Crashes	74.0%	66.2%

[1] Includes fixed-object, non-collision overturning, head-on, and sideswipe collisions

Attachment D – Countywide Intersection EPDO Analysis Results

DESCHUTES COUNTY

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Table D-1. Countywide Intersections with Highest Crash Severity Scores (Top 1% Sites)

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
1	US 20 / Hamby Rd	ODOT	97.8	3	18	9	Roundabout constructed in 2022.
2	SW Hemholtz Way / OR 126	ODOT	91.8	3	15	9	-
3	US 20 / Old Bend Redmond Hwy	ODOT	84.8	3	12	4	Roundabout constructed in 2023.
4	US 97 / Vandevert Rd	ODOT	81.4	3	10	7	Divided highway with merge lanes constructed in 2022.
5	US 20 / OB Riley Rd / Cook Ave	ODOT	73.0	2	16	5	Roundabout constructed in 2023.
6	Powell Butte Hwy / NE Butler Market Rd	County	71.0	3	5	5	Roundabout constructed in 2024.
7	US 97 / Jackpine Lp	ODOT	62.0	3	1	0	-
8	State Recreation Rd / US 97	ODOT	56.6	2	8	3	-
9	Huntington Road / State Recreation Rd	County	52.6	2	6	3	-
10	NW Lower Bridge Way / NW 31st St	County	50.6	2	5	3	Improvement in progress.

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
11	US 20 / Pinehurst Rd	ODOT	50.4	2	5	2	-
12	NE Oneil Way / US 97	ODOT	49.6	2	4	8	-
13	Bear Creek Rd / Ward Rd	County	49.0	2	4	5	-
14	Alfalfa Market Rd / Elk Ln	County	44.4	2	2	2	-
15	SW 61st St / US 97	ODOT	44.4	1	12	2	-
16	NE 33rd St / NE Smith Rock Way	County	44.2	2	2	1	-
17	NE Smith Rock Way / NE 1st St	County	42.2	2	1	1	-
18	US 20 / Erickson Rd	ODOT	38.4	1	9	2	-
19	NW Lower Bridge Way / US 97	ODOT	35.2	1	7	6	Interchange under construction.
20	Deschutes Market Rd / Hamehook Rd	County	34.4	1	7	2	Roundabout constructed in 2024.
21	US 97 / Bowery Ln	ODOT	30.6	1	5	3	-
22	Cloverdale Rd / OR 126	ODOT	30.4	1	5	2	-

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
23	US 97 / OR 31	ODOT	30.4	1	5	2	-
24	SW Quarry Ave / US 97	ODOT	30.2	1	5	1	-
25	S Century Dr / Spring River Rd	County	28.6	1	4	3	Improvement is planned.
26	US 20 / Powell Butte Hwy	ODOT	28.6	1	4	3	-
27	NW Lower Bridge Way / NW 43rd St	County	28.4	1	4	2	Improvement is planned.
28	OR 126 / SW 67th St	ODOT	27.4	1	3	7	-
29	S Century Dr / Vandevert Rd	County	27.0	1	3	5	Improvement is planned.
30	OR 126 / Goodrich Rd	ODOT	26.4	1	3	2	-
31	Fryrear Rd / US 20	ODOT	26.2	1	3	1	-
32	Holmes Rd / OR 126	ODOT	26.0	1	3	0	-
33	NW Canal Blvd / NE Oneil Way	County	26.0	1	3	0	-
34	C Ave / US 97	ODOT	26.0	1	3	0	-
35	US 20 / 5th St	ODOT	25.2	1	2	6	-

Rank	Intersection	Jurisdiction	Crash Severity Score	Total Crashes			Intersection Improvement Status
				Fatal / Serious Injury	Major / Minor Injury	PDO	
36	NW 43rd St / NW Ice Ave	County	24.6	1	2	3	-
37	Gist Rd / US 20	ODOT	24.6	1	2	3	-
38	Cottonwood Rd / S Imnaha Rd	County	24.4	1	2	2	-
39	US 20 / Peterson Ridge Rd	ODOT	24.2	1	2	1	-
40	NW Oasis Dr / OR 126	ODOT	24.2	1	2	1	-

Attachment E – Countywide Segment EPDO Analysis Results

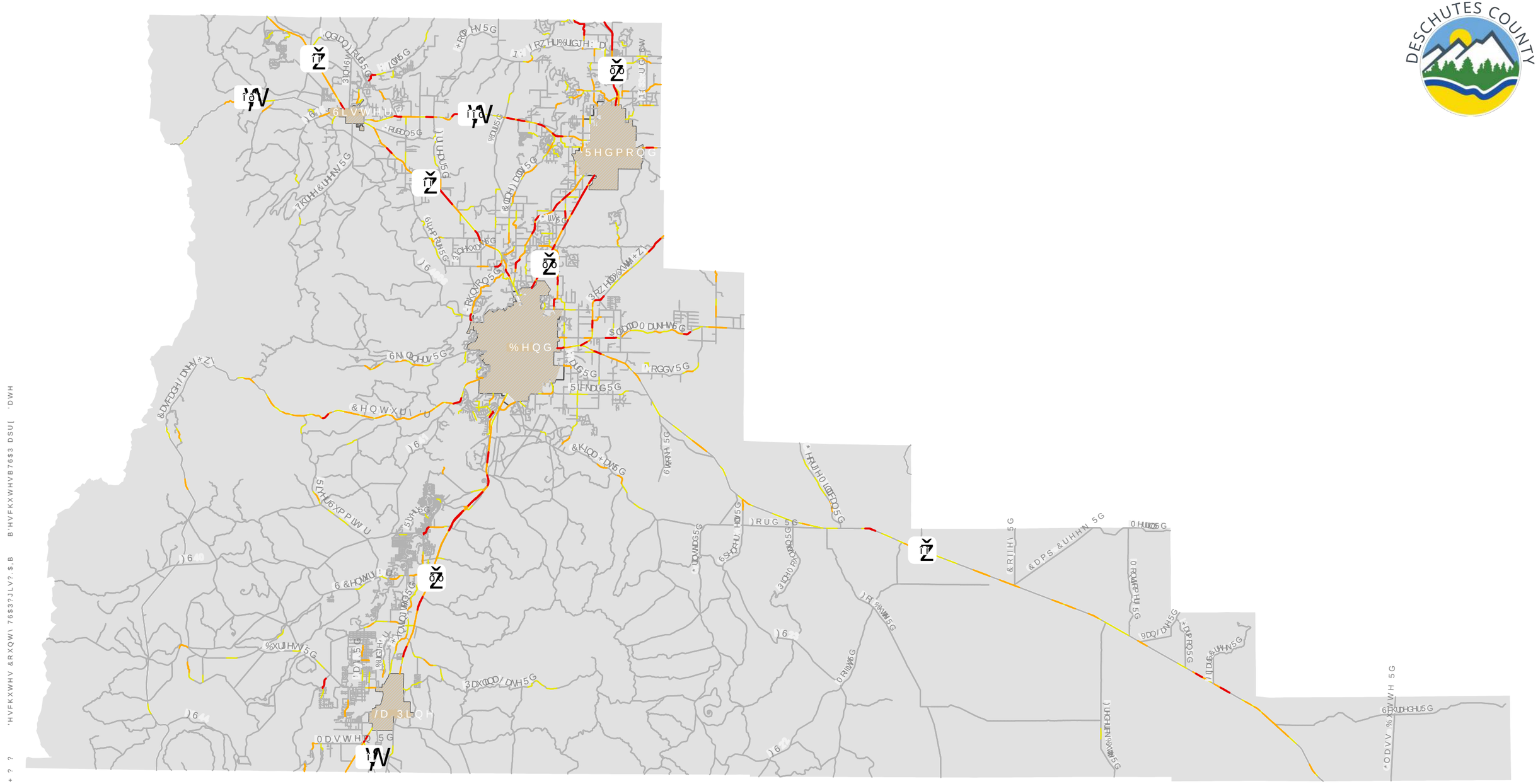

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Table E-1. Countywide Segments with Highest Crash Severity Scores (Top 1% Sites)

Rank	Roadway	Extents	Length (Miles)	Jurisdiction	Crash Severity Score	Total Crashes		
						Fatal/ Serious Injury	Major/ Minor Injury	PDO
1	US 97	MP117.52 to MP 118.28	0.76	ODOT	108.4 - 90.8	5	6	4
2	US 97	MP 125.33 to MP 127.58	2.25	ODOT	76.2 - 24.4	5	19	10
3	US 97	MP 158.46 to MP 159.44	0.98	ODOT	69.4 - 41.2	4	4	11
4	US 97	MP 112.82 to MP 115.02	2.20	ODOT	66.2 - 22.4	6	9	7
5	Old Bend Redmond Hwy	MP 0.99 to MP 1.75	0.76	County	62.6	3	1	3
6	US 97	MP 132.07 to MP 132.83	0.76	ODOT	50.8 - 47.2	2	5	7
7	SW Canal Blvd	MP 2.80 to MP 4.49	1.69	County	50.2 - 30.2	2	5	1
8	US 97 NB	MP 146.67 to 147.43	0.76	ODOT	49.2 - 47.0	2	4	6
9	Wilt Rd	MP 0.0 to MP 0.75	0.75	County	48.0 - 24.0	2	5	0
10	US 97	MP 128.07 to MP 128.83	0.76	ODOT	47.0 - 44.6	2	5	8
11	US 97 NB	MP 151.83 to MP 152.56	0.73	ODOT	47.0 - 42.4	2	4	5
12	US 97	MP 124.40 to MP 125.09	0.69	ODOT	45.8 - 44.4	2	4	9
13	US 20	MP 59.20 to MP 59.96	0.76	ODOT	44.2	4	0	1
14	OR 126	MP 2.57 to MP 3.08	0.51	ODOT	42.6	2	1	3
15	US 20	MP 5.8 to MP 6.30	0.50	ODOT	42.6	2	1	3

Rank	Roadway	Extents	Length (Miles)	Jurisdiction	Crash Severity Score	Total Crashes		
						Fatal/ Serious Injury	Major/ Minor Injury	PDO
16	Navajo Rd	Cinder Butte Rd to Hopi Rd	0.57	County	42.4	2	1	2
17	US 20	MP 31.43 to MP 32.19	0.76	ODOT	42.4 - 42.2	2	1	2
18	Powell Butte Hwy	MP 0.75 to MP 1.25	0.50	County	40.0	2	0	0
19	NW 43rd St	MP 0.99 to MP 1.82	0.83	County	35.6 - 29.2	1	8	9
20	US 97	MP 133.07 to MP 133.57	0.50	ODOT	31.8	1	5	9
21	US 97 SB	MP 148.32 to 149.08	0.76	ODOT	30.8 - 26.6	1	4	5
22	US 97	MP 118.52 to MP 119.03	0.51	ODOT	30.2	1	5	1
23	OR 126	MP 107.40 to MP 108.15	0.75	ODOT	30.2 - 30.0	1	7	1
24	US 20	MP 95.21 to MP 96.46	1.25	ODOT	30.2 - 24.2	2	7	3
25	US 97 NB	MP 130.07 to MP 130.60	0.53	ODOT	28.4	1	4	2
26	US 97 SB	MP 150.33 to MP 151.08	0.75	ODOT	28.4 - 24.6	1	4	3
27	US 97	MP 116.52 to MP 117.02	0.50	ODOT	28.2	1	4	1
28	OR 126	MP 104.64 to MP 105.14	0.50	ODOT	26.8	1	3	4
29	US 20	MP 7.68 to MP 9.20	1.52	ODOT	26.8 - 23.0	2	5	11
30	NW Chinook Dr	MP 0.0 to MP 0.75	0.75	County	26.6 - 26.2	1	3	3
31	US 97 SB	MP 151.58 to MP 152.83	1.25	ODOT	26.6 - 22.4	2	5	5

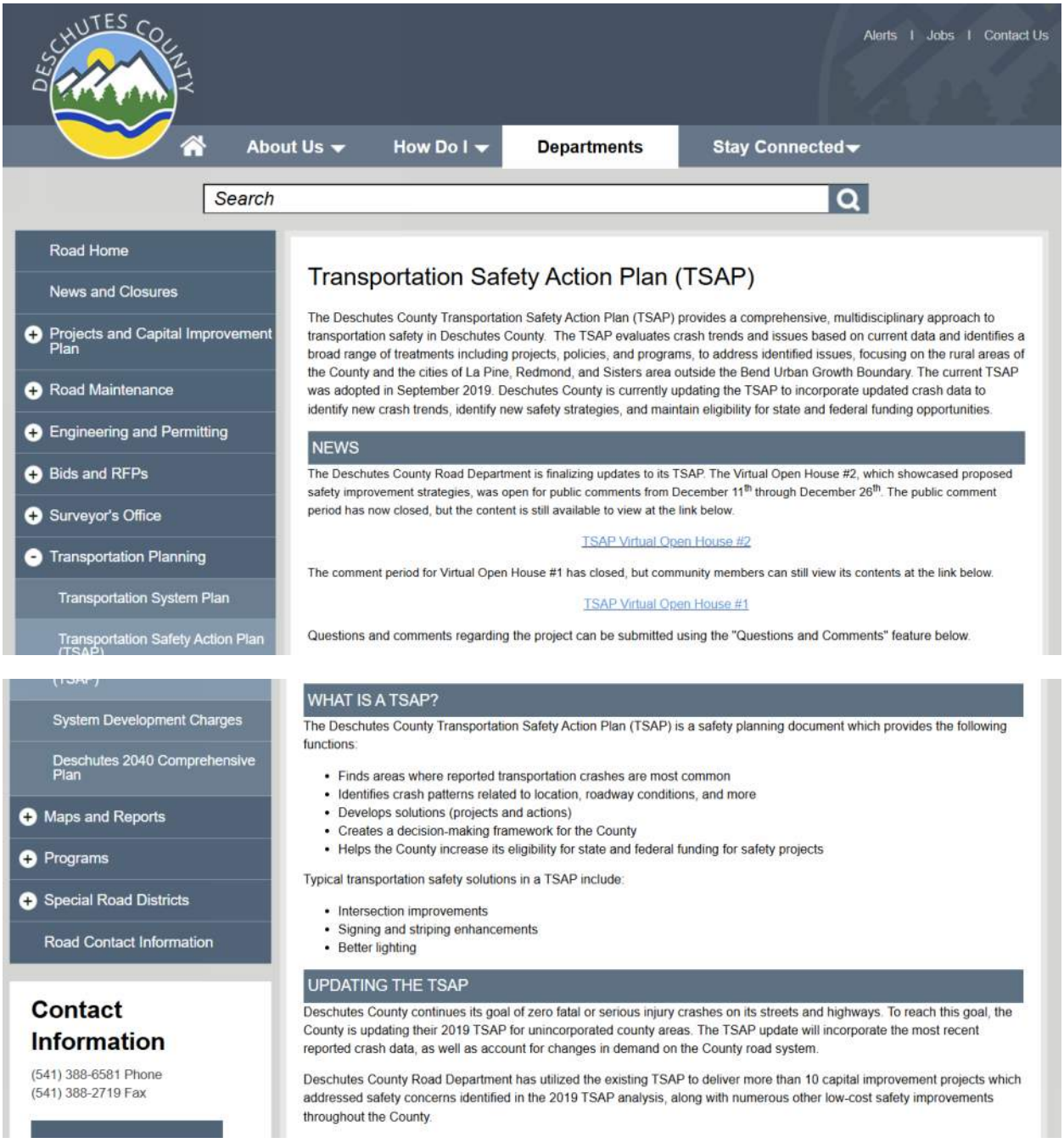
Rank	Roadway	Extents	Length (Miles)	Jurisdiction	Crash Severity Score	Total Crashes		
						Fatal/ Serious Injury	Major/ Minor Injury	PDO
32	US 20	MP 99.21 to MP 99.74	0.53	ODOT	26.4	1	3	2
33	Powell Butte Hwy	MP 2.75 to MP 3.51	0.76	County	26.4 - 24.4	1	3	3
34	SW Canal Blvd	MP 3.49 to MP 4.25	0.76	County	26.4 - 24.0	1	3	2
35	US 20	MP 3.05 to MP 3.53	0.48	ODOT	26.2	1	3	1
36	US 97 NB	MP 152.83 to MP 153.35	0.52	ODOT	26.2	1	3	1
37	OR 126	MP 99.91 to MP 100.68	0.77	ODOT	26.2 - 23.0	1	3	5
38	US 97 NB	MP149.67 to MP 150.44	0.77	ODOT	26.0 - 24.0	1	3	0
39	Powell Butte Hwy	MP 8.00 to MP 9.26	1.26	County	26.0 - 24.0	2	6	0
40	US 20	MP 15.48 to MP 15.98	0.50	ODOT	25.0	1	2	5
41	US 20	MP 11.68 to MP 12.44	0.76	ODOT	24.6 - 24.4	1	2	3
42	US 97 SB	MP 131.06 to MP 131.82	0.76	ODOT	24.6 - 22.6	1	2	3
43	SW Century Dr	MP 16.87 to MP 17.37	0.50	ODOT	24.4	1	2	2
44	Old Bend Redmond Hwy	MP 1.18 to MP 1.93	0.75	County	24.4 - 24.0	1	3	2
45	US 20	MP 2.93 to MP 3.43	0.50	ODOT	24.2	1	2	1
46	Old Bend Redmond Hwy	MP 1.99 to MP 2.50	0.51	County	24.2	1	2	1
47	Alfalfa Market Rd	MP 1.00 to MP 1.75	0.75	County	24.2 - 24.0	1	2	1

Rank	Roadway	Extents	Length (Miles)	Jurisdiction	Crash Severity Score	Total Crashes		
						Fatal/ Serious Injury	Major/ Minor Injury	PDO
48	Bailey Rd	MP 0.00 to MP 0.50	0.50	County	24.0	1	2	0
49	Deschutes Market Rd	MP 0.74 to MP 1.25	0.51	County	24.0	1	2	0
50	Ponderosa Way	2,200 feet SW of Burgess Rd to 250 feet south of White Pine Way	0.76	County	24.0	1	2	0
51	US 20	MP 57.18 to MP 57.70	0.52	ODOT	24.0	1	2	0
52	OR 126	MP 95.64 to MP 96.16	0.52	ODOT	23.2	1	1	6
53	US 97	MP 169.16 to MP 169.65	0.49	ODOT	22.6	1	1	3
54	SW Century Dr	MP 6.61 to MP 7.36	0.75	ODOT	22.6 - 22.4	1	1	3
55	OR 126	MP 97.89 to MP 98.40	0.51	ODOT	22.4	1	1	2
56	OR 126	MP 103.89 to MP 104.40	0.51	ODOT	22.4	1	1	2
57	OR 126	MP 106.12 to MP 106.63	0.51	ODOT	22.4	1	1	2
58	61st St	MP 0.62 to MP 1.13	0.51	County	22.4	1	1	2
59	Deschutes Market Rd	MP 2.46 to MP 2.97	0.51	County	22.4	1	1	2
60	Shevlin Park Rd	MP 0.07 to MP 0.44	0.37	County	22.4	1	1	2
61	Alfalfa Market Rd	MP 7.00 to MP 7.50	0.50	County	22.4	1	1	2
62	Powell Butter Hwy	MP 0.0 to MP 0.48	0.48	County	22.4	1	1	2

Rank	Roadway	Extents	Length (Miles)	Jurisdiction	Crash Severity Score	Total Crashes		
						Fatal/ Serious Injury	Major/ Minor Injury	PDO
63	South Century Drive	MP 18.22 to MP 18.92	0.70	County	22.4	1	1	2
64	US 97	MP 162.20 to MP 162.95	0.75	ODOT	22.4	1	1	2

APPENDIX B–COMMUNITY ENGAGEMENT MATERIALS

Project Website



TSAP UPDATE STUDY AREA

The study area for the Deschutes County TSAP Update will focus on all public roads within the county and outside of all incorporated city boundaries.

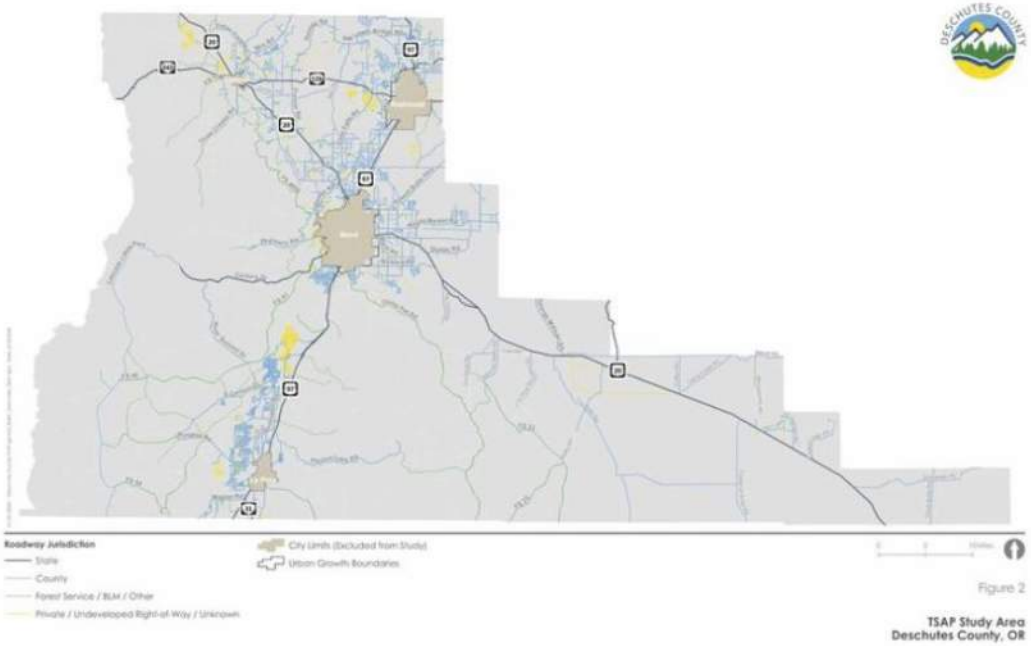


Figure 2

TSAP Study Area
Deschutes County, OR

WHAT WILL THE TSAP ACCOMPLISH?

This project will:

- Identify goals, policies, and strategies to facilitate a safer multimodal transportation network in rural Deschutes County.
- Use crash data, school safety audits, and community input to identify high-risk areas and guide future improvements.
- Increase safety for all roadway users traveling to their destinations, including the most vulnerable (e.g., pedestrians, bicyclists), with engineering, education, emergency response, and enforcement strategies.
- Incorporate equity to ensure safety strategies benefit everyone, especially historically underserved communities.

ESTIMATED COST AND SCHEDULE

The United States Department of Transportation (USDOT) awarded the County a $144,000 Safe Streets and Roads for All (SS4A) Grant in early 2024 to update its TSAP. There may be other grants that the County can pursue in the future to fund the implementation of recommendations in the TSAP. The estimated total project cost is $187,000.

The TSAP is currently being finalized. Final adoption is anticipated in February 2026.

PUBLIC INVOLVEMENT

Perspectives and input from members of the public are an important element of updating this plan. The County invites community members to share their thoughts on how rural transportation safety can be improved in Deschutes County. The Engagement Strategy for the TSAP Update is provided below under “Supporting Documents”.

Two Virtual Open Houses are planned for Spring and Fall 2025. Additional details on each event will be provided here in advance – be sure to check back periodically for updates.

PROJECT TEAM

Project Management Team (PMT)

- Cody Smith, County Engineer/Assistant Road Department Director
- Blaine Wruck, Senior Transportation Engineer
- Chris Doty, Road Department Director

Consultant Team

- Matt Kittelson, PE, Consultant Project Manager, Kittelson & Associates, Inc.
- Miranda Barrus, PE, Consultant Deputy Project Manager, Kittelson & Associates, Inc.
- Joel McCarroll, PE, Consultant Project Principal, DKS Associates

COMMENTS AND QUESTIONS

Your Comments and Questions *

Name *

Email Address

Phone Number

Submit

Supporting Documents

- Tech Memo #1, Existing Conditions - TSAP Update (12 MB)
- Engagement Strategy - TSAP Update (3 MB)
- 2019 Transportation Safety Action Plan (67 MB)
- Appendix 1, 2019 TSAP (719 KB)
- Appendix 2, 2019 TSAP (4 MB)
- Appendix 3, 2019 TSAP (6 MB)
- Appendix 4, 2019 TSAP (243 KB)
- tsap-update-study-area-image-2025.jpg (124 KB)

Phase 1 Community Engagement

ADVERTISEMENTS

Deschutes County · Follow
May 27, 2025 ·

Join the conversation for safer roads in Deschutes County!

The County is updating its 2019 Transportation Safety Action Plan to help eliminate fatal and serious injury crashes from the County road network. We want YOUR input to help determine County roads that need the most help.

Participate in our virtual open house at the website below to voice your thoughts on how you think roads could be safer in unincorporated Deschutes County! Please provide your input by Friday, May 30.

Whether you walk, roll, bike or drive, we want you to reach your destination safely.

https://www.deschutescounty.gov/.../transportation-safety...

County Road Department seeks public input on Transportation Safety Action Plan

The Deschutes County Road Department is actively seeking community input to enhance transportation safety on rural county roadways. As the department works to update its 2019 Transportation Safety Action Plan (TSAP), it is hosting a virtual open house where community members can provide their feedback and insights.

Deschutes County has a goal of zero fatal or serious injury crashes on county roadways. The TSAP is a planning document that helps the Road Department achieve this goal by identifying safety issues and opportunities for location-specific and systemic safety improvements to the county road system. The TSAP update focuses on county roads located in the unincorporated, rural areas outside of the cities of Bend, LaPine, Redmond, and Sisters.

Pedestrians, cyclists and drivers are all encouraged to participate in the virtual open house and provide their feedback. To participate in the virtual open house and share your feedback, please visit the TSAP website beginning Tuesday, May 27 through Wednesday, June 9.

###

Media Contact:

Cody Smith, County Engineer

(541) 388-6581

News Release Issued: May 27, 2025

Deschutes County seeks community feedback to update road safety plan

Central Oregon Daily News Staff
May 28, 2025

Canva

BEND, Ore. -- The Deschutes County Road Department is holding a virtual open house, asking the public for its input to improve safety on rural county roads. The open house is available on the Transportation Safety Action Plan website through June 9. The survey can be found at this link.

Here is the full announcement from Deschutes County:

The Deschutes County Road Department is actively seeking community input to enhance transportation safety on rural county roadways. As the department works to update its 2019 Transportation Safety Action Plan (TSAP), it is hosting a virtual open house where community members can provide their feedback and insights.

Transportation Safety Action Plan (TSAP)

The Deschutes County Transportation Safety Action Plan (TSAP) provides a comprehensive, multidisciplinary approach to transportation safety in Deschutes County. The TSAP evaluates crash trends and issues based on current data and identifies a broad range of treatments including projects, policies, and programs, to address identified issues, focusing on the rural areas of the County and the cities of La Pine, Redmond, and Sisters area outside the Bend Urban Growth Boundary. The current TSAP was adopted in September 2019. Deschutes County is currently updating the TSAP to incorporate updated crash data to identify new crash trends, identify new safety strategies, and maintain eligibility for state and federal funding opportunities.

NEWS

The Deschutes County Road Department is finalizing updates to its TSAP. The Virtual Open House #2, which showcased proposed safety improvement strategies, was open for public comments from December 11th through December 26th. The public comment period has now closed, but the content is still available to view at the link below.

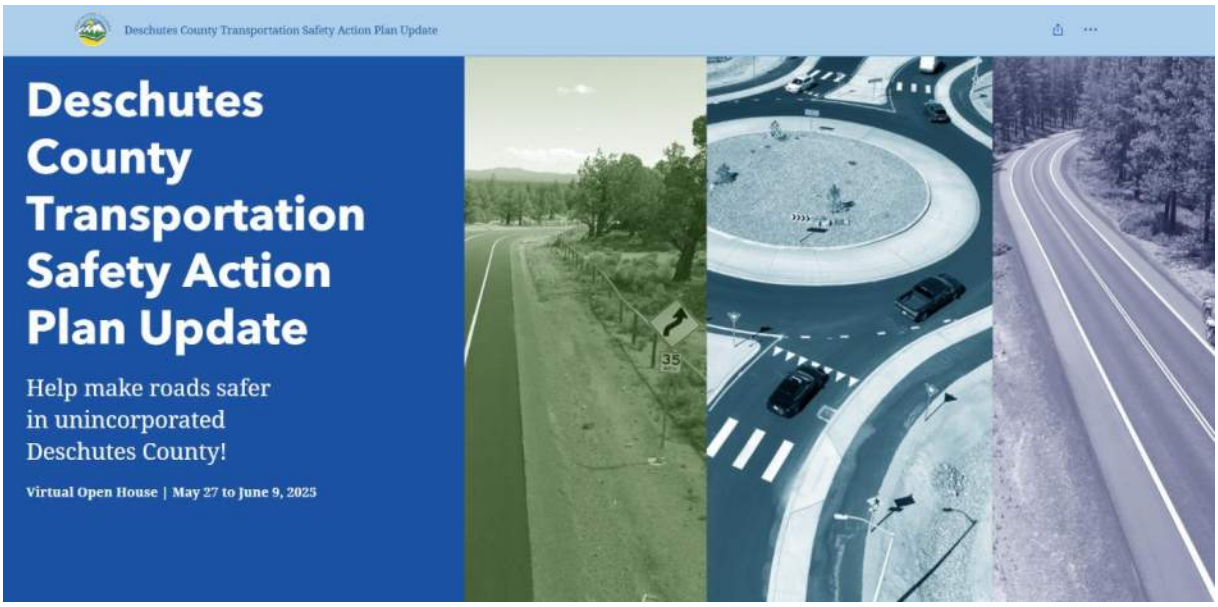
TSAP Virtual Open House #2

The comment period for Virtual Open House #1 has closed, but community members can still view its contents at the link below.

TSAP Virtual Open House #1

Questions and comments regarding the project can be submitted using the "Questions and Comments" feature below.

VIRTUAL OPEN HOUSE



PROJECT BACKGROUND WHY IS THE UPDATE NEEDED? HOW YOU CAN HELP? KEY CRASH PATTERNS SURVEY

PROJECT BACKGROUND

Welcome to the first virtual open house for the Deschutes County TSAP Update!

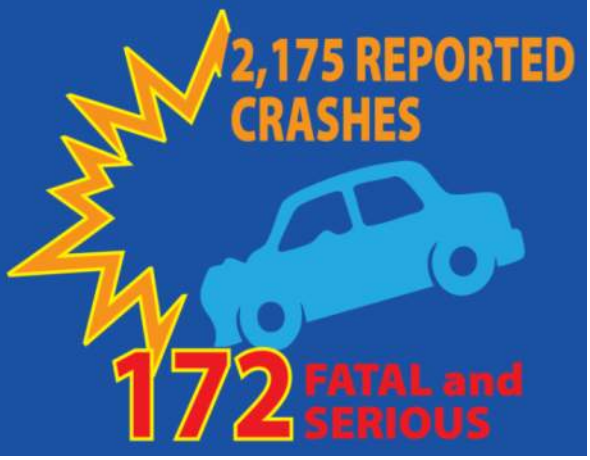
In this open house you can:

- *Learn about the objectives of the TSAP Update;*
- *Share your valuable input on how unincorporated Deschutes County can become a safer place for driving, walking, biking, and rolling; and,*
- *Discover the County's current safety situation by exploring the latest crash data.*

PROJECT BACKGROUND WHY IS THE UPDATE NEEDED? HOW YOU CAN HELP? KEY CRASH PATTERNS SURVEY

WHY IS THE UPDATE NEEDED?

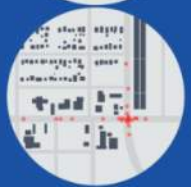
Between 2018 and 2022, ***172 crashes*** *were reported on County roads in unincorporated Deschutes County that* ***resulted in fatal or serious injuries*** *(representing 8% of all 2,175 reported crashes).* The primary goal of the Deschutes County TSAP is to identify actions that can eliminate these serious crashes from the County's transportation system.



In order to identify such actions, the TSAP Update will evaluate the following:

Contributing factors to serious crashes (e.g., driver age, driver behavior, physical characteristics of streets / intersections)

Types of crashes resulting in fatal or serious injuries.



Locations where fatal and serious injury crashes are concentrating.

PROJECT BACKGROUND WHY IS THE UPDATE NEEDED? HOW YOU CAN HELP? KEY CRASH PATTERNS SURVEY

Recommended physical changes to streets and intersections and recommended action items for the County to carry out with its various partners (e.g., schools, health departments, emergency response teams).

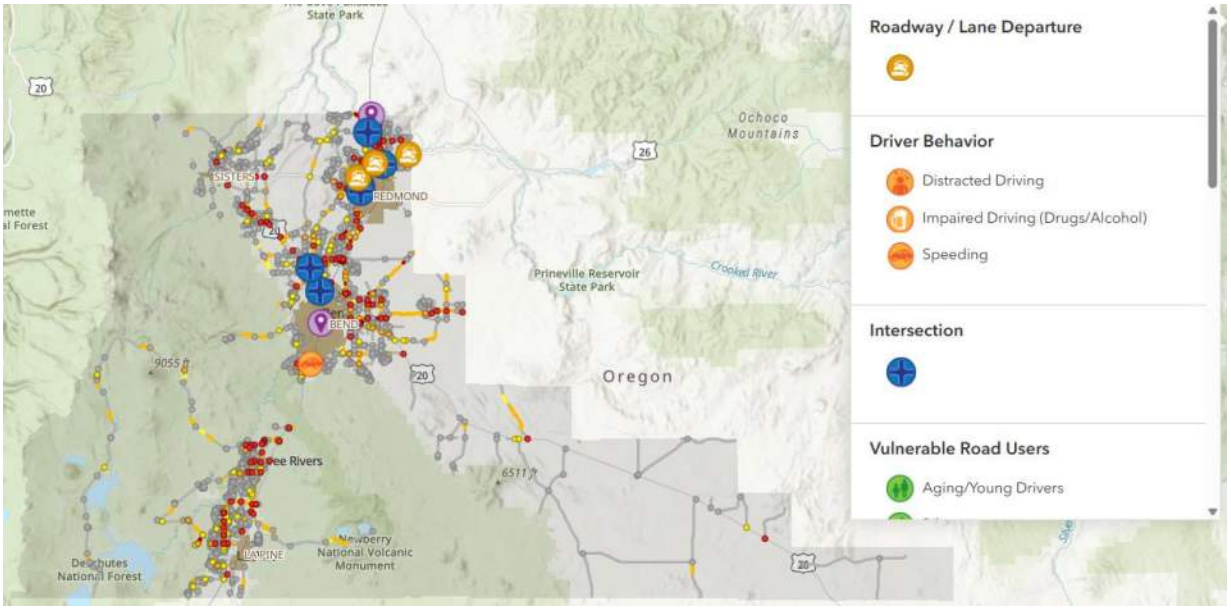
Funding sources to support implementing the recommendations.

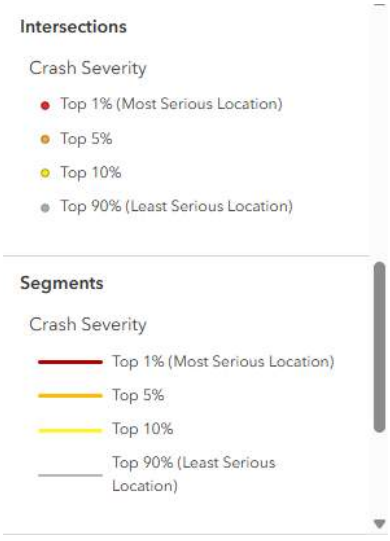
The TSAP is an important roadmap for Deschutes County that enables them to prioritize safety improvements and justify applying for state and federal funding to implement those improvements.

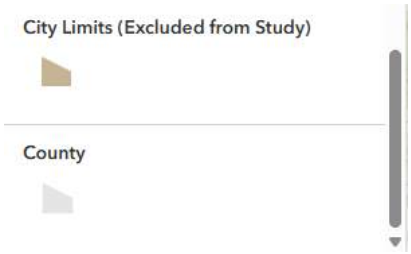
PROJECT BACKGROUND | WHY IS THE UPDATE NEEDED? | HOW YOU CAN HELP? | KEY CRASH PATTERNS | SURVEY

HOW YOU CAN HELP?

We would like to hear about your experiences related to transportation safety in unincorporated Deschutes County! You can help us by identifying locations on County roads in the map below where you don't feel safe or observe behaviors that should be addressed. The map illustrates where crashes have concentrated on County roads. Red dots and lines show the most serious locations where either many crashes have been reported or higher severity crashes have happened.



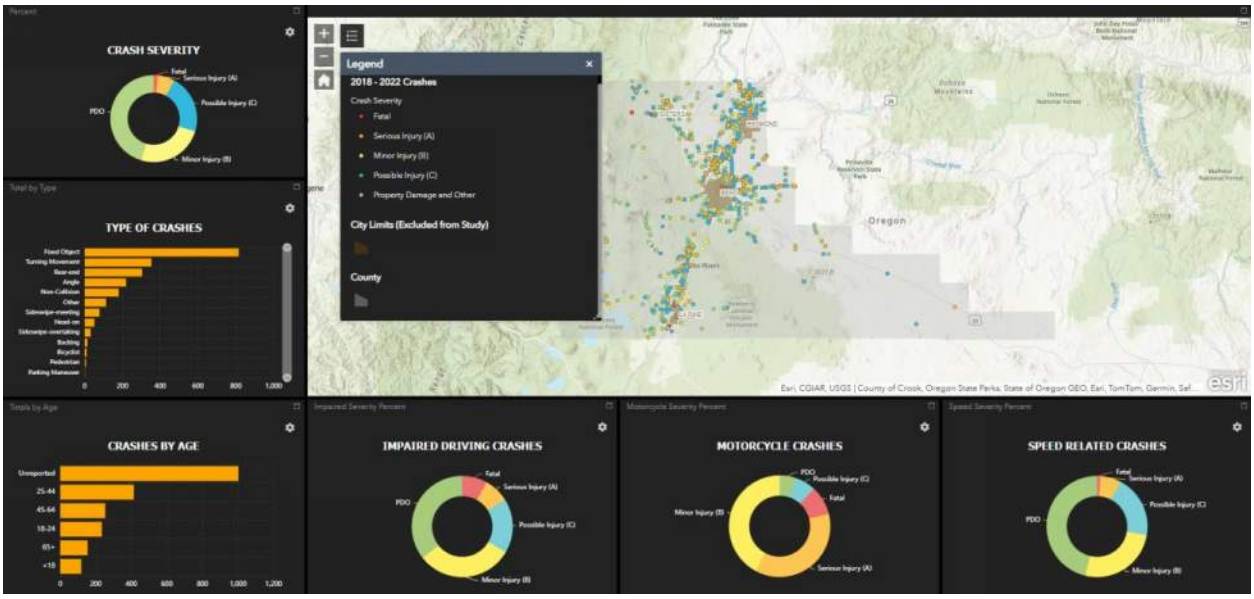




PROJECT BACKGROUND | WHY IS THE UPDATE NEEDED? | HOW YOU CAN HELP? | KEY CRASH PATTERNS | SURVEY

KEY CRASH PATTERNS

Use the interactive map and charts below to explore the most recent 5 years of crash data reported on County roads to understand current safety issues.



" Thank you for participating in the first Virtual Open House for the Deschutes County TSAP Update! Your input is valuable to this planning process. Later this year, the project team will run a second and final Virtual Open House to present draft recommendations. Be sure to check the Project Website periodically! "

Deschutes County TSAP Update Survey

Your feedback is an important part of the Deschutes County TSAP Update so that the County can understand where to prioritize safety improvements. The following questions will help County staff ensure that people throughout rural Deschutes County and from different backgrounds are getting the opportunity to participate in the TSAP Update. Your responses should only take a couple minutes to provide.

1. Select how often you do the following to get around rural Deschutes County.

	Frequently (multiple times per week)	Occasionally (once per week or less)	Never
Drive alone in personal car, truck, or van	◯	◯	◯
Carpool with others (car, truck, or van)	◯	◯	◯
Drive a motorcycle	◯	◯	◯
Take the bus	◯	◯	◯
Ride a bike	◯	◯	◯
Walk	◯	◯	◯
Use wheelchair/mobility aid	◯	◯	◯
Other	◯	◯	◯

2. What is your zipcode?

3. What is your age?

- ◯ 5-14 years old
- ◯ 15-24 years old
- ◯ 25-44 years old
- ◯ 45-64 years old
- ◯ 65+ years old
- ◯ Prefer not to respond

4. Do you have a motor vehicle available for your use?

- ◯ Yes
- ◯ No

5. Please share any other feedback you have on transportation safety in rural Deschutes County.

FEEDBACK

DESCHUTES COUNTY TRANSPORTATION SAFETY ACTION PLAN UPDATE

Community Engagement Phase 1 Results May 27 - June 9, 2025

195 people reached

56 online survey or email responses

13 online map comments

TOP COMMUNITY PRIORITIES FOR SAFETY IMPROVEMENTS
(BASED ON COMMENTS RECEIVED)

Speeding | Active Transportation | Intersections | Roadway/Lane Departures

TRANSPORTATION MODES OF PARTICIPANTS

Mode	Frequently	Occasionally	Never
Drive alone in personal car, truck, or van	73%	27%	0%
Walk	38%	29%	33%
Carpool with others (car, truck, or van)	31%	36%	33%
Ride a bike	22%	34%	44%
Drive a motorcycle	3%	11%	87%
Take the bus	3%	5%	92%
Use wheelchair/mobility aid	3%	3%	94%

COMMON THEMES

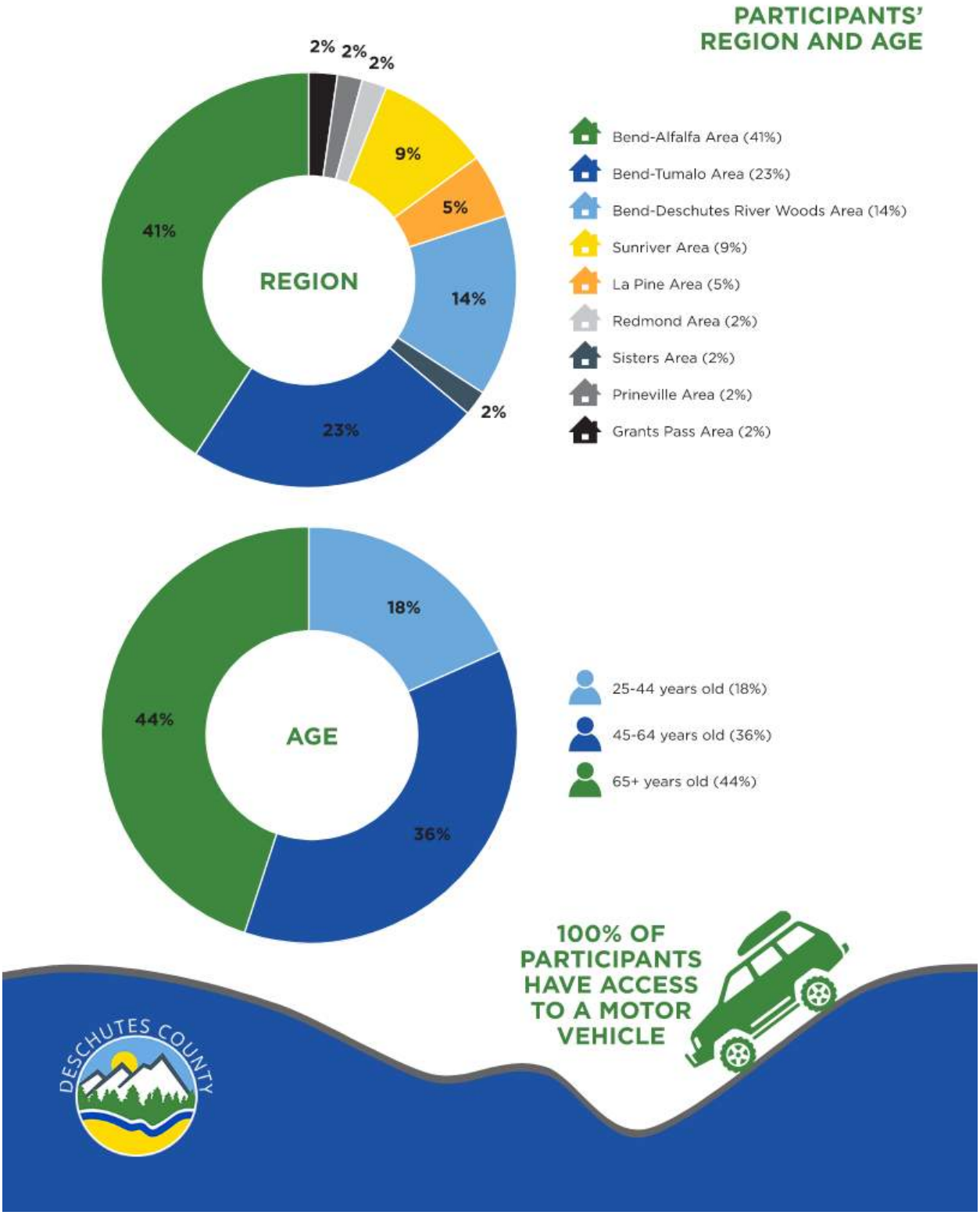
Wildlife Needs (signage, reduced speeds, education, wildlife crossings)

Reduced Posted Speeds (Hamby, Johnson, Dorrance Meadow, Spring River, Dickey)

Intersection Traffic Control (8 specific intersections, some mentioned multiple times)

Hamby Road Concerns (speeding, unmuffled exhaust braking, increased truck and RV traffic, limited active transportation facilities)

More active transportation facilities where appropriate


PARTICIPANTS' REGION AND AGE
2%
2%
2%
9%
5%
41%
REGION
14%
23%
2%
Bend-Alfalfa Area (41%)
Bend-Tumalo Area (23%)
Bend-Deschutes River Woods Area (14%)
Sunriver Area (9%)
La Pine Area (5%)
Redmond Area (2%)
Sisters Area (2%)
Prineville Area (2%)
Grants Pass Area (2%)
18%
44%
AGE
36%
25-44 years old (18%)
45-64 years old (36%)
65+ years old (44%)
100% OF PARTICIPANTS HAVE ACCESS TO A MOTOR VEHICLE
DESCHUTES COUNTY

- Lazy River Dr. (directly south of Thousand Trails near Sunriver) was completely rebuilt about 25 years ago with funds provided by the residents living there and Deschutes County agreed to maintain said collector street thereafter. Because of extensive cracking, insufficient sealing, subsequent freezing and heaving with continued heavy construction traffic, you are on the verge of losing this road structure. Please have your consultants come look at this road (I am more than happy to drive them down here). Please don't perform more chip sealing until you consider milling and overlaying with new asphalt or complete removal of the problem areas.
- How about a traffic light on Hwy 26 & Helmholtz on the west side of Redmond
- At a recent Deschutes County BPAC meeting, a member of the public gave public comment that the new pedestrian and bicycle underpass of Hwy 10 in Tumalo was underused and that most cyclists were crossing HWY 20 at the roundabout, a fairly dangerous place to cross. In an informal survey, he discovered that most cyclists did not know the underpass existed. He suggested that wayfinding signage on Cook Ave, Bailey Rd, and OB Riley Rd would make cyclists aware of the underpass and encourage them to use it.
- The ODOT rep responded that this is part of a state scenic bikeway but that the bikeway only is recognized as going in one direction and they've already installed the signage they are obligated to provide.
- Please include signage to encourage cyclists to use the underpass as a project in the TSAP. This will greatly improve cycling safety in Tumalo.
- People commonly ride bikes and walk along county roads, especially on proposed county bikeways. Many of these roads do not have a shoulder wide enough to allow people to walk or bike safely out of the traffic lane. Please add shoulders to these roads as maintenance is scheduled. Unfortunately, this was not done on some roads used regularly by cyclists in the last couple of years. This needs more attention in the future.
- The number one thing to do to reduce traffic fatalities is to lower the speed limit on Hwy 97. And enforce it.
- Thank you for the complete data-based report. A couple of comments: 1. I was surprised that the review of data ended in 2016 - that is nine years ago, and Deschutes County has experienced significant growth since then. Shouldn't more recent data be analyzed? Helmholtz and Hwy 126 recently had a school bus crash with significant injuries, for example. 2. Very happy to see a wide variety of solutions based on the particular issues of a site. We have a new flashing stop sign at the intersection of Wickiup Ave and Helmholtz - very noticeable! 3. As a long-time bicyclist, I have a concern about Highway 126 at Cline Falls where the bridge is very narrow. Back in the day, it was possible to time one's ride across the bridge so that no cars were close, but there is so

much traffic now that one has to "take the lane" at times - and it feels scary. The flashing "bike on bridge" sign would be nice. Thanks again for all the work on this.

