

Rapid City Comprehensive Safety Action Plan

Chapter 1. Introduction

In 2023, the City of Rapid City was awarded \$160,000 to develop a Comprehensive Safety Action Plan (CSAP) as part of the U.S. Department of Transportation's Safe Streets and Roads for All (SS4A) grant program. This funding provides our community with the opportunity to develop a plan that expands on existing transportation goals and objectives to create a safer community with zero roadway deaths.

What Is Safe Streets for All?

SS4A is a competitive grant program established in 2021 through the Infrastructure Investment and Jobs Act passed by Congress. The U.S. Department of Transportation manages the SS4A fund, with \$5 billion in funding available from 2022 to 2026. The program helps fund regional and local safety projects that will prevent roadway fatalities and serious injuries, with an overall goal of zero roadway deaths.

Safe System Approach

The aim for zero roadway deaths is guided by the Federal Highway Administration's (FHWA) Safe System Approach (SSA), which views safety as a shared responsibility among all individuals involved in the use, planning, design, or construction of the transportation network (**Figure 1**). SSA is a shift from conventional road safety thinking because it focuses on

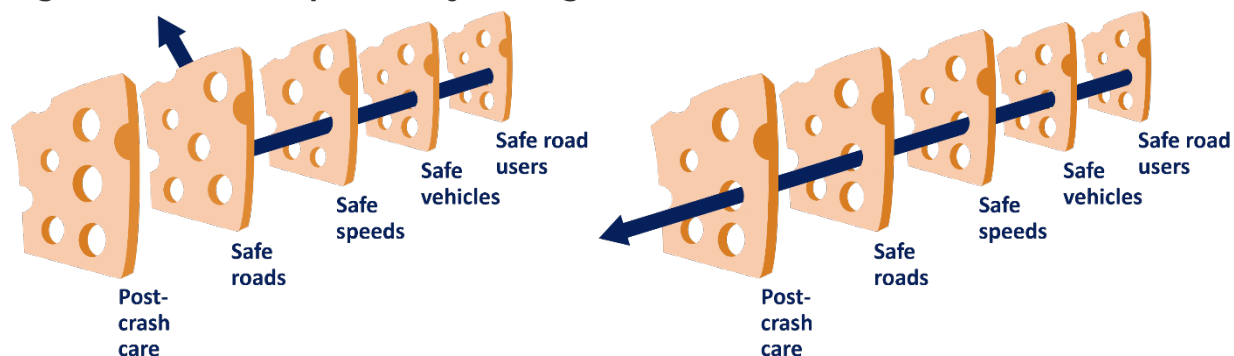
Figure 1. FHWA Safe System Approach



Source: FHWA

both human mistakes and human vulnerabilities by designing systems with layers of protection. If one layer of safety fails, another will help prevent a crash or lessen the likelihood of serious injury or death (**Figure 2**).

Figure 2. Shared Responsibility Through SSA



Source: FHWA

Why Is a CSAP Needed?

To be eligible for SS4A funding, Rapid City must complete a CSAP that outlines the region's safety goals and creates an actionable framework for identifying safety issues and appropriate strategies to move toward zero roadway deaths (**Figure 3**).

Figure 3. Components of a Project Plan



Who Was Engaged in the SS4A CSAP?

The CSAP allows Rapid City to engage with stakeholders and the public to identify policy changes that will improve safety and determine what safety strategies are suitable for the area. Rapid City actively led the development of the CSAP; however, it actively engaged the South Dakota Department of Transportation (SDDOT), the Federal Transit Administration, FHWA, and citizen and stakeholder focus groups. The feedback from the public was essential in developing the CSAP, and timely opportunities for public engagement were held through open houses, social media, and online meetings.

What Did the Safety Analysis Indicate?

The safety analysis identified key contributing factors that informed the development of a focused street network for safety interventions. This analysis revealed that 70 percent of fatal or serious injury crashes occur on just 11 percent of Rapid City's road network, underscoring the importance of concentrating strategies in this high-priority area.

The CSAP targets the 11 percent, focusing on eliminating fatalities and serious injuries. These contributing factors, also referred to as emphasis areas, included the following:

- Angle crashes
- Speeding
- Vulnerable road users (pedestrians and bicyclists)
- Alcohol/impairment
- Motorcycles
- Younger drivers
- Older drivers

The overarching goal of the CSAP will be to implement safety strategies in a new, strategic way based in the SSA. The SSA will guide the choice of effective strategies at the worst locations based on the risk of loss of life and the contributing factors most associated with those crashes. The safety analysis used these contributing factors to construct a focused street network, called the High-Priority Network (HPN), which will be the key for Rapid City in targeting safety interventions.

What Happens Next?

With the CSAP now complete, Rapid City will transition from planning to implementation. The next step is to pursue a 2025 SS4A Implementation Grant, which would provide federal funds to carry out priority projects identified in the CSAP. Implementation funds can be used for design, engineering, construction, and quick-build strategies that directly address the HPN and the key contributing crash factors identified in the safety analysis.

In parallel, Rapid City has also submitted a FY25 SS4A Supplemental Planning and Demonstration Grant application (status pending), which outlines several key initiatives to strengthen the CSAP. These include developing an Americans with Disabilities (ADA) Transition Plan to bring pedestrian infrastructure into compliance with Public Right-of-Way Accessibility Guidelines, pilot-testing cell- and radio-based emergency management system signal pre-emption technology to improve emergency response reliability, and conducting road safety screenings at high-need intersections to collect data and guide future safety investments.

Together, these efforts position Rapid City to not only advance implementation of near-term safety projects but also address critical systemic gaps, ensuring the CSAP continues to evolve and support the long-term goal of eliminating roadway fatalities and serious injuries.

Chapter 2. Commitment to Reaching Zero

Rapid City Governance

Rapid City departments work together to provide a local transportation system by directly investing in construction and managing major streets and through oversight functions for planning and zoning, public safety, and enforcement. Key Rapid City departments included in the safety action planning process follow:

- Mayor's Office
- City Council
- Community Development
- Public Works
- Police
- Fire

- Parks & Recreation

Rapid City also collaborates with state and federal agencies to manage the transportation system and funding and oversight for major streets. Partner agencies include the following:

- SDDOT
- FHWA
- Federal Transit Administration

Study Advisory Team

A Study Advisory Team (SAT) met three times during CSAP creation, directing the development of the document. The SAT included members of city, state, and federal agencies with the intent of leveraging their expert perspectives in directing and developing the safety analysis, safety projects and strategies, and the plan development process.

The SAT met during the following months:

- **Fall 2024:** Kickoff
- **November 2024:** Safety Findings
- **February 2025:** Policy Assessment/Stakeholder Meetings
- **July 2025:** Project/Strategy Recommendations/ Stakeholder Meetings
- **October 2025:** Plan Review

Rapid City Leadership Commitment

Rapid City pledges that the only sensible goal for loss of life or life-changing injury on the City's streets is zero. The City wants to engage in safety planning to work toward a goal of zero, while recognizing that: 1) it will take time, and 2) it will require everyone to lean into the SSA to make this goal possible.

From 2019 to 2023, Rapid City experienced 31 fatalities and 203 serious injuries; the City has used this level of severe crash frequency to determine a path to zero for fatal and serious injury crashes by the year 2050. Strategically, this goal will guide City staff to implement and manage a safety program that reduces roughly three fatal and serious injury crashes per year until the target year of 2050. On the following pages is the resolution adopted by the City Council of Rapid City. **INCLUDE COPY OF RESOLUTION ADOPTED BY CITY COUNCIL HERE.**

Chapter 3. Safety Analysis

CRASH TRENDS AND CHARACTERISTICS



The safety analysis reviewed crash data across Rapid City to identify patterns in fatal and serious injury crashes. Key factors included travel mode, time of day, location type (urban versus rural), and contributing behaviors.

HIGH-INJURY NETWORK



The High-Injury Network (HIN) highlights corridors with the highest concentration of severe crashes. This network includes all travel modes and helps focus resources on the 4 percent of roads where more than half of fatal or serious injury crashes occur.

SYSTEMIC RISK NETWORK



This proactive analysis identifies locations with high crash risk based on roadway design, speed, lighting, and surrounding land use. These areas may not have a history of severe crashes but share characteristics with high crash locations.

Rapid City is committed to eliminating fatalities and serious injuries on its multimodal transportation network. This chapter documents the safety analysis completed for the CSAP using 2019 through 2023 crash data from SDDOT and local records by doing the following:

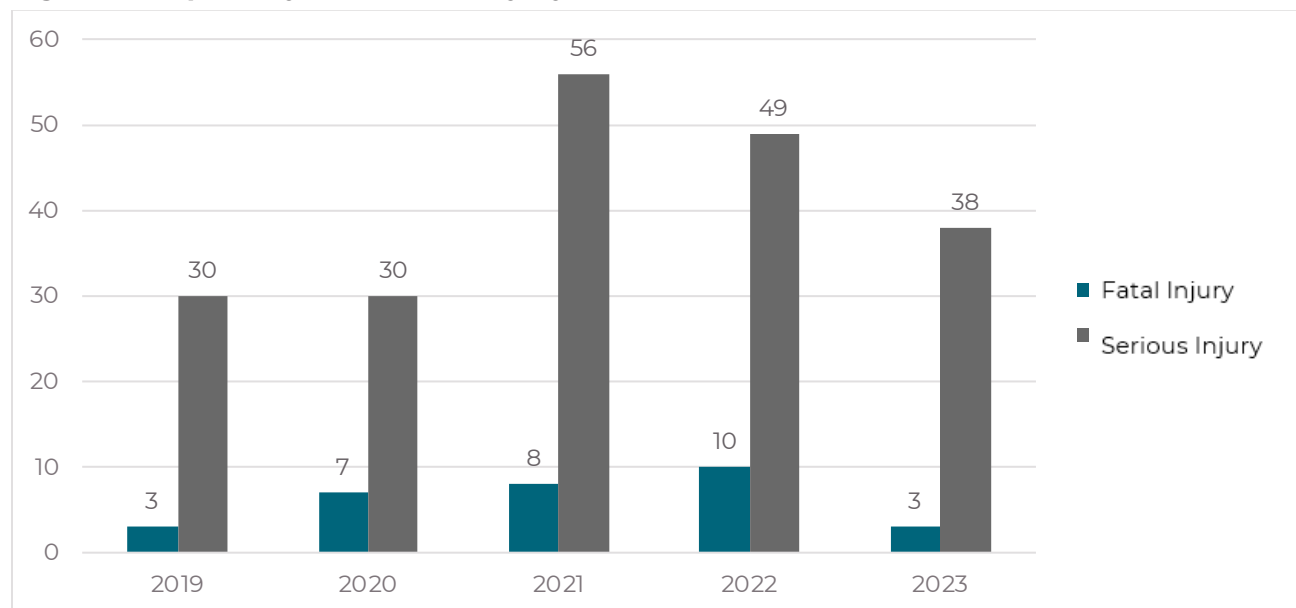
- Analyzing suspected serious injury crash trends by year, severity, travel mode, time of day, roadway type, and contributing behaviors
- Defining safety emphasis areas used throughout the plan (angle crashes, speed, vulnerable road users, alcohol/impairment, motorcycles, younger drivers, older drivers, and dark/night conditions)
- Developing a HIN based on weighted crash severities and a Systemic Risk Network that flags locations with risk conditions similar to known high crash sites
- Combining the results with local insight to identify the HPN for targeted interventions
- Evaluating equity and community context by overlaying crash risk with demographic indicators, including areas of persistent poverty

The chapter concludes with key findings that link directly to the policy and process recommendations in **Chapter 5** and the systemic and capital project strategies in **Chapter 6**. Figures and tables in this chapter (e.g., crash severity by year, emphasis area maps, HIN and HPN maps) provide the analytical basis for prioritizing locations and countermeasures.

Crash Trends and Characteristics

Between 2019 and 2023, Rapid City experienced 234 fatal and serious injury crashes. Crash trends between 2019 and 2023 have seen a variable level of fatalities, with an average of six fatalities per year. Fatal or serious injury crashes are disproportionately concentrated in specific months (July to October), times of day (evening hours), and roadway types. **Figure 4** shows crash severity from 2019 to 2023.

Figure 4. Rapid City Crash Severity by Year, 2019–2023



Analysis of fatal and serious injury crashes in the Rapid City area highlights several recurring patterns and contributing factors:

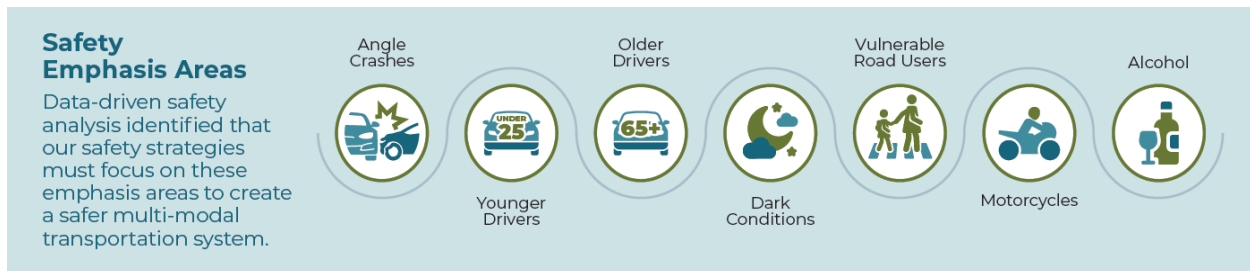
- **Crash types:** A significant proportion of fatal or serious injury crashes involved single vehicles, particularly those resulting from roadway departures or collisions with fixed objects.
- **Contributing behaviors:** Speeding, failure to yield, and distracted driving were among the most frequently identified contributing factors.
- **Safety emphasis areas:** To guide future safety strategies, several crash contributing factors – also known as emphasis areas – were identified based on crash trends and risks common to users and the built environment. The

following shows emphasis areas and the percentage of total crashes that they represent:

- 40 percent angle crashes
- 36 percent young drivers (25 years old or younger)
- 30 percent older drivers (65 years old or older)
- 30 percent dark/night crashes
- 25 percent motorcycle involved
- 22 percent vulnerable road users (VRU)
- 21 percent alcohol impairment
- 19 percent speed related

These findings have been used to inform targeted recommendations to improve roadway safety throughout the Rapid City region.

Figure 5. Safety Emphasis Areas in Rapid City



To guide the development of these emphasis areas and other safety strategies, a structured safety analysis process was conducted. The process began with compiling and analyzing crash data and then applied both systemic and location-specific methods to identify risk. This framework ultimately informed the development of the HPN, which will be discussed in the following sections.

The key findings that follow provide further insight into how the safety analysis supports Rapid City in progressing toward zero traffic-related deaths and serious injuries by 2050.

Key Safety Findings

- Angle crashes are dominant on urban arterials.
 - Angled crashes were concentrated on Mt Rushmore Road, Cambell Street, 5th Street, and South Dakota Highway 44 (SD 44).
- Recurring crash patterns along U.S. Highway 16 (US 16), U.S. Highway 16B (US 16B), SD 44, and Skyline Drive.
 - This pattern indicates systemic safety issues, such as speeding, driver behavior, and lack of pedestrian infrastructure.

- Young and older drivers' risk zones overlap.
 - Along SD 44, US 16, and Skyline Drive, frequent crashes involving drivers under 25 and over 65 highlight corridors where age-specific safety interventions could be prioritized.
- VRU crashes cluster downtown and along arterial corridors.
 - VRU crashes were pedestrian related and heavily concentrated in the downtown core, on Lacrosse Street, and on major arterial connectors.
- Speed-related crashes on scenic or curvy roads.
 - Speed-related crashes were notably high along Skyline Drive, suggesting issues with road geometry, speeding, and lack of roadway warnings or enforcement.

