IOWA'S VULNERABLE ROAD USER SAFETY ASSESSMENT

IOWA | DOT

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Letter from Governor Kim Reynolds

My Fellow Travelers,

Thank you for your interest in the state of Iowa and the safety of our roadways.

Whether you have lived in Iowa all your life, vacation here, or are looking for a great place to establish a career and raise a family, Iowa offers you a wealth of great opportunities. Ensuring we have an efficient and safe transportation system is key to many of those opportunities.

We're excited to support Iowa's Vulnerable Road User (VRU) Safety Assessment. The assessment lays out several safety strategies we'll implement as we strive to reduce traffic fatalities for vulnerable road users. Implementation of the safety strategies outlined in this assessment will help vulnerable road users stay safe while walking or riding on Iowa's roadways.

Iowa has shown that with dedication to proven safety programs and projects, traffic fatalities and serious injuries can be reduced. We are committed to broadening existing programs that work and implementing the safety strategies outlined in the Strategic Highway Safety Plan (SHSP) to continue to drive down fatalities and serious injuries. We are steadfast to continue our partnerships with the many dedicated safety professionals in our education, enforcement, engineering, and emergency response communities.

This statewide, interagency plan includes a fifth E—everyone. Because with everyone working together, we can change the traffic culture so everyone arrives safely to their destination.

We urge all Iowans to join the effort in keeping our roadways safe.

Sincerely,

Kim Reynolds

Kim Reynolds
Governor of Iowa

1. INTRODUCTION AND BACKGROUND

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BACKGROUND OF THE VULNERABLE ROAD USER (VRU) SAFETY ASSESSMENT

All states are required to develop a VRU Safety Assessment as part of their Highway Safety Improvement Program (HSIP) in accordance with 23 U.S.C. 148(1). The VRU Safety Assessment is a new requirement from the Bipartisan Infrastructure Law. Subsequent updates are to be completed with the routine Strategic Highway Safety Plan (SHSP) updates in accordance with the HSIP. This assessment reviews and highlights statewide safety challenges for bicycles and pedestrians on both the state highway and local roadway systems and identifies specific projects and strategies to address VRU concerns.

VRU Safety Assessment Goals

» Identify areas of higher risk for bicyclist and pedestrian crashes

» Provide insight on areas of necessary infrastructure improvements on Iowa roads

» Further the objective of achieving zero fatalities on the nation's roads

What is a VRU?

VRUs are defined in 23 U.S.C. 148(a)(15) as "nonmotorists." A non-motorist is a pedestrian, bicyclist, or other cyclist, excluding motorcyclist. Examples of other non-motorists include:

- Person on personal conveyance
- Injured person
- Highway worker on foot in a work zone

A personal conveyance is a device, other than a transport device, used by a pedestrian for personal mobility assistance or recreation. These devices can be motorized or human-powered, but not propelled by pedaling. This includes rideable toys (e.g., skateboard, scooter): motorized rideable toys (e.g., skateboard, toy car); mobility assistance devices (e.g., wheelchair, segway); etc.

IOWA-SPECIFIC GUIDANCE

In Iowa, motorized bicycles (mopeds) that exceed a certain speed are considered motorcycles. Because motorcycles are excluded from the definition of VRUs, it is imperative to clearly define what is considered to be a motorcycle. The following guidance outlines how these types of devices are classified in Iowa:

Bicycle

NOT ABLE TO EXCEED 20 MILES PER HOUR
when powered solely by an electric motor of less than 750 watts (one horsepower)

Mopeds

ABLE TO EXCEED 20 MILES PER HOUR
as defined for bicycles

NOT ABLE TO EXCEED 39 MILES PER HOUR
as defined for motorcycles

Motorcycles

ABLE TO EXCEED 39 MILES PER HOUR
on level ground unassisted by human power

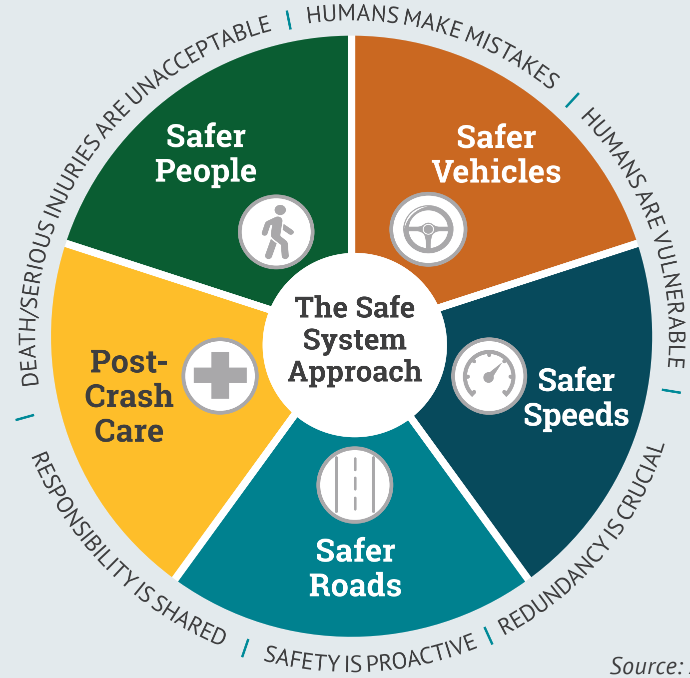
SAFE SYSTEM APPROACH

The United States Department of Transportation (U.S. DOT) has adopted a Safe System Approach as the guiding paradigm to address roadway safety. The Safe System Approach has been embraced as an effective way to address and mitigate the risks inherent in our complex transportation system. It works by building and reinforcing multiple layers of protection to both prevent crashes from happening in the first place and minimize the harm caused to those involved when crashes occur.

Traditional traffic safety efforts have involved a review of crash, roadway, and driver data segregated into emphasis areas. To align with the national shift to the Safe System Approach, the SHSP groups emphasis areas into the five Safe System elements: Safer People, Safer Vehicles, Safer Speeds, Safer Roads, and Post-Crash Care. Additional information and resources on the Safe System Approach are available on the *U.S. DOT website*.

The Safe System Approach is a shift from conventional approaches to roadway safety because it focuses on both human mistakes and human vulnerability, and designs a system with many redundancies in place to protect everyone. **Figure 1.1** displays the emphasis areas included in Iowa's most recent SHSP organized by the Safe System elements. The five Es in the SHSP are: Education, Emergency medical services, Enforcement, Engineering, and Everyone. Additional information and resources on the SHSP can be found on the *Iowa SHSP website*. The Safe System Approach is a holistic and comprehensive approach that provides a guiding framework to make driving, riding, and walking on the roadway safer for people.