- My comments mainly concern Dickey Rd from the intersection at Butler Market - extending to the intersection of Torkelson/Bear Creek.
- Dickey Rd was repaved in the past 3 years and seems that the project was not completed or the scope of the project was incomplete to start with. There are no speed limit signs from the intersection of Dickey Rd and Butler Mkt Rd to the intersection of Torkelson and Bear Creek Rd. Every surrounding road is posted at 35 mph (Powell Butte Hwy) or 45 mph Hamby/Hamehock and Neff Road (going to 40 past Big Sky Park), as well as Butler Market from Powell Butte Hwy is 50mph (a larger road with wider, paved shoulders). In the past year, Dickey Rd has been used as a detour for construction with large equip and vehicles traveling a road that has limited shoulder space at or in many cases in excess of 55mph. One 40mph sign during construction on Powell Butte Hwy/Butler Mkt Rd Roundabout was posted but not enforced.
- The project to repave this area also failed to include reasonable paved shoulders to accommodate bicyclists and pedestrians. The gravel shoulders are not solid enough to provide a safe option for bicyclists or pedestrians. In some cases, the shoulder drops off quickly into a ditch. This is a road that children walk to the bus stop and is NOT a safe route to school.
- There are many driveways that enter on to this stretch from Dickey/Butler Mkt to Torkelson/Bear Creek. There are more than 10 drive ways from Dickey/Butler Mkt to the corner of Dickey/Erickson Rd alone.
- The section from Dickey/Butler Mkt Rd to Dickey/Nelson Rd is particularly unsafe for bicyclists and pedestrians. It is an uphill/downhill no passing zone with limited shoulder space for pedestrians and limited visibility for drivers. In the evenings this road is often used by motorcycles and cars as test track for speed.
- Would love to see a couple of things
  - 1. Speed limit (below 55mph) posted and enforced.
  - 2. Improved shoulders to safely accommodate pedestrians and bicyclists - it would be great if this were a bike lane with the extra separation. (double stripping)
  - #2 applies to most roads in the unincorporated county. There are really limited shoulders and no designated bike/walk paths (that I have found) in the county that take you into any of the incorporated areas.
- I hope in repaving Nelson Rd there is paved shoulder included otherwise, this is a missed opportunity.
- Thanks for hosting this opportunity for comment. Please feel free to contact me for further details.

- Hamby Rd.(In front of Buckingham Elementary) is difficult to cross on foot at times due to increase in traffic and speeding cars and large front loader trucks. 20 mph in front of Buckingham Elementary is only in the am and pm during school days. All other times the speed is excessive compared to 30 mph at all times on Empire and Butler Mkt. Rd.near Trinity Lutheran, for example. I'm always concerned about a fatal accident waiting to happen as cars exit Big Sky Park onto Hamby Rd. Another area of concern is the crazy intersection of Hamby and Butler Mkt. Rds. There needs to be a round-about there.
- My property is on Hamby road across from the East Fire Station. I frequently hear/see motorcycles, cars and trucks speeding dangerously and never see police monitoring the road except when Buckingham School is in session. Change speed limit and monitor traffic at off hours.
- Hamby between Buckingham Elementary and at least Neff needs a reduced speed limit! 30 mph! Increase traffic, Jake breaks and speeding putting us all at risk!
- In the 36 years I have lived on Quail Ridge Rd (with property adjacent to Hamby Rd) traffic on Hamby Rd has increased dramatically. I would like to see the speed limit reduced to 35 mph (average speed now is probably close to 55mph except when school speed limit is in use), I would like to see bike lanes of appropriate width, and I would LOVE to see unmuffled exhaust brakes on large trucks prohibited.
- I live off Hamby by Buckingham Elementary School. The speed limit seem excessively high compared to other roads where there are schools, sports complexes and a fire station. There is also an inordinate amount of large truck traffic lately. I'm worried about a potential fatal accident on the stretch from just north of Buckingham to Neff Road.
- My concerns mainly pertain to the roadway south of the Hamehook/Hamby intersection through east Hwy. 20; noted as follows:
  - 1. Would suggest improvements to the three way intersections @ Hamehook/Butler Market and Hamby/Butler Market as the two way stop sign configurations are quite ambiguous and prone to confusion/accidents.
  - 2. Since limiting the Buckingham Elementary school zone speed to 20 mph only when lights are flashing, speed has become much more of a problem as it is common for parties to exceed 45 mph. This is especially dangerous given the location and constant ingress/egress from the school, in light of notable pedestrian and bicycle traffic associated with both the school and Big Sky Park. I would ask for consideration in reducing the speed limit from the school to east Highway 20 to 35 mph.

- 3. Based upon the location of the school, park and surrounding residential communities, I think it is high time to designate the area from Buckingham Elementary through the east Hwy. 20 as a ""no unmuffled braking zone"". The constancy of the noise has become quite elevated/undesirable effecting the livability of people who reside, are educated, or recreate in and around this thoroughfare.
- Thanks very much for your kind consideration!
- I am lucky to live in a walkable neighborhood and can walk to many of the locations I frequent easily. However, that's in a city. Much greater distances are required in the county. During the water months I ride my bike, but never in the colder months. I know that by making active transportation easier and safer, more and more people would like and use that option. We will look into e-bikes soon.
- We live just off of Hamby Road and use this for our access everywhere. We have been seeing an increasing amount of heavy truck and recreational vehicle use of Hamby especially, since the state has not provided any clear access from Highway 97 for those going east to get onto the highway 20. It appears the truckers and those with gps are starting to use hamby for-this access. There is a a fire station,school, Parks,and residential areas on Hamby that are directly affected by the recreational vehicle and increasing truck traffic as well as a general increase in car traffic due to the growth. We are becoming increasingly concerned for the safety of everyone using this county Road for a thoroughfare.
- Hamby Road in front of Buckingham is very dangerous. Since the flashing lights for the school zone went in and it changed to 20 MPH only when flashing cars and big trucks are driving 65+ MPH. There are kids crossing at all times of day and with Big Sky sports complex also on weekends. The speed zone by the school needs to be lowered to 35 MPH. This should also be a no compression braking for large trucks. It is just a matter of time until a child gets injured.
- Hamby Road is heavily used and too high of a speed limit with park access, fire dept and school in near proximity
- Concerns: speeding through a school zone (Buckingham) and near a park (Big Sky), large trucks engine braking, no bike lanes. I can't pull out of Quail Ridge Road without cars coming around the blind corner at 50 mph on Hamby Rd.
- Hamby Road needs safety updates. Automobile, truck and large semi trucks have dramatically increased. Please, no loud braking. Thee needs in this area are: reduced speed (currently 45, but many go 60), improved bike lanes for getting to/from school and the park), putting 3 way stops in at the intersections of Butler Market Road and both Hamby and Hamehook. These three way intersections are currently 2 way stops and one direction not stopping (think one vehicle going 50+MPH through the

intersection one way, one stopped, and one trying to make a left hand turn). It makes it confusing, dangerous and can back up traffic if someone is trying to make a left hand turn, but are having difficulty doing so with the traffic. It was fine when this was a less frequently traveled road, but that is no longer the case.

- Hamby on the east side could use some safety updates. There has been a notable increase in all traffic but most notable has been the heavy duty and semi truck traffic. We would like to see a reduction in the 45 mph speed limit, dedicated bike lanes along the entire length, and prohibiting unmuffled exhaust breaking. There are multiple neighborhoods, churches, schools, Big Sky sports complex, and the fire station which access Hamby. This access is getting riskier with a good number of vehicles regularly exceeding the speed limit.
- Lack of sidewalks, adequate street lighting, and signage (deer crossing, lit/flashing alerts to cross streets near hills or curves, hwy 97 ruts need fixed, and dividers down high speed areas of hwy.
- We need enforcement of the speed limit and safe distances for cyclists
- Yes Johnson road is the link to an Oregon scenic bike route and the speed limit is not marked so it is 55. This is extremely fast and dangerous for cyclists on this road. It only seems logical that it should be 45 mph if not slower by some of the homes. Please consider this for everyone's safety let's not wait until someone gets hit and dies to address this issue
- I have lived on Paloma off Hamby Rd since 1986. Since the massive development of Petrosa and adjacent subdivisions and improved access by roundabouts at Hwy 20 and Hamehook/Deschutes Market Rd., Hamby has become a high speed bypass. At the same time, it often has significant congestion to pick up and drop off of students at Buckingham school and the new entrance to Big Sky Park which has frequent athletic events at its many ball field, bicycle track and trails and one of the larger off leash dog parks in the area. At the north end is the J bar J youth facility, which, in addition to generating its own traffic, has frequent athletic events on its ball field and a major horse riding event for two weeks in the summer. If all that weren't enough, it has the major fire station for the east side Of Bend and rural to shoots county.
- A speed limit of 45 miles an hour is significantly too high, especially when giant semi earth hauling trucks frequently exceed it by 5 to 10 miles an hour. The intersection of Paloma and Hamby is a set up for a serious accident to happen in the future. When exiting Paloma, the visibility to the south is blocked by multiple telephone poles and visibility to the north is blocked by a small lava flow (which some idiot keeps building a stone cairn on). There is no left turn lane for southbound traffic to turn onto Paloma. And at least once a month when I am northbound and slowing to make a right turn

onto Paloma someone will cross over the double left line and pass me in the intersection.

- If nothing else, the speed limit on Hamby should be lowered to 35 miles an hour between nephro and Butler market. Lowering the speed limit to 40 mph as was done on Neff Road from Big Sky to Eagle Road would probably not significantly slow the speeding traffic.
- At the intersection of Paloma and Hamby, there is not room to install a roundabout or even a left term lane without running up prohibitive cost. Although all direct Stop sign intersections seem to be an anethma comparable to long COVID to traffic planners, I think in this case, it could be a sensible and financially feasible solution. It would require solar powered flash red boarders on the Hamby stop signs and warning grooves crossways in the road approaching the intersection (this worked well on Riggs Road in crook County), but it would have the advantage of significantly slowing the traffic on what has become a mile long Speedway between Neff and Butler market roads.
- Unfortunately, it took multiple fatalities before the intersections at Hamby Road and Highway 20 and Hamby Road and Neff Road improved. I hope that won't be the case for the rest of Hamby Road.
- More separated bike/ped paths. Excited for Bend to Lava Lands and Lava Lands to La Pine paths. Big need for paths between communities or communities to nearby amenities or attractions. E-bikes are changing how people move about, infrastructure and rules need to keep up with this change.
- Please add bike lanes to Knott Road east of 15th to 27th. This will complete a loop around Bend with bike lanes.
- We love the rural roundabouts, especially the ones that cannot be driven through (with art work and/or built up higher in the center) to keep everyone on the pavement. They are safer 24/7 and require everyone to slow down.
- Dorrance Meadow is the only major road in La Pine that does not have a speed limit. Vehicles and motorcycles constantly drive above 55 mph with one motorcyclist admitting to going 80 mph when he hit a deer and cut it in half recently.
- Dorrance Meadow Rd. needs a speed limit now set to 45 mph or less.
- Walking/riding paths to allow bikes and pedestrians to stay off of the roads are a win…every time.
- STOP BUILDING ROUNDABOUTS. MAKE STRAIGHT ROADS, INSTEAD OF MAKING PEOPLE HAVE MOTION SICKNESS FROM THE WINDING CURVEY ROADS YOU PUT EVERYWHERE.

- STOP MAKING CURB BUMP OUTS. STOP ACCOMMODATING BICYCLE RIDERS AND WALKERS BECAUSE THIS TOWN IS TO BIG AND WE HAVE TOO LONG OF WINTER TO ACCOMMODATE ANYTHING OTHER THAN VEHICLES.
- IT SHOULD NOT TAKE MORE THAN 20 MINUTES TO GET ANYWHERE IN THIS TOWN BUT IT OFTEN TAKES OVER 30 MINUTES. STOP TAKING SO LONG TO FIX BAD ROADS. STOP THE WASTEFULNESS AND GET THE ROAD LAYOUT AND STOPLIGHTS RIGHT THE FIRST BUILD, THIS TOWN HAS BUILT AND ERASED JUST TO REBUILD THINGS LIKE CURB ISLANDS, CHANGING INTERSECTIONS TO ROUNDABOUTS, ETC. IT'S VERY WASTEFUL AND UNNECESSARY!
- Just stop punishing the LOCALS and confusing the tourists, vehicles will never not be needed in Deschutes Co, stop encouraging people to move away from driving because its not going to work. There are so many people that live in Deschutes Co that are not capable of walking or riding a bike so we've had enough of that being the main focus. Safety is not the issue, timely, easy navigation while driving a vehicle is the issue.
- Please fix Empire between Boyd acres & 3rd. It's a terrifying disaster.
- We need more wildlife crossings and more education about driving at dawn and dusk.
- Reduce speed limit on Spring River Rd to 25 all year round.
- Unpaved and not groomed roads are unsafe. Take for example the unpaved portion of Scenic Dr. people using it end up driving of the wrong side to avoid horrible pot holes even around blind curves. Kids walk this road too.
- Expand the bike lanes on major arterials, e.g. Huntington Rd, Spring River, S Century, Burgess, State Recreation Rd, Day Rd. Extend the bike path from Bend to La Pine. Extend the 4 lanes on 97 from Vandevert Rd to Wickiup Junction
- Add more speed markers. People speed down rural roads
- I know of one place that needs attention, it is a big spot sticking up on a main road!
- Widen road to allow for better bike lanes
- The greenwood st..needs to go back the way it was...you guys bottle necked the road for what reason??? We need more road for DRIVING on NOT parking...
- I think the biggest issue is speeding on these rural roads, and unsafe passing--when it's only 55 mph zone, and people are driving 65-70+ mph, that is NOT safe!! And so many people pass illegally & speed, which is very dangerous!
- They need to do more traffic enforcement and have routine patrols out on those roads, esp. bet. Bend & Prineville and Redmond & Prineville. Those are such dangerous roads now, esp. during 'rush hours' (4p-6p).
- I think that's where the money needs to go, and once people start getting tickets (which can pay for the extra patrols), hopefully that will start to slow people down. There have been way too many accidents and fatalities on those 2 roads!

- Thank you so much for asking for our feedback!
- No safety concerns
- When you live outside the towns there is no other option except to drive. People on the rural roads do not follow the speed limits and are generally not good drivers.
- We need more medians all along highways to separate fast moving traffic. Additionally, slowing down traffic could help. Road diets.
- Truck traffic, speeding, and traffic volumes have all increased dramatically on Hamby Road making it often risky to enter from adjacent neighborhoods, schools,and, and parks. Reducing the speed limit to 35 mph between Butler Mkt and Neff Rd would improve the situation.
- You need to widen 97. It cannot handle cross traffic at peak hours, then people pass close to Bend.
- As the County population grows and the state highways become more congested, demand (auto and bicycle) on the county road system increases. Safety on key commuting corridors and key biking corridors should be prioritized.

Phase 2 Community Engagement

ADVERTISEMENTS

Deschutes County's Post

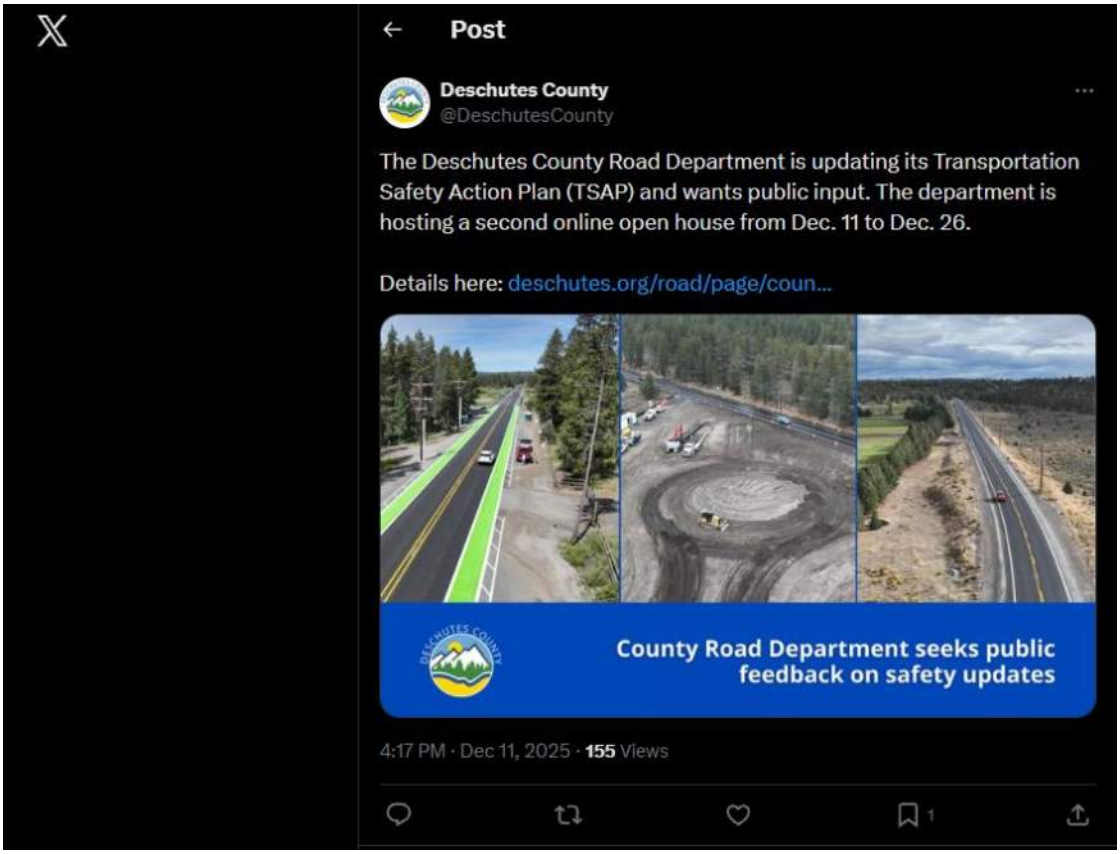
Deschutes County
December 11, 2025 ·

The Deschutes County Road Department is updating its Transportation Safety Action Plan (TSAP) and wants public input. The department is hosting a second online open house from Dec. 11 to Dec. 26, for residents to review and comment on proposed safety improvements to county roads in the unincorporated, rural areas outside Bend, La Pine, Redmond, and Sisters.

Deschutes County has a goal of zero fatal or serious injury crashes on its roadways. The TSAP helps the Road Department meet this goal by identifying safety issues and finding ways to improve specific locations and the overall county road system. Feedback gathered during the first online open house last spring led to the latest updates of the TSAP.

Pedestrians, cyclists and drivers are encouraged to provide feedback on the proposed updates. To participate, please visit the TSAP website here: https://www.deschutescounty.gov/.../transportation-safety...

Public comments will be accepted online from Thursday, Dec. 11 through Friday, Dec. 26.



County Road Department seeks public feedback on safety updates

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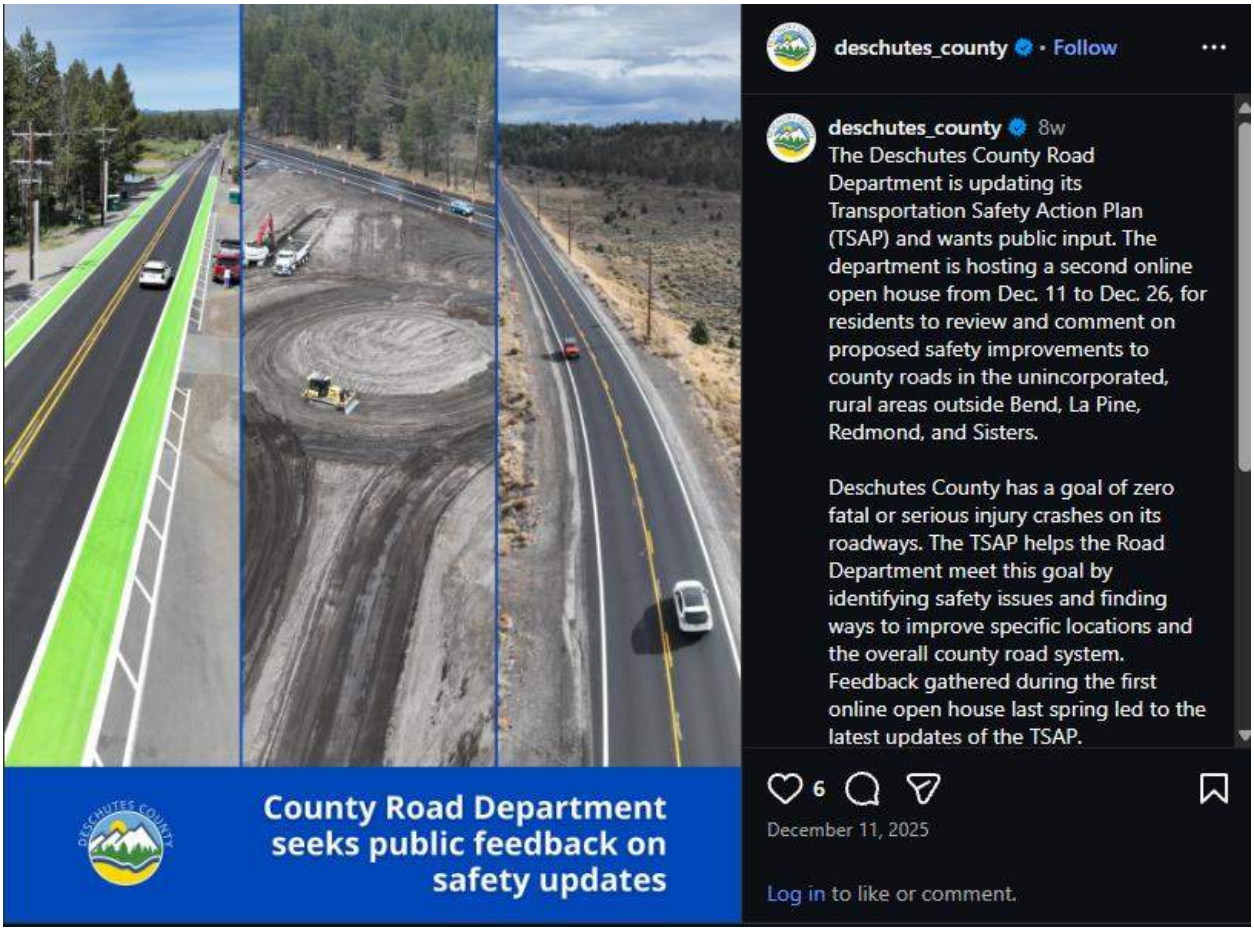
Media Contact:

Cody Smith, County Engineer/Assistant Director

(541) 388-6581

News Release Issued: December 11, 2025


County Road Department seeks public feedback on safety updates
deschutes_county • Follow
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6
December 11, 2025
Log in to like or comment.

the SOURCE
Bend's Independent Voice

Credit: Jimmy Emerson

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This story is based on submitted information and has not been verified by our news team.

Cale

Transportation Safety Action Plan (TSAP)

The Deschutes County Transportation Safety Action Plan (TSAP) provides a comprehensive, multidisciplinary approach to transportation safety in Deschutes County. The TSAP evaluates crash trends and issues based on current data and identifies a broad range of treatments including projects, policies, and programs, to address identified issues, focusing on the rural areas of the County and the cities of La Pine, Redmond, and Sisters area outside the Bend Urban Growth Boundary. The current TSAP was adopted in September 2019. Deschutes County is currently updating the TSAP to incorporate updated crash data to identify new crash trends, identify new safety strategies, and maintain eligibility for state and federal funding opportunities.

NEWS

The Deschutes County Road Department is finalizing updates to its TSAP. The Virtual Open House #2, which showcased proposed safety improvement strategies, was open for public comments from December 11th through December 26th. The public comment period has now closed, but the content is still available to view at the link below.

TSAP Virtual Open House #2

The comment period for Virtual Open House #1 has closed, but community members can still view its contents at the link below.

TSAP Virtual Open House #1

Questions and comments regarding the project can be submitted using the "Questions and Comments" feature below.

Virtual Open House

Deschutes County Transportation Safety Action Plan Update

Community Engagement Phase 2

Virtual Open House | Available through December 26, 2025

Welcome to the second and final open house for the Deschutes County Transportation Safety Action Plan (TSAP) Update!

This Virtual Open House presents transportation safety projects that have been recommended to address current transportation safety needs in rural Deschutes County. These transportation safety needs and recommended projects focus on rural County roads outside of all City Limits. Crash patterns and hotspots were identified as part of the Existing Conditions analysis in TM#1, which can be found by clicking here.

Projects are based on the latest 5-year crash history (2018-2022) in the county and the community input we received during our May-June virtual open house. Recommended projects aim to reduce all crashes in the county but focus especially on eliminating fatal and serious injury crashes within rural Deschutes County.

Projects are organized into two categories: countywide systemic treatments and priority location capital projects. Please review them and take a moment to complete the questionnaire to let us know what you think. Your input is a critical component of updating this plan!

Systemic Treatments

Systemic treatments are lower-cost projects that can be applied to roads and intersections across Deschutes County. These focus on reducing the following types of crashes:

- Crashes involving Drug and/or Alcohol Impairment
- Crashes involved Aging Drivers (65+)
- Motorcyclist Crashes
- Crashes involving Younger Drivers (15-25)
- Crashes involving Speeding
- Crashes at Intersections

These types of crashes correspond to the Emphasis Areas identified in TM#1: Existing Conditions.

The treatments are organized into five general groups:

- **Roadway/Lane Departure Countermeasures,** which are treatments to reduce the crashes from motorists departing the travel lane or roadway.
- **Corridor Access Management Countermeasures,** which are treatments designed to reduce crashes related to driveways.
- **Pedestrian and Bicycle Countermeasures,** which include treatments that address crashes involving vulnerable road users, most commonly bicyclists and pedestrians.
- **Intersection Countermeasures,** which may be applied in a systemic fashion at intersections in the County
- **Speed Management Strategies,** which are treatments designed to reduce crashes related to vehicles speeding.

Roadway/Lane Departure Countermeasures

Chevron Signs on Curves
(Potential Crash Reduction = 16%)

Recessed Pavement Markers
(Potential Crash Reduction = 15%)

Post-Mounted Delineators in Curves
(Potential Crash Reduction = 30%)

Oversized or Doubled Up Advance Curve Warning Signs
(Potential Crash Reduction = 20%)

Edgeline Striping / Wider Striping
(Potential Crash Reduction = 11-14%)

Shoulder and Centerline Rumble Strips
(Potential Crash Reduction = 12-45%)

Pavement Friction (Segment or Curve Application)
(Potential Crash Reduction = 72% curves; 57% segments)

Guardrail End Treatments / New Guardrail
(Potential Crash Reduction = 47%)

Wider Shoulders
(Potential Crash Reduction = 6-18%)

Pass/No Pass Markings
(Potential Crash Reduction Varies)

Remove, Relocate, or Protect Fixed Objects Adjacent to Road
(Potential Crash Reduction = 22-44%)

1. Do the countermeasures for preventing roadway and lane departure crashes presented above align with your expectations for improving rural road safety? 5 stars mean they align very well and 1 star means they don't align.

☆ ☆ ☆ ☆ ☆

2. Are there other measures you would prioritize instead to improve rural roadway safety?

Corridor Access Management Countermeasures

Close, Consolidate, or Relocate Driveways (Access Management)
(Potential Crash Reduction = 25-31%)

3. Do the countermeasures for preventing corridor access management crashes presented above align with your expectations for improving rural road safety? 5 stars mean they align very well and 1 star means they don't align.

4. Are there other measures you would prioritize instead to improve rural corridor access management safety?

Pedestrian & Bicyclist Countermeasures

Green Bike Lanes at Conflict Points
(Potential Crash Reduction = 39%)

Buffered Bike Lanes
(Potential Crash Reduction = 47%)

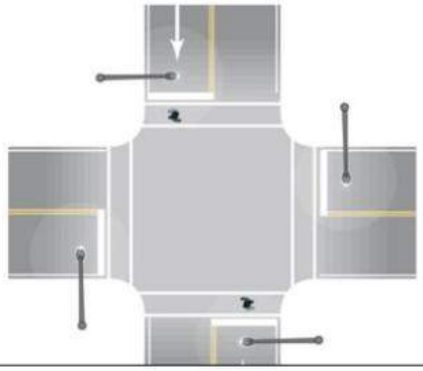
Shared Roadway Features
(Potential Crash Reduction Varies)

Pedestrian Refuge Island
(Potential Crash Reduction = 31%)

Curb Extensions
(Potential Crash Reduction = 30%)

Bicycle Signage and Beacons at Pinch Points
(Potential Crash Reduction Not Available)

Raised or Tabletop Crosswalks
(Potential Crash Reduction = 30%)



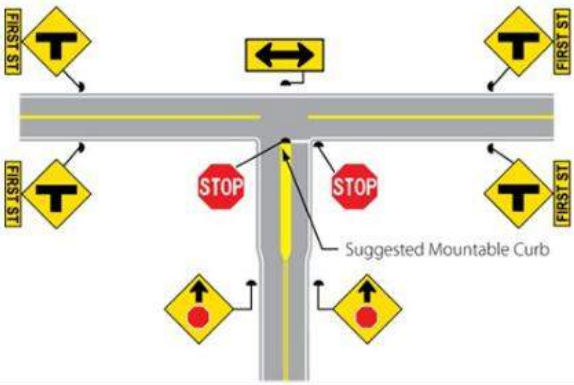
Lighting for Pedestrians/Cyclists
(Potential Crash Reduction = 42%)

Rectangular Rapid Flashing Beacons
(Potential Crash Reduction = 10-56%)

5. Do the countermeasures for preventing pedestrian and bicyclist crashes presented above align with your expectations for improving rural road safety? 5 stars mean they align very well and 1 star means they don't align.

6. Are there other measures you would prioritize instead to improve rural pedestrian and bicycle safety?

Intersection Countermeasures



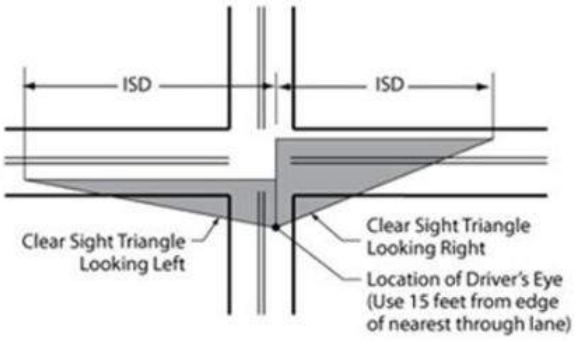
Increased Intersection Warning
(Potential Crash Reduction = 20-30%)

Rumble Strips Before Intersections
(Potential Crash Reduction = 25%)

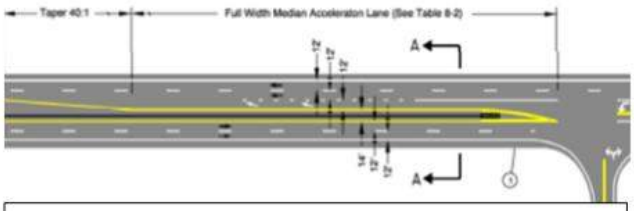
Lighting (Potential Crash Reduction = 38%)

'Stop Ahead' Pavement Markings
(Potential Crash Reduction = 31%)

LED Stop Signs
(Potential Crash Reduction = 41%)



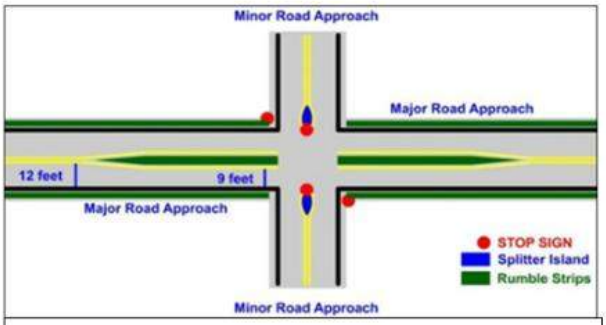
Greater Visibility at Intersections
(Potential Crash Reduction = 48%)



Median Acceleration Lane
(Potential Crash Reduction = 45%)

Mini or Full-Size Roundabout
(Potential Crash Reduction = 61-82%)

Splitter Islands on Uncontrolled Approaches



Splitter Islands on Stop Approaches

Left-Turn Lanes on Major Roads
(Potential Crash Reduction = 44%)

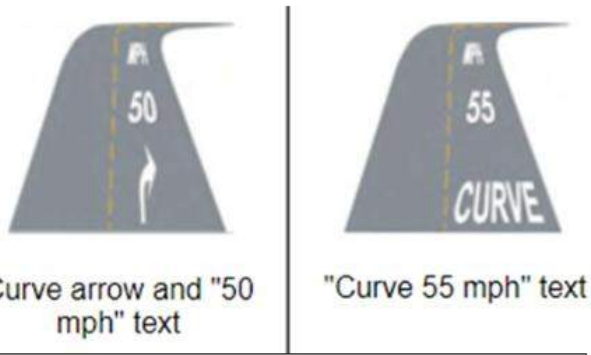
Reduce the Skew Angle of an Intersection (Potential Crash Reduction Varies by Skew Angle)

7. Do the countermeasures for preventing intersection crashes presented above align with your expectations for improving rural road safety? 5 stars mean they align very well and 1 star means they don't align.

8. Are there other measures you would prioritize instead to improve rural intersection safety?

Speed Management Strategies

Transverse Lane Marking



Curve arrow and "50 mph" text

"Curve 55 mph" text

Speed Advisory Markings in Lane

Narrow Travel Lanes at Intersection Approaches
(Potential Crash Reduction = 30%)

Centerline Delineator Posts

LEDs in Advisory Signs

Splitter Islands at Intersections

Horizontal Deflections

Dynamic Speed Displays

Site Specific Capital Projects

Site-specific capital projects are higher-cost interventions identified at five locations within the county —marked in green on the map below—to address areas with some of the most frequent and severe crashes. Five additional intersections—highlighted in blue—are proposed for systemic treatment to address a common pattern of crashes identified at each location. These priority locations are on the High Injury Network (HIN) for the County's road system, ranking in the Top 5% of all rural locations. Many other HIN locations not presented below have improvements planned or already constructed.

Priority Locations

The map below shows the priority locations for capital improvements. The intersection locations are listed below.

Priority Locations with Conceptual Layouts of Potential Improvements

- US 97 / Jackpine Loop (North)
- US 20 / Pinehurst Road
- US 20 / Gerking Market Road
- US 20 / Erickson Road-Torkelson Road
- Day Road / Amber Lane / 5th Street

Priority Locations with Systemic Treatments Applied

- State Recreation Road / Huntington Road
- Bear Creek Road / Ward Road
- NE Smith Rock Way / NE 33rd Street
- NE Smith Rock Way / NE 1st Street
- NW Ice Avenue / NW 43rd Street

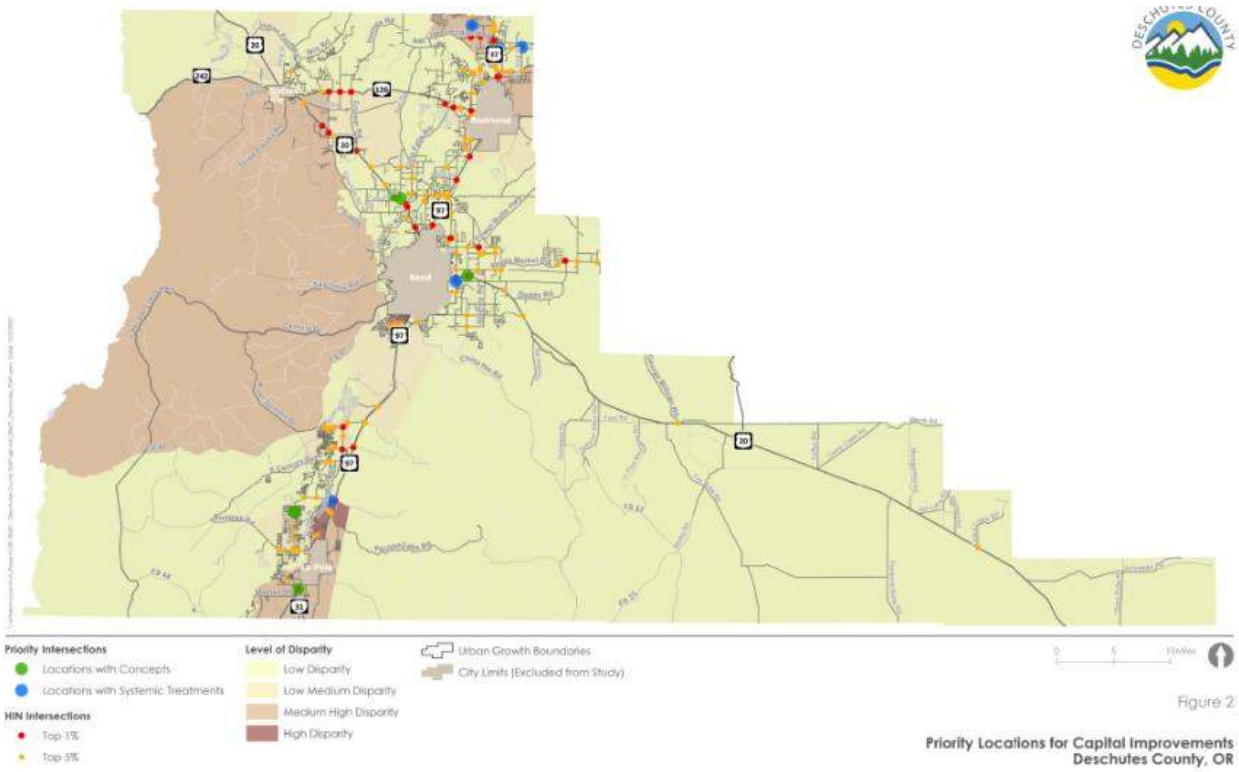


Figure 2

Priority Locations for Capital Improvements
Deschutes County, OR

Priority Locations with Concepts

The treatments recommended at these priority sites are based on a detailed review of the crash history. **The concepts presented below are in draft form.**

US 97 / Jackpine Loop

- Disconnect Jackpine Loop from US 97 and extend Pierce Road south to Masten Road, crossing Jackpine Loop
- Stop-control the new Pierce Road / Jackpine Loop intersection
- Remove curve on Pierce Road No 2 and create a 3-leg intersection
- Increase signage on US 97 warning drivers of Masten Road intersection
- Coordinate with ODOT on potential median barrier on US 97

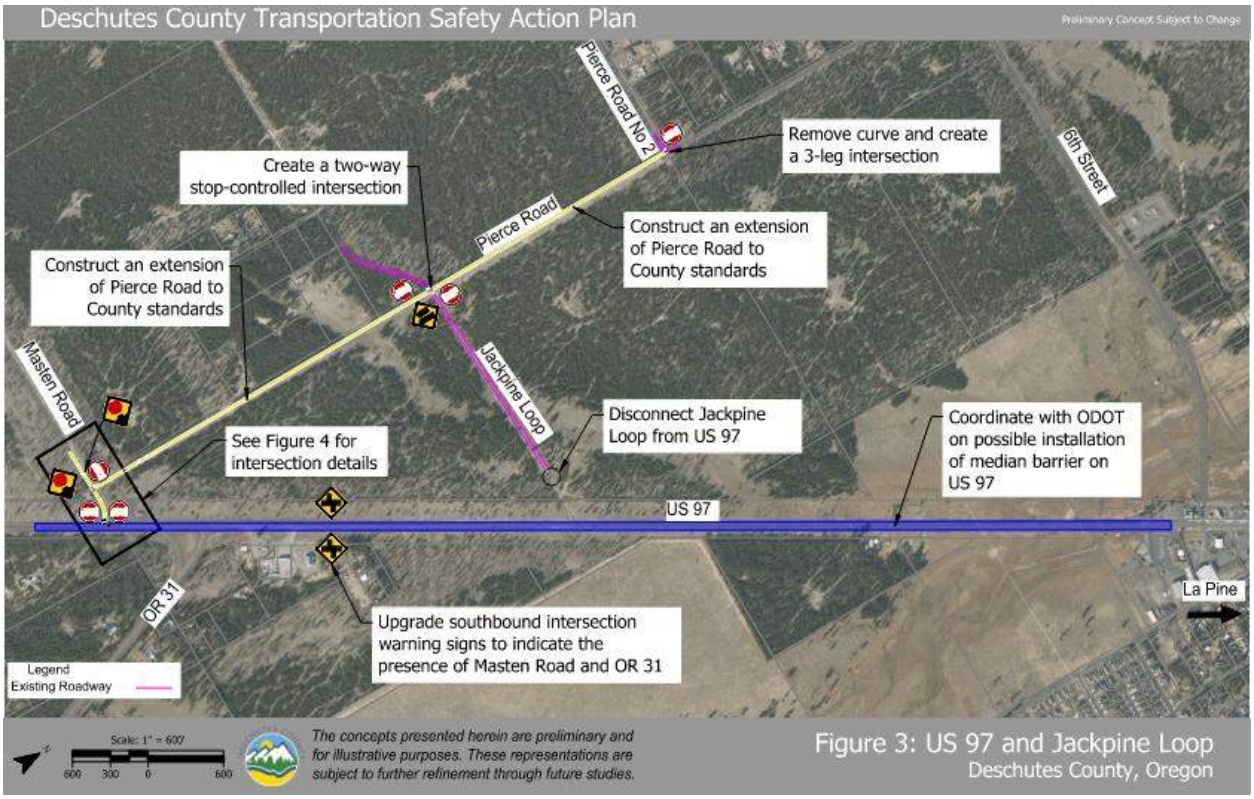


Figure 3: US 97 and Jackpine Loop
Deschutes County, Oregon

US 97 / Masten Road

- Reduce intersection skew
- Double up 'stop ahead' warning signs
- Install doubled up stop signs with LED flashing borders
- Install 'STOP AHEAD' pavement markings
- Investigate improved lighting at intersection
- Coordinate with ODOT on potential median barrier on US 97