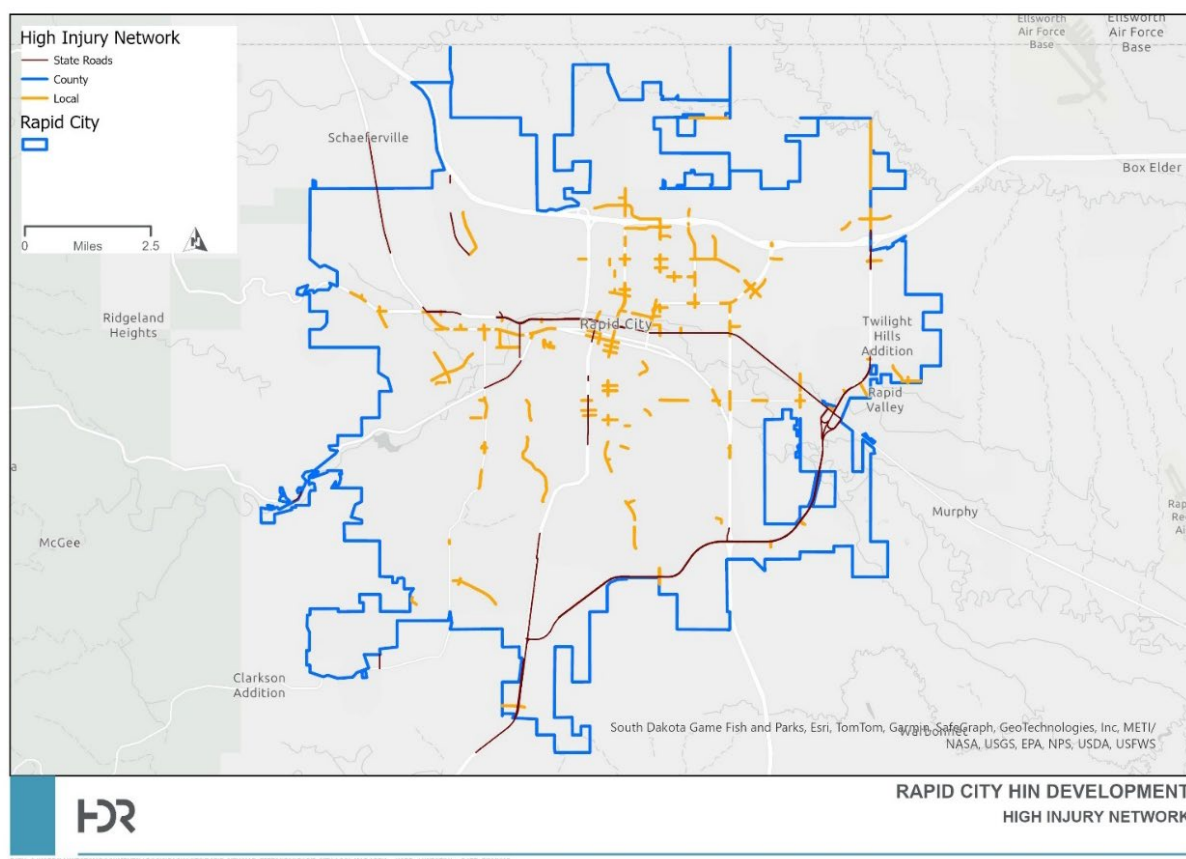
High-Injury Network

The HIN identifies corridors with the highest concentrations of fatal or serious injury crashes between 2019 and 2023. Rather than focusing solely on total crash counts, the HIN prioritizes locations where fatal or serious injury crashes are most concentrated. Each crash was assigned a severity weight—giving greater emphasis to more severe outcomes—to better reflect the impact of these incidents. This approach aligns with the SSA, which emphasizes reducing the most harmful crashes. While lower-severity crashes were included as early indicators of risk, they were weighted less heavily. The resulting network highlights corridors with the greatest need for intervention. For the Rapid City CSAP, the HIN serves as a complement to other tools like systemic analysis. The HIN used a weighted crash scale that gives more preference to severe crashes. The weighted scale is as follows:

- Fatal and serious injury: 3
- Minor injury: 2
- Possible and unknown injury: 1

It is recommended that the corridors with the highest score be prioritized for safety improvements due to their elevated crash risk and strategic importance in the transportation network. **Figure 6** shows the complete HIN.

Figure 6. High-Injury Network



High-Priority Network

The HPN represents the most critical corridors for safety investment, combining data-driven analysis with local insight. To develop the HPN, results from the HIN and systemic crash analysis were layered with input from Rapid City staff and the public. Each roadway segment was evaluated based on how many key emphasis areas—such as speeding, impaired driving, or vulnerable road user crashes—it met or exceeded. Segments with multiple overlapping risk factors were prioritized, regardless of which specific emphasis areas were present. This approach ensures that the HPN reflects both the most pressing safety concerns and the greatest opportunities for impact. **Figure 7** shows the resulting HPN identified as part of this CSAP. The pink corridors represent state-owned facilities, and the orange corridors represent City-owned facilities.

Key corridors in the HPN include the following:

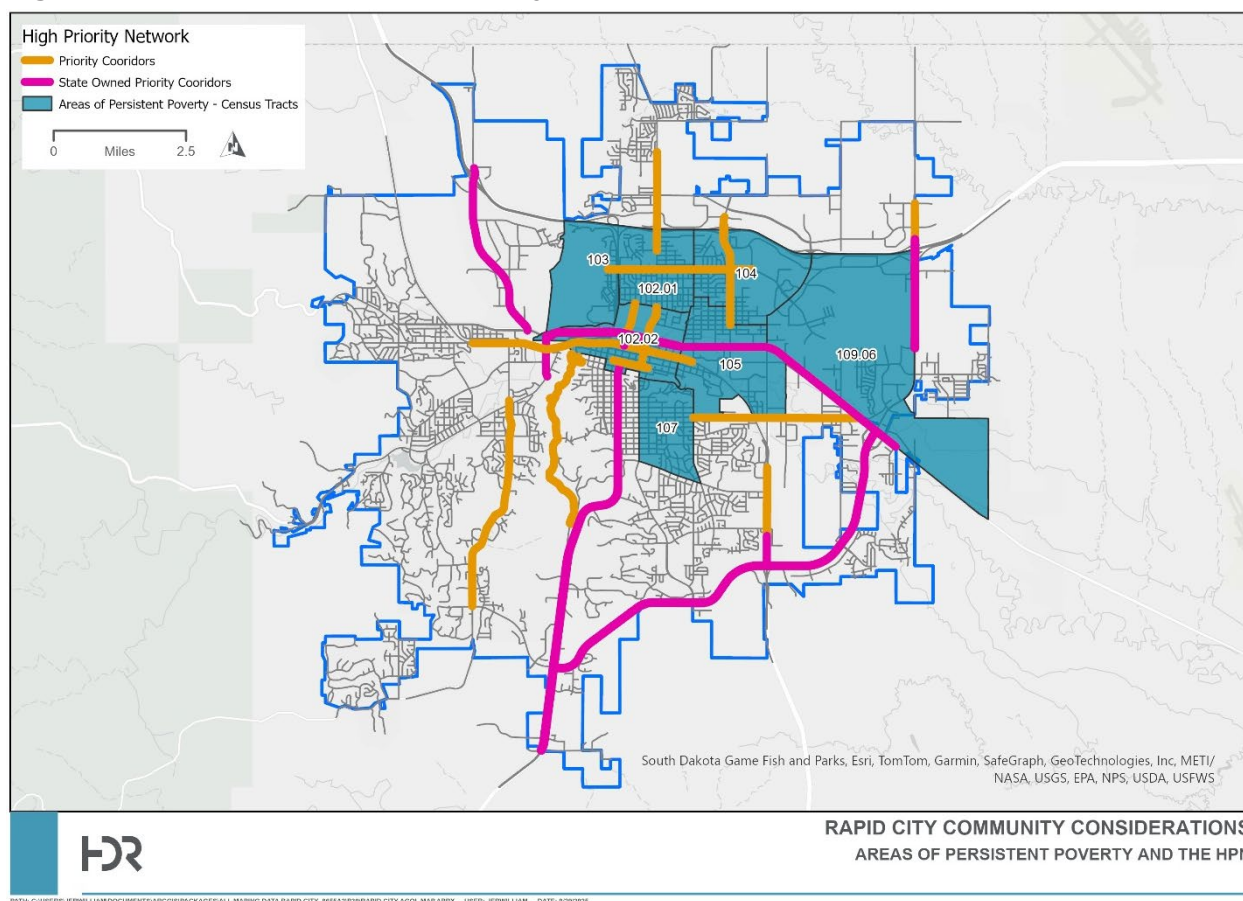
- Haines Avenue (Lindbergh Avenue to Kathryn Avenue)

- Main Street (32nd Street to St Joseph Street and St Joseph Street to Maple Avenue)
- St Patrick Street (Elm Avenue to SD 44)
- Campbell Street (Bridge View Drive to US 16)
- Anamosa Street (Silver Street to Luna Avenue)
- N 5th Street (North Street to Quincy Street)
- Lacrosse Street (Disk Drive to E Philadelphia Street)
- Quincy Street (9th Street to 4th Street)
- Skyline Drive (Tower Road to Quincy Street)
- Sheridan Lake Road (SD 44 to Catron Boulevard)
- Mt Rushmore Road (North Street to Main Street)
- Elk Vale Road (Mall Drive to Seger Drive)
- SD 44 (Jackson Boulevard to Omaha Street and Omaha Street to Twilight Drive)
- South Dakota Highway 445 (SD 445)/Deadwood Avenue (Tatanka Road to South Dakota Highway 231)
- US 16 (Quincy Street to Tower Road and Moon Meadows Drive to Cathedral Drive)
- US 16B (US 16 to SD 44 and Anamosa Street to Mall Drive)

Crash data was overlaid with demographic and socioeconomic indicators to identify disparities in safety outcomes. Areas with higher concentrations of low-income households, renters, and communities of color often coincide with higher crash rates and gaps in safety infrastructure.

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Figure 8. Areas of Persistent Poverty and the HPN



Chapter 4. Engagement and Collaboration

Community outreach played a vital role in shaping the CSAP by offering valuable insights into how residents and stakeholders perceive transportation safety across Rapid City. Through both virtual and in-person outreach, the project team gathered input from a range of residents and stakeholders, including community leaders, residents, technical experts, and groups disproportionately affected by traffic safety issues. This engagement not only informed the planning process but also helped raise awareness of traffic safety as a regional priority and educated the public about countermeasures to improve traffic safety. This chapter outlines the methods used to engage the community and highlights the feedback received.

In-Person Engagement

Pop-Up Meetings

The Rapid City CSAP team attended three large public events in the community, timed with the project kickoff. The pop-up meetings raised awareness about what the CSAP is and how it will involve the public. In October 2024, the CSAP team attended two events, the Rapid City Bike Fest and the Trunk or Treat, engaging with 40 attendees and 200 families, respectively. In November 2024, the CSAP team distributed 1,200 brochures in race packets at the Turkey Trot.

Focus Group Sessions

The focus groups allowed the community to provide feedback for the CSAP and helped inform the public about safety efforts. The focus groups were held on two different dates: July 15 and July 17, 2025. The focus groups were divided into three areas: young drivers; downtown visitors, businesses, and residents; and HIN for Rapid City staff and City Council members.

Online Engagement

Website

The CSAP project website served as an information hub for sharing information and engaging the community throughout the CSAP process and provided an online comment form for the public to share feedback. The site outlined the CSAP's purpose and its connection to the SS4A program, provided updates about the safety analysis and project timeline, and highlighted partner agencies such as SDDOT, FHWA, and the Federal Transit Administration. It also offered interactive tools, including a survey link, comment map, and mailing list sign-up, giving residents multiple ways to provide input and stay informed.

While the site generated limited direct comments, one submission received in June 2025 highlighted concerns about vehicles exceeding the speed limit on Flormann Street and suggested that installing speed bumps could improve safety. This comment reinforces community concerns around speeding and the desire for traffic-calming measures, which were also reflected in survey and focus group input. No additional comments have been received through the website since that time.

Survey

To capture a broader range of community input, the CSAP team conducted an online survey that asked residents about their perceptions of safety and priorities for improvement. The survey collected more than 30 responses, with questions focused on how safe people feel using different travel modes, what concerns them most about transportation safety, and which improvements they would most like to see.

Results showed that driving was generally viewed as the safest mode, while biking and walking were perceived as less safe. Distracted driving, failure to yield, and limited crosswalks, sidewalks, and bike facilities were among the top community concerns. Respondents also identified impaired driving and speeding as ongoing issues. When asked about potential solutions, participants most frequently supported adding separated pedestrian and bicyclist facilities, encouraging alternative intersection designs such as roundabouts, and implementing traffic-calming strategies.

The survey responses helped shape the focus areas of the CSAP by highlighting the importance of designing for vulnerable road users, addressing high-risk driver behaviors, and prioritizing infrastructure improvements that create a safer, more comfortable environment for all travelers.

Key Engagement Results

The following key safety findings were developed based on feedback:

- Speed as a factor in crashes and general safety issues were seen as the largest concerns.
- Rapid City intersections could improve, with issues such as congestion, unprotected left turns leading to crashes, inattentive drivers and drivers choosing to ignore posted signage or rules of the road, and problems for pedestrians feeling comfortable or safe when crossing the road.
- Generally, participants think driving was significantly safer than using other modes of transportation (walking, biking, rolling, or using public transportation).
- The top improvement to enhance safety in Rapid City was adding more separated bicycle and pedestrian facilities.

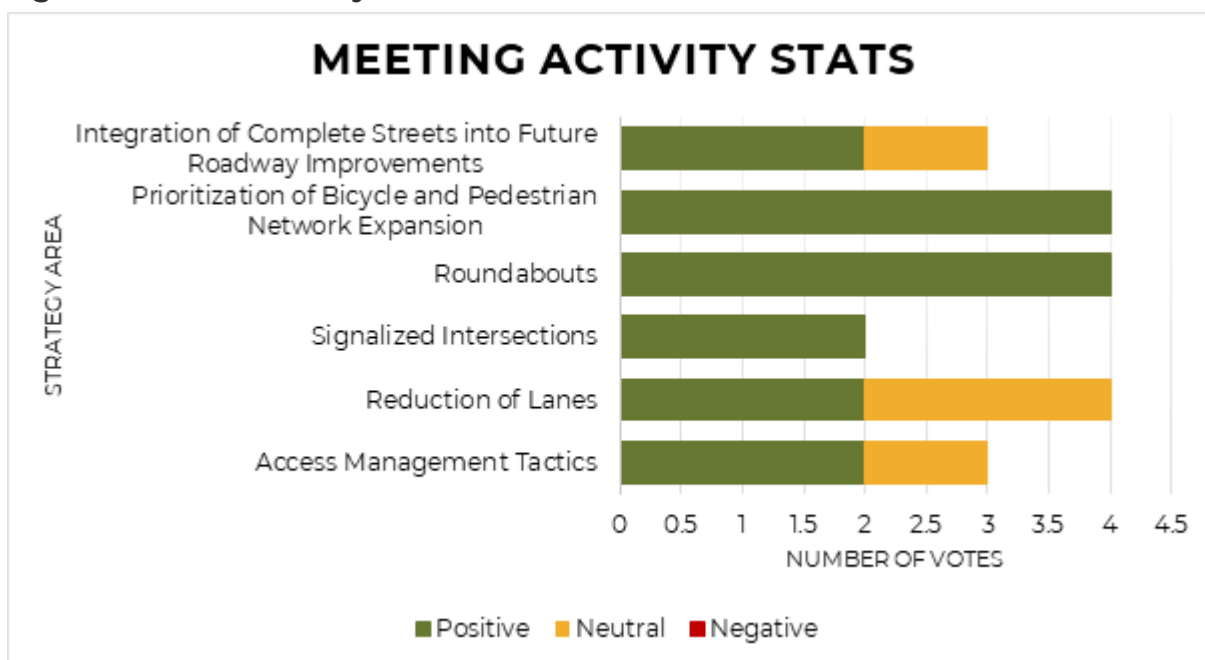
During the focus group sessions, participants voted on the following six strategies to improve transportation safety in Rapid City:

- Access management tactics

- Reduction of lanes
- Signalized intersections
- Roundabouts
- Prioritization of bicycle and pedestrian network expansion
- Integration of Complete Streets into future roadway improvements (a policy and design approach that ensures streets are planned, designed, operated, and maintained to enable safe, comfortable travel for all users, including people walking, biking, rolling, taking transit, and driving, across ages and abilities)

Participants indicated their opinions on each strategy using colored stickers. Green stickers signified that respondents prefer a strategy, yellow signified a neutral opinion on the item, and red signified that respondents did not prefer a strategy. **Figure 9** shows the results of the activity.

Figure 9. Sticker Activity Results



Chapter 5. Policy and Process Changes

Rapid City's commitment to safety extends beyond infrastructure investments; it includes a deliberate shift in how transportation policy, planning, and internal processes support the SSA. While this CSAP identifies specific corridors and projects, sustainable safety outcomes will depend on Rapid City's ability to integrate safety into everyday practices and decision-making structures.

This chapter outlines a forward-looking framework to align Rapid City policies and internal processes with the vision of eliminating fatal and serious injury crashes. These recommendations support a long-term strategy that enhances project delivery, improves design consistency, and ensures that all projects, from routine maintenance to major capital investments, advance community safety goals. Additional details about the underlying review of existing policies and procedures and proposed areas of policy focus are included in **Appendix C** and **Appendix D**, respectively.

Existing Rapid City Safety Policy

The CSAP established the existing state of safety policy by reviewing the following:

- **Rapid City Comprehensive Plan** (2014): Provides a vision for land use, transportation, housing, and community growth, with an update underway to reflect new development pressures and community needs.
- **RapidTRIP 2050 Metropolitan Transportation Plan** (2025): The region's long-range transportation plan, which sets strategies for roadway, transit, bicycle, and pedestrian investments, including safety goals and performance measures.
- **Rapid City Area Bicycle and Pedestrian Master Plan** (2011): Establishes priorities for expanding bicycle and pedestrian facilities, filling network gaps, and improving connectivity for nonmotorized users.
- **Rapid City Transit Development Plan** (2022): Outlines service improvements, route planning, and infrastructure needs to strengthen public transit and support safe, reliable mobility options.
- **City of Rapid City Infrastructure Design Criteria Manual** (2022): Provides engineering and design standards for roadway and infrastructure projects, with direct implications for safety-related design elements such as intersections, crosswalks, and accessibility.
- **South Dakota Strategic Highway Safety Plan** (2024): Sets statewide priorities for safety, such as lane departure, impaired driving, speed management, and VRU. By linking local strategies to these emphasis areas, the CSAP supports state goals while focusing on Rapid City's HPN.