FIGURE 1.1: EMPHASIS AREAS BY THE SAFE SYSTEM APPROACH



Source: Adapted from FHWA

*Key Emphasis Area

(%) Percent of fatalities and serious injuries attributed to the emphasis area. Fatalities and serious injuries may be associated with multiple emphasis areas.

Safer People
Occupant Protection (37%) *
Impairment Involved (23%) *
Distracted Driving (15%) *
Younger Drivers (19%)
Older Drivers (19%)
Pedestrians (6%)
Bicyclists (3%)

Safer Vehicles
Motorcycles (17%)
Heavy Trucks (9%)
Other Special Vehicles (2%)
Train (0.4%)

Safer Speeds
Speed-related (52%) *

Safer Roads
Local Roads (69%) *
Lane Departures (53%) *
Intersections (29%) *
Roadside Collisions (40%)
Winter Road Conditions (6%)
Work Zones (2%)

Post-Crash Care
Post-Crash Care

The Federal Highway Administration (FHWA) has also adopted the Safe System Approach and encourages states to view it as:

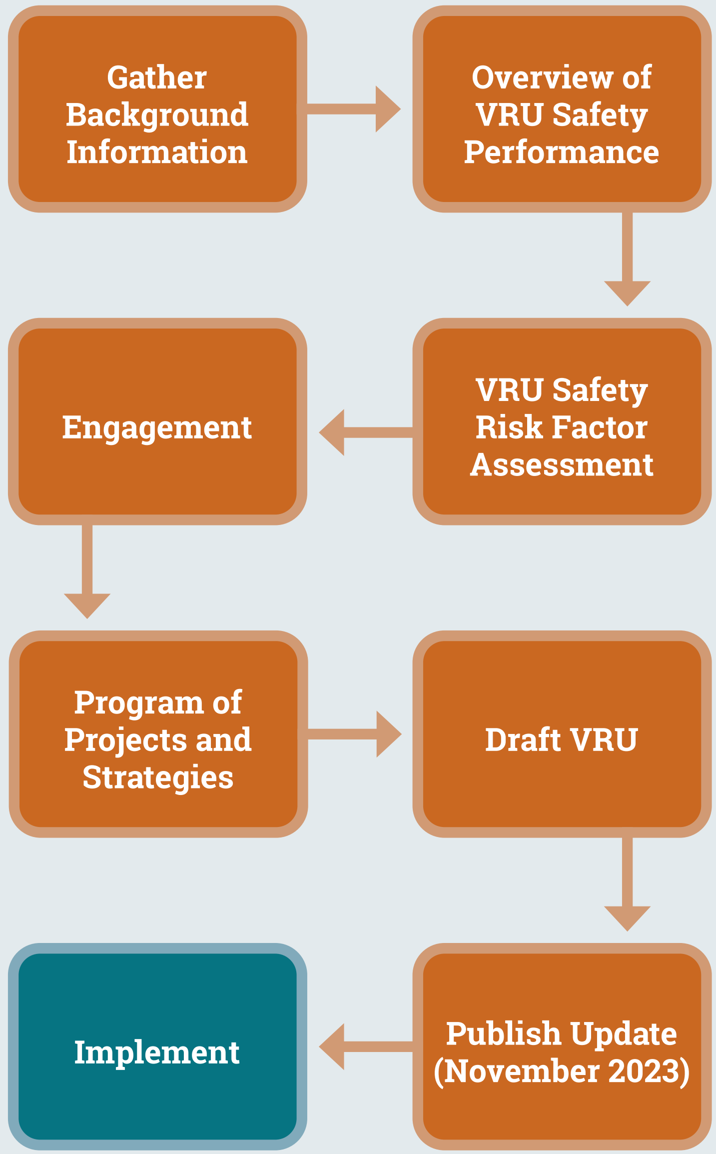
- Aiming to eliminate death and serious injury for all road users
- Anticipating and accommodating human mistakes
- Keeping crash impact energy on the human body within tolerable levels
- Proactively identifying safety risks in the system
- Building in redundancy through layers of protection so if one part of the system fails, the other parts provide protection
- Sharing responsibility among all who design, build, manage, and use the system for achieving the goal of zero fatalities and serious injuries on roadways

OVERVIEW OF VRU SAFETY ASSESSMENT PROCESS

The process used for the VRU Safety Assessment is outlined below and displayed in **Figure 1.2**.

- Gather background information
- Provide an overview of VRU safety performance
- Conduct VRU Safety Risk Factor Assessment
- Engage with stakeholders
- Develop a program of projects and strategies to address VRU safety
- Document VRU Safety Assessment
- Implement

FIGURE 1.2: VRU SAFETY ASSESSMENT DEVELOPMENT PROCESS



2. VRU SAFETY PERFORMANCE

2. VRU SAFETY PERFORMANCE

This section provides an overview of safety performance for crash data over the seven-year period from January 1, 2016 to December 31, 2022. Iowa changed how non-motorist crash data was reported in 2015; therefore, 2016 was selected as the first year of the analysis period to provide consistency in the assessment of the data.

Figure 2.1 illustrates the number of VRU fatalities and serious injuries in Iowa from 2016 through 2022. **Figure 2.2** illustrates the percentage of VRU fatalities and serious injuries in Iowa from 2016 through 2022 by user type.

FIGURE 2.1: VRU FATALITIES AND SERIOUS INJURIES (2016-2022)

