Missouri

VULNERABLE ROAD USER SAFETY ASSESSMENT

November 2025

MoDOT

SUPPORTING DOCUMENTS:

MoDOT VRUSA Data Analysis Technical Memorandum

MoDOT VRUSA Consultation Technical Memorandum

MoDOT VRUSA Programming Technical Memorandum

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EXECUTIVE SUMMARY

Almost everyone is a vulnerable road user (VRU) at some point in their daily life. VRUs refer to anyone using active modes of transportation, such as walking or using mobility aids, bicycling, or scootering. This means that simply walking to your car parked on the side of the street, biking with your kids in your neighborhood, waiting for the bus at a stop, or even riding e-scooters with your friends downtown can make you a vulnerable road user.

All these people, including you, are especially vulnerable to being killed or seriously injured if involved in a crash with a vehicle. VRUs across the state were involved in 1,144 fatal crashes and 3,445 serious injury crashes from 2015 through 2023. These crashes, along with over 12,300 minor injury VRU crashes, have not only forever changed the lives of people and their loved ones but have also resulted in an estimated economic cost of $17.8 billion to society. Fatal and serious injury VRU crashes increased more than 50% in that time period.

Due to the increase in VRU crashes and their impact, MoDOT has developed the 2025 Vulnerable Road User Safety Assessment as an appendix to the Show-Me Zero Highway Safety Plan. MoDOT engaged with over 200 engineers, planners, and elected officials across the state in collaborative workshops and reviewed every VRU crash on every road in Missouri over the past 10 years. Crash potential factors were used to develop a Higher Crash Potential Network of roads, indicating where VRU crashes are likely to occur in the future, even if they haven't happened there yet. By proactively identifying which roads pose the highest crash potential for VRUs, the State can begin prioritizing safety improvement projects in areas where they are needed the most to save lives.

The data analysis, consultation workshops, and review of national best practices helped MoDOT develop a program of projects, a set of strategies, and an action plan to achieve the Show Me Zero goals for VRUs in Missouri. The projects encompass over 100 miles of roads where VRU safety improvements are needed. This work is framed by the Safe System Approach, which is a new way to approach traffic safety. The strategies and actions will serve as a resource for engineers, planners, advocates, elected officials, and the public to guide decision-making that results in safer outcomes for VRUs.

FROM 2015-2023 VULNERABLE ROAD USERS ACROSS THE STATE WERE INVOLVED IN

1,144
Fatal
VRU Crashes

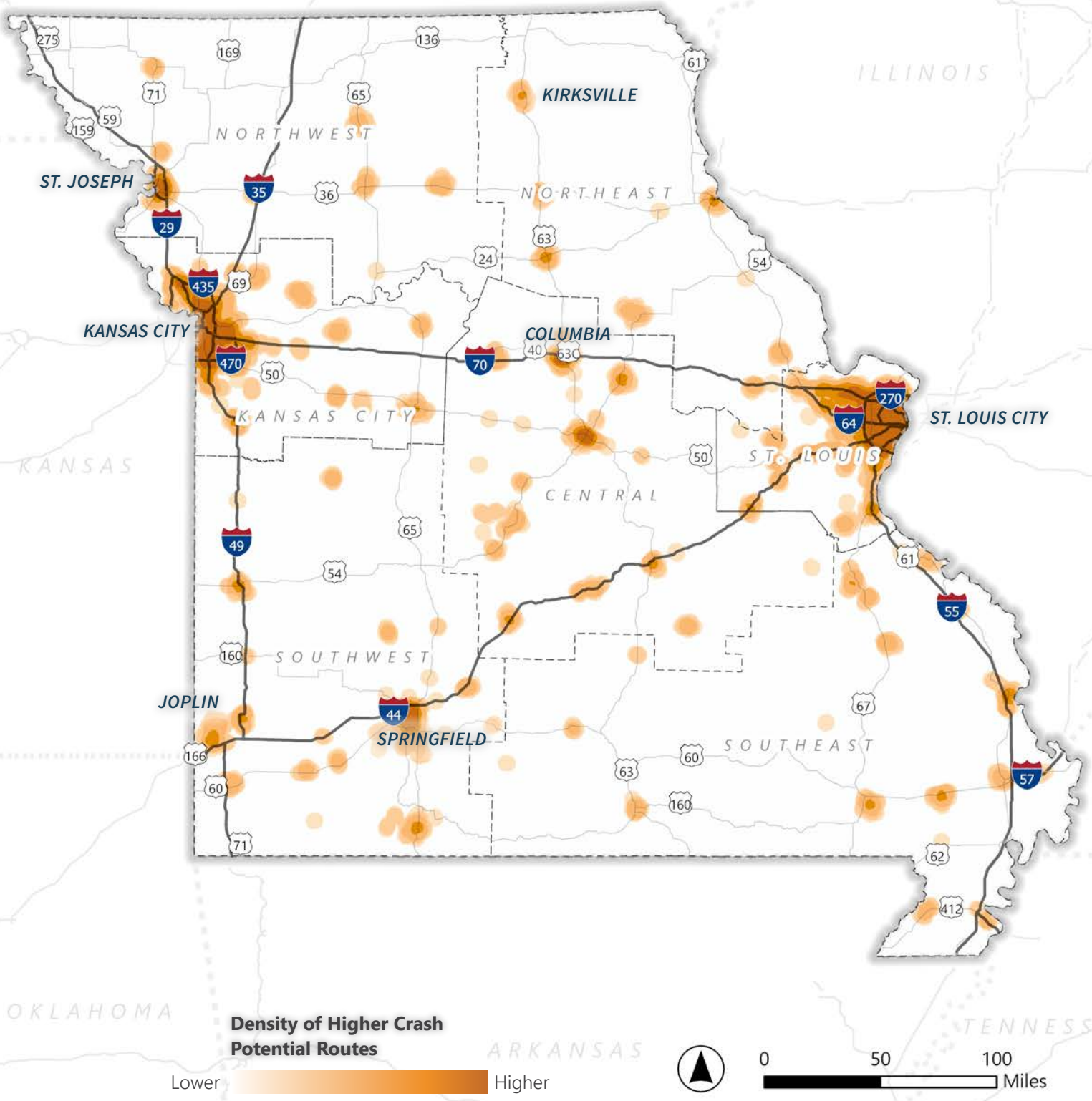
3,445
Serious Injury
VRU Crashes

12,331
Minor Injury
VRU Crashes

VRU crashes cost Missouri
$17.8 BILLION

For more information on roadway safety in Missouri, please visit www.savemolives.com by scanning this code.

Figure 1. Missouri's VRU Higher Crash Potential Density Map



A SAFER SYSTEM FOR VULNERABLE ROAD USERS

INTRODUCTION

Have you ever tried crossing a busy street and felt like drivers weren't willing to stop for you? Have you ever let your kids bike on the road and hoped drivers would slow down when they went by them? Have you ever been waiting at a bus stop and felt exposed to drivers speeding by? Have you ever been walking or rolling on a sidewalk that suddenly ended or was too close to the curb and wondered how you would continue your journey safely?

Have you ever considered how quickly an everyday trip, whether walking, biking, or rolling, could turn unsafe? Chances are, we all have. Because the truth is, we are all vulnerable road users (VRUs) at some point in our daily lives. Whether you are pushing your baby in a stroller in your neighborhood, walking to lunch with your coworkers, or bicycling for exercise on the weekends, VRUs have a higher potential of death or sustaining serious injuries when involved in a crash with a vehicle. Not only is this the case nationally, but it is also true here in Missouri. Our state has consistently been ranked among the worst in the nation for supporting the travel needs of people biking, walking, and rolling. Tragically, over 4,000 people in Missouri have lost their lives or have been seriously injured in VRU crashes since 2015, and that number is steadily rising. **These statistics are not just numbers. They are real people with real lives here in Missouri.** We can do better, and we must do better to save lives and reduce VRU crashes in our state.

Missouri has remained committed to making travel safer for everyone, including VRUs. The 2025 update to the Show-Me Zero Strategic Highway Safety Plan (SHSP) outlines goals and strategies to steadily decrease fatal and serious injury crashes for all road users. Included as an appendix to the SHSP, the 2025 Vulnerable Road User Assessment (VRUSA) serves as a resource for everyone who uses our roads, including you, to begin making changes that will improve safety for VRUs across Missouri's entire transportation system.

In alignment with the US Department of Transportation (USDOT) federal requirements, this plan relies on a thorough VRU crash data analysis, consultation with key stakeholders, and research into national best practices to identify various strategies, policies, and projects to improve VRU safety across Missouri and especially in areas with a higher potential for VRU crashes. This work has led to the development of an action plan to guide statewide decision-making and the efforts of all individuals working to advance transportation safety in Missouri over the next five years.

Missouri was ranked

49TH OUT OF 50

states for bicycle friendliness by the League of American Bicyclists (2024)

The Safe Routes Partnership

RANKED MISSOURI LAST

in the nation for supporting active transportation (2024)

The Safe System Approach

Missouri can improve roadway safety for VRUs and reduce the potential for crashes through the use of the Safe System Approach. This framework, developed by the USDOT, starts with a simple assumption: crash-related deaths and serious injuries are unacceptable. Many people may believe that crashes are an inevitable outcome associated with using transportation systems. However, accepting this mindset is not an alternative we are willing to make.

Many people also believe that crashes can be avoided if people behave appropriately when using the transportation system. While human choices and mistakes can contribute to crashes, it is important to understand that those mistakes should not cost us or others their lives. Instead of demanding perfect behavior from drivers and VRUs, this approach acknowledges that mistakes are inevitable and that instead we must build redundant, self-enforcing transportation systems that prevent crashes and minimize the severity of crashes that occur.

Another principle of the Safe System Approach is the notion that safety is a shared responsibility. From the public that uses the roads, to the engineers and planners that design the roads, and to the advocates and elected officials that develop laws and regulations governing our roads. Safety can only be achieved when we work together and across every layer of our transportation system to encourage Safer People, design Safer Infrastructure, enforce Safer Speeds, require Safer Vehicles, and prioritize Safer Response. These five key elements (shown in the inner ring of the Safe System Approach graphic) are supported by the Safe System Approach's six philosophical principles (shown on the outer ring of the Safe System Approach graphic) and work collectively to shift the focus of transportation systems from convenience to prioritizing our lives and helping everyone get home safely.

VRU SAFETY PERFORMANCE & ANALYSIS

OVERVIEW OF VRU SAFETY PERFORMANCE

This section provides an overview of the VRU safety performance in Missouri, including historical trends for all VRU crashes that resulted in **fatalities and serious injuries (also referred to as severe crashes)** using data from 2015 through 2023. In addition to providing historical crash trends, this section includes results from systemic crash potential analyses and summarizes the methodology used to identify higher crash potential areas for VRUs in Missouri. More detailed information can be found in the Data Analysis Technical Memorandum.

Sometimes we can get lost in the numbers when talking about big issues like traffic safety. But every number in this report represents a person who was killed or seriously injured. What if one of these people were your child or parent? None of us would consider this acceptable, and yet this happens almost daily in Missouri. The only acceptable number of these crashes on our roads is zero.

Deaths and Serious Injuries are Unacceptable

Residents and visitors alike enjoy being active in Missouri, and data supports this claim. An estimated 850 million miles were traveled by VRUs who walked, rolled, or biked in Missouri during 2024. However, a combined total of more than 100 pedestrians and bicyclists are killed each year in Missouri traffic crashes. From 2015 through 2023 , VRUs were involved in 1,144 fatal crashes and 3,445 serious injury crashes. In more recent years, since 2019, roughly a quarter of all severe VRU crashes have resulted in death.

Crash potential for VRUs is also concentrated on a small percentage of roads in the state. Even though Missouri has about 135,000 miles of roads, more than half of the VRU fatalities and serious injuries happened on just 788 miles of them. That accounts for less than 1% of the entire road network and represents Missouri's VRU Higher Injury Network (HIN).

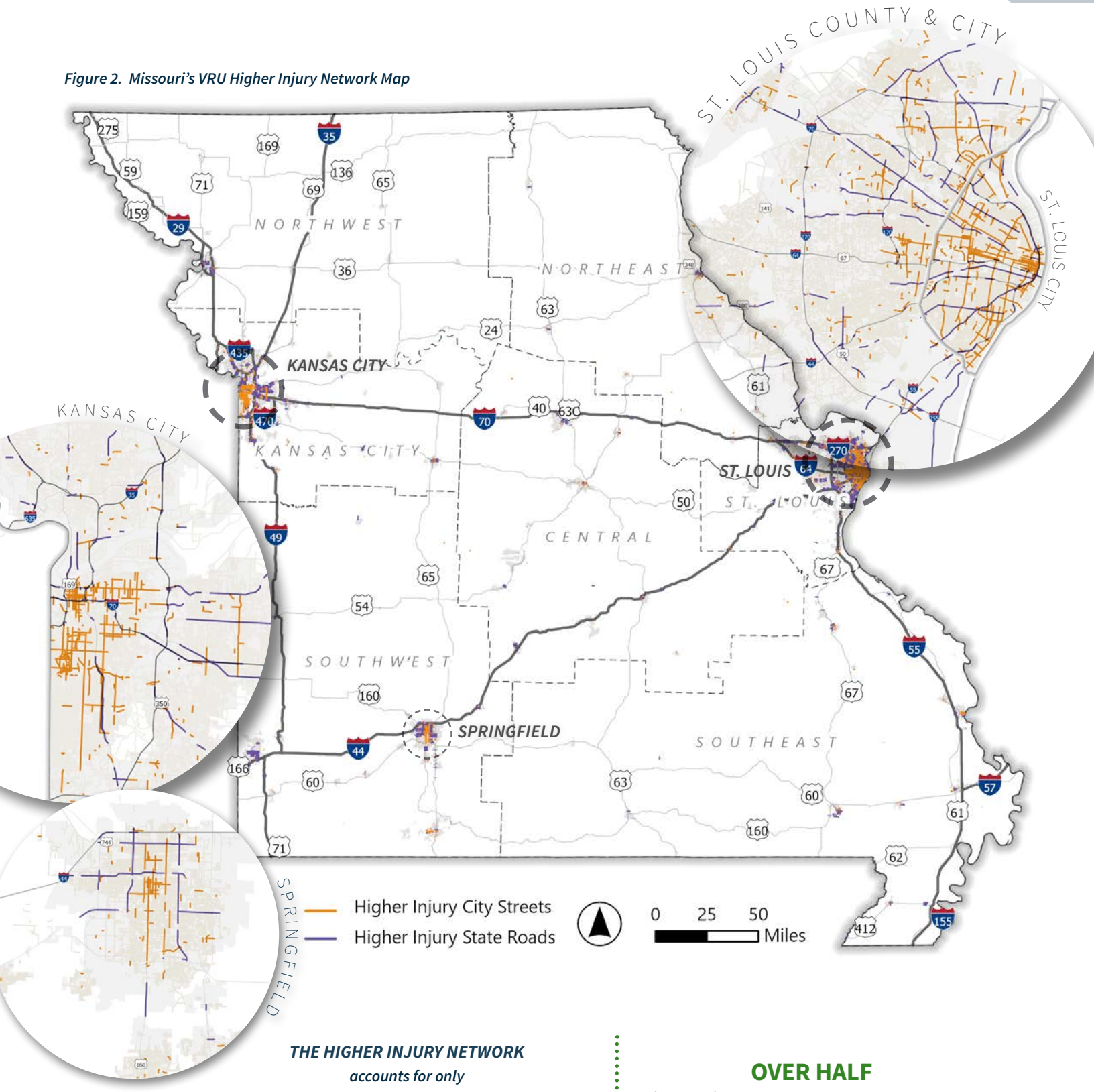
TOTAL VRU CRASH COUNT (2015-2023)

1,144	3,445	12,331
fatal crashes	*serious injury crashes*	*minor injury crashes*

CRASH TRENDS (2015-2023)

The annual rate of VRU serious injury crashes increased by	*The annual rate of VRU fatal crashes increased by*
62%	**22%**

Figure 2. Missouri's VRU Higher Injury Network Map



THE HIGHER INJURY NETWORK
accounts for only
788 MILES OUT OF APPROXIMATELY 135,000 TOTAL MILES
in the state's roadway network.

OVER HALF
of all VRU fatal and serious injury crashes occurred
ON LESS THAN 1%
of the state's roadway network.

STATEWIDE SAFETY PERFORMANCE

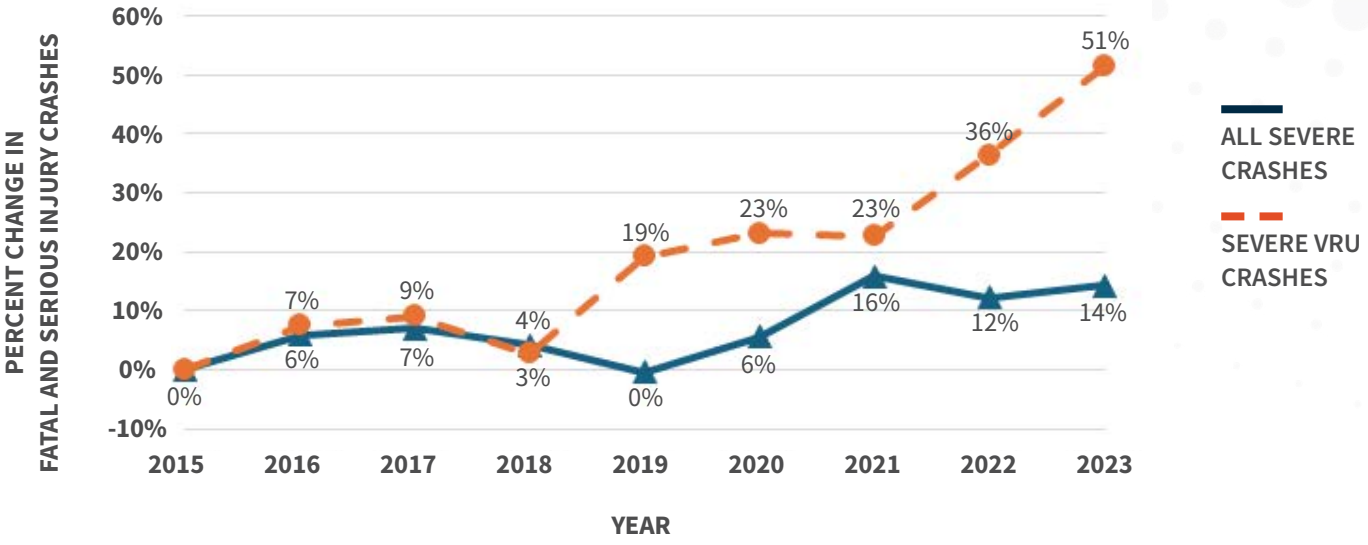
In Missouri, severe crashes involving VRUs are more likely to result in death compared to crashes involving all other road users. Even though VRUs account for a smaller share of the total people who have been killed or seriously injured in crashes in the state, the number of severe VRU crashes is increasing at a much faster rate. From 2015 through 2023, the overall total of severe crashes among all road users statewide went up by 14%; however, severe crashes involving VRUs jumped by 51%. As a result, the VRU share of severe crashes grew from 9% in 2015 to 13% in 2023. This comparison and target measure analysis highlights that there is still substantial progress that needs to be made to reduce VRU fatalities across the state.