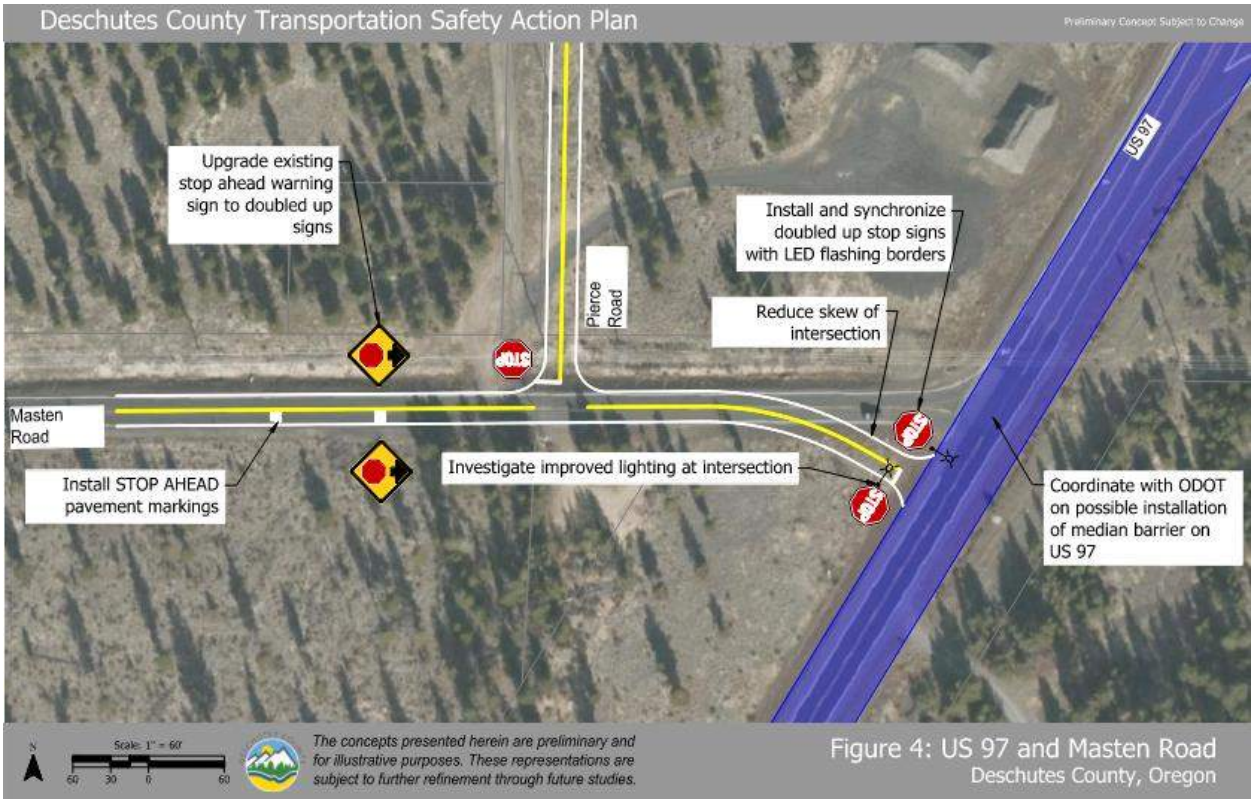
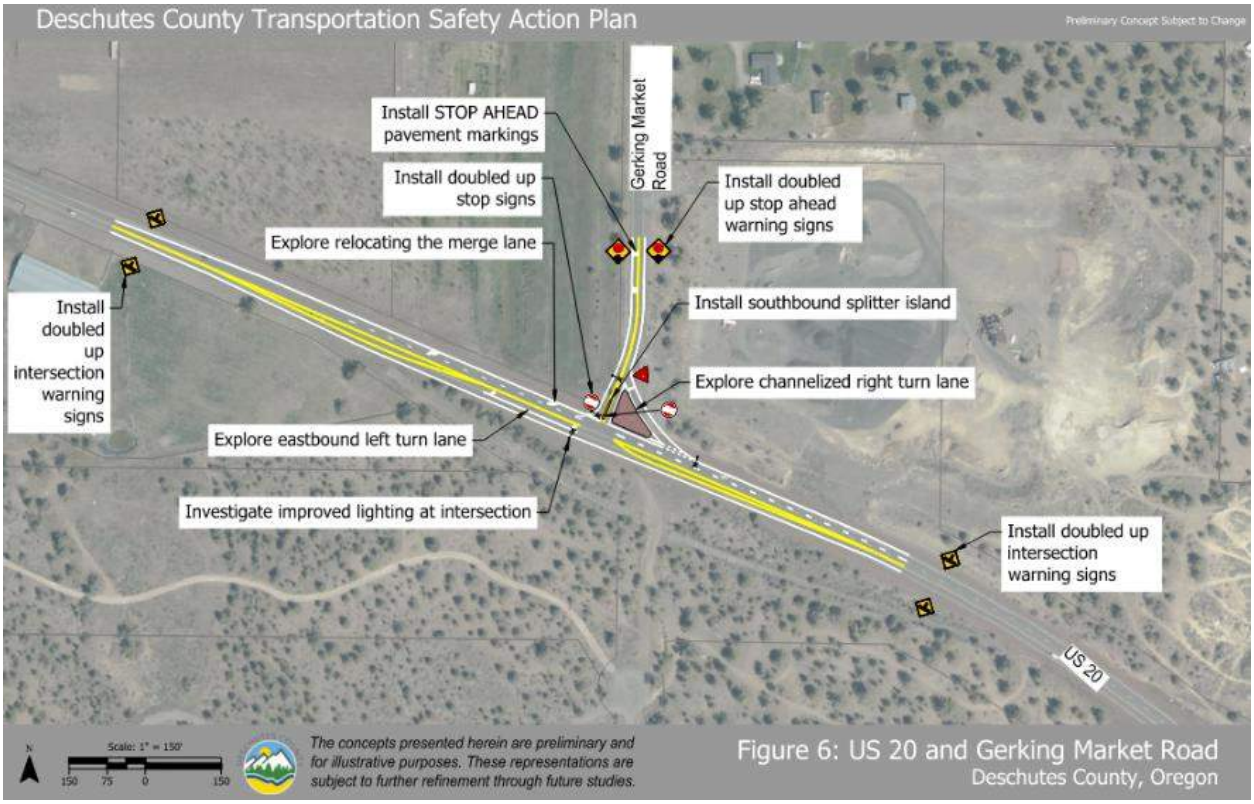


Figure 4: US 97 and Masten Road
Deschutes County, Oregon

US 20 / Gerking Market Road

- Reduce intersection skew
- Install doubled up intersection warning signs on US 20
- Explore turn lanes on US 20
- Investigate improved lighting at intersection
- Install doubled up 'stop ahead' warning signs and stop signs on Gerking Market Road
- Install 'STOP AHEAD' pavement markings on Gerking Market Road
- Explore relocating the US 20 merge lane



US 20 / Erickson Road-Torkelson Road

- Explore turn lanes on US 20
- Install doubled up 'stop ahead' warning signs and stop signs with LED flashing borders on Erickson Road and Torkelson Road
- Install 'STOP AHEAD' pavement markings on Erickson Road and Torkelson Road
- Install splitter islands on Erickson Road and Torkelson Road
- Investigate improved lighting at intersection
- Remove trees near intersection to increase sight distance for drivers pulling onto US 20

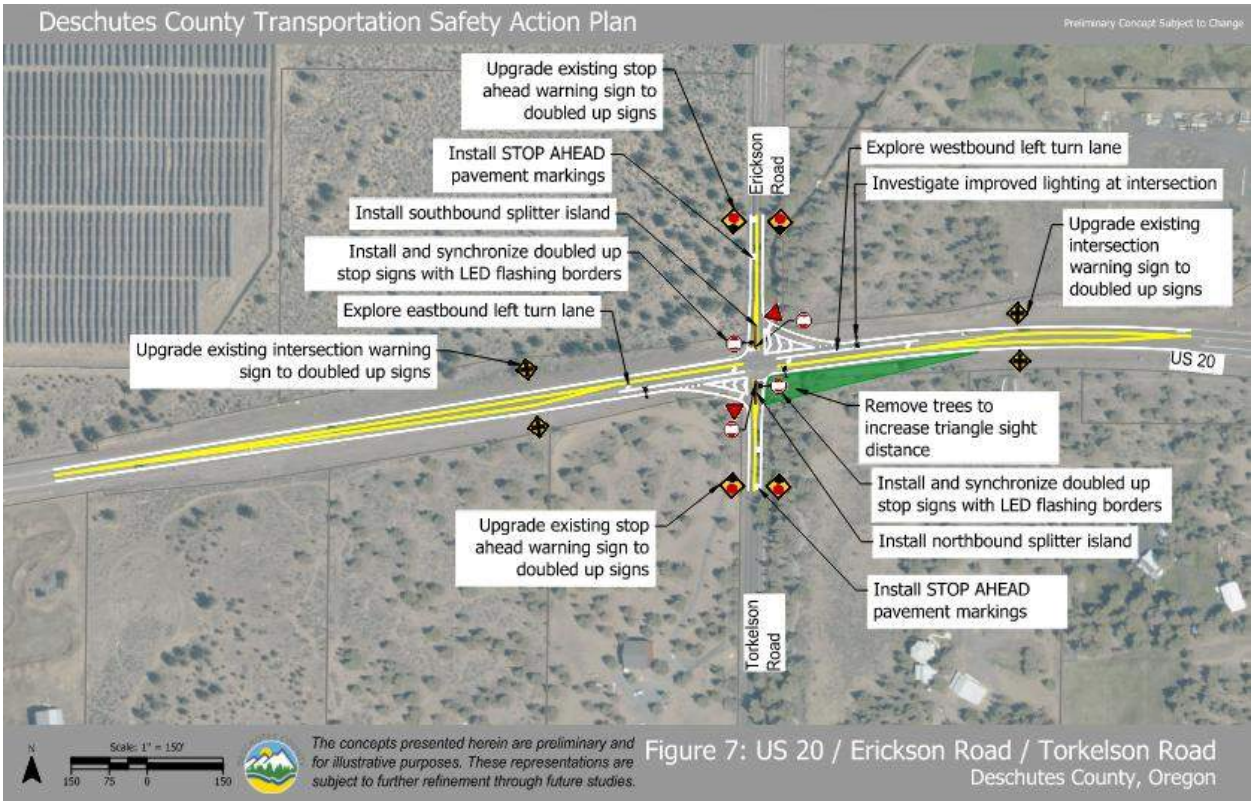


Figure 7: US 20 / Erickson Road / Torkelson Road
Deschutes County, Oregon

Day Road / Amber Lane / 5th Street

- Reduce sharpness of curves and consider realigning driveways
- Install post-mounted delineators along curves
- Install speed feedback signs before curves
- Retain existing curve warning signs with LED flashers
- Install centerline recessed pavement markers with double yellow striping
- Widen fog lings
- Widen shoulders and install rumble strips

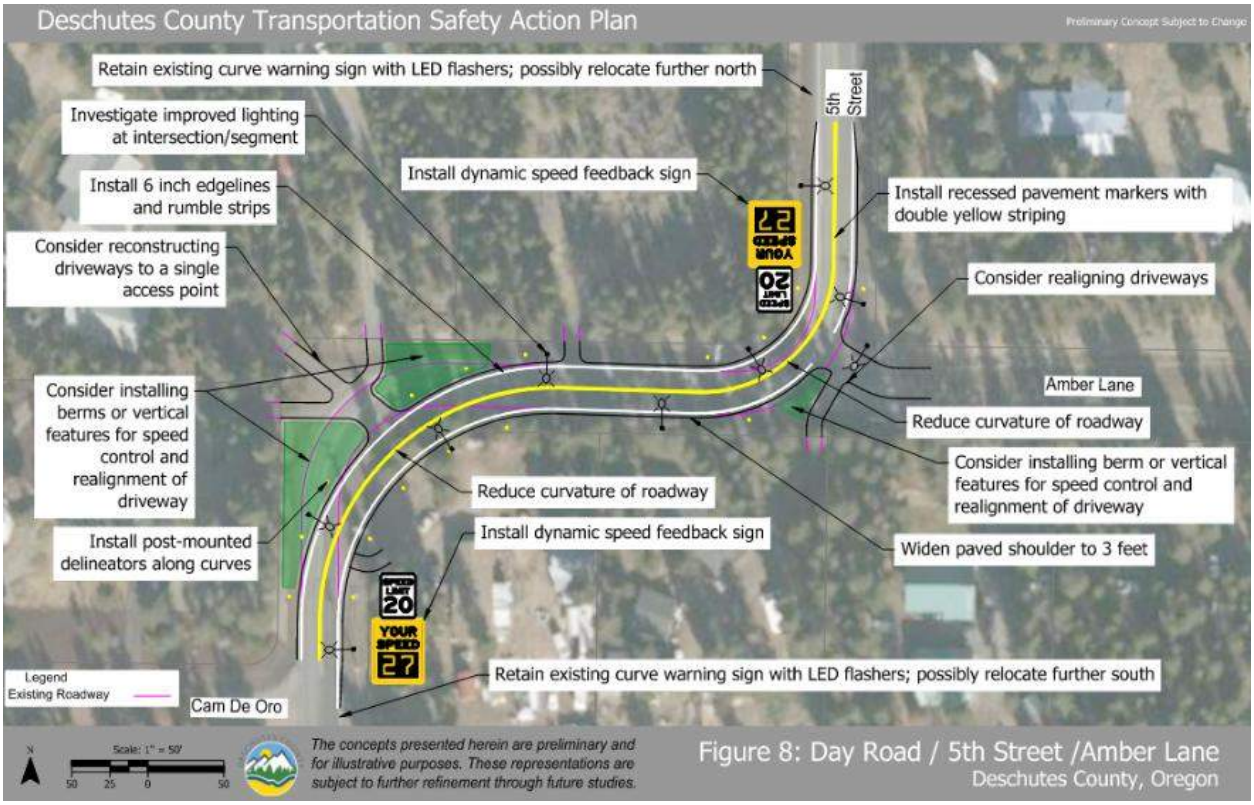


Figure 8: Day Road / 5th Street /Amber Lane
Deschutes County, Oregon

9. How well do these five priority locations that we've identified for capital projects align with your expectations for improving rural road safety? 5 stars mean they align very well and 1 star means they don't align.

10. Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below.

US 97 / Jackpine Loop - US 97 / Masten Road

US 20 / Pinehurst Road

US 20 / Gerking Market Road

US 20 / Erickson Road-Torkelson Road

Day Road / Amber Lane / 5th Street

Priority Locations with Systemic Treatments
Lower-cost systemic treatments are recommended for the other 5 priority locations shown in the map. Those treatments are listed under each intersection.

State Recreation Road / Huntington Road

- Improve intersection warning with pavement markings and additional signage.
- Provide flashing LED stop signs at the stop-controlled approaches.
- Install transverse rumble strips on the stop-controlled approaches.
- Install raised dividers on the uncontrolled approaches with tubular markers.

Bear Creek Road / Ward Road

- Improve intersection warning by doubling up the stop signs with LED lights.
- Install flashing beacons on the intersection warning signs on Ward Road.
- Install intersection lighting.
- Install raised dividers on the uncontrolled approaches with tubular markers.

NE Smith Rock Way / NE 33rd Street

- Improve intersection warning with pavement markings and signage.
- Provide flashing LED stop signs at the stop-controlled approaches.
- Install raised dividers on the uncontrolled approaches with tubular markers.

NE Smith Rock Way / NE 1st Street

- Improve intersection warning with pavement markings and signage.
- Provide flashing LED stop signs at the stop-controlled approaches.
- Install raised dividers on the uncontrolled approaches with tubular markers.

NW Ice Avenue / NW 43rd Street

- Improve intersection warning with pavement markings and additional signage.
- Provide flashing LED stop signs at the stop-controlled approaches.
- Install dividers on the uncontrolled approaches with tubular markers.

11. How well do these five priority locations that we've identified for systemic treatments align with your your expectations for improving rural road safety? 5 stars mean they align very well and 1 star means they don't align.

12. Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below.

State Recreation Road / Huntington Road

Bear Creek Road / Ward Road

NE Smith Rock Way / NE 33rd Street

NE Smith Rock Way / NE 1st Street

NW Ice Avenue / NW 43rd Street

Optional Demographics Questionnaire

The following questions will help Deschutes County ensure that people throughout the county are getting the opportunity to participate in the TSAP Update process. Your responses are helpful but not required.

13. What is your zip code?

14. What is your age?

- ◯ Younger than 18 years old
- ◯ 18-24 years old
- ◯ 25-44 years old
- ◯ 45-64 years old
- ◯ 65 years old and older
- ◯ Prefer not to respond

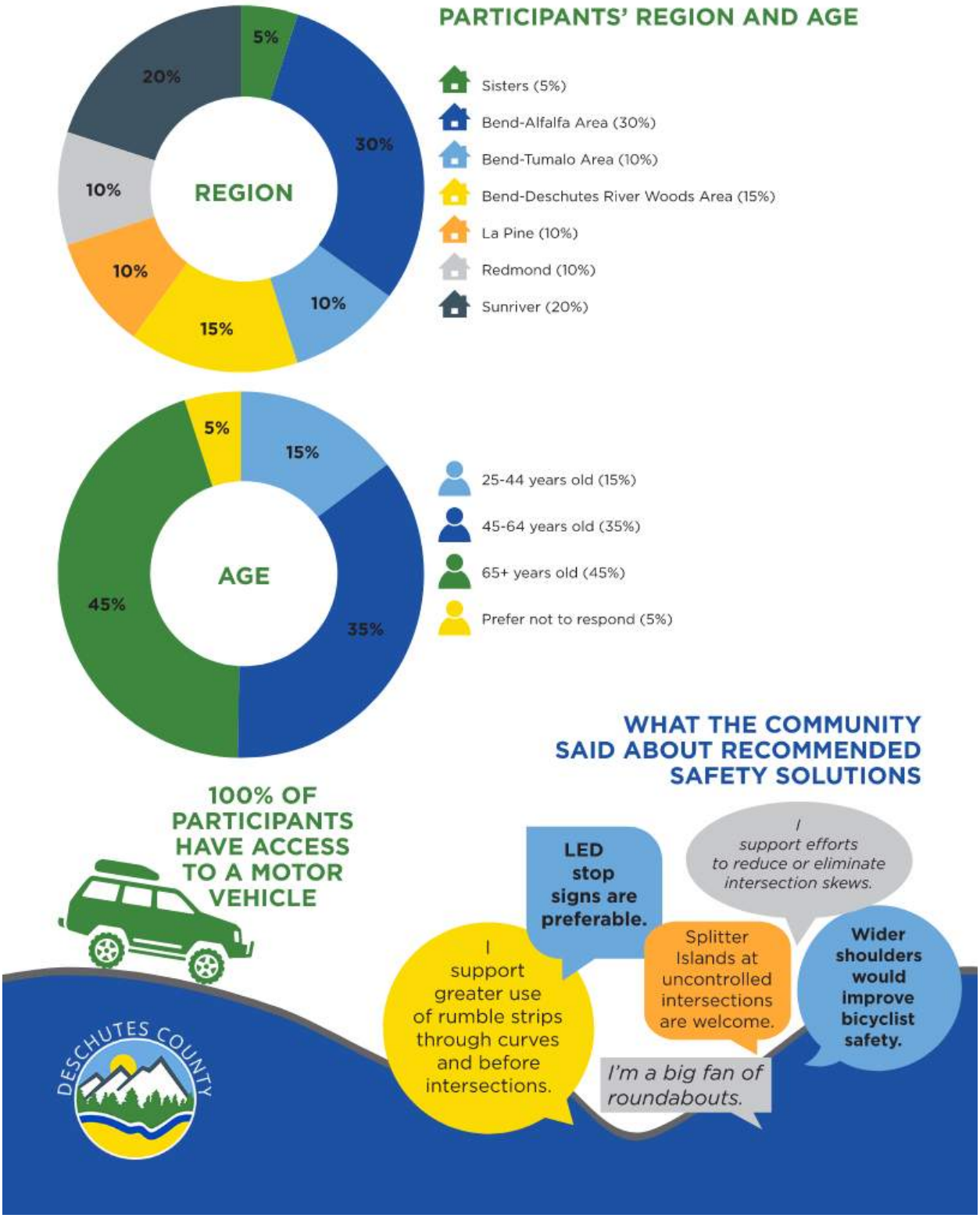
15. Do you have a motor vehicle available for your use?

- ◯ Yes
- ◯ No

16. Please share any other feedback you have on transportation safety in rural Deschutes County.

Feedback


DESCHUTES COUNTY TRANSPORTATION SAFETY ACTION PLAN UPDATE
Community Engagement
Phase 2 Results
December 11-26, 2025
HOW RECOMMENDATIONS ALIGN WITH COMMUNITY SAFETY GOALS
Roadway/Lane Departure Countermeasures
4+ out of 5 stars
Access Management Countermeasures
3+ out of 5 stars
Pedestrian & Bicyclist Countermeasures
3+ out of 5 stars
Intersection Countermeasures
4 out of 5 stars
HIGH PRIORITY LOCATIONS
Capital Improvements
3+ out of 5 stars
Systemic Treatments
3+ out of 5 stars
Represents community rating of recommended safety solutions
COMMON THEMES
Improve intersections
(11 specific intersections, some mentioned multiple times)
Reduce and enforce posted speeds
(Huntington Road, Hamby Road)
Improve intersection sight distance
(reduce skew, cut back vegetation)
Consider low-cost interim treatments while long-term projects are programmed
Consider context for bicycle facilities


PARTICIPANTS' REGION AND AGE
REGION
5%
30%
10%
15%
10%
20%
Sisters (5%)
Bend-Alfalfa Area (30%)
Bend-Tumalo Area (10%)
Bend-Deschutes River Woods Area (15%)
La Pine (10%)
Redmond (10%)
Sunriver (20%)
AGE
5%
15%
35%
45%
25-44 years old (15%)
45-64 years old (35%)
65+ years old (45%)
Prefer not to respond (5%)
WHAT THE COMMUNITY SAID ABOUT RECOMMENDED SAFETY SOLUTIONS
100% OF PARTICIPANTS HAVE ACCESS TO A MOTOR VEHICLE
LED stop signs are preferable.
I support efforts to reduce or eliminate intersection skews.
Splitter Islands at uncontrolled intersections are welcome.
Wider shoulders would improve bicyclist safety.
I support greater use of rumble strips through curves and before intersections.
I'm a big fan of roundabouts.
DESCHUTES COUNTY

- I would like to see a round about put it at the intersection of hwy 97 & hwy 31. I would also like to see an over pass or underpass at Hwy 97 and state rec rd.
- So far you have done nothing but made the roadways more congested and smaller. Your bike roads and safety posts have made it harder to drive in Bend. Longer commutes, unsafe driving habits and angry drivers. So, well done. Everyone I've talked to hates what you have done to our roadways for what you safe is safer for all.
- Need center divider on all sections of Hwy 97 where the speed limit is over 35 to accomplish zero head on crashes.
- Please see my comments posted on the virtual open house
- The intersection of Knott and China Hat roads is something I've been dealing with for years and it is getting worse. When I pull out of Tall Pine Ave. I've had several near collisions due to cars going east around the the corner at a high rate of speed. These include both cars and semi trucks. It seems a roundabout would be a perfect solution. There have been fatalities and accidents there over the years. Why has nothing been done other than placing plastic poles around the curve?
- We live on Hwy 31 in La Pine but have to commute to Bend weekly for doctor appointments and shopping. We have noticed there are cement barriers halfway from Bend on Hwy 97 but stops short of coming all the way to La Pine. It is our's and many other residents that those cement barriers need to continue all the way down Hwy 97 to La Pine. I/we are of the firm belief that such a barrier would have saved numerous lives during the winter months. How can you put a price on the life of someone??
- We live at 20160 Winston Loop, Bend, OR 97703. We are in an unincorporated zone in Deschutes County. I have a few areas of concern near our home. At the intersection of Tumalo Road and Simon Road, we need a blinking light and a cross walk. That corner is very dangerous and we now have 17 kids who live in our neighborhood (likely more as I don't know the families on Swalley). It would be extremely helpful to have a blinking light and crosswalk to protect people when crossing the road. In addition, that turn from Simon Rd heading West on Tumalo Road is harrowing. Also, people hardly EVER stop for the school bus even when their stop sign is out. Hopefully a crosswalk and blinking light would slow down cars and increase safety. Also, given the large number of families who walk around this area, it would be helpful if a sidewalk is put in from Tumalo Rd/Simon intersection all the way to Tumalo Center. It's extremely dangerous to walk on Tumalo Road yet I know many families who would love to walk to Tumalo Center but do not feel safe doing so with the current situation.

Are there other measures you would prioritize instead to improve rural roadway safety?

- Wildlife crossings and fencing!

- Lane widening to give more room to catch yourself before heading over the yellow line, maybe with those single narrow lanes in the middle.
- Seems like the percentages should speak to the allocation of limited resources. For example, the curved surface preps seem like they'd be expensive, but the percentages are compelling. On the other hand, guardrail ends seem relatively inexpensive, but again the percentages are compelling.
- Nothing to add, but I support greater use of shoulder and centerline rumble strips, particularly on curves.
- More passing lanes so slower traffic does not impede.
- More concrete barriers on Hwy 97 north and south, change to double lanes instead of single lanes on 97.
- A roundabout or traffic light MUST be installed at Hemholtz & Hwy 126!!!!!!!
- Lower speed limits. Mark incoming roads better.
- Let them wreck. Most are driving reckless. The no passing painting is what 2 lines is already for and we see that does nothing.
- O'Neil Junction... That intersection is a death trap and an impossible dilemma for drivers. You need to put in a roundabout. In the interim. You need to completely block the ability to cross the road from O'Neill to Pershall
- BIKE SAFETY

Are there other measures you would prioritize instead to improve rural corridor access management safety?

- Several T intersections on Hwy 20 between Bend and Sisters have limited visibility and no provisions for a partial leftbturn into a central refuge lane, so drivers must wait for simultaneous openings in both lanes and contend with speeding cars, limited visibility and no options for escape.
- Cutting vegetation and trees back further to allow for a farther visual before turning out of driveways.
- No stop installing these.
- A roundabout or traffic light MUST be installed at Hemholtz & Hwy 126!!!!!!!
- Reduce speed limits. Better signage
- With building and growth that may be needed
- O'neill junction between Redmond and Terrebonne

Are there other measures you would prioritize instead to improve rural pedestrian and bicycle safety?

- More consistency in roadway and shoulder withs so bicyclists can enjoy regular, predictable riding areas. Also, shoulders often seem to collect loose gravel and crap so more regular sweeping would be great.
- If those riding their bikes actually follow the rules, we wouldn't need to over engineer everything.
- As a driver and avid cyclist I like the added emphasis on pedestrian and cyclist safety. Clear expectations for all helps.
- I would encourage the green painted bike lanes not just at conflict points, but along major bike routes in the area. For example, they would seem perfect for the Cascade Lakes Highway, Skyliners Rd, and select "bike" routes like Twin Bridges.
- The roads in the rural areas generally have very narrow or no area from pedestrians or bikes, e.g. Huntington Rd between S Century and State Recreation. There are many bicyclists using county roads. Having a wider designated shoulder would improve safety. Earlier this year work crews added gravel to build up and maybe widen the shoulders. Unfortunately once an automoblie drives on this area the gravel collapses. It seems like this was a waste of public funds.
- A roundabout or traffic light MUST be installed at Hemholtz & Hwy 126!!!!!!!
- There are way too many bike lanes and bike safety corridors for the number of folks who actually ride daily. Most of these corridors impact drivers, making our turn lanes smaller.
- Stop putting in sidewalks that go no where, stop widening sidewalks that's a waste of space and money, stop putting in bike lanes in rural areas or taking away full functionally lanes for bikers! It's snows half the year here. Put in a bus system not bike lanes… such a waste
- Separated multiuse paths and separated grade crossings.
- Slow the speed down. You have Harper bridge shown here. Were there wrecks before? I live off that road and never see anything it's congested you aren't doing 80
- I tried to inspire some bike safety ideas for the newest roundabout at Huntington and South Century currently under construction. It's not too late to add a creative bike lane away from the roundabout.....plenty of time and very important in your(our)motto of "... a goal of zero fatal or serious injury crashes on its roadways"

Are there other measures you would prioritize instead to improve rural intersection safety?

- Reducing the skew angles makes intersections much wider for people crossing on foot. A raised triangle separating the two lanes would be helpful. The splitter Islands at uncontrolled intersections and stops will be very welcome.

- I'm a big fan of roundabouts and educated people using them. Sometimes I find road furniture, particularly posts, can clutter an intersection and actually make it harder to see pedestrians or other hazards so I think they should be used judiciously.
- Not a big fan of rumble strips before intersections. LED stop signs are preferable.
- No measures to add, but I strongly support greater use of rumble strips before intersections. We also have a large number of skewed intersections, and I support efforts to reduce or eliminate the skews.
- A roundabout or traffic light MUST be installed at Hemholtz & Hwy 126!!!!!!!
- More lighted stop signs. Reduce speed limits.
- Think snow removal. These are horrible
- Make it impossible to cross cross from O'Neill road to pershall road at O'Neill junction. It is a death trap. Put concrete barriers in. Eventually put in a roundabout.
- minimize signage to what is necessary. adopt the red street lamp concept for wildlife and to align with our Dark Sky goals++ https://www.reddit.com/r/mildlyinteresting/comments/ex7k3x/the_town_we_vacationed_in_has_red_street_lights/

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [US 97 / Jackpine Loop - US 97 / Masten Road]

- Active speed enforcement - ticketing!
- Reduce speed limits

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [US 20 / Pinehurst Road]

- Active speed enforcement - ticketing!
- Reduce speed limits

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [US 20 / Gerking Market Road]

- Active speed enforcement - ticketing!

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [US 20 / Erickson Road-Torkelson Road]

- Active speed enforcement - ticketing!
- Not sure this should be a high priority

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [Day Road / Amber Lane / 5th Street]

- Active speed enforcement - ticketing!

- Not sure this should be a high priority

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [State Recreation Road / Huntington Road]

- Adding a blinking stop light and rumble strips will definitely help. Why not a 4-way stop or roundabout? I think when people pull up to that intersection, people are usually distracted with something (technology, thoughts, food, etc) and they immediately forget that it is a two-way, and just pull out. Possibly reduce the speed on State Rec to 35 until after that intersection and add a blinking yellow caution sign on State Rec right before that intersection, alerting those drivers to try to watch for people making poor choices.
- Yes
- Just put another stop sign and you are good

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [Bear Creek Road / Ward Road]

- No
- Consider all way stop similar to Hamby/Neff intersection. Flashing LED stop signs like those already installed on Bear Creek
- Make this a 4-way stop.

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [NE Smith Rock Way / NE 33rd Street]

- No

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [NE Smith Rock Way / NE 1st Street]

- Yes

Are there other treatments that we should consider at these locations? Please provide your input in the comment boxes below. [NW Ice Avenue / NW 43rd Street]

- Yes
- i'm not familiar enough with these areas to comment

Please share any other feedback you have on transportation safety in rural Deschutes County.

- I want to see much more active and consistent police presence and photo enforcement of speeding and reckless driving!
- You can't make those riding their bikes follow the rules unless we start ticketing them for not following the rules. You can continue to over engineer streets like Wilson,

Greenwood and soon to be Olney. I have been at the lights or roundabouts for all of those streets and have had bikers completely dismiss the bike lanes and continue to ride in car lanes. We'd need to start ticketing bikers if you expect any of the changes to actually work.

- I think the County does a great job with our roads and I know there are a lot of issues on hwy 97 that you can't control without the help of the State. I would emphasize the winter upkeep on Huntington from La Pine to Sunriver because that's the safer way to travel when the highway has snow and ice on it. The highway is not maintained as well as it could be, and is extremely dangerous to travel on in winter. So keeping Huntington safe is really important to those of us in La Pine. I would really like to see one of the flashing lights at Vandevert and Hwy 97. It's so dark there at night, and the first time I turned south there at night, I almost didn't see the stop sign in time. When I looked left, I saw that yellow line in the southbound lane and couldn't see much further in front of me, and now know why so many people turn left into that lane into oncoming traffic. It's not that clear to see you need to cross the highway to go north. And the "do not enter" signs aren't lit up without oncoming northbound traffic so I didn't even notice them.
- Appreciate your work!
- Look again at adding a paved connection between Sisters and Suttle Lake on the NE side of the highway, i.e. don't adversely impact Black Butte Ranch folks.
- The Vandevert/S Century intersection is "an accident waiting to happen". It is a VERY dangerous intersection, especially the traffic going north on S Century. The Huntington Rd to State Recreation seems to be a race course for some people. The double yellow lines do not have an impact. What can be done to slow traffic down? There are many curves, neighborhood access streets, and blind driveways thta create potential satefy hazards.
- Hamby Road traffic speed needs to be significantly reduced. Consider all way stop At Paloma. Or at least left turn lane for southbound Hamby and right turn lane for northbound. Even though it’s a no passing zone when you slow to make a right turn onto Paloma it’s routine for cars behind to pass you. Visibility for cars entering from
- Paloma is blocked by a lava flow on the north and power poles on the south. Hamby has become a defacto east side bypass the frequent massive earth hauling and construction truck traveling 45-55mph.
- PLEASE consider a roundabout at Burgess and 97. PLEASE at least add an LED stop sign at Vandevert and 97-the stop sign is hardly visible especially at night. Please remove the yellow line on the south lane of 97 at Vandevert intersection because at night, there is not good lighting there so it makes entering 97 look like the northbound lane is the

first lane and people keep turning left onto the southbound lane. Or put yellow diagonal stripes n that shoulder to discourage northbound drivers turning there. Please work to add a middle turn lane on 97s in north La Pine in front of the businesses like Habitat for Humanity Restore because it's very unsafe to stop there on 97s to turn left when cars and semis don't stop and fly past you on the shoulder. Please install a roundabout at State Rec road and 97. The only way to safely turn left onto 97 in La Pine is at the one stop light on 97 in town.

- A roundabout or traffic light MUST be installed at Hemholtz & Hwy 126!!!!!!! Please address this very dangerous intersection. I see near accidents EVERY day and have witnessed some terrible accidents many times. A roundabout or a traffic light would save lives.
- Fix Butler Market and Hamby/ Hamehook intersections sooner rather than later. Do more lighted signs until you can do roundabouts. Lower speed limits on Hwy 97.
- These bike lanes are out of hand and such a waste of money. The reed market train plan is a bad plan and also the road blocks from bend to Redmond is a horrible plan cutting off driveways and businesses causing MORE people to turn and pull out in front of fast moving traffic. Makes no sense AT ALL! Think things through people!
- People are going to drive reckless no matter what. Don't make it harder for semis and snow removal. Stop wasting other peoples money.
- The neglect of the dangerous intersection at O'Neill junction is shameful. There are crashes and wrecks. There constantly a number of deaths. When? Oh when will you pay attention to it. Smith Rockaway and 33rd is not dangerous. Neither is first Street and Smith Rockaway. Opened your eyes deal with the O'Neill junction hazards
- more bike lanes please. i would love for the community to be able to bike from the oww2 neighborhood +/~ to sunriver more++ safely

APPENDIX C–SCHOOL SAFETY AUDITS MEMORANDUM

Technical Memorandum

Date:	July 29, 2025	Kittelson Project No: 30431
To:	Project Management Team	
From:	Matt Kittelson, PE, Miranda Barrus, PE, and Eza Gaigalas	
Subject:	Final School Safety Audit Memo	

Introduction

Deschutes County is updating its 2019 Transportation Safety Action Plan (TSAP) to focus on the unincorporated areas of the county. The purpose of the TSAP is to help the County eliminate fatal and serious injury crashes from the transportation system through site-specific and systemic countermeasures and multidisciplinary actions. As part of the TSAP Update, the team conducted School Safety Audits at key schools either located within the unincorporated areas of the county or along County-owned and maintained roads within urban areas (specifically within La Pine) to evaluate walking, biking, and driving needs as they correlate to the crash data, and presence of gaps in existing infrastructure. The audits were conducted at the following schools, as shown in Figure 1:

- Three Rivers School
- La Pine Elementary, Middle, and High Schools
- Rosland Elementary School
- Buckingham Elementary School
- Tumalo Community School
- Terrebonne Community School

This memorandum summarizes key observations from the audits and potential treatment opportunities at each school location. This information, in combination with input from the County and community, will serve as the basis for identifying specific actions, either in the short-term or long-term, that could be implemented at or near these school sites.

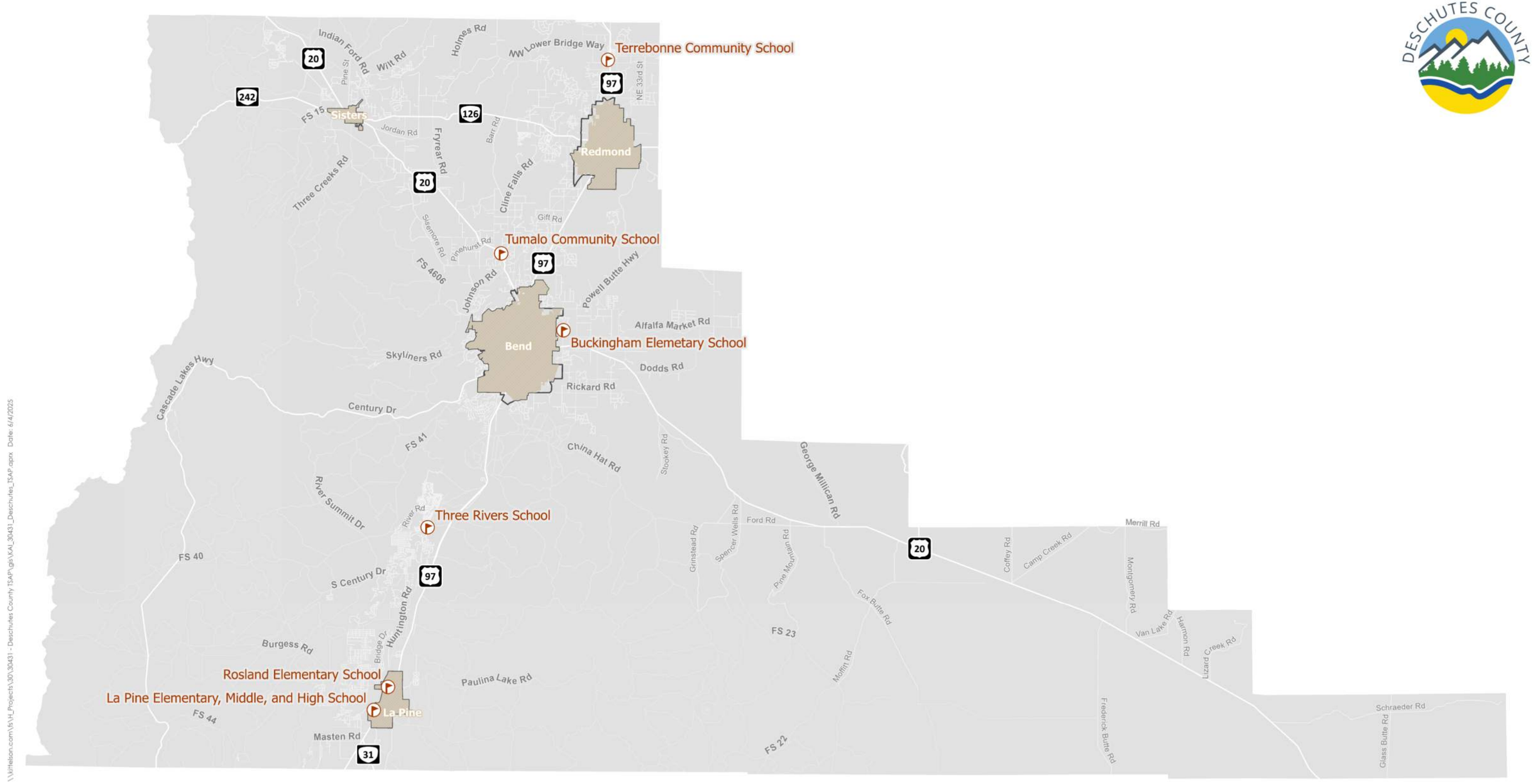


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Figure 1

School Safety Audit Locations
Deschutes County, OR

Three Rivers School

Three Rivers School is a K-8 school in Sunriver. The school safety audit was conducted on May 8th, 2025, by Blaine Wruck and Torina Wilson (Deschutes County), Tim Broadbent (Three Rivers Principal), Chris Mather (Bend-La Pine Assist. Transp. Director), and Matt Kittelson (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- Traffic flow leaving the school in the afternoon can be challenging. There are long delays during the pickup hour associated with exiting vehicles, with queues forming at the Venture Lane and Enterprise Drive intersection. All participants noted that the forthcoming changes to the Venture Lane and S Century Drive intersection, which currently are being pursued by the County, are expected to address most vehicular circulation challenges noted.
- Walking and biking trips to and from the school are fairly limited with more students relying on buses or parent pick-up and drop-off. Students that do walk are generally traveling to a destination within the Venture Business Loop, the Sunriver Village, or to a nearby residence. Walking and biking routes are generally either along local paths within the Venture Lane area or via a multiuse path east of the school that connects to S Century Drive.
- Bus drivers find the difference in vertical grades at the Enterprise Drive and School Access intersection to be challenging.

Treatment Opportunities

Based on the observations described above, opportunities to improve vehicle, pedestrian, and bicycle circulation around the school were identified as minor yet impactful strategies that could be implemented in the school vicinity. These improvements are shown in Figure 2 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install sidewalk along the north and south sides of Venture Lane and Enterprise Drive between Century Drive and the school.
2. Stripe a crosswalk on the west leg of the Venture Lane and Enterprise Drive intersection.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

1. Install sidewalk along the north and south sides of Venture Lane and Enterprise Drive between Century Drive and the school.
2. Stripe a crosswalk on the west leg of the Venture Lane and Enterprise Drive intersection.

Three Rivers School

S Century Drive

Enterprise Drive

Venture Lane

1

2

A roundabout is under design at S Century Drive & Venture Lane. Construction is planned to begin in 2026.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

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Scale: 1" = 100'

100 50 0 100

Figure 2: Three Rivers School

Sunriver, Oregon

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La Pine Elementary, Middle, and High Schools

La Pine Elementary, Middle, and High schools serve students from grades K-12. The schools have separate campuses adjacent to each other in La Pine, so an audit was conducted for each to understand individual school needs. The school safety audit for the high school was conducted on May 8th, 2025, by Blaine Wruck and Torina Wilson (Deschutes County), Scott Olszewski (La Pine High School Principal), Chris Mather (Bend-La Pine Schools Assistant Transportation Director), Michelle Rhoads (Bend-La Pine Schools Active Transportation Coordinator), Deputy/Student Resource Office Jeff Woods (Deschutes County Sheriff's Office), Matt Kittelson and Miranda Barrus (Kittelson & Associates), and additional La Pine HS staff. The school safety audit for the middle and elementary schools was conducted on May 21st, 2025, by Blaine Wruck (Deschutes County), Megan Silvey (La Pine Elementary School Principal), Brian Barringer (La Pine Middle School Principal), Deputy/Student Resource Office Jeff Woods (Deschutes County Sheriff's Office Deputy/SRO), and Matt Kittelson, Miranda Barrus, and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There is pedestrian traffic between the schools and the residences and businesses to the east. This is because many students reside in the developments to the east of Huntington Road. Additionally, a Bi-Mart across from Huntington Road attracts students, especially during the lunch hour.
- Coach Road, which is a north-south frontage road and primary access road for the elementary and high schools, lacks any marked midblock crosswalks. As a result, students accessing Bi-Mart or other locations to the east cross Coach Road at non-marked locations.
- Future residential and commercial development northeast of the schools along Huntington Road is expected to increase student trips to and from this vicinity.
- Today, students cut through the wooded, undeveloped parcel between Coach Road and Huntington Road in front of the High School.
- Students also use an existing sidewalk located south of the Mid Oregon Credit Union site, which connects Coach Road to Huntington Road. On Huntington Road, the east end of this sidewalk connects to a marked school zone crossing. However, the west end does not fully extend to Coach Road and lacks curb ramps or a marked mid-block crosswalk.
- To the south, students cross at various locations along 1st Street, including at the Coach Road and 1st Street intersection, Huntington Road and 1st Street traffic signal, and unmarked locations at other places along 1st Street.

- More students walk to school in the winter due to challenging winter driving conditions. However, snow berms along roads in the vicinity, and especially along Memorial Lane, force students to walk on the road.
- Multiple intersections surrounding the schools are lacking crosswalks on one or more legs.
- Vehicles often exceed the posted speed limit on Huntington Road and Coach Road.
- The Memorial Lane and Huntington Road intersection is slated to have additional curb ramps and crosswalks installed as part of an ongoing residential development in the northeast corner. Long-term, the intersection is planned for a roundabout.
- A more detailed review of school zone signs in the vicinity of the schools is needed to confirm compliance with current guidance in the *Manual on Uniform Traffic Control Devices (MUTCD)* on sign placement and school zone designations.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle circulation around the school were identified. These improvements are shown in Figure 3 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install crosswalks on 1st Street at the Stillwell Street intersection.
2. Investigate converting the 1st Street and Morson Street intersection to all-way stop control and stripe crosswalks on the west and south legs.
3. Install sidewalk on the south side of 1st Street.
4. Review school zone signage along area streets and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons with speed feedback signs along Coach Road.
5. Install a midblock crosswalk along Coach Road at the elementary school entrance (near Mid Oregon).
6. Install a crossing on the west and south legs of the Coach Road and Memorial Lane intersection and evaluate all-way stop-control.
7. Install an enhanced crossing, such as an RRFB, at the crosswalk in front of the Bi-Mart.
8. Install an enhanced crossing, such as an RRFB, and crosswalk on the north leg at the intersection of Memorial Lane and Huntington Road.
    a. Note: a roundabout is planned at this location in the long-term per City of La Pine plans.

9. Install sidewalk on the west side of Coach Road in front of La Pine High School to infill pedestrian pathways within the right-of-way.
10. Install sidewalks on the north and south sides of Memorial Lane from Huntington Road to the school (north side to be constructed by ongoing residential development).

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

Legend

- Time-of-Day Flashing Beacon
- Rapid Rectangular Flashing Beacon
- School Speed Limit Sign
- Speed Feedback Sign
- Pedestrian Crossing Sign
- Stop Sign

1. Install crosswalks on 1st Street at the Stillwell Street intersection.
2. Investigate converting the 1st Street and Morson Street intersection to all-way stop control and stripe crosswalks on the west and south legs.
3. Install sidewalk on the south side of 1st Street.
4. Review school zone signage along area streets and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons with speed feedback signs along Coach Road.
5. Install a midblock crosswalk along Coach Road at the elementary school entrance (near Mid Oregon).
6. Install a crossing on the west and south legs of the Coach Road and Memorial Lane intersection and evaluate all-way stop-control.
7. Install an enhanced crossing, such as an RRFB, at the crosswalk in front of the Bi-Mart.
8. Install an enhanced crossing, such as an RRFB, and crosswalk on the north leg at the intersection of Memorial Lane and Huntington Road.
   Note: a roundabout is planned at this location in the long-term per City of La Pine plans.
9. Install sidewalk on the west side of Coach Road in front of La Pine High School to infill pedestrian pathways within the right-of-way.
10. Install sidewalks on the north and south sides of Memorial Lane from Huntington Road to the school (north side to be constructed by ongoing residential development).

La Pine Middle School

La Pine Elementary School

La Pine High School

Morson Street

1st Street

Coach Road

Huntington Road

Memorial Lane

A roundabout is planned for the long-term at Memorial Lane & Huntington Road.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

Scale: 1" = 200'

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200 100 0 200

Figure 3: La Pine Elementary, Middle, and High Schools

La Pine, Oregon

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Rosland Elementary School

Rosland Elementary School is a K-5 school in La Pine. The school safety audit was conducted on May 21st, 2025, by Blaine Wruck (Deschutes County), Deborah Buduan (Rosland Elementary School Principal), Chris Mather (Bend-La Pine Schools Assistant Transportation Director), Michelle Rhoads (Bend-La Pine Schools Active Transportation Coordinator), and Matt Kittelson, Miranda Barrus, and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There are paths on the east and west sides of the school along City of La Pine streets that do not currently connect to any services or neighborhoods. A network of unpaved roads are present south of the school within undeveloped, forested lands.
- In front of the school, Burgess Road lacks pedestrian facilities and marked crosswalks, and it is not designated as a school zone. Staff at the school noted that students walking to the school is not common, though one student walks today and crosses at the intersection of Pine Drive and Burgess Road. There are no designated pedestrian routes for walking to and from school. Additional pedestrian activity is anticipated as development continues to occur in the area.
- School staff cross Burgess Road at Pine Drive to access the school mailbox, which is on the north side of this intersection.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are shown in Figure 4 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install a marked crosswalk and enhanced crossing, such as an RRFB, at the Pine Drive and Burgess Road intersection. Provide a sidewalk connection to the mailboxes on the north side of Burgess Road. Coordinate with the school district to improve the existing path along Pine Drive.