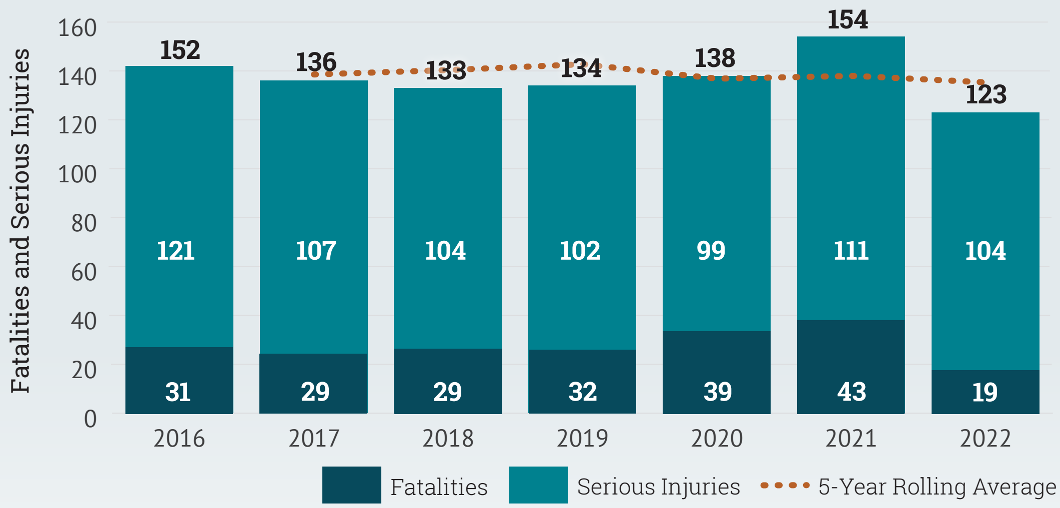
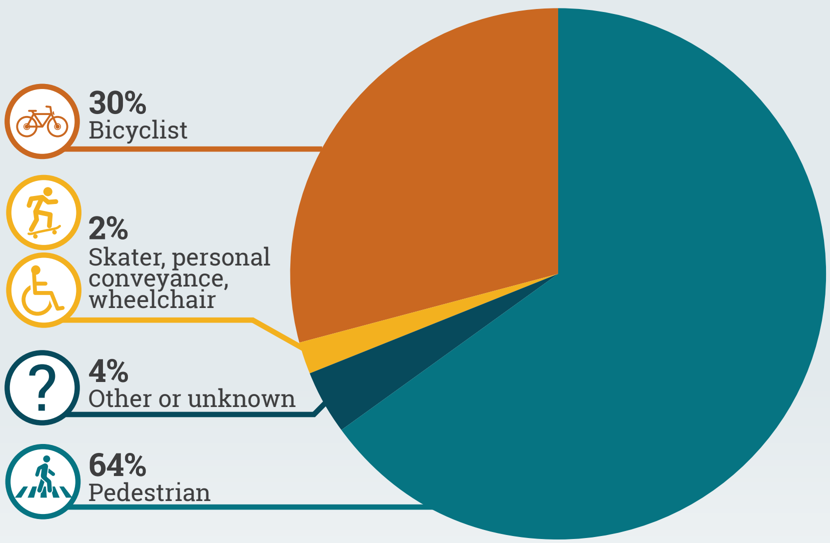


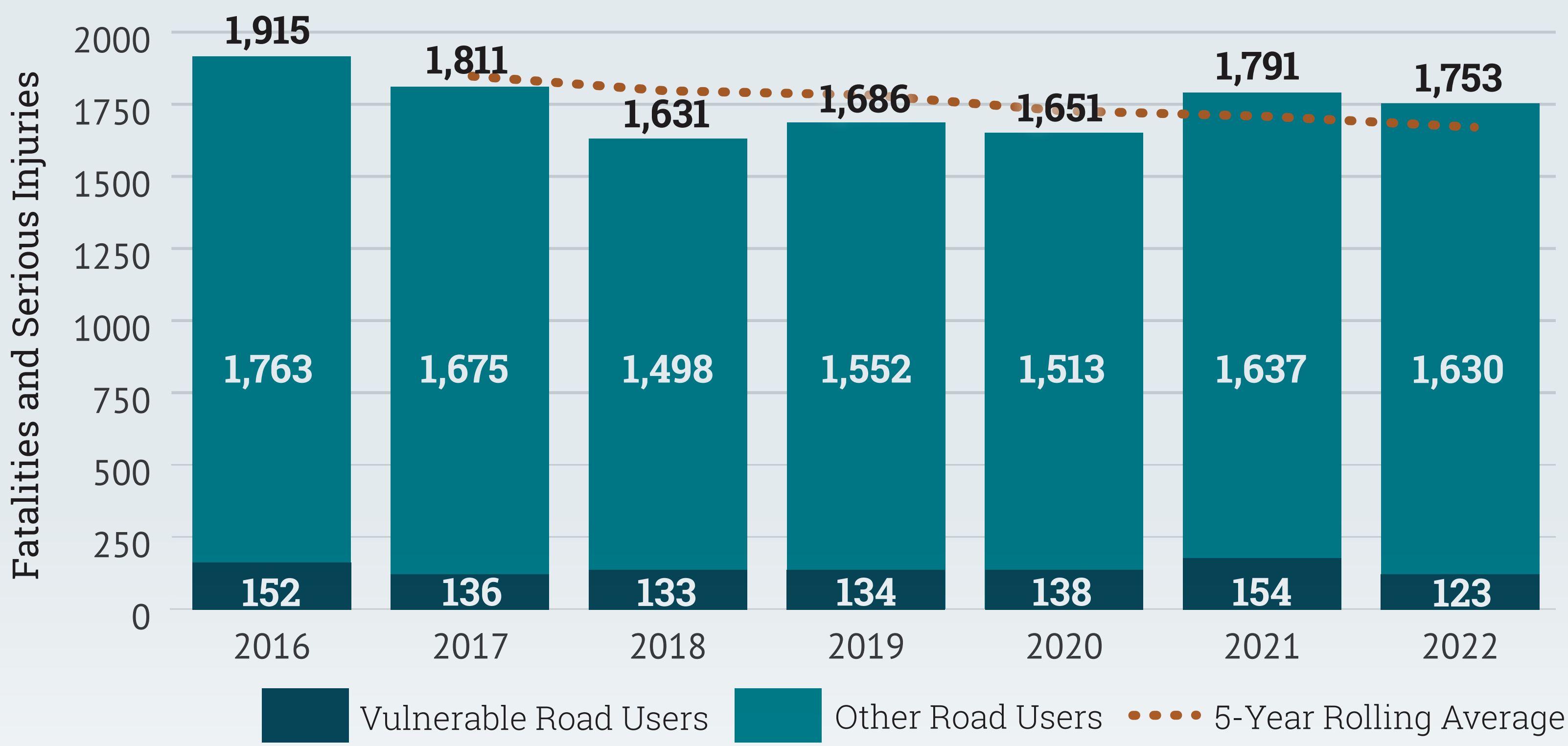
FIGURE 2.2: VRU FATALITIES AND SERIOUS INJURIES BY USER TYPE (2016-2022)



COMPARISON OF VRU TRENDS TO OVERALL TRENDS IN IOWA

Eight percent of all fatalities and serious injuries in Iowa are VRUs. **Figure 2.3** illustrates the fatalities and serious injuries for all road users in Iowa compared to VRUs.