The State's 2021-2025 SHSP outlined goals for:

- Reducing the overall number of pedestrian and bicyclist deaths annually
- Increasing helmet use among bicyclists
- Reducing the number of deaths from speeding
- Reducing the number of deaths from distracted driving
- Reducing the number of deaths from impaired driving

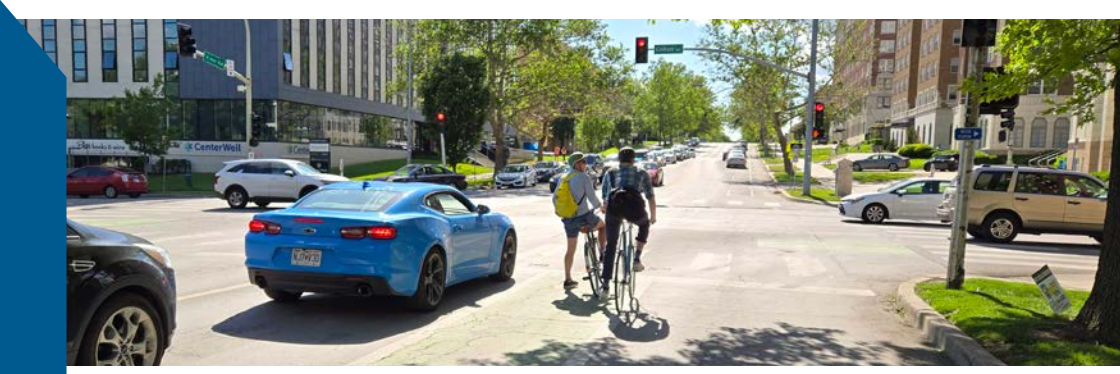
While data on helmet usage among bicyclists was unavailable, these other factors were analyzed using crash data from 2015 through 2023. Since 2021, some of these safety goals have shown improvement, while others have not. The rate of annual VRU fatal crashes by each factor has increased since 2021, except for deaths related to distracted driving, which saw a decrease in fatal crashes in those two years. These findings indicate that Missouri has not yet begun achieving its goal to improve safety for all road users, especially VRUs. While the community of safety professionals and advocates has worked continuously over the last several decades to make progress towards making our transportation system safer, there is still a tremendous amount of work that lies ahead.

Figure 3. Percent Change of All Severe Crashes and Severe VRU Crashes



Humans are Vulnerable

Imagine you are outside in a hailstorm without shelter. You are exposed to the direct impact of the hail and could get hurt. But if you are inside a car, your chances of getting hurt are substantially lower. Your car may get a few dents or even a broken window, but you still have a metal frame offering you protection. This illustrates the stark difference in vulnerability between drivers and VRUs. Those outside of vehicles during crashes are much more likely to be seriously injured or killed in a crash.



Compared to motorized road users, VRUs have been disproportionately represented in crash data both nationally and within Missouri. Many factors, including the weight, height, and speed of vehicles, also pose safety concerns for those who remain vulnerable outside of vehicles.

The crash rate for VRUs is more than seven times higher per mile than for crashes only involving vehicle occupants. Among the VRUs involved in crashes, pedestrians accounted for the vast majority of those seriously injured or killed, while bicyclists accounted for approximately 13% of severe crashes. Additionally, from 2015 through 2023, the number of pedestrian crashes has continued to rise each year.

Aside from pedestrians and bicyclists, VRU crashes can also involve first responders and construction workers. Individuals in these occupations have the potential of being involved in a crash without additional safety measures in place. However, they often have specialized safety training and/or follow rigorous procedures. Notably, these individuals account for only 3% of those involved in severe VRU crashes.

Crash reports do not always include demographic data; however, we can still observe patterns where data is available. When reported, the data reveals disparities in crash involvement and outcomes. In Missouri, the following people are more likely to be involved in VRU crashes:

- Males account for roughly two-thirds of VRU crashes when sex is reported.
- The ages that experience the highest share of severe VRU crashes are those aged 21 – 35 years old.
- Most VRU deaths are among White individuals; however, Black individuals are 3.2 times more likely to be killed in a VRU crash than white individuals.

These findings underscore the importance of integrating demographic data into crash analyses to identify disparities. Recognizing these patterns can help Missouri to develop targeted interventions for the populations that have a higher potential for VRU crashes compared to other populations in the state. These numbers are not just statistics; they are real people and real lives. All of whom are among the most vulnerable of road users in the state.

SEVERE VRU CRASH BY USER TYPE (2015-2023)

87% ***Pedestrians***

13% ***Bicyclists***

VRU crashes involving pedestrians has continued to rise each year.

Imagine you're at a busy grocery store and you step out of an aisle in front of someone pushing their shopping cart. The person with the cart was distracted and she bumps into you. She says sorry, and you both move on with your day. Now imagine that same mistake made on the street. The result might be a fatal pedestrian crash. Everyone makes mistakes, but our transportation system needs to be designed to account for these and keep mistakes from turning into deaths and serious injuries.

Humans Make Mistakes

The choices that people make when using transportation systems, whether they are drivers, pedestrians, or bicyclists, can have an impact on everyone. Sometimes people make honest mistakes, such as making a left turn into a driveway without looking for pedestrians on the sidewalk. However, on all types of roads and especially in unprotected environments, even small mistakes of both VRUs and drivers can cost a person their life. These mistakes aren't just accidents or basic errors; they are partially the result of our transportation system and built environment failing to protect people, especially those who are most vulnerable.

We cannot simply accept that crashes are inevitable due to our mistakes. We also can't stop mistakes from continuing to happen. But what we can do is create a safer transportation system that prevents mistakes from turning into tragedies.

USER BEHAVIOR TRENDS

Most crashes involving VRUs are not a result of reckless or negligent behavior by either the driver or the VRU. From 2019 to 2023, the most common contributing circumstance cited in police reports for severe VRU crashes was "none." The second most cited contributing circumstance was "failure to yield." These top-reported contributing circumstances may reflect that most crashes could be the result of everyday driving errors, or poorly designed infrastructure, rather than recklessness or negligence.

Other contributing circumstances were cited less frequently. For VRUs, alcohol and drug intoxication (7.3%) and distraction/inattention (6.3%) were the next most cited. For drivers, speeding (4.6%), alcohol and drug intoxication (4.3%), and distraction/inattention (4.0%) were the most common circumstances. These findings suggest that factors like roadway design may play a more prominent role in VRU crash rates in Missouri rather than road user behaviors.

"FAILURE TO YIELD"

was the most common contributing circumstance cited in police reports for severe VRU crashes (2019-2023)

22% *VRUs*

8% *Drivers*

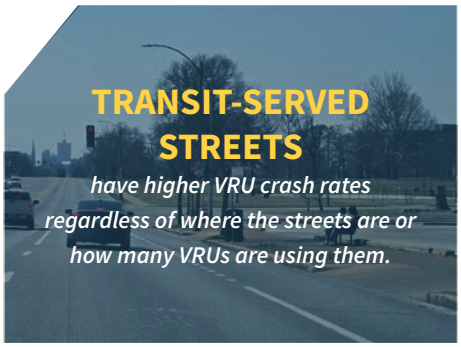
CRASH LOCATIONS (2019-2023)

ALMOST 90%

of severe VRU crashes occurred in the road

75%

of all severe VRU crashes happened outside of crosswalk locations, while 25% happened in either marked or unmarked crosswalks



CRASH LOCATION PATTERNS

From 2019 to 2023, **nearly all (90%) of the severe pedestrian crashes occurred on the roadway and not on sidewalks or trails.** Indicating that if a pedestrian is on a dedicated walkway, they are substantially less likely to be hit by a vehicle than if walking along the edge of a road.

Most crashes involving VRUs happen outside of intersections and crosswalk locations. **Non-intersection location crashes have increased by 56% since 2015.** Many factors may lead to a VRU being on the road. It may be due to a lack of supportive infrastructure, such as sidewalks or separated bicycle lanes. It could also be related to lengthy distances between safer crossings and the need to cross mid-block to access destinations.

A systemic crash data analysis revealed what factors are associated with a higher potential for VRU crashes in Missouri. This analysis found that vehicular traffic volumes on any given road is not a strong predictor of VRU crash potential. Instead, roads with higher volumes of people walking, rolling, and/or biking tend to experience more VRU crashes. Roads with transit access also play a role in VRU crash potential and present higher VRU crash rates. These areas tend to have more people transitioning between modes, as well as those walking, rolling, or biking to transit. However, the surrounding infrastructure may not always support safe connections to transit, such as lacking designated crossings at transit stops.

Roadway design, such as the number of vehicular travel lanes, is a strong indicator of VRU crash potential. **Roads with three or four vehicular travel lanes had a seven times greater VRU crash potential compared to roads with one to two lanes and had twice the crash potential compared to roads with five or more travel lanes.** Another key factor was whether multilane roads were divided or undivided. Undivided roads with more than two lanes, without physical medians or barriers were found to be more prone to VRU crashes.

WHY THIS MATTERS

These patterns relate to busting a key myth about VRU crashes: Most crashes involving VRUs are not the result of reckless or negligent behaviors by either the driver or the VRUs involved. Instead, the findings from this analysis suggest that many VRUs may be using roads that were not designed with their safety in mind.

We know that most people don't voluntarily make decisions that jeopardize their safety. However, making even small errors when navigating challenging environments, such as needing to cross a four-lane, undivided road mid-block to get to the bus stop, can have life-altering consequences. Designing roads that provide safer infrastructure for VRUs can not only accommodate for inevitable mistakes but can also mean the difference between life and death.

VRUs have the highest crash potential on roads with higher volumes of VRUs, served by transit, that are multilane undivided, and/or have three to four travel lanes.

Responsibility is Shared

You wouldn't be able to complete a puzzle without all the pieces. That is because every piece matters. If just one piece is missing or misshaped, the puzzle won't reveal the full picture. The same is true for transportation systems. Road users, including drivers and VRUs, in addition to transportation engineers, planners, advocates, and policymakers, all hold a unique piece of the safety puzzle. No single group can improve safety alone.

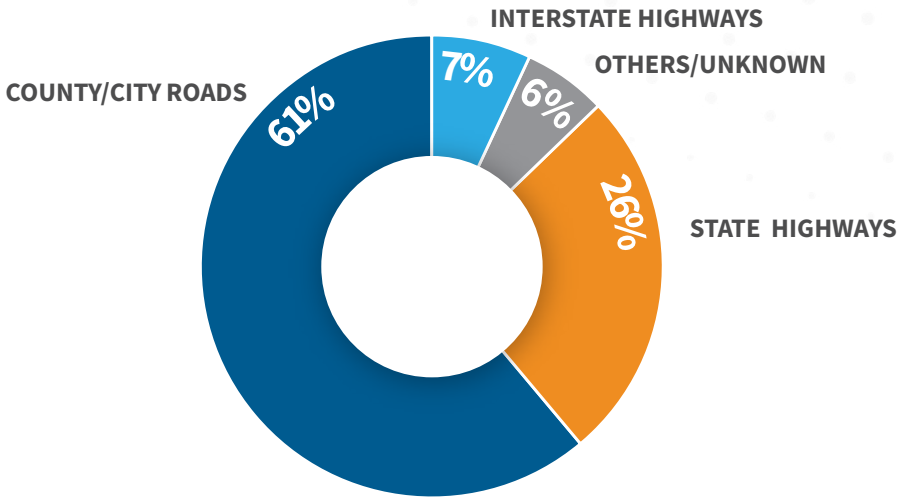
MoDOT cannot improve transportation safety across the state alone. Instead, doing this work will require coordination and effort across every level of government. This is because most VRU crashes occur on roads under the jurisdiction and maintenance of cities and counties, and not the State. In fact, from 2019 through 2023, 61% of all severe VRU crashes occurred on city or county roads. At the same time, state highways accounted for only 26% of severe VRU crash locations. From 2015 through 2023, severe VRU crashes on city or county roads increased substantially by roughly 41%.

DIFFERENT COMMUNITIES HAVE DIFFERENT PRIORITIES

Different area types across the state present different challenges to VRUs. MoDOT must work with various types of communities, including large cities and small towns, to tailor safety solutions to the unique priorities each area type presents.

Urban areas experience VRU crashes at a rate that is roughly six times higher than the state average. Suburban areas were also found to experience VRU crashes at a slightly higher rate than the state average. In contrast, both small towns and rural areas were found to have substantially lower VRU crash frequencies compared to the statewide average. The safety concerns that VRUs encounter in urban or suburban areas differ from those experienced in small towns or rural settings. Yet, every community, regardless of size, shares the responsibility of keeping VRUs safe.

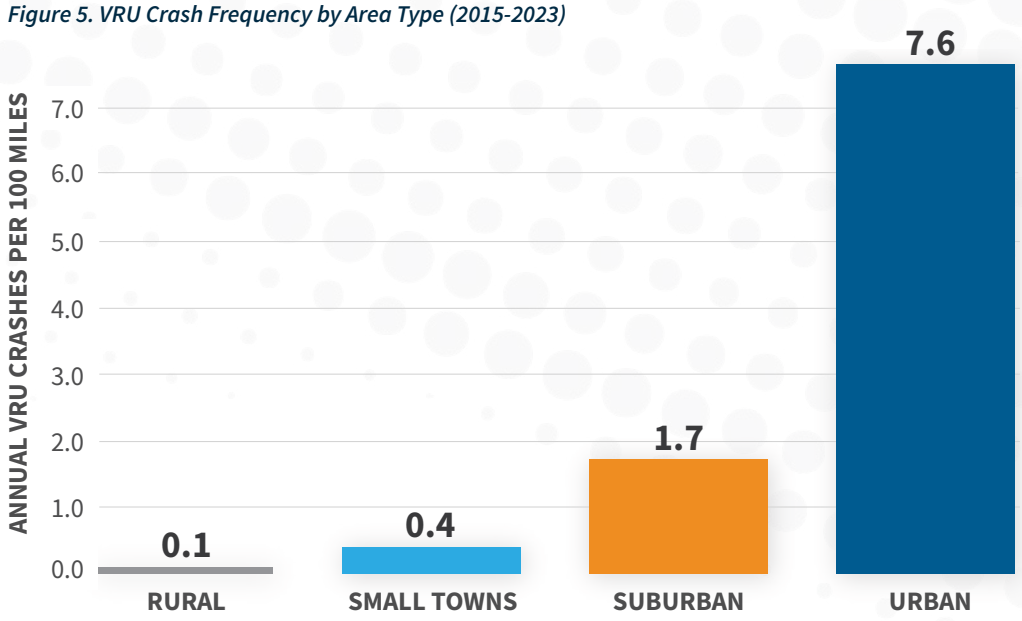
Figure 4. VRU Crashes by Highway Class (2019-2023)



The potential for VRU crashes is also influenced by a VRU's proximity to different types of land uses. This is especially true near places like schools and parks. Streets near schools and near parks had a crash rate nearly five times higher than streets not near schools and parks. This is substantially higher than the average of just one severe crash per year on roads more than half a mile away from schools and parks. These land use pattern findings are particularly concerning, given that these are typically places where children, among the most vulnerable of road users, can be found walking, biking, or even playing outside.

Our transportation system is like a puzzle. It is not just shaped by our individual choices, but also by the infrastructure, maintenance, and operations that each jurisdiction dictates in communities. To improve VRU safety, all must come together to complete the puzzle. This will require coordination not just among state, county, and local jurisdictions, but it will also involve community groups, businesses, and schools within urban, suburban, small town, and rural settings. Working together can help communities to implement a variety of solutions in order to holistically address VRU safety including new policies, programming, and educational opportunities. When we all join together, we can make every trip, whether on foot, by bike, or with a mobility aid, a whole lot safer.

Figure 5. VRU Crash Frequency by Area Type (2015-2023)



Area type designations used for this analysis were based on patterns in the built environment, an important factor when evaluating VRU crash rates.

Urban Areas: *Developed areas with over 5,000 people and predominately pre-1970 structures, reflecting older, denser, and more walkable urban cores.*

Suburban/Exurban Areas: *All remaining areas within urban area boundaries, representing neighborhoods built predominantly after 1970.*

Small Towns: *Incorporated places that do not overlap with any urbanized areas, and are typically smaller in scale, self-contained, and have distinct development patterns.*

Rural Areas: *All remaining regions not classified under the above three categories.*

Safety is Proactive and Redundancy is Crucial

Imagine you go to the dentist and get a cavity filled. Instead of treating it as a one-time fix, your dentist urges prevention, like brushing, flossing, and regular checkups. Since following this advice, you haven't had a cavity since! Transportation safety works the same way. Reactive tools like Higher Injury Networks show where crashes happened, while proactive tools like Higher Crash Potential Networks reveal where they're most likely to happen and could help us prevent them. We don't need to wait for someone to be killed or seriously injured to act.

The Higher Injury Network shows us where crashes have already occurred and help us to respond to known problems. The Higher Crash Potential Network, on the other hand, provides us with the opportunity to visualize what roads pose the highest potential for future VRU crashes based on known crash potential factors. As a result, this allows us to proactively apply safety solutions to higher crash potential sites before crashes ever occur.

The Higher Crash Potential Network (HCPN) analysis is a useful tool particularly for growing or developing areas of the state. For example, a street in a growing part of town may have specific crash potential factors (e.g., no designated crosswalks) but lack any VRU crashes because there are no VRUs actively using that road. However, if a school or park were to be built along that road in the future, this would increase the number of VRUs using this road, and the crash potential associated with the current conditions could be realized and result in a crash if left unmitigated.