2. As development occurs south of the school, coordinate with the City of La Pine to identify improved access routes to and from the school for people driving, walking, and biking.
3. Review school zone signage along Burgess Road and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

1. Install a marked crosswalk and enhanced crossing, such as an RRFB, at the Pine Drive and Burgess Road intersection. Provide a sidewalk connection to the mailboxes on the north side of Burgess Road. Coordinate with the school district to improve the existing path along Pine Drive.
2. As development occurs south of the school, coordinate with the City of La Pine to identify improved access routes to and from the school for people driving, walking, and biking.
3. Review school zone signage along Burgess Road and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

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Scale: 1" = 150'

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Figure 4: Rosland Elementary School

La Pine, Oregon

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Buckingham Elementary School

Buckingham Elementary School is a K-5 school in Bend. The school safety audit was conducted on May 21st, 2025, by Blaine Wruck (Deschutes County), Michelle Wilson (Buckingham Elementary School Principal), Bend-La Pine Schools staff, Michelle Rhoads (Bend-La Pine Schools Active Transportation Coordinator), and Matt Kittelson, Miranda Barrus, and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There are a few students who live in the neighborhood surrounding Quail Ridge Road and walk to school. However, there are no pedestrian paths or sidewalks connecting to the school, except for a gravel path from Big Sky Park.
- There are no turning lanes at the school vehicular access points along Hamby Road. While southbound vehicles are waiting to turn left, other southbound vehicles have been observed to pass turning vehicles using the roadway shoulder.
- Buses and vehicles have reported that it is challenging to exit the school due to congestion on Hamby Road.
- Many students live within a mile of the school but they are bused or dropped off since there are no walking routes. The only students observed to walk to school do so from the Quail Ridge neighborhood directly west of the school.
- In 2024, the County installed time-of-day flashing beacon school zone signs, speed feedback signs, a pedestrian crossing of Hamby Road at Quail Ridge Road, and pedestrian crossing ahead warning signs on Hamby Road.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are summarized below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

- Since school improvements were recently constructed, no specific improvements to County-owned facilities were identified in the near-term.

- The school could work with agency partners to improve pedestrian and bicycle circulation in the near-term, including evaluating the feasibility of using the adjacent Bend Park and Recreation District (BPRD) parking lot to facilitate school pick up and drop off activities.

Tumalo Community School

Tumalo Community School is a K-5 school in Tumalo. The school is planned to be fully expanded as a K-8 school by the 2028/2029 school year. The school safety audit was conducted on May 27th, 2025, by Blaine Wruck (Deschutes County), Sam Platt (Tumalo Community School Principal), and Miranda Barrus and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There are no sidewalks along 2nd Street except in front of the school. There are no sidewalks along Cook Avenue except south of the fire station. Some students walk to school, and there are outdoor education activities off of 4th Street to the east by the river, where there are no sidewalks.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are shown in Figure 5 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install sidewalks on the north and south side of 2nd Street.
2. Install sidewalks on the west side of Cook Avenue.
3. Install an enhanced crossing, such as an RRFB at the intersection of Cook Avenue and 4th Street.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

Legend

- Rapid Rectangular Flashing Beacon
- Pedestrian Crossing Sign

Tumalo Community School

2nd Street

Cook Avenue

Cline Falls Highway

Tumalo Road

4th Street

1

2

3

A roundabout is planned for Cline Falls Road & Tumalo Road in the County's Capital Improvement Plan for Year 2029.

1. Install sidewalks on the north and south side of 2nd Street.
2. Install sidewalks on the west side of Cook Avenue.
3. Install an enhanced crossing, such as an RRFB at the intersection of Cook Avenue and 4th Street.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

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Scale: 1" = 100'

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Figure 5: Tumalo Community School

Tumalo, Oregon

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Terrebonne Community School

Terrebonne Community School is a K-5 school in Terrebonne. The school safety audit was conducted on June 4th, 2025, by Blaine Wruck (Deschutes County), Cyndi Ganfield (Terrebonne Community School Principal), Bend-La Pine Schools staff and Miranda Barrus (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- The midblock crosswalk on B Avenue lacks continental striping and Americans with Disabilities Act (ADA) compliant curb ramps.
- The bus drop off/pick up occurs on B Avenue and the parent drop off/pick up occurs on C Avenue.
- Vehicle on-street parking queues on C Avenue may block visible of the school zone signs and contribute to vehicle speeding in the corridor. The school places a cone in the middle of the midblock crosswalk on C Avenue to encourage vehicles to slow down.
- The Morning Glory neighborhood is not in the bussing zone and walking facilities for students within one mile of school are limited.

Recommendations/Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are shown in Figure 5 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership from partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install a continental crosswalk and install new curb ramps at the existing crossing on B Avenue in front of the school.
2. Review school zone signage along C Avenue and update to be compliant with MUTCD guidance and state law. Consider installing time-of-day flashing beacon school zone signs with speed feedback signs.
3. Install a crossing sign in the middle of the existing midblock crosswalk on C Avenue behind the school per MUTCD guidance.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

Legend

- Time-of-Day Flashing Beacon
- School Speed Limit Sign
- Speed Feedback Sign
- In-Street Pedestrian Crossing Sign

1. Install a continental crosswalk and install new curb ramps at the existing crossing on B Avenue in front of the school.
2. Review school zone signage along C Avenue and update to be compliant with MUTCD guidance and state law. Consider installing time-of-day flashing beacon school zone signs with speed feedback signs.
3. Install a crossing sign in the middle of the existing midblock crosswalk on C Avenue behind the school per MUTCD guidance.

C Avenue

Terrebonne Community School

B Avenue

US 97

An RRFB is under construction on the north leg of US97 & B Avenue.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

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Scale: 1" = 100'

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Figure 6: Terrebonne Community School

Terrebonne, Oregon

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Attachments

Attachment A – School Safety Audit Notes

Safety Walk Audit

S Century Drive
- Some ped traffic to SR village

Venture Lane

Enterprise Drive

Key Intersections
- S Century Drive / Venture Lane

- Bus-Vehicle conflicts

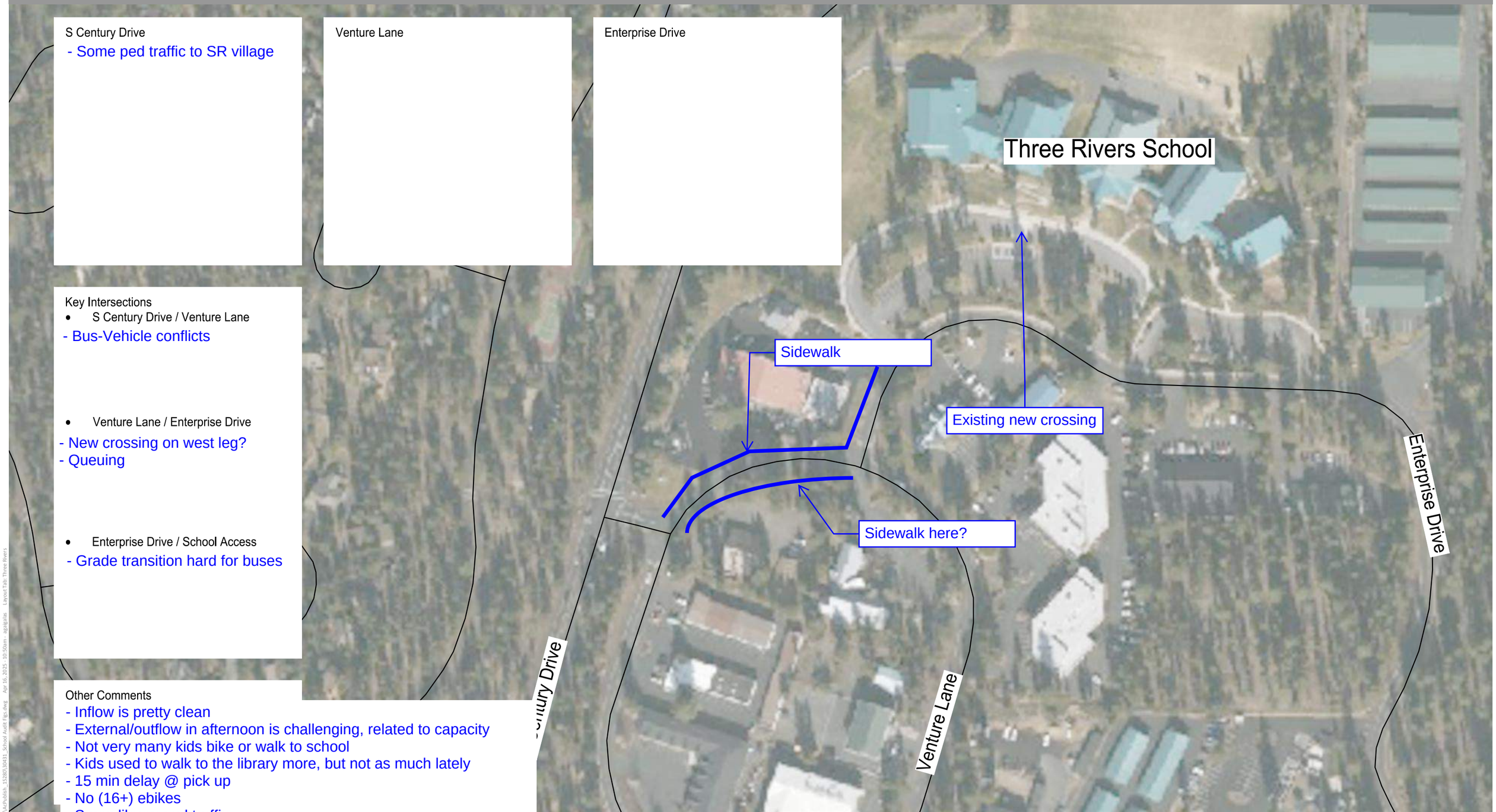
- Venture Lane / Enterprise Drive

- New crossing on west leg?
- Queuing

- Enterprise Drive / School Access

- Grade transition hard for buses

Other Comments
- Inflow is pretty clean
- External/outflow in afternoon is challenging, related to capacity
- Not very many kids bike or walk to school
- Kids used to walk to the library more, but not as much lately
- 15 min delay @ pick up
- No (16+) ebikes
- Some library ped traffic
- School newsletter 1st + 15th



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S Century Drive, Venture Lane, and Enterprise Drive
Three Rivers School

Safety Walk Audit

Key Intersections

- Coach Road / 1st Street

- Check crossings - a lot of foot traffic
- Traffic at pick up and drop off

- Huntington Road / 1st Street

- Backs up at pick up

- Coach Road / Memorial Lane

- No crosswalks
- Crossing should be on west leg
- AWSC? NB approach is free

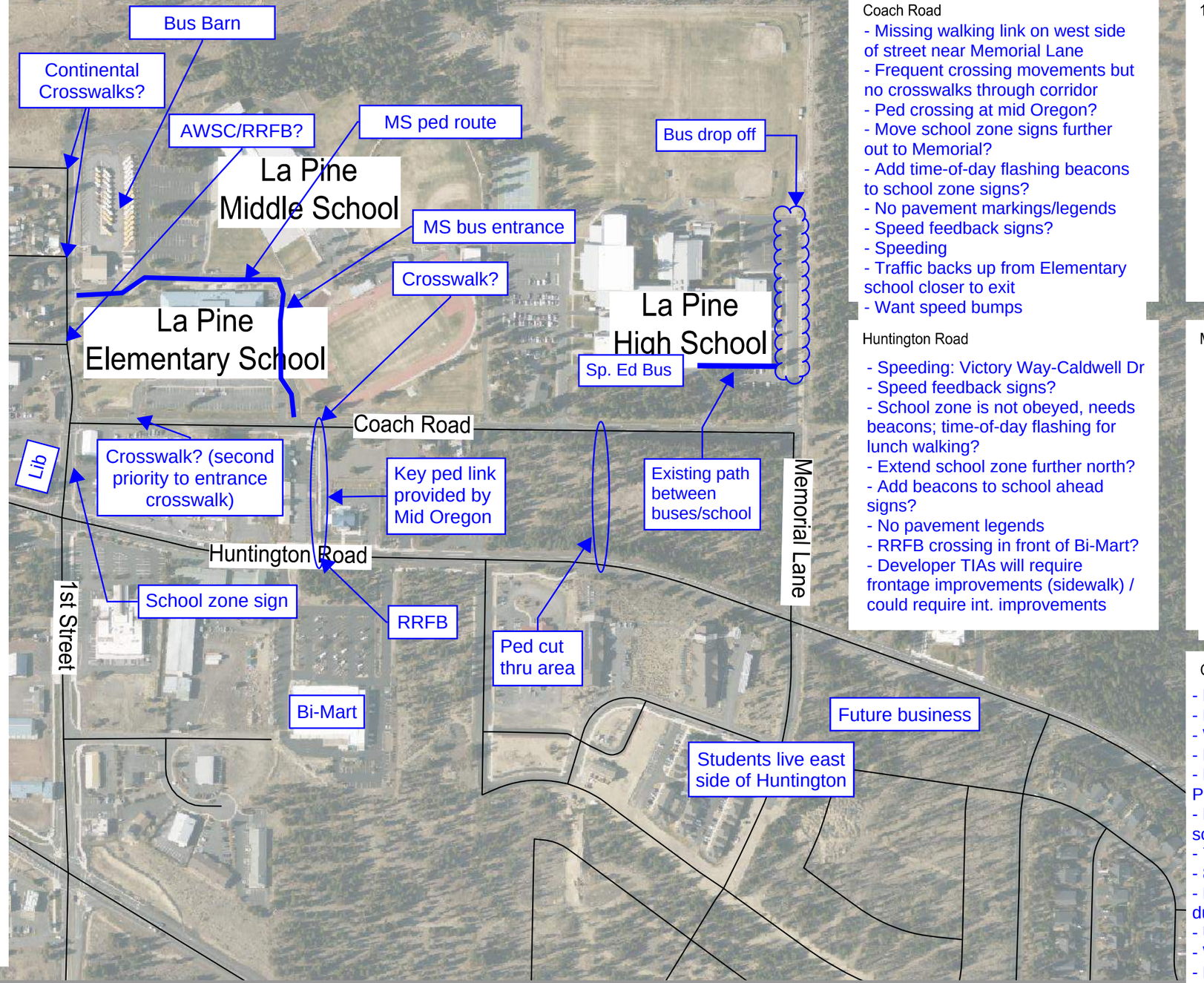
- Memorial Lane / Huntington Road

- Elementary kids walk across Huntington Rd
- RRFB in the near-term?
- Need crosswalk on north side (to connect to existing ramps and future sidewalk constructed by developer)
- Future commercial development NE intersection corner
- Future potential roundabout

- Coach Road / School Access

1st Street/School Access

- School zone infill



Coach Road

- Missing walking link on west side of street near Memorial Lane
- Frequent crossing movements but no crosswalks through corridor
- Ped crossing at mid Oregon?
- Move school zone signs further out to Memorial?
- Add time-of-day flashing beacons to school zone signs?
- No pavement markings/legends
- Speed feedback signs?
- Speeding
- Traffic backs up from Elementary school closer to exit
- Want speed bumps

Huntington Road

- Speeding: Victory Way-Caldwell Dr
- Speed feedback signs?
- School zone is not obeyed, needs beacons; time-of-day flashing for lunch walking?
- Extend school zone further north?
- Add beacons to school ahead signs?
- No pavement legends
- RRFB crossing in front of Bi-Mart?
- Developer TIAs will require frontage improvements (sidewalk) / could require int. improvements

1st Street

- No school zone signs near school (only school crossing signs)
- Midblock crossing?
- Sidewalk on south side?

Memorial Lane

- No sidewalks today - kids walk in gravel shoulders; snow berms in winter make it worse, kids have to walk in street
- Crossing needs at Coach Rd and at Huntington Rd
- Development (apartments) north side --> sidewalk being constructed between Coach Rd and Huntington Rd
- No school zone on Memorial Ln, just school crossing ahead signs
- Frontage improvements between Coach Road and Huntington Road

Other Comments

- More students drive in spring
- Ped traffic common in winter
- Would like RRFBs
- Flashing beacons for School Zones
- Dep. Jeff Woods says they do AM Patrols
- Not a lot of walkers from the elementary school
- 7:25 - ES bell time
- 8:45 - MS bell time
- Not a lot of walking between schools during drop off/pick up at ES/MS
- US 97 is a barrier for walking to school
- Walk and Roll activities May 28+June 6
- Pick up is more problematic than drop off

Scale: 1" = 350'

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350 175 0 350

DESCHUTES COUNTY

Coach Road, 1st Street, Huntington Road, and Memorial Lane

La Pine Elementary School, La Pine Middle School, and La Pine High School

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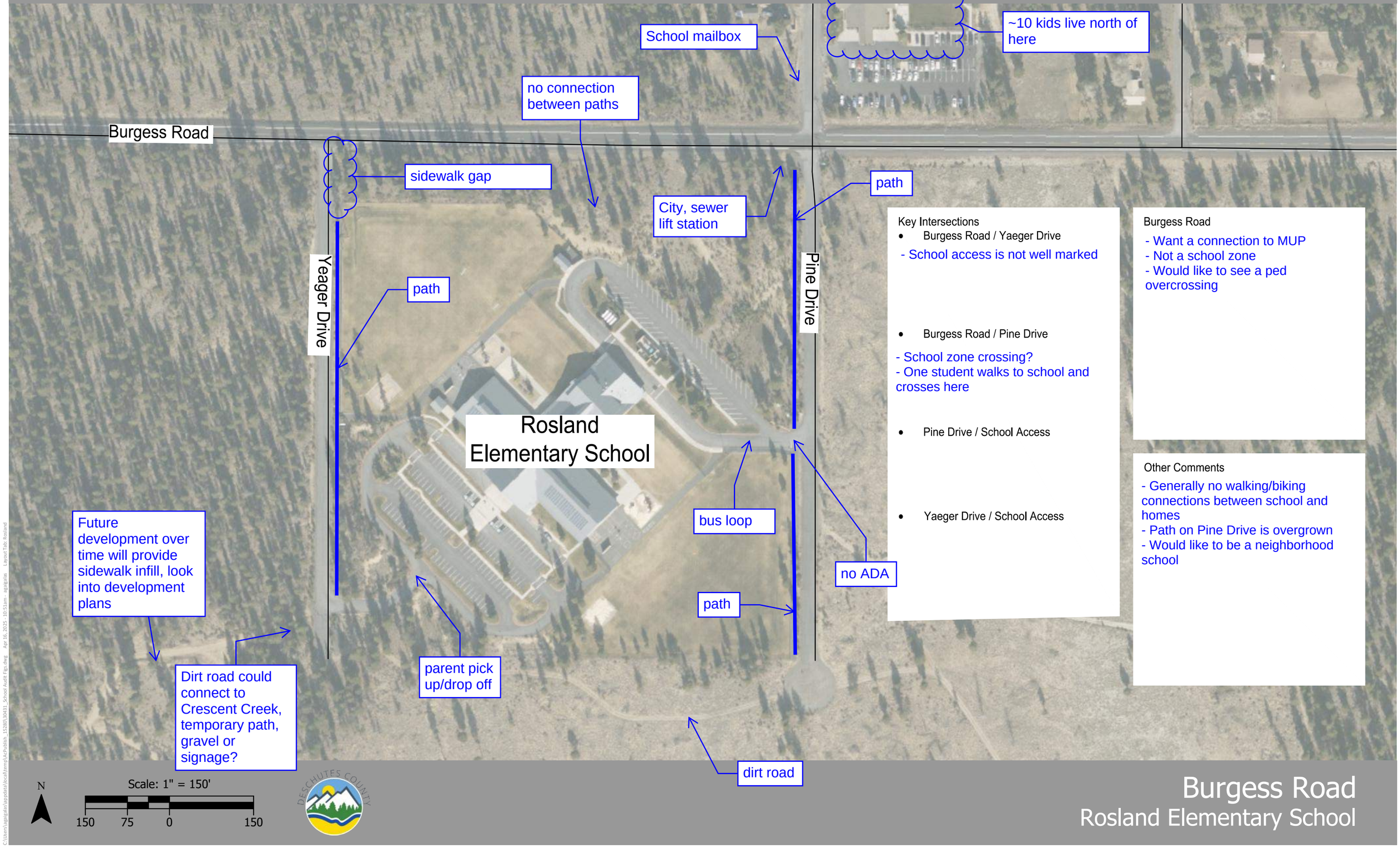
Safety Walk Audit



Key Intersections

- Burgess Road / Yaeger Drive

  - School access is not well marked

- Burgess Road / Pine Drive

  - School zone crossing?
  - One student walks to school and crosses here

- Pine Drive / School Access

- Yaeger Drive / School Access

Burgess Road

- Want a connection to MUP
- Not a school zone
- Would like to see a ped overcrossing

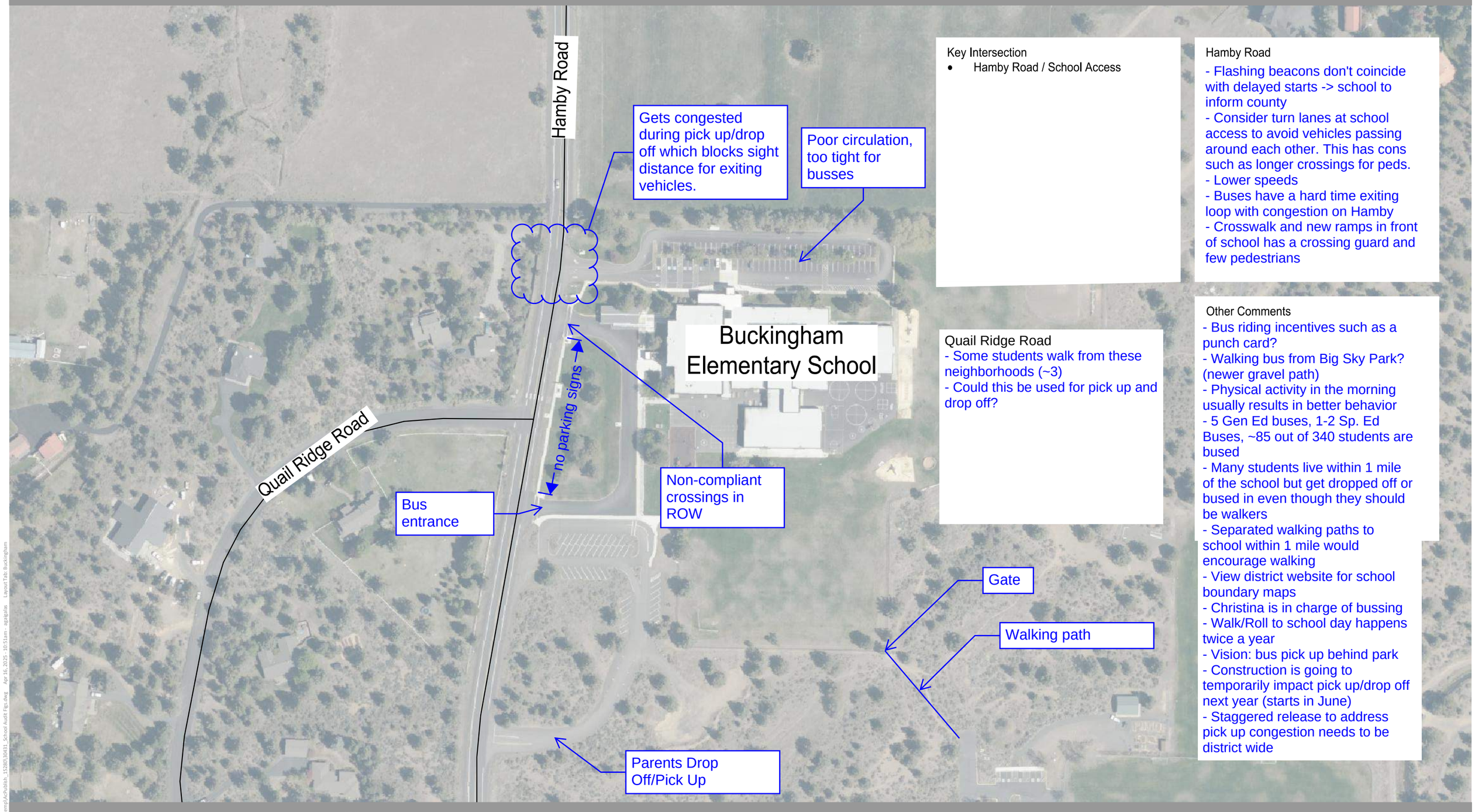
Other Comments

- Generally no walking/biking connections between school and homes
- Path on Pine Drive is overgrown
- Would like to be a neighborhood school

Burgess Road
Rosland Elementary School

C:\Users\vegi\atas\appdata\local\temp\AcPublish_15280\30431_School Audit Figs.dwg Apr 16, 2025 - 10:51am - vegi Layout Tab: Rosland

Safety Walk Audit



Key Intersection

- Hamby Road / School Access

Hamby Road

- Flashing beacons don't coincide with delayed starts -> school to inform county
- Consider turn lanes at school access to avoid vehicles passing around each other. This has cons such as longer crossings for peds.
- Lower speeds
- Buses have a hard time exiting loop with congestion on Hamby
- Crosswalk and new ramps in front of school has a crossing guard and few pedestrians

Quail Ridge Road

- Some students walk from these neighborhoods (~3)
- Could this be used for pick up and drop off?

Other Comments

- Bus riding incentives such as a punch card?
- Walking bus from Big Sky Park? (newer gravel path)
- Physical activity in the morning usually results in better behavior
- 5 Gen Ed buses, 1-2 Sp. Ed Buses, ~85 out of 340 students are bused
- Many students live within 1 mile of the school but get dropped off or bused in even though they should be walkers
- Separated walking paths to school within 1 mile would encourage walking
- View district website for school boundary maps
- Christina is in charge of bussing
- Walk/Roll to school day happens twice a year
- Vision: bus pick up behind park
- Construction is going to temporarily impact pick up/drop off next year (starts in June)
- Staggered release to address pick up congestion needs to be district wide

N

Scale: 1" = 150'

150 75 0 150

DESCHUTES COUNTY

Hamby Road

Buckingham Elementary School

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Safety Walk Audit

2nd Street

- Need sidewalk
- Drop off is smooth

4th Street

- Sidewalk connection to outdoor activities to the east by the river
- Students walk to school from south of 4th Street

Cook Avenue

- Need sidewalk

Cline Falls Road

- Vehicles travel fast when approaching Cook Avenue/4th Street

Key Intersections

- 2nd Street / Cook Avenue

- Sidewalk?

- 4th Street / Cook Avenue

- RRFB?

- 2nd Street / School Access

Other Comments

- Low number of people walking to school
- Will become a K-8 school by 28'/29'

Parent drop off/pick up

Residents encroaching on County ROW

Tumalo Community School

2nd Street

Cook Avenue

Cline Falls Road

No issues with uncontrolled intersection

Bus drop off/pick up

Buses exit on this street

4th Street

N

Scale: 1" = 100'

100 50 0 100

DESCHUTES COUNTY

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2nd Street, 4th Street, and Cook Avenue

Tumalo Community School

Safety Walk Audit

B Avenue

- Bus loading zone is on this street
- Midblock crosswalk is manned in the afternoon, add continental crosswalk and new ramps
- Inadequate parking
- Generally safe, lots of adult presence
- No parent pick up/drop off

C Avenue

- Vehicle queues during drop-off/pick-up block school zone signs
- TOD beacons/speed feedback signs?
- Vehicle speeding issues
- No parking during drop-off/pick-up?
- The midblock crosswalk is manned in the AM and PM
- Add centerline crosswalk sign? Mimics the temporary cone that bus drivers place in the crosswalk
- Replace tubular markers at crosswalk
- Queuing on both sides

Key Intersections

- C Avenue / US 97
  - Future signal?
- B Avenue / US 97
  - Some kids cross in the PM
- B Avenue / School Access

Other Comments

- Flashing beacons/speed signs at other schools seem to be most effective
- Limited walking facilities for students within a mile
- Need more off-site parking for family events
- Busiest in the AM (8:30-8:50 AM)
- More frequent walkers in afternoon
- Terrebonne detours
- No ped access to Morning Glory NH and no bussing
- CRR students + districting

N

Scale: 1" = 150'

150 75 0 150

DESCHUTES COUNTY

B Avenue and C Avenue
Terrebonne Community School

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APPENDIX D–STRATEGIES MEMORANDUM

Technical Memorandum

Date:	January 21, 2026	Kittelson Project No: 30431
To:	Project Management Team	
From:	Matt Kittelson, PE; Miranda Barrus, PE; Eza Gaigalas, PE; Kacie Schmidt; Joel McCarroll; Lacy Brown, PhD, PE, RSP_2; Briana Velasquez	
Subject:	Final Tech Memo #2: Strategies	

Introduction

This memorandum presents recommended strategies for the Deschutes County Transportation Safety Action Plan (TSAP) Update to reduce fatal and serious injury crashes on rural Deschutes County roads. These strategies were developed based on systemic trends and site-specific crash histories identified through previous technical analyses, summarized in the Existing Conditions Memorandum, and from community feedback. The recommended strategies include:

- Systemic treatments that can be applied through the County's transportation system;
- Site-specific projects to implement at 10 priority sites, including 5 concept drawings;
- Multidisciplinary actions (e.g., education, enforcement, emergency response, equity) to complement the infrastructure recommendations; and.
- Safe System Approach Principles and Objectives (Source: FHWA).

This memorandum identifies potential funding sources for Deschutes County to pursue with partner agencies in implementing the draft strategies. It also includes recommended performance measures to assess progress toward the goal of zero transportation-related fatalities and serious injuries within rural Deschutes County.

The information presented herein describes the intent behind the strategies and how they work together to achieve the Safe System Approach (Figure 1) and improve safety culture in rural Deschutes County.

The recommended strategies will be refined based on feedback from the Safety Working Group (SWG) and community to be incorporated into the draft TSAP.

Figure 1. Safe System Approach Principles and Objectives (Source: FHWA)

Systemic Treatments

This section presents recommended systemic engineering treatments. Systemic solutions are generally lower cost and can often be applied on a wide scale to proactively address crash risks as well as these crash Emphasis Areas identified for rural Deschutes County:

- Roadway and Lane Departure Crashes
- Drug and Alcohol Impairment
- Aging Drivers (65+)
- Motorcyclists
- Younger Drivers (15-25)
- Speeding
- Intersections

Many of the systemic treatments presented in this section may be incorporated into ongoing maintenance activities to maximize cost-effectiveness. The treatments are organized into four general groups:

- **Roadway/Lane Departure Countermeasures,** which are treatments to reduce crashes from motorists departing the travel lane or roadway.
- **Corridor Access Management Countermeasures,** which are treatments designed to reduce crashes related to driveways.
- **Pedestrian and Bicycle Countermeasures**, which include treatments that address crashes involving vulnerable road users, most commonly bicyclists and pedestrians.
- **Intersection Countermeasures**, which may be applied in a systemic fashion at County Road intersections.
- **Speed Management Strategies,** which are treatments designed to reduce crashes related to vehicles speeding.

Descriptions of these treatments include their documented effectiveness at reducing crashes through the Oregon Department of Transportation (ODOT)-approved Crash Reduction Factor (CRF) list, when available. The descriptions also provide additional detail on the context for when the treatments could be implemented effectively and define some constraints that might limit their effectiveness. CRFs are not available for non-engineering strategies.

The treatments are categorized into three tiers for implementation:

- **Tier 1 Countermeasures** have a low cost and have low barriers to implementation.
- **Tier 2 Countermeasures** have a medium cost and have medium barriers to implementation.
- **Tier 3 Countermeasures** have a high cost and have high barriers to implementation.

Roadway/Lane Departure Countermeasures

This category of countermeasures includes treatments to reduce roadway and lane departure crashes.

Tier 1 Countermeasures

Install Chevron Signs on Horizontal Curves	
Chevron signs along horizontal curves provide a visual cue to alert and guide motorists through an approaching curve. Chevron signs alert drivers to reduce speeds and prepare to enter a curve. Chevron placement also helps guide drivers through the curve by providing a visual cue to the approaching curve's radius.	
Applicable Collision Types	*Run-off-the-road injury crashes*
Potential Collision Reduction	*16%*
Planning-Level Cost	*$750 per sign*

Source: FHWA

Install Recessed Pavement Markers

Recessed pavement markers are installed along the edge and centerline of the roadway to increase reflectivity and visibility during night-time conditions.

Applicable Collision Types	*Nighttime crashes*
Potential Collision Reduction	*15%*
Planning-Level Cost	*$20 to $23 each* *$2,500 to $3,000 per lane mile*

Source: Deschutes County

Install Post-Mounted Delineators (Curve Application)

Post mounted delineators can be installed adjacent to the roadway to provide better delineation for drivers to see where the edge of the roadway is, particularly during low-visibility conditions.

Applicable Collision Types	*Nighttime curve crashes*
Potential Collision Reduction	*30%*
Planning-Level Cost	*$90 each*

Source: Deschutes County

Install Oversized or Doubled Up Advanced Curve Warning Signs

Oversized or doubled up warning signs can be installed in advance of curves to provide additional warning.

Applicable Collision Types	*Run-off-the-road crashes*
Potential Collision Reduction	*20%*
Planning-Level Cost	*$1,500 each*

Source: FHWA

Install Fluorescent Yellow Sheeting for Advanced Warning Signs

Curve warning signs can be upgraded to fluorescent yellow sheeting for additional emphasis on curves to provide additional warning to motorists.

Applicable Collision Types	*Run-off-the-road crashes*
Potential Collision Reduction	*20%*
Planning-Level Cost	*$30 per sq foot of sheeting or $1,500 for a new sign*

Source: FHWA

Install Retroreflective Strips on Sign Posts Advanced Warning Signs	
The posts on any sign, but particularly curve warning signs can be upgraded to install retroreflective strips on the post or additional emphasis on curves to provide additional warning to motorists.	
Applicable Collision Types	*Run-off-the-road crashes*
Potential Collision Reduction	*Not Available*
Planning-Level Cost	*$30 per post*

Source: NYSDOT

Install LED Flashing Curve Signs/Chevrons	
Upgrade existing curve warning signs and/or chevrons to LED flashing outlined sign at curves to provide additional warning to motorists.	
Applicable Collision Types	*Curve crashes*
Potential Collision Reduction	*10%*
Planning-Level Cost	*$1,000 to $2,000 per sign*

Source: DKS

Install Edgeline Striping (4")	
Stripe edgelines to delineate the traveled way and improve visibility for drivers. Edgelines help define the edge of the roadway. This increased visibility of the roadway edge can reduce the occurrence of vehicles leaving the roadway.	
Applicable Collision Types	*Run-off-the-road crashes*
Potential Collision Reduction	*11%*
Planning-Level Cost	*$0.25-1.50 per foot (thermoplastic); $0.15 to 0.75 per foot (paint)*

Source: Texas A&M Transportation Institute

Install Wider Edgelines (8”)	
Restripe edgelines to increase their width to improve visibility for drivers. Wider edge-lines more clearly define the edge of the roadway. This increased visibility of the edge of roadway can reduce the incidence of vehicles leaving the roadway.	
Applicable Collision Types	*All crashes*
Potential Collision Reduction	*14%*
Planning-Level Cost	*$2.50-3.00 per foot (thermoplastic); $2.00 per foot (paint)*

Source: Google (Deschutes County)

Tier 2 Countermeasures

Install Dynamic Feedback Sign on Curves	
Dynamic speed warning signs alert drivers of their speed into the approach of a curve when their speed is above the curve design speed. Dynamic speed warning signs can reduce curve-related crashes by providing visual feedback to the driver that speeds should be reduced when approaching a curve.	
Applicable Collision Types	*All crashes*
Potential Collision Reduction	*5%*
Planning-Level Cost	*$20,000 per sign*

Source: FHWA

Install Shoulder Rumble Strips

Shoulder rumble strips provide auditory and tactile feedback to motorists when they begin to exit the outside of the travel lane. Shoulder rumble strips can help reduce run-off-the-road crashes by alerting drivers that they are traveling beyond the designated lane. Consideration should be given to bicycle traffic when determining where to place rumble strips and how to accommodate bicyclists on the shoulder.

Applicable Collision Types	*Run off the road crashes*
Potential Collision Reduction	*22%*
Planning-Level Cost	*$3,000 per mile (both sides)*

Source: FHWA

Install Shoulder Sinusoidal Rumble (Mumble) Strips

Shoulder rumble strips provide auditory and tactile feedback to motorists when they begin to exit the outside of the travel lane. Mumble strips reduce the amount of noise to nearby land uses while providing tactile feedback to the motorist. They are also more compatible with narrow paved shoulders. Consideration should be given to bicycle traffic when determining where to place rumble strips and how to accommodate bicyclists on the shoulder.

Applicable Collision Types	*Run off the road collisions*
Potential Collision Reduction	*22%*
Planning-Level Cost	*$2,000 per mile*

Source: Caltrans

Install Centerline Rumble Strips

Centerline rumble strips provide auditory and tactile feedback to motorists when they have begun to cross over the centerline of the roadway. Centerline rumble strips can reduce head-on and other crossover crash types on horizontal curves of undivided roadway segments by alerting drivers they are crossing over the centerline into the opposing direction of traffic.

Applicable Collision Types	*All injury crashes; head-on and sideswipe meeting injury crashes*
Potential Collision Reduction	*12%; 45%*
Planning-Level Cost	*$2,000 per mile*

Source: Deschtues County

Increase Pavement Friction (Segment or Curve Application)

High friction surface treatments apply aggregate to the pavement to increase or maintain the pavement friction at a site. Increasing or maintaining appropriate pavement friction through a curve can reduce the potential for motorists to lose control of their vehicle or skid when navigating a curve. Increased pavement friction has been shown to reduce crash frequency during wet conditions and in locations with high friction demand caused by vehicle speeds or roadway geometrics.

Applicable Collision Types	*Run-off-the-road crashes (curves); Wet road crashes (segments)*
Potential Collision Reduction	*72% (curves); 57 (wet segments)%*
Planning-Level Cost	*$40 per square yard*

Source: FHWA

Upgrade Guardrail End Treatments		
Upgrading guardrail end treatments ensure that errant motorists who strike the leading end of a guardrail will strike an energy absorbing system that will minimize the risk of injury to the motorist.		
Applicable Collision Types	*Run-off-the-road crashes*	 *Source: Deschutes County*
Potential Collision Reduction	*Not available*	
Planning-Level Cost	*Varies*	

Review Pass/No Pass Markings		
Systematically review Pass/No Pass Markings on two lane roads to ensure that passing zones are marked correctly and motorists have adequate sight distance to safely pass based on the posted or operating speeds. The review can be completed using traditional methods or by using LIDAR.		
Applicable Collision Types	*Head-on crashes; Side-swipe meeting crashes*	 *Source: ODOT*
Potential Collision Reduction	*Varies*	
Planning-Level Cost	*Varies*	

Tier 3 Countermeasures

Widen Paved Shoulder by 1 to 3 Feet	
Widen the paved shoulder adjacent to travel lanes. Paved shoulders may increase safety performance when navigating horizontal curves by providing a paved recovery area for motorists who have left the travel lane. The shoulder can help a driver maintain control and correct the vehicle path. Widening the outside shoulder of a curve provides the greatest benefit on roads where existing space is limited. This treatment also benefits bicyclists by providing more dedicated space for the bicyclists separate from motor vehicle traffic.	
Applicable Collision Types	*All collisions*
Potential Collision Reduction	*6% (by 1 foot); 13% (by 2 feet); 18% (by 3 feet)*
Planning-Level Cost	*Varies*

Source: Deschutes County

Install New Guardrail	
Install guardrail where lane departure crashes strike object in the clear zone or where vehicles tend to roll over because of non-recoverable slopes in the clear zone.	
Applicable Collision Types	*Run-off-the-road injury crashes*
Potential Collision Reduction	*47%*
Planning-Level Cost	*$2,000 per lineal foot*

Source: Deschutes County

Remove, Relocate, or Protect Fixed Objects Adjacent to Road	
Remove or relocate fixed objects adjacent to the roadway to increase the unpaved shoulder clear zone. Clearing or moving fixed objects away from the roadway can reduce fixed-object crashes by providing a clear zone that gives drivers more space and time to correct their path should they leave the road.	
Applicable Collision Types	*All crashes*
Potential Collision Reduction	*22% (from 3 feet to 16 feet); 44% (from 16 feet to 30 feet)*
Planning-Level Cost	*Varies*

Source: Deschutes County

Corridor Access Management Countermeasures

This category includes a single countermeasure to reduce driveway related crashes.

Tier 3 Countermeasures

Close, Consolidate, or Relocate Urban Driveways (Access Management)		
Access management refers to the control of entry and exit points along a roadway. Access management treatments can include closing, consolidating, or relocating driveways or restricting certain movements in and out of driveways. This treatment can enhance safety for all modes, facilitate walking and biking, reduce trip delay and congestion, and decrease vehicle conflicts.		
Applicable Collision Types	*All injury crashes*	 *Source: Deschutes County*
Potential Collision Reduction	*25% (10-24 driveways to less than 10 per mile); 29% (48 driveways to 26-48 per mile); 31% (26-48 driveways to 10-24 per mile)*	
Planning-Level Cost	*Varies*	

Pedestrian & Bicyclist Countermeasures

This category includes countermeasures to reduce crashes involving vulnerable road users such as bicyclists and pedestrians.

Tier 1 Countermeasures

Install Green Bike Lanes at Conflict Points	
On-street bike lanes may be painted green to designate a high conflict location. This can include intersections where there are large volumes of right-turning vehicles, segments where there are many driveways or where the bicycle lane must cross over a motor vehicle lane. For example, when a right turn lane is developed, the through bicycle lane must cross it.	
Applicable Collision Types	*Bicycle crashes*
Potential Collision Reduction	*39%*
Planning-Level Cost	*$10 per square foot (pavement markings only)*

Source: Deschutes County

Install Buffered Bike Lanes

Bike lanes are on-street facilities. This facility type includes bike lanes with a painted buffer (stripe) but no physical (horizontal and vertical) separation between vehicle travel lanes and bicycle travel lanes. The class II designation includes buffered bike lanes, which provide extra lateral separation visually but without vertical elements. In general, a buffer is preferred where possible. When bicycle lanes are installed on roads with on-street parking, the buffer should be wide enough to prevent "dooring" bicycle crashes. Buffered bicycle lanes are limited to roadways with a minimum of 36' of width as 18' per side is the minimum necessary to accommodate an 11' travel lane, 2' buffer and a 5' bike lane.

Applicable Collision Types	*Bicycle injury crashes*
Potential Collision Reduction	*47%*
Planning-Level Cost	*$20,000-$30,000 per mile (striping only)*

Source; City of Corvallis

Install Shared Roadway Features

Bike routes (which may be designated as "bicycle boulevards" or "urban greenways") provide shared use of right-of-way among bicyclists and motorists, as designated by signs or permanent markings along a route. Roadways designated as Class III bike routes should have enough width to accommodate motorists and bicyclists together. Shared-lane markings ("sharrows") can be used to alert users of the shared roadway environment. Because the right-of-way is shared, speed management on Class III bikeways is essential (see the *Speed Management Toolbox* later in this memorandum).

Applicable Collision Types	*Bicycle crashes*
Potential Collision Reduction	*TBD*
Planning-Level Cost	*$500 per pavement marking*

Source: NACTO

Install Shared Roadway Features	
At locations with physical constraints, such as bridges and tunnels, active warning beacons, signage, and pavement markings may be used to alert drivers that bicyclists are on the roadway. It may be appropriate to reduce vehicle speeds through reduced posted or advisory speed limits and traffic calming measures to increase bicyclist comfort.	
Applicable Collision Types	*Bicycle crashes*
Potential Collision Reduction	*Not available*
Planning-Level Cost	*$10,000*

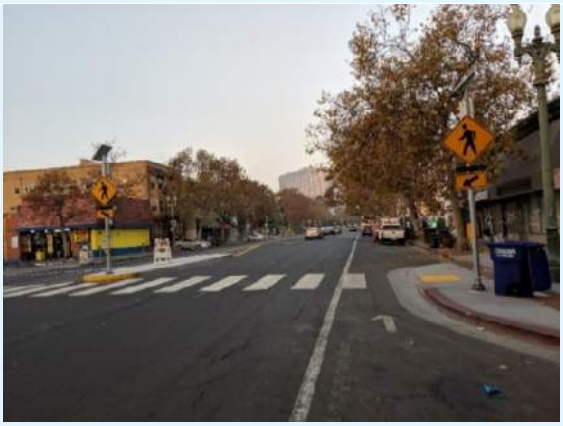
Source: Deschutes County

Tier 2 Countermeasures

Install Pedestrian Refuge Island	
Median refuge islands are physical crossing enhancements that allow for two-stage crossings (where people only need to cross one direction of travel at a time). This effectively shortens the crossing distance and reduces exposure to vehicles. Median refuge islands are most suitable for locations where pedestrians must cross three or more vehicle travel lanes (but may also be considered in other locations, space permitting). Medians may also support speed management on high-speed roadways at uncontrolled or midblock crossing locations.	
Applicable Collision Types	*Pedestrian crashes*
Potential Collision Reduction	*31%*
Planning-Level Cost	*$25,000*

Source: New York City DOT

Install Urban Curb Extensions	
Curb extensions visually and physically narrow the roadway at pedestrian crossing locations and provide additional space to wait at street corners while reducing crossing distances for pedestrians. Curb extensions increase visibility of pedestrians by bringing the crossing further into the roadway. This is especially beneficial with the presence of on-street parking at the approach to the crossing. Curb extensions can also serve as transit stop locations to support bus priority in not leaving the traffic stream.	
Applicable Collision Types	*All crashes*
Potential Collision Reduction	*30%*
Planning-Level Cost	*$25,000*



Source: FHWA

Tier 3 Countermeasures

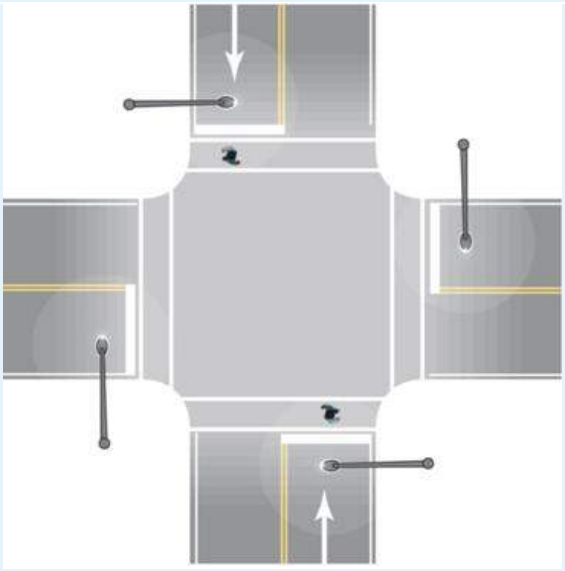
Install Raised or Tabletop Urban Crosswalks	
At locations with high volumes of pedestrians or where pedestrians mix with higher speed traffic, raised crosswalks elevate the visibility of pedestrians while ensuring drivers reduce their speeds. Typically, they are flush with the adjacent sidewalk. Drainage can be issue. Generally, this countermeasure would only be implemented in urbanized environments and are not applicable to rural highways. They also complicate winter maintenance efforts (snow plowing).	
Applicable Collision Types	*Bicycle and pedestrian crashes*
Potential Collision Reduction	*30%*
Planning-Level Cost	*$31,000*

Source: FHWA

Install Intersection Lighting (Pedestrians/Bicyclists)

Adding intersection lighting for signalized and non-signalized intersections helps improve the visibility of the intersection and potential conflicts. Intersection illumination, including pedestrian crossings, helps illuminate crossing pedestrians for approaching motorists and assists pedestrians in navigating the crossing.