FIGURE 2.3: FATALITIES AND SERIOUS INJURIES FOR ROAD USERS (2016-2022)



~8% of all fatalities and serious injuries in Iowa are VRUs

~20% of all fatalities and serious injuries in the U.S. are VRUs
Based on 2016-2020 Fatality Analysis Reporting System (FARS)

PROGRESS TOWARDS SAFETY PERFORMANCE TARGETS FOR NON-MOTORIZED USERS

Table 2.1 shows the five-year averages for non-motorist and VRU fatalities and serious injuries are trending downward. The rolling average for 2022 is about four fatalities or serious injuries above the safety performance target goal of 134.4 as defined in Iowa's 2022 HSIP Report for calendar year 2023.

TABLE 2.1: NON-MOTORIST SAFETY PERFORMANCE MEASURES (FIVE-YEAR AVERAGES)

Year	Non-Motorist	Non-Motorist Target	Vulnerable Road Users
2020	141.0	131.0	138.6
2021	140.8	129.8	139.0
2022	137.8	134.4	136.4

There is a slight difference between what is considered a VRU for the purposes of this assessment and what Iowa classifies as non-motorists for its crash reporting. The five-year averages for VRU fatalities and serious injuries show a similar downward trend.

Non-Motorists

VRU

- Pedestrian
- Pedalcyclist (bicycle/tricycle/unicycle/pedal car)
- Pedalcycle passenger
- Skater, personal conveyance, wheelchair
- Other non-motorist
- Unknown
- In or on building
- Horse and buggy

IOWA VRU FATALITY TRENDS

Iowa is one of the 10 states that are included in Mid America Association of State Transportation Officials (MAASTO), which includes the following states Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Nebraska is also a helpful comparison state for Iowa due to its geographical proximity and its similarities in demographics and population. **Figures 2.4, 2.5, and 2.6** provide a comparison of various VRU fatality data within these states based on 2016-2020 fatality data in FARS.

Low High

FIGURE 2.4: VRU FATALITY RATE PER 100,000 POPULATION

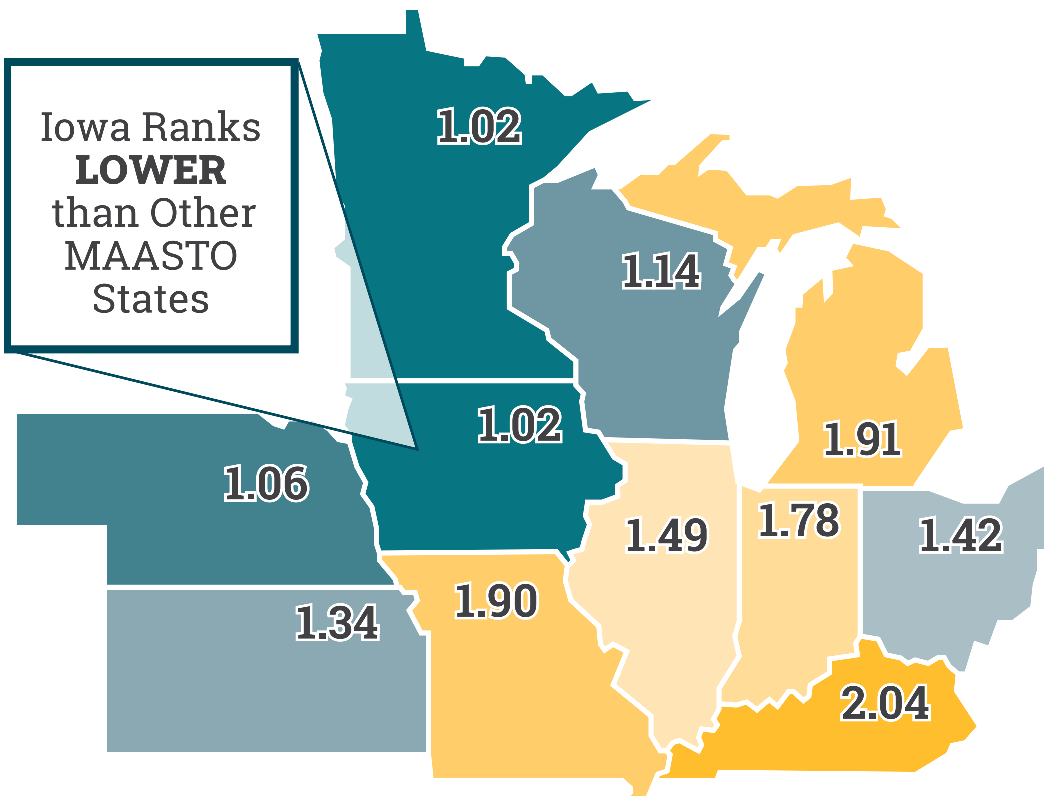


FIGURE 2.5: BIKE PERCENTAGE OF TOTAL FATALITIES

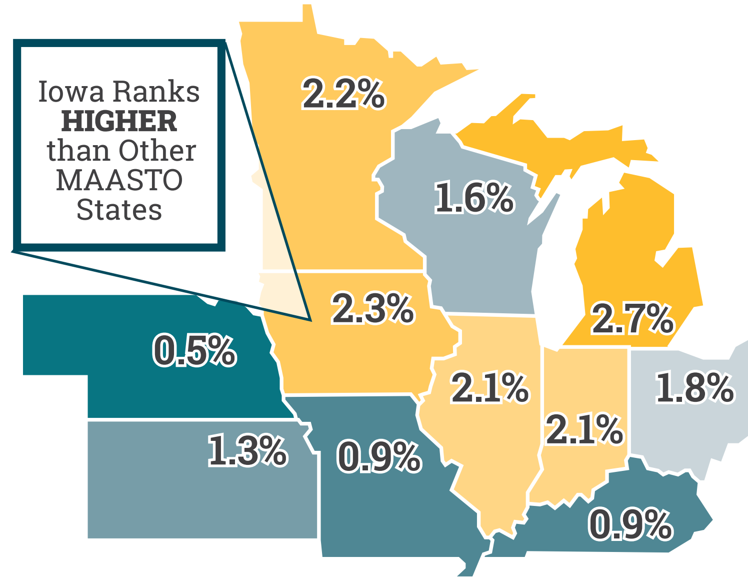
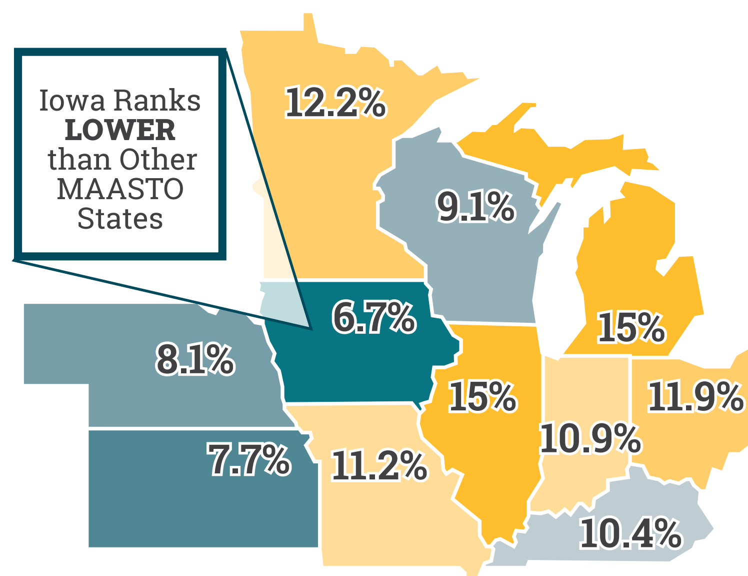