MISSOURI'S VRU HIGHER CRASH POTENTIAL NETWORK

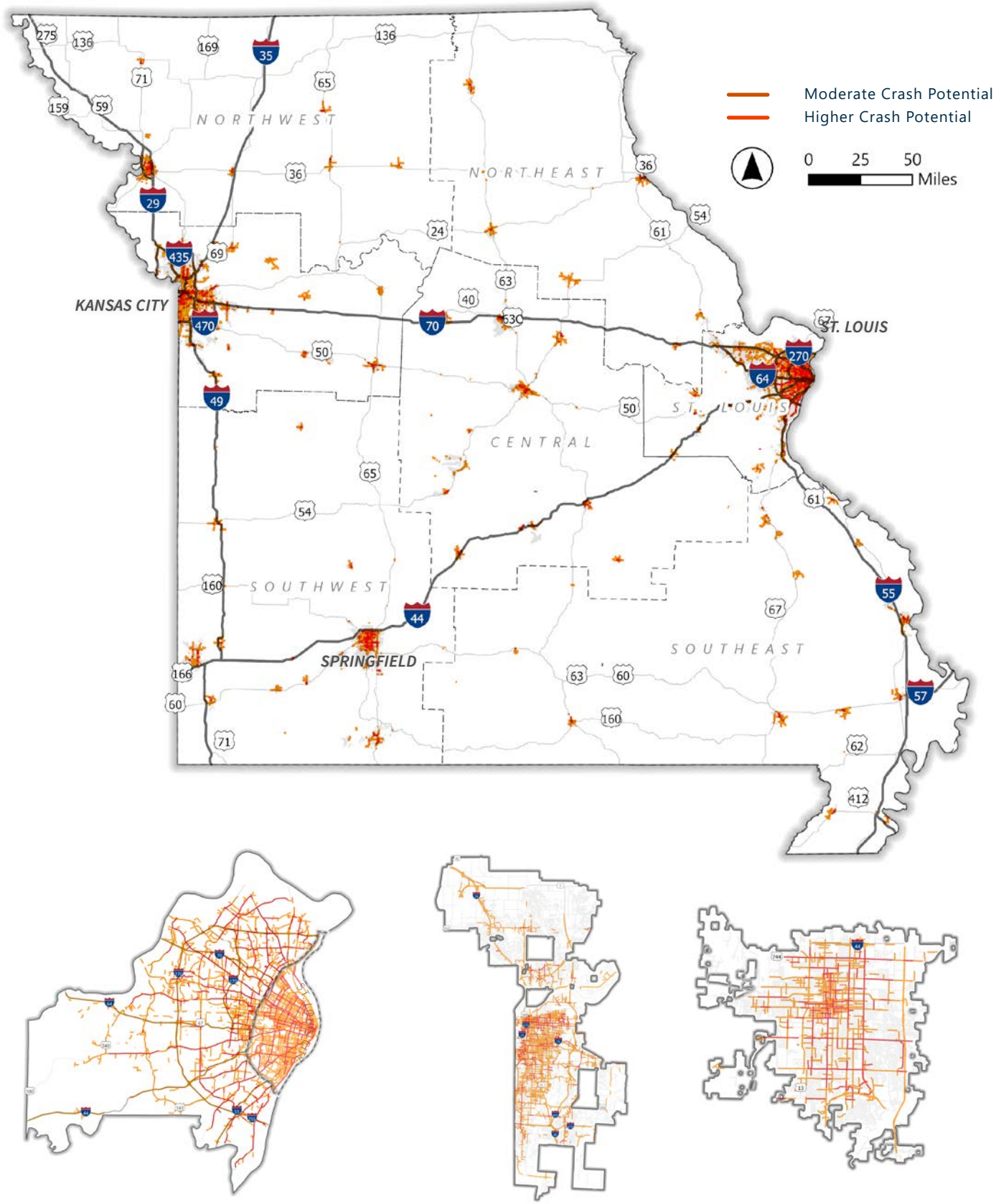
The Missouri VRU HCPN was developed to identify relative safety concerns across various transportation factors. This systemic analysis involved calculating the frequency of VRU crashes that resulted in fatalities or injuries for all roads across Missouri based on shared features. To convert the findings of the systemic analysis into a network, the more consequential crash potential factors were identified, and street segments were classified into lower, moderate, and higher crash potential classes. The crash potential factors used to differentiate crash potential across the state included:

- Area Type, with urban areas being higher
- Jurisdiction, with City and State roads being higher
- Number of Lanes, four-lane roads being higher
- Divided or Undivided Roads, with undivided roads being higher
- Daily VRU trips, with roads with more VRU trips being higher
- Whether served by Transit, with roads served by transit being higher

The number of severe VRU crashes is spread roughly equally across the three crash potential classes. However, there are substantially more road miles in the lower crash potential class, compared to the moderate and higher crash potential categories. **This results in the HCPN's higher crash potential roads having a VRU crash rate that is nearly 120 times higher than lower crash potential roads.**

Similar to seeking preventative healthcare in your everyday life, proactive transportation planning can save lives. While the HIN shows us where crashes have already occurred, the HCPN analysis provides us with the opportunity to act before tragedy strikes. By identifying both specific road segments and communities with the greatest VRU crash potential, MoDOT and partners across the state can prioritize proactive safety improvements where they are needed most.

Figure 6. Missouri's VRU Higher Crash Potential Network Map



ST. LOUIS COUNTY & CITY KANSAS CITY SPRINGFIELD

ENGAGING ACROSS THE STATE


Cost
ROW needs
Operational needs
Political or Public
resistance

ENGAGING ACROSS THE STATE

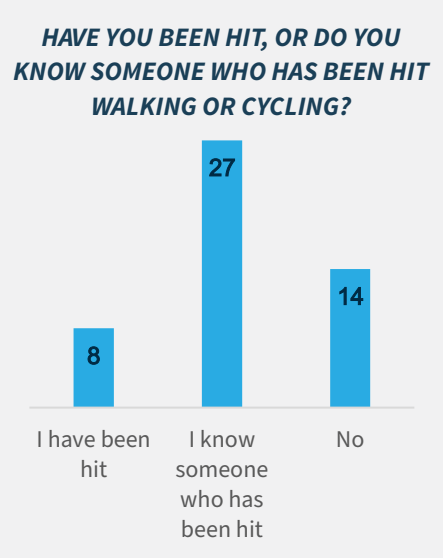
Engagement during the planning process was essential for moving beyond the data analysis to better understand the lived experiences and challenges faced by people actively working to improve VRU safety in Missouri. MoDOT engaged practitioners across Missouri in two primary ways: two Statewide Agency Consultation meetings and five Higher Priority Cities Consultation workshops. This section provides an overview of the consultation process and a summary of the key findings. More detailed information can be found in the Consultation Technical Memorandum.

The findings from the consultation process have been used in conjunction with the data analysis to identify various strategies, VRU safety improvement projects, and action steps for improving VRU safety in Missouri. Overall, consultation discussions and activities were focused on on identifying four primary elements:

- Safety focus areas for VRUs,
- Strategies to improve safety,
- Barriers to implementing those strategies, and
- Solutions to lessen those barriers.

Statewide Agency Consultation Meetings

MoDOT hosted two virtual Statewide Agency Consultation meetings in April 2025. The goal of these meetings was to provide participants with an overview of the data analysis and to gather input about their experiences and suggestions. Attendees were spread out around the state and included representatives from regional and metropolitan planning organizations, cities, counties, councils of government, advocacy groups, and the private sector. A total of 187 individuals registered, with 169 people ultimately attending across the two sessions.



Source: Statewide Agency Consultation

Attendees across both sessions were provided with several opportunities to engage throughout the meetings. This allowed MoDOT to better understand how VRU crashes have personally impacted their lives, their level of familiarity with MoDOT's Safety Assessment For Every Roadway (SAFER) tool, takeaways from the crash data analysis, thoughts on countermeasures they have employed, and VRU safety strategy implementation solutions.

Higher Priority Cities Consultation Workshops

Several communities across the state were identified based on a variety of factors demonstrating their higher potential for VRU crashes. This analysis was completed using the 140 Missouri cities that have a population of over 5,000 residents. Several independent factors were evaluated for each of these cities, including:

- Percent of local roads on the HIN
- Percent of all roads with the higher crash potential designation on the HCPN
- Average expected crash frequency
- Annual VRU crashes per 100,000 people
- Annual VRU crashes per 1 million VRU trips

In total, there were five cities designated as Missouri's Higher Priority Cities for VRUs based on their scoring and ranking.

These five Higher Priority Cities became the focus for outreach consultations to better understand local VRU safety challenges and what MoDOT can do to help improve VRU safety outcomes at the local level. Each workshop largely

followed the same structure, with a presentation, interactive activities, and a discussion.

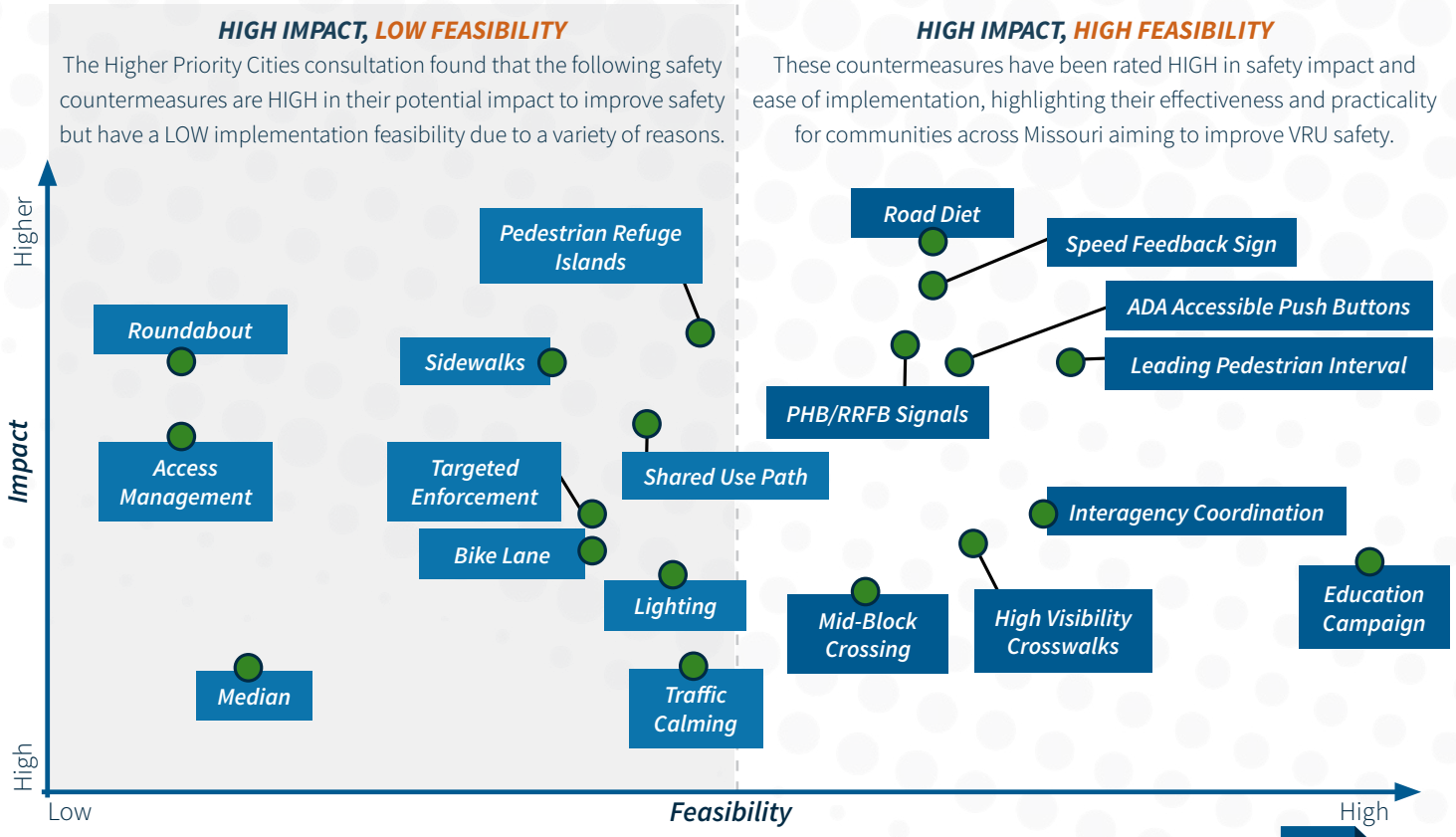
While attendees of each of the workshops were provided opportunities to engage throughout the meeting, one key engagement activity involved identifying safety strategies based on their relative impact on safety and implementation feasibility. Input was gathered on what communities believed would be the best strategies and/or solutions to implementing safety countermeasure projects that they deemed to have the highest safety impact, but also had the lowest implementation feasibility.

5 HIGHER PRIORITY CITIES

- **ST. LOUIS CITY**
- **ST. LOUIS COUNTY**
  *(Ferguson, Maplewood, Jennings, Berkeley, Overland, Glasgow Village, Dellwood, Olivette, Florissant, Clayton, Lemay)**
- **KANSAS CITY**
- **SPRINGFIELD**
- **SEDALIA**

** Because eleven of the top fifteen ranked cities in the state were located within St. Louis County, the County was used to represent this group of cities and count as only one of the top five Higher Priority Cities. This allowed additional cities to be added to the list and enabled greater diversification of cities across the state.*

Figure 7. Higher Priority Cities' Identified Countermeasures by Safety Impact and Implementation Feasibility



Consultation Outcomes

The two Statewide Agency Consultation meetings and the five Higher Priority Cities Consultation workshops provided insights into the challenges and opportunities facing public agencies improving safety for VRUs across Missouri. Participants identified recurring themes that underscore the complexity of addressing VRU safety in both urban and rural contexts. However, the participants also identified a path forward to improving safety. A complete list of the key takeaways includes:

VRU SAFETY FOCUS AREAS

Roadway Design & Infrastructure: Undivided multilane roads, poor lighting, long distances between crossings, sidewalk and bicycle facility gaps, constrained right-of-way (ROW), and major highways bisecting communities.

Driver Behavior & Enforcement: Speeding, distracted driving, red-light running, and failing to yield to VRUs, along with the challenges in addressing these behaviors through enforcement alone.

VRU Behavior & Enforcement: Crossing outside of crosswalks (when they are reasonably available) especially in mid-block locations, distraction, and walking/bicycling on inappropriate facilities such as interstate highways, along with the challenges in addressing these behaviors through enforcement alone.

Education & Awareness: Gaps in driver education, lack of public campaigns on VRU safety, and limited empathy for VRUs.

Policy & Funding: Policies not conducive to prioritizing safety and VRU infrastructure, funding gaps, community opposition, and lack of proactive planning.

STRATEGIES TO IMPROVE VRU SAFETY

Infrastructure Improvements: Rectangular rapid flashing beacons (RRFBs)/pedestrian hybrid beacons (PHBs), pedestrian refuge islands/medians, road reallocations (also referred to as road diets), high-visibility crosswalks, improved lighting, sidewalks, bike lanes, and traffic calming, access management, shared-use paths, and ADA-accessible push buttons at traffic signals.

Operational & Behavioral Strategies: Optimized traffic signals for VRU safety (e.g., leading pedestrian intervals, sufficient pedestrian walk time), speed feedback signs, targeted enforcement, and education campaigns.

Planning & Coordination: Interagency coordination between groups (including planners, engineers, law enforcement, first responders, community members, and others), developing long-range safety plans, applying a data driven approach to identify the areas of greatest need.

BARRIERS TO IMPLEMENTING VRU SAFETY STRATEGIES

Funding & Resources: Limited budgets, competing priorities, and staffing shortages.

Policy & Governance: Lack of performance-based policies, complex regulations, and insufficient political support.

Community Perception: Fear of change, resistance to innovation, and concerns about displacement.

Cultural & Behavioral: Car-centric mindset and acceptance of crashes as inevitable.

Infrastructure Constraints: Older infrastructure, ROW limitations, and streets that serve multiple purposes and users with competing needs.

Data Gaps: Limited understanding of crash patterns and systemic crash potential factors.

These findings are essential in determining which state-level strategies MoDOT may pursue to better help local governments and regional planning organizations lessen barriers to implementing the projects that have the greatest safety impacts for VRUs.

Springfield Higher-Priority City Consultation Workshop

SOLUTIONS TO LESSEN BARRIERS TO IMPLEMENTATION

Policy & Planning: Update policies to prioritize safety, adopt context-sensitive design standards, and develop clear plans.

Education & Engagement: Public campaigns highlighting the issues related to VRU safety and the need for improvements (primarily targeted at the public, elected officials, and technical staff to raise awareness and educate on strategies that can be employed with appropriate funding), broaden driver and VRU education.

Implementation Tactics: Quick-build and pilot projects, accelerated construction, and incremental improvements.

Collaboration: Unite law enforcement, planners, and engineers, foster public-private partnership, engage transit agencies.

Data-Driven Approach: Use systemic safety analysis, before/after studies, and storytelling with data to build support.


Kansas City Higher-Priority City Consultation Workshop

VRU SAFETY STRATEGIES

USING THE SAFE SYSTEM APPROACH TO IMPROVE VRU SAFETY

The implementation of multimodal transportation solutions is the necessary path toward improving safety for all road users in Missouri. These types of solutions have the ability to lower the potential of crashes and the severity of crash outcomes for VRUs in particular. This section provides an overview of various VRU safety strategies that may be implemented at the state, regional, and/or local-levels to address the key safety concerns and VRU safety project implementation barriers identified through the data analysis and consultation processes. More detailed information can be found in the Programming Technical Memorandum.

These strategies, also referred to as countermeasures, are presented in alignment with the Safe System Approach elements and include infrastructure, education, programming, and policy-based solutions. Many of the countermeasures may be systematically implemented across the state to collectively improve safety system-wide, or some may be better suited for systemic implementation at targeted high crash potential locations to address safety concerns for specific populations and areas.

Many local governments across the state face barriers when implementing VRU Safety Projects. Challenges may include aging infrastructure, major state highways bisecting communities, ROW limitations, and mixed land uses creating conflicting safety needs. Specific strategies to address these barriers may include:

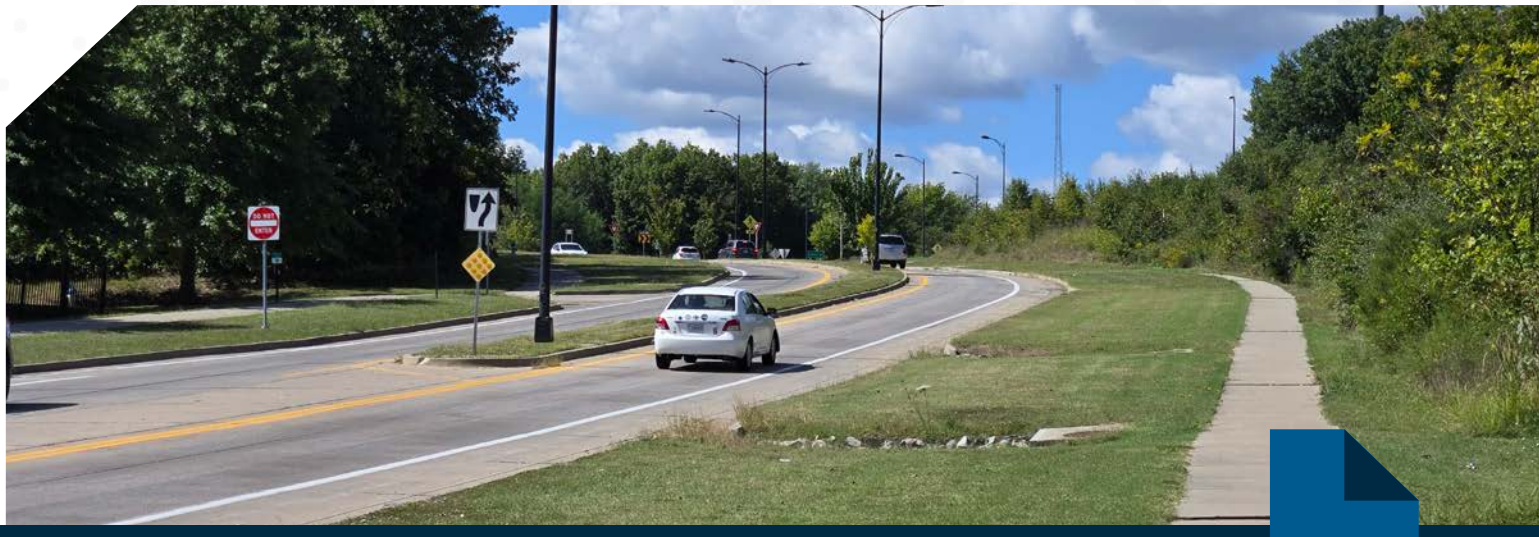
- Quick-Build or Pilot Projects
- Accelerating the Permitting and Construction Cycle
- Incremental, Smaller Scale but Strategic, Improvements
- Updated Planning and Design Guidelines
- Incorporating VRU Infrastructure in Developments

Additionally, empowering people in Missouri to view and value active transportation and empathize with VRUs is another crucial component to improving safety. Many local governments feel as though their communities may fear change, are resistant to innovation, and are worried about displacement associated with VRU facility projects. It will take a sustained effort to challenge existing car-centric mindsets and help people understand that it is unacceptable to believe that crashes are inevitable.