During the early development of the CSAP, existing plans and policies were inventoried and several safety-related practices identified. In general, Rapid City has several safety topics that are starting to be addressed or discussed but that have not been developed into everyday practices. There were also several components of the seven required elements of an SS4A that did not have current practices associated

with them, which suggests potential opportunities exist to initiate such practices. The following list summarizes the key findings from the existing safety policy review:

- Pedestrian and bicycle safety-related projects are widespread, but there is room to expand funding for such projects and identify or prioritize other safe system projects and strategies.
- Safety-related goals should be well defined, and consistent practices should be developed for project prioritization and transparency.
- Existing practices and policies can be aligned with the SSA by implementing policies such as Complete Streets or Access Management.
- A safety committee should be organized to provide oversight of the CSAP; the inaugural committee could come from the project SAT.
- Opportunities exist to increase public awareness and education and engage with local leadership and disadvantaged communities.

Foundations of a Safe Policy Framework

The eight emphasis areas outlined in this section were derived from historic Rapid City crash data, South Dakota's Strategic Highway Safety Plan, and SS4A planning guidance. Each emphasis area is analyzed at both the crash-event level and systemic level. These categories reflect the five elements of the SSA and allow Rapid City to consider not only where crashes have occurred but also where risk conditions exist so that they can be addressed before crashes happen through targeted design, behavior modification, and policy interventions.

The following lists the eight emphasis areas:

- Angle crashes
- VRU
- Speed related
- Lighting conditions
- Alcohol/impairment
- Motorcycles
- Young drivers
- Older drivers

These emphasis areas are listed intentionally in this order based on the Safe System Roadway Design Hierarchy (**Figure 10**). Angle crashes and VRU safety are closely related to Tier 1 (Remove Severe Conflicts, which has the highest potential for severe crash reduction and elimination). Speed management corresponds to Tier 2, focusing on keeping operating speeds appropriate for the context. Lighting is the last design-focused emphasis area and most closely aligns with Tier 4.

Figure 10. FHWA Safe System Roadway Design



While the remaining emphasis areas are not design or engineering focused, alcohol and impairment have some potential to be addressed by Rapid City through policy and law enforcement activity. Motorcycles, young drivers, and older drivers use the system; street designs and policy can change to better accommodate these users, but working with users on behavior modifications may take partnerships for Rapid City to implement.

Crash Emphasis Areas Linked to Policy

Each emphasis area from the crash analysis maps is directly related to policy needs based on federal, state, and local guidance:

- **Angle crashes:** Roundabout-first policies, Access Management standards.

- **VRU:** Complete Streets adoption, crossing warrants, ADA upgrades.
- **Speed:** Context-based speed policy, lane narrowing, raised crosswalks.
- **Lighting conditions:** Pedestrian-scale lighting in all crossings and pathways (e.g., sidewalk, bike lane).
- **Alcohol/impairment:** Increased separation of modes, roundabouts, barriers.
- **Motorcycles:** Enhanced curve signing, high-friction surface treatments, access controls.
- **Young drivers:** Simplified intersections, clearer signage, speed feedback technology.
- **Older drivers:** Larger font signage, extended crossing times, simplified geometry.

Implementation Steps and Recommended Safety Processes

The following list outlines next steps and recommended safety practices for Rapid City:

- Revise design manuals and standard drawings to include best practices, such as a Complete Streets policy
- Conduct road safety audits on priority corridors and intersections to identify near-term fixes and longer-term capital needs
- Develop and adopt a speed management plan that sets context-appropriate target speeds and outlines engineering, enforcement, and education actions
- Establish a sidewalk and trail snow removal program that defines responsibilities, time frames, and enforcement to maintain year-round accessibility
- Update capital improvement plan (CIP) project scoping forms to require a safety policy checklist
- Adopt resolutions or ordinances for key policies (e.g., roundabout-first, Complete Streets)
- Train staff and consultants on updated standards
- Monitor compliance through project review processes

Chapter 6. Projects and Strategies

Project and Strategy Philosophy

The Rapid City CSAP philosophy for safety projects and strategies can be summarized by the three tiers in **Figure 11**. In short, policy strategies are the foundation for systemic projects (which creates a proactive safety approach), and the top tier identifies the limited but critical major safety infrastructure projects. The following paragraphs unpack each tier in more detail.

Policy strategies are foundational; they cover how agencies, their partners, and the traveling public approach safe travel and the development of safe multimodal travel networks. Policy strategies have the greatest potential impact on future severe crash reductions because modified behaviors, proactive planning, meaningful changes to policies, and adoption of safety best practices can affect all local multimodal travel facilities over time. That broad geographic coverage will outweigh a focus on any one hot spot. The Rapid City CSAP is the building block for all other strategies for policy and process recommendations in **Chapter 5** and its supporting appendices.

The second layer of safety recommendations are **systemic projects**. Systemic approaches focus on the risk of severe crashes and where those risks may be elevated. For example, a systemic approach may be useful for severe road departure crashes because they are most often related to common contributing factors (e.g., level of travel, road geometry, features of the built and natural environment like curves and steep slopes). In the Rapid City dataset, the data limitations led the project team to focus on history of property damage crashes and lower severity injury crashes as a proxy for future severe crash risk. In the systemic framework, each risk area (emphasis area) is paired with appropriate low-cost treatments that can be deployed in standalone safety projects over multiple higher risk locations. Systemic thinking can also be put in action by using risk maps to add safety value to smaller-scope maintenance and rehabilitation projects (even projects that focus on nontransportation infrastructure like water and gas utility projects).

Figure 11. Projects and Strategies



The final layer accounts for **major projects**. These projects reshape the built environment, so streets and intersections may have features added (e.g., medians, curb bulb-outs) or resized (e.g., intersections converted to roundabouts; walkways or bikeways widened). Major safety projects typically apply one or more best practice countermeasures in areas with severe crash history or higher risk levels and more moderate crash history. These more significant infrastructure countermeasures often provide the best means to reduce severe conflicts, manage the balance of speed to context, increase user separation in time, and improve traveler awareness. However, due to their cost and time to develop and deliver, major projects are used in a limited manner and must focus on addressing the highest priority locations first.

Segment and Intersection Countermeasures

Rapid City's CSAP resulted in the development of a Safer Street Toolkit, which summarizes available safety countermeasures for use in infrastructure projects aimed at reducing crashes. The Toolkit is foundational to the projects and strategies defined in this CSAP and serves as a key reference for both systemic and major (also known as location-specific) projects.

The Toolkit is organized into segment and intersection countermeasures, which may be applied alone or combined into a more comprehensive project. Each category includes subgroups of targeted strategies designed to address crash trends and local context. These strategies were vetted through safety analysis (based on the 2019–2023 crash dataset), input from Rapid City staff and emergency responders, and a review of systemic risk factors.

Segment- and intersection-level strategies in Rapid City reflect patterns of recurring safety concerns:

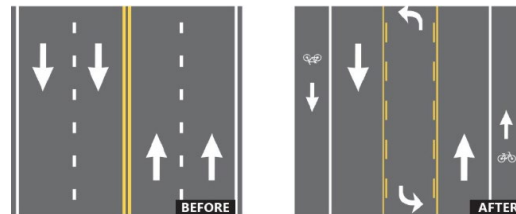
- Angle crashes at unsignalized or complex intersections
- Roadway departure crashes in high-speed corridors
- Speed-related crashes near key institutions (e.g., schools)
- Rear-end and turning crashes on multilane arterials
- Crashes involving VRUs

These countermeasures include systemic improvements (low-cost, widespread treatments) and major capital projects and were selected based on effectiveness, crash reduction potential, and feasibility:

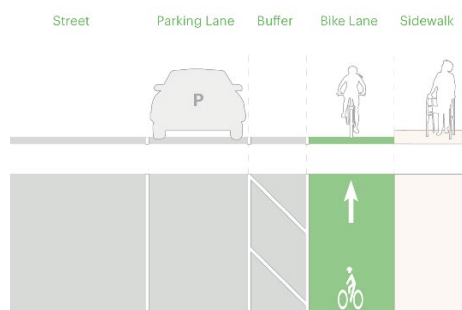
- **Vertical and horizontal traffic calming** (e.g., speed humps, bulb-outs, chicanes)



- **Roadway reconfigurations** (e.g., 4-to-3 lane conversions)
- Protected or buffered bike lanes
- **Systemic intersection treatments** (e.g., signal upgrades, rectangular rapid flashing beacons (RRFBs), left-turn hardening)
- **Access management** (e.g., raised medians and driveway consolidation)



Full descriptions, cost tiers, crash reduction factors, and implementation guidance are included in the Safer Street Toolkit (see **Appendix D**).



Systemic Projects

Systemic projects aim to reduce risk conditions citywide, even in locations without a significant crash history, by applying proven countermeasures to similar roadway environments. These projects are typically low to moderate in cost and are ideal for implementation during routine maintenance, resurfacing, or asset preservation cycles.

Low-Cost Safety Enhancements

Systemic safety projects may include the following low-cost safety enhancements:

- High-visibility crosswalks and advance yield markings
- Reflective signal backplates
- Radar speed feedback signs
- Pedestrian refuge islands
- Lighting enhancements at intersections and midblock crossings
- RRFBs at uncontrolled pedestrian crossings
- Edge line rumble strips on curves and rural transitions
- Chevron signs and dynamic curve warnings
- Speed cushions or striping changes to narrow perceived lane widths

These improvements are not corridor specific but rather context specific and are based on adjacent land use, crash type history, geometry, and user conflict potential.

Policy and Planning Integration

Rapid City's systemic safety approach can integrate with ongoing City processes and capital planning cycles. Systemic safety treatments will become most effective when incorporated into the following:

- **CIP project programming:** By using the Safer Street Toolkit in concept development and sequencing and intentionally reserving some funding for safety projects (potentially to serve as match for federal or state safety funds)
- **Asset rehabilitation processes and resurfacing schedules:** By applying context-sensitive and street rightsizing principles
- **Land development permit and land use or zoning change requests:** By focusing reviews on access management policies and safety impact mitigation from traffic impact studies
- **Community and economic development projects** (particularly in areas of persistent poverty): By intentionally scoping improvements to fill gaps in limited pedestrian infrastructure and reduce crashes in historically underrepresented streets and intersections

Integration with Crash Emphasis Areas

Each systemic project should align with one or more of the emphasis areas from the safety analysis. **Table 1** lists applicable countermeasures mapped to specific crash types. The following pages focus deeper on combining observed safety needs from individual emphasis areas to targeted portions of the Rapid City streets network where each emphasis area is prevalent and could be treated with systemic strategies.

Table 1. Emphasis Area to Applicable Systemic Strategies Alignment

Emphasis Area	Applicable Systemic Strategies
Angle Crashes	Reflective backplates, protected left-turn phasing, access management, roundabouts
Young Drivers	Radar feedback signs, simplified signage, painted centerlines
Older Drivers	Larger font signage, advanced warning signs, simplified intersection geometry
Lighting Conditions	LED lighting retrofits, illumination at key intersections and crossings

VRUs	RRFBs, midblock crossings, sidewalk gap closures, curb extensions, pedestrian refuges, updated ADA transition plan (status pending)
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Integration with the 2050 Metropolitan Transportation Plan

The CSAP aligns closely with the RapidTRIP 2050 Metropolitan Transportation Plan (MTP), which establishes long-range transportation strategies for the region. While the MTP addresses safety at a high level, its strategies were designed to overlap with those in the CSAP and reinforce a shared goal of reducing fatalities and serious injuries. Importantly, the MTP safety strategies were introduced during public engagement for the CSAP, and the feedback informed the CSAP's emphasis areas. This integration ensures consistency between local safety planning and the region's federally required MTP.

Major Projects: High-Priority Capital Improvement

While systemic strategies address risk across the network, some corridors require significant capital investment due to the scale of safety issues present in their design relative to current use. These **major projects** target locations with high concentrations of fatal and serious injury crashes, repeated appearance across multiple crash emphasis areas (including angle crashes, speed, and VRU incidents), and alignment with capital planning opportunities.

These corridors are not stand-alone safety efforts. Safety improvements will be integrated into larger capital projects through the City's CIP, ensuring that infrastructure upgrades address both current deficiencies and long-term safety priorities. Some corridors are already programmed in the CIP, while others may advance through separate funding sources or be addressed incrementally.

Typical project elements may include the following:

- Corridor reconstruction or redesign with integrated pedestrian and bicycle facilities
- Intersection conversions (e.g., roundabouts, reduced conflict intersections) as stand-alone or corridor-wide improvements

- Signalization upgrades
- Context-sensitive speed reduction design and Access Management strategies
- Multimodal enhancements, including lighting, ADA upgrades, and drainage improvements

Project Prioritization and Implementation

To guide implementation of the CSAP, recommendations for corridors, intersections, and systemic strategies were prioritized using the following criteria:

- Crash history and severity
- Alignment with the HIN
- Context-specific feasibility
- Support from technical stakeholders

Priority corridors and intersections are shown on maps included in **Chapter 3**. These maps guide the implementation of countermeasures, ensuring that selected projects are evidence based and locally relevant. The emphasis area countermeasures, major project definitions, and prioritization process ensure that both proactive and location-specific solutions address the Rapid City's most critical crash patterns. By integrating these strategies into the CIP and routine project delivery, Rapid City can systematically reduce fatal and serious injury crashes while building a safer, more consistent transportation network for all users.

2050 MTP Projects on the HPN

Several projects included in the fiscally constrained plan of the 2050 MTP are located on the HPN and are safety oriented. These projects include roadway and bicycle and pedestrian improvements and are considered in the MTP as higher priority projects to meet the needs of the region's existing multimodal transportation system. **Table 2** lists the 2050 MTP fiscally constrained projects that are located on the HPN.

Table 2. 2050 MTP Fiscally Constrained Safety Projects on the HPN

Project Type	Location	Time Frame	Cost (2025)	Cost (YOE)	Responsible Agency
Street Projects					
Safety Improvements	Main Street and Mountain View Road	2025–2030	\$70,000	\$70,000	Rapid City
Safety Improvements	Main Street and Mt Rushmore Road	2025–2030	\$480,000	\$500,000	Rapid City
Bicycle and Pedestrian Projects					
Shared Use Path	Anamosa Street from Haines Avenue to Silver Street	2025–2030	\$1,090,000	\$1,150,000	Rapid City
Sidewalk	East St. Patrick Street from East St. Joseph Street to Cherry Avenue	2025–2030	\$30,000	\$30,000	Rapid City
Buffered Bicycle Lane	Mt Rushmore Road from North Street to Omaha Street	2041–2050	\$90,000	\$140,000	Rapid City

Notes: YOE = year of expenditure

The 2050 MTP's fiscally constrained projects are not committed but rather identified for future programming when funds are available. The anticipated federal funding sources for these projects include Safe Streets and Roads for All (SS4A), Surface Transportation Block Grant (STBG), Highway Safety Improvement Program (HSIP), Transportation Alternatives Program (TAP).