FIGURE 2.6: PEDESTRIAN PERCENTAGE OF TOTAL FATALITIES



3. VRU SAFETY RISK ASSESSMENT

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METHODOLOGY

A data-driven, systemic analysis was conducted to identify urban and rural locations with the greatest crash risk for VRUs. The analysis builds on the methodology established for the *Statewide Bicycle and Pedestrian Systemic Safety Analysis 2020* published by the Iowa Department of Transportation in 2020 by incorporating census data for at-risk populations, updating the analysis to be at the person level (as opposed to crash level), and updating the crash data from 2009-2018 to 2016-2022.

Crash Data

Consistent with the original analysis, fatalities and serious injuries were divided into two categories: pedestrians and bicyclists. Pedestrians included all fatalities and serious injuries involving the following non-motorist types, which operate in a manner similar to or in the same space as a pedestrian:

- Pedestrians
- Skater, personal conveyance, wheelchair
- Other non-motorists
- Unknown

Bicyclist crashes included all fatalities and serious injuries involving the following non-motorist types, which operate in a manner similar to or in the same space as a bicyclist:

- Pedalcyclist (bicycle/tricycle/unicycle/pedal car)
- Pedalcycle passenger

VRU fatalities and serious injuries were evaluated to calculate the correlation of VRU safety for various facility and census data. After the crash data set was determined, fatalities and serious injuries were spatially joined to roadway segments, intersections, and census block groups, and then risk factors were assessed to determine the relationship between the risk factor and the proportion of pedestrian and bicyclist crashes.

Risk Factors

Both facility characteristics and demographics data were evaluated to determine high-risk locations within the state. Consistent with the previous analysis, the risk assessment considered factors frequently identified as contributing factors or environmental/facility conditions that are common to VRU crashes. The factors are separated into three categories:

- Existing Conditions: Factors that relate to the absence of sufficient VRU accommodation
- VRU Demand: Factors that estimate the presence of VRUs
- At-Risk Groups: Factors in the degree of safety concern that the absence of facilities creates

Because the Iowa DOT *Statewide Bicycle and Pedestrian Systemic Safety Analysis 2020* was completed recently (in 2020), the same data was used for the segment and intersection attributes as the previous analysis. Data for VRU Demand and At-Risk Groups was obtained at the block-group level based on five-year American Community Survey (ACS) data obtained from the U.S. Census Online Portal. Raw census data was used as opposed to an aggregated data source, such as the Centers for Disease Control and Prevention's (CDC's) Social Vulnerability Index, so that multiple attributes could be considered independently. **Table 3.1** provides the risk factors used in the analysis and their respective data sources.

TABLE 3.1: RISK FACTOR DATA SOURCES

Factor	Variable		Data Source
	Segment	Intersection	
Existing Conditions	AADT	DEV	Iowa DOT*
	Median type	Intersection angle	Iowa DOT*
	Number of lanes	Intersection type	Iowa DOT*
	Parking type (only urban)	Number of lanes	Iowa DOT*
	Shoulder type	Number of legs	Iowa DOT*
	Shoulder rumble	Speed limit	Iowa DOT*
	Shoulder width	Traffic control	Iowa DOT*
	Speed limit		Iowa DOT*
VRU Demand	Population density (population per square mile)		U.S. Census Bureau
At-Risk Groups	Percent households in poverty		U.S. Census Bureau
	Percent households with no vehicle		U.S. Census Bureau
	Proportion of population over 64 years old		U.S. Census Bureau
	Proportion of population under 18 years old		U.S. Census Bureau
	Proportion of population with disabilities		U.S. Census Bureau

* *From the Statewide Bicycle and Pedestrian Systemic Safety Analysis 2020*

As shown in **Table 3.1**, the risk factors used to identify high-risk locations for VRUs involved a combination of facility characteristics and demographics data. The facility data was used to determine the risk to VRUs from an existing roadway conditions standpoint. For segments, this included the annual average daily traffic (AADT) on the road segment; the type of median (e.g., none, surface with no barrier, barrier, etc.); number of lanes; on-street parking presence and type; shoulder type (none, earth, gravel, or paved); shoulder rumble strip presence; shoulder width; and speed limit. For intersections, this included the daily entering vehicles (DEV) at the intersection, the angle at which the roadways intersect, the type of intersection, number of lanes, number of legs, speed limit, and traffic control (e.g., two-way stop, four-way stop, traffic signal, etc.).

Demographics data was used to demonstrate VRU risk from a potential user standpoint. Areas with a high percentage of people or households in the various metrics are generally expected to have a higher quantity of people who rely on walking or biking as their primary mode of transportation. The percentage of at-risk census groups were gathered for each census block, including households in poverty, households with no vehicles, population over 64 years old, population under 18 years old, and population with disabilities. Population density was used to evaluate overall demand for the transportation network.