Safer Infrastructure

Improved roadway design can proactively reduce the potential for crashes involving VRUs in Missouri. When crashes do occur, safer infrastructure can also minimize the severity of outcomes and prevent deaths or serious injuries for VRUs. Strategies to improve safety through infrastructure can encompass both new facilities and updating existing facilities. Enhanced roadway planning, engineering, and design can work to encourage safer behaviors among drivers while providing safer travel opportunities for VRUs.

- **Walkways:** Nearly all pedestrian crashes that result in fatalities or serious injuries in Missouri happen in the roadway, meaning if a pedestrian is on a walkway (e.g., sidewalk or shared-use path) they are substantially less likely to be hit by a driver.
- **Bicycle Facilities:** Physical separation from drivers can provide bicyclists with safer and a more comfortable riding experience and encourage its use as an alternative mode of transportation.
- **Safe and Accessible Crossings:** While most VRU crashes in Missouri do not occur at intersections, intersection and crossing safety enhancements, such as curb extensions and refuge islands, can work to improve overall safety for VRUs.
- **Medians and Access Management:** VRUs are involved in severe crashes at much higher frequencies on undivided roads compared to all other road configuration types. Unrestricted turning movements at driveways pose VRU conflicts and roads without raised medians may have higher vehicle speeds. Adding medians and managing the number of driveway access points makes a road safer for VRUs traveling along a road and across it.
- **Road Space Reallocation:** Four-lane roads have the highest crash potential for pedestrians and bicyclists, especially undivided four-lane roads. Road space reallocation projects (often referred to as road diets) involve reducing the number of vehicular travel lanes on a road. These projects can create more space for safer and/or multimodal infrastructure like medians or bicycle and pedestrian facilities. They may also slow down traffic, simplify the complexity of a road for all users, and shorten crossing distances for VRUs.
- **Traffic Signals:** The most common contributing factor of drivers involved in VRU crashes was "failure to yield" in Missouri. The use of effective traffic signals is essential in cases where people crossing are not visible to drivers, when signal phasing is complex, at established school zone crossings, and on wide streets.
- **Lighting:** A majority of severe VRU crashes in Missouri happened at night, among those, nearly half occurred under unlit conditions. Lighting is a strategy that can enhance the visibility of all road users while also increasing personal perceptions of safety.



Safer Speeds

Speed control is one of the most effective ways to lower crash potential and the severity of crash outcomes for VRUs if they are hit by a vehicle. This is especially important on roads where vehicular traffic and VRU activity is mixed. Safer Speed strategies can be implemented through various infrastructure design methods, behavioral changes, and updated policies.

- **Traffic Calming:** Roadway design strategies to narrow roadway widths, such as lane narrowing, can be used to reduce driving speeds and traffic volume while improving safety for all road users
- **Speed Limit Reductions:** Reducing posted speed limits may influence behaviors and lower the operating speeds of many drivers, however, this is not a guaranteed outcome. When paired with infrastructure changes that alter the context of a roadway, speed limit reductions can be more effective as drivers may further lower their speeds to better suit their environment. Speed limit reductions are not intended to be a blanket approach to improve safety for all corridors. Rather this strategy is more relevant to areas with higher levels of VRU activity.
- **Speed Feedback Signs:** These signs can be installed temporarily on trailers or fixed permanently to infrastructure. They work by detecting and displaying a driver's current driving speed and encouraging drivers to slow down through dynamic messaging.
- **Targeted Safety Enforcement:** Partnering with police departments in cities across Missouri can help identify solutions that promote safer driving behaviors and lower speeds, ultimately improving safety for VRUs sharing the road with drivers.
- **Speed Enforcement Cameras:** While speed cameras are currently prohibited on state highways, it is legal for Missouri cities and counties to use speed safety cameras so long as drivers can be visually identified and a police officer reviews the images to identify the driver. These devices are an effective and reliable resource for reducing drivers' speeds and can supplement more traditional forms of education and enforcement.

Safer People

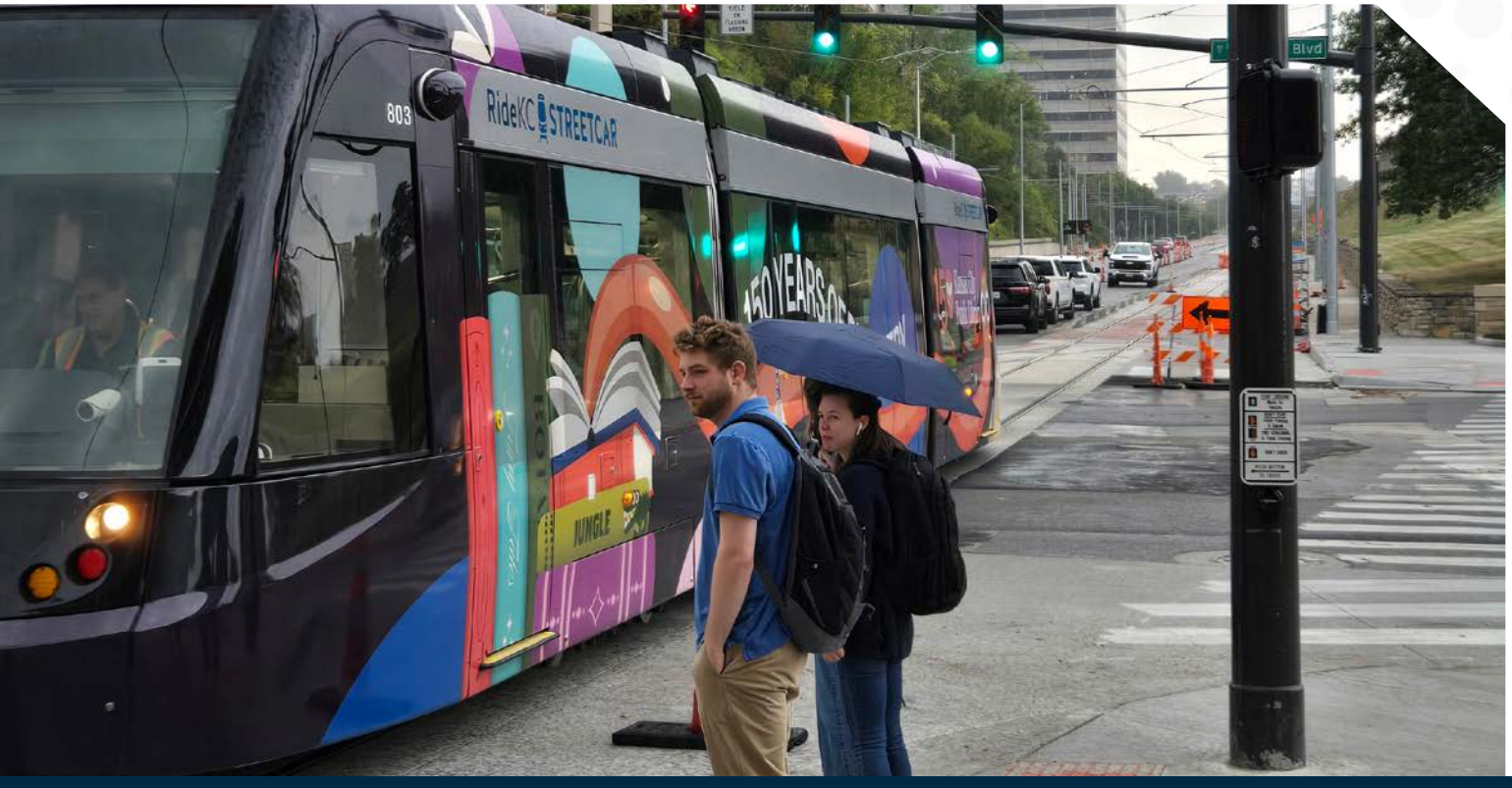
Encouraging people to behave safer when sharing roadways is a key element in the Safe System Approach. The behaviors and choices of drivers, pedestrians, and bicyclists can have an impact on everyone using the transportation system around them. Strategies to encourage Safer People in Missouri may include enhanced enforcement tactics, updated policies, as well as education and programming.

- **Driver Education:** In Missouri, prospective drivers are not required to take driver's education courses before obtaining a permit or license, but some driving experience monitored by a licensed driver is required. While some school districts voluntarily offer courses for students, there are many areas of the state where teens are not provided with this essential learning opportunity, or it is not affordable. It is also important to continue education over the lifespan. Older adults and working adults can equally benefit from regular driver refresher courses.
- **Pedestrian and Bicyclist Education:** Providing early education about safe pedestrian and bicyclist travel can help everyone, including children, to understand the basics of sharing the road with drivers. MoDOT's current educational programs such as Smart Riders, Traffic Gardens, and Teens Taking Action to Prevent Crashes (TRACTION) can help provide resources for local jurisdictions seeking to improve VRU education campaigns.
- **Safe Routes to School, Parks, and Transit Programs:** Safe Routes programs aim to improve safety for those using active transportation options to reach everyday destinations and are known to provide health, economic, traffic congestion, and school performance benefits for communities. MoDOT provides funding for local Safe Routes to School initiatives through the Transportation Alternatives Program (TAP).
- **Mass Media Campaigns:** Great examples of safety campaigns working to increase safety for VRUs are already being implemented across the state, with the City of Springfield's pedestrian safety campaign, Safe Across, being recognized as a national best practice. MoDOT also recently launched the Heads Up St. Louis campaign aimed at encouraging safer behaviors and increasing the alertness of all road users.
- **Data Sharing and Data-Driven Approaches:** Sharing data across departments and/or agencies is crucial for making data-driven decisions related to VRU safety projects. State agencies may also support local safety planning efforts by providing technical assistance on projects when support is needed.
- **Multi-Disciplinary Collaboration:** Comprehensive problem-solving and the better allocation of resources and funding can be achieved through collaboration across governmental departments and agencies. This can be implemented through the use of taskforces or committees, requiring interdepartmental reviews on projects, and cross-training staff.

Safer Vehicles

Road users, including drivers and VRUs, are constantly needing to adapt to changing technology and innovations in complex transportation systems. While safer vehicle systems and safety features are essential for preventing VRUs from being involved in fatal and serious injury crashes, a shift to multi-modal solutions also serves as a key strategy for improving safety. As a safer transportation option, public transportation is one solution for reducing deaths and serious injuries on Missouri roadways.

- **Public Transportation:** Increasing transit access and ridership in communities is one of the most effective ways to improve roadway safety, as traveling by bus is one of the safest transportation options available today. Transit agencies can work to improve pedestrian safety and accessibility at stops and stations through collaboration with local governments. Active transportation networks in communities can support transit by being designed in ways that safely and efficiently connect people to transit options.
- **Micromobility Safety:** Improving the safety and accessibility of e-bicycles and e-scooters can be achieved through a combination of rider education, adequate parking facilities, enforcement, and speed-control technology.
- **Safer Fleets Initiatives:** Governments and private entities of all scales can improve safety in communities by upgrading vehicle fleets to include newer technology features and data sharing systems or to have lower front ends and lower weights such as with sedans.
- **Active Safety Feature Technology:** Drivers can promote safety in their communities by buying personal vehicles that possess assistance technologies. These technologies can range from speed limit alerts or automatic breaking. However, it remains crucial that drivers continue to be attentive and not become reliant on assistance technologies to drive.



Safer Response

When crashes do occur, people need to receive emergency medical care quickly to increase their chances of survival. First responders need systems in place to allow for timely responses to the scene of crashes and to be assured that there are safe working environments for providing care. Enhanced safety during responses also reduces the potential for secondary crashes.

- **Training for Common Pedestrian and Bicyclist Injury Types:** Based on national data, the most common types of injuries for pedestrians and bicyclists include head, pelvis, and leg injuries. First responders and bystanders should be aware of these common VRU injury types and have the tools and training necessary to respond quickly and efficiently.
- **Collaboration with Health Professionals:** Transportation professionals must connect and collaborate to improve crash outcomes and get survivors the timely and lifesaving care they need. Collaboration with health professionals may involve data sharing, incorporating health principles into traffic safety initiatives, direct intervention and patient education, and advocacy and policymaking.
- **Improve Crash Data Reporting:** Better data sharing practices between first responders, medical facilities, law enforcement, and transportation professionals can enable a more complete understanding of crash trends and patient outcomes. Ultimately helping to develop more targeted safety solution in communities.
- **Traffic Incident Management (TIM):** Missouri's TIM program improves crash response through coordinated partnerships. On-going training on the best practices for improving safety, restoring traffic flow quickly, and reducing secondary crashes is essential for VRU safety, especially for first responders.

SAFE SYSTEM POLICY AND PLANNING RECOMMENDATIONS FOR MODOT

By revising MoDOT policies and design standards, state routes can be improved across Missouri. However, MoDOT policy extends beyond just state routes. Many local agencies look to MoDOT policies and standards as a guide for their local decision-making.

A review of current statewide policies and design standards, guided by the insights gathered from the safety data analysis and consultation process, was conducted to identify opportunities for improved VRU safety. Many local governments and regional planning organizations have expressed the desire for more statewide planning, data-driven policies, simplified regulations, and boosting political support across the state regarding VRU safety. The following policies are recommended to prioritize safety for VRUs on Missouri's roadways.

Safer Infrastructure

Road Safety Assessment Program: This document outlines 100 miles of projects in the Program of VRU Safety Projects. Each of these corridors requires additional study to determine specific safety issues and identify appropriate countermeasures. A Road Safety Assessment (RSA) Program should be developed to prioritize RSAs on all project corridors within the next five years that don't have current safety efforts in progress. The RSAs should be conducted using the FHWA Road Safety Audit Guidelines as a best practice to guide this work.

Lighting Policy: MoDOT policy currently only specifies continuous lighting on some freeway segments and at spot locations on other state roads. Spot lighting is important at intersections and marked crosswalks, but the data analysis shows the majority of VRU crashes happen outside of intersections and marked crosswalks. Lighting policy updates should be considered for continuous lighting on VRU HIN segments and roadways designated higher crash potential on the HCPN.

Sidewalk and Crosswalk Policy: MoDOT policy does not definitively specify when sidewalks should be installed on a roadway and whether those sidewalks should be constructed on just one or both sides of the road. MoDOT should work to clarify this policy, with a special focus on installing sidewalks on both sides of higher crash potential roads identified on the HCPN and roads on the HIN (excluding freeways), also considering network gaps between adjacent higher crash potential roads on the HCPN and HIN segments. This sidewalk policy update should also clarify where crosswalks should be installed and at what intervals they should be installed in various contexts. This crosswalk policy should consider transit stops as a key location for added crosswalks. MoDOT should consult the FHWA Safe Transportation for Every Pedestrian (STEP) Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations as a best practice for crosswalk needs.

Road Space Reallocation Policy: Undivided roads with four or more lanes have a much higher potential for VRU crashes than divided roads with fewer lanes. Many roads in the state have more lanes than are necessary for acceptable traffic operations. The department should consider adopting a policy that reconfigures the road space on four-lane, undivided roads when they are resurfaced, based on traffic volume. Where the road has fewer than 15,000 vehicles per day, the number of through lanes should be reduced to add other safety features such as left-turn lanes, medians, and bicycle facilities. Where roads have 15,000 to 20,000 vehicles per day, a road space reallocation should be evaluated. Roads with more than 20,000 vehicles per day are unlikely to be suitable for a road space reallocation; instead, other VRU safety treatments should be considered for these roads when they are on the HIN or designated as higher crash potential on the HCPN. The recommendations and metrics from the National Cooperative Highway Research Program (NCHRP) Research Report 1036: Roadway Cross-Section Reallocation: A Guide should be incorporated into state policy.

Jefferson City, Missouri

Roundabout First Policy: The MoDOT Engineering Policy Guide (EPG) identifies the benefits of roundabouts but does not identify them as a preferred intersection type. Roundabouts are the safest form of intersection control for VRUs. Only five VRU KA crashes (0.1% of VRU KA crashes) were recorded at roundabouts in the state over the nine-year analysis period. MoDOT should pursue a policy that prioritizes roundabouts as the preferred intersection type when considering intersection control alternatives, as discussed in EPG Section 233.5 Intersection Alternatives. This policy would also benefit vehicle occupants, as roundabouts typically reduce all fatal and serious injury crashes by up to 80%. The updates to the EPG related to roundabouts should be considered in conjunction with the updates being planned with the adoption of the MUTCD 11th Edition updates.

VRU SAFER Tool Requirement: MoDOT developed the SAFER tool as a resource for incorporating safety into all projects and throughout all project phases. Within this tool, there is a comprehensive section on incorporating VRU safety considerations into any type of roadway project. MoDOT should continue the requirement for the use of the SAFER tool VRU section during all MoDOT projects, but also consider additional requirements to document the outcomes of that evaluation publicly.

Statewide Active Transportation Planning Framework: Missouri is one of the few states in the nation that lacks a statewide active transportation plan (ATP). MoDOT should consider the development of a statewide active transportation planning framework for addressing active transportation needs in the state. This planning framework is important for understanding the current conditions of active transportation networks in the state, developing a continuous network of VRU facilities, filling gaps in the network, and prioritizing investments in areas that need it the most. This planning framework can build off the VRUSA safety data analysis and agency consultation but should include a public engagement process and further analysis using the bicycle level of traffic stress and pedestrian level of comfort analysis methods. This planning framework could be created in coordination with the Long Range Transportation Plan (LRTP), similar to how the State Freight and Rail Plan is developed. The planning framework could also include an economic impact assessment of active transportation and toolkits for local agencies.