Applicable Collision Types	*Nighttime pedestrian and bicycle injury crashes*
Potential Collision Reduction	*42%*
Planning-Level Cost	*$8,500 per pole*

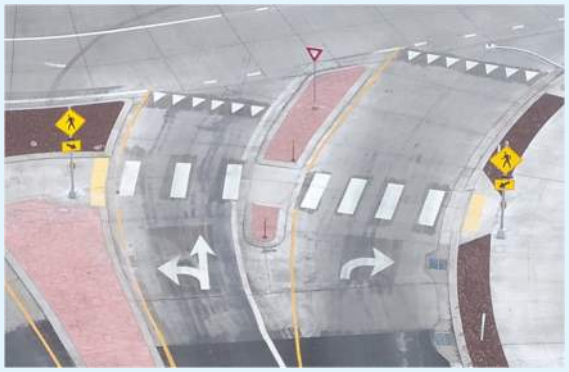


Source: FHWA

Install Rectangular Rapid Flashing Beacons

Rectangular Rapid Flashing Beacons (RRFBs) are pedestrian-actuated warning signs supplemented with high-visibility LED lights. When activated, RRFBs flash a high-visibility strobe-like light warning drivers when pedestrians are crossing. RRFBs have shown to reduce pedestrian collisions by up to 47%. RRFBs should be used in locations with high pedestrian safety issues as over-use may diminish their effectiveness. Installing median pedestrian islands with RRFBs can also reduce crashes at pedestrian crossings with more than two lanes.

Applicable Collision Types	*Pedestrian crashes*
Potential Collision Reduction	*10% (2-lane road or 3-lane+ road without median); 56% (3-lane+ with median)*
Planning-Level Cost	*$20,000 - $50,000*



Source: Deschtues County

Intersection Countermeasures

This category includes countermeasures to reduce crashes involving motor vehicles at intersections.

Tier 1 Countermeasures

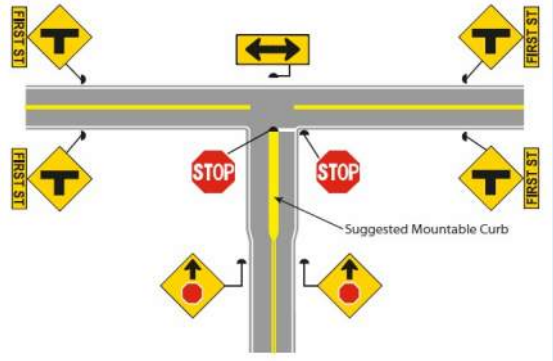
Increase Intersection Warning with Signing and Striping

Implementing a package of low-cost treatments can be used to increase intersection warning and improve safety performance at unsignalized intersections. The improvements may include:

- Doubled (left and right) oversize warning signs
- Doubled STOP signs
- A raised splitter island on the stop approach (if feasible)
- Street name signs
- Stop bars
- Removing any limitations to sight distance
- Double warning arrow at the stem of T-Intersections

This set of enhancements combines multiple treatments to make the approach of two-way stop-controlled intersections more visible to the driver and increase awareness and visibility of potential conflicts. These treatments can help slow approaching vehicles and increase stop compliance on the controlled approaches. The County and cities should determine which treatments are appropriate at the individual locations where they are applied; some of the treatment options may not be applicable at every location.

Applicable Collision Types	*All collisions*
Potential Collision Reduction	*20% (1-2 treatments); 25% (3-4 treatments); 30% (5-7 treatments)*
Planning-Level Cost	*Varies: $750 per new sign; $1,500 per oversized sign; $1,200 per Stop Ahead legend*



Source: FHWA

Install Transverse Rumble Strips on Stop-Controlled Approaches

Transverse rumble strips create an audible warning to attract the attention of a driver and alert them to a possible change of conditions, such as an upcoming stop control or curve. Transverse rumble strips should be used in conjunction with advance signing to warn of the intersection ahead. Care should be taken to avoid installing transverse rumble strips near residences and businesses due to the noise generated by the vehicles when driving over the strips. In locations with bicycle lanes or wide paved shoulders, these should not extend into the bicyclist's area. Breaks in the rumble strips may allow motorcycles to avoid them. The rumble strips may be ground into the pavement as shown in the photograph below or can be raised thermoplastic strips.

Applicable Collision Types	*All fatal & serious injury crashes*
Potential Collision Reduction	*25%*
Planning-Level Cost	$4 per foot

Source: FHWA

Install "Stop Ahead" Pavement Markings

Stop ahead pavement markings are used to alert drivers of the presence of an intersection and that stopping is required. These markings provide a supplementary message and should be used in conjunction with additional regulatory warning and stops signs.

Applicable Collision Types	*All collisions*
Potential Collision Reduction	*31%*
Planning-Level Cost	*$1,200 each*

Source: FHWA

Install Flashing LED Stop Sign[1]

Flashing LED stop signs help draw motorists' attention to an upcoming intersection, particularly in low light.

Applicable Collision Types	*Angle crashes*
Potential Collision Reduction	*41%*
Planning-Level Cost	*$1,000 per sign*

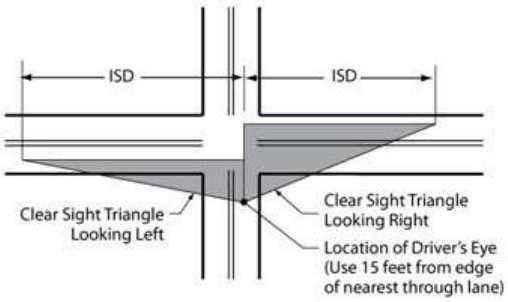
Source: MnDOT

[1] FHWA Crash Modification Factor (CMF) Clearinghouse, CMF ID 6602

Increase Triangle Sight Distance

Increasing intersection sight distance may involve a variety of actions to increase the line of sight including clearing vegetation and embankments, relocating objects, implementing parking restrictions. By increasing intersection sight distance, drivers are provided with a greater distance to see potential conflicts and complete maneuvers to avoid potential collisions.

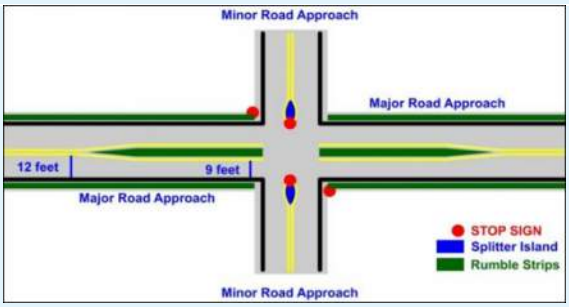
Applicable Collision Types	*All injury crashes*
Potential Collision Reduction	*48%*
Planning-Level Cost	*Varies*



Source: FHWA

Tier 2 Countermeasures

Install Raised Divider on Stop Approach (Splitter Island)[1]	
Installing a raised divider (with mountable curb) on a stop-controlled approach to an intersection can reduce approach speeds by reducing the available and perceived width for motorists on approach. It may also allow for warning signs on the left as well as the right.	
Applicable Collision Types	*All crashes*
Potential Collision Reduction	*Not available*
Planning-Level Cost	*$7-10 per square foot*



Source: FHWA

[1] FHWA, "Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections," (2014)

Install Raised Divider on Major (Uncontrolled) Approach (Splitter Island)[1]	
Installing a raised divider (with mountable curb) on a stop-controlled approach to an intersection can reduce approach speeds by reducing the available and perceived width for motorists on approach. It may also allow for warning signs on the left as well as the right.	
Applicable Collision Types	*All crashes*
Potential Collision Reduction	*Not available*
Planning-Level Cost	*$7-10 per square foot*

Source: FHWA

[1] FHWA, "Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections," (2014)

Tier 3 Countermeasures

Convert Minor Road Stop-Controlled Intersection to Compact or Mini Roundabout[1]

Compact and min-roundabouts feature channelized approaches and a traversable central island to move traffic through an intersection. As at typical roundabouts, entering traffic yields to vehicles already circulating, leading to improved operational performance. Mini roundabouts have an inscribed circular diameter (ICD) between 45 and 80 feet while compact roundabouts have an ICD between 70 to 110 feet. Both mini and compact roundabouts often fit within the footprint of the existing intersection. Mini roundabouts are more appropriate for lower speed environments such as urban or suburban areas. An Intersection Control Evaluation should be completed before install a compact or mini-roundabout.

Applicable Collision Types	*All injury crashes*
Potential Collision Reduction	*61%*
Planning-Level Cost	*$100,000 - $800,000*

Source: MSA

[1] FHWA CMF Clearinghouse, CMF ID 11241

Install Intersection Lighting (Motorists)

Adding intersection lighting for signalized and non-signalized intersections helps improve the visibility of the intersection and potential conflicts. Intersection illumination, including pedestrian crossings, helps illuminate crossing pedestrians for approaching motorists and assists pedestrians in navigating the crossing.

Applicable Collision Types	*Nighttime crashes*
Potential Collision Reduction	*38%*
Planning-Level Cost	*$8,500 per pole*

Source: Deschutes County

Convert Minor Road Stop-Controlled Intersection to Roundabout

Roundabouts feature channelized approaches and a central island to move traffic through an intersection. At roundabouts, entering traffic yields to vehicles already circulating, leading to improved operational performance. Single-lane roundabouts are typically designed so that drivers must approach the intersection at speeds below 25 miles per hour. The approach speed can reduce the severity of crashes when compared to other intersection forms. Roundabouts can be used in place of a two-way and all-way stop-controlled intersection, and potentially traffic signals depending on volume. Replacing a rural two-way stop-controlled intersection with a single-lane roundabout has been shown to reduce injury crashes as much as 82 percent.

Applicable Collision Types	*All injury crashes*
Potential Collision Reduction	*82%*
Planning-Level Cost	*$2.5M - $3M*

Source: Deschutes County

Reduce the Skew Angle of an Intersection

A skewed intersection has an angle of less than 90 degrees between the intersecting streets. Intersections with severe skews reduce sight distance for approaching drivers. They are especially problematic for older drivers who have reduced neck mobility.

Applicable Collision Types	*All crashes*
Potential Collision Reduction	*Varies by skew angle*
Planning-Level Cost	*Varies*

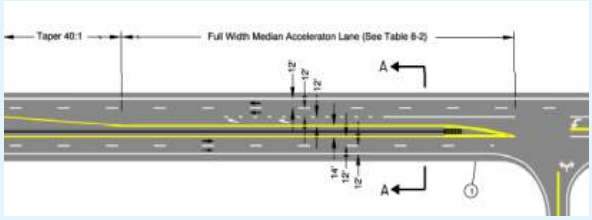
Source: Google (Deschutes County)

Install Left-Turn Lanes on Major Roads at Stop-Controlled Intersections	
Left-turn lanes provide physical separation between turning vehicles and through traveling vehicles, thus separating the slowing vehicles from the rest of traffic and reducing the risk for rear-end crashes. Left-turn lanes allow drives to continue through the intersection without having to stop for traffic making left turns.	
Applicable Collision Types	*All crashes*
Potential Collision Reduction	*44% (3-leg intersection); 48% (4-leg intersection)*
Planning-Level Cost	*Varies*


Example of left-turn lanes.

Source: FHWA

Install Rural Median Acceleration Lane	
Rural median acceleration lanes allow vehicles turning from the side street onto the major street to complete a two-stage left-turn. Vehicles must wait for a gap in one direction of traffic before turning into the acceleration lane, where they are able to accelerate and merge into the travel lane at full speed.	
Applicable Collision Types	*All injury crashes*
Potential Collision Reduction	*45%*
Planning-Level Cost	*Varies*



Source: ODOT APM

Speed Management Strategies

Excessive speed can exacerbate risks when a crash occurs, especially for bicyclists and pedestrians. As such, managing speeds is an area of continued interest for the County. This section presents a secondary set of treatments for managing speeds, either by reducing the frequency of unsafe speeds by motorists and/or by clearly indicating to drivers when speeds need to be reduced to prepare for a change in roadway conditions, such as a stop-controlled intersection or curves. These focus on low-cost treatments that may be implemented in a systemic manner.

Some of the systemic treatments presented in the previous section can also be used as speed management tools. For instance, lane narrowing is an intersection-specific crash countermeasure that can also reduce speeds of motorists. For this reason, such treatments are not repeated in this section.

The types of treatments and other strategies presented in the Speed Management Toolbox are organized into the following three categories:

- Pavement markings;
- Physical roadway improvements; and,
- Signing.

For each treatment, a description is provided as well as guidance on typical application. The treatments are broken into Tiers of Low (1) and Medium (2) cost.

Tier 1 Countermeasures

Transverse Lane Marking

Description: Transverse lane markings are horizontal markings placed on the roadway. There are many types of transverse lane markings including optical bars and chevron marking. They may extend partially into a lane or be placed fully across the lane.

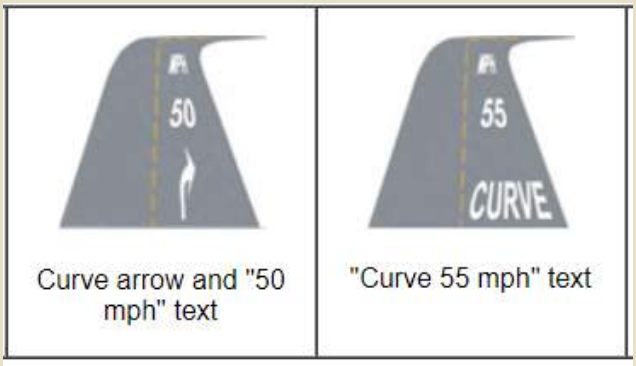
Application Guidance: Transverse markings are especially useful for transition zones and can be used in locations where there is an approaching change in roadway character such as an intersection or curve. Markings may be spaced increasingly closer on the approach to an intersection to give the appearance of increased speed so a driver is more aware of their speed. Transverse lane markings support decreased speeds on intersection approaches or other roadway transition. Optical speed bars are an additional type of transverse marking. MUTCD Section 3B.22 provides guidance on placement of optical speed bars.

Source: Deschutes County

Speed Advisory Markings in Lane ("Slow", "Curve", or "Speed Limit XX")

Description: Advisory markings provide information before curves and other advisory zones. Markings may include the speed limit or a warning of an approaching curve.

Application Guidance: NCHRP Report 600: *Human Factors Guidelines for Road Systems* contains guidelines for effective markings. The report found that usage of speed advisory markings may lower speeds by up to 4 MPH and showed an 11% reduction in vehicles exceeding the speed limit. Speed advisory markings can supplement other signage such as curve advisory signs. MUTCD Section 3B.20 provides design and placement criteria for pavement advisory markings.



Curve arrow and "50 mph" text | "Curve 55 mph" text

Source: FHWA

Narrow Travel Lanes on the Approach to Intersection

Description: Narrowing travel lanes on the approach to an intersection provided a visual cue to motorists to reduce speeds on the approach.

Application Guidance: Narrower lanes can be installed on the approach to signalized, stop controlled or uncontrolled approaches. The lanes may be narrowed by creating a media, a wider shoulder (or bicycle lane), or both. Narrower lanes may be supplemented by the addition of splitter islands, rumble strips, tubular markers, recessed pavement markers or buffered bike lanes depending on site conditions.

Source: FHWA

Centerline Delineator Posts

Description: Vertical centerline posts are a type of vertical treatment that delineates the centerline. This treatment is also known as a longitudinal channelizer.

Application Guidance: Vertical delineators can be used for lane narrowing. Delineators may be between 18-36 inches tall and spaced 32 inches apart. Posts should only be applied where there is enough room in the roadway to accommodate larger vehicles. This treatment can help reduce speed along long straight roadways. Centerline vertical delineators placed on rural roads have been shown to reduce average speed by as much as 3 MPH. Delineators also have the benefit of separating oncoming traffic and potentially reducing the risk of head-on collisions.

Source: Iowa State University, Speed Management Toolbox for Rural Communities

LEDs in Pavement Markings or Signs

Description: LEDs can be embedded in delineators or any warning or regulatory sign. MUTCD Section 2A.08 contains guidance on the installation of signage with embedded LEDs.

Application Guidance: LEDs can draw driver attention and improve comprehension of signage on curves. This treatment has also been applied LEDs experimentally by placing LEDs in the roadway serving the function of roadway advisory pavement markings. LEDs may also be embedded in speed limit signs. LEDs on speed limit signs have been shown to reduce the number of vehicles that were traveling over the speed limit.

Source: Deschutes County

Tier 2 Countermeasures

Splitter Islands at Intersections

Description: Splitter islands are a treatment for stop-controlled intersections that may be located on the approach to an intersection to increase the intersection visibility and allow space to add a left-side stop sign. They can also be used to provide deflection on the intersection approach to support speed reduction. They help channelize and guide turning vehicles from the major roadway.

Application Guidance: Splitter islands have been shown to be effective at decreasing traffic speed and reducing intersections crashes. Splitter islands can be combined with doubled-up stop signs for increased visibility. NCHRP Report 279 covers splitter island design and placement.

Source: FHWA

Horizontal Deflections

Description: Horizontal deflections are a type of physical roadway or curb enhancement to narrow or otherwise break up a roadway's straight design character. A horizontal deflection requires the motorist to navigate a curvilinear alignment stay on the roadway path.

Application Guidance: Horizontal deflections can provide a visual endpoint for the roadway along curves. Lateral shifts, chicanes, and roundabouts are examples of horizontal deflections. Horizontal deflections are more common in populated areas and can be integrated as a part of other roadway infrastructure such as medians, pedestrian islands, or curb extensions. Center islands are an additional type of horizontal defection that provides separation from traffic and can reduce the risk of a head-on collision occurring.


Source: City and County of San Francisco

Dynamic Speed Displays and Vehicle-Actuated Signs / Speed Trailers

Description: Dynamic speed feedback signs display the speed of approaching vehicles. Dynamic signs can display other information or signage that is triggered by an approaching vehicle.

Application Guidance: Dynamic speed feedback signs on rural roadways may reduce 85th percentile speeds by 2 – 7 MPH. Typical applications include paring a dynamic speed feedback sign with a speed limit sign or curve advisory sign.

Source: Deschutes County

Priority Location Improvements

The Existing Conditions Memorandum identified the High Injury Network (HIN) throughout rural Deschutes County, highlighting roads and intersections with the highest concentrations of crashes—particularly those resulting in fatal or serious injuries. Based on this evaluation and community input, the County selected 10 locations for capital projects aimed at addressing observed crash histories and patterns. These capital projects are generally more costly than the previously presented systemic treatments. Figure 2 shows the 10 priority locations. Potential improvements have been developed for each location: conceptual layouts are provided for five locations, while systemic treatments are proposed for the remaining five. The County and its partners will continue to refine proposed changes to the transportation system through further analysis, design, and stakeholder input.

Priority Locations with Conceptual Layouts of Potential Improvements

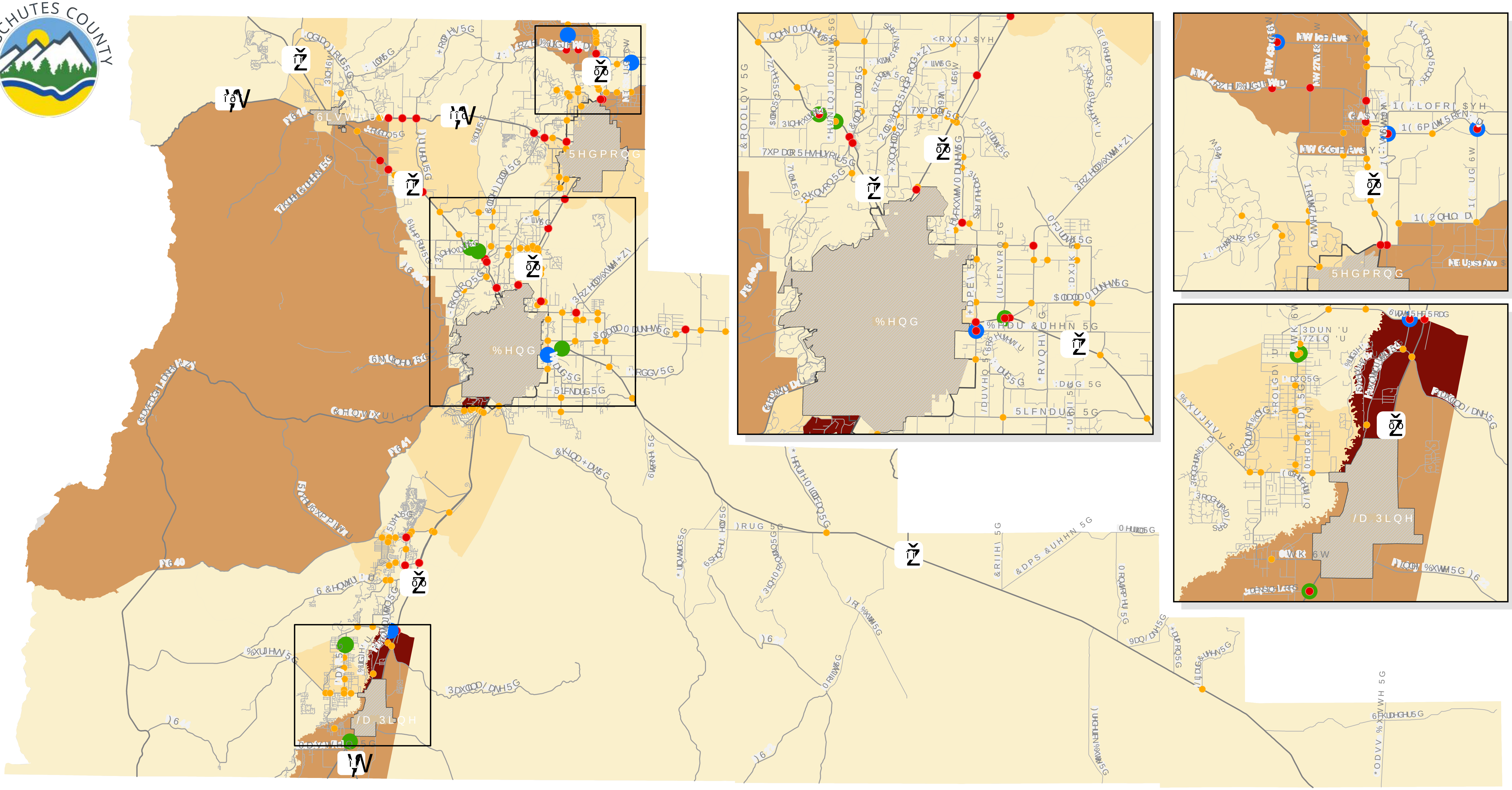
- US 97 / Jackpine Loop (North)
- US 20 / Pinehurst Road
- US 20 / Gerking Market Road
- US 20 / Erickson Road-Torkelson Road
- Day Road / Amber Lane / 5th Street

Priority Locations with Systemic Treatments Applied

- State Recreation Road / Huntington Road
- Bear Creek Road / Ward Road
- NE Smith Rock Way / NE 33rd Street
- NE Smith Rock Way / NE 1st Street
- NW Ice Avenue / NW 43rd Street

Figure 2 displays the 10 sites and how their locations correspond to social equity data across the county (shown in blue shading), which was sourced from ODOT. This illustrates that, in addition to addressing priority safety improvements within the County, many of these projects are generally situated near people that are often underserved by the transportation system.

Additional safety improvements for various locations have been identified as part of previous planning efforts. Details about these projects are provided in the 'Previously Planned & Ongoing Safety Projects' section later in this memorandum.



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The following sections present a brief summary of the crash characteristics at these sites and the recommended changes to reduce their crash frequencies and severities. The recommended changes are guided by the intersection design principles listed below, which are rooted in the Safe System Approach:

- Reducing the number of conflict points (between all users)
- Improving (reducing) conflict angles
- Reducing speeds
- Improving visibility
- Separating different modes of transportation

All recommendations are for consideration by the County and its partners and require additional evaluation for project development, such as traffic operations analysis at intersections with traffic control changes, ball-banking tests for curves with curve warning and chevron signs, and lighting assessments.

Priority Locations with Conceptual Layouts

This section presents the recommended modifications for the five priority locations with conceptual layouts. Proven countermeasures from the ODOT All Roads Transportation Safety (ARTS) Program approved countermeasure list were intentionally selected in order to be consistent with State DOT guidance.

US 97 / Jackpine Loop (North)

Jackpine Loop is an unpaved dirt road south of La Pine that connects to US 97 at two separate locations. Of the two, the northern intersection has experienced a crash pattern that identifies it as a priority location for improvements. This intersection serves as a connection between US 97 and adjacent rural properties. It is a three-leg, two-way stop-controlled intersection without turn lanes. Jackpine Loop is the minor stop-controlled facility, while US 97 is the major uncontrolled facility. There is no signage warning motorists on US 97 of the approaching intersection, although a road sign for Jackpine Loop is present at its connection to US 97. The intersection does not have power lines or streetlights. The crash history within the intersection boundary is summarized in Table 1 and demonstrates complex issues for the highway and motorists making passing maneuvers in the vicinity of the intersection, as well as intersection issues. For example, the serious sideswipe-overtaking crash resulted in a four-vehicle collision when a northbound vehicle sideswiped another northbound vehicle and collided into two southbound vehicles. Additionally, the serious turning movement crash was reported at the US 97 / Jackpine Loop (North) intersection.

Table 1: US 97 / Jackpine Loop Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Sideswipe-Overtaking	1	-	-	**1**
Turning	1	-	-	**1**
Head On	1	-	-	**1**
Misc (Animal)	-	1	-	**1**
Total	**3**	**1**	**-**	**4**

The rural roadway network west of US 97 provides an opportunity to consolidate intersections and reduce conflict points along US 97, consistent with the Safe System Approach. Based on these principles, the concept developed for the location would:

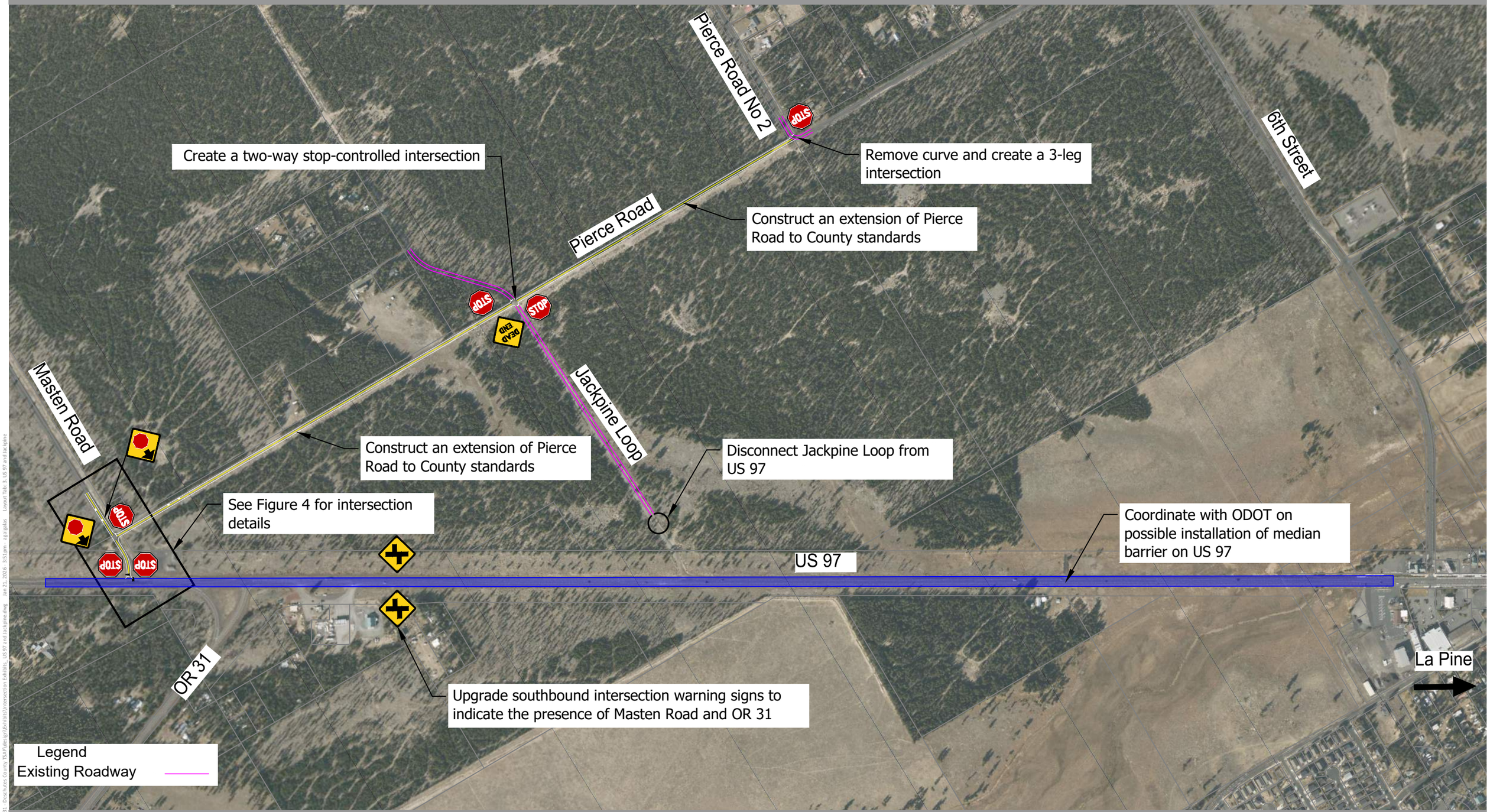
- Close access at the US 97 / Jackpine Loop (North) intersection and reroute vehicular access to the US 97 / Masten Road intersection approximately 3,650 feet to the south.
- Improve Pierce Road, which is a north-south road between Jackpine Loop and Masten Road.
- Improve intersection warning to the US 97 / Masten Road intersection to increase visibility for vehicles approaching from all directions.

These recommended system modifications are presented in Figure 3 and Figure 4 and the crash reduction associated with specific countermeasures are summarized in Table 2. The planning-level cost estimate for these improvements will be detailed in the updated TSAP.

The US 97 / Masten Road is located just south of the US 97 / OR 31 intersection. Based on the proximity, the concept presented, including the potential installation of a median along the highway, should be further coordinated with ODOT to increase compatibility with the near-term and long-term function of that junction and the highway as a whole. Today, there is an intersection warning sign on the northbound approach on US 97 but not the southbound. The southbound approach has a right-turn lane. US 97 through this intersection is a two-lane undivided highway with southbound passing allowed. On Masten Road, there is a single ‘stop ahead’ warning sign for the eastbound direction approaching US 97. There are powerlines crossing US 97 at this intersection and no lighting is present.

Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change



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The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 3: US 97 and Jackpine Loop

Deschutes County, Oregon

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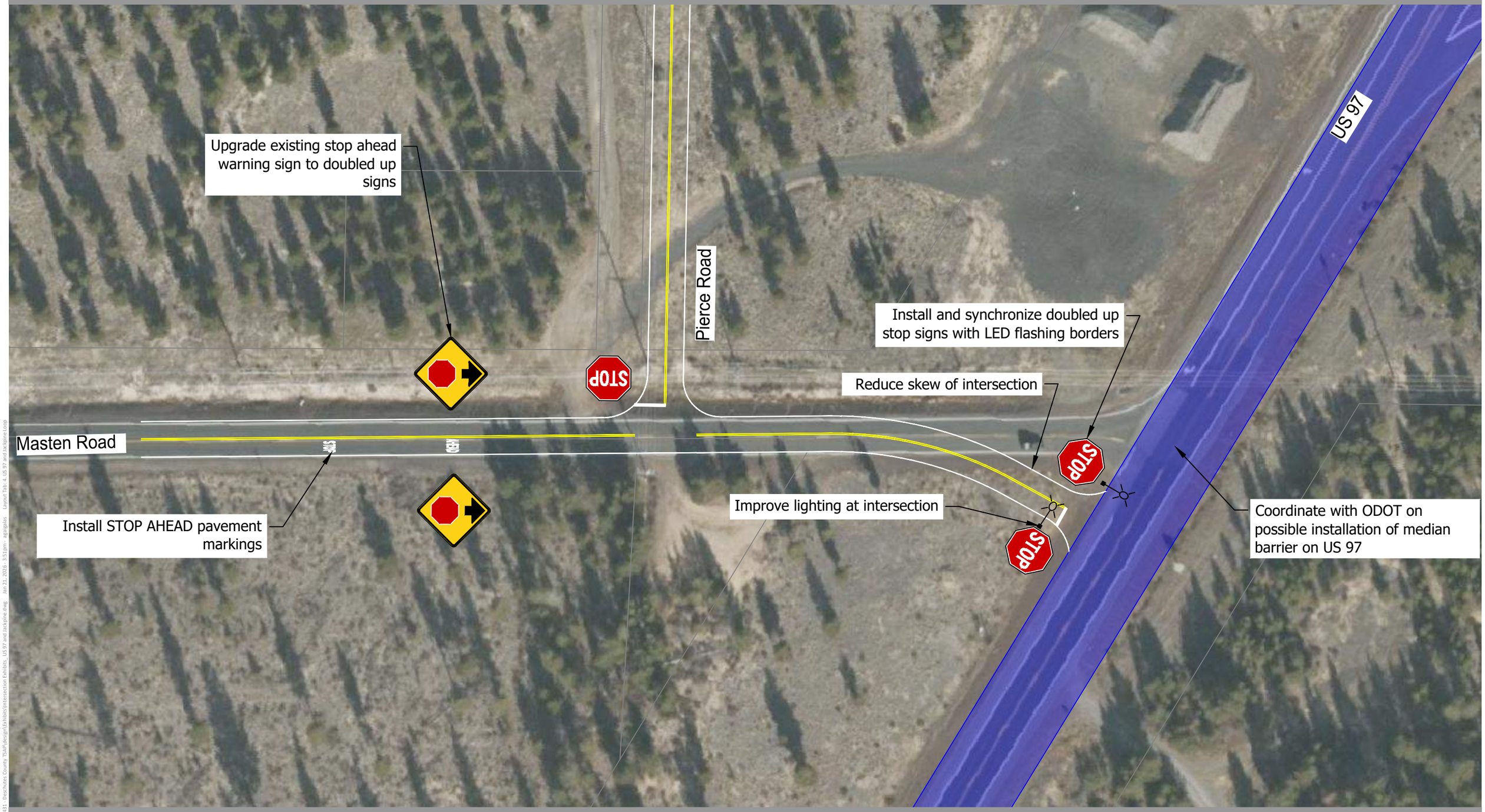
Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change



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Scale: 1" = 60'

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The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 4: US 97 and Masten Road

Deschutes County, Oregon

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Table 2. US 97 / Jackpine Loop Countermeasures

ARTS[1] #	Description	CRF (%)	Crash Type	Crash Severity
H29	Install Lighting at Intersection	38	Night	All Injury (Excludes PDO's)
I15	Install Flashing Beacons as Advance Warning at Intersections (Not Coordinated with Signal Timing)	13	All	All
I17	Increase Triangle Sight Distance	48	All	All Injury (Excludes PDO's)
I21	Improve Intersection Warning: Stop Ahead Pavement Markings, Stop Ahead Signs, Additional Stop Signs	25	All	All

[1] All Roads Transportation Safety (ODOT's transportation safety program)

US 20 / Pinehurst Road

This intersection connects US 20 to nearby properties and serves local east-west travel along Pinehurst Road. It is a two-way stop-controlled intersection of rural two-lane roadways without turn lanes on either US 20 or Pinehurst Road. Pinehurst Road is severely skewed across US 20. Pinehurst Road is the stop-controlled facility, while US 20, oriented northwest-southeast, is uncontrolled. US 20 is posted as 55 mph. Advance signage indicating an approaching intersection is posted on US 20. A gravel turnout along southeast-bound US 20 connects to Pinehurst Road prior to the intersection and is frequently used as a right-turn lane. Eastbound Pinehurst Road has a posted advisory turning speed of 30 mph and a 'stop ahead' warning sign, though no additional intersection or speed limit signage is present. There is no street lighting at the intersection, but overhead powerlines cross US 20 at the intersection. The crash history at this intersection is summarized in Table 3.

Table 3: US 20 / Pinehurst Road Crash History (2018-2022)

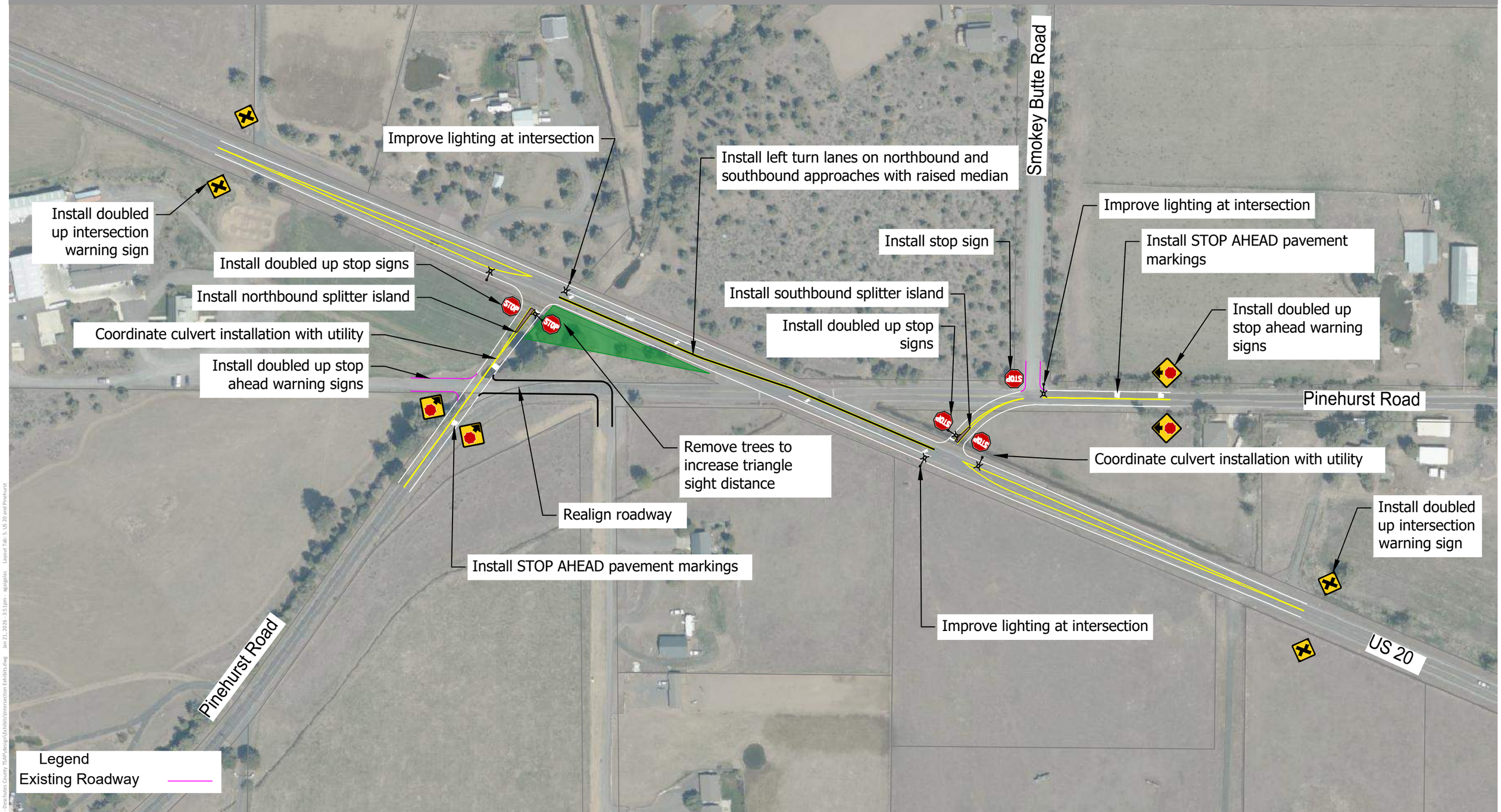
Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Rear-End	1	3	1	**5**
Turning	1	1	-	**2**
Misc (Fixed-Object)	-	1	1	**2**
Total	**2**	**5**	**2**	**9**

The modifications recommended for this intersection to address its crash history are illustrated in Figure 5 and identified in Table 4, including countermeasure crash reduction factors. As shown in Figure 5, the primary recommended modification is to separate the four-leg Pinehurst Road intersection into two three-leg intersections to alleviate the severe skew angle and create left-turn lanes on US 20.

The planning-level cost estimate for these improvements will be detailed in the updated TSAP.

Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change



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Scale: 1" = 150'

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The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 5: US 20 and Pinehurst Road

Deschutes County, Oregon

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Table 4. US 20 / Pinehurst Road Countermeasures

ARTS [1] #	Description	CRF (%)	Crash Type	Crash Severity
H10	Left Turn Lane on Both Major Road Approaches: Rural, Unsignalized Intersection (4-leg)	48	All	All
H17	Channelized Left Turn Lane with Raised Median on All Approaches (3- or 4-leg)	27	All	All Injury (Excludes PDO's)
H26	Convert 4-Leg Intersection to Two 3-Leg Intersections (Minor St ADT is 15-30% of Total Entering Traffic)	25	All	All Injury (Excludes PDO's)
H27	Convert 4-Leg Intersection to Two 3-Leg Intersections (Minor St ADT is 30% + of Total Entering Traffic)	33	All	All Injury (Excludes PDO's)
H29	Install Lighting at Intersection	38	Night	All Injury (Excludes PDO's)
H61	Reduce Intersection Skew Angle (Minor Street Stop-Controlled Intersections Only) on 4-Leg intersection	CRF = 100*(1-e0.0054*ΔSkew Angle) Where, ΔSkew Angle = Proposed Skew Angle - Existing Skew Angle"	All	All
I17	Increase Triangle Sight Distance	48	All	All Injury (Excludes PDO's)
I21	Improve Intersection Warning: Stop Ahead Pavement Markings, Stop Ahead Signs, Additional Stop Signs	25	All	All
I28	Install 6 ft. or greater Raised Divider on Stop Approach (Splitter Island)	15	All	All

[1] All Roads Transportation Safety (ODOT's transportation safety program)

US 20 / Gerking Market Road

The intersection of US 20 and Gerking Market Road is a rural T-intersection located northwest of Tumalo. It is a two-way stop-controlled intersection of rural two-lane highways without turn lanes. Gerking Market Road is the stop-controlled facility on the minor approach with a posted speed limit of 45 mph, while US 20 is uncontrolled with a posted speed limit of 55 mph. Gerking Market Road is skewed at its connection to US 20. Additionally, a passing lane on US 20 begins east of the intersection in the westbound direction and its merge of the passing lane into the primary lane is present through intersection, with signage provided to indicate the transition. There are no streetlights at the intersection. Overhead powerlines are present across US 20 at the intersection. The crash history at this intersection is summarized in Table 5.

Table 5: US 20 / Gerking Market Road Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Rear-End	-	1	2	**3**
Turning	1	-	-	**1**
Sideswipe	-	-	1	**1**
Total	**1**	**1**	**3**	**5**

The modifications recommended for this intersection to address its crash history are illustrated in Figure 6 and identified in Table 6, including countermeasure crash reduction factors. As shown in Figure 6, the primary recommended modifications are to reduce the intersection skew and to provide turn lanes on US 20.

The planning-level cost estimate for these improvements will be detailed in the updated TSAP.

Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change

Gerking Market Road

Install STOP AHEAD pavement markings

Install doubled up stop signs

Explore relocating the merge lane

Install doubled up intersection warning signs

Install doubled up stop ahead warning signs

Install southbound splitter island

Install channelized right turn lane

Install eastbound left turn lane

Improve lighting at intersection

Install doubled up intersection warning signs

US 20

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Scale: 1" = 150'

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The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 6: US 20 and Gerking Market Road

Deschutes County, Oregon

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Table 6. US 20 / Gerking Market Countermeasures

ARTS [1] #	Description	CRF (%)	Crash Type	Crash Severity
H6	Channelized Right Turn Lane with Raised Median	35	All	All Injury (Excludes PDO's)
H9	Left Turn Lane on Single Major Road Approach: Rural, Unsignalized Intersection (3-leg)	44	All	All
H29	Install Lighting at Intersection	38	Night	All Injury (Excludes PDO's)
H60	Reduce Intersection Skew Angle (Minor Street Stop-Controlled Intersections Only) on 3-Leg intersection	CRF = 100*(e^0.0040*Skew Angle) existing (e^0.0040*Skew Angle) proposed	All	All
I21	Improve Intersection Warning: Stop Ahead Pavement Markings, Stop Ahead Signs, Additional Stop Signs	25	All	All
I28	Install 6 ft. or greater Raised Divider on Stop Approach (Splitter Island)	15	All	All

[1] All Roads Transportation Safety (ODOT's transportation safety program)

US 20 / Erickson Road-Torkelson Road

The intersection of US 20 and Erickson Road is a rural four-leg intersection located east of Bend. It is a two-way stop-controlled intersection with two lanes on all approaches. The US 20 eastbound and westbound approaches have space for right-turning vehicles to move out of the travel lane to make their maneuver and remain on the roadway, but these spaces lack pavement markings and signage for the right-turn movement. Erickson Road (north) and Torkelson Road (south) are the stop-controlled approaches with no posted speed limit, while US 20 is uncontrolled with a posted speed limit of 55 mph.

On the eastbound and westbound approaches, there are intersection warning signs for the approaching Erickson Road intersection. On the northbound and southbound approaches, there are 'stop ahead' warning signs approaching US 20. There are no streetlights at the intersection and overhead powerlines cross US 20 at the intersection. Trees near the intersection may obstruct sight lines for Erickson Road vehicles waiting to turn onto or cross US 20. The intersection is also located in relatively close proximity to the US20-Powell Butte Highway intersection to the east, which has a protected left turn lane on the eastbound approach. The crash history at this intersection is summarized in Table 7.

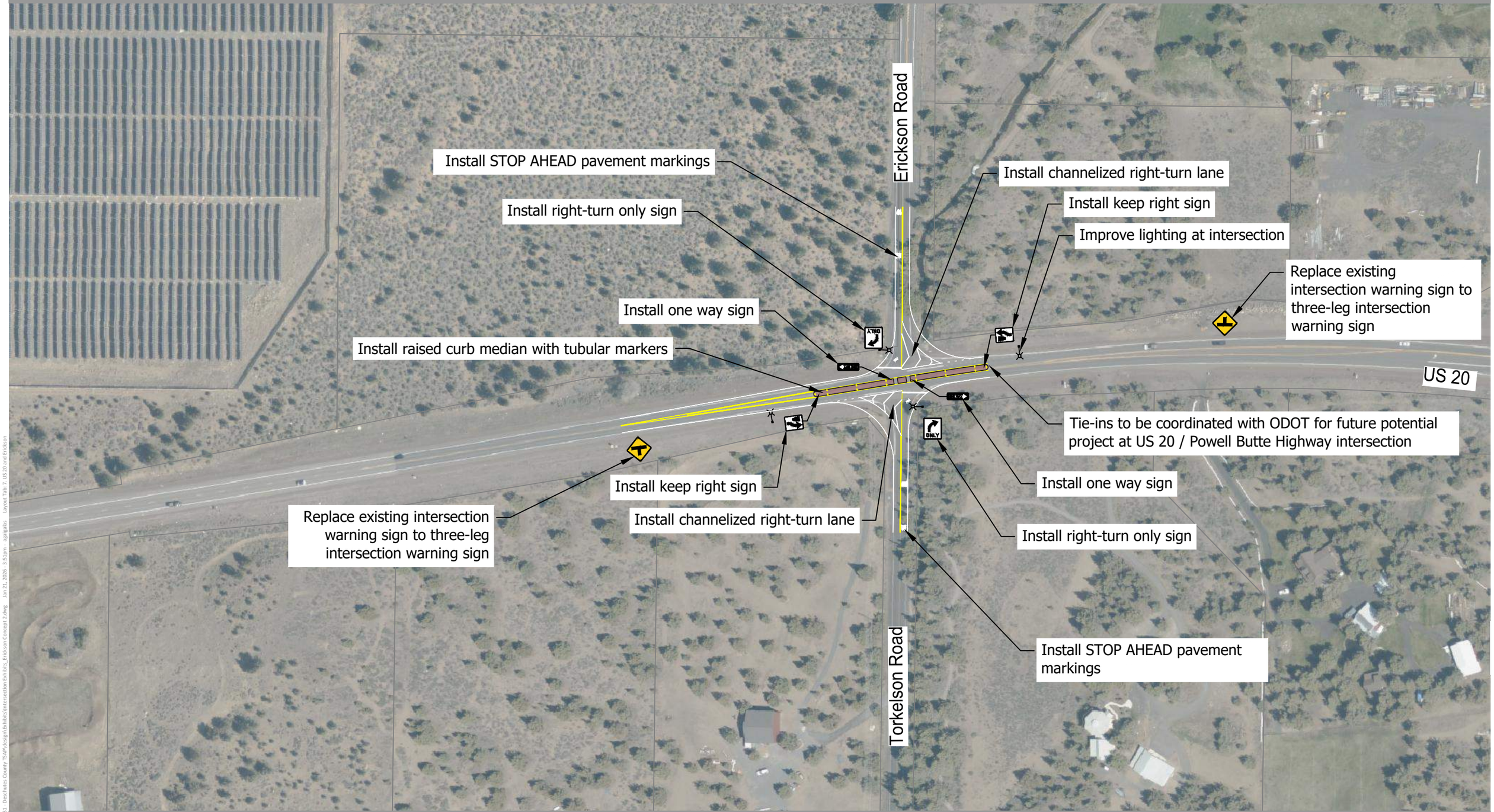
Table 7: US 20 / Erickson Road-Torkelson Road Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Rear-End	-	3	-	**3**
Angle	1	5	-	**6**
Sideswipe	-	1	-	**1**
Misc (Fixed-Object)	-	-	2	**2**
Total	1	9	2	**12**

The modifications recommended for this intersection to address its crash history are illustrated in Figure 7 and identified in Table 8, including countermeasure crash reduction factors. As shown in Figure 7, the primary recommended modifications is to restrict intersection turning movements to right-in, right-out maneuvers, along with overall intersection warning enhancements. The planned roundabout at Powell Butte Highway to the east, together with the existing roundabout at Ward Road / Hamby Road to the west, would help maintain network connectivity under these turning movement restrictions. If the eastern roundabout has not yet been constructed, an operational analysis should be completed to evaluate the systemwide effects of implementing these restrictions before moving forward with this concept. The planning-level cost estimates for these improvements will be detailed in the updated TSAP.

Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change



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Scale: 1" = 150'

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The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 7: US 20 / Erickson Road / Torkelson Road

Deschutes County, Oregon

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Table 8. US 20 / Erickson Road-Torkelson Road Countermeasures

ARTS [1] #	Description	CRF (%)	Crash Type	Crash Severity
H10	Left Turn Lane on Both Major Road Approaches: Rural, Unsignalized Intersection (4-leg)	48	All	All
H29	Install Lighting at Intersection	38	Night	All Injury (Excludes PDO's)
I17	Increase Triangle Sight Distance	48	All	All Injury (Excludes PDO's)
I21	Improve Intersection Warning: Stop Ahead Pavement Markings, Stop Ahead Signs, Additional Stop Signs	25	All	All
I25	Provide Flashing Beacons at Minor Road Stop Controlled Intersections	13	Angle	All
I28	Install 6 ft. or greater Raised Divider on Stop Approach (Splitter Island)	15	All	All

[1] All Roads Transportation Safety (ODOT's transportation safety program)

Day Road / Amber Lane / 5th Street

The Day Road / Amber Lane / 5th Street site is a series of intersections and sharp curves situated northwest of La Pine. Day Road runs north-south, connecting with Amber Lane to the west, and continues north-south as 5th Street to the north of Amber Lane. All approaches are two-lane roads without dedicated turn lanes. Amber Lane is an east-west road that is pavement for a short segment at its junction with Day Road and 5th Street transitions into a dirt road east of 5th Street, serving as the stop-controlled approach. A yield sign is present on the southbound approach of 5th Street to Amber Lane and Day Road and 5th Street feature 'curve ahead' and advisory speed warning signs set at 15 mph in both northbound and southbound directions. The posted speed limit along 5th Street is 45 mph, with no posted limits on the other roads. Directional warning signage is provided along the curve to keep motorists on the road. There is no lighting at this site and overhead powerlines cross 5th Street, Day Road, and Amber Lane. The crash history at this intersection is summarized in Table 9.

Table 9: Day Road / Amber Lane / 5th Street Crash History (2018-2022)

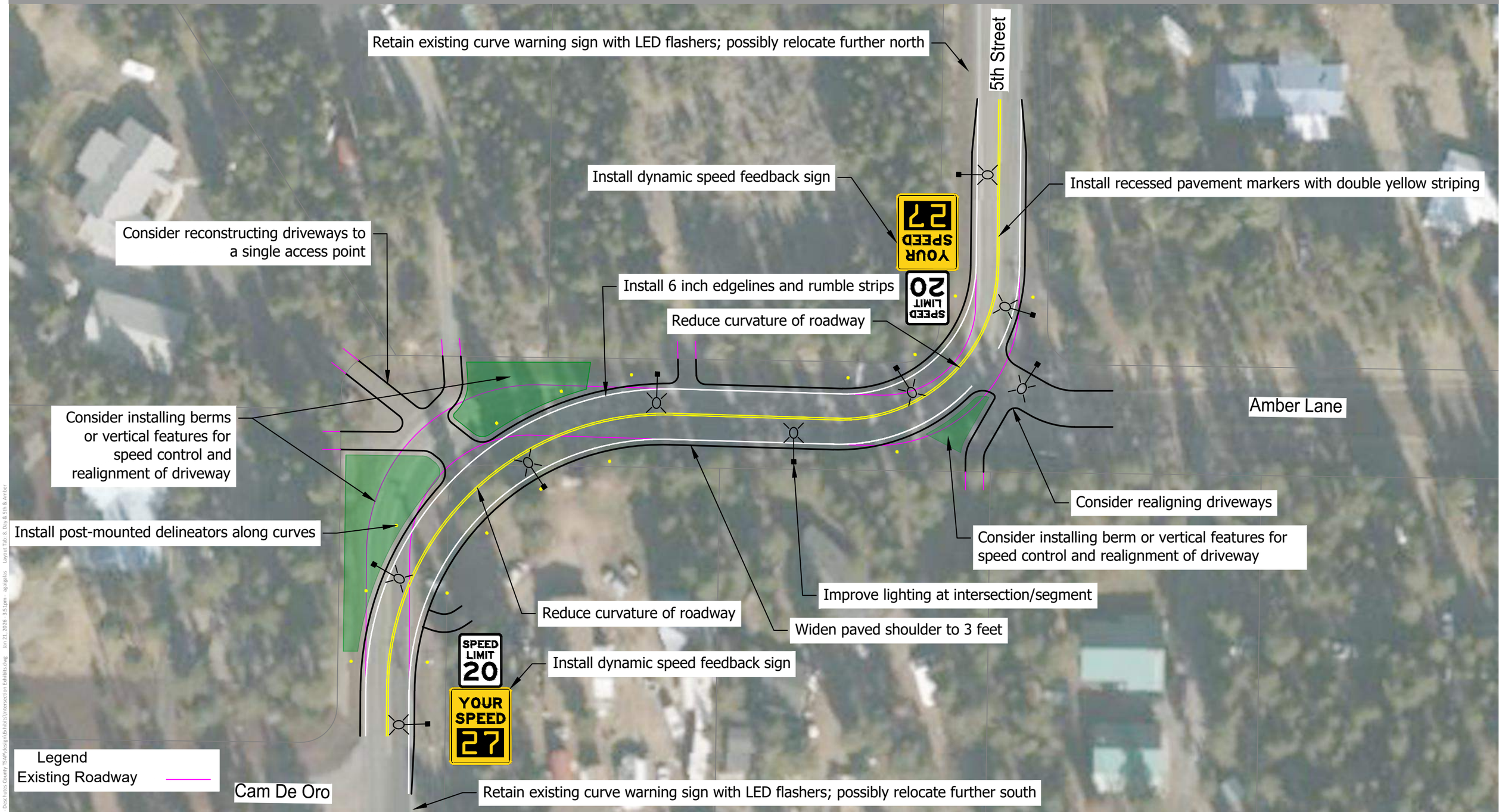
Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Turning Movement	-	-	2	**2**
Sideswipe	-	1	-	**1**
Misc (Fixed-Object)	-	4	4	**8**
Total	**-**	**5**	**6**	**11**

The modifications recommended for this intersection to address its crash history are illustrated in Figure 8 and identified in Table 10, including countermeasure crash reduction factors. As shown in Figure 8, the primary recommended modifications are flattening the horizontal curves, widening the paved shoulders, and increasing curve warning.

The planning-level cost estimate for these improvements will be detailed in the updated TSAP.

Deschutes County Transportation Safety Action Plan

Preliminary Concept Subject to Change



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Scale: 1" = 50'

50 25 0 50

The concepts presented herein are preliminary and for illustrative purposes. These representations are subject to further refinement through future studies.

Figure 8: Day Road / 5th Street /Amber Lane

Deschutes County, Oregon

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Table 10. Day Road / Amber Lane / 5th Street Countermeasures

ARTS [1] #	Description	CRF (%)	Crash Type	Crash Severity
H29	Install Lighting at Intersection	38	Night	All Injury (Excludes PDO's)
H30	Install Lighting on a Roadway Segment	28	Night	All Injury (Excludes PDO's)
H43	Flatten Horizontal Curve (Increase Radius)	15-78	All	All
H48	Increase Pavement Friction by Installing High Friction Surface Treatment - Curves Application	72	Run off the Road	All
RD11	Install Dynamic Speed Feedback Sign for Curves	5	All	All
RD13	Install Recessed Pavement Markers	14	Night	All
RD14	Install Post-Mounted Delineators (Curve Application)	30	Curve crashes at Night	All
RD18	Install Shoulder Rumble Strips	22	Run off the Road	All
RD22	Install Widen Paved Shoulder by 3 ft.	18	All	All
RD24	Install wider edgelines (4 in. to 6 in.)	14	All	All

[1] All Roads Transportation Safety (ODOT's transportation safety program)

Priority Locations with Systemic Treatments

This section presents the recommended modifications for the remaining five priority locations with systemic treatments. Given that many of the systemic treatments recommended at these priority locations are similar, the treatments for each location are provided in simplified lists, and the crash reduction information associated with the treatments are summarized in one table at the end of this section.

State Recreation Road / Huntington Road

The intersection of State Recreation Road and Huntington Road is located less than half a mile west of US 97, north of La Pine. This intersection connects US 97 to the Deschutes River and other recreation as well as residential communities nearby. It is a four-leg, two-way stop-controlled intersection of rural two-lane roadways without turn lanes. The north-south oriented Huntington Road is the stop-controlled facility and has a posted speed of 40 mph on the north leg only. State Recreation Road is uncontrolled with a posted speed limit of 55 mph and crosses Burlington Northern Santa Fe's rail line approximately 250 feet to the east. There are no streetlights at the intersection. Both Huntington Road approaches have 'stop ahead' warning signs. The crash history at this intersection is summarized in Table 11.

Table 11: State Recreation Rd / Huntington Rd Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Angle	1	4	2	**7**
Turning	1	2	-	**3**
Misc (Animal)	-	-	1	**1**
Total	**2**	**6**	**3**	**11**

The modifications recommended for this intersection to address its crash history include:

- Improving intersection warning with pavement markings and additional signage.
- Providing flashing LED stop signs at the stop-controlled approaches.
- Installing transverse rumble strips on the stop-controlled approaches.
- Installing 6-foot or greater raised dividers on the uncontrolled approaches with tubular markers.

The planning-level cost estimates for each of these treatments can be found in the previous Systemic Treatments section of this memorandum.

Bear Creek Road / Ward Road

The intersection of Bear Creek Rd and Ward Road is located east of Bend. It is a two-way stop-controlled intersection of rural two-lane roadways without turn lanes. Bear Creek Road, oriented east-west, is the stop-controlled facility and includes doubled up 'stop ahead' warning signs and 'stop ahead' pavement markings, as well as 'stop' pavement markings at the approach stop bars. Additionally, the stop signs include solar-powered LED flashing lights on the border and warning sign plaques indicating crossing vehicles do not stop. Ward Road, oriented north-south, is uncontrolled and includes doubled up intersection warning signs for the intersecting Bear Creek Road. Both roads have a posted speed of 45 mph and have adjacent powerlines. No streetlights are present. The crash history at this intersection is summarized in Table 12.

Table 12: Bear Creek Road / Ward Road Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Rear-End	-	1	-	**1**
Angle	2	3	5	**10**
Total	**2**	**4**	**5**	**11**

The modifications recommended for this intersection to address its crash history The modifications recommended for this intersection to address its crash history include:

- Improving intersection warning by doubling up the stop signs with LED lights.
- Installing flashing beacons on the intersection warning signs on Ward Road.
- Installing intersection lighting.
- Installing 6-foot or greater raised dividers on the uncontrolled approaches with tubular markers.

The planning-level cost estimates for each of these treatments can be found in the previous Systemic Treatments section of this memorandum.

NE Smith Rock Way / NE 33rd Street

The intersection of NE Smith Rock Way and NE 33rd Street is located east of Terrebonne and serves as a connection for visitors traveling westbound to Smith Rock State Park. The intersection consists of two-lane rural roads and is controlled by stop signs, with no turn lanes. NE 33rd Street, running north-south, is the stop-controlled approach and features 'stop ahead' signage, though no speed limit is posted. NE Smith Rock Way which curves horizontally near the intersection, has a posted speed limit of 40 mph but lacks advance intersection warning signs. Powerlines run adjacent to NE 33rd Street. No streetlights are present at the intersection. The crash history at this intersection is summarized in Table 13.

Table 13: NE Smith Rock Way / NE 33rd Street Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Angle	2	1	1	**4**
Turning	-	1	-	**1**
Total	**2**	**2**	**1**	**5**

The modifications recommended for this intersection to address its crash history The modifications recommended for this intersection to address its crash history include:

- Improving intersection warning with pavement markings and signage.
- Providing flashing LED stop signs at the stop-controlled approaches.
- Installing 6-foot or greater raised dividers on the uncontrolled approaches with tubular markers.

The planning-level cost estimates for each of these treatments can be found in the previous Systemic Treatments section of this memorandum.

NE Smith Rock Way / NE 1st Street

This intersection of NE Smith Rock Way and NE 1st Street is located east of Terrebonne and serves as a connection for visitors traveling eastbound to Smith Rock State Park. The intersection is a two-way stop-controlled intersection with two-lane rural roads with no turn lanes. NE 1st street, running north-south, is the stop-controlled facility with a posted speed limit of 45 mph, and 'stop ahead' signs. Smith Rock Way has a posted speed limit of 50 mph and guardrails on the northern side of the eastbound approach. The westbound approach has a gravel shoulder near the intersection that is likely often used as vehicles turn right onto NE 1st Street. The intersection also has power lines adjacent to both roads and no streetlights. The intersection is also a connection for patrons to Smith Rock Ranch that offers a heavily visited seasonal pumpkin patch in the fall. The crash history at this intersection is summarized in Table 14.

Table 14: NE Smith Rock Way / NE 1st Street Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Rear-End	1	-	-	**1**
Misc (Fixed-Object)	1	1	-	**2**
Overturning	-	1	-	**1**
Total	**2**	**2**	**0**	**4**

The modifications recommended for this intersection to address its crash history The modifications recommended for this intersection to address its crash history include:

- Improving intersection warning with pavement markings and signage.
- Providing flashing LED stop signs at the stop-controlled approaches.
- Installing 6-foot or greater raised dividers on the uncontrolled approaches with tubular markers.

The planning-level cost estimates for each of these treatments can be found in the previous Systemic Treatments section of this memorandum.

NW Ice Avenue / NW 43rd Street

The intersection of NW Ice Avenue and NW 43rd Street is a rural T-intersection located northwest of Terrebonne. It is a two-way stop-controlled intersection of rural two-lane roadways without turn lanes. NW Ice Avenue, oriented east-west, is the stop-controlled facility and does not have a nearby posted speed limit or advance intersection warning signage. NW 43rd Street, oriented north-south, is uncontrolled with a posted speed limit of 45 mph and a single intersection warning sign for the approaching NW Ice Avenue intersection on both northbound and southbound approaches. A gravel driveway connects to the west leg of the intersection and serves private property; it is not controlled by a stop sign and lacks reflective signage. Overhead powerlines are present to the north, south, and east of the intersection. No streetlights are present at the intersection. The crash history at this intersection is summarized in Table 15.

Table 15: NW Ice Avenue / NW 43rd Street Crash History (2018-2022)

Crash Type	Level of Severity			
	Fatal / Serious Injury	Moderate / Minor Injury	Property Damage Only	Total
Sideswipe-Overtaking	-	-	1	**1**
Overturning	1	2	-	**3**
Misc (Fixed-Object)	-	-	2	**2**
Total	**1**	**2**	**3**	**6**

The modifications recommended for this intersection to address its crash history The modifications recommended for this intersection to address its crash history include:

- Improving intersection warning with pavement markings and additional signage.
- Providing flashing LED stop signs at the stop-controlled approaches.
- Installing 6-foot or greater raised dividers on the uncontrolled approaches with tubular markers.

The planning-level cost estimates for each of these treatments can be found in the previous Systemic Treatments section of this memorandum.

Crash Reduction of Priority Location Systemic Treatments

The crash reduction details associated with the systemic treatments recommended for the five priority locations in the sections above are summarized in Table 16.

Table 16. Priority Location Systemic Treatment Crash Reduction Details

ARTS [1] #	Description	CRF (%)	Crash Type	Crash Severity
I15	Install Flashing Beacons as Advance Warning at Intersections (Not Coordinated with Signal Timing)	13	All	All
I21	Improve Intersection Warning: Stop Ahead Pavement Markings, Stop Ahead Signs, Larger Signs, Additional Stop Signs and/or Other Intersection Warning or Regulatory Signs	20% for 1-2 Countermeasures from List 25% for 3-4 Countermeasures from List 30% for 5-7 Countermeasures from List	All	All
-	Provide flashing LED stop signs at Minor Road Stop Controlled Intersections	41[2]	Angle[2]	All[2]
I27	Install Transverse Rumble Strips on Stop Controlled Approach(es)	25	All	Fatal/Serious Injury (A)
H29	Install Lighting at Intersection	38	Night	All Injury (Excludes PDO's)

[1] All Roads Transportation Safety (ODOT's transportation safety program)
[2] FHWA CMF Clearinghouse, CMF ID 6602

Previously Planned & Ongoing Safety Projects

As identified in the Existing Conditions Memorandum, other safety projects across Deschutes County have either been identified by past planning efforts or are being developed in concurrence with the TSAP through ongoing separate evaluation. Those projects include the following:

- 2019 Deschutes County TSAP strategies that are under ongoing implementation through the County's Capital Improvement Plan (CIP).
- Recommendations from the School Audits Memorandum completed in Summer 2025 that are in process or planned (Attachment A).
- The update to the 2019 Bend TSAP is underway and will identify transportation safety strategies within the Bend urban growth boundary (UGB) based on more recent crash histories.
- Neighboring counties have either adopted or are developing new TSAPs, including Jefferson County and Crook County and creates a collaboration opportunity for Deschutes County near county boundaries.

In addition to the priority locations presented in the previous section of this memorandum, Deschutes County has developed concepts and strategies for other intersections through previous planning efforts that are also located on the County's HIN, as summarized in Table 17 on the following page and detailed later in Attachment B.

Table 17. Previously Planned & Ongoing Safety Projects

Intersection	Project Summary	Project Source	Project Status
SW Helmholtz Way / OR 126	Safety study	ODOT	Project Planned
NW Lower Bridge Way / NW 31st Street	Add turn lanes	2019 County TSAP	Concept Developed
Cloverdale Road / OR 126	Improve advance warning countermeasures and install raised median on stop-controlled approach	Deschutes County Road Department	Concept Developed
US 20 / Fryrear Road	Reduce intersection skew and add turn lanes	Deschutes County Road Department & ODOT	Concept Developed
NW Canal Boulevard / NE Oneil Highway	Add turn lanes and improve sight distance	2026-2030 County CIP	Project Planned
US 97 / Baker Road / Knott Road (Deschutes River Woods) Interchange	Realign ramps, add turn lanes, and modify traffic control	ODOT Interchange Area Management Plan	Concept Developed
SW Canal Boulevard / Young Avenue	Reduce intersection skew	Deschutes County Road Department	Concept Developed
Cline Falls Highway / Connarn Rd	Install traversable median islands, rumble strips, and improve advance warning	Deschutes County Road Department	Concept Developed

Multidisciplinary Actions

As described in the introduction of this document, the Safe System Approach is a comprehensive philosophy for mitigating transportation-related fatalities and serious injuries beyond changes to transportation infrastructure. Some of the County's crash Emphasis Areas require other non-engineering strategies and partnerships amongst multiple agencies, including behaviors such as driving while impaired or distracted or without protective equipment, speeding, etc.

Table 18 presents potential action items that bring together the multidisciplinary efforts needed to apply the Safe System Approach in rural Deschutes County. These add another transportation safety layer to the capital improvements documented above and require collaboration between County staff, elected officials, law enforcement, educators, emergency responders, and public health providers. These strategies will be modified through community input, particularly from the project's Safety Working Group.

Table 18. Multidisciplinary Action Items

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A1	Support the **Regional Transportation Safety Committee** facilitated by Central Oregon Intergovernmental Council (COIC) which meets regularly to coordinate transportation safety efforts and carry out the Action Items identified in the TSAP. The committee should include representatives from outreach and advocacy groups to support community engagement, as well as City and County staff from departments such as police, streets, capital projects, engineering, and community development to promote resource sharing, data coordination, and unified safety strategies.	Safety Culture	ODOT, Deschutes County, Bend, Bend MPO, Redmond, Sisters, La Pine, Police, Sheriff, District Attorney's office, Emergency Services, OLCC, Department of Public Health, COIC	$$$
A2	Consider staffing needs or a consultant position to lead the Regional Transportation Safety Committee and lead implementation of the Action Items in the TSAP. Staff may be part of Deschutes County or ODOT to better serve the full region. Seek funding for this position. Collaborate with COIC on staffing needs or a consultant position to lead the Regional Transportation Safety Committee and TSAP Action Item implementation. Seek and develop a sustainable funding model for this position.	Safety Culture	ODOT, Deschutes County, COIC	$$
A3	Support the 2024 COIC Safety Communications Plan, including an education and public outreach system, that promotes a roadway safety culture that emphasizes attentive driving, sober driving, calm driving, driving at appropriate speeds, and awareness of individual impact on roadway safety. This should be a comprehensive and ongoing program.	Safety Culture, Aggressive Driving	ODOT, Deschutes County, Bend MPO, City of Bend, COIC	$$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A4	Develop a Safety Communications Calendar that provides monthly messages to emphasize in Deschutes County. Develop a plan for recurring educational events throughout the year(s). Provide educational programs at community events. Align Deschutes County safety messaging and recurring events with COIC's regional efforts.	Safety Culture	Deschutes County, ODOT, COIC	$$
A5	Provide educational materials to visitors through partnerships with Visit Bend and local hotels/resorts. Expand upon ongoing efforts with COIC.	Safety Culture	Deschutes County, Bend MPO, City of Bend, Visit Bend, COIC	$$
A6	Develop and maintain policies to support the actions identified in the TSAP and to better incorporate safety into long-range planning and the project development process.	Safety Culture	Deschutes County	$
A7	Increase enforcement during highest risk times, based on the reported crash data patterns, and at locations identified in the TSAP based on reported crash data.	Safety Culture, Enforcement	Police/Sheriff, Deschutes County	$$
A8	Evaluate the need to increase sheriff staffing to increase enforcement. Explore funding opportunities to increase enforcement.	Safety Culture, Enforcement	Police/Sheriff, Deschutes County	$$
A9	Provide bystander training courses to the public to educate residents how to respond in an emergency event.	Emergency Response	Police, EMS, Hospitals	$$
A10	Reduce (optimize) response time to crashes. Work with the EMS Council and Oregon Area Trauma Advisory Board to complete this.	Emergency Response	EMS, Police	$
A11	Develop criteria for identifying and designating safety corridors within the County.	Aggressive Driving, Safety Culture	Deschutes County, ODOT	$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A12	Encourage employers and families to institute policies related to driving safely, including attentive driving, by sharing the National Safety Council's sample contract in its Distracted Driving Toolkit. Expand upon ongoing efforts with COIC.	Safety Culture, Distracted Driving	Deschutes County, Employers, Local cities, COIC	$
A13	Educate youth and adults on the importance of paying attention when using the transportation system. Expand upon ongoing efforts with COIC.	Safety Culture, Distracted Driving	Deschutes County, COIC	$
A14	Continue to implement an unmarked car distracted driving program. Consider partnering with the City of Bend to expand the program.	Safety Culture, Distracted Driving, Enforcement	County Sheriff, Police, City of Bend	$$
A15	Develop an educational campaign to promote sober driving. Provide educational posters, social media posts, and public service announcements to inform the public about the dangers of impaired driving, including alcohol and drugs. Work in schools to educate students on the consequences of impaired driving. Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Deschutes County, ODOT, Bend MPO, Schools, COIC	$
A16	Increase Driving Under the Influence and impaired driving enforcement through data-driven saturation patrols and provide officers with Drug Recognition Expert Training and standardized field sobriety tests training.	Impaired Driving, Enforcement	Police, County Sheriff, Deschutes County	$$
A17	Focus on programs and partnerships, as the Shared Future Coalition, to increase education and awareness around impaired driving for all drivers. Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Deschutes County (Shared Future Coalition), COIC	$$
A18	Develop repeat DUI driver offender programs focused on treating the causes of DUI.	Impaired Driving	District Attorney's Office	$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A19	Support the City of Bend in formalizing rideshare locations in the downtown area and near locations with multiple restaurants, bars, and pubs to encourage greater use of cabs and rideshare options. Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Bend MPO, City of Bend, Downtown Bend, Restaurants and Bars, Cab and Rideshare companies, Deschutes County, COIC	$$
A20	Coordinate with local bars, businesses, and rideshare companies to develop and offer a program that provides users with a discount for taking a cab or rideshare to or from drinking establishments or special events (such as Bit of Bend, Summerfest, etc.). Expand upon ongoing efforts with COIC.	Safety Culture, Impaired Driving	Bend MPO, City of Bend, Downtown Bend, Restaurants and Bars, Cab and Rideshare companies; Deschutes County, COIC	$
A21	Report matter-of-fact crash statistics in a manner meant to inform potential riders of the risks associated with choosing the motorcycle as a mode of transportation. Expand upon ongoing efforts with COIC.	Safety Culture; Motorcycles	Deschutes County, ODOT, Bend MPO, City of Bend, COIC	$
A22	Conduct targeted outreach using various means, relationships, and venues to encourage a change in safety culture to convince motorcyclists to enact safe riding practices. Work with motorcycle shops to educate riders about the behaviors associated with higher risk such as discouraging group rides. Provide educational posters, social media posts, and educational placards to inform motorcyclists of the consequences of crashes and promote safe riding practices, safety equipment, gear choice (full face helmets, full gloves, appropriate jackets and pants, boots, etc. and All the Gear All the Time (ATGATT)), importance of lights or reflective gear at night, the importance of not riding the wrong way, the importance of not riding impaired, and motorcycle handling skills and maintenance. Expand upon ongoing efforts with COIC.	Safety Culture, Motorcycles	Deschutes County, ODOT, COIC	$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A23	Encourage more education programs for riders who have taken a break from riding. Work with motorcycle retailers to encourage education for new riders and continued training after receiving their endorsement. Expand upon ongoing efforts with COIC.	Safety Culture, Motorcycles	Deschutes County, ODOT, COIC	$
A24	Continue partnership with Commute Options and Pedestrian Advisory Committee (BPAC).	Safety Culture, Pedestrians / Bicyclists	Deschutes County, BPAC	$
A25	Continue to provide local educational programs at schools and other venues (safety fairs, community events, etc.) for both students and parents, including: educate parents about traffic safety, including safe parking locations when lining up for school pick-up; educate students and parents about the importance of reflective clothing when walking or biking at night; educate students and parents on safe pedestrian and bicycle practices including safe crossing practices and not playing behind vehicles or near streets; educate about the importance of adult supervision; provide educational materials for students to share with parents about the risks associated with distracted driving, including distracted pedestrians.	Safety Culture, Pedestrians / Bicyclists	Commute Options, Schools	$$
A26	Collaborate with the Department of Public Health to work on active transportation, safe routes to school, health impact assessments, and rural access to health care. Include transportation safety in public health education programming.	Safety Culture	Deschutes County Health Department	$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A27	Commute Options is a community group that administers the "Friendly Driver Course." Support this group to continue the course for truck drivers and expand it beyond truck drivers to include drivers associated with businesses and business activities. This program currently educates truck drivers on how to operate in the presence of people walking and biking. Offer incentive programs to encourage businesses to expand this program beyond truck drivers.	Safety Culture; Pedestrians/ Bicyclists	Commute Options, Local Businesses, Deschutes County	$$
A28	Evaluate where opportunities exist for new educational and promotional programs for pedestrians and bicyclists over time.	Safety Culture; Pedestrians/ Bicyclists	Commute Options, Deschutes County	$
A29	Conduct adult pedestrian and bicycle outreach, such as safe crossing practices and new pedestrian/bicycle infrastructure education. Expand upon ongoing efforts with COIC.	Safety Culture; Pedestrians/ Bicyclists	Commute Options, Deschutes County, COIC, City of Bend	$
A30	Educate drivers and bicyclists about bicycle transportation, including proper driver and bicyclist behavior and rules of the road for bicyclists, when to dismount, how to use sidewalks and crosswalks, how to ride through roundabouts, common crash types, etc.	Safety Culture; Pedestrians/ Bicyclists	Deschutes County, Bend MPO, ODOT, Commute Options, COIC, City of Bend	$
A31	Coordinate with BPAC to reintroduce placards with rules for bicyclists, pedestrians, and motor vehicle drivers.	Safety Culture; Pedestrians/ Bicyclists	BPAC	$
A32	Develop a countywide bicycle route map that identifies the preferred bicycle routes (lower volume, lower speed, and available shoulders) and provide wayfinding to direct cyclists to these routes. Illuminate pedestrian crossings near schools in the County.	Pedestrians/ Bicyclists	Deschutes County	$$

Action Item	Description	Focus Area(s)	Participating Agencies	Funding Need
A33	Provide transportation options through infrastructure that allows for transit, walking, and other forms of transportation, where possible. Partner with transportation assistance programs to promote non-driving options for seniors. Expand upon ongoing efforts with CET.	Senior Drivers	COIC, CET, Deschutes County, ODOT, COIC	$$
A34	Support driver education programs and safety education for younger drivers in rural areas. Support peer-based safe driving marketing efforts and outreach programs in high schools to provide driver and non-motorized travel safety education. Support family-based driver education to leverage parental influence. Expand upon ongoing efforts with COIC.	Safety Culture; Young Drivers	ODOT, Commute Options, COIC	$
A35	Begin safety education before young people reach driving age, as early as preschool. Partner with groups such as Safety Towns and school districts.	Safety Culture; Young Drivers	Commute Options, Safety Towns, School District, Central Oregon Health Council	$
A36	Seasonally educate drivers about proper driving behavior and vehicle preparations for winter conditions. Expand upon ongoing efforts with COIC.	Safety Culture; Winter Driving	ODOT, Deschutes County, Deschutes County, COIC, City of Bend	$
A37	Evaluate options to collect and use traffic volume, near-misses, and other data to understand where perceived safety issues may exist	Technology	Deschutes County, ODOT	$$
A38	Evaluate the ability to use crowdsourcing technology to identify risks and locations for additional assessment	Technology	Deschutes County, ODOT	$$
A39	Update the TSAP every 3 to 5 years.	Monitoring	Deschutes County	$

Funding Sources

The Deschutes County TSAP recommends countermeasures that are located on roads and highways under the jurisdiction of the Deschutes County and the State. Countermeasures may be funded through a combination of different resources. A detailed list of Federal and State funding sources applicable to the TSAP is summarized in Table 19.

Table 19. Potential Federal and State Funding Sources to Implement TSAP

Funding Source	Description	Potential Application
Safe Streets and Roads for All (SS4A) Program	SS4A is a five-year program of the Infrastructure Investment and Jobs Act (IIJA) that was allocated $5 billion to safety action plan and implementation programs to prevent roadway deaths and serious injuries for cities, counties, and MPOs. The IIJA was signed into law on November 15, 2021. Equitable outreach and an Action Plan backed by the community and elected officials are critical elements of this program.	Planning and implementation projects to eliminate fatal and serious injury crashes from roadways.
All Roads Transportation Safety Program (ARTS)	The federal Highway Safety Improvement Program is administered as ARTS in Oregon. ARTS provides funding to infrastructure and non-infrastructure projects that improve safety on all public roads. ARTS requires a data-driven approach and prioritizes projects in demonstrated problem areas.	Areas of safety concerns within the city and county, as identified in the TSAP, and consistent with Oregon's Transportation Safety Action Plan.
Statewide Transportation Improvement Program (STIP)	STIP is the State of Oregon's four-year transportation capital improvement program. ODOT's system for distributing these funds has varied over recent years. Generally, local agencies apply in advance for projects to be funded in each four-year cycle.	Projects on any facility that meet the benefit categories of the STIP.
Rural Surface Transportation Grant Program	Rural Surface Transportation Grant Program will support projects to improve and expand the surface transportation infrastructure in rural areas to increase connectivity, improve the safety and reliability of the movement of people and freight, and generate regional economic growth and improve quality of life.	Rural Surface Transportation Grant Program
Safe Routes to School (SRTS)	SRTS, administered by ODOT, focus on infrastructure and non-infrastructure programs to improve access and safety for children to walk, roll, and/or bike to school.	Pedestrian and bicycle-related projects within the vicinity of local schools.

Multimodal Active Transportation Fund	This fund invests in multimodal transportation infrastructure improvements across Oregon.	Pedestrian and bicycle-related projects.
State Transit Improvement Fund (STIF) and Public Transportation Funds	STIF is a dedicated source of funding under Section 122 of the House Bill (HB) 2017 Transportation Funding Package for improving or expanding public transportation service in Oregon.	Pedestrian and bicycle improvements that provide connections to transit.
Oregon Transportation Infrastructure Bank (OTIB)	A statewide revolving loan fund is available to local governments for many transportation infrastructure improvements, including highway, transit, and non-motorized projects. Most funds made available through this program are federal; streets must be functionally classified as a major collector or higher to be eligible for loan funding.	Infrastructure improvements to major collectors or higher classified roads for vehicle, transit, and non-motorized travel.
State Highway Trust Fund/ Bicycle Bill	When roads are constructed or reconstructed, Oregon law requires walkways and bikeways to be provided. Additionally, all agencies receiving State Highway Funds are required to spend at least 1% of those funds on bicycle and/or pedestrian infrastructure improvements (ORS 366.514). Currently, cities and counties receive 20% and 30% of the state's highway trust funds, respectively, which can be used for walking and biking projects along roads.	Bicycle and pedestrian projects.
Sidewalk Improvement Program (SWIP)	ODOT's SWIP builds pedestrian and bicycle facilities on state roads and local roads that help people moving across or around the state system.	Bicycle and pedestrian projects.
Federal Lands Access Program (FLAP)	The program provides funding for projects that improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands. The Access Program has an emphasis on high-use recreation sites and economic generators.	Planning and implementation projects in proximity to Federal lands.

Performance Measures

Performance measures are used to evaluate progress in completing the actions identified in the TSAP and in achieving its desired outcomes. The Oregon TSAP identifies two general types of performance measures:

- **Effectiveness Performance Measures** track the results of a program or activity. For example, they track how many fatalities or injuries occurred, or number of non-motorist fatalities.
- **Efficiency Performance Measures** track effort and output. For example, they track how many activities were conducted, or miles of treatment were installed.

The goal of the County is to eliminate fatal and serious injury crashes from its rural transportation system, and therefore, it is recommended that effectiveness measures are used to track outcomes.

Effectiveness performance measures that the County could use to evaluate the ongoing success of the TSAP in reducing rural fatal and serious injury crashes include:

- Total number of fatal and serious injury crashes within the rural County
- Number of fatal and serious injury crashes on all rural roads by the following categories:
    - Roadway and Lane Departure Crashes
    - Drug and Alcohol Impairment
    - Aging Drivers (65+)
    - Motorcyclists
    - Younger Drivers (15-25)
    - Speeding
    - Intersections

Fatal and serious injury crashes should be reported annually, and performance should be based on the latest five-year annual average number of crashes to help normalize for random fluctuations in crashes each year. Crash data are available to the public through two primary avenues: making direct requests to ODOT or downloading the data from their public site (Crash Analysis Reporting Unit).

Baseline performance between 2018 and 2022 within the rural County are summarized in Table 20. **In order to work toward the goal of zero transportation-related fatalities and serious injuries, Deschutes County has set a benchmark to reduce the overall number of fatal and serious injury crashes within the rural county and within the crash emphasis areas listed above by 50% by the year 2050.**

Table 20. Rural County Effectiveness (Outcome) Baseline Performance

Performance Measure	Number of Reported Fatal/Serious Injury Crashes (2018-2022)
Fatal and Serious Injury Crashes	172
Fatal or Serious Injury Crashes Involving:	
Roadway or Lane Departures	75
Drug and Alcohol Impairment	36
Aging Drivers (65+)	34
Motorcyclists	35
Younger Drivers (15-25)	40
Speeding	61
Intersections	76

Note: one fatal or serious injury crash may include multiple categories listed above (example: a younger motorcyclist could get into a crash while speeding). Therefore, the sum of the crashes for these individual categories exceeds the total quantity of fatal and serious injury crashes.

Next Steps

The recommended strategies will be incorporated into the draft TSAP. These strategies, grounded in the Safe System Approach, aim to comprehensively improve transportation safety and culture in Deschutes County.

Attachment A: School Safety Audits Memorandum

Technical Memorandum

Date:	July 29, 2025	Kittelson Project No: 30431
To:	Project Management Team	
From:	Matt Kittelson, PE, Miranda Barrus, PE, and Eza Gaigalas	
Subject:	Final School Safety Audit Memo	

Introduction

Deschutes County is updating its 2019 Transportation Safety Action Plan (TSAP) to focus on the unincorporated areas of the county. The purpose of the TSAP is to help the County eliminate fatal and serious injury crashes from the transportation system through site-specific and systemic countermeasures and multidisciplinary actions. As part of the TSAP Update, the team conducted School Safety Audits at key schools either located within the unincorporated areas of the county or along County-owned and maintained roads within urban areas (specifically within La Pine) to evaluate walking, biking, and driving needs as they correlate to the crash data, and presence of gaps in existing infrastructure. The audits were conducted at the following schools, as shown in Figure 1:

- Three Rivers School
- La Pine Elementary, Middle, and High Schools
- Rosland Elementary School
- Buckingham Elementary School
- Tumalo Community School
- Terrebonne Community School

This memorandum summarizes key observations from the audits and potential treatment opportunities at each school location. This information, in combination with input from the County and community, will serve as the basis for identifying specific actions, either in the short-term or long-term, that could be implemented at or near these school sites.

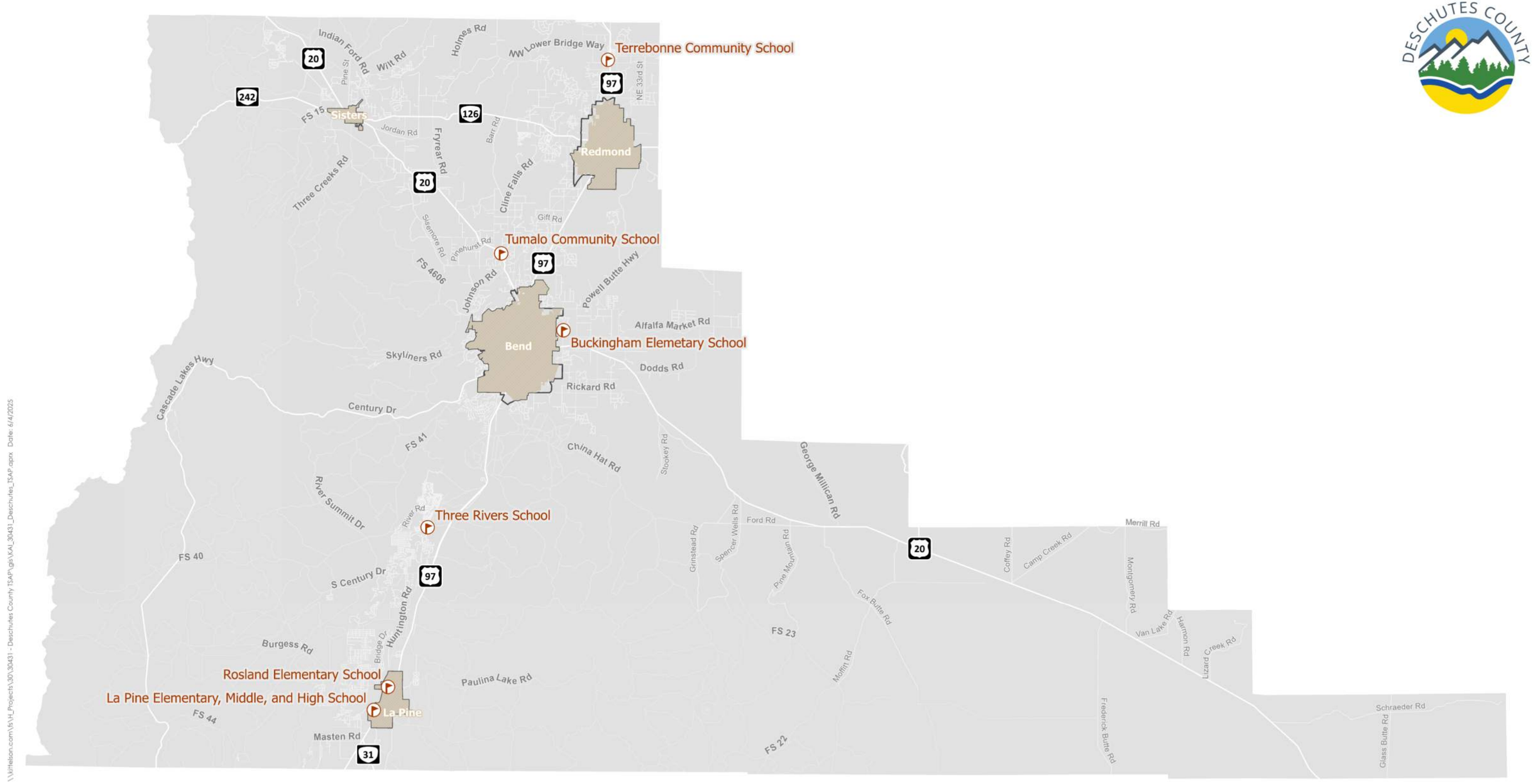

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Figure 1

School Safety Audit Locations
Deschutes County, OR

Three Rivers School

Three Rivers School is a K-8 school in Sunriver. The school safety audit was conducted on May 8th, 2025, by Blaine Wruck and Torina Wilson (Deschutes County), Tim Broadbent (Three Rivers Principal), Chris Mather (Bend-La Pine Assist. Transp. Director), and Matt Kittelson (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- Traffic flow leaving the school in the afternoon can be challenging. There are long delays during the pickup hour associated with exiting vehicles, with queues forming at the Venture Lane and Enterprise Drive intersection. All participants noted that the forthcoming changes to the Venture Lane and S Century Drive intersection, which currently are being pursued by the County, are expected to address most vehicular circulation challenges noted.
- Walking and biking trips to and from the school are fairly limited with more students relying on buses or parent pick-up and drop-off. Students that do walk are generally traveling to a destination within the Venture Business Loop, the Sunriver Village, or to a nearby residence. Walking and biking routes are generally either along local paths within the Venture Lane area or via a multiuse path east of the school that connects to S Century Drive.
- Bus drivers find the difference in vertical grades at the Enterprise Drive and School Access intersection to be challenging.