Evaluation Process

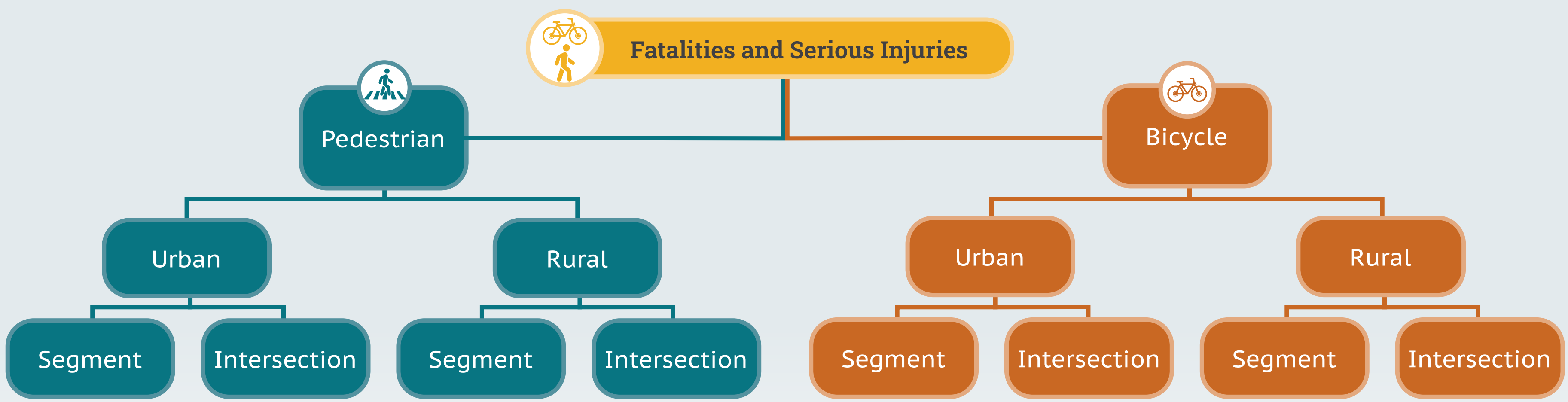
A two-step process was used to evaluate the roadway network:

- **Step 1 – Initial GIS-Based Screening:** Uses available statewide data to identify and screen potential locations, consistent with an established set of risk criteria, where pedestrian and bicycle facilities should be considered.
- **Step 2 – Final Desktop Screening:** Uses imagery and map data to review high-risk locations identified in Step 1 with respect to surrounding land uses, proximity to transit, proximity to bike facilities, and anticipated pedestrian and bicyclist demand.

Step 1 – Initial GIS-Based Screening

The initial screening process involved scoring each individual intersection and roadway segment based on the characteristics of the risk factors identified in **Table 3.1.** The scoring was completed by spatially joining pedestrian and bicycle fatalities and serious injuries to roadway segments and intersections, and then evaluating correlations between each characteristic and the number of crashes within various groups of the data on a statewide level. Once the pedestrian and bicycle fatalities and serious injuries were joined to the roadway segments and intersections, they were divided into eight categories based on the crash type, area type, and facility type for evaluation. Consistent with prior analysis in the *Statewide Bicycle and Pedestrian Systemic Safety Analysis 2020* and *Iowa Bicycle and Pedestrian Long-Range Plan*, fatalities and serious injuries that occurred in incorporated areas were classified as urban and those occurring outside of incorporated were classified as rural. **Figure 3.1** outlines the eight different bins that were evaluated.

FIGURE 3.1: CATEGORY BINS FOR SYSTEMIC SAFETY ANALYSIS



Source: Statewide Bicycle and Pedestrian Systemic Safety Analysis 2020

Scores for each risk factor were quantified and normalized according to the same methodology used in the Iowa DOT *Statewide Bicycle and Pedestrian Systemic Safety Analysis 2020*. Scoring for the VRU Demand and At-Risk Groups, which uses demographics data, was completed using a similar methodology to the facility attributes, with a couple minor changes:

- The data was divided into only two category bins (pedestrian and bicycle), because block groups span city boundaries and cannot be divided into a specific segment or intersection.
- The data was evaluated as a continuous data set. Each risk factor was categorized into 10 groups based on every tenth percentile.
- Consistent with the previous analysis, a crash rate was then calculated for each of the 10 groups and assigned a normalized score. Rates were develop based on the population of each census block within each category bin.

Appendix A contains the normalized scoring for each risk factor within each category bin of the analysis, including: a breakdown of the number of fatalities and serious injuries, either the total mileage, intersection count, or population; resulting rate; and normalized score. All paved facilities in Iowa, excluding those with a minimum speed limit, were scored in Step 1 using the developed, normalized scoring. Roadways with minimum speed limits were eliminated from this analysis because pedestrian and bicyclist are prohibited from using facilities with minimum speed limits.

Scores were calculated using an even weighting for each risk factor and ranged between zero and 100, with lower scores representing higher risk locations. Scores for each facility were then sorted to identify the highest risk locations for each of the eight bins, shown in **Figure 3.1.** **Appendix B** provides the 25 highest-risk locations for each of the eight category bins split into the six Iowa DOT districts. For more detailed scoring, contact the Iowa DOT.

Step 2 – Final Desktop Screening

The final desktop screening involved manually evaluating the eight highest risk locations within each of the eight category bins with respect to surrounding land uses, proximity to transit, proximity to bike facilities, and anticipated pedestrian and bicyclist demand, and was limited to state routes or intersections where at least one roadway is a state route. The evaluation found that many of the highest scoring locations were located near one another because they are located within a high-risk block group and/or similar facility characteristics exist between separate intersections or roadway segments. Therefore, where reasonable, high-risk locations were combined together and narrowed down to seven urban locations and five rural locations for which potential safety countermeasures were identified to provide the greatest safety benefit to the community.

4. STAKEHOLDER ENGAGEMENT

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As part of the Iowa VRU Safety Assessment, stakeholder input was gathered via virtual meetings with three groups of stakeholders:

» Metropolitan Planning Organization (MPO)/Regional Planning Affiliation (RPA): June 21, 2023

» Bicycle and Pedestrian Advisory Committee: August 23, 2023

» SHSP Advisory Team: August 31, 2023

More than 80 people participated in the meetings from 25+ organizations across Iowa and various bureaus within the Iowa DOT. Additionally, members of these stakeholder groups had the opportunity to review the draft document and provide comments.