Expand Messaging and Continue Funding Safe Routes to Schools Projects: Missouri provides SRTS funding for local jurisdictions to develop SRTS plans and implement projects through the TAP. In Missouri, roads near schools have elevated potential for VRU crashes. MoDOT should expand messaging related to SRTS and continue to fund SRTS efforts through the TAP.

VRU Project Repository: Tracking and monitoring progress toward creating safer conditions for VRUs across Missouri is an essential component of this plan. Developing a system that publicly lists the state road VRU safety projects that have been planned, are under construction, and are complete can help build buy-in and support among the public for VRU projects and continued investments. MoDOT should create a state repository of VRU safety projects in addition to establishing a program to evaluate before/after results of VRU safety projects.

Complete Streets Policy Update: In 2011 the Missouri General Assembly adopted a Complete Streets Resolution (HCS HCR 23) that ***declares support for Complete Streets policies and urges their adoption at all levels of government regarding the shared use of our roads and highways by motorists, bicyclists and walkers.*** MoDOT should perform a legislative review of this policy and identify opportunities to upgrade the existing policy to better align with current best practices. Additionally, MoDOT should also consider publishing information related to ongoing State road Complete Streets projects to the department website to provide local governments with a resource for implementing Complete Streets projects in their communities. For example, these projects may include those applying principles from resources such as MoDOT's ***Blueprint for Arterials*** guide, East-West Gateway Council of Governments' ***Great Streets Initiative***, or the Mid-America Regional Council's ***Planning Sustainable Places*** program.

Safer Speeds

Speed Limit Reductions: The State of Missouri has direct jurisdiction over the roads designated as state roads, which include interstates, freeways, expressways, highways, and state routes. Depending on the urban or rural area context of any given road, maximum posted speed limits range from 70 mph in urban areas to 65 mph in rural areas. The lettered state routes are set at 55 mph but can be raised to 60 mph following a review from MoDOT. Under State statute, local jurisdictions are also given the power to lower speed limits on state roads within their community by ordinance with the approval of the State Highways and Transportation Commission. There are many resources available to help jurisdictions to inform their decision-making processes regarding speed limit reductions in relation to roadway design. One resource may include a 2023 research study by Johns Hopkins University titled ***A National Investigation on the Impacts of Lane Width on Traffic Safety***, which discusses the relationship between crash potential, speed limits, and roadway widths. MoDOT should reevaluate speed limits in urban areas on roads on the HIN or designated as higher crash potential on the HCPN.

Update Speed Limit Guidelines: The MoDOT EPG 905.2 Traffic Studies outlines various criteria for setting posted speed limits different from the statutory limits based on traffic studies. These guidelines include a criteria for pedestrian traffic. The guidelines related to pedestrian volume should be revised to include a special criterion for lowering speeds by up to 20% for roads on the HIN and roads designated as higher crash potential on the HCPN. It should also include a criterion for lowering speeds by up to 10% for roads designated as moderate crash potential on the HCPN.

Speed Zone Speed Limit Reductions and Fine Increases: The State of Missouri may pursue opportunities to reduce speed limits within speed zones, including School Zones and Construction Zones, and/or increase the fines for those who are in violation. MoDOT should perform a legislative review and advocate for appropriate updates to the law.

Safer People

Travel Safe Zones: Missouri law under RSMo §304.590 allows for the establishment of travel safe zones with double fines for certain violations with appropriate signage. MoDOT should consider making all state roads on the HIN and roads designated as higher crash potential on the HCPN be made Travel Safe Zones and appropriate signage posted.

Safe Passing Law: Safe passing laws require vehicles to pass each other at a safe distance. However, according to the League of American Bicyclists, legislatures in most states have recognized that "safe distance" requires further definition, particularly for drivers passing people on bicycles. Many bicycle advocates request to be passed in the same manner as a motorized vehicle, that is to change lanes to pass. MoDOT should perform a legislative review of current safe passing legislation and advocate for updated legislation to align with national best practices.

Pedestrian Right-of-Way: Missouri currently has a law that states drivers must yield to pedestrians in crosswalks, but does not require drivers to fully stop at midblock crosswalks when a pedestrian is present, regardless of the side of the road the pedestrian is on. Missouri should explore the opportunity, like Oregon, to have a law requiring drivers to stop fully. The law should also be evaluated for requiring drivers to yield to pedestrians even when they are not within a marked crosswalk. Missouri could also explore the possibility, like San Francisco, to limit right-turn-on-red at intersections near schools, parks, and transit hubs to increase safety and reduce the likelihood of crashes or injuries to pedestrians or bicyclists. MoDOT should perform a legislative review and advocate for appropriate updates to the law.

Safety Education Programs Expansion and Enhancement: The State of Missouri should prioritize the expansion and enhancement of existing safety education programs such as Heads Up, Smart Riders, Traffic Gardens, and TRACTION. Previous educational campaigns within the state have included a focus on marked crosswalks, the White Cane Law, and laws related to service dogs. The purpose of these programs is to educate the public and targeted groups on specific transportation safety concerns. Resources provided by national organizations like NHTSA and Safe Kids Worldwide can also be used as examples for future education program expansion

and enhancement efforts. Specifically related to VRU safety education, future education may be focused on targeting pedestrian populations, VRUs traveling during the evening hours, male VRUs, and other disadvantaged groups, which were shown to be disproportionately affected by VRU crashes based on the VRU data analysis. One example of targeted education might be utilizing radio advertising for safe driving and pedestrian awareness in the hour directly before and after sunset when VRU crashes happen at an elevated rate.

Safer Vehicles

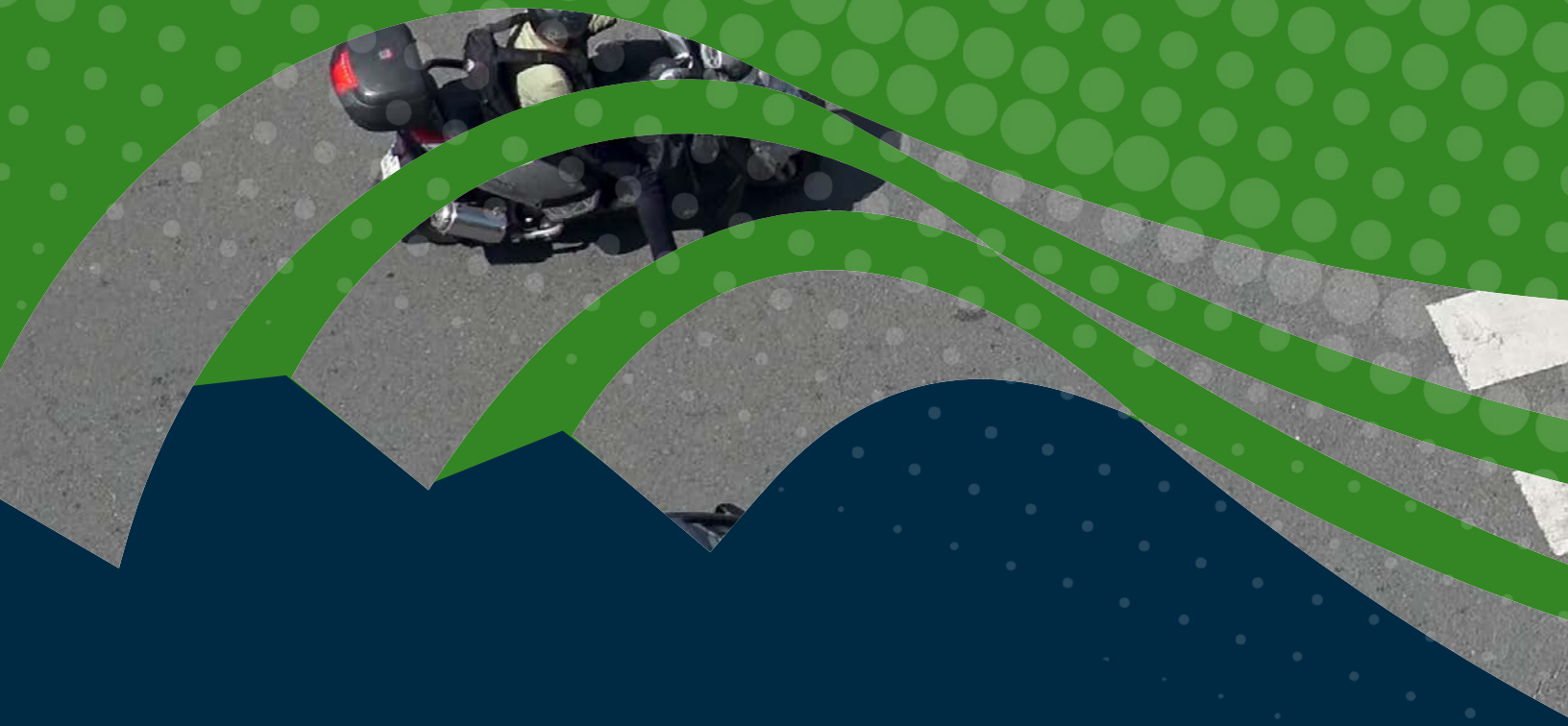
Transit Funding: Expanding access to transit and increasing ridership is one of the most effective ways to increase transportation safety across the state of Missouri. MoDOT should advocate for expanded state and federal funding for transit. Traditionally, states are able to rely on FTA grant programs to supplement transit costs. However, MoDOT should research innovative opportunities to combine transit improvement projects into other transportation projects, including highway and road projects, funded under alternative grant programs under departments such as the FHWA.

Safer Response

Multidisciplinary Health and Safety Taskforce: Improving safety and increasing rates of people using active modes of transportation are goals that align with both health and transportation departments anywhere. Active transportation can increase physical activity in communities which has direct health benefits including lowering community rates of chronic diseases. As MoDOT continues to implement the Safe System Approach, it will remain essential that the department incorporates a public health lens into every project. MoDOT should explore the development of partnerships and/or a health and safety taskforce comprised of a multidisciplinary group of representatives from public health, transportation, public safety, medical professionals, and first responders. This taskforce should meet regularly and advance the recommendations outlined in the VRUSA.

Crash Survivor Network: MoDOT should explore opportunities to establish a network for those who have survived crashes, including VRU crashes. While this network can provide support for the community of individuals impacted by traffic crashes, it can also provide valuable insights and firsthand information on being involved in crashes and ideas on how to improve post-crash response and care practices in the state.

Pre-Hospital Whole Blood Program: Several states and municipalities around the nation have improved the survivability of crashes by implementing whole blood programs into EMS response efforts. These programs, typically implemented through public-private partnerships with hospital systems, are designed to train and allow EMS teams to carry and administer whole blood during patient transport to hospitals. Loss of blood is one of the leading causes of death during traumatic injuries. MoDOT should conduct research into best practices for implementing whole blood programs across the state and consider partnering with other agencies to implement pilot programs in areas with higher VRU crash potential.



PROGRAM OF VRU SAFETY PROJECTS

CITY AND STATE VRU SAFETY PROJECTS

In addition to the strategies previously described, MoDOT has identified the top 100 miles of State Roads and the top 37 miles of City Streets for potential VRU safety improvements. Both the Higher Injury Network and Higher Crash Potential Network analyses have informed the selection of these projects. These roads represent only 0.1% of roads across the state. However, 17% of all VRU crashes that resulted in deaths or serious injuries occurred on them. These roads have a fatal and serious injury crash rate 200 times higher than the average road in the state. More detailed information can be found in the Programming Technical Memorandum.

These projects are highly concentrated in just a few locations throughout the state. Over half of the state road project miles and crashes are located within MoDOT's St. Louis District. Additionally, over three-quarters of the project miles and crashes on city streets are located in the City of St. Louis or cities in St. Louis County.

MoDOT and the cities where these projects are located can systematically apply countermeasures outlined in the previous section to improve VRU safety. The following tables and maps depict the approximate locations of these projects. Please note, the projects highlighted represent approximate project locations and are not intended to rigidly define project limits. Further study should be conducted on each corridor to identify specific factors leading to the elevated crash rate and to establish specific project limits.

The identification of these projects involved the use of crash data over the past 10 years. Many agencies across the state, including MoDOT, are actively working to improve VRU safety. Some of the projects identified in this study based on historical data are currently being studied for improvements or have recently had countermeasures implemented. These corridors are noted on the following maps as current safety projects. The planning work on these projects should be continued, and locations where improvements have been implemented (such as on MO-115/ Natural Bridge Avenue) should continue to be monitored for future safety enhancements.

State Road VRU Safety Projects

There are 100 miles of state roads that have been identified to be in most need of safety improvements for VRUs in Missouri. This category predominately includes state routes, US highways, and interstates. The summary table to the right outlines the total number of state road projects, and the miles of roads recommended for safety improvements, organized by MoDOT District and county. Two of the seven MoDOT districts do not contain projects because of their relatively lower number of VRU crashes.

City Street VRU Safety Projects

There are nearly 40 miles of streets located under local jurisdiction that have been identified as being in the most need of VRU safety improvements. The summary table to the right outlines the total number of projects and the miles of city streets recommended for safety improvements, organized by MoDOT District and county.

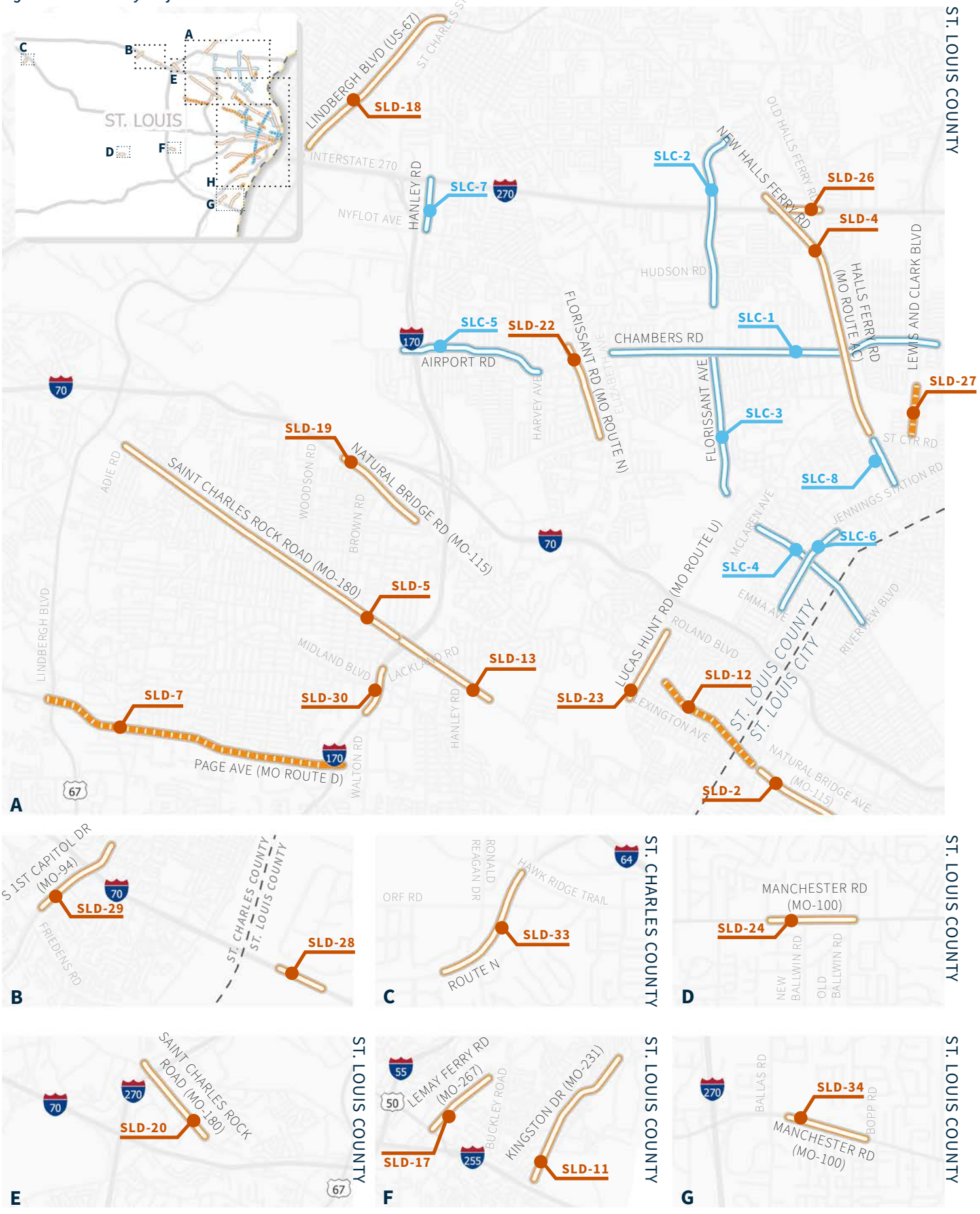
Table 8. Summary Table of VRU Safety Projects on State Roads