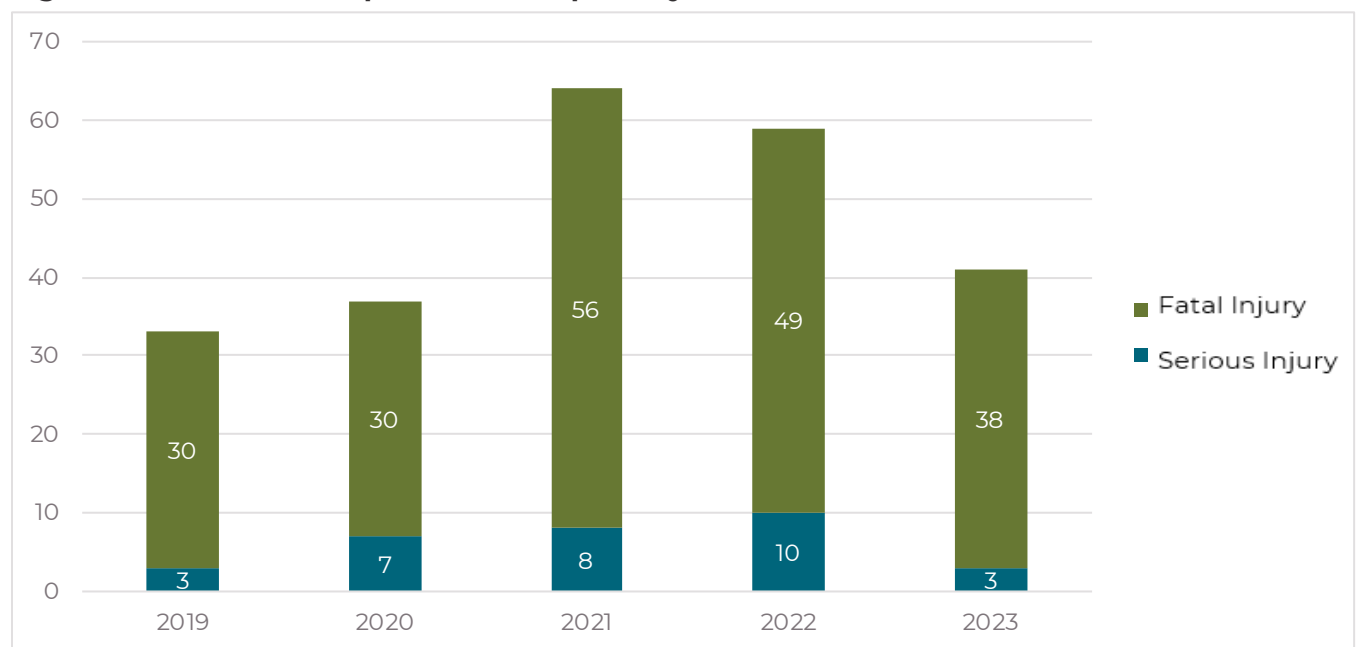
Chapter 7. Progress and Transparency

The Rapid City CSAP establishes a data-driven foundation for reducing fatal and serious injury crashes across the region. To ensure accountability and maintain momentum toward the goal of zero traffic deaths by 2050, it is essential to track progress over time and make safety progress available to the public. This chapter outlines proposed performance metrics, transparency strategies, and recommendations for sustaining long-term safety improvements.

Annual Fatal and Serious Injury Crashes

Fatal and serious injury crashes are the primary metric for evaluating the success of the CSAP because it allows Rapid City to track both the total number of fatal or serious injury crashes and the rate per 100 million vehicle miles traveled. Although both measures have declined since 2021 (**Figure 12**), the current trajectory will not achieve the CSAP goal of zero by 2050 without additional action. To close the gap, this CSAP establishes an interim performance path that reduces fatal or serious injury crashes by approximately three per year and updates the metrics annually to reflect the impact of implemented strategies and projects.

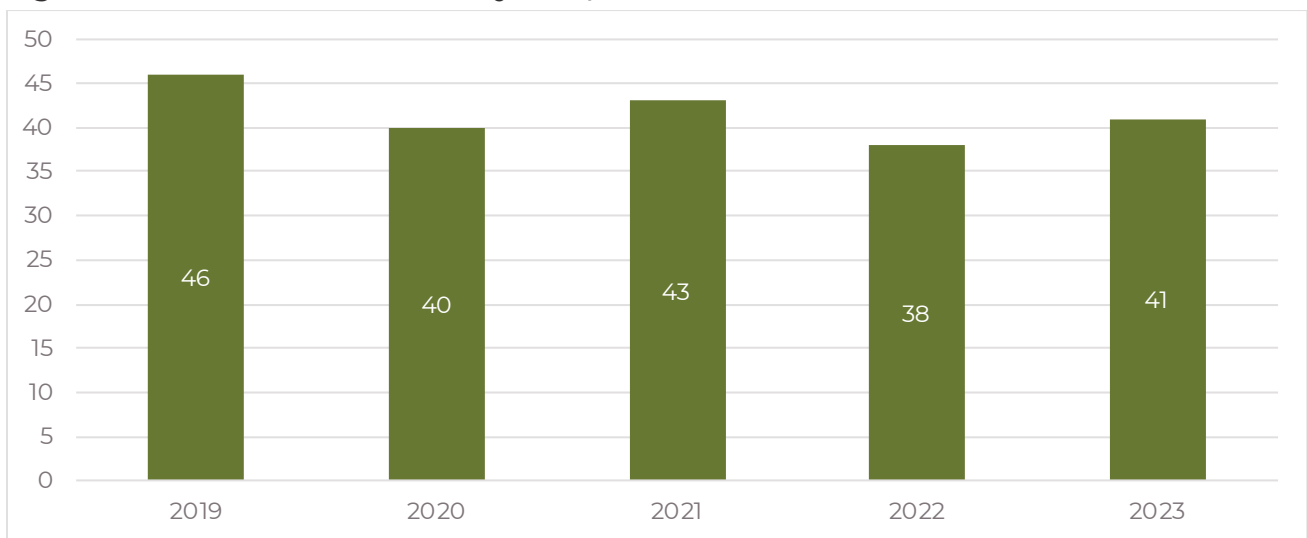
Figure 12. Fatal Crashes per Year in Rapid City



Annual Pedestrian and Bicycle Fatal or Serious Injury Crashes

VRUs account for 3 percent of fatal or serious injury crashes in Rapid City. This section tracks the annual number of pedestrian fatal or serious injury crashes and the annual number of bicycle serious injury crashes separately, as countermeasures differ by mode. **Figure 13** shows the annual counts for each mode. Improvements to high-risk corridors identified in the HIN are expected to reduce these numbers over time.

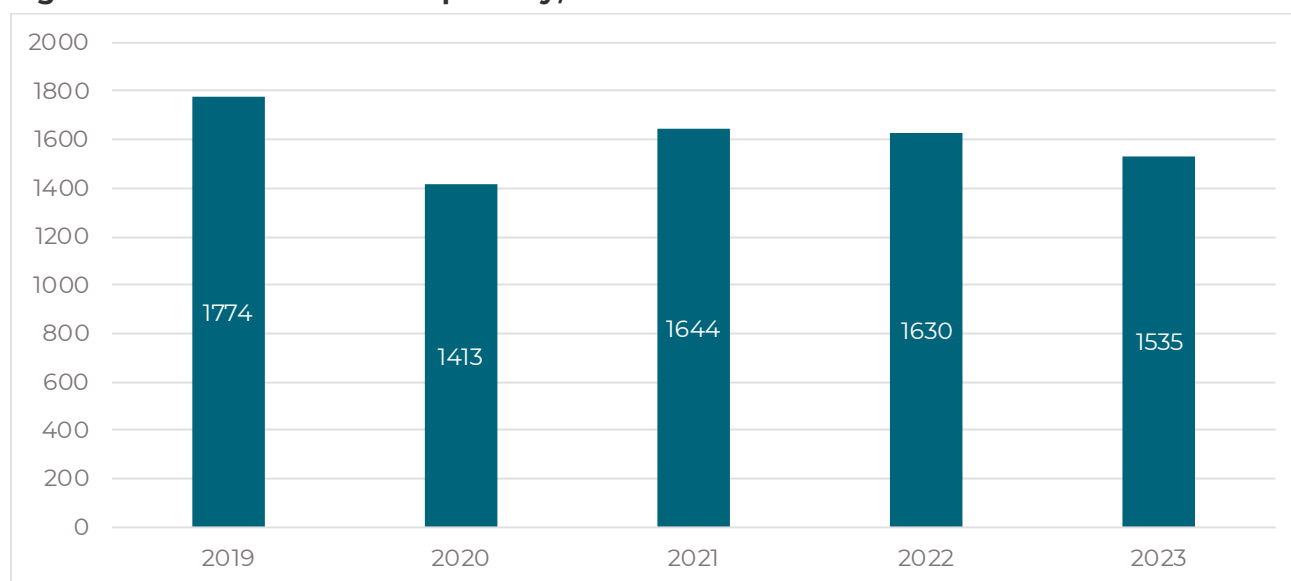
Figure 13. Collisions with a VRU by Year, 2019–2023



Annual Crashes by Severity – Totals

While the focus of the CSAP is on severe crashes, tracking all crash severities provides a broader view of safety trends. This metric includes annual totals for fatal, serious injury, minor injury, and property-damage-only crashes, along with crash rates. **Figure 14** show the total crashes that occurred in Rapid City between 2019 and 2023. Monitoring these trends helps identify whether reductions in severe crashes are accompanied by increases in lower-severity incidents.

Figure 14. Total Crashes in Rapid City, 2019–2023



Project-Level Safety Performance Metrics

To evaluate the effectiveness of the CSAP, Rapid City may track more detailed performance measures annually, including the following:

- Implementation status of priority projects (projects completed or projects in design)
- Crash trends before and after project implementation
- Fatal or serious injury crashes
- VRU crashes
- Emphasis area crash types

Public Access and Transparency

Annual progress reports should be made publicly available on the Rapid City website, summarizing key actions, performance metrics, project milestones, and funding updates. To track progress more effectively, a public dashboard or dedicated webpage could be developed to display performance data, crash data, project updates, and progress reports.

Needs and Recommendations

Ensuring the CSAP is implemented successfully and that progress is tracked and kept public is important for sustaining support for safety initiatives. A safety committee should be organized to ensure continuous implementation of the CSAP.

If additional funds are available, an additional position specializing in CSAP implementation could be considered.

The CSAP also aligns with the RapidTRIP 2050 MTP, where safety is identified as a core goal area with objectives that mirror the CSAP's progress metrics. By comparing CSAP implementation to the MTP's safety objectives and performance measures, Rapid City can meet federal performance targets while ensuring that local and regional planning efforts move forward together.

Appendices

Appendix A. Policy Review Memo

Introduction

Vision Zero and the Safe Streets and Roads for All (SS4A) program is an international movement dedicated to implementing strategies that eliminate traffic deaths and serious injuries and improve the overall safety of the transportation network for all users. Reaching zero deaths can be achieved through the implementation of a Safe System Approach (SSA), which is comprised of five core elements and six principles, detailed later in this memorandum. The City of Rapid City is leading the development of a regional Comprehensive Safety Action Plan (CSAP) that will utilize the SSA to locate key areas of safety concern and establish solutions targeting these areas. This document identifies how the plans and policies implemented across the City of Rapid City align with the SSA and highlights opportunities for refining and strengthening policies and processes.

Safe System Approach¹

The SSA is a holistic and comprehensive approach that provides the guiding framework to make the transportation system safer for everyone. Making a commitment to zero traffic deaths means addressing all aspects of safety through the framework, as depicted in **Figure 1**.

¹ Foundational definitions of the Safe System Approach have been included in their original form from the U.S. Department of Transportation website: [What Is a Safe System Approach?](#)

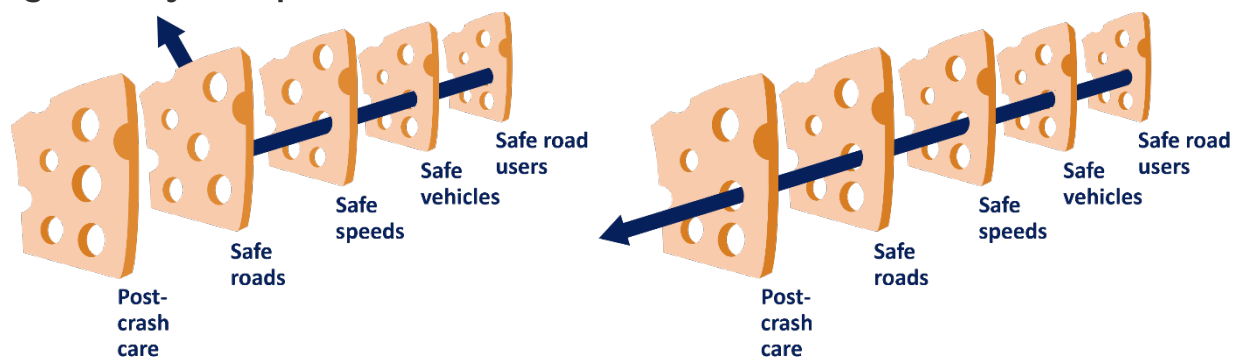
Figure 1. What Is a Safe System Approach?



Source: U.S. Department of Transportation

The SSA is a shift from conventional road safety thinking because it focuses on both human mistakes and human vulnerability by designing systems with layers of protection. If one countermeasure fails, another will help prevent a crash or lessen the likelihood of serious injury or death, as shown in **Figure 2**.

Figure 2. Layers of protection.



Source: Federal Highway Administration

In the SS4A grant program, comprehensive safety action plans (referred to as “Action Plans”) are the basic building block to significantly improve roadway safety.

They are aimed at reducing and eliminating serious injury and fatal crashes for all roadway users. A successful CSAP includes seven key components (**Figure 3**).

Figure 3. Comprehensive Safety Action Plans



Source: U.S. Department of Transportation

Specifically, the eight key components are:

- **Leadership Commitment & Goal Setting** – An official public commitment by a high-ranking official and/or governing body to eliminate roadway fatalities and serious injuries based on a timeline and set of goals.
- **Planning Structure** – A committee, task force, implementation group, or similar body charged with oversight of the Action Plan’s development, implementation, and monitoring.
- **Safety Analysis** – An analysis of existing conditions, historical trends, contributing factors, crash types, and crash severity to provide a baseline understanding of crashes involving fatalities and serious injuries across a jurisdiction.
- **Engagement & Collaboration** – Engagement with the public and stakeholders to allow for community representation and feedback.

- **Policy & Process Changes** – An assessment of current policies, plans, guidelines, and standards to identify opportunities to improve how processes prioritize transportation safety.
- **Strategy & Project Selections** – Using data, noteworthy practices, stakeholder input, and equity considerations, a comprehensive set of projects and strategies will be identified that will address the safety problems and focus on a SSA approach.
- **Progress & Transparency** – Ongoing efforts to measure progress to ensure transparency is established with community members and stakeholders.

Policy Review

The policy review involved examining current transportation and land use plans, policies, and standards from Rapid City. The list below provides a summary of the document types reviewed for this task:

- **Comprehensive Plan** – Identifies goals, policies, strategies, and actions in the areas of land use, public facilities and utilities, transportation, and housing and makes recommendations for plan implementation and plan maintenance.
- **Metropolitan Transportation Plan** – Provides an assessment of the region's transportation system and its future needs, including a list of regionally significant transportation projects based on reasonably anticipated local, state, and federal revenues.
- **Bike/Pedestrian Master Plan** – Establishes a series of recommendations for specified corridors that create a system of bikeways and walkways to provide local and regional connectivity and develop a set of efforts focused on putting the plan into action.
- **Transit Plan** – Provides a strategic blueprint for future transit investments and priorities by supporting mobility, accessibility, sustainability, and equity.
- **Design Criteria Manual** – Summarizes and outlines policy, methods, practice, procedures, and design standards that are adopted to obtain consistency in the design and development of infrastructure.
- **Master Fee Ordinance** – Establishes the permits, fees, and charges to be collected by the jurisdiction for various services.

The purpose of this memo is to perform a high-level document review and provide an overview of how practices and policies in Rapid City align with the seven Action Plan components and six SSA principles previously noted. The document types listed

were identified for review due to their impact on the transportation network and the relevancy of their goals and policies to the SS4A planning efforts. The Vulnerable Road User (VRU) Safety Assessment and Strategic Highway Safety Plan (SHSP) from the South Dakota Department of Transportation (DOT) were also reviewed due to their alignment with the SSA principles and elements. The following sections highlight key findings organized by Action Plan component topics.

Leadership Commitment and Goal Setting

Based on the document review, there is a need to identify and document safety-related goals that align with the SS4A program. These goals will provide clarity and direction and allow for key decision-makers to track the CSAP's progress. Additionally, providing a public commitment from local leadership to these goals will garner additional public support and encourage action toward safety improvements and initiatives for targeted and systemic safety.

Planning Structure

Rapid City currently does not have a pre-existing safety committee, task force, or implementation group dedicated to enhancing and advocating for safety-focused projects and programs. Establishing a group to oversee the development, implementation, and monitoring of the CSAP will prove vital to the overall success of the Plan. The City may hold key roles in the implementation group, but it could also involve other safety interest groups in the planning structure. For example, the Rapid City Area Bike and Pedestrian Master Plan notes that the City is looking to reapply for the League of American Bicyclist's Bicycle Friendly Community designation. Allowing organizations with specific interests, such as bicyclists, to participate on the safety committee or similar body will provide additional support. The project to develop a CSAP has already initiated a body to serve as Study Advisory Team. The City has added several safety advocates to the Study Advisory Team, and one practical path to an ongoing implementation group would be to formalize the Study Advisory Team at plan completion to be the inaugural implementation group.

Safety Analysis

The South Dakota SHSP has identified Rapid City as one of the two cities with the highest frequency of VRU fatal or serious injury crashes in South Dakota. Therefore, traffic safety has been identified as a priority for the City with crash analyses focused on several variables identified through federal safety performance measures. The Metropolitan Transportation Plan (MTP) notes that these measures (from the 2019 HSIP and 2019 Annual Report) were used to identify intersections with the highest number of crashes so the City could focus on those locations and improve overall

regional safety. Several tables and figures focusing on traffic safety and crashes are also included in the MTP. They primarily focus on:

- The 20 highest crash frequency intersections
- Fatal and serious injury crashes
- The 20 intersections with the highest crash rate (crashes/million entering vehicles)
- Bicycle and pedestrian crashes

Engagement and Collaboration

The SHSP notes one statewide educational campaign occurring in Rapid City known as “Don’t Thump Your Melon.” The program promotes helmet safety and education and is supported by the Monument Health Rapid City Hospital. However, there is an opportunity to expand educational outreach in the City through the CSAP and place a greater emphasis on the Safer People objective of the SSA.