MEETING CONTENT

Due to the project timeline, the meeting with the MPO/RPA followed a different format than the meeting with the Bicycle and Pedestrian Advisory Committee and the SHSP Advisory Team. Information was shared with the MPO/RPA during one of their quarterly meetings and was brief in nature. The presentation provided an overview of the VRU Safety Assessment, the methodology being used to conduct the assessment, an overview of the development process, a summary of the planned engagement, and next steps for the study. The meetings with the Bicycle and Pedestrian Advisory Committee and the SHSP Advisory Team were structured similarly and included a discussion of what can be done to improve VRU safety in Iowa.

An example PowerPoint presentation of what was shared at the meetings is included in **Appendix C**. Following the meeting, each group was encouraged to forward VRU questions to their organizations' members for further comment. **Figure 4.1** displays the flyer with meeting information and discussion questions that was provided to the participants before the meetings with the Bicycle and Pedestrian Advisory Committee and the SHSP Advisory Team.

FIGURE 4.1: VRU SAFETY ASSESSMENT FLYER

IOWADOT

VULNERABLE ROAD USER (VRU) SAFETY ASSESSMENT

WHAT IS A VRU SAFETY ASSESSMENT?

An assessment of the safety performance of a State with respect to vulnerable road users and the plan of the State to improve the safety of VRUs. It is a requirement in the Infrastructure Investment and Jobs Act (IIJA). All States are required to develop a Vulnerable Road User Safety Assessment as part of their Highway Safety Improvement Program (HSIP) in accordance with 23 U.S.C. 148(l).

WHAT IS A VRU?

The definition of a vulnerable road user (VRU) is provided in 23 U.S.C. 148(a)(15) as "a nonmotorist." It includes pedestrians, bicyclists, other cyclists, and people on personal conveyance. A vulnerable road user may include people walking, biking, or rolling. The definition does not include motorcyclists.

MEETING PURPOSE

The Iowa DOT's Traffic and Safety Bureau is currently developing Iowa's VRU Safety Assessment with the assistance of the Kimley-Horn consultant team and would like your input on the assessment.

QUESTIONS

Please come prepared to discuss the following questions with respect to rural and urban environments.

- What do you see as the barriers to biking for non-recreational trips (such as trips to work or trips for groceries)? What would make non-recreational trips easier?
- What do you see as the barriers to walking or rolling for non-recreational trips? What would make these trips easier?
- What innovative bike or pedestrian infrastructure have you seen in other locations that you think would be appropriate for Iowa?
- What driver behaviors do you perceive have the most impact on the safety of VRUs?
- What role can law enforcement play in making a safer environment for VRUs?
- What areas do you think VRUs need education on? What areas do you think drivers need education on with respect to VRUs?

SUMMARY OF OUTCOMES

The following is a summary of the discussion from the Bicycle and Pedestrian Advisory Committee and SHSP Advisory Team stakeholder meetings. This summary includes key takeaways from both the urban and rural context. The full meeting summaries are provided in **Appendix D**.

What do you see as the barriers to biking for non-recreational trips (such as trips to work or trips for groceries)? What would make non-recreational trips easier?

- Participants felt that Iowa does not have a comprehensive bicycle transportation system and that the roads are designed strictly for cars, leading to significant gaps in bicycle infrastructure, or in some cases, complete exclusion. It was noted that this was especially true at roundabouts and large intersections, which are often barriers to bicyclists.
- Participants shared that there is a lack of knowledge regarding how bicyclists are permitted to use facilities.
- Participants felt that vehicle drivers often do not give proper attention and consideration to bicyclists.
- Participants shared frustration that the barriers extend beyond public perception and state that some public officials, specifically in rural areas, believe bicycles do not belong on roadways and thus should be excluded from consideration for facility improvements.
- Participants felt that zoning and parking reform in general are a hindrance to pedestrians/bicyclists, that bicycle parking is an issue that creates a barrier for biking, and that when bicycle parking is provided, it is typically inadequate or is damaged from being struck by a car.

What do you see as the barriers to walking or rolling for non-recreational trips? What would make these trips easier?

- Participants shared that they feel there is a lack of involvement at the political level to address VRU transportation needs. They shared that sidewalk ordinances are not enforced, and agencies tend to be more reactive than proactive when addressing needs.
- Participants felt it would be helpful if an agency leader vocally supported the need to accommodate facility improvements for non-recreational pedestrian trips.
- Iowa law is to yield to pedestrians instead of to stop for pedestrians. Participants questioned if leadership should pursue a change to this regulation.

What innovative bicycle or pedestrian infrastructure have you seen in other locations that you think would be appropriate for Iowa?

- Participants shared that Iowa does not necessarily need innovative facilities, but rather safer and better-connected facilities.
- Participants stated that funding is needed to provide infrastructure to close the gaps in the bicycle and pedestrian networks.

What driver behaviors do you perceive have the most impact on the safety of VRUs?

- Participants felt that vehicle drivers have a tendency to roll into and stop in pedestrian crossing areas to turn more efficiently, and that this could be due to a lack of paint and/or delineation of the space.
- Participants noted that distracted driving and high speeds have a great impact on VRU safety.
- Participants felt drivers should not coast through stop signs and need to come to a complete stop. This is especially problematic on intersections that have traffic signals and right turns on red are legal.

What role can law enforcement play in making a safer environment for VRUs?

- Participants noted the differences between law enforcement available in urban and rural settings.
- Participants discussed the perceived bias that VRUs are always the ones ignoring the law. They felt that this was unfair because the infrastructure typically does not include accommodations for bicyclists/pedestrians and often excludes them. While most bicyclists/pedestrians have a driver's license, they are navigating a system that is not built for them.
- Participants shared that it might be helpful for the Iowa DOT to provide guidance for local governments on how they can effectively use enforcement to make people safer. They shared that sometimes localities are inspired to use enforcement as a revenue tool, but that does not always result in making things safer.
- Participants shared that more consistency is needed among different jurisdictions. Enforcement can be different between neighboring jurisdictions (that might be passed through in the same trip) and/or in different cities across the state (causing confusion when traveling). It was suggested that Iowa develop a more consistent and unified approach to enforcement and regulation that can apply to all metro areas.

What areas do you think VRUs need education on? What areas do you think drivers need education on with respect to VRUs?

- Participants suggested education is needed for all road users on current laws, specifically Iowa's crosswalk laws, and how to navigate bicycle- and pedestrian-specific infrastructure.
- Participants suggested education for bicyclists and pedestrians on safe practices such as using a light at night and walking against traffic, etc.
- Participants suggested education on how to pass bicyclists, other VRUs, and slow-moving vehicles.
- Participants suggested education on pavement markings and the importance of adhering to the directions provided with the markings and signals.
- Participants suggested using footage from cameras on buses to show what children experience when vehicles pass illegally.
- Participants suggested finding ways to relate shared experiences among all Iowans to VRUs. For example, a farm vehicle and bicyclist may have a shared experience with safe passing.
- Participants suggested using a message that everyone is a VRU at one point. For example, a person walking to get their mail, children waiting for the bus, etc.
- General agreement from participants that graphics are more effective than words.