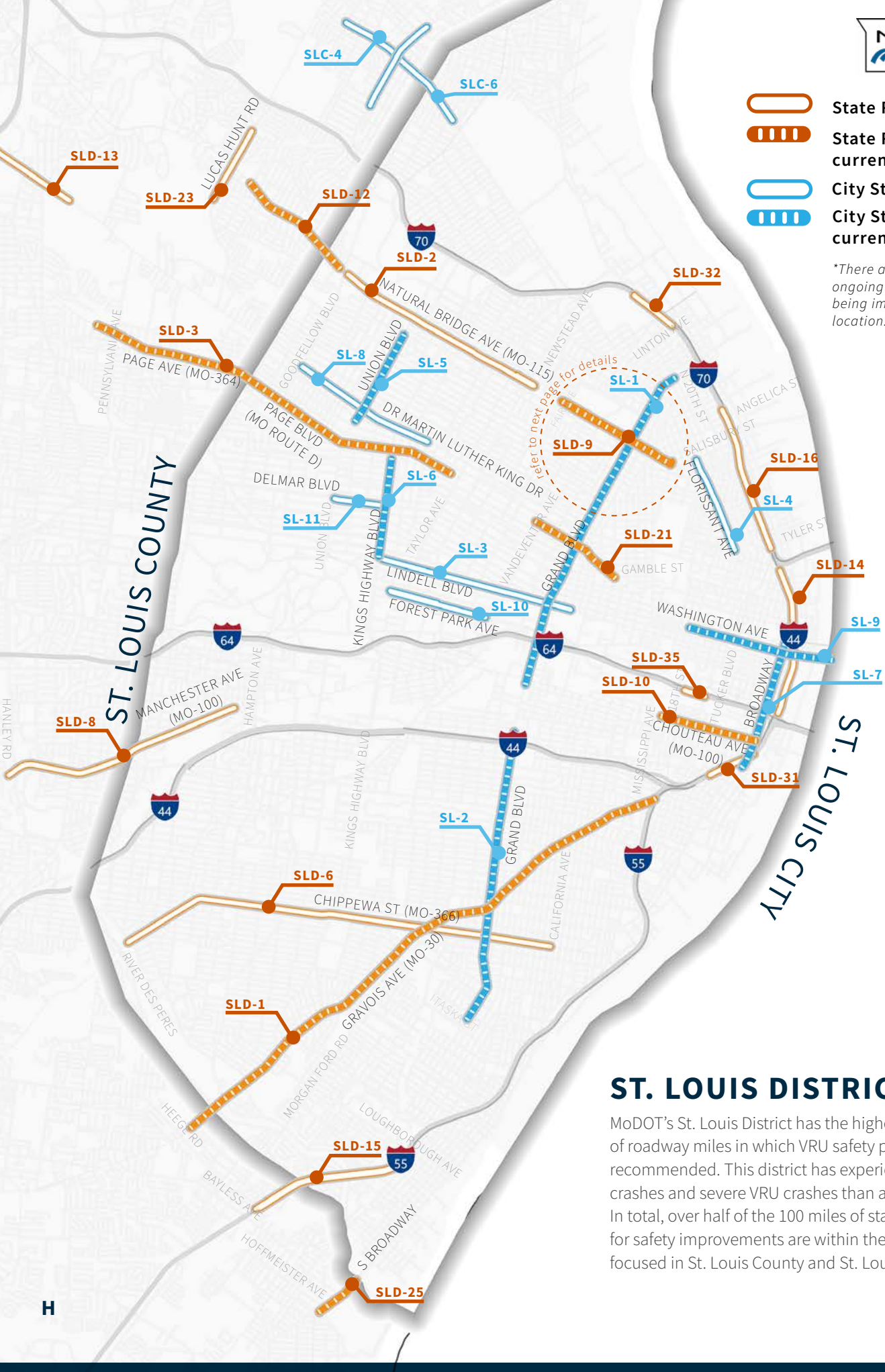
MODOT DISTRICT	COUNTY	NUMBER OF PROJECTS	APPROX. LENGTH (MILES)	TOTAL VRU CRASHES
St. Louis	St Louis County	23	40.4	569
	St Louis City	10	15.7	228
	St Charles County	2	1.5	9
Southwest	Greene County	10	18.8	231
	Jasper County	2	2.5	22
	Newton County	1	0.5	4
Kansas City	Jackson County	13	16.6	138
	Cass County	1	1.5	29
	Platte County	1	0.5	3
Central	Boone County	2	1.4	25
Southeast	Pemiscot County	1	0.5	4
	Dunklin County	1	0.5	4
	Cape Girardeau County	1	0.5	3
TOTAL		**68**	**100.9**	**1269**

Table 9. Summary Table of VRU Safety Projects on City Streets

MODOT DISTRICT	COUNTY	NUMBER OF PROJECTS	APPROX. LENGTH (MILES)	TOTAL VRU CRASHES
St. Louis	St. Louis County	8	11.8	184
	St. Louis City	11	17	380
Kansas City	Jackson County	8	8.4	210
Southwest	Greene County	1	0.7	21
TOTAL		**28**	**37.9**	**795**

Figure 10. VRU Safety Projects in St. Louis District





ST. LOUIS DISTRICT

MoDOT's St. Louis District has the highest number of roadway miles in which VRU safety projects are recommended. This district has experienced more VRU crashes and severe VRU crashes than any other district. In total, over half of the 100 miles of state roads identified for safety improvements are within the St. Louis District, focused in St. Louis County and St. Louis City.

VRU Success Story:

MO-115 (NATURAL BRIDGE AVE) SAFETY IMPROVEMENTS

MoDOT has taken an active role in implementing projects that enhance both the safety and mobility of all road users. One particular success story in this effort includes the MO-115 Project. In 2020 and 2021, MoDOT constructed safety improvements along MO-115 within the St. Louis District. This project included road space reallocation elements and the implementation of a raised center median, mid-block pedestrian crossings, signal improvements, and roundabouts. The improvements, particularly in the area where the road space reallocation was implemented, represented a dramatic change to the roadway environment and safety.

This project should be considered a best practice for similar arterial roadways throughout St. Louis, across the State of Missouri, and on similar corridors across the nation.

The community has already begun to experience the benefits of the MO-115 safety improvements. A before/after evaluation study was conducted to understand the impact this project has had on improving safety along the corridor. Particularly where the road diet and roundabouts were implemented:

- Fatal crashes reduced by 80%
- Reduced pedestrian crashes by more than 50%
- Reduced vehicles traveling over 60 mph by 95%
- Did not cause drivers to avoid traveling on the road space reallocation sections
- Did not substantially increase travel time
- Did not increase intersection delay

Although the improvements were highly successful, fatal and serious injury crashes continue to happen on the MO-115 corridor. Vehicle speeds remain higher than optimal for a corridor with higher VRU usage that is served by transit and provides access to many community amenities and services. Additional future safety investments along MO-115, in alignment with the Safe System Approach, will serve to continue the positive momentum on MO-115 and help achieve the goal of zero deaths on Missouri roadways.

BENEFITS OF SAFETY IMPROVEMENTS

FATAL CRASHES
reduced by
80%

PEDESTRIAN CRASHES
reduced by
50%

EXCESSIVE SPEEDS 60+MPH

reduced by

95%

DID NOT

cause drivers to avoid traveling on the road space reallocation sections

DID NOT

substantially increase travel time

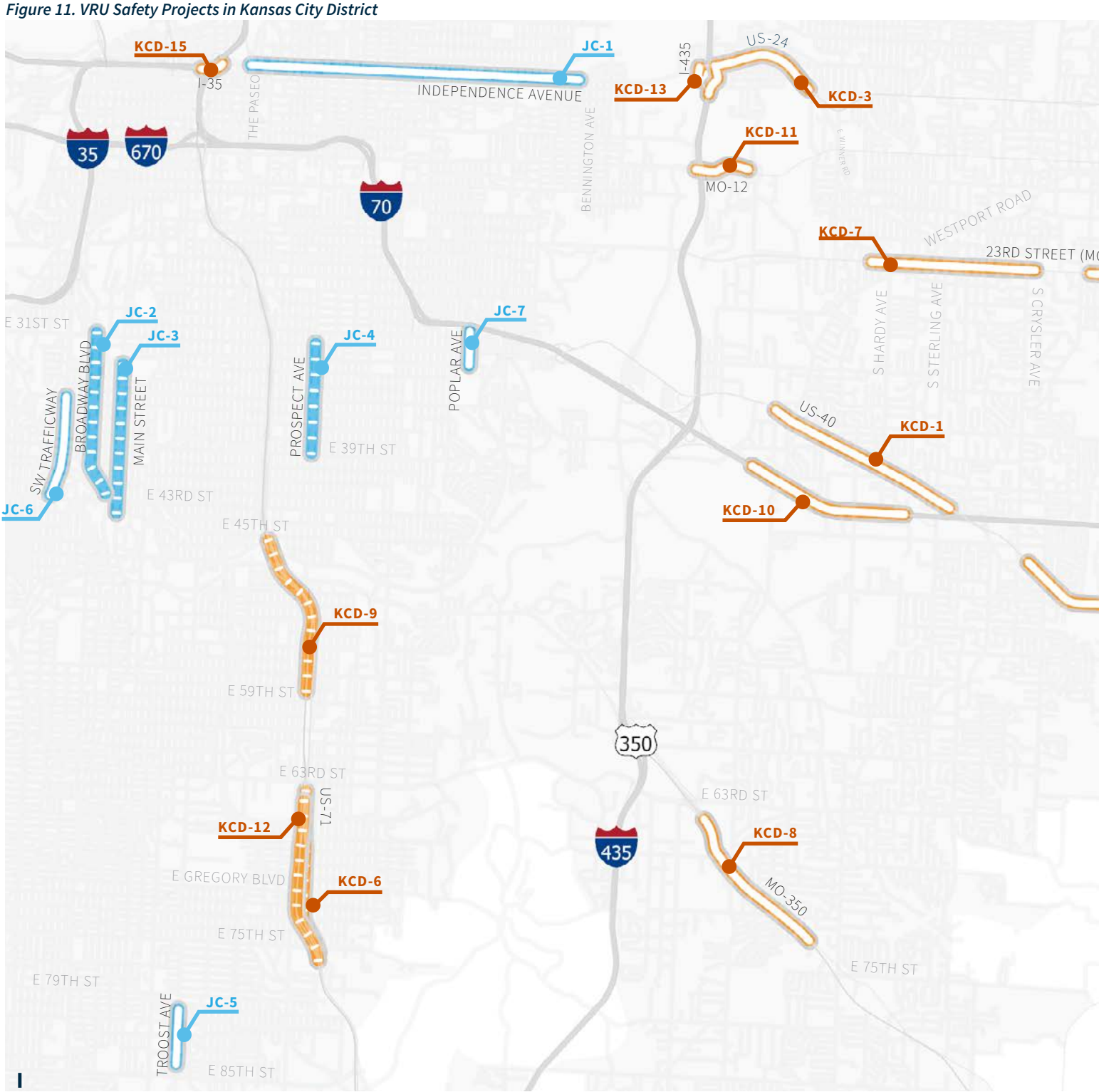
DID NOT

increase intersection delay

KANSAS CITY DISTRICT

Approximately 18.3 miles of state roads have been identified for safety improvements within the Kansas City District, primarily in Jackson, Cass, and Platte Counties. There are eight projects and approximately 8.4 miles of city streets that have been identified for safety improvements in Jackson County. These improvements are focused primarily in Kansas City with one project in Independence.

Figure 11. VRU Safety Projects in Kansas City District



State Roads

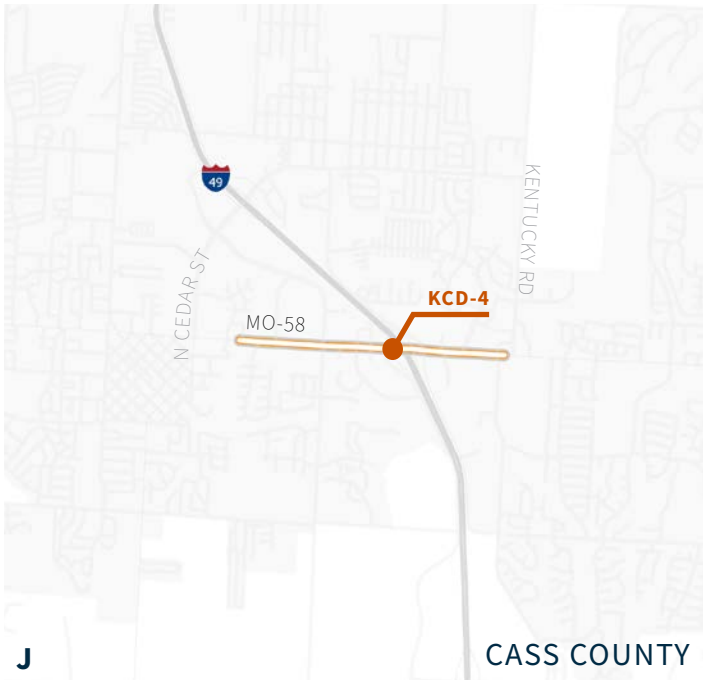
State Roads with *current safety projects

City Streets

City Streets with *current safety projects

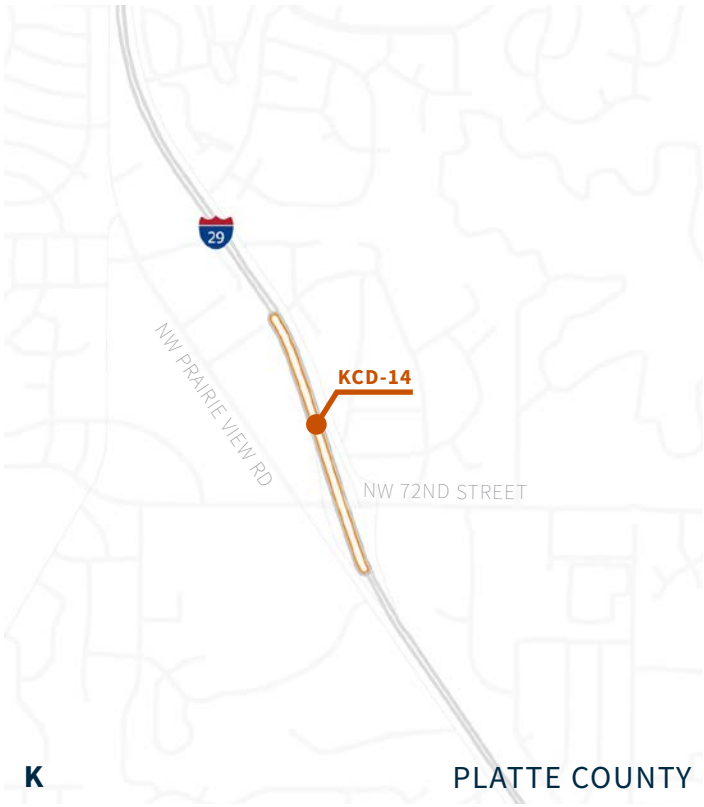
*There are current, planned, or ongoing safety improvements being implemented at this location.

JACKSON COUNTY



J

CASS COUNTY



K

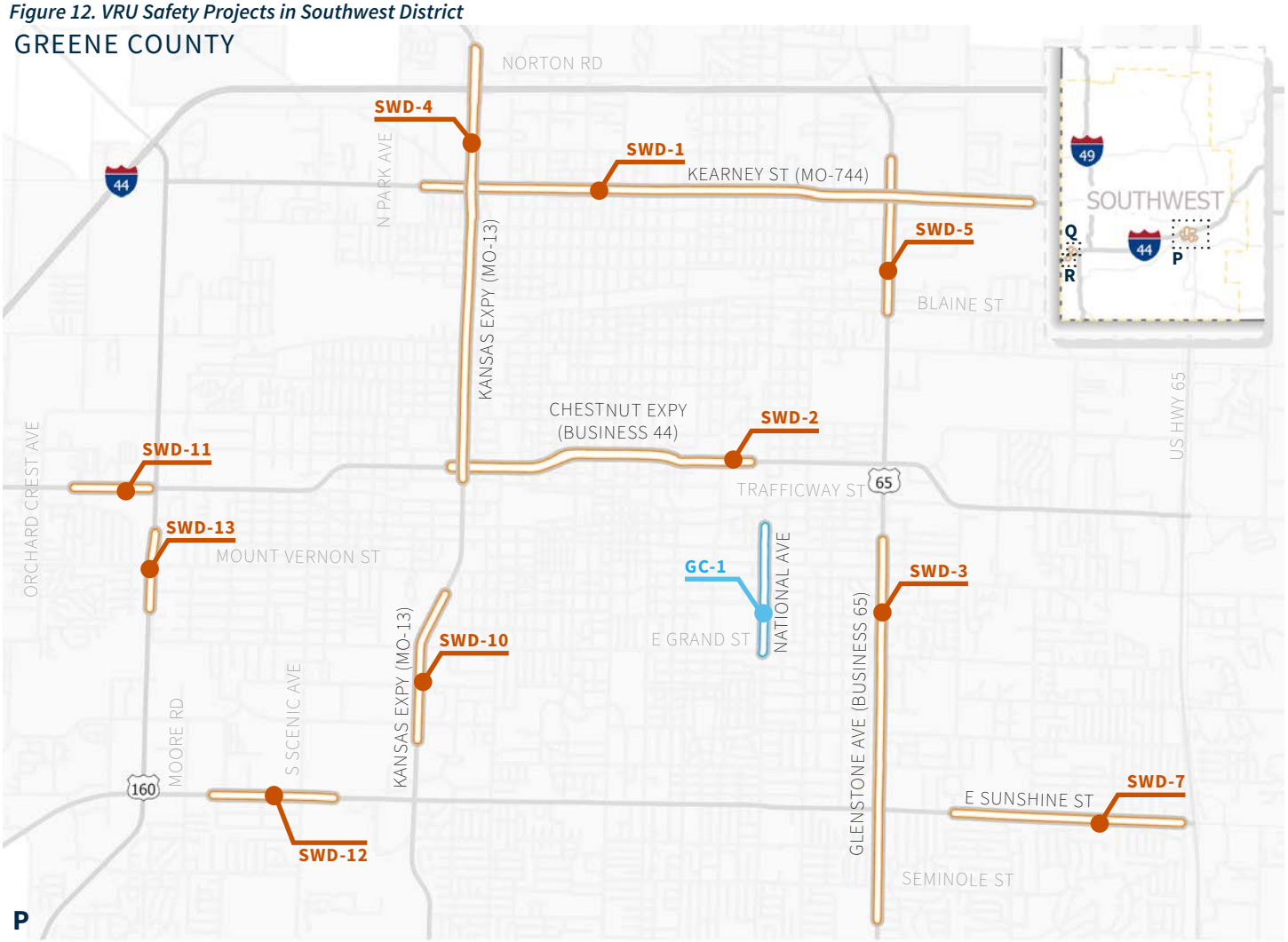
PLATTE COUNTY

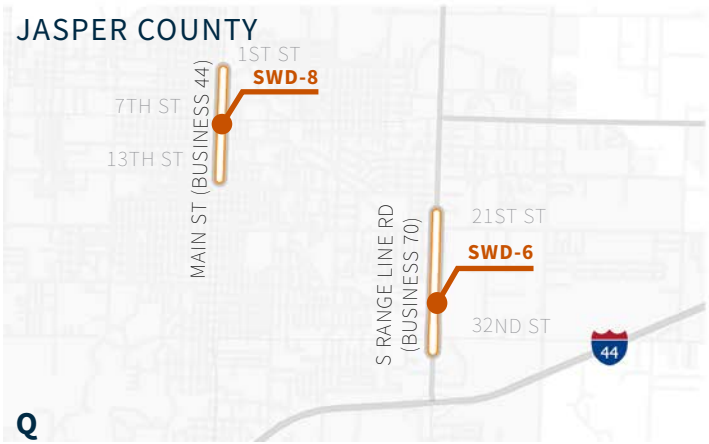
SOUTHWEST DISTRICT

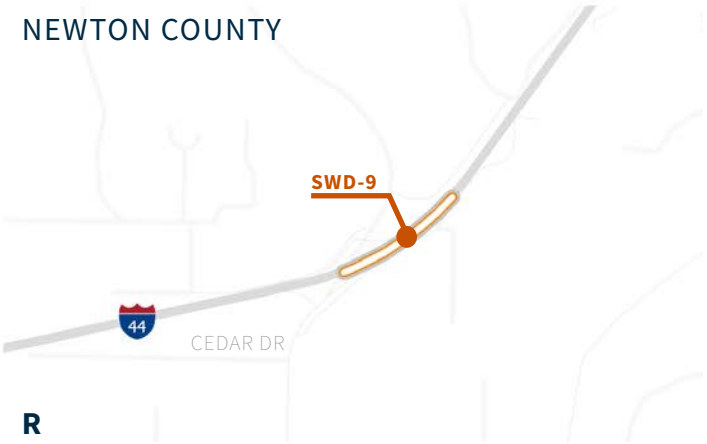
There are approximately 21.8 miles of state roads and 0.7 miles of city streets that have been identified for safety improvements within the Southwest District, focused in Greene, Jasper, and Newton Counties. This district has experienced the second-highest total number of VRU crashes and severe VRU crashes.