Treatment Opportunities

Based on the observations described above, opportunities to improve vehicle, pedestrian, and bicycle circulation around the school were identified as minor yet impactful strategies that could be implemented in the school vicinity. These improvements are shown in Figure 2 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install sidewalk along the north and south sides of Venture Lane and Enterprise Drive between Century Drive and the school.
2. Stripe a crosswalk on the west leg of the Venture Lane and Enterprise Drive intersection.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

1. Install sidewalk along the north and south sides of Venture Lane and Enterprise Drive between Century Drive and the school.
2. Stripe a crosswalk on the west leg of the Venture Lane and Enterprise Drive intersection.

Three Rivers School

S Century Drive

Enterprise Drive

Venture Lane

1

2

A roundabout is under design at S Century Drive & Venture Lane. Construction is planned to begin in 2026.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

N

Scale: 1" = 100'

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Figure 2: Three Rivers School

Sunriver, Oregon

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La Pine Elementary, Middle, and High Schools

La Pine Elementary, Middle, and High schools serve students from grades K-12. The schools have separate campuses adjacent to each other in La Pine, so an audit was conducted for each to understand individual school needs. The school safety audit for the high school was conducted on May 8th, 2025, by Blaine Wruck and Torina Wilson (Deschutes County), Scott Olszewski (La Pine High School Principal), Chris Mather (Bend-La Pine Schools Assistant Transportation Director), Michelle Rhoads (Bend-La Pine Schools Active Transportation Coordinator), Deputy/Student Resource Office Jeff Woods (Deschutes County Sheriff's Office), Matt Kittelson and Miranda Barrus (Kittelson & Associates), and additional La Pine HS staff. The school safety audit for the middle and elementary schools was conducted on May 21st, 2025, by Blaine Wruck (Deschutes County), Megan Silvey (La Pine Elementary School Principal), Brian Barringer (La Pine Middle School Principal), Deputy/Student Resource Office Jeff Woods (Deschutes County Sheriff's Office Deputy/SRO), and Matt Kittelson, Miranda Barrus, and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There is pedestrian traffic between the schools and the residences and businesses to the east. This is because many students reside in the developments to the east of Huntington Road. Additionally, a Bi-Mart across from Huntington Road attracts students, especially during the lunch hour.
- Coach Road, which is a north-south frontage road and primary access road for the elementary and high schools, lacks any marked midblock crosswalks. As a result, students accessing Bi-Mart or other locations to the east cross Coach Road at non-marked locations.
- Future residential and commercial development northeast of the schools along Huntington Road is expected to increase student trips to and from this vicinity.
- Today, students cut through the wooded, undeveloped parcel between Coach Road and Huntington Road in front of the High School.
- Students also use an existing sidewalk located south of the Mid Oregon Credit Union site, which connects Coach Road to Huntington Road. On Huntington Road, the east end of this sidewalk connects to a marked school zone crossing. However, the west end does not fully extend to Coach Road and lacks curb ramps or a marked mid-block crosswalk.
- To the south, students cross at various locations along 1st Street, including at the Coach Road and 1st Street intersection, Huntington Road and 1st Street traffic signal, and unmarked locations at other places along 1st Street.

- More students walk to school in the winter due to challenging winter driving conditions. However, snow berms along roads in the vicinity, and especially along Memorial Lane, force students to walk on the road.
- Multiple intersections surrounding the schools are lacking crosswalks on one or more legs.
- Vehicles often exceed the posted speed limit on Huntington Road and Coach Road.
- The Memorial Lane and Huntington Road intersection is slated to have additional curb ramps and crosswalks installed as part of an ongoing residential development in the northeast corner. Long-term, the intersection is planned for a roundabout.
- A more detailed review of school zone signs in the vicinity of the schools is needed to confirm compliance with current guidance in the *Manual on Uniform Traffic Control Devices (MUTCD)* on sign placement and school zone designations.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle circulation around the school were identified. These improvements are shown in Figure 3 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install crosswalks on 1st Street at the Stillwell Street intersection.
2. Investigate converting the 1st Street and Morson Street intersection to all-way stop control and stripe crosswalks on the west and south legs.
3. Install sidewalk on the south side of 1st Street.
4. Review school zone signage along area streets and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons with speed feedback signs along Coach Road.
5. Install a midblock crosswalk along Coach Road at the elementary school entrance (near Mid Oregon).
6. Install a crossing on the west and south legs of the Coach Road and Memorial Lane intersection and evaluate all-way stop-control.
7. Install an enhanced crossing, such as an RRFB, at the crosswalk in front of the Bi-Mart.
8. Install an enhanced crossing, such as an RRFB, and crosswalk on the north leg at the intersection of Memorial Lane and Huntington Road.
    a. Note: a roundabout is planned at this location in the long-term per City of La Pine plans.

9. Install sidewalk on the west side of Coach Road in front of La Pine High School to infill pedestrian pathways within the right-of-way.
10. Install sidewalks on the north and south sides of Memorial Lane from Huntington Road to the school (north side to be constructed by ongoing residential development).

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

Legend

- Time-of-Day Flashing Beacon
- Rapid Rectangular Flashing Beacon
- School Speed Limit Sign
- Speed Feedback Sign
- Pedestrian Crossing Sign
- Stop Sign

1. Install crosswalks on 1st Street at the Stillwell Street intersection.
2. Investigate converting the 1st Street and Morson Street intersection to all-way stop control and stripe crosswalks on the west and south legs.
3. Install sidewalk on the south side of 1st Street.
4. Review school zone signage along area streets and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons with speed feedback signs along Coach Road.
5. Install a midblock crosswalk along Coach Road at the elementary school entrance (near Mid Oregon).
6. Install a crossing on the west and south legs of the Coach Road and Memorial Lane intersection and evaluate all-way stop-control.
7. Install an enhanced crossing, such as an RRFB, at the crosswalk in front of the Bi-Mart.
8. Install an enhanced crossing, such as an RRFB, and crosswalk on the north leg at the intersection of Memorial Lane and Huntington Road.
   Note: a roundabout is planned at this location in the long-term per City of La Pine plans.
9. Install sidewalk on the west side of Coach Road in front of La Pine High School to infill pedestrian pathways within the right-of-way.
10. Install sidewalks on the north and south sides of Memorial Lane from Huntington Road to the school (north side to be constructed by ongoing residential development).

La Pine Middle School

La Pine Elementary School

La Pine High School

Morson Street

1st Street

Coach Road

Huntington Road

Memorial Lane

A roundabout is planned for the long-term at Memorial Lane & Huntington Road.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

Scale: 1" = 200'

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200 100 0 200

Figure 3: La Pine Elementary, Middle, and High Schools

La Pine, Oregon

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Rosland Elementary School

Rosland Elementary School is a K-5 school in La Pine. The school safety audit was conducted on May 21st, 2025, by Blaine Wruck (Deschutes County), Deborah Buduan (Rosland Elementary School Principal), Chris Mather (Bend-La Pine Schools Assistant Transportation Director), Michelle Rhoads (Bend-La Pine Schools Active Transportation Coordinator), and Matt Kittelson, Miranda Barrus, and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There are paths on the east and west sides of the school along City of La Pine streets that do not currently connect to any services or neighborhoods. A network of unpaved roads are present south of the school within undeveloped, forested lands.
- In front of the school, Burgess Road lacks pedestrian facilities and marked crosswalks, and it is not designated as a school zone. Staff at the school noted that students walking to the school is not common, though one student walks today and crosses at the intersection of Pine Drive and Burgess Road. There are no designated pedestrian routes for walking to and from school. Additional pedestrian activity is anticipated as development continues to occur in the area.
- School staff cross Burgess Road at Pine Drive to access the school mailbox, which is on the north side of this intersection.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are shown in Figure 4 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install a marked crosswalk and enhanced crossing, such as an RRFB, at the Pine Drive and Burgess Road intersection. Provide a sidewalk connection to the mailboxes on the north side of Burgess Road. Coordinate with the school district to improve the existing path along Pine Drive.

2. As development occurs south of the school, coordinate with the City of La Pine to identify improved access routes to and from the school for people driving, walking, and biking.
3. Review school zone signage along Burgess Road and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

1. Install a marked crosswalk and enhanced crossing, such as an RRFB, at the Pine Drive and Burgess Road intersection. Provide a sidewalk connection to the mailboxes on the north side of Burgess Road. Coordinate with the school district to improve the existing path along Pine Drive.
2. As development occurs south of the school, coordinate with the City of La Pine to identify improved access routes to and from the school for people driving, walking, and biking.
3. Review school zone signage along Burgess Road and update to be compliant with MUTCD guidance and state law. Consider time-of-day flashing beacons.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

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Scale: 1" = 150'

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Figure 4: Rosland Elementary School

La Pine, Oregon

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Buckingham Elementary School

Buckingham Elementary School is a K-5 school in Bend. The school safety audit was conducted on May 21st, 2025, by Blaine Wruck (Deschutes County), Michelle Wilson (Buckingham Elementary School Principal), Bend-La Pine Schools staff, Michelle Rhoads (Bend-La Pine Schools Active Transportation Coordinator), and Matt Kittelson, Miranda Barrus, and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There are a few students who live in the neighborhood surrounding Quail Ridge Road and walk to school. However, there are no pedestrian paths or sidewalks connecting to the school, except for a gravel path from Big Sky Park.
- There are no turning lanes at the school vehicular access points along Hamby Road. While southbound vehicles are waiting to turn left, other southbound vehicles have been observed to pass turning vehicles using the roadway shoulder.
- Buses and vehicles have reported that it is challenging to exit the school due to congestion on Hamby Road.
- Many students live within a mile of the school but they are bused or dropped off since there are no walking routes. The only students observed to walk to school do so from the Quail Ridge neighborhood directly west of the school.
- In 2024, the County installed time-of-day flashing beacon school zone signs, speed feedback signs, a pedestrian crossing of Hamby Road at Quail Ridge Road, and pedestrian crossing ahead warning signs on Hamby Road.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are summarized below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

- Since school improvements were recently constructed, no specific improvements to County-owned facilities were identified in the near-term.

- The school could work with agency partners to improve pedestrian and bicycle circulation in the near-term, including evaluating the feasibility of using the adjacent Bend Park and Recreation District (BPRD) parking lot to facilitate school pick up and drop off activities.

Tumalo Community School

Tumalo Community School is a K-5 school in Tumalo. The school is planned to be fully expanded as a K-8 school by the 2028/2029 school year. The school safety audit was conducted on May 27th, 2025, by Blaine Wruck (Deschutes County), Sam Platt (Tumalo Community School Principal), and Miranda Barrus and Eza Gaigalas (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- There are no sidewalks along 2nd Street except in front of the school. There are no sidewalks along Cook Avenue except south of the fire station. Some students walk to school, and there are outdoor education activities off of 4th Street to the east by the river, where there are no sidewalks.

Treatment Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are shown in Figure 5 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership by partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install sidewalks on the north and south side of 2nd Street.
2. Install sidewalks on the west side of Cook Avenue.
3. Install an enhanced crossing, such as an RRFB at the intersection of Cook Avenue and 4th Street.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

Legend

- Rapid Rectangular Flashing Beacon
- Pedestrian Crossing Sign

Tumalo Community School

2nd Street

Cook Avenue

Cline Falls Highway

Tumalo Road

4th Street

1

2

3

A roundabout is planned for Cline Falls Road & Tumalo Road in the County's Capital Improvement Plan for Year 2029.

1. Install sidewalks on the north and south side of 2nd Street.
2. Install sidewalks on the west side of Cook Avenue.
3. Install an enhanced crossing, such as an RRFB at the intersection of Cook Avenue and 4th Street.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

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Scale: 1" = 100'

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Figure 5: Tumalo Community School

Tumalo, Oregon

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Terrebonne Community School

Terrebonne Community School is a K-5 school in Terrebonne. The school safety audit was conducted on June 4th, 2025, by Blaine Wruck (Deschutes County), Cyndi Ganfield (Terrebonne Community School Principal), Bend-La Pine Schools staff and Miranda Barrus (Kittelson & Associates).

Key Observations

The key observations from the school safety audit are detailed on an aerial map in Attachment A. Below is a summary of these observations.

- The midblock crosswalk on B Avenue lacks continental striping and Americans with Disabilities Act (ADA) compliant curb ramps.
- The bus drop off/pick up occurs on B Avenue and the parent drop off/pick up occurs on C Avenue.
- Vehicle on-street parking queues on C Avenue may block visible of the school zone signs and contribute to vehicle speeding in the corridor. The school places a cone in the middle of the midblock crosswalk on C Avenue to encourage vehicles to slow down.
- The Morning Glory neighborhood is not in the bussing zone and walking facilities for students within one mile of school are limited.

Recommendations/Opportunities

Based on the observations described above, opportunities to improve pedestrian and bicycle safety around the school were identified. These improvements are shown in Figure 5 and correspond to the summary below.

Note: While the County may consider these recommendations for future projects, some initiatives might fall under the jurisdiction of partner agencies or may not align with the County's funding or prioritization criteria. These recommendations aim to provide a general framework for improving school access over time, potentially with the involvement of or leadership from partner agencies. Also, future improvements may differ from recommendations below pending further project evaluation and design.

1. Install a continental crosswalk and install new curb ramps at the existing crossing on B Avenue in front of the school.
2. Review school zone signage along C Avenue and update to be compliant with MUTCD guidance and state law. Consider installing time-of-day flashing beacon school zone signs with speed feedback signs.
3. Install a crossing sign in the middle of the existing midblock crosswalk on C Avenue behind the school per MUTCD guidance.

Safety Walk Audit Treatment Opportunities

Preliminary Concept Subject to Change

Legend

- Time-of-Day Flashing Beacon
- School Speed Limit Sign
- Speed Feedback Sign
- In-Street Pedestrian Crossing Sign

1. Install a continental crosswalk and install new curb ramps at the existing crossing on B Avenue in front of the school.
2. Review school zone signage along C Avenue and update to be compliant with MUTCD guidance and state law. Consider installing time-of-day flashing beacon school zone signs with speed feedback signs.
3. Install a crossing sign in the middle of the existing midblock crosswalk on C Avenue behind the school per MUTCD guidance.

C Avenue

Terrebonne Community School

B Avenue

US 97

An RRFB is under construction on the north leg of US97 & B Avenue.

The concepts presented herein are preliminary and intended to illustrate a range of potential improvements. These representations are subject to further refinement through future studies.

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Scale: 1" = 100'

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Figure 6: Terrebonne Community School

Terrebonne, Oregon

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Attachment B: Previously Planned & Ongoing Safety Projects

SW Helmholtz Way / OR 126

The intersection of SW Helmholtz Way with OR 126 (SW Highland Ave) is located within the Redmond Urban Growth Boundary. It is a four-way intersection with stop-control on the minor approach. Protected left turn lanes exist on OR126.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The frequency and severity of crashes at this location are indicative of need for improvements. The crash history at this intersection is summarized in Table B-1.

Table B-1: SW Helmholtz Way / OR 126 Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
3	15	9	**27**

ODOT has identified this intersection for a future safety corridor study which will evaluate improvement alternatives to address predominant crash patterns. While no conceptual alternatives have been presented to-date, Deschutes County Road Department will observe any proposed improvements yielded from the forthcoming safety corridor study and partner with ODOT and the City of Redmond as appropriate to implement safety improvements.

NW Lower Bridge Way / NW 31st Street

The section of Lower Bridge Way from 19th St to 31st St is a ¾-mile long segment of arterial roadway near the community of Terrebonne. There are three 3-leg intersections along the length of the roadway segment, each with stop-control on the minor roadway approaches. The intersection of NW 31st is linked to the majority of crashes in this section.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-2.

Table B-2: NW Lower Bridge Way / NW 31st Street Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
2	5	3	**10**

This intersection was also noted in the 2019 TSAP as a Top Site for safety improvements. Deschutes County Road Department applied for ARTS funding for corridor improvements to the NW 19th and NW 31st Street intersections which include:

- Installation of left turn lanes on the westbound major approaches
- Advance warning countermeasures, including Stop/Stop Ahead pavement markings, intersection advance warning signage and stop ahead advance warning signs.
- Flashing LED Stop Signs
- Improvements to pavement markings

The improvement concept included with the ARTS funding application is shown in Figure B-1. Award of ARTS funding is currently pending.

Figure B-1: NW Lower Bridge Way / NW 31st Street Improvement Concept

Cloverdale Road / OR 126

The intersection of Cloverdale Rd with OR 126 is a three-leg intersection with stop control on the minor approach. The rural two-lane collector roadway (Cloverdale Rd) serves north-south traffic between US20 and OR 126 and intersects OR 126 at its northern terminus at a nearly right angle.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-3.

Table B-3: Cloverdale Road / OR 126 Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
1	5	2	**8**

Deschutes County Road Department has developed an improvement concept which includes:

- Improving advance warning countermeasures on the minor intersection approach by adding signage and pavement legends;
- Installation of a dynamic flashing LED stop sign on the minor approach;
- Installation of a raised median island on the stop-controlled approach to command driver attention; and
- Vegetation & fixed object removal to improve sight distance from the stop-controlled intersection approach within the sight triangle in order to mitigate turning movement crashes.

The improvement concept is shown in Figure B-2.

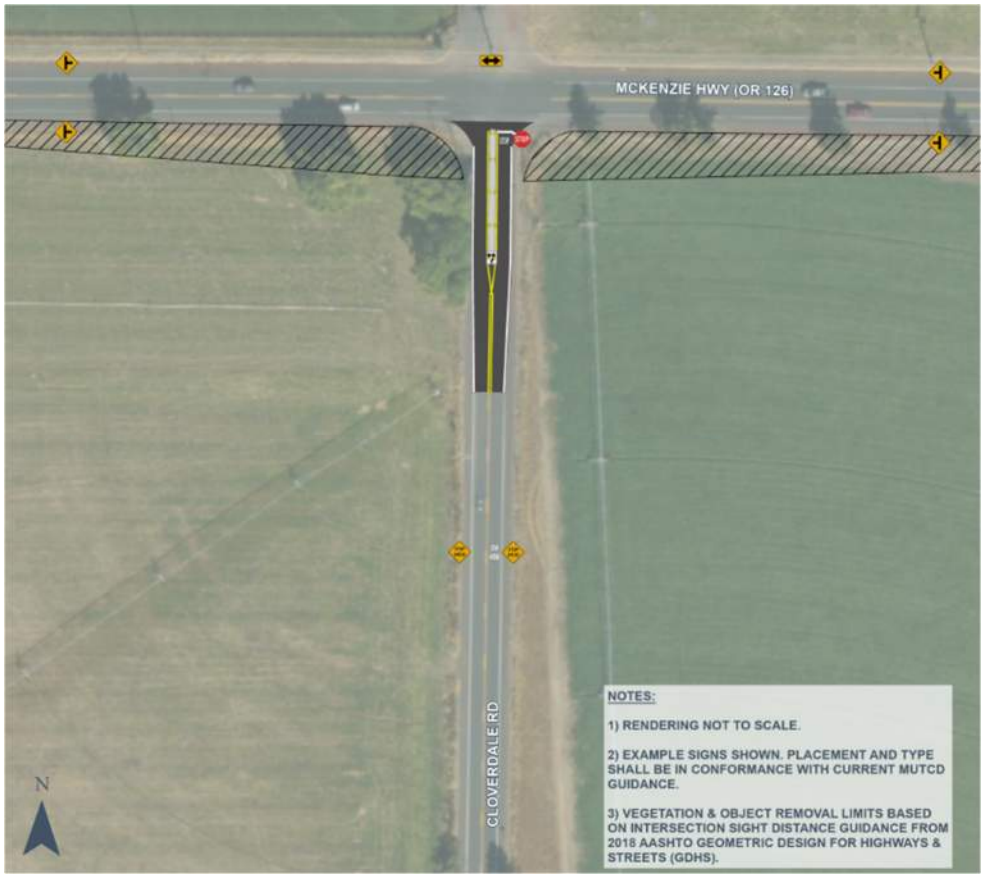


Figure B-2: Cloverdale Road / OR 126 Improvement Concept

US 20 / Fryrear Road

The intersection of US20 with Fryrear Road is a three-leg intersection with stop control on the minor approach (Fryrear Road). US20 primarily serves freight and passenger vehicle traffic between Central Oregon and the Willamette Valley west of the Cascade Mountain Range. Fryrear Road is classified as a Minor Collector and is operated and maintained by Deschutes County Road Department. Presently, the intersection is configured in such a way that eastbound vehicles turning onto Fryrear Road do not have a refuge to wait for adequate gaps in oncoming westbound traffic. As a result, eastbound traffic must slow significantly or stop completely, leading to a high propensity for rear-end crashes. Although advance warning signage for the Fryrear Road intersection exists in both westbound and eastbound directions on US20, eastbound traffic user expectancy of a stop condition is poor. These issues are compounded by the fact that the intersection is located within a horizontal curve with substandard sight distance on US20.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-4.

Table B-4: US 20 / Fryrear Rd Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
1	3	1	**5**

Deschutes County Road Department, in collaboration with ODOT, has developed an improvement concept which includes:

- Addition of protected Left Turn Lane for eastbound US20 traffic
- Installation of illumination at the intersection
- Realignment of US20 to the south to improve sight distance and horizontal curve layout
- Realignment of Fryrear Road to remove intersection skew and improve sight distance
- Other low-cost systemic countermeasures, including pavement markings, delineation, and dynamic feedback traffic control devices

The improvement concept is shown in Figure B-3.

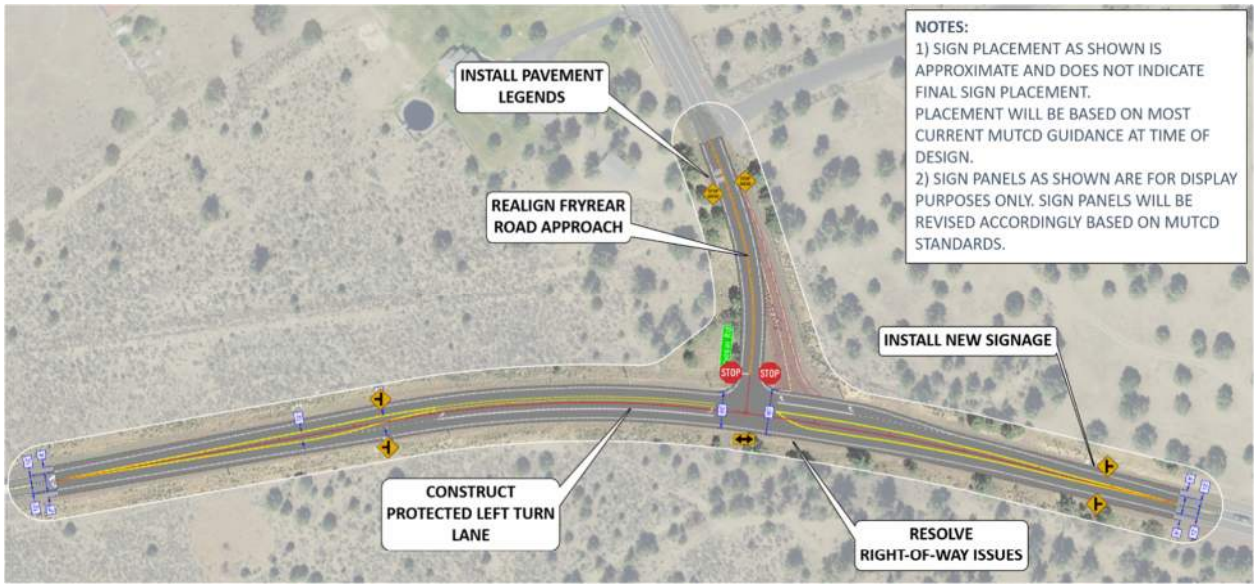


Figure B-3: US 20 / Fryrear Road Improvement Concept

NW Canal Boulevard / NE Oneil Highway

The intersection of NW Canal Blvd with NE Oneil Hwy is a four-leg intersection of a state highway with a County road located north of the Redmond City Limits. The intersection presently has stop control on the minor approaches (NW Canal Blvd). Most of the crashes at this intersection involved turning vehicles or vehicles queued to complete a turning movement.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-5.

Table B-5: NW Canal Boulevard / NE Oneil Highway Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
1	3	0	**4**

Deschutes County Road Department has obligated funding for improvements to NW Canal Blvd between the Redmond City Limit and NE Oneil Hwy as part of their 2026-2030 Capital Improvement Plan (CIP). As part of this roadway improvement project, appropriate safety improvements at the intersection will be evaluated for implementation.

Potential improvements could include:

- Left turn lane on westbound major approach
- Improved advance warning signage and pavement markings for stop-controlled approach.
- Doubled-up intersection advance warning signs on major approaches.
- Improving triangle sight distance.

US 97 / Baker Road / Knott Road (Deschutes River Woods) Interchange

The US 97 interchange at Baker Road/Knott Road is located south of the Bend urban growth boundary. The interchange is comprised of two-lane, two-way roadways and a series of stop-controlled intersections at the highway ramp terminals, as well as an at-grade railroad crossing.

Intersections within the footprint of the interchange were identified as Top 5% Sites in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-6.

Table B-6: US 97 / Baker Road / Knott Road Interchange Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
0	14	10	**24**

Note: Number of crashes shown above is inclusive of all crashes within the interchange area, including intersections of ramp terminals with County roads.

ODOT has developed an Interchange Area Management Plan (IAMP), which evaluated options for improvement to the existing interchange configuration. As a result of the IAMP, a preferred alternative was selected, which includes the following improvements:

- US 97 southbound ramps realignment and traffic signal and railroad crossing improvements
- US 97 acceleration and deceleration lanes
- Cinder Butte Road realignment and turn lanes
- Baker Road/Cinder Butte Road signalization
- Confirm intersection control for US 97 northbound ramp terminal
- Baker Road bridge widening
- US 97 northbound roundabout ramp terminal
- Multi-use path connections
- Realign Scale House Road

The improvements are proposed to be delivered in two phases. The conceptual rendering of the preferred improvement alternative is shown in Figure B-4.

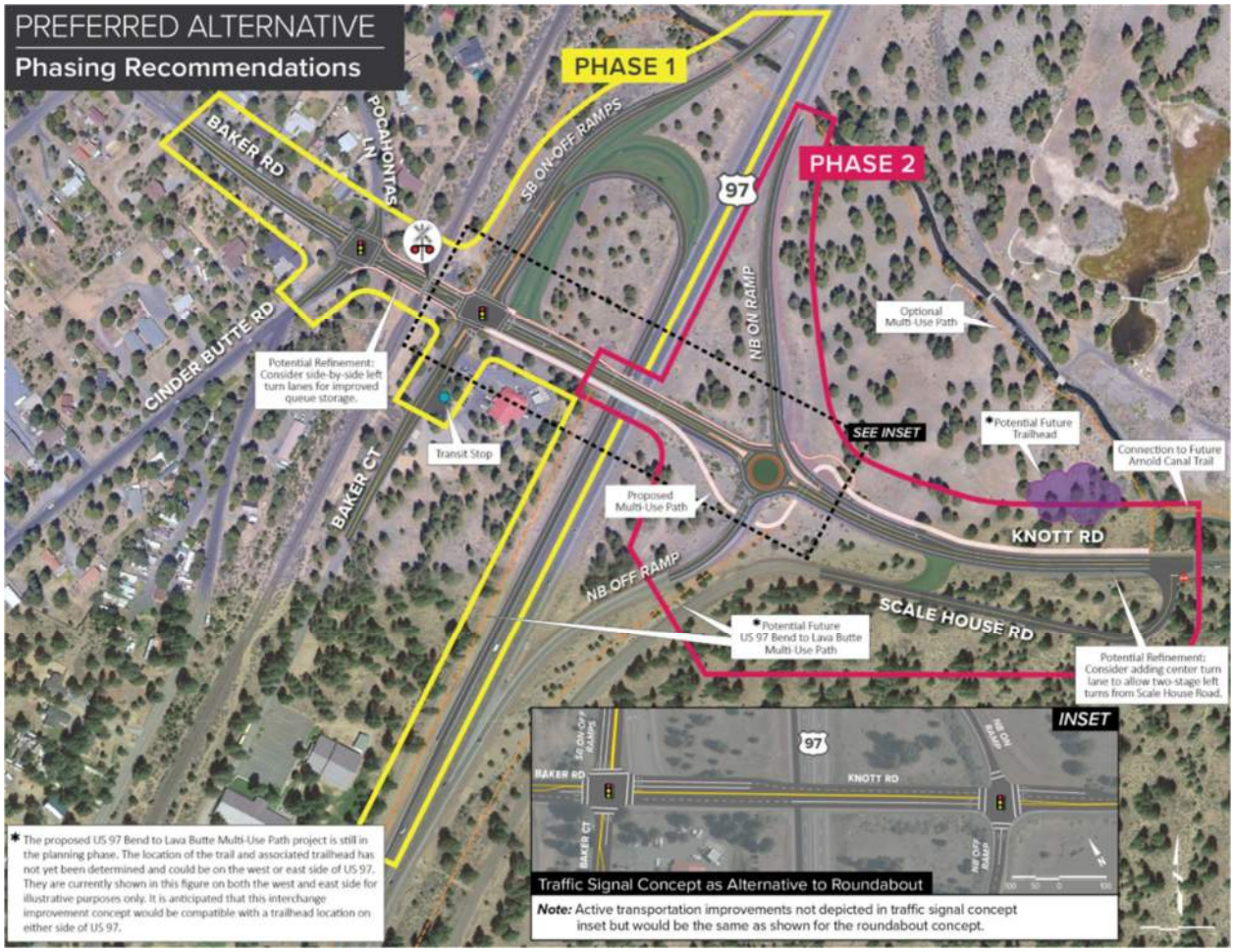


Figure B-4: US 97 / Baker Road / Knott Road Interchange Improvement Concept

SW Canal Boulevard / Young Avenue

The intersection of SW Canal Blvd with Young Ave is a four-leg intersection with stop control on the minor east-west approaches (Young Ave). SW Canal Blvd is a rural arterial roadway, providing access to south Redmond from outlying communities and commuter traffic. Young Ave intersects SW Canal Blvd at a significant skew. The intersection was identified as an ODOT Safety Priority Index System (SPIS) site in 2020.

The intersection was identified as a Top 5% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-7.

Table B-7: Cloverdale Road / OR 126 Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
0	4	2	**6**

Deschutes County Road Department has developed an improvement concept which includes:

- Realigning the minor intersection approaches to reduce skew
- Installing intersection lighting
- Low-cost advance warning countermeasures, including improved advanced warning signage and pavement legend markings

The proposed realignment of Young Ave at the intersection of Old Bend-Redmond Hwy/S Canal Blvd project (Project) will address safety through improved geometry and low-cost countermeasures. The improvement concept is shown in Figure B-5.

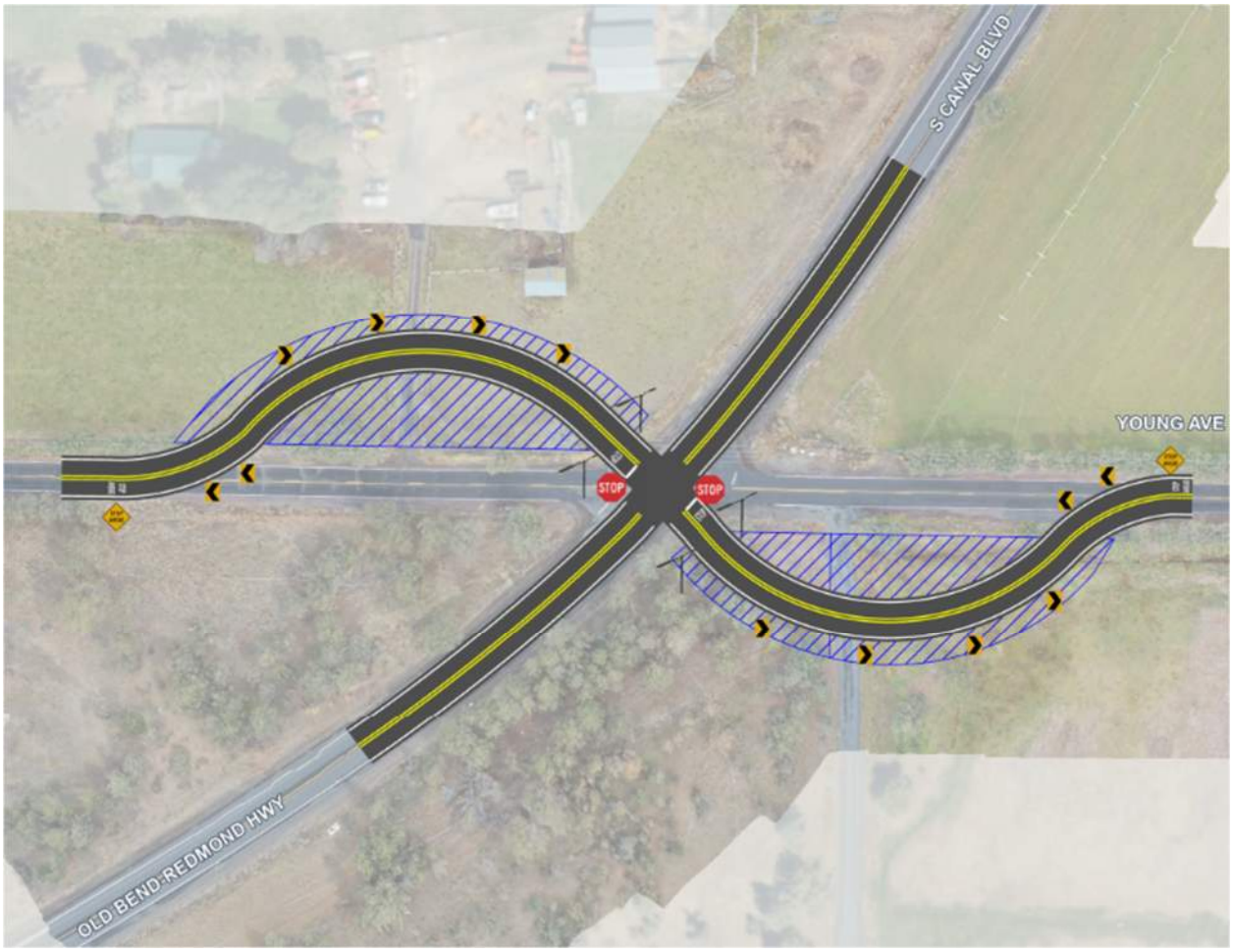


Figure B-5: SW Canal Blvd / Young Ave Improvement Concept

Cline Falls Highway / Connarn Rd

The intersection of Cline Falls Hwy / Connarn Rd is a three-leg intersection with stop control on the minor approach (Connarn Rd). Cline Falls Hwy is a rural arterial roadway providing access to residences, resort communities and recreational opportunities west of Redmond.

The intersection was identified as a Top 5% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-8.

Table B-8: Cline Falls Hwy / Connarn Rd Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
0	1	3	**4**

Deschutes County Road Department applied for ARTS funding for a corridor improvement project on Cline Falls Hwy between Connarn Rd and Newcomb Rd which included similar improvements at five intersections within a three-mile segment. Improvements were tailored to the predominant crash types observed within the segment, which included speed-involved crashes, roadway departures and intersectional crashes. Proposed improvements include:

- Traversable median islands on major approaches
- Sinusoidal fog line rumble strips
- Intersection advance warning improvements (signage & pavement markings)

The improvement concept included with the ARTS funding application is shown in Figure B-6. Award of ARTS funding is currently pending.

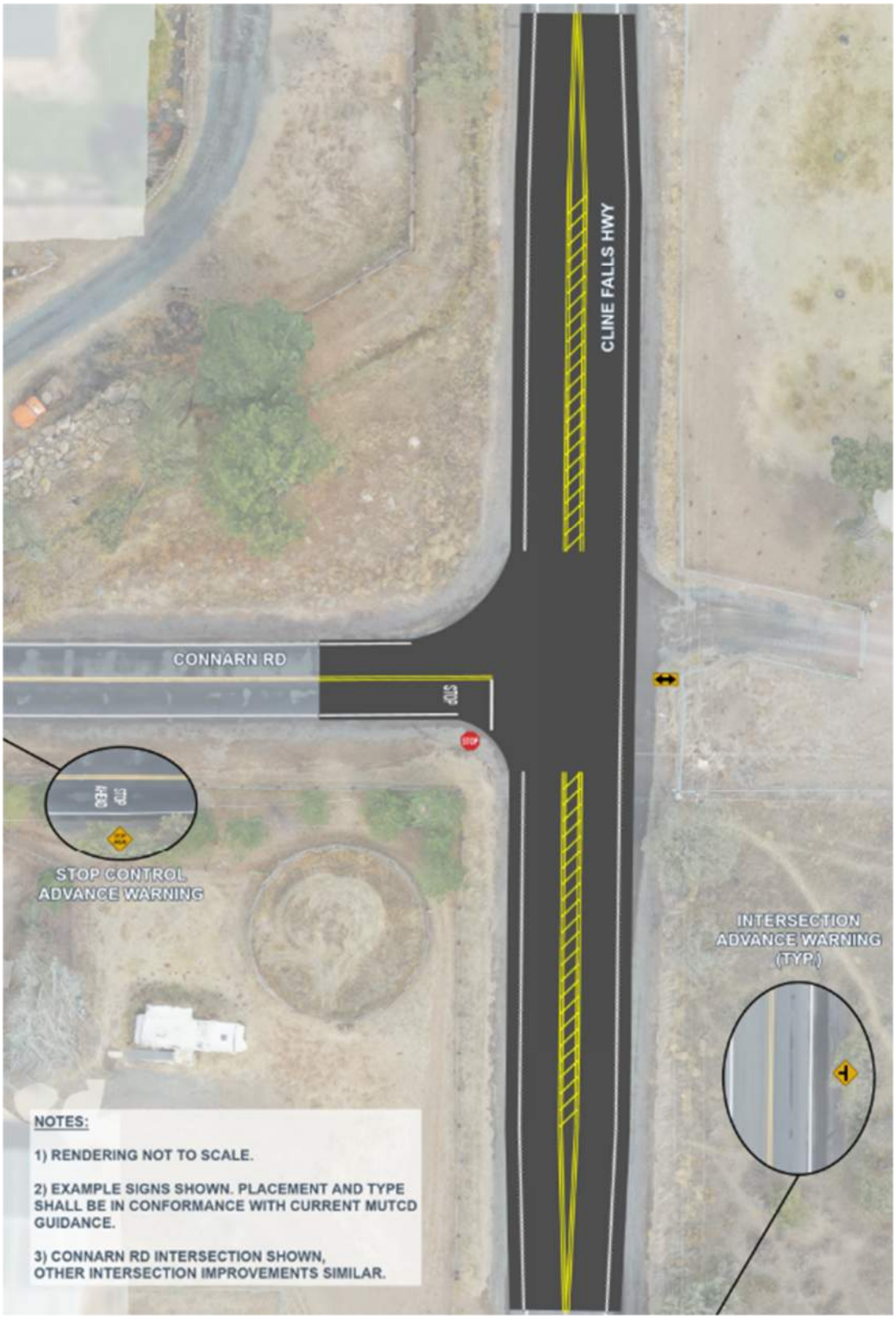


Figure B-6: Cline Falls Hwy / Connarn Rd Improvement Concept

APPENDIX E–PROJECT PRIORITIZATION & COST ESTIMATE WORKSHEETS

Priority Location	Crash History Rating	Equity Disparity Rating	Planning-Level Cost Rating	Public Support Rating	Environmental/Property Impacts Rating	Jurisdiction Coordination Rating	Previously Planned Projects Rating	Implementation Timeframe
Rural Intersections								
US 97/Jackpine Lp	●	◖	◖	●	⊗	◖	⊗	**Mid-Term (5-10 yrs)**
US 20/Pinehurst Rd	◖	⊗	◖	●	⊗	◖	⊗	**Long-Term (10-20 yrs)**
US 20/Gerking Market Rd	⊗	◖	○	●	○	◖	⊗	**Long-Term (10-20 yrs)**
US 20/Erickson Rd	○	⊗	●	●	◖	◖	⊗	**Mid-Term (5-10 yrs)**
State Rec Rd/Huntington Rd	◖	●	●	◖	●	●	⊗	**Short-Term (1-5 yrs)**
Bear Creek Rd/Ward Rd	◖	○	●	◖	●	●	⊗	**Short-Term (1-5 yrs)**
Smith Rock Way/NE 33rd St	●	⊗	●	◖	●	●	⊗	**Short-Term (1-5 yrs)**
Smith Rock Way/NE 1st ST	●	⊗	●	◖	●	●	⊗	**Short-Term (1-5 yrs)**
NW Ice Ave/NW 43rd St	⊗	◖	●	◖	●	●	⊗	**Mid-Term (5-10 yrs)**
Rural Road								
Day Rd/Amber Ln/5th St Curve	⊗	⊗	⊗	●	⊗	●	⊗	**Long-Term (10-20 yrs)**

Criteria Ratings	Definition
●	Strong history of serious crashes; overlap with high equity disparity area; low-cost improvement; strong public support; low environmental/property impacts; no cross-jurisdiction coordination; advances prior planned project
◖	Some history of serious crashes; overlap with medium equity disparity area; low/medium-cost improvement; some public support; some environmental/property impacts; no cross-jurisdiction coordination; advances prior planned project
○	Minimal history of serious crashes; overlap with low equity disparity area; medium-cost improvement; little public support; higher environmental/property impacts; cross-jurisdiction coordination; doesn't advance prior planned project
⊗	No history of serious crashes; no overlap with areas of equity disparity area; high-cost improvement; no public support; significant environmental/property impacts; cross-jurisdiction coordination; does not advance prior planned project

Deschutes County TSAP Update

US 97 and Jackpine Loop Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE			*Date: December 2025*		
Reviewed By: Darren Hippenstiel, PE					
	Mobilization	LS	ALL	$213,000.00	$213,000.00
	Traffic Control	LS	ALL	$97,000.00	$97,000.00
	Construction Staging	LS	ALL	$97,000.00	$97,000.00
	Erosion Control	AC	3.3	$10,000.00	$33,000.00
	Removal of Structures and Obstructions	LS	ALL	$19,000.00	$19,000.00
	Clearing and Grubbing	LS	ALL	$37,000.00	$37,000.00
	General Earthworks	CY	8,800	$65.00	$572,000.00
	Asphalt Roadway - Full Depth	SF	143,725	$7.90	$1,135,427.50
	Asphalt Roadway - Grind & Inlay (2" Depth)	SF	11,400	$3.10	$35,340.00
	Subgrade Geotextile	SY	15,970	$2.00	$31,940.00
	Pavement Markings, Complete	LS	ALL	$37,680.00	$37,680.00
	Signage, Complete	LS	ALL	$8,750.00	$8,750.00
	Illumination System, Complete	LS	ALL	$23,000.00	$23,000.00
				TOTAL CONSTRUCTION COST	**$ 2,340,138**
	ENGINEERING SUPPORT				
	Engineering & Construction Management	LS	ALL	$586,000.00	$586,000.00
	ENGINEERING SUPPORT SUBTOTAL				**$ 586,000**
				TOTAL PROJECT SUBTOTAL	**$ 2,928,872**
				30% Contingency	**$ 878,670**
				TOTAL ESTIMATED PROJECT COST	**$ 3,808,000**

Deschutes County TSAP Update

US 97 and Jackpine Loop Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE	*Date: December 2025*
Reviewed By: Darren Hippenstiel, PE	

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 5 inches ACP over 10 inches of compacted aggregate base.
- R/W costs are not included as part of this effort.
- Pierce Road to be constructed within ROW and overhead utilities are to to remain.
- No sound walls are required for this project.
- The cost of widening and median barrier along US 97 is not included in this estimate.
- County-owned road cross section width is assumed to be 26 feet.
- Grind and inlay area is assumed to cover the full width of existing roadway where new pavement markings will be applied on the inlaid surface.
- Assumes two new light poles at intersection.
- Stormwater facilities are assumed to be ditches which are inlcuded in the earthwork quantitiy.

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 60% based on risk.