Policy and Process Changes

Several key policies and processes were referenced throughout the material reviewed for this memo. The City of Rapid City Infrastructure Design Criteria Manual provides guidance on traffic-calming devices, such as roundabouts, street islands and boulevards, and curb line flares. Additionally, the MTP notes that two of the key emphasis areas identified in the SHSP are speeding and aggressive drivers. Key strategies to address these issues include setting speed limits consistent with design and development context, enhanced enforcement, effective communication and outreach campaigns, and increased use of advisory speed signs and radar speed feedback signs. Both signage strategies align with the Safer Speeds objective of the SSA.

General development principles are in place to emphasize pedestrian facilities and access. These principles place an emphasis on Safer Users, another objective of the SSA. A goal outlined in the Rapid City Comprehensive Plan is to prioritize sidewalk and trail improvements that complete gaps or “missing links” between existing neighborhoods and other community destinations, such as schools, parks, or shopping areas. The Comprehensive Plan also identified a general design principle that focuses on pedestrian and access orientation. The goal is to design sites and orient buildings with an emphasis on the character and safety of the pedestrian realm.

While Rapid City does not have an Access Management policy, South Dakota DOT provides guidance on access management criteria. A table is provided in South

Dakota's administrative rules that shows highway classifications and access location criteria. This table is a good starting point, but it would be beneficial to provide additional guidance for the more urban development pattern in Rapid City to better meet the specific needs of the community. It would also be recommended to consider developing additional policies such as a Complete Streets policy.

Strategy and Project Selections

Transportation safety-related projects are widespread throughout Rapid City, especially for pedestrian and bicycles facilities, which are growing in transportation infrastructure. The Comprehensive Plan identifies a list of recommended actions to support the implementation of the CSAP. The recommended actions are organized by three key time frames: near term (0 to 2 years) for policy updates and quick-build and low-cost systemic treatments; midterm (3 to 7 years) for programmatic rollouts and corridor projects that require design and standard procurement; and long term (8 to 20 years) for major capital reconstructions and network build-out. In the Bike and Pedestrian Master Plan, pedestrian and bicycle projects were evaluated and prioritized based on a set of criteria. One of the criteria is "project addresses a location of a fatality of a person walking."

The Bike and Pedestrian Master Plan outlines goals and objectives to enhance transportation choices by developing a network of safe and comfortable on-street and off-street bicycle and pedestrian facilities. Each objective has a set of action items to support implementation and benchmarks to evaluate progress. One of the goals included in the plan is to "integrate bicycle and pedestrian planning into Rapid City's Planning Process." This includes reviewing and updating the project and program priorities every 5 years. The Bike and Pedestrian Master Plan also identifies bicycle and pedestrian facility types and crossing treatments that could be considered for implementation. All of these treatments have references and guidance from national resources like National Association of City Transportation Officials (NACTO), Federal Highway Administration (FHWA), Institute of Transportation Engineers (ITE), etc.

The current Rapid City MTP identifies multimodal mobility and accessibility as two of the metrics used to prioritize future projects. Projects receive a higher score if they complete a planned bicycle or pedestrian facility that connects to a regional bicycle and pedestrian system or if they improve traffic mobility or provide a new bicycle, pedestrian, or transit connection to a designated growth area in the region.

The MTP also notes that 26.33 miles of side paths and 18.47 miles of shoulder bikeways are located in the RCAMPO boundaries. The metropolitan planning organization has identified an additional 28.25 miles of bike lanes and 28.01 miles of shared use paths that are planned for future investments. The current MTP also discusses emerging transportation trends and technologies and identifies some strategies to help address these trends.

Facility Type	Length
Bike Lane	9.68
Bike Path	16.42
Cycle Track	0.28
Shared Lane	1.79
Shoulder Bikeway	18.47
Side Path	26.33
Total Existing Mileage	72.97

Rapid City MTP Multimodal Total Existing Mileage

All of the preceding examples of strategy and project selection show that Rapid City is committed to implementing safety-related projects, especially projects related to pedestrians and bicycles. This correlates with the Safer Roads objective of the SSA. However, there may be a potential to expand safety-focused project selection even further through adjustments to directly target safety data analysis findings and through expanded or optimized funding to increase strategy implementation.

Progress and Transparency

Rapid City is dedicated to transparency and measuring progress of safety-related goals over time. The Comprehensive Plan discusses how the Rapid City Progress Report, issued quarterly through the Mayor's Office, provides an update on projects in progress, long-term goals, and actions taken. The public can subscribe to the Progress Report and stay up to speed on City indicators and achievements. The Comprehensive Plan also discusses developing an Annual Report to monitor the Comprehensive Plan's implementation and to track achievements.

Key Findings

The Study Advisory Team inventoried existing plans and policies for Rapid City and identified several safety-related practices. In general, Rapid City has several safety topics that are being addressed or discussed but that have not necessarily been developed into everyday practices. Several CSAP components also do not have current practices associated with them, which suggests potential opportunities exist to initiate such practices. The Rapid City CSAP project will expressly consider opportunities with high benefit but limited resource cost to implement to support fatality and serious injury reductions.

Overall, the following list summarizes the key findings from the review:

- Pedestrian and bicycle safety-related projects are widespread, but there is room to expand funding for such projects and identify and prioritize other safe system projects and strategies.
- Safety-related goals should be well defined, and consistent practices should be developed for project prioritization and transparency.
- Opportunities exist to increase public awareness and education and engage with local leadership and disadvantaged communities.
- Existing practices and policies can be aligned with the SSA by implementing policies such as Complete Streets or Access Management.
- A safety committee should be organized to provide oversight of the CSAP; the inaugural safety committee could come from the project's Study Advisory Team.

Following the completion of this existing practices and policy review, the Study Advisory Team will continue to refine the safety analysis to identify a high-priority safety network based on reducing existing fatal and serious injury crash patterns. The project team will also further develop Rapid City-approved policy and process change recommendations to support the CSAP plan document.

Appendix B.

Engagement Summary

(Placeholder)

Appendix C. Safety Analysis Memos (Parts 1 and 2)

Introduction

Under the general guidelines of the U.S. Department of Transportation (USDOT) Safe Streets and Roads for All (SS4A) program, state and local transportation agencies have shifted to a new approach aimed at reducing fatalities and serious injuries on roadways. The Safe System Approach (SSA) adopted by USDOT is an outline for other agencies to follow suit in effectively addressing the risks associated with driving and incorporates aimed strategies to prevent crash incidents and reduce the severity of crashes when they occur.

The SSA aims to achieve zero deaths on roadways by a certain target date that, in certain cases, can be ambitious without the correct strategies and measures in place. Under a SSA approach, local agencies implement several strategies to address the causes of roadway fatalities, while holding themselves accountable to reducing deaths by using a target date to achieve Vision Zero. **Therefore, it is recommended that Rapid City adopts a safety target of zero deaths by 2050 as part of the Comprehensive Safety Action Plan (CSAP).** However, the SS4A program also accepts the goal to dramatically reduce fatalities and serious injuries to *near zero* by a target date.

Background on SS4A

A national movement in transportation agencies has recognized that deaths and serious injuries on roadways are unacceptable. An increasing number of agencies are re-evaluating their approach to safety and asserting that crashes are predictable and preventable. The SSA recognizes that humans make mistakes, but loss of life should not be a result of these mistakes. Following the SSA allows municipalities to place safety first when making investments or designing roadways. The SS4A program provides a data-driven approach for agencies to adopt solutions based on practices that are proven to improve safety.

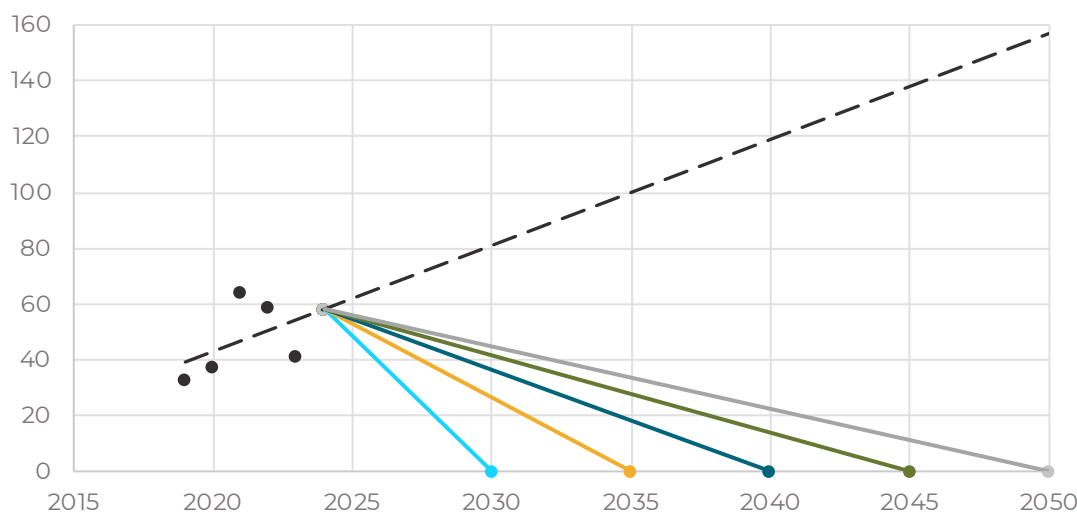
By following the guidelines of the SS4A program, Rapid City can set a safety target that aligns with national goals, sets measurable targets, and utilizes proven countermeasures to address high-risk areas.

Recommendation: Vision Zero by 2050

Figure 1 demonstrates the upward trend of fatal and serious injury crashes of roughly four additional crashes per year in Rapid City. The figure also shows recommended crash reductions required to meet certain Vision Zero targets. Those targeted reductions are as follows:

- **2030:** ~10 crashes per year
- **2035:** ~6 crashes per year
- **2040:** ~4 crashes per year
- **2045:** ~3 crashes per year
- **2050:** ~3 crashes per year

Figure 1. Fatal and Serious Injury Crash Trends and Goals to Achieve Zero Deaths



Rapid City can adopt a phased approach to Vision Zero by setting a target date of 2050 for achieving zero deaths and initially committing to a substantial reduction in crashes. A softer commitment of reducing crashes “substantially” rather than promising Vision Zero allows Rapid City to prioritize measurable progress in a more practical approach. Interim targets, such as a significant reduction of fatalities by a set number or percentage, provides more adaptability to strategies.

Feedback from the Study Advisory Team is recommended for setting a fatality reduction target in Rapid City. Input is essential for ensuring that a recommendation of 2050 as a safety target aligns with regional priorities. The following section will

outline approaches and strategies in the Near Term, Midterm, and Long Term to reach a potential target date of 2050.

Near-Term Target (2024–2030)

A Focus on Non-Capital Infrastructure Strategies

Target: Reduce fatal and serious injury crashes by 15 per year in Rapid City.

- **Speed management and traffic calming**
 - Prioritize key zones for safety enhancements, such as school districts, work zones, and downtown areas
 - Set and design for safe impact speeds by targeting ≤ 20 mph in areas with vulnerable users and preventing conditions that allow > 40 mph using traffic calming, lower posted limits, and enforcement near schools, downtown, and other high-pedestrian corridors
 - Implement measures such as lower speed limits and speed feedback signs through areas with a history of traffic speeding and targeted traffic enforcement campaigns
- **Incorporation into existing projects**
 - Incorporate proven safety measures into projects that are already programmed to allow for quicker implementation of safety measures
 - Utilize tools such as road safety audits to identify opportunities for immediate improvement
- **Enhanced coalitions and emergency response**
 - Collaborate with emergency medical services to reduce response times and implement life-saving techniques at crash sites
 - Partner with advocacy groups, local schools, and community organizations to promote safe roadway behaviors
- **Education and outreach**
 - Enhance public awareness programs focused on traffic safety, including education geared to motorcyclists and enforcement initiatives
 - Partner with local schools, community organizations, and advocacy groups to promote safe behavior

Examples of non-capital infrastructure strategies that have been proven to improve safety include the following:

- **Dynamic speed displays or feedback signs**

- These are low-cost solutions that can be installed in a short time frame but be effective long term.
- **Reduce citywide default speed**
 - Both Denver and Seattle reduced their default citywide speeds from 25 to 20 mph. Seattle measured a 22 percent crash reduction and 54 percent reduction in drivers traveling 40+ mph.²
 - Higher speed limits could still be signed and designed toward on higher functionally classified streets.
- **Increase education campaigns**
 - Denver Vision Zero aims to create a multimodal safety curriculum for schools K–12 to promote safety in young and future drivers.³
- **Post-crash care**
 - To increase coordination with first responders to improve crash response, MetroPlan Orlando uses strategies such as high-visibility paint, retroreflective striping, and built-in passive lights to improve the safety of arriving responders.⁴

Midterm Target (2030–2037)

Combine Programmatic and Capital Infrastructure Strategies

Target: Reduce fatal and serious injury crashes by 30 per year.

- **Expand on near-term strategies**
 - Continue to expand efforts in speed management, education, enforcement, and partnerships.
 - Evaluate previous non-capital strategies for their effectiveness in crash reduction.
- **Safe streets practices and strategies**
 - Implement policies that prioritize safety into the entire life cycle of the transportation project process.
 - Continue to build on awareness of safe street practices among the public and local agencies.

² <https://www.visionzero4youth.org/wp-content/uploads/NineStrategies.pdf>.

³ <https://www.denvergov.org/files/assets/public/v/4/vision-zero/documents/denver-vision-zero-action-plan.pdf>.

⁴ [Safety | MetroPlan Orlando](#)

- **Capital infrastructure improvements**

- Develop a plan of action with the South Dakota Department of Transportation to program capital safety improvements, such as roundabouts and improved pedestrian crossings on state routes.
- Address high-risk corridors identified through crash data analyses with infrastructure upgrades.

- **Vehicle fleet safety enhancements**

- Promote adoption of modern safety technologies in vehicle fleets, such as automatic emergency braking, lane departure warnings, and blind-spot monitoring.

- **Mobility and safety for vulnerable populations**

- Develop and promote alternative transportation options for older and impaired drivers to reduce unsafe driving incidents.
- Collaborate with service providers to promote accessibility of safe mobility options.

Long-Term Target (2037–2050)

Achieving a Safe System and Vision Zero

Target: Reduce fatal and serious injury crashes to near-zero or zero by 2050.

- **Build on midterm successes**

- Continue to implement and scale strategies from the near- and midterm phases.

- **Increased safety capital project implementation**

- Accelerate implementation of safety-focused capital projects, such as corridor redesigns and systemwide infrastructure upgrades.
- Target implementation of projects with proven safety benefits.

- **Safe users and speeds through design technology**

- Adopt user-centered design practices that inherently promote safe behaviors.
- Leverage advancements in vehicle technology to enhance safety for all road users.

- **Robust enforcement and emergency response systems**

- Standardize consistent enforcement of safety practices, including compliance with speed limits and prevention of impaired or unrestricted driving.

- **Adopting and achieving Vision Zero**

- Embed Vision Zero principles into all transportation policies, programs, and practices.
- Establish a culture of Vision Zero and safety where all stakeholders advocate for zero deaths as a shared responsibility.

Safety Data Analysis

Memo (Part 2)

Introduction

This memo builds on the discussion and recommendations from Part 1 of the Safety Analysis for Rapid City's Comprehensive Safety Action Plan (CSAP) under the Safe Streets and Roads for All (SS4A) discretionary grant program. The second part of the safety analysis involved evaluating crash patterns and identifying high-priority locations for safety improvements. The data provided from the South Dakota Department of Transportation (DOT) for the 5-year period of 2019–2023 was used as the foundation of the analysis. Interstate segments were excluded to focus on local and arterial roadways where interventions would be aligned with funding requirements of SS4A.