State Roads City Streets

Figure 12. VRU Safety Projects in Southwest District



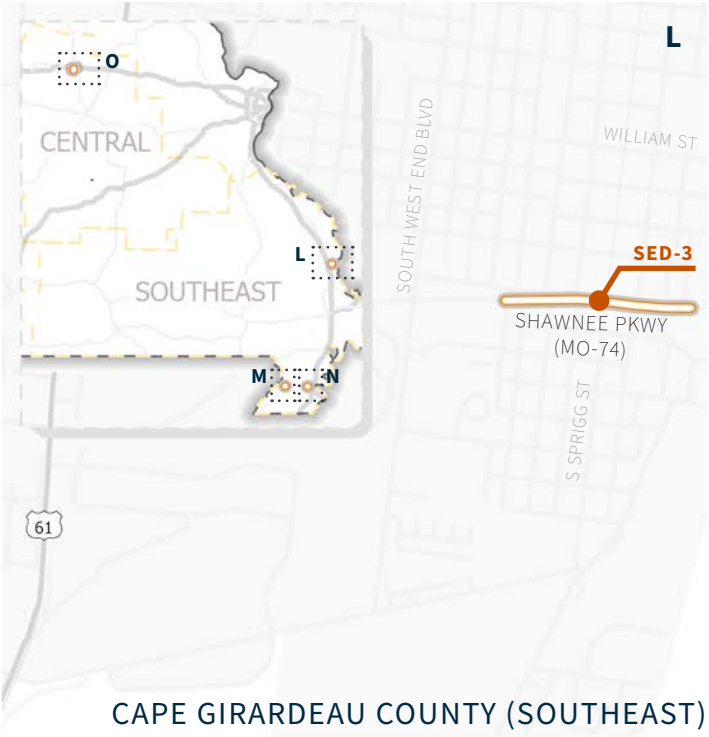




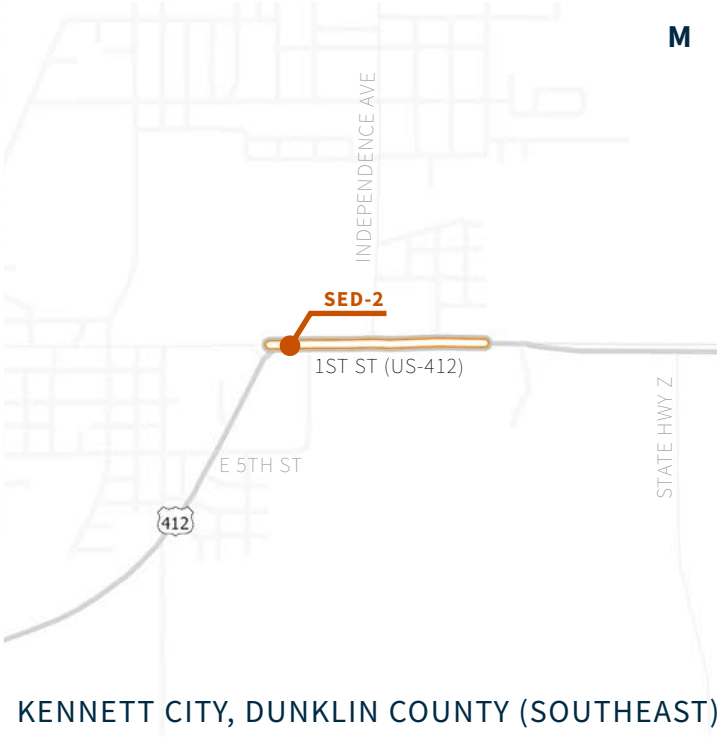
SOUTHEAST DISTRICT & CENTRAL DISTRICT

Approximately 1.5 miles of state roads have been identified for safety improvements within the Southeast District, focused in Pemiscot, Dunklin, and Cape Girardeau Counties. Within Central District, approximately 1.4 miles of state roads have been identified for safety improvements, solely focused within Boone County.

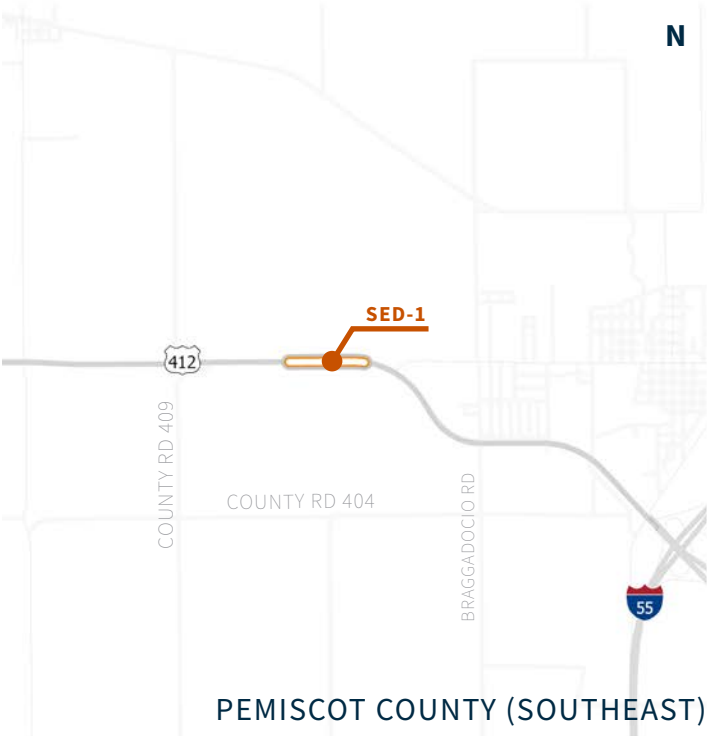
Figure 13. VRU Safety Projects in Southeast and Central Districts



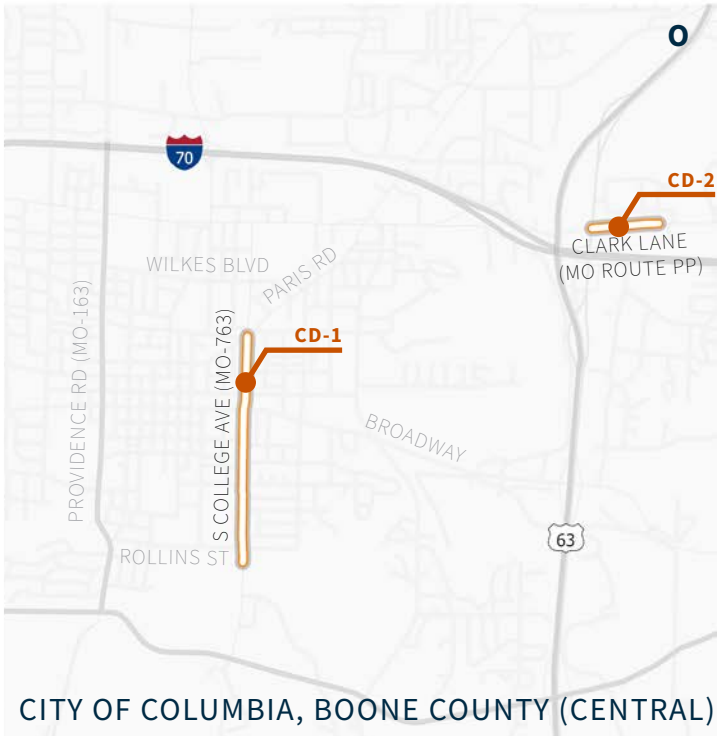
CAPE GIRARDEAU COUNTY (SOUTHEAST)



KENNETT CITY, DUNKLIN COUNTY (SOUTHEAST)



PEMISCOT COUNTY (SOUTHEAST)



CITY OF COLUMBIA, BOONE COUNTY (CENTRAL)

FUNDING STRATEGIES

MoDOT utilizes various federal and state funding opportunities aimed at providing financial assistance for implementing projects and programs that improve VRU safety. The following is a targeted list of funding opportunities for VRU safety projects and programs. Please note, there may also be funding opportunities for local or regional projects through regional planning councils and through national organizations.

Highway Safety Improvement Program (HSIP): HSIP is a key federal-aid program with the purpose of providing financial support to states for projects aimed at achieving a significant reduction in traffic fatalities and serious injuries on all roads, including those under state jurisdiction. This program requires the use of data-driven approaches to improve safety and focus on performance. MoDOT has committed to dedicating at least 15% of the HSIP program funds towards VRU safety projects going forward.

Transportation Alternatives Program (TAP): In Missouri, TAP consolidates funding from prior Moving Ahead for Progress in the 21st Century (MAP-21) programs like Transportation Enhancements, Recreational Trails, Safe Routes to Schools, and Scenic Byways into one source. MoDOT distributes TAP funds biennially (even years) outside of Transportation Management Association (TMA) areas through competitive selection. The July 2025 call included projects for trail construction, non-motorized transportation, and safety infrastructure.

Safe Streets and Roads for All (SS4A): This program provides various grant types through the USDOT to support comprehensive safety action planning efforts, demonstration activities, and implementation projects. Grants may be awarded to local governments, metropolitan planning organizations, and/or regional planning councils. This funding can pay for the development of vision zero and comprehensive safety action plans, other related planning such as complete street and active transportation plans, demonstration projects which construct pilot projects, and major capital improvements.

Additional Federal and State Funding Sources for Pedestrian and Bicyclist Projects:

- Recreational Trails Program (RTP)
- Statewide Planning and Research (SP&R)
- Surface Transportation Block Grant Program (STBG)
- National Highway Performance Program (NHPP)
- Congestion Mitigation and Air Quality (CMAQ) Improvement Program
- Better Utilizing Investments to Leverage Development (BUILD)
- Federal Transit Administration (FTA)
- Centers for Disease Control and Prevention (CDC)
- Traffic Engineering Assistance Program (TEAP)

MoDOT's SAFER Tool

All MoDOT state roadway projects are required to incorporate a safety assessment throughout all phases of the project development process. Doing so supports the growth of a culture of safety and over time contributes to a safer transportation network for all.

The Safety Assessment For Every Roadway (SAFER) tool is a resource developed by MoDOT to facilitate these safety assessments for project teams. The SAFER tool is also a great resource for local jurisdictions to prioritize VRU safety in every project. Local jurisdictions should use this tool to facilitate decision-making regarding VRU safety considerations during every roadway project phase.

For more information on the SAFER tool, please refer to MoDot's Engineering Policy Guide.

- Promote safer vehicle speeds for VRUs
- Opportunities for traffic calming
- Sufficient crossing times for VRUs
- Safe and separated VRU facilities
- Land use context
- Prioritize accessibility
- Closing VRU network gaps
- Demographics or unique needs of road users and VRUs
- Visibility for all road users

WORKING TOGETHER TO ADVANCE VRU SAFETY

WORKING TOGETHER TO ADVANCE VRU SAFETY

We have all had moments when sharing the road as someone walking, rolling, biking, or waiting for transit has felt unsafe. These everyday experiences reflect a simple truth about each of us in Missouri: we are all vulnerable road users. Our state's transportation system should reflect this reality. However, as the number of VRUs who are seriously injured or killed continues to rise, it is clear that improving our system is not only necessary but urgent.

That is why Missouri's 2025 Vulnerable Road User Safety Assessment has embraced the Safe System Approach. This approach has allowed us to recognize that people can and will continue to make mistakes on our roads. Instead of demanding perfect behavior from drivers and VRUs, we must build redundant, self-enforcing transportation systems that prevent crashes and minimize the severity of crashes that do occur because we know that accepting the idea that crashes are inevitable is unacceptable.

We also recognize that we can only achieve our goals by working together. Roadway safety is a shared responsibility, and we all have a part to play. Everyone, including local governments, businesses and organizations, and individuals and families, will play a role in improving safety for all road users, especially VRUs. Whether it's investing in safer infrastructure, enforcing safer speeds, encouraging safer people, requiring safer vehicles, and prioritizing safer response, all Missourians can begin actively working toward creating safer conditions for VRUs.

While the community of safety professionals and advocates has worked continuously over the last several decades to make progress towards making our transportation system safer, there is still a tremendous amount of work that lies ahead. We can do better, and we must do better to save lives and reduce the potential for VRU crashes in our state. Safety isn't just our goal, it's a commitment.

Have you ever thought about how YOU can improve safety for VRUs in Missouri? Get ready, because we are just getting started! The following pages outline various action steps that can be taken in Missouri to improve VRU safety. Based on your role (e.g., parent or caregiver, business owner, local government official, transit agency staff member, etc.), certain pages may be more or less relevant to you. However, each one offers different ideas and strategies that can be used to improve safety for vulnerable road users in Missouri. Please note, many of these action steps also overlap with those outlined in the SHSP related to VRU safety.

STATE AGENCIES

The State of Missouri's officials and agencies have the responsibility of allocating transportation funding and developing policies, laws, and regulations that influence safety in the state and impact VRUs.

GUIDE STATEWIDE STRATEGIES

- Formally commit to the Safe System Approach and work to incorporate safety into all aspects of the State's processes and priorities.
- Provide visible leadership that prioritizes safety at the highest level. Keep the conversation active.
- Provide critical VRU safety information to newly elected officials during orientation.
- Develop annual State of VRU safety reports for public dissemination.
- Commit agency resources to participate in VRU safety efforts. Consider:
  - Supporting new public policy.
  - Participating in safety advocacy groups.
  - Educating employees on VRU safety.
  - Distributing safety information to more Missourians.
- Hire and retain dedicated traffic safety professionals and fund their activities outside of regular working hours.
- Consider establishing a health and safety task force to advocate for multidisciplinary collaboration between health and transportation professionals to improve roadway safety.
- Update Complete Streets policy and develop and integrate a Complete Streets program.

LEGISLATION AND ENFORCEMENT

- Establish a legislative VRU safety task force to consider laws most poised to reduce roadway fatalities and serious injuries in Missouri. Consider:
  - An all-rider helmet requirement for bicyclists and motorcyclists.
  - A safe passing law to increase vehicle clearance from bicyclists.
  - A vulnerable road user law that increases penalties for reckless driving behaviors.
  - Enhanced crash reporting requirements and integration of anonymous health data into statewide crash databases.
- Review and enforce laws designed to protect VRUs, including stopping at crosswalks and prioritizing pedestrian right-of-way.
- Reduce focus on laws that criminalize VRU infrastructure based behaviors such as crossing midblock, loitering, and general use of public spaces.
- Support the use of automated enforcement (e.g., red light and/or speed cameras).
- Set appropriate speeds on state roads based on crash potential, surrounding land use context, and concerns expressed by communities.
- Consider establishing an active transportation advisory committee to inform transportation departments about alternative modes.
- Allocate adequate funding for VRU educational, enforcement, engineering, and emergency services programs designed to reduce roadway fatalities and serious injuries.
- Promote recent and existing laws related to VRU safety.
- Work to expand the availability of 911 for all residents, preferably Smart 911 systems.
- Enhance crash data reporting by integrating anonymous health data into statewide crash databases.

INFRASTRUCTURE AND OUTREACH

- Explore new ways to support rural and local agencies in identifying VRU safety needs and implementing low-cost, effective countermeasures.
- Develop and present clear, concise, and positive outreach and messaging on all critical VRU safety issues.
- Collaborate with universities on continued research needs for VRU safety advancements.
- Foster an environment of increased public-private partnerships to leverage additional expertise, resources, and opportunities for advancing safety messaging and supporting technologies.
- Revise and update roadway design standards to improve safety and conditions for VRUs.
  - Invest in safe and accessible pedestrian and bicycle facility networks, including safe crossings.
  - Educate employees and officials on VRU safety issues and solutions.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

CITIES AND COUNTIES

Local governments, such as cities and counties, hold the greatest influence in shaping a community's built environment and roadway infrastructure through policy making, planning, engineering, and enforcement.

ADOPT POLICIES AND ORDINANCES THAT REINFORCE A CULTURE OF SAFETY

- Provide critical VRU safety information and training to newly elected officials, administrators, department heads, and other positions of leadership.
- Adopt county or city policies and ordinances that are guided by the principles of the Safe System Approach that are proven to increase safety for all road users.
- Develop and implement a local road safety plan (LRSP) or comprehensive safety action plan (CSAP).
- Adopt a Complete Streets policy and develop and integrate a Complete Streets program.

INFRASTRUCTURE AND DESIGN

- Implement safety improvements in infrastructure projects.
- Adopt design standards that encourage alternate modes of travel and enhance safety for pedestrians, bicyclists, and other active transportation users.
- Evaluate and redesign roadways identified on higher-injury and/or higher-crash potential corridors.
- Systematically improve safety within communities by implementing proven safety strategies as provided in this plan.

DATA AND TECHNOLOGY

- Utilize data to prioritize safety investments in neighborhoods or blocks where VRUs experience higher crash or injury potential.
- Explore new technologies to enhance available VRU datasets, providing more data-driven solutions to improve VRU safety, such as near-miss technology or pedestrian and bicyclist counters.

ENFORCEMENT AND EMERGENCY RESPONSE

- Make a commitment to vigorous, visible traffic enforcement. Especially violations that have major impacts on VRUs such as speeding, driving while distracted, running red lights, and failures to yield.
- Prioritize enforcement on corridors with higher levels of VRU activity or with a higher frequency of crashes related to speeding and aggressive driving.

COMMUNITY SUPPORT AND COMMUNICATION

- Take advantage of external safety grant opportunities.
- Provide reliable transit services for older adults and people with disabilities.
- Develop new safety messaging campaigns that target driving behaviors such as yielding for VRUs, speeding, and driving while distracted.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

LAW ENFORCEMENT

Through data-driven approaches, law enforcement can help to improve safety for VRUs and prevent drivers from practicing higher-crash potential behaviors.

ENFORCEMENT STRATEGY AND POLICIES

- Make a commitment to vigorous, visible traffic enforcement using data-driven deployment.
- Prioritize enforcing safe driving behaviors rather than targeting VRUs (e.g., crossing outside a crosswalk), especially when safer alternatives to movement are not available on roadways.
- Support public policy initiatives proven to increase safety for all road users.
- Develop new mobilization campaigns that specifically focus on no parking in pedestrian or bicycle facilities, yielding, speeding, and distracted driving. Prioritize enforcement on corridors with higher levels of VRU activity or those with higher injury rates.

COMMUNITY ENGAGEMENT AND EDUCATION

- Participate in statewide enforcement campaigns and VRU safety campaigns.
- Participate in outreach efforts to raise community awareness of VRU safety. This may include co-hosting roadway safety events with schools, public health departments, and other community organizations.
- Use school resource officers (SRO) to deliver traffic safety practices directly to teens.

DATA MANAGEMENT AND REPORTING

- Document VRU crashes accurately within official crash reports.
- Implement electronic reporting of motor vehicle crashes and submit reports to the Statewide Traffic Accident Records System within 30 days.