Deschutes County TSAP Update

US 20 and Pinehurst Road Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE		*Date: December 2025*		
Reviewed By: Darren Hippenstiel, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$133,000.00	$133,000.00
Traffic Control	LS	ALL	$61,000.00	$61,000.00
Construction Staging	LS	ALL	$61,000.00	$61,000.00
Erosion Control	AC	0.9	$10,000.00	$9,000.00
Removal of Structures and Obstructions	LS	ALL	$12,000.00	$12,000.00
Clearing and Grubbing	LS	ALL	$29,000.00	$29,000.00
General Earthworks	CY	3,600	$65.00	$234,000.00
Asphalt Roadway - Full Depth	SF	37,787	$14.60	$551,690.20
Asphalt Roadway - Grind & Inlay (2" Depth)	SF	71,955	$3.10	$223,060.50
Subgrade Geotextile	SY	4,199	$2.00	$8,398.00
Raised Concrete Island	SF	1,260	$16.20	$20,412.00
Pavement Markings, Complete	LS	ALL	$23,656.00	$23,656.00
Signage, Complete	LS	ALL	$9,750.00	$9,750.00
Illumination System, Complete	LS	ALL	$80,500.00	$80,500.00
Stormwater System	LS	ALL	$34,960.00	$34,960.00
TOTAL CONSTRUCTION COST				**$ 1,491,427**
ENGINEERING SUPPORT				
Engineering & Construction Management	LS	ALL	$373,000.00	$373,000.00
ENGINEERING SUPPORT SUBTOTAL				**$ 373,000**
TOTAL PROJECT SUBTOTAL				**$ 1,867,161**
30% Contingency				**$ 560,150**
TOTAL ESTIMATED PROJECT COST				**$ 2,428,000**

Deschutes County TSAP Update

US 20 and Pinehurst Road Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE	*Date: December 2025*
Reviewed By: Darren Hippenstiel, PE	

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 11 inches ACP over 12 inches of compacted aggregate base.
- R/W costs are not included as part of this effort.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.
- County-owned roads cross section width is assumed to be 26 feet.
- US 20 cross section width is assumed to be 48 feet at intersections.
- Grind and inlay area is assumed to cover the full width of existing roadway where new pavement markings will be applied on the inlaid surface.
- This assumes full-depth widening of US 20 on both sides but this shall be refined through future studies.
- Assumes seven new light poles at intersections.
- This estimate assumes culverts are replaced as part of the line item 'Stormwater System'. Project should avoid stormwater utility impacts if possible.
- Stormwater facilities are assumed to be ditches which are inlcuded in the earthwork quantitiy.

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 60% based on risk.

Deschutes County TSAP Update

US 20 and Gerking Market Road Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE			*Date: December 2025*		
Reviewed By: Darren Hippenstiel, PE					
	Mobilization	LS	ALL	$113,000.00	$113,000.00
	Traffic Control	LS	ALL	$52,000.00	$52,000.00
	Construction Staging	LS	ALL	$52,000.00	$52,000.00
	Erosion Control	AC	0.8	$10,000.00	$8,000.00
	Removal of Structures and Obstructions	LS	ALL	$10,000.00	$10,000.00
	Clearing and Grubbing	LS	ALL	$20,000.00	$20,000.00
	General Earthworks	CY	2,600	$65.00	$169,000.00
	Asphalt Roadway - Full Depth	SF	30,510	$14.60	$445,446.00
	Asphalt Roadway - Grind & Inlay (2" Depth)	SF	77,050	$3.10	$238,855.00
	Subgrade Geotextile	SY	3,390	$2.00	$6,780.00
	Raised Concrete Island	SF	3,414	$16.20	$55,306.80
	Pavement Markings, Complete	LS	ALL	$19,794.79	$19,794.79
	Signage, Complete	LS	ALL	$6,750.00	$6,750.00
	Illumination System, Complete	LS	ALL	$46,000.00	$46,000.00
	TOTAL CONSTRUCTION COST			**$**	**1,242,933**
	ENGINEERING SUPPORT				
	Engineering & Construction Management	LS	ALL	$311,000.00	$311,000.00
	ENGINEERING SUPPORT SUBTOTAL			**$**	**311,000**
	TOTAL PROJECT SUBTOTAL			**$**	**1,556,667**
	30% Contingency			**$**	**467,000**
	TOTAL ESTIMATED PROJECT COST			**$**	**2,024,000**

Deschutes County TSAP Update

US 20 and Gerking Market Road Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE	*Date: December 2025*
Reviewed By: Darren Hippenstiel, PE	

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 11 inches ACP over 12 inches of compacted aggregate base.
- R/W costs are not included as part of this effort.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.
- County-owned roads cross section width is assumed to be 26 feet.
- US 20 cross section width is assumed to be 59 feet at intersection.
- Grind and inlay area is assumed to cover the full width of existing roadway where new pavement markings will be applied on the inlaid surface.
- This assumes full-depth widening of US 20 on the south side but this shall be refined through future studies.
- Assumes three new light poles at intersection.
- Stormwater facilities are assumed to be ditches which are inlcuded in the earthwork quantitiy.

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 60% based on risk.

Deschutes County TSAP Update

US 20 / Erickson Road / Torkelson Road Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE			*Date: December 2025*		
Reviewed By: Darren Hippenstiel, PE					
	Mobilization	LS	ALL	$50,000.00	$50,000.00
	Traffic Control	LS	ALL	$23,000.00	$23,000.00
	Construction Staging	LS	ALL	$23,000.00	$23,000.00
	Erosion Control	AC	0.3	$10,000.00	$3,000.00
	Removal of Structures and Obstructions	LS	ALL	$5,000.00	$5,000.00
	Clearing and Grubbing	LS	ALL	$9,000.00	$9,000.00
	General Earthworks	CY	1,000	$65.00	$65,000.00
	Asphalt Roadway - Full Depth	SF	8,780	$14.60	$128,188.00
	Asphalt Roadway - Grind & Inlay (2" Depth)	SF	40,750	$3.10	$126,325.00
	Subgrade Geotextile	SY	976	$2.00	$1,952.00
	Raised Concrete Island	SF	2,510	$16.20	$40,662.00
	Pavement Markings, Complete	LS	ALL	$14,983.76	$14,983.76
	Signage, Complete	LS	ALL	$7,260.00	$7,260.00
	Illumination System, Complete	LS	ALL	$46,000.00	$46,000.00
				TOTAL CONSTRUCTION COST	**$ 543,371**
	ENGINEERING SUPPORT				
	Engineering & Construction Management	LS	ALL	$136,000.00	$136,000.00
	ENGINEERING SUPPORT SUBTOTAL				**$ 136,000**
				TOTAL PROJECT SUBTOTAL	**$ 682,105**
				30% Contingency	**$ 204,640**
				TOTAL ESTIMATED PROJECT COST	**$ 887,000**

Deschutes County TSAP Update

US 20 / Erickson Road / Torkelson Road Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE	*Date: December 2025*
Reviewed By: Darren Hippenstiel, PE	

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 11 inches ACP over 12 inches of compacted aggregate base.
- R/W costs are not included as part of this effort.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.
- County-owned roads cross section width is assumed to be 26 feet.
- US 20 cross section width is assumed to be 45 feet at intersection.
- Grind and inlay area is assumed to cover the full width of existing roadway where new pavement markings will be applied on the inlaid surface.
- This assumes full-depth widening of US 20 on both sides but this shall be refined through future studies.
- Assumes four new light poles at intersection.
- Stormwater facilities are assumed to be ditches which are inlcuded in the earthwork quantitiy.

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 60% based on risk.

Deschutes County TSAP Update

Day Road / 5th Street / Amber Lane Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE		*Date: December 2025*		
Reviewed By: Darren Hippenstiel, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$37,000.00	$37,000.00
Traffic Control	LS	ALL	$17,000.00	$17,000.00
Construction Staging	LS	ALL	$17,000.00	$17,000.00
Erosion Control	AC	0.3	$10,000.00	$3,000.00
Removal of Structures and Obstructions	LS	ALL	$4,000.00	$4,000.00
Clearing and Grubbing	LS	ALL	$7,000.00	$7,000.00
General Earthworks	CY	700	$65.00	$45,500.00
Asphalt Roadway - Full Depth	SF	9,035	$7.90	$71,376.50
Asphalt Roadway - Grind & Inlay (2" Depth)	SF	14,325	$3.10	$44,407.50
Subgrade Geotextile	SY	1,004	$2.00	$2,008.00
Pavement Markings, Complete	LS	ALL	$5,824.08	$5,824.08
Signage, Complete	LS	ALL	$41,440.00	$41,440.00
Illumination System, Complete	LS	ALL	$103,500.00	$103,500.00
TOTAL CONSTRUCTION COST				**$ 399,056**
ENGINEERING SUPPORT				
Engineering & Construction Management	LS	ALL	$100,000.00	$100,000.00
ENGINEERING SUPPORT SUBTOTAL				**$ 100,000**
TOTAL PROJECT SUBTOTAL				**$ 501,790**
30% Contingency				**$ 150,540**
TOTAL ESTIMATED PROJECT COST				**$ 653,000**

Deschutes County TSAP Update

Day Road / 5th Street / Amber Lane Concept

Deschutes County

Engineer's Conceptual Estimate

Prepared By: Eza Gaigalas, PE	*Date: December 2025*
Reviewed By: Darren Hippenstiel, PE	

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 5 inches ACP over 10 inches of compacted aggregate base.
- R/W costs are not included as part of this effort.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.
- Cost opinion does not include berm, vertical features for speed control, or driveway realignment.
- County-owned road cross section width is assumed to be 30 feet.
- Grind and inlay area is assumed to cover the full width of existing roadway where new pavement markings will be applied on the inlaid surface.
- Assumes nine new light poles at intersections.
- Stormwater facilities are assumed to be ditches which are inlcuded in the earthwork quantitiy.

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 60% based on risk.

APPENDIX F–OTHER SAFETY PROJECTS

SW Helmholtz Way / OR 126

The intersection of SW Helmholtz Way with OR 126 (SW Highland Ave) is located within the Redmond Urban Growth Boundary. It is a four-way intersection with stop-control on the minor approach. Protected left turn lanes exist on OR126.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The frequency and severity of crashes at this location are indicative of need for improvements. The crash history at this intersection is summarized in Table B-1.

Table B-1: SW Helmholtz Way / OR 126 Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
3	15	9	**27**

ODOT has identified this intersection for a future safety corridor study which will evaluate improvement alternatives to address predominant crash patterns. While no conceptual alternatives have been presented to-date, Deschutes County Road Department will observe any proposed improvements yielded from the forthcoming safety corridor study and partner with ODOT and the City of Redmond as appropriate to implement safety improvements.

NW Lower Bridge Way / NW 31st Street

The section of Lower Bridge Way from 19th St to 31st St is a ¾-mile long segment of arterial roadway near the community of Terrebonne. There are three 3-leg intersections along the length of the roadway segment, each with stop-control on the minor roadway approaches. The intersection of NW 31st is linked to the majority of crashes in this section.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-2.

Table B-2: NW Lower Bridge Way / NW 31st Street Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
2	5	3	**10**

This intersection was also noted in the 2019 TSAP as a Top Site for safety improvements. Deschutes County Road Department applied for ARTS funding for corridor improvements to the NW 19th and NW 31st Street intersections which include:

- Installation of left turn lanes on the westbound major approaches
- Advance warning countermeasures, including Stop/Stop Ahead pavement markings, intersection advance warning signage and stop ahead advance warning signs.
- Flashing LED Stop Signs
- Improvements to pavement markings

The improvement concept included with the ARTS funding application is shown in Figure B-1. Award of ARTS funding is currently pending.

Figure B-1: NW Lower Bridge Way / NW 31st Street Improvement Concept

Cloverdale Road / OR 126

The intersection of Cloverdale Rd with OR 126 is a three-leg intersection with stop control on the minor approach. The rural two-lane collector roadway (Cloverdale Rd) serves north-south traffic between US20 and OR 126 and intersects OR 126 at its northern terminus at a nearly right angle.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-3.

Table B-3: Cloverdale Road / OR 126 Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
1	5	2	**8**

Deschutes County Road Department has developed an improvement concept which includes:

- Improving advance warning countermeasures on the minor intersection approach by adding signage and pavement legends;
- Installation of a dynamic flashing LED stop sign on the minor approach;
- Installation of a raised median island on the stop-controlled approach to command driver attention; and
- Vegetation & fixed object removal to improve sight distance from the stop-controlled intersection approach within the sight triangle in order to mitigate turning movement crashes.

The improvement concept is shown in Figure B-2.

Figure B-2: Cloverdale Road / OR 126 Improvement Concept

US 20 / Fryrear Road

The intersection of US20 with Fryrear Road is a three-leg intersection with stop control on the minor approach (Fryrear Road). US20 primarily serves freight and passenger vehicle traffic between Central Oregon and the Willamette Valley west of the Cascade Mountain Range. Fryrear Road is classified as a Minor Collector and is operated and maintained by Deschutes County Road Department. Presently, the intersection is configured in such a way that eastbound vehicles turning onto Fryrear Road do not have a refuge to wait for adequate gaps in oncoming westbound traffic. As a result, eastbound traffic must slow significantly or stop completely, leading to a high propensity for rear-end crashes. Although advance warning signage for the Fryrear Road intersection exists in both westbound and eastbound directions on US20, eastbound traffic user expectancy of a stop condition is poor. These issues are compounded by the fact that the intersection is located within a horizontal curve with substandard sight distance on US20.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-4.

Table B-4: US 20 / Fryrear Rd Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
1	3	1	**5**

Deschutes County Road Department, in collaboration with ODOT, has developed an improvement concept which includes:

- Addition of protected Left Turn Lane for eastbound US20 traffic
- Installation of illumination at the intersection
- Realignment of US20 to the south to improve sight distance and horizontal curve layout
- Realignment of Fryrear Road to remove intersection skew and improve sight distance
- Other low-cost systemic countermeasures, including pavement markings, delineation, and dynamic feedback traffic control devices

The improvement concept is shown in Figure B-3.

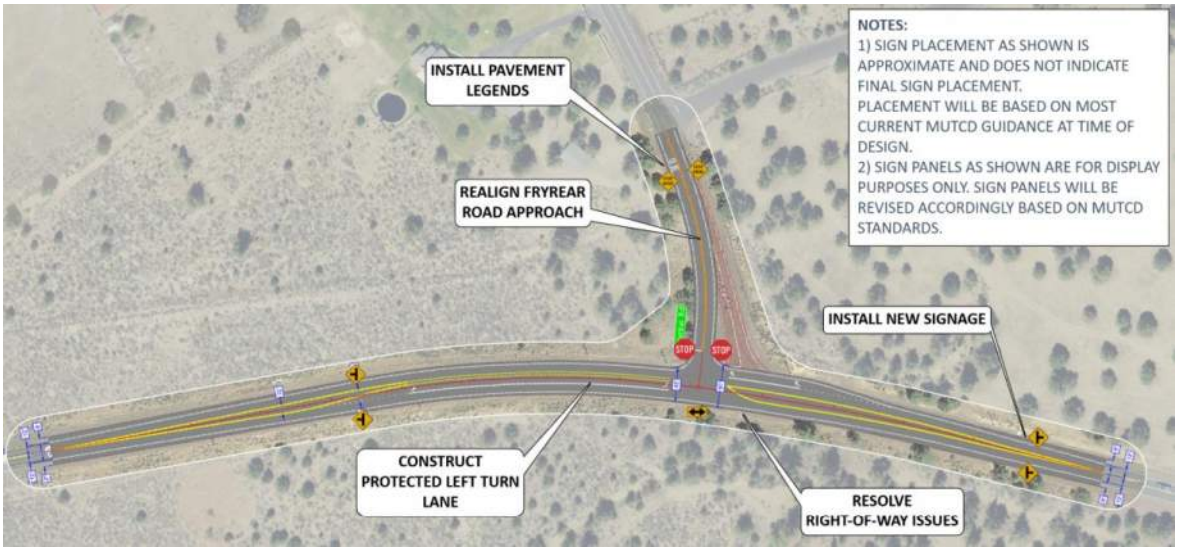


Figure B-3: US 20 / Fryrear Road Improvement Concept

NW Canal Boulevard / NE Oneil Highway

The intersection of NW Canal Blvd with NE Oneil Hwy is a four-leg intersection of a state highway with a County road located north of the Redmond City Limits. The intersection presently has stop control on the minor approaches (NW Canal Blvd). Most of the crashes at this intersection involved turning vehicles or vehicles queued to complete a turning movement.

The intersection was identified as a Top 1% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-5.

Table B-5: NW Canal Boulevard / NE Oneil Highway Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
1	3	0	**4**

Deschutes County Road Department has obligated funding for improvements to NW Canal Blvd between the Redmond City Limit and NE Oneil Hwy as part of their 2026-2030 Capital Improvement Plan (CIP). As part of this roadway improvement project, appropriate safety improvements at the intersection will be evaluated for implementation.

Potential improvements could include:

- Left turn lane on westbound major approach
- Improved advance warning signage and pavement markings for stop-controlled approach.
- Doubled-up intersection advance warning signs on major approaches.
- Improving triangle sight distance.

US 97 / Baker Road / Knott Road (Deschutes River Woods) Interchange

The US 97 interchange at Baker Road/Knott Road is located south of the Bend urban growth boundary. The interchange is comprised of two-lane, two-way roadways and a series of stop-controlled intersections at the highway ramp terminals, as well as an at-grade railroad crossing.

Intersections within the footprint of the interchange were identified as Top 5% Sites in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-6.

Table B-6: US 97 / Baker Road / Knott Road Interchange Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
0	14	10	**24**

ODOT has developed an Interchange Area Management Plan (IAMP), which evaluated options for improvement to the existing interchange configuration.

As a result of the IAMP, a preferred alternative was selected, which includes the following improvements:

- US 97 southbound ramps realignment and traffic signal and railroad crossing improvements
- US 97 acceleration and deceleration lanes
- Cinder Butte Road realignment and turn lanes
- Baker Road/Cinder Butte Road signalization
- Confirm intersection control for US 97 northbound ramp terminal
- Baker Road bridge widening
- US 97 northbound roundabout ramp terminal
- Multi-use path connections
- Realign Scale House Road

The improvements are proposed to be delivered in two phases. The conceptual rendering of the preferred improvement alternative is shown in Figure B-4.

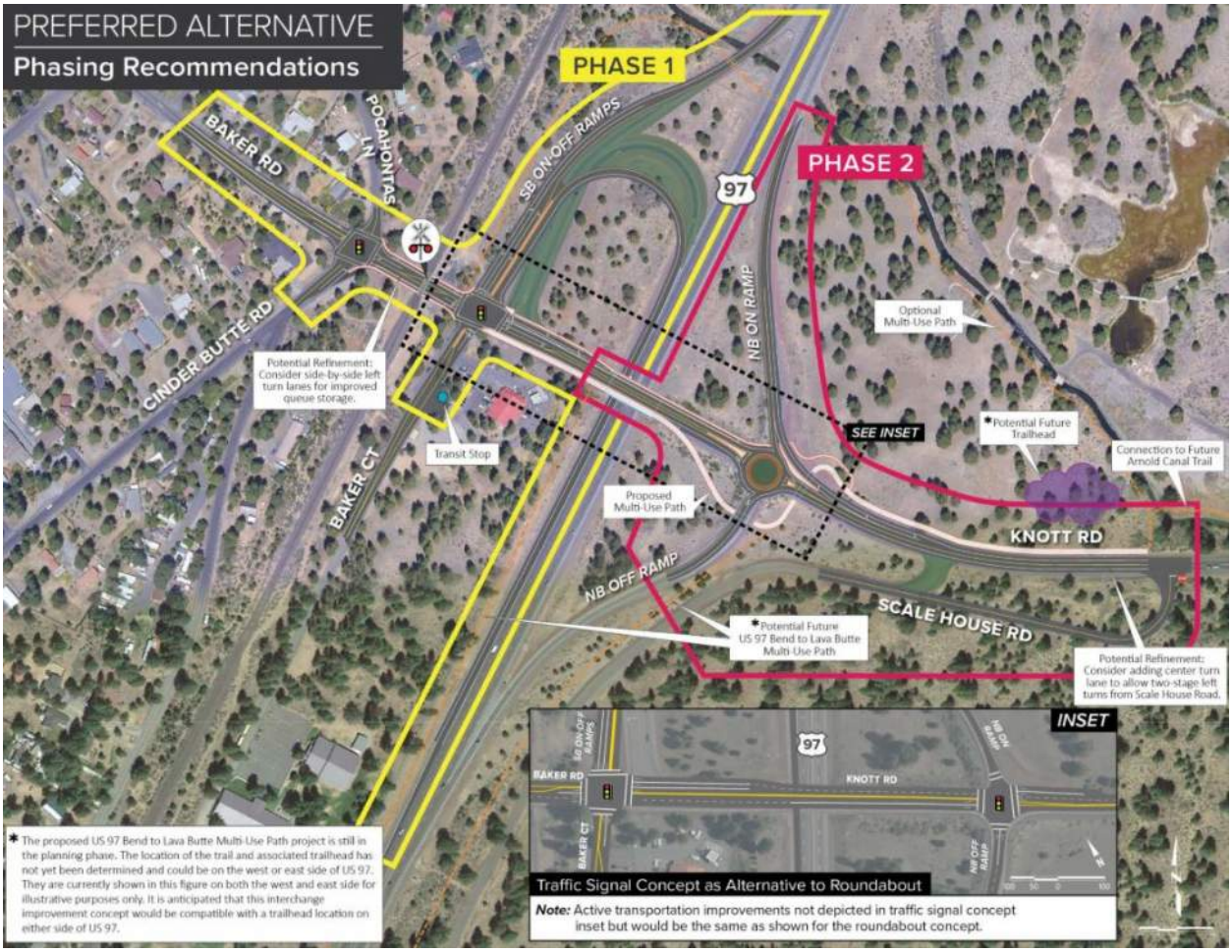


Figure B-4: US 97 / Baker Road / Knott Road Interchange Improvement Concept

SW Canal Boulevard / Young Avenue

The intersection of SW Canal Blvd with Young Ave is a four-leg intersection with stop control on the minor east-west approaches (Young Ave). SW Canal Blvd is a rural arterial roadway, providing access to south Redmond from outlying communities and commuter traffic. Young Ave intersects SW Canal Blvd at a significant skew. The intersection was identified as an ODOT Safety Priority Index System (SPIS) site in 2020.

The intersection was identified as a Top 5% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-7.

Table B-7: Cloverdale Road / OR 126 Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
0	4	2	**6**

Deschutes County Road Department has developed an improvement concept which includes:

- Realigning the minor intersection approaches to reduce skew
- Installing intersection lighting
- Low-cost advance warning countermeasures, including improved advanced warning signage and pavement legend markings

The proposed realignment of Young Ave at the intersection of Old Bend-Redmond Hwy/S Canal Blvd project (Project) will address safety through improved geometry and low-cost countermeasures. The improvement concept is shown in Figure B-5.

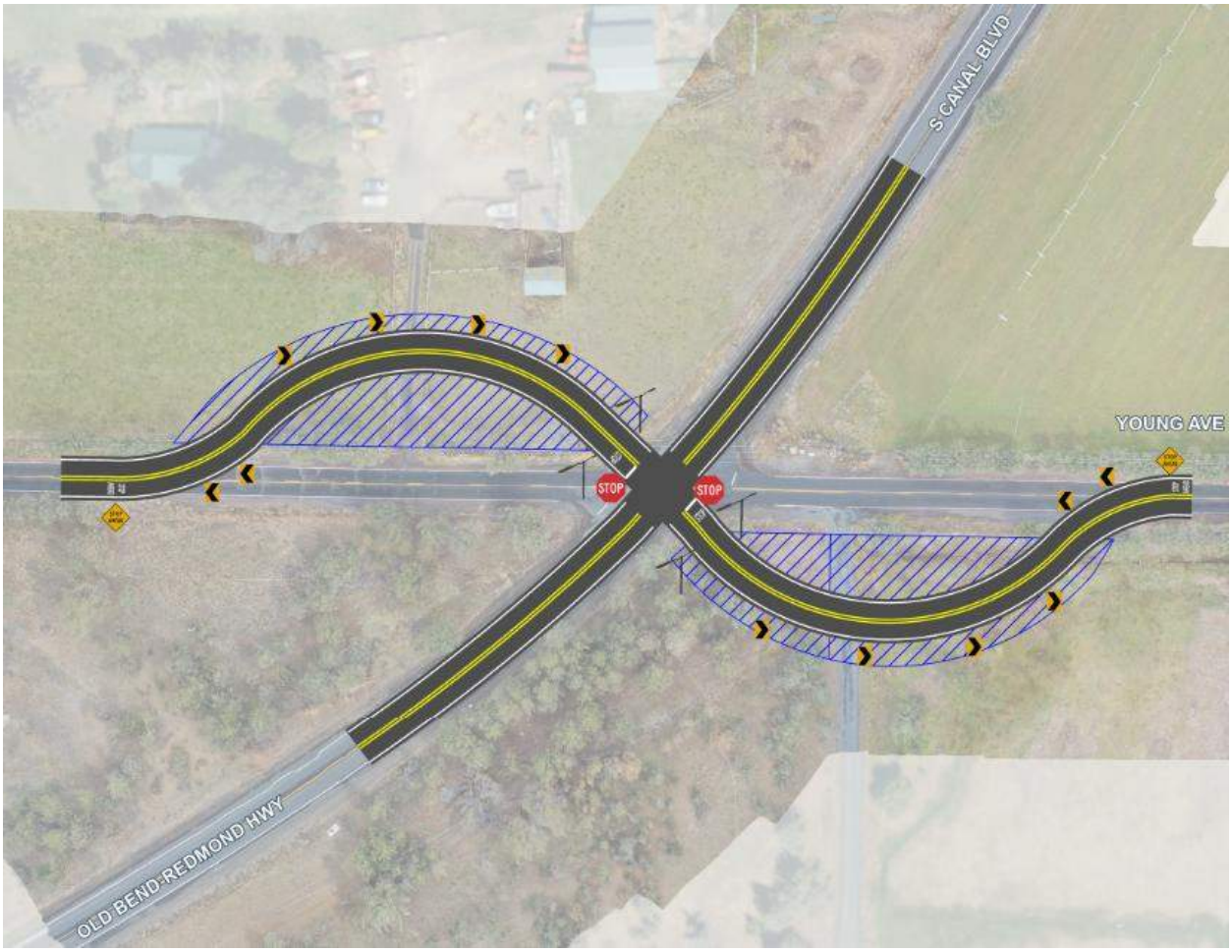


Figure B-5: SW Canal Blvd / Young Ave Improvement Concept

Cline Falls Highway / Connarn Rd

The intersection of Cline Falls Hwy / Connarn Rd is a three-leg intersection with stop control on the minor approach (Connarn Rd). Cline Falls Hwy is a rural arterial roadway providing access to residences, resort communities and recreational opportunities west of Redmond.

The intersection was identified as a Top 5% Site in the High Injury Network (HIN). The crash history at this intersection is summarized in Table B-8.

Table B-8: Cline Falls Hwy / Connarn Rd Crash History (2018-2022)

Total Number of Crashes			
Fatal / Serious Injury	**Moderate / Minor Injury**	**Property Damage Only**	**Total**
0	1	3	**4**

Deschutes County Road Department applied for ARTS funding for a corridor improvement project on Cline Falls Hwy between Connarn Rd and Newcomb Rd which included similar improvements at five intersections within a three-mile segment. Improvements were tailored to the predominant crash types observed within the segment, which included speed-involved crashes, roadway departures and intersectional crashes. Proposed improvements include:

- Traversable median islands on major approaches
- Sinusoidal fog line rumble strips
- Intersection advance warning improvements (signage & pavement markings)

The improvement concept included with the ARTS funding application is shown in Figure B-6. Award of ARTS funding is currently pending.

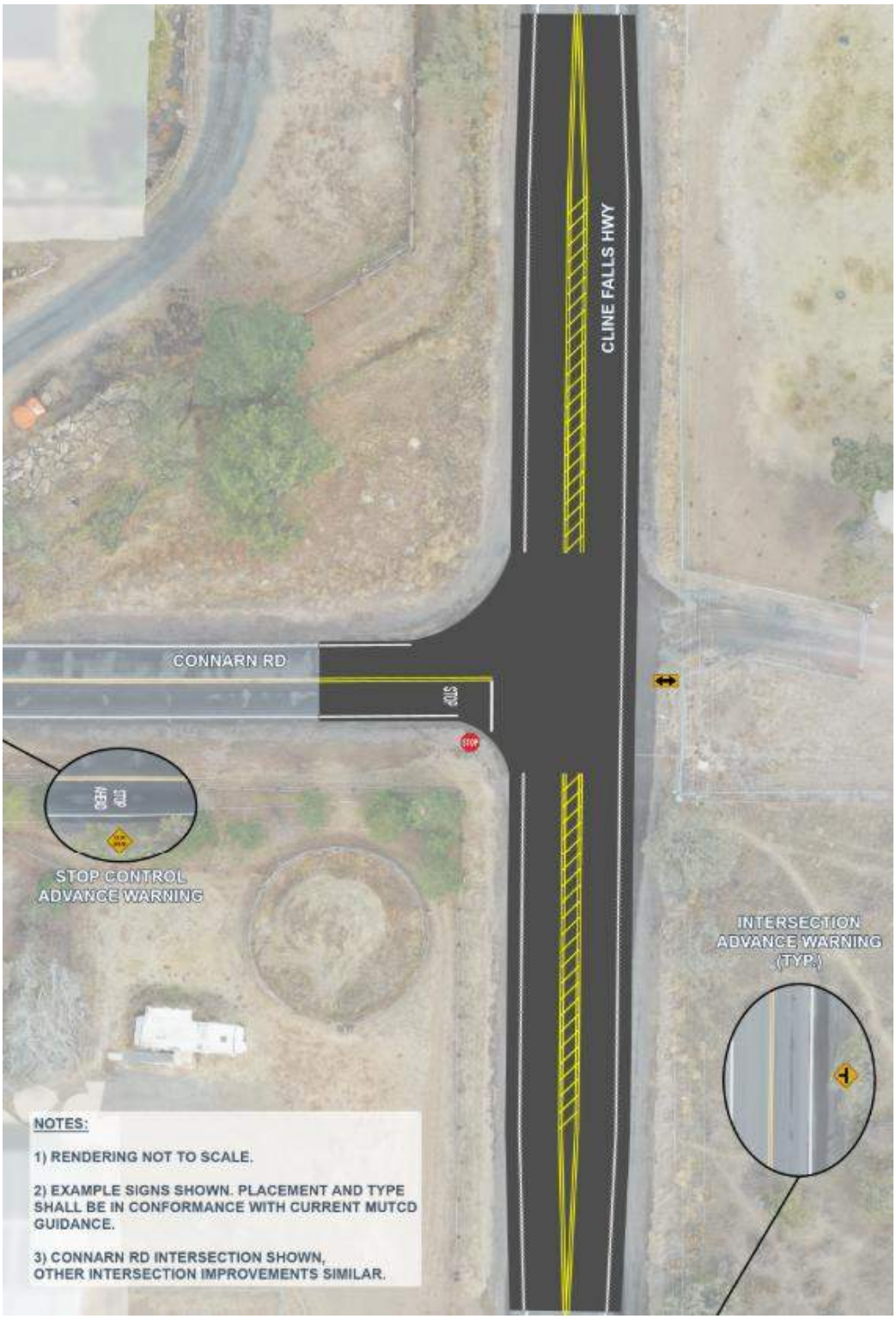
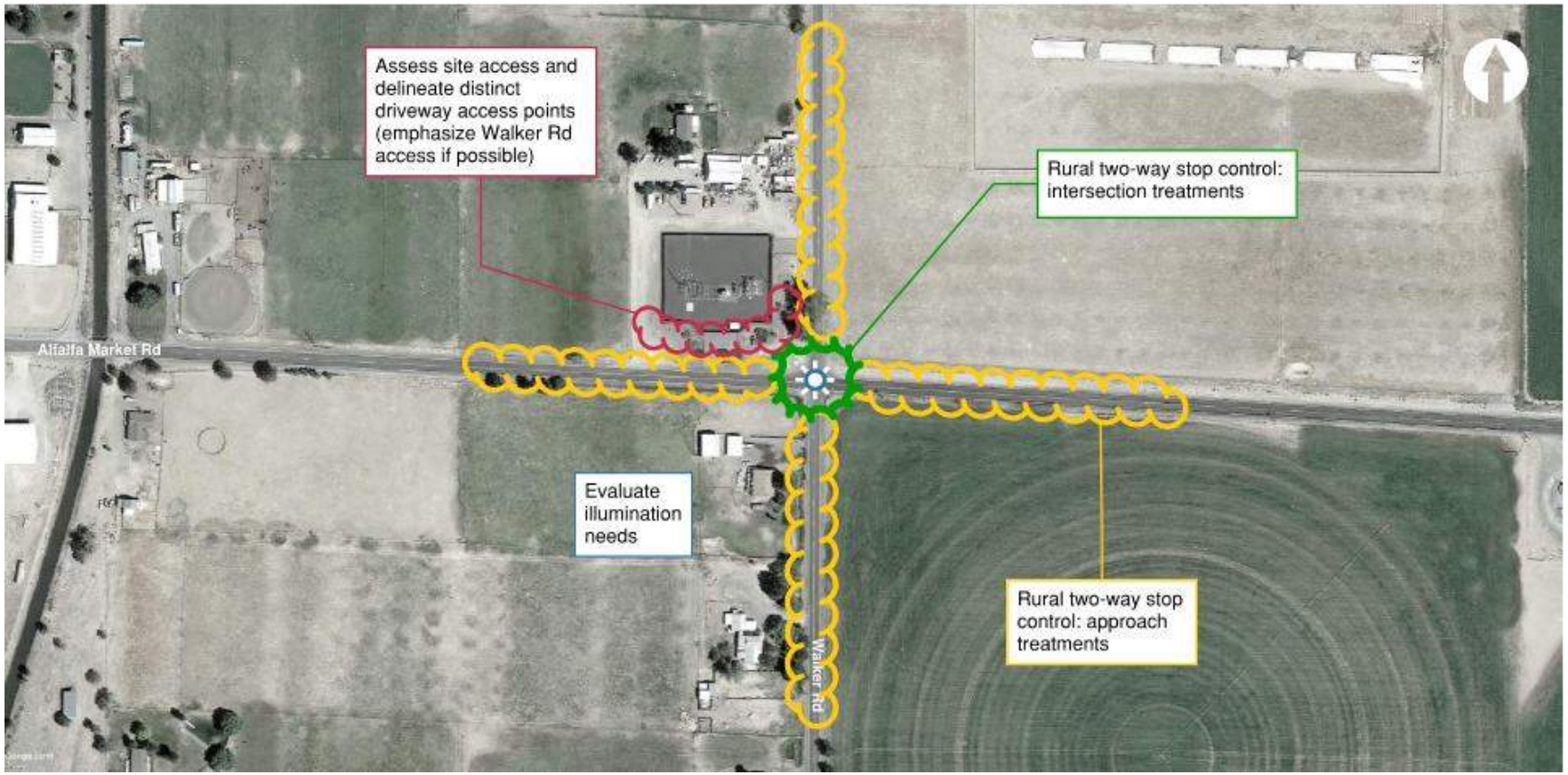
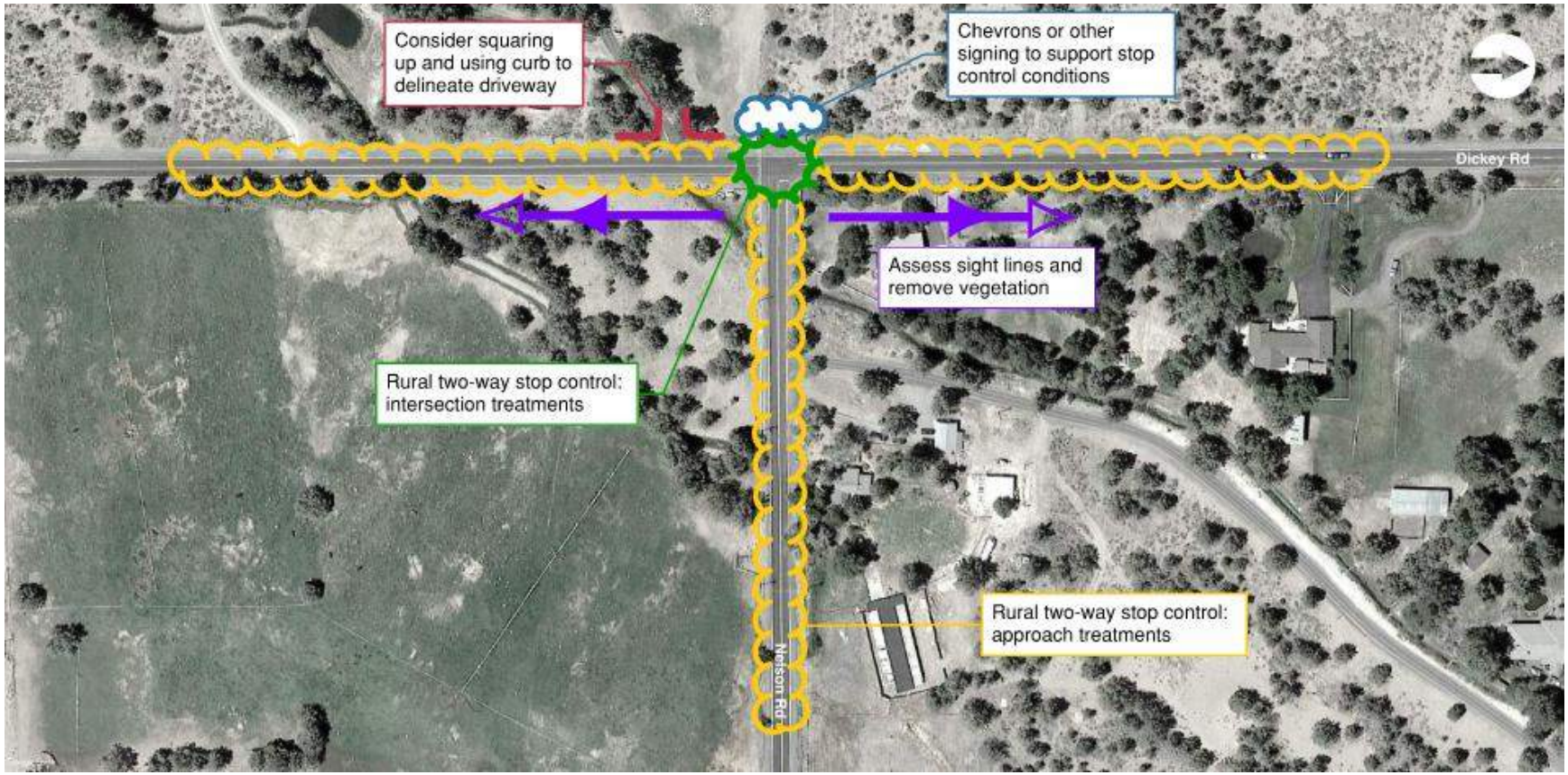


Figure B-6: Cline Falls Hwy / Connarn Rd Improvement Concept

Johnson Ranch Road / Walker Road

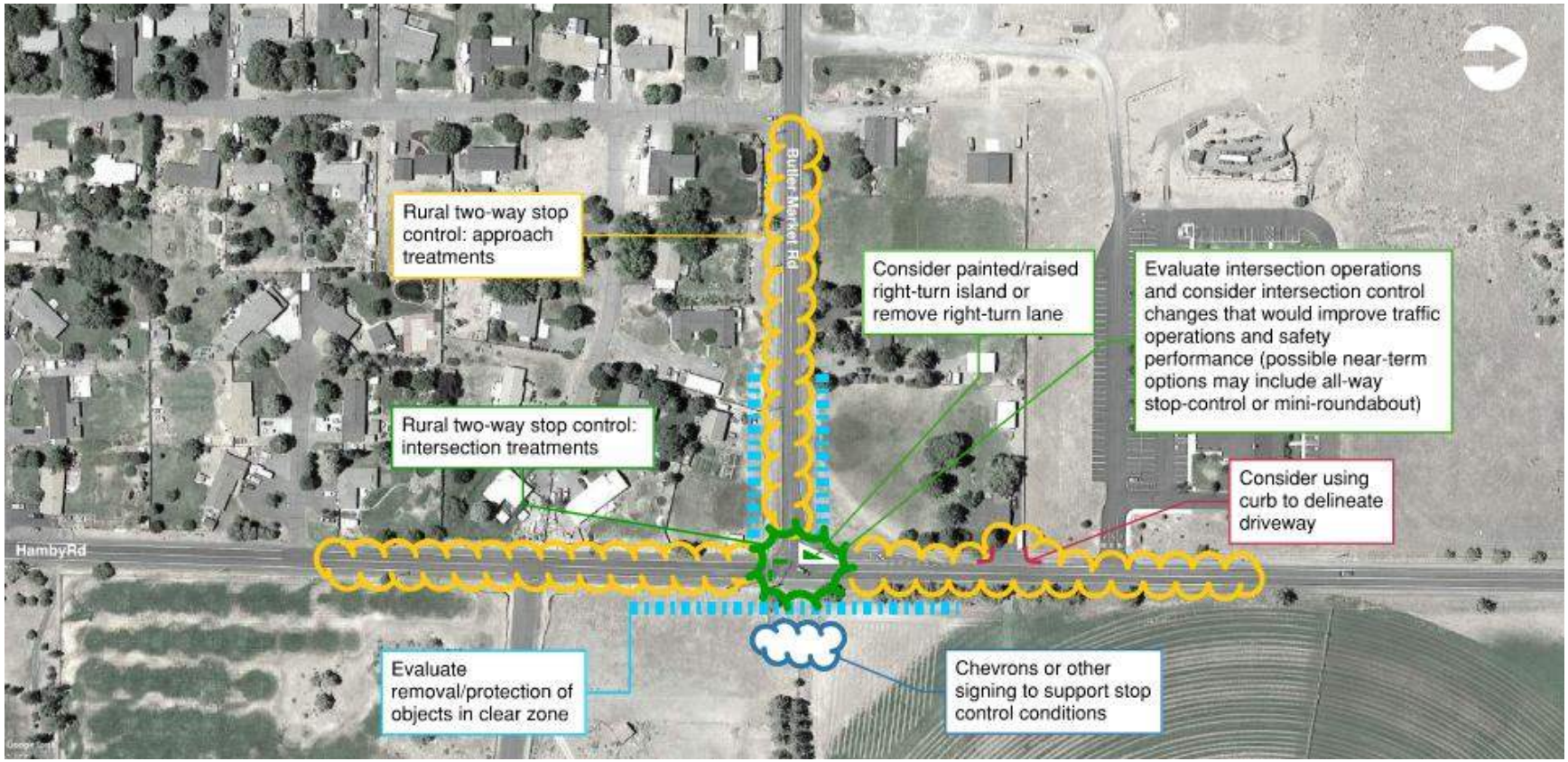


Dickey Road / Nelson Road

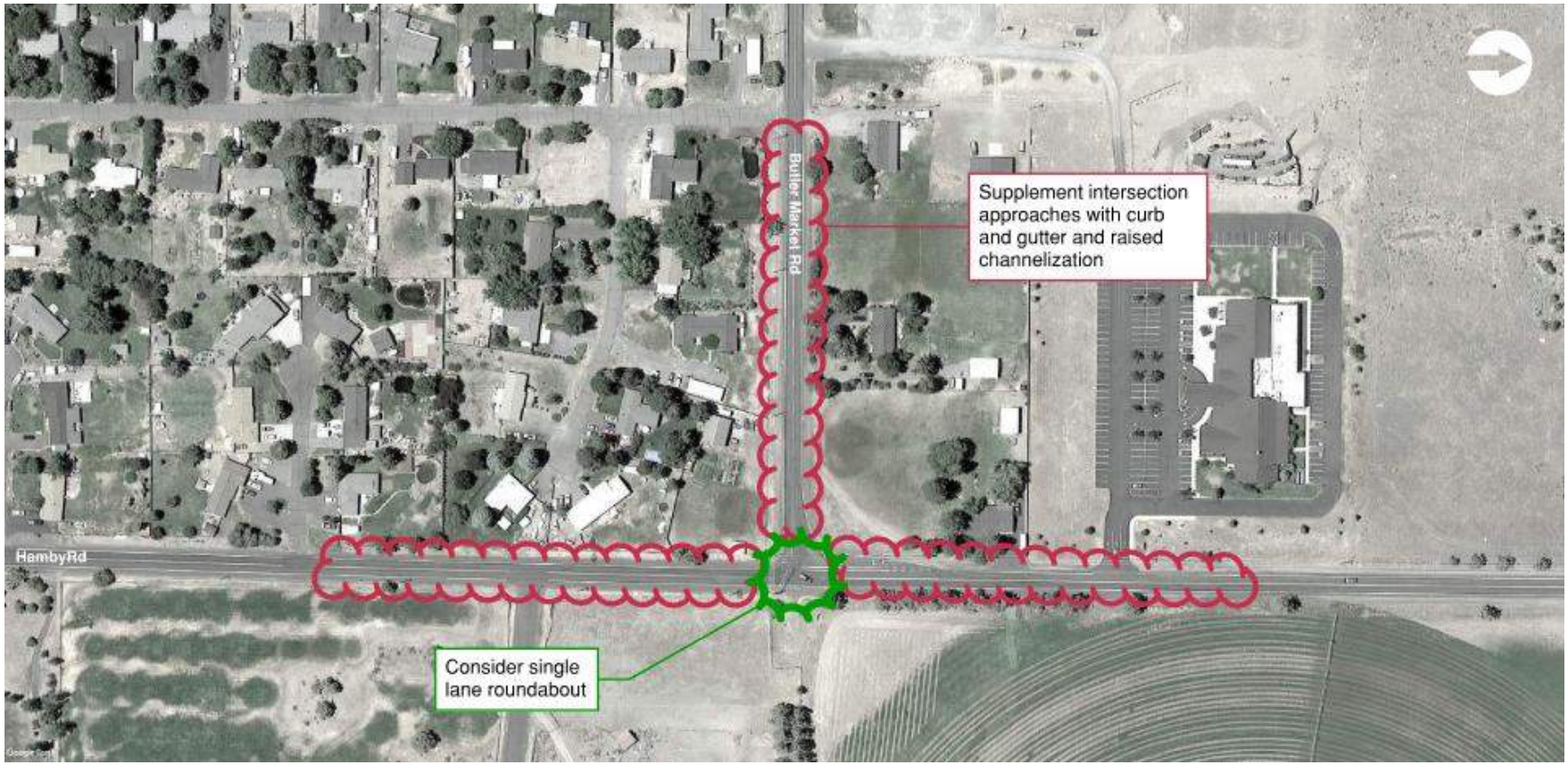


Butler Market Road / Hamby Road

NEAR-TERM



LONG-TERM


Butler Market Rd
Supplement intersection approaches with curb and gutter and raised channelization
HambyRd
Consider single lane roundabout

Lower Bridge Way / 19th Street

This project is anticipated to be funded by 2031.