Crash Data Analysis

Specific crash types were reviewed based on the eight emphasis areas identified in Part 1. The emphasis areas included:

- Angle Crashes
- Young Drivers
- Older Drivers
- Lighting Conditions
- Vulnerable Road Users
- Motorcycles
- Alcohol
- Speed

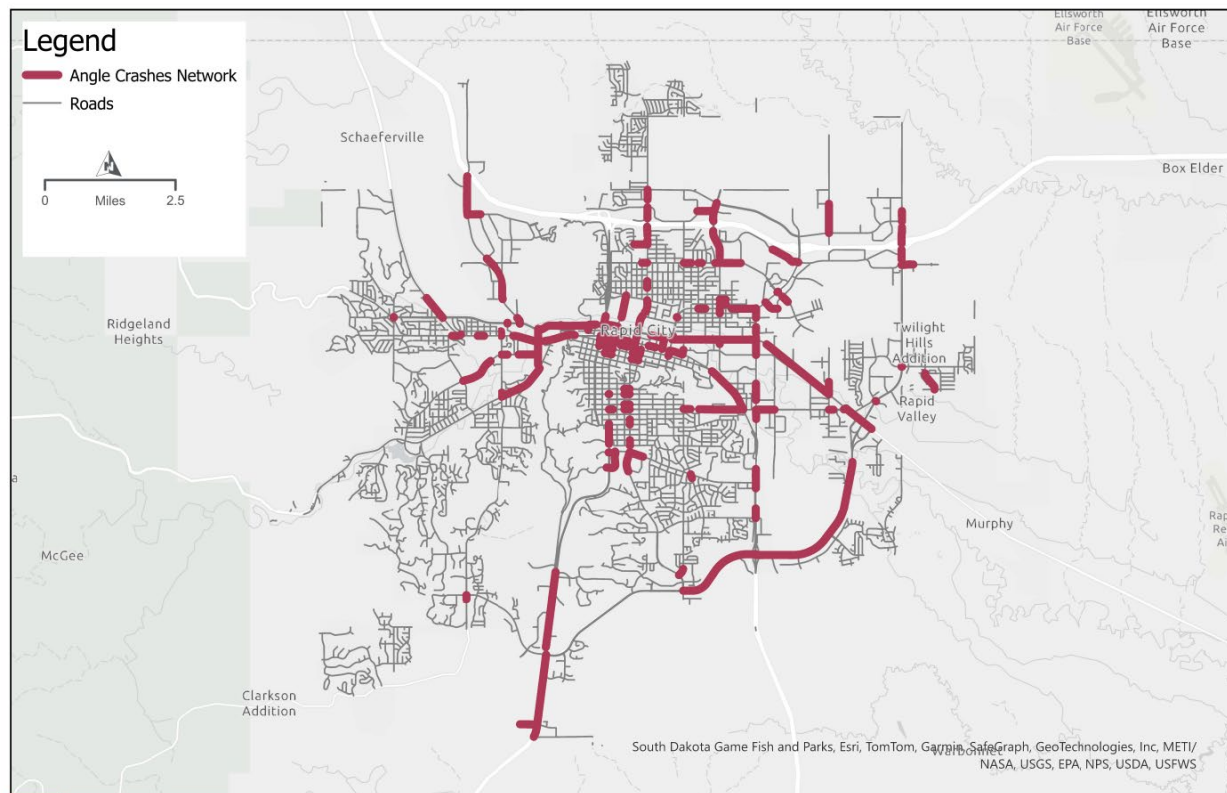
The crash types selected were analyzed to identify locations with recurring safety issues. Each road segment was assessed, and crash types were individually tallied. Thresholds were then established to identify the top 10 to 20 percent highest-frequency crash segments in the network. In cases where the 10 percent threshold

could not be achieved due to limited data, any segment exhibiting that specific crash type was flagged. This led to the development of a combined network of flagged crash segments. The following sections discuss each of the crash types in further detail.

Angle Crashes

The first crash type analyzed manner of collision, specifically angle crashes. In Part 1, it was noted that 68 percent of angle crashes occurred on urban arterial streets, particularly those leading to and from the downtown area. The segments highlighted in red in **Figure 1** are corridors that reported six or more angle crashes of any crash severity level. Key corridors include the downtown area, South Dakota Highway 44 (SD 44), U.S. Highway 16 (U.S. 16)/Mt Rushmore Road, U.S. Highway 16B (U.S. 16B), Cambell Street, and 5th Street/Haines Avenue.

Figure 1. Angle-Related Crashes

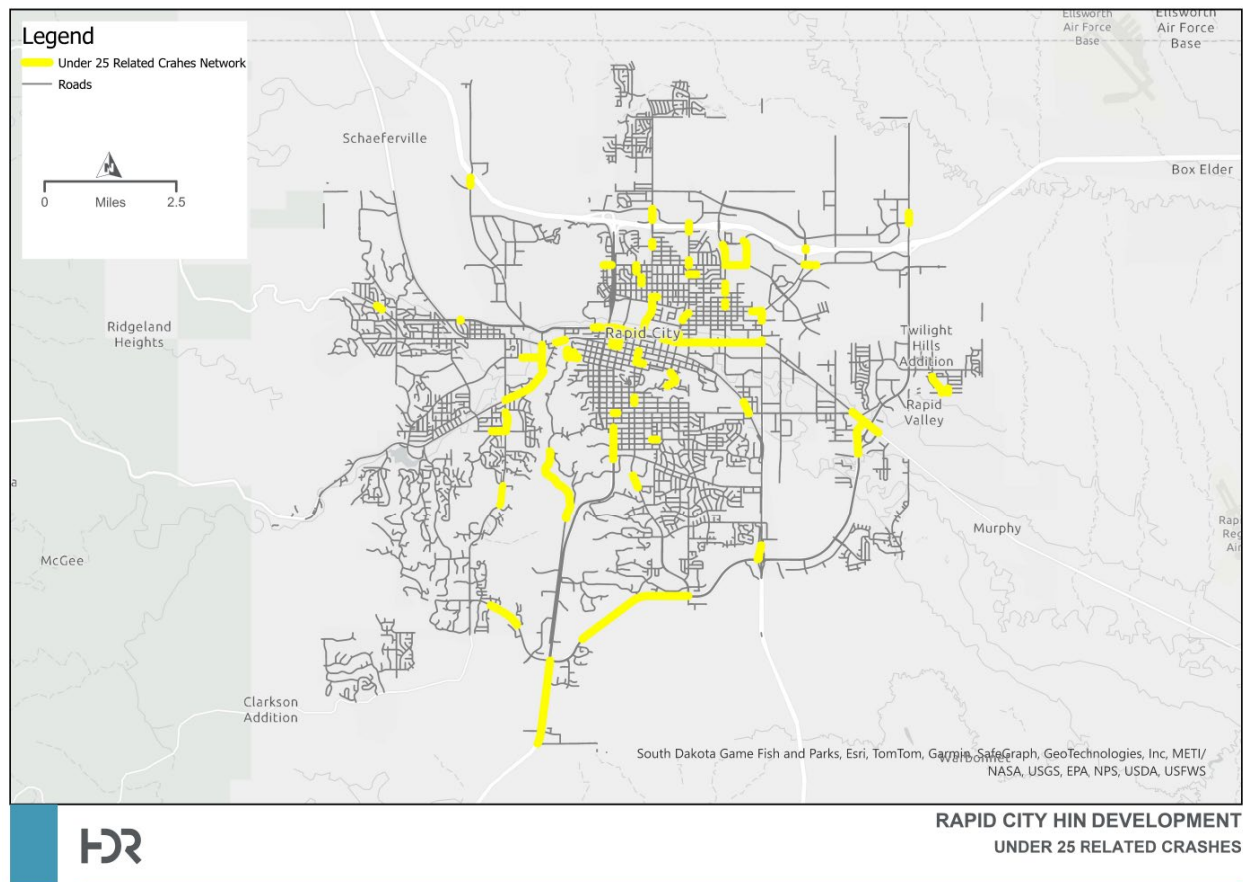


**RAPID CITY HIN DEVELOPMENT
ANGLE RELATED CRASHES**

Drivers Under 25 Crashes

The next crash type reviewed was for young drivers, specifically drivers under the age of 25. In Part 1, it was noted that impulse control development is ongoing until the age of 25. Therefore, 25-and-under drivers are seen as an elevated crash risk category when it comes to auto insurance purposes. **Figure 2** shows all the segments that included a crash with a driver under the age of 25. Corridors of note include SD 44, U.S. 16, U.S. 16B, Skyline Drive, and the streets around the Walmart Supercenter south of Interstate 90 (I-90).

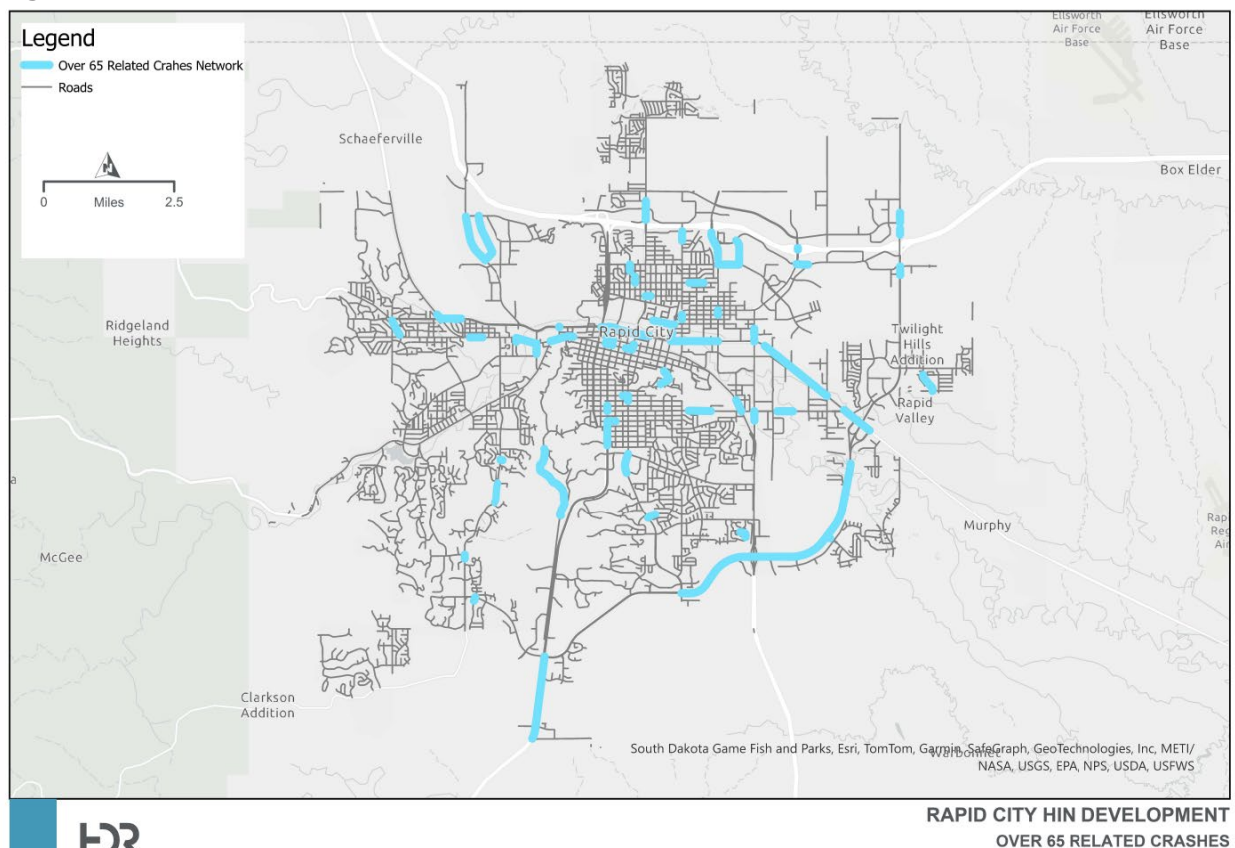
Figure 2. Under 25-Related Crashes



Drivers Over 65 Crashes

In addition to young drivers, crashes involving drivers over the age of 65 (classified as older drivers) were also identified as a crash type of interest. While the onset of driver-inhibiting, age-related physical and cognitive conditions varies widely, 65 was selected as the threshold even though it is assumed to be on the lower end of when these issues may arise. **Figure 3** identifies all the segments that involved drivers over the age of 65 in a crash. Corridors of significance include SD 44, South Dakota Highway 445 (SD 445)/Deadwood Avenue, U.S. 16, U.S. 16B, Skyline Drive, and the streets around the Walmart Supercenter south of I-90.

Figure 3. Over 65-Related Crashes

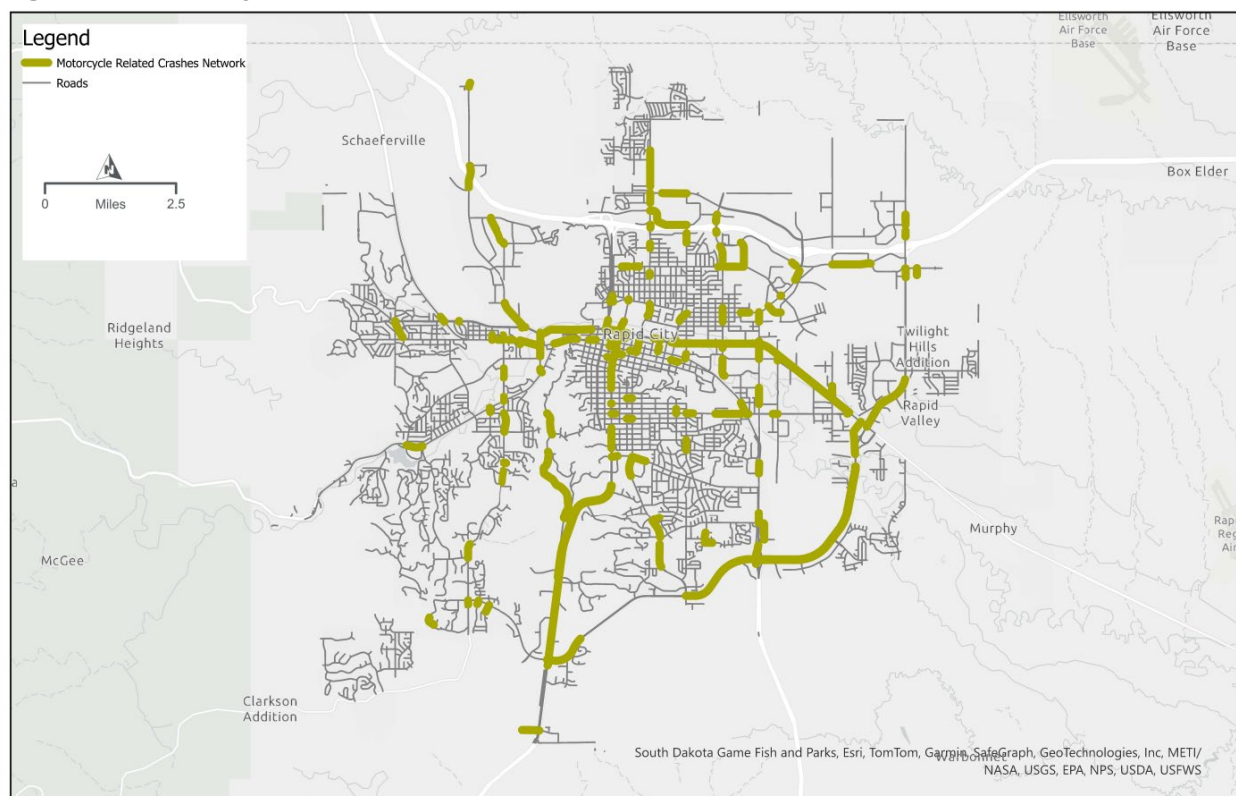


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Motorcycle Crashes

Motorcycle crashes were also evaluated as part of the safety analysis. Previously, it was noted that 39 percent of motorcycle crashes occurred on urban minor arterial roads. The segments highlighted green in **Figure 4** show corridors that reported at least one crash involving a motorcycle. Key corridors include SD 44, U.S. 16/Mt Rushmore Road, U.S. 16B, Skyline Drive, Haines Avenue, Sheridan Lake Road, and Cambell Street.