5. PROGRAM OF PROJECTS AND STRATEGIES

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Based on the statewide risk assessment of the roadway network and feedback obtained via stakeholder engagement, recommendations have been identified for high-risk locations on the Iowa DOT system, and strategies have been developed to assist with educating the public about VRU safety and funding VRU safety projects.

PROJECTS IN HIGH-RISK LOCATIONS

High-level recommendations/improvement options were developed for each of the urban and rural high-risk locations on **Figure 5.1**. The recommendations developed as part of this assessment will be discussed and refined with each agency. Based on FHWA guidance, recommendations focused on prioritizing countermeasures and strategies that align with the Safe System Approach to improve safety for people walking, biking, and rolling include:

- Separating users in space (e.g., separated bicycle lanes, walkways, pedestrian refuge islands)
- Implementing physical features to slow traffic (e.g., self-enforcing roads, 4- to 3-lane conversions)
- Separating users in time (e.g., leading pedestrian interval)
- Increasing attentiveness and awareness (e.g., crosswalk visibility enhancements, pedestrian hybrid beacons ([PHBs], lighting)
- Implementing speed enforcing strategies (e.g., speed safety cameras)

FIGURE 5.1: HIGH-RISK PROJECT LOCATIONS

Table 5.1 provides a list of the highest-ranking urban and rural locations. These locations are only along state routes or intersections with at least one roadway being a state route. Detailed project information sheets for each location, including location scoring, screening, and potential countermeasures with aerial images, can be found in **Appendix E**.

While the Step 2 screening focuses on high-risk state facilities, all paved facilities in Iowa, excluding those with a minimum speed limit, were scored in Step 1 of the assessment. **Appendix B** provides the 25 highest-risk locations for each of the eight category bins split into the six Iowa DOT districts. For more detailed scoring, contact the Iowa DOT.

TABLE 5.1 HIGH-RISK PROJECT LOCATIONS

Context	Bike or Ped	Location No.	Intersection or Segment	County	City/Nearest City	Mainline	Minor Road/ Start of Segment	End of Segment
Urban	Both Both Bike Bike	1	Segment Segment Intersection Intersection	Webster	Fort Dodge	Kenyon Rd (US 20/US 169) S 8th St IA 926 IA 926	S 12th St 4th Ave S 3rd Ave S 4th Ave S	Avenue C Kenyon Rd N/A N/A
	Ped Ped	2	Segment Intersection	Pottawattamie	Council Bluffs	E Kanesville Blvd E Kanesville Blvd	Hillsdale Dr Sherwood Dr	Railroad Hwy N/A
	Bike Bike Bike Bike	3	Intersection Intersection Intersection Intersection	Pottawattamie	Council Bluffs	S 6th St S 6th St S 7th St S 7th St	5th Ave Willow Ave Willow Ave 5th Ave	N/A N/A N/A N/A
	Ped Ped	4	Intersection Intersection	Scott	Davenport	US 61 US 61	Brown St Marquette St	N/A N/A
	Ped	5	Segment	Des Moines	Burlington	US 61	Mount Pleasant St	Agency St
	Both Bike Ped Ped	6	Segment Segment Intersection Intersection	Johnson	Iowa City	US 6 US 6 IA 1/Burlington St IA 1/Burlington St	1st Ave Newton Rd Front St S Capitol St	Newton Rd South of W Burlington St N/A N/A
	Bike	7	Intersection	Jasper	Newton	US 6	E 5th St	N/A
Rural	Bike Bike Bike	1	Segment Intersection Intersection	Lucas	Chariton	US 34 US 34 US 34	Albia Rd 472nd Ln Red Haw State Park	Lake Ellis Culvert N/A N/A
	Ped Ped Both Both	2	Segment Intersection Intersection Intersection	Pottawattamie	Council Bluffs	IA 92 IA 92 IA 92 IA 92	Valley View Dr Valley View Dr Pine Terrace Dr Somerset Ave	Somerset Ave N/A N/A N/A
	Ped	3	Segment	Scott	Davenport	US 67	Mound St	Greenwood Ave
	Bike	4	Segment	Muscatine	Muscatine	US 61	Savannah Ave	Old US 61 Frontage Rd
	Ped	5	Segment	Polk	Ankeny	US 69	SW Oralabor Rd	NE 72nd Ave

STRATEGIES

The following strategies have been identified to address VRU safety within Iowa.

Public Education Campaign

The Iowa DOT recently developed educational videos on the following topics that can be shared through public educational campaigns:

- Rectangular Rapid Flashing Beacons (RRFBs)
- PHBs
- 4- to 3-lane conversions
- Roundabouts

Funding Opportunities

A variety of funding opportunities are available through the Iowa DOT to assist with funding VRU-related projects in Iowa including, but not limited to, those discussed in this document.

HSIP-Local

The Iowa DOT *HSIP-Local program* provides Federal-Aid Swap (State) funds to counties and cities for low- to medium-cost systemic safety improvements. HSIP-Local program funding is $5 million/year for FY 2023-2027.

Traffic Safety Improvement Program (TSIP)

TSIP funding can be used to treat a single location based on demonstrated crash history. TSIP awards cannot exceed $500,000 per project. Example projects include but are not limited to:

- RRFBs
- Speed feedback signs
- Leading Pedestrian Intervals (LPIs)
- Painted crosswalks

Discretionary Grants

The following discretionary grants are most-applicable for VRU projects and can be considered by those looking to implement projects to improve VRU safety in Iowa:

- Safe Streets for All (SS4A): Iowa DOT is providing a funding match for counties to develop Safety Action Plans ($5,000 per county) and for MPO/RPA ($12,000 per MPO/RPA)
- Rebuilding American Infrastructure with Sustainability and Equity (RAISE)
- If the project meets the appropriate criteria the following grants could be utilized:
    - Reconnecting Communities and Neighborhoods (RCN)
    - Railroad Crossing Elimination (RCE)
    - Consolidated Rail Infrastructure and Safety Improvements (CRISI)
    - Strengthening Mobility and Revolutionizing Transportation (SMART)

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