OFFICER TRAINING AND PREPAREDNESS

- Provide specialized training to officers on VRU laws, crash trends, and how policies and roadway conditions contribute to crash outcomes to reinforce that enforcement and behavior change alone will not lead to safer conditions for VRUs.
- Volunteer to become trained in Stop the Bleed practices. Carry and use tourniquets.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

PUBLIC AGENCIES

PROSECUTORS & COURTS

Prosecutors and courts can influence roadway safety for VRUs in how they charge, sentence, and overall prioritize traffic-related offenses involving injuries and fatalities of VRUs.

PHILOSOPHY AND APPROACH TO CRASHES

- Practice using the Safe System Approach and treat crashes not as "accidents" but as preventable incidents that are oftentimes related to faults throughout different layers of the larger transportation system.
- Promote the use of non-criminal interventions such as safer roadway designs to increase safety for VRUs.

VICTIM SUPPORT AND JUSTICE

- Pursue justice for VRUs involved in crashes that resulted in injuries or fatalities. Consider maximum penalties and sentences for drivers involved in VRU crashes.
- Increase fines associated with crimes related to VRU injuries and fatalities.
- Apply the same standards for investigations, prosecutions, and sentencing, whether the victim is housed or unhoused.
- Meet with families and loved ones of victims from VRU crashes to better understand why people choose or may need to walk, roll, or bike to travel, and how these choices have impacted their lives.

LEGAL PROCESSES AND ENFORCEMENT

- Participate in law enforcement during traffic enforcement tactics to gain insights during investigations.
- Consider limits on diversion and plea agreements for repeat offenders.
- Develop VRU safety-focused diversion programs for first-time non-violent offenders. These programs may include safety courses or community service with pedestrian or bicyclist activist groups.
- Require driver re-education for those who have committed serious offenses.

EDUCATION AND PREVENTION

- Educate prosecutors and judges on VRU crash trends and how infrastructure and driver behaviors contribute to severe crash outcomes for VRUs.
- Continue education by attending webinars on VRU safety topics.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

SCHOOLS (ALL LEVELS)

Schools at all levels can make a large impact in improving roadway safety in their communities, especially for children and families/caretakers who walk, roll, bike, or take other non-motorized devices to and from school.

ESTABLISH AND SUPPORT SCHOOL-BASED SAFETY PROGRAMS

- Create or participate in a local Safe Routes to School Program to identify challenges and crash potential factors associated with traveling to and from school and develop or advocate for improvements to help students and families/caretakers have safe and accessible travel routes.
- Develop a School Crossing Guard program and consider involving local community members.
- Organize Walk and Bike to School events among students, families/caretakers, and staff, and/or partner with other schools in the community to encourage a larger-scale event.
- Expand access to driver education programs for students.
- Task a student organization (Family, Career, and Community Leaders of America (FCCLA), Students Against Destructive Decisions (SADD), Student Council, etc.) with raising awareness and initiating changes in road user behaviors among students and staff.
- Keep contact lists for school administrators up to date to help road user safety organizations establish and maintain efficient working relationships with schools.

EDUCATE AND EMPOWER STUDENTS ACROSS ALL GRADE LEVELS

- Provide road user safety information, including for walking, biking, and rolling to school, to all high school students during annual school year orientations and promote awareness during health classes.
- Promote the Missouri Coalition for Roadway Safety (MCRS) Smart Riders program for elementary-aged students (www.savemolives.com).
- Promote road user safety programs available to college students. Visit www.savemolives.com for a complete listing.
- Participate in available roadway safety programs geared toward youth who walk, bike, or roll to school, many of which are free. Visit www.savemolives.com for a full listing.

IMPROVE INFRASTRUCTURE AND ROUTES NEAR SCHOOLS

- Conduct walk and bike audits with students, families/caretakers, and staff to map unsafe routes, intersections, and missing or unsafe sidewalks or bicycle facilities surrounding the school.
- Partner with local governments to prioritize the implementation of safety improvement projects near school zones.
- Install traffic calming measures in school parking areas and pickup and drop-off areas to slow speeds and prevent conflict among different road users.
- Keep pedestrian and bicycle facilities safe and accessible by removing obstructions, especially during winter months.
- Install bicycle racks to encourage bicycling among students and staff.
- Host traffic gardens where even the youngest students can begin learning traffic safety and operation in a mock roadway setting.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

PUBLIC WORKS & ENGINEERING DEPARTMENTS

Across Missouri, transportation professionals within public works and engineering departments at the state, regional, and local levels shape the physical infrastructure of communities through planning, design, and engineering. These groups are also often responsible for the maintenance and operation of transportation systems.

DESIGN AND IMPLEMENT PROVEN SAFETY STRATEGIES

» Reduce VRU crashes by implementing proven safety countermeasures and other evidence-based strategies for improving VRU safety.

» Provide safer facilities and accommodations for vulnerable road users even if it is not the primary scope. Remember, agencies are responsible for all modes of transportation- not just motor vehicles- within their jurisdictions:

- Accessible and connected pedestrian networks
- Accessible and connected bicycle facility networks
- Traffic calming improvements
- Crosswalk visibility enhancements
- Access management
- Enhanced signage, signaling, and markings
- Road space reallocations
- Roadway lighting

» Implement quick-build projects that allow for timely evaluations to assess the effectiveness of new street designs and understand the public's perceptions before installing permanent safety improvements.

» Design from the users' perspective. If possible, ride along the route in a wheelchair to experience design deficiencies firsthand.

» Partner with transit agencies to implement safe and accessible VRU networks that allow for efficient first/last-mile connections to public transportation facilities.

» Provide border connectivity with active transportation facilities in neighboring states.

» Keep VRU networks, such as pedestrian and bicycle facilities, maintained and in good repair to improve accessibility for all road users, especially during the winter months.

» Deploy clear communication and build informed consent for innovative or unknown countermeasures that may be perceived as unpopular.

USE DATA AND PLANNING TO DRIVE SAFETY DECISIONS

» Integrate safety into routine planning processes.

» Use data-driven safety analysis to identify, prioritize, and quantify the safety impacts of roadway improvements.

- Conduct road safety assessments.
- Establish safe, reasonable, and consistent speed limits for specific roadway segments.
- Prioritize safety improvements based on expected reductions in fatal and serious injury crashes.
- Adopt a "safe system" mindset, evaluating all projects for safety improvements.

» Implement ADA transition plans and prioritize efforts to make new VRU facilities that meet or exceed accessibility standards and best practices.

» Take advantage of technology solutions to reduce the likelihood of crashes.

- Explore options to implement near-miss technology and/or pedestrian and bicyclist counters.
- Use intelligent transportation systems to detect and warn of higher crash potential or adverse conditions.

» Regularly measure and report the progress of safety improvement efforts to provide transparency to community members.

» Resist the temptation to remove safety improvements from projects because of budget concerns or public pressure.

» Seek specialized grants to fund additional VRU improvements.

» Adopt and integrate Complete Streets policies into project development

We all share responsibility for making Missouri safer for Vulnerable Road Users.

PUBLIC TRANSPORTATION AGENCIES

Public transportation is an essential service for many people who rely on active transportation as their primary mode of travel. Local governments can collaborate with them to design pedestrian and bicycle facility networks that allow for safer and more efficient connections to transit facilities.

DESIGN SAFE AND ACCESSIBLE TRANSIT INFRASTRUCTURE

» Design safe and accessible transit facilities and, whenever feasible, upgrade all facilities to include:

- Sidewalks
- Crosswalks and ramps, with enhancements as needed
- Shelters and seating options
- Lighting

IMPROVE WAYFINDING AND ACCESS

» Improve signage and wayfinding to increase transit riders' awareness of proximity to key destinations (e.g., hospitals, social services, grocery stores).

» Coordinate with local transportation departments to plan for active transportation networks that provide safe and efficient connections to transit facilities.

» Provide secure bike parking at transit hubs.

» Provide space for bicycle on buses and trains.

INTEGRATE SAFETY INTO BROADER TRANSPORTATION EFFORTS

» Support local VRU safety improvement efforts.

» Incorporate VRU safety countermeasures into capital projects.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

PUBLIC AGENCIES

METROPOLITAN & REGIONAL PLANNING ORGANIZATIONS

Metropolitan and Regional Planning Organizations work to guide the development and establish long-range regional goals for transportation systems spanning multiple cities within one region. These groups can lead regional-level safety efforts, prioritize safety in project funding, and promote safety across jurisdictions.

LEADERSHIP AND STRATEGIC DIRECTION

- Establish an interdisciplinary safety committee to lead organizational actions for incorporating safety into all transportation related functions.
- Encourage cities to adopt a Vision Zero (www.visionzeronetwork.org) approach to addressing transportation safety, including Complete Streets or Livable Streets.
- Make safety an overarching theme and core element of transportation plans, including regional Metropolitan Transportation Plans.

PLANNING AND PROJECT PRIORITIZATION

- Analyze and map VRU higher injury and/or crash potential corridors in the region to understand where safety concerns for VRUs exist.
- Promote proven engineering countermeasures and include safety as a scoring criterion in project prioritization and selection.
- Emphasize safety when prioritizing improvements among various modes of transportation, considering how increased multimodal alternatives and operational projects can reduce the likelihood of crashes.
- Regularly measure and report the progress of the region's collective VRU safety efforts and provide opportunities for jurisdictions to gain insights from one another.
- Prioritize funding for projects that directly address historic or systemic safety concerns for VRUs.
- Create mini-grant programs for local VRU safety demonstrations or events.

PUBLIC ENGAGEMENT AND COLLABORATION

- Create public engagement processes that specifically include stakeholders or participants who represent pedestrians, bicyclists, and other non-motorized road users.
- Participate in Missouri Coalition for Roadway Safety meetings and activities. Visit www.savemolives.com for more information.
- Seek or provide safety grant-writing assistance for communities that may lack the personnel.
- Promote safety programming, including Safe Routes to School programs and other VRU educational initiatives.
- Educate member agencies on the significance of VRU safety and how their agencies can contribute to a safer road system.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

FAMILIES & INDIVIDUALS

The collective actions of individuals have the potential to transform safety in the state arguably more than any other group. Families and caretakers play a vital role in influencing the behaviors of the next generation of current and future road users.

PRACTICE SAFE WALKING, ROLLING, AND BIKING BEHAVIORS

» As often as possible, practice safe pedestrian and bicyclist behaviors.
- Look both ways when crossing the street.
- If possible, make eye contact with drivers performing turns before crossing the street.
- Maintain appropriate speeds for the walking, rolling, or bicycling facility you are using.
- Use sidewalks, shared-use paths and bike lanes, if available.
- Cross the street at visible, marked locations.
- If riding a bike, always wear a helmet.
- Put your phone in your pocket and keep headphone volumes low.
- At night, be sure to wear clothing that is highly visible.

ENCOURAGE SAFE BEHAVIORS TO CHILDREN

» Have conversations early on with children about the importance of using active travel modes like walking, rolling, biking, and public transportation for maintaining a healthy lifestyle. Conversations may include topics like the importance of safe behaviors when sharing the road with drivers.

» Request that your child's school promote road user safety and participate in safer road user programs, such as pedestrian and bicyclist safety courses.

» Never allow a child under 16 years of age to operate a Class 3 e-bike. Class 3 e-bikes are allowed to travel up to 28 mph, which young children are not legally allowed to operate in Missouri.

SUPPORT SAFE DRIVING AMONG OLDER ADULTS

» Help older adults find alternative modes of transportation available to them when driving is no longer an option.

SUPPORT COMMUNITY AND INFRASTRUCTURE IMPROVEMENTS

» Advocate for safe and accessible active transportation networks in your community so that everyone, regardless of age or ability, can access everyday destinations, like schools and jobs, when walking, rolling, or biking.

» Use public transportation and encourage others to try public transportation options in your community, whenever possible or accessible.

» Take advantage of highway safety courses and workshops in your community, many of which are free. Visit www.savemolives.com for a complete listing.

PRACTICE SAFE AND RESPONSIBLE DRIVING BEHAVIORS

» Always demonstrate positive driving behaviors.
- Be mindful of other road users sharing the road, especially pedestrians and bicyclists.
- If possible, make eye contact with VRUs crossing the street before performing turns.
- Always yield to VRUs, especially at crosswalks.
- Always leave crosswalks and walkways unobstructed.
- Provide bicyclists with adequate space when sharing the road.

STAY SAFE WHEN STRANDED

» If stranded alongside the roadway
- Make yourself visible. If driving, turn on vehicle hazard lights.
- Stay off the roadway when a shoulder or curb is available. If driving, stay in your vehicle with your seatbelt on until help arrives.

We all share responsibility for making Missouri safer for Vulnerable Road Users.

BUSINESSES & CORPORATIONS

Businesses and corporations play an integral role in shaping every community. These entities can influence the behaviors of both customers and employees while creating a culture of safety stemming from the top.

DESIGN AND MAINTAIN SAFE, ACCESSIBLE INFRASTRUCTURE

- Keep pedestrian, bicycle, and transit facilities safe and accessible by keeping them clear of obstructions, especially during the winter months.
- When constructing or redeveloping properties, provide safe and accessible pedestrian and bicycle facilities for VRUs.
- Design or implement safety measures to prevent conflicts among different road users in loading zones and driveways.
- Improve lighting surrounding properties, especially in areas with higher VRU volumes such as store fronts, parking areas, and delivery zones.
- Install traffic calming measures like speed cushions or raised crossings in parking areas.
- Install bicycle racks to encourage bicycling among employees and customers.

ENCOURAGE ACTIVE TRANSPORTATION AMONG EMPLOYEES AND CUSTOMERS

- Organize Walk and Bike to Work events among employees and/or partner with other businesses in your community to encourage a larger-scale event.
- Develop an employee incentives program to encourage the use of active modes of transportation, such as walking, rolling, biking, and taking transit when commuting to work.
- Partner with local safety campaigns or co-sponsor community events focused on improving roadway safety for all road users.
- Promote traffic safety during workplace safety meetings.
- Provide traffic safety information to customers explaining how they can help create safer roads. Visit www.savemolives.com for available resources.

IMPLEMENT SAFE DRIVING POLICIES AND PRACTICES

- Implement regular roadway safety training for all employees, particularly those who operate vehicles, focusing on VRU awareness and safe road sharing.
- Equip corporate vehicle fleets with VRU detection systems, such as automatic braking and blind spot technology.

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CIVIC & COMMUNITY

Civic organizations and community groups do not directly shape the infrastructure of communities. Still, they do influence local politics, public opinions, and can shape policies through their efforts.

ADVOCATE AND SUPPORT SAFETY POLICIES

- Advocate for safer streets for all road users, including VRUs, in your community.
- Support the implementation of local transportation safety plans, such as Vision Zero plans and Safety Action Plans.
- Work with schools, community leaders, and elected officials to adopt public policy and/or deliver infrastructure improvements to increase safety.

CONDUCT SAFETY OUTREACH

- Host or sponsor presentations, workshops, training, and other events to promote VRU safety for all road user groups. This may include hosting booths at markets, conducting walk audits, or other programming like open streets or safety demonstrations.

AMPLIFY VOICES AND LEARN FROM OTHERS

- Amplify the voices and lived experiences of those who have been impacted by traffic crashes while walking, rolling, biking, or using public transportation.
- Amplify success stories or safety wins in your community when they occur.
- Study the example of other jurisdictions that practice traffic safety well and emulate them.

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HEALTH PROVIDERS & EMERGENCY RESPONDERS

In alignment with public health principles, health professionals understand that safety for VRUs can be achieved through a safe system approach. On the other hand, providers and emergency responders are often the first groups to witness the impacts of VRU crashes and can advocate for safer conditions.

STRENGTHEN EMERGENCY RESPONSE SYSTEMS

- Upgrade computer-aided dispatch systems and protocols to ensure responders are sent to the correct location the first time and receive critical information to provide an appropriate level of care.
- Train and encourage non-medical responders like police and firefighters to provide basic first aid like tourniquet application.
- Strive to transport patients from crash to emergency room within 60 minutes – the so-called golden hour.
- Administer whole blood in the pre-hospital setting.
- Train and employ more EMT staff and dispatchers – as young as 18 – to assuage short-staffing and burnout.
- Provide all first responders with high-visibility roadside apparel.
- Participate in traffic incident management courses and/or training exercises.

COMMUNITY ENGAGEMENT AND PUBLIC OUTREACH

- Educate the public on STOP, CALL, STAY bystander response strategies.
- Collaborate with schools on Safe Routes to School programs and initiatives.
- Arrange for EMS and fire departments to teach pedestrian and bicycle safety to children by conducting safety rodeos and traffic gardens.
- Work with family physicians and public health departments to educate patients on safe road user habits when walking, rolling, or biking.
- Provide mental health resources for patients recovering from serious pedestrian or bicyclist crashes.
- Join committees and coalitions focused on transportation safety to provide a healthy perspective.
- Educate citizens on emergency preparedness and properly responding to emergency vehicles.

IMPROVE DATA COLLECTION AND INTERAGENCY COLLABORATION

- Document and code crash injuries accurately in medical records and/or trauma registries, including the mode of travel used by the person.
- Partner with local law enforcement and local governments, including planners and engineers, to develop anonymous data-sharing agreements to better understand VRU crash trends and outcomes.
- Integrate transportation safety into injury and violence prevention programs, include crash data and existing built environment conditions data to understand how traffic violence impacts health disparities.

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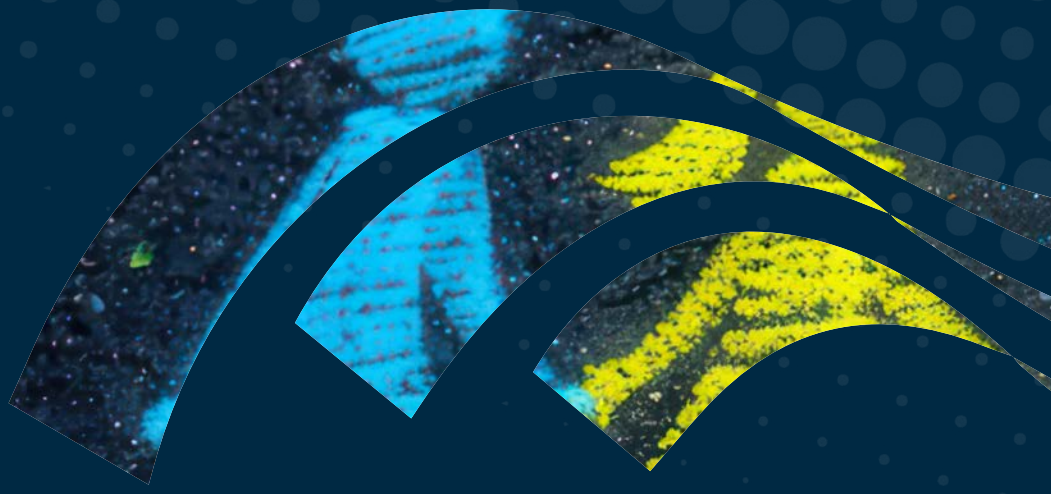
WE'RE All IN THIS
together
STOP



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