Figure 4. Motorcycle-Related Crashes



**RAPID CITY HIN DEVELOPMENT
MOTORCYCLE RELATED CRASHES**

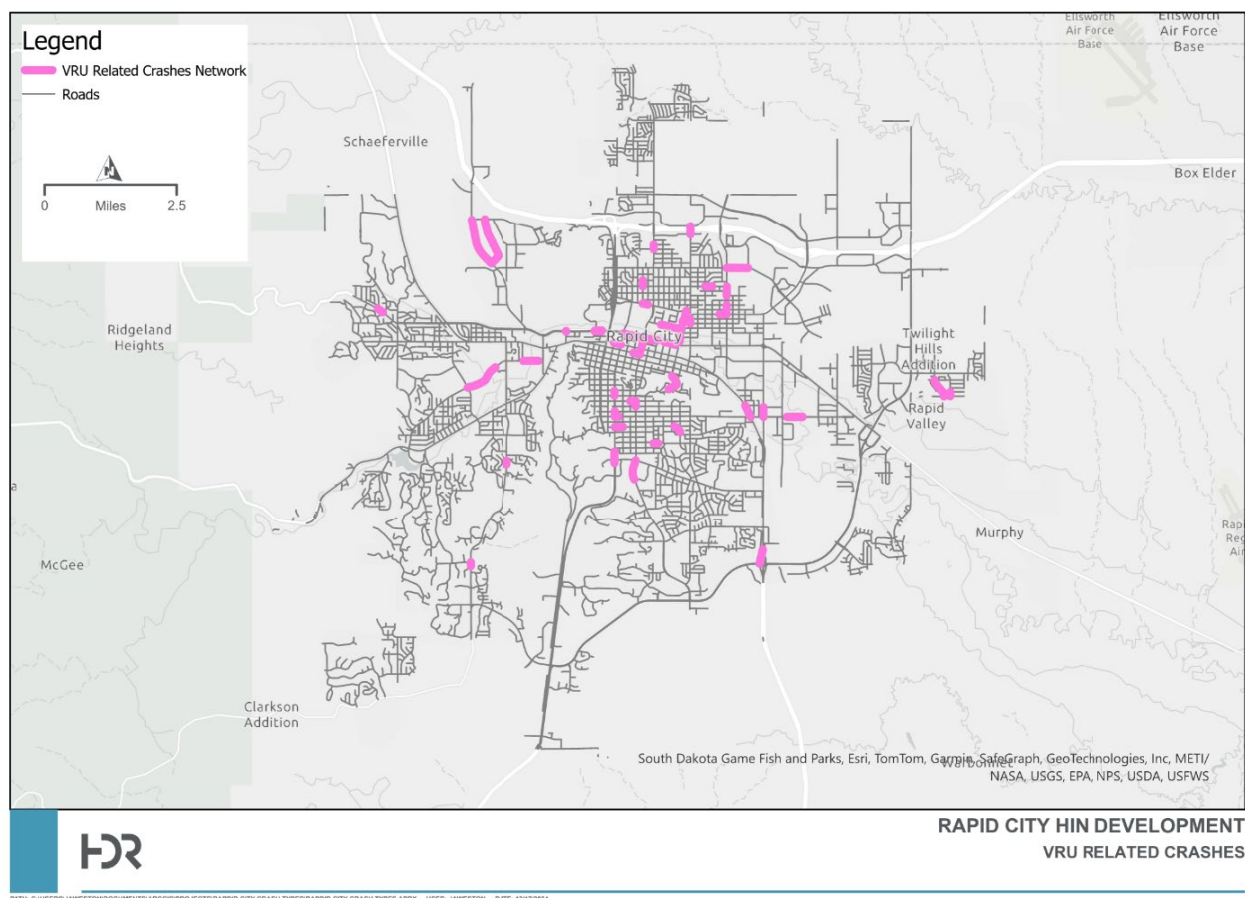
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Vulnerable Road User Crashes

The fifth crash type reviewed was vulnerable road user (VRU) crashes. VRUs are individuals walking, biking, or rolling. Because VRUs are not protected by shielding technology such as vehicle frames, airbags, or crumple zones, they are at a higher risk of injury or death in a collision. It was identified in Part 1 that the majority of VRU crashes are concentrated in the downtown area and on arterials leading to and from that area. **Figure 5** includes all the segments that had at least one VRU crash reported. The downtown area, SD 445/Deadwood Avenue, U.S. 16/Mt Rushmore Road, and Lacrosse Street are all corridors identified.

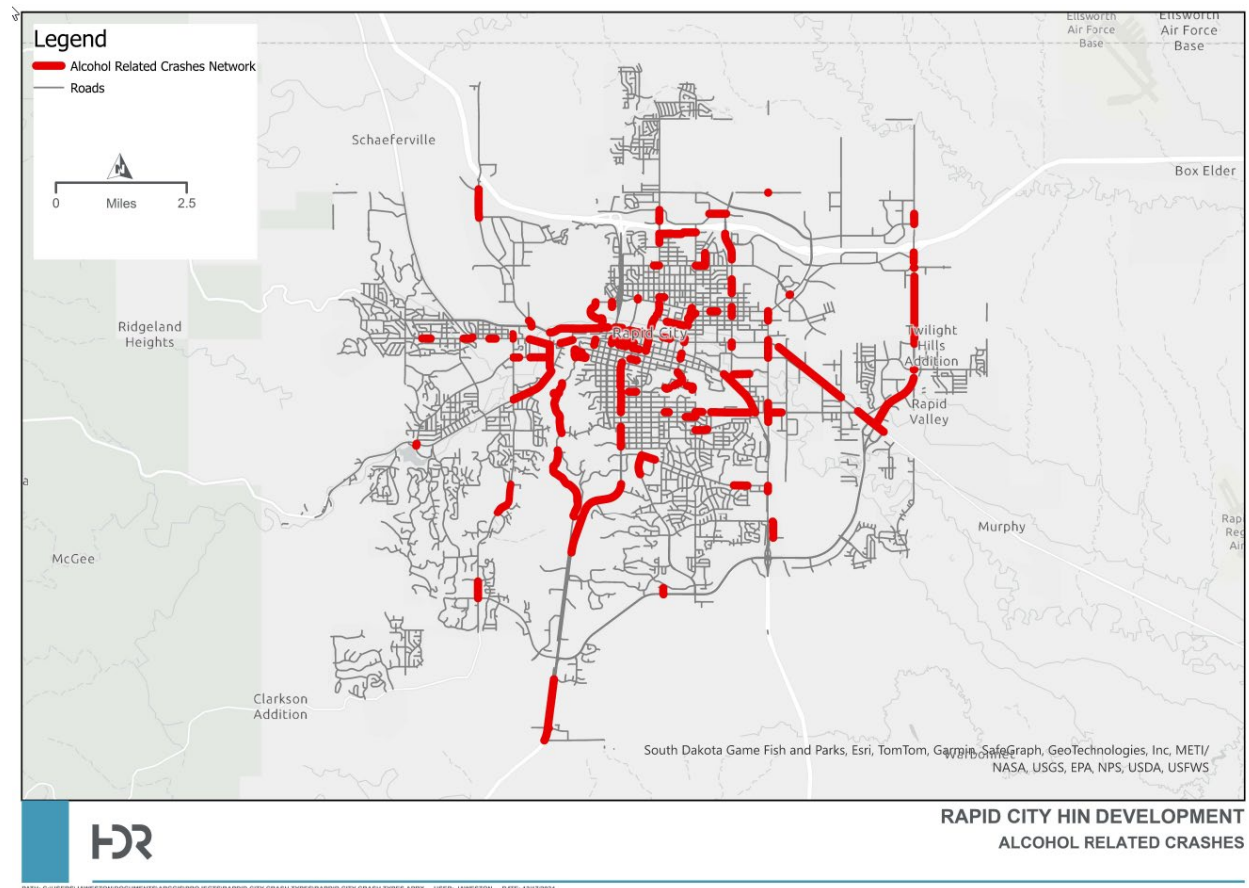
Figure 5. VRU-Related Crashes



Alcohol-Related Crashes

The next crash type identified was alcohol-related crashes. The analysis in Part 1 noted that more than 60 percent of fatal and serious injury crashes that had alcohol involved occurred on city streets. The corridors highlighted in red in **Figure 6** are segments that had two or more alcohol-related crashes. Corridors of significance include the downtown area, SD 44, U.S. 16/Mt Rushmore Road, Skyline Drive, Cambell Street, and Lacrosse Street.

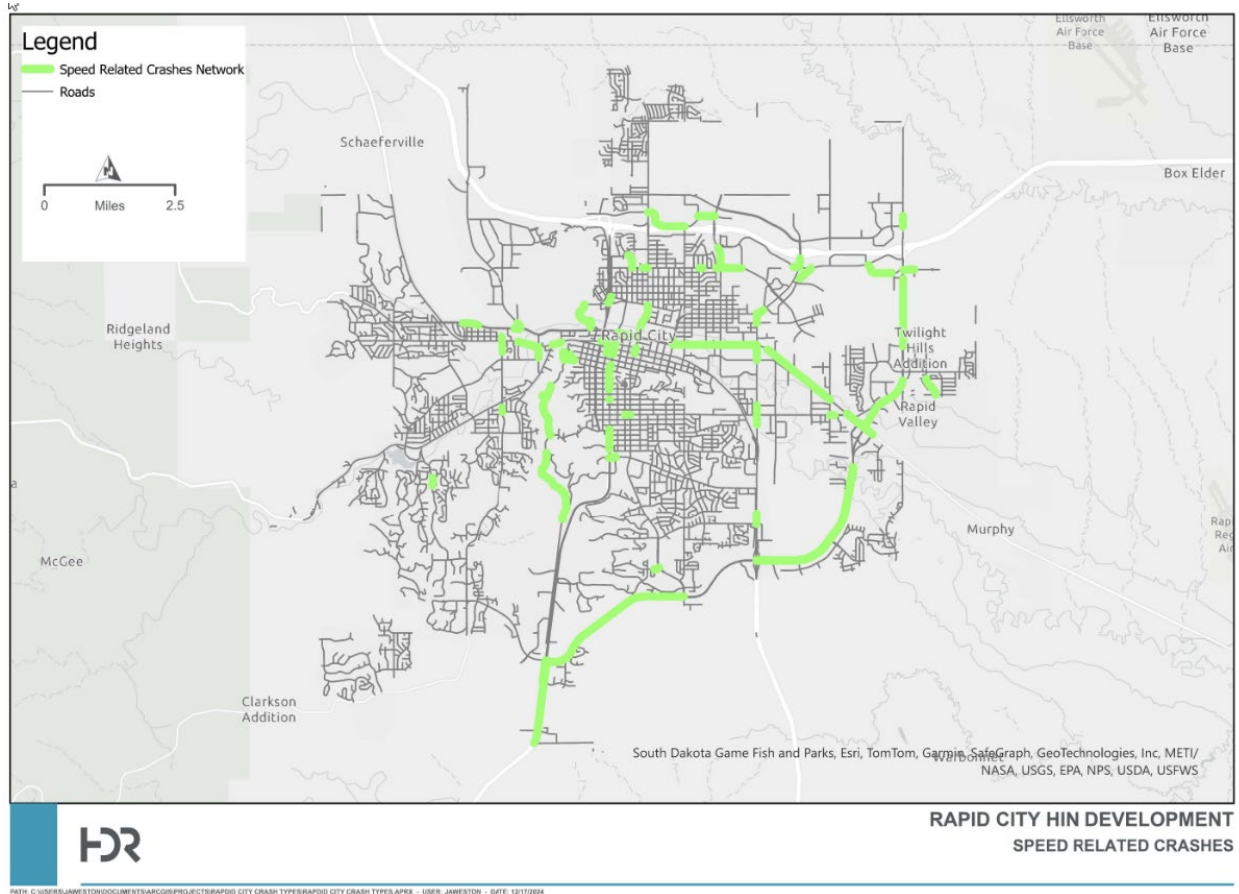
Figure 6. Alcohol-Related Crashes



Speed-Related Crashes

The final crash type analyzed was speed-related crashes. Almost 50 percent of speed-related crashes occurred on city streets as noted in Part 1. **Figure 7** identifies the segments that had three or more crashes labeled as speed related. Corridors to note include SD 44, Mt Rushmore Road, U.S. 16B/Elk Vale Road, Skyline Drive, Cambell Street, and Anamosa Street.

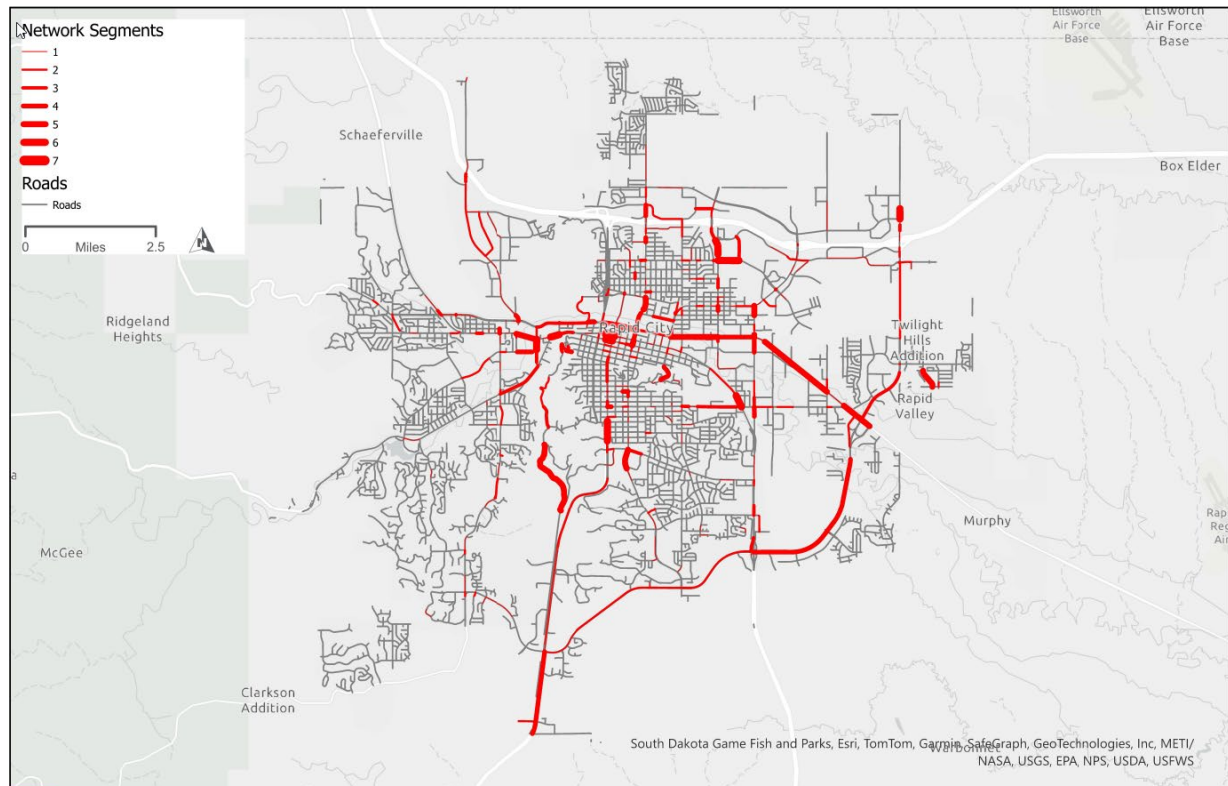
Figure 7. Speed-Related Crashes



All Segments

All crash types were then combined to create **Figure 8**, which assigns a score to all of the segments included in the analysis. Each segment was assigned a score based on the total number of categories the segment was included in. For example, if a segment showed up in just the “Over 65” and “Alcohol-Related” categories, it would have a score of two. Several corridors showed in four or more categories, including SD 44, U.S. 16/Mt Rushmore Road, U.S. 16B/Elk Vale Road, Skyline Drive, Cambell Street, Anamosa Street, and a few streets in the downtown area.

Figure 8. Multiple Network Segments



**RAPID CITY HIN DEVELOPMENT
MULTIPLE NETWORK SEGMENTS**

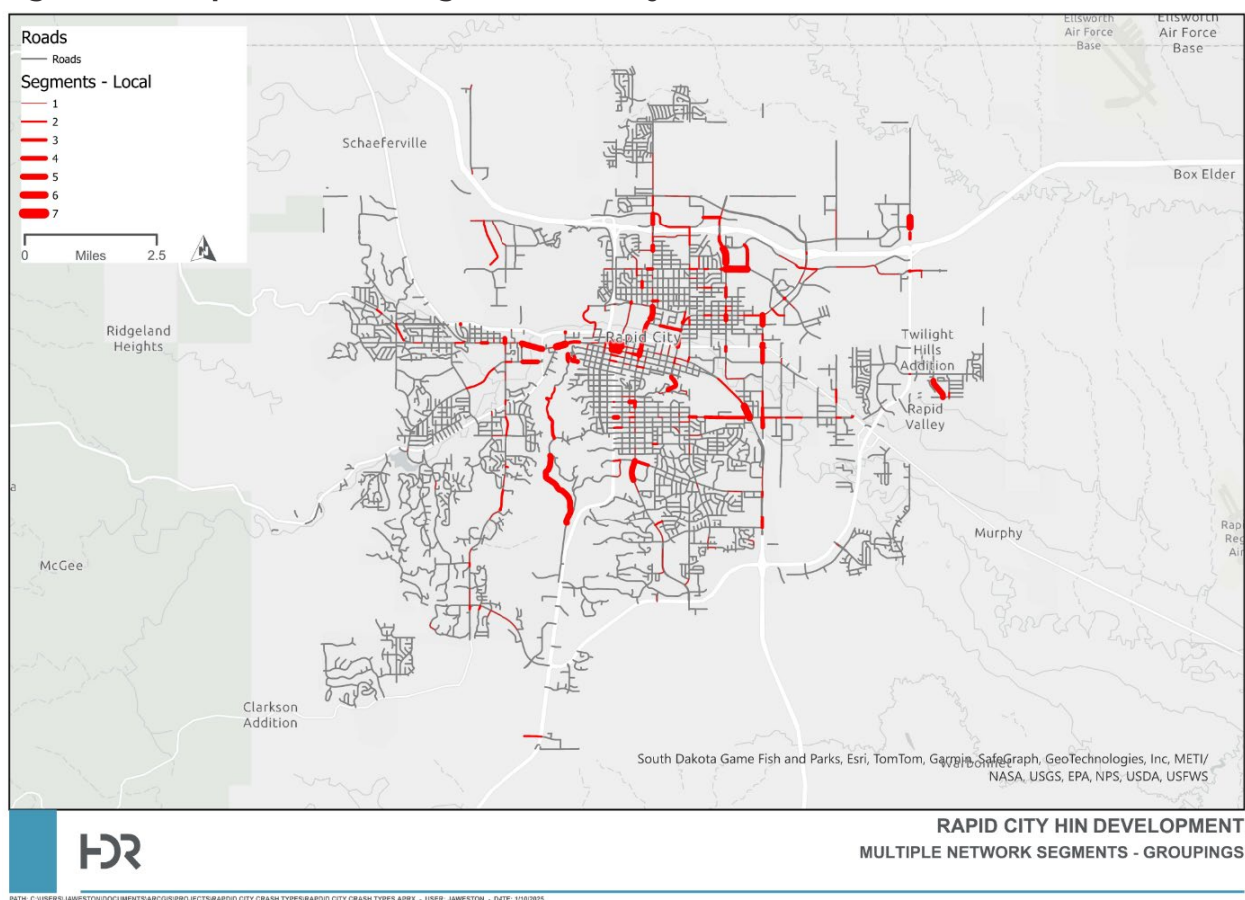
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All City-Owned Segments

The data collected through the safety analysis and discussed in this memo focuses on the entirety of Rapid City's roadway network. While addressing all of these corridors will be crucial to reducing the number of fatal and serious injury crashes in Rapid City to zero, multiple High-Injury Network streets identified are under the jurisdiction of South Dakota DOT. The City's objective for this study is to place a priority on safety measures that can be advanced on City-owned streets. **Figure 9** maps the High-Injury Network as it applies to just City streets. These locations will be the focus of next steps for the SS4A planning process, which will include identifying corridors of focus for safety treatments and infrastructure design concepts.

Figure 9. Multiple Network Segments on City Streets



Safety Findings

Based on the analysis conducted, several key findings and recommendations were noted for segments with significant crash issues:

- The central business district boasts excellent overall network coverage of traffic-calming measures and improvements for VRUs. With the addition of a few targeted enhancements and enforcement, the area could reduce the occurrence of crashes, further promoting safety and accessibility for all users.
- U.S. 16, U.S. 16B, and SD 44 collectively exhibit safety concerns along their full extents. These corridors are critical transportation routes that face a combination of challenges, such as high crash frequency, lack of adequate pedestrian and bicycle facilities, and infrastructure conditions that may contribute to unsafe driving behaviors. Addressing these issues could benefit from a localized education campaign or an enforcement strategy to promote safer behaviors and raise awareness of roadway risks. Combining these approaches holistically is essential to improving transportation safety and mobility in the region.
- Every interstate crossroad presents safety challenges, which is a common occurrence in similar urban settings. However, addressing these issues through targeted interventions, such as optimized traffic flow measures, speed management techniques, improved signage, and enhanced lighting, could greatly enhance safety and efficiency at these critical intersections.
- Skyline Drive, with its winding curves and scenic appeal, frequently experiences excessive speed-related crashes, likely due to joyriding. These incidents are primarily attributed to drivers losing control on the sharp turns. To address this, a combination of targeted safety measures is recommended. The installation of rumble strips along the edges and centerlines can help prevent lane departures, while chevrons placed at key curves can provide visual warnings to encourage safer speeds. Additionally, dynamic speed displays can remind drivers to reduce their speed, particularly in areas prone to violations. Together, with periodic speed enforcement campaigns, these interventions can significantly mitigate crashes on this curvy section, enhancing safety while maintaining the roadway's appeal.

Safety Countermeasures

Proven safety countermeasures from the Federal Highway Administration (FHWA) were referenced as potential solutions for the identified crash types.

Countermeasures included, but not limited to, include the following:

- **Speed Management:** Implementing speed management measures, such as speed displays and enforcement cameras, is recommended for corridors with high-speed concerns. These interventions can help mitigate crash risks by encouraging drivers to maintain safe speeds.
- **Crosswalk Enhancements:** Installing painted crosswalks, raised crosswalks, and reflective backplates can improve pedestrian safety by enhancing visibility. Specific intersections and mid-block crossings should also include lighting to ensure pedestrian visibility at night.
- **Traffic Signal Improvements:** The addition of protected traffic signals and reflective backplates is crucial for reducing vehicle-vehicle and vehicle-pedestrian conflicts at intersections. Enhanced signal visibility is particularly important on high-traffic corridors.
- **Pedestrian-Specific Infrastructure:** The installation of rectangular rapid flashing beacons (RRFBs), pedestrian islands, and midblock crossings will create safer opportunities for pedestrians to cross busy streets. These measures are particularly effective on corridors with heavy pedestrian activity.
- **Lighting and Visibility Improvements:** Increasing lighting at intersections and along corridors can address visibility issues during low-light conditions, reducing crashes involving VRUs.
- **Traffic-Calming Measures:** Techniques such as chevrons, rumble strips, and corridor management strategies can reduce aggressive driving behaviors and encourage compliance with traffic rules.
- **Enforcement and Monitoring:** Safety cameras and consistent enforcement of speed and traffic laws can act as deterrents to unsafe driving behaviors. Coupled with educational campaigns, these efforts can have a lasting impact on driver behavior.
- **Sidewalk and Access Enhancements:** Building or repairing sidewalks and managing access points can create safer environments for pedestrians and cyclists, ensuring they are separated from vehicular traffic where possible.

Each FHWA proven countermeasure was mapped to relevant crash types as follows.

Table 1. Countermeasure and Crash Type Relationship

Countermeasure	Applicable Crash Types
Speed Management	Speed-related crashes, alcohol-related crashes
Painted Crosswalks	VRU crashes
Protected Traffic Signals	Angle crashes, VRU crashes
RRFBs	VRU crashes
Pedestrian Islands	VRU crashes
Chevron Markings	Angle crashes, speed-related crashes
Rumble Strips	Speed-related crashes, alcohol-related crashes
Reflective Backplates	Intersection crashes (angle and VRU)
Sidewalk Installations	VRU crashes
Midblock Crossings	Pedestrian crashes, VRU crashes
Lighting Improvements	Intersection crashes, VRU crashes
Crosswalk Visibility	Pedestrian crashes, VRU crashes
Radar Speed Displays	Speed-related crashes
Corridor Management	Speed-related crashes, angle crashes
Speed Safety Cameras	Speed-related crashes
Traffic Calming Measures	Speed-related crashes, alcohol-related crashes
Enforcement Strategies	Alcohol-related crashes, speed-related crashes

Priority Corridors

Flagged segments with higher scores that were continuous or had minimal gaps were grouped together and identified for further analysis. **Figure 10** illustrates these priority corridors with pink representing state-owned corridors and orange representing City-owned corridors. These segments were reviewed using satellite imagery and Google Street View to validate crash patterns, assess existing roadway

environment, and identify countermeasures that would improve safety. This step confirmed that appropriate countermeasures were identified based on real-world conditions.

Using the proven safety countermeasures from FHWA and the crash types recognized on each corridor from the safety analysis, potential safety countermeasures were identified for each priority corridor. **Table 2** summarizes the location and extents of the priority corridors and lists any recommended safety countermeasures that would benefit safety and address known crash types.

This safety analysis provides a data-driven framework to address critical crash locations in Rapid City's roadway network. By leveraging FHWA proven safety countermeasures and conducting visual verification, this approach promotes recommended improvements that are targeted, effective, and tailored to the unique challenges of each roadway segment.

Figure 10. Priority Corridors

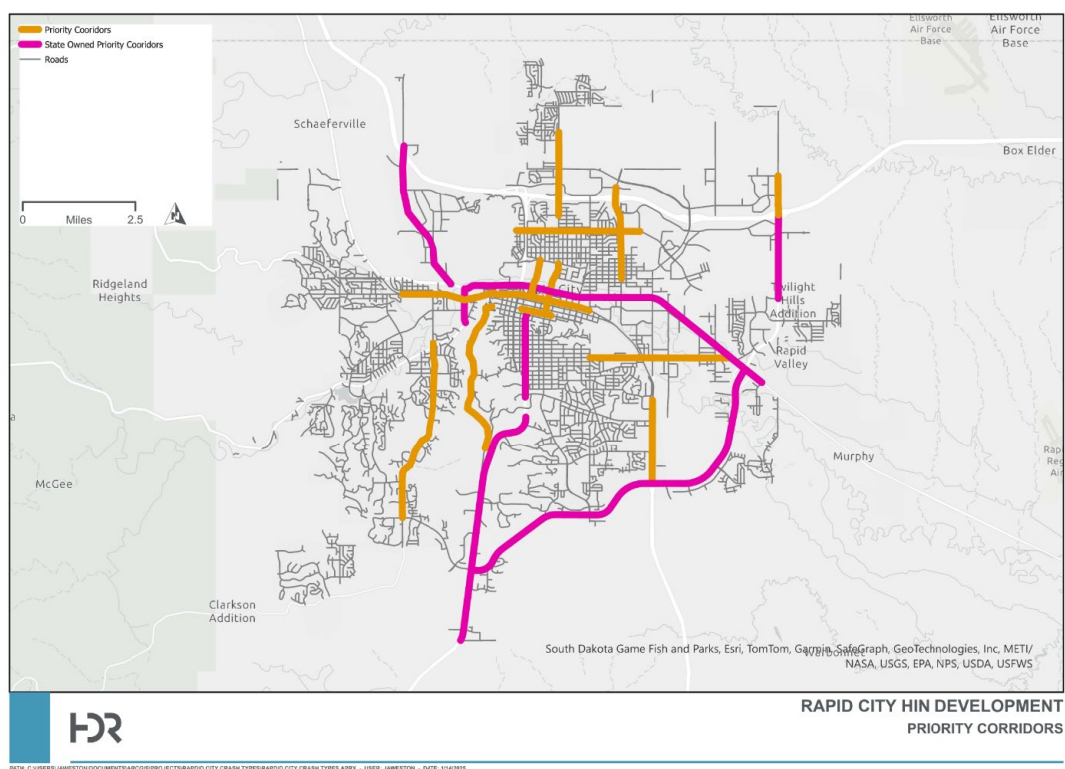


Table 2. Key Roadway Segments and Recommended Countermeasures

Road	Extents	Speed Management	Painted Crosswalks	Protected Traffic Signals	RRFB	Pedestrian Islands	Chevrons	Rumble Strips	Reflective Backplates	Sidewalks	Midblock Crossings	Lighting at Intersections	Crosswalk Visibility Enhancements	Speed Displays	Corridor Management Access	Speed Safety Cameras	Traffic Calming	Enforcement
City-Owned Roads																		
Haines Ave	Lindbergh Ave – Kathryn Ave	X		X					X	X		X	X	X	X	X		
Main St	32nd St – St Joseph St			X	X	X					X							
Main St	St. Joseph St – Maple Ave				X				X					X			X	X
St. Patrick St	Elm Ave – SD 44											X						
Campbell St	Bridge View Dr – U.S. 16			X														X
Anamosa St	Silver St – Luna Ave	X		X							X			X			X	
N 5th St	North St – Quincy St			X											X			X
Lacrosse St	Disk Dr – E Philadelphia St		X	X	X													
Quincy St	9th St – 4th St													X				X
Skyline Dr	Tower Rd – Quincy St						X	X										
Sheridan Lake Rd	SD 44 – Carlton Blvd	X	X											X				X
Mt Rushmore Rd	North St – Main St													X				X
Elk Vale Rd	Mall Dr – Seger Dr	X												X				X
State-Owned Roads																		
SD 44	Jackson Blvd – Omaha St											X						X
SD 44	Omaha St – Twilight Dr	X	X	X								X		X				X
SD 445	Tatanka Rd – SD 231		X	X						X								X
U.S. 16	Quincy St – Tower Rd				X												X	X
U.S. 16	Moon Meadows Dr – Cathedral Dr																	
U.S. 16B	U.S. 16 – SD 44																	X
U.S. 16B	Anamosa St – Mall Dr	X												X				X

Comment Map

Public input has been collected through the project's website where community members are prompted to leave comments at specific locations on a comment map. To date, 28 comments have been received, ranging from topics covering speeding, pedestrian crossings, bicycle facilities, and roadway conditions. **Figure 11** illustrates where the comments are on Rapid City's roadway network. Key takeaways include the following:

- Four comments related to pedestrian crossing were included at the intersection of SD 44 and Canal Street. The comments note that while there are Americans with Disabilities (ADA) ramps and a pedestrian median refuge island at this location, trees block drivers' views of the crosswalk. Additionally, there are concerns with only one lane of vehicles stopping on SD 44 to allow pedestrians and bicyclists to cross, creating conflicts with vehicles in the second lane who do not see the pedestrians crossing and do not stop. Drivers on Canal Street are also only focused on turning left and miss pedestrians and bicyclists traveling west on SD 44. This intersection connects Founders Park with several businesses, including a bike shop and brewery. High-visibility crosswalks or a pedestrian signal would improve safety in this area.
- Six comments were located at the intersection of 5th Street and Enchanted Pines Drive. Issues reported include speeding, roadway geometry, and an increase in traffic volumes due to the new apartment complex. Recommendations include installing a traffic signal, increasing enforcement, and adjusting medians.
- Bicycle conditions in the downtown area are a concern. Streets like Main Street have speeds that make the roadway feel unsafe, and bicyclists have to constantly be aware of cars parking or extending into the travel lane. Separated bicycle facilities would be valuable in these locations.

Comments received from the public via the website or other engagement activities will continue to be monitored and summarized.

A map of Rapid City, South Dakota, showing the locations of 18 red pin markers. The map includes major roads like I-90, I-16, and I-29, and landmarks like the Rapid City River and downtown area. The text "WILDWOOD ADDITION" and "ARROWHEAD ESTATES" is visible in the bottom left corner.

Appendix D. Safe Streets for All Projects and Strategies Memo

Purpose

The recommendations presented here are designed to support the strategy and project selections component of the Rapid City Comprehensive Safety Action Plan (CSAP). From Safe System Approach (SSA) research and principles, it is clear that greater proactivity is foundational to reducing fatalities and serious injuries. The City of Rapid City and project team have proposed recommendations at the policy, systemic, and major project level. As seen in **Figure 1**, policy strategies are foundational, explaining how agencies, their partners, and the traveling public approach safe travel and how developing safe multimodal travel networks has the greatest potential impact on severe crash reductions because modified behaviors, proactive planning, meaningful changes to policies, and adoption of safety best practices can affect every piece of local multimodal travel. That broad geographic coverage will outweigh a focus on any one hot spot. The memo first describes which safety problems have been prioritized (or designated emphasis areas) and then lists policy recommendations pertinent to each. A major part of the City's safety policy is documenting relevant safety aspects of plans and standards.

The second layer of safety recommendations includes systemic strategies and their resulting projects. Systemic approaches focus on the risk of severe crashes and where those risks may be elevated. For example, a systemic approach may be useful for severe road departure crashes because they are most often related to common

Figure 1. Projects and Strategies Framework



combinations of factors (e.g., level of travel, road geometry, features of the built and natural environment like curves and steep slopes). In the Rapid City dataset, the data limitations led the project team to focus on the history of property damage crashes and lower severity injury crashes as a proxy for future severe crash risk. In the systemic framework, each risk area (emphasis area) is paired with appropriate low-cost treatments that could be deployed in stand-alone safety projects over multiple higher risk locations. Systemic thinking can also be put in action by using risk maps to add safety value to smaller scope maintenance and rehabilitation projects (even projects focusing on nontransportation infrastructure like water and gas utility projects).

The final layer considers major safety projects. These projects reshape the built environment so that streets and intersections can have features added (e.g., medians, curb bulb outs) or features resized (e.g., intersection converted to roundabouts, walkways or bikeways widened). Major safety projects typically apply one or more best practice countermeasures in areas with severe crash history or higher risk levels and more moderate crash history. These more significant infrastructure countermeasures often provide the best means to reduce severe conflicts, manage the balance of speed to context, increase user separation in time, and improve traveler awareness. However, due to their cost and time to develop and deliver, major projects must be used in a limited manner and must be focused to address the highest priority locations first.

Policy Strategies

This section outlines how Rapid City can update internal policies, procedures, and design standards to more effectively reduce crash risk. Policy strategies refer to noncapital changes, such as speed-setting practices, design criteria, and project review processes, that shape how streets are planned and built.

These strategies are organized into three roles:

- **Policy Change** – Updates to design standards and guidance. Updates in this category are often public works-led and funded, but some safety findings like SS4A can be used to help agencies incorporate the latest advances into their community.
- **Proactive Prevention** – Ensuring safety is integrated into routine decisions, not just reactive fixes. City staff beyond transportation functions need to play a role here because many proactive fixes are identified by police/public safety, maintenance and inspector staff, and citizen comments. Opportunities for low-cost strategies deployed proactively may depend on high levels of internal collaboration to focus on making each project a safety project.

- Behavior Modification** – Even with a good approach to projects and increasing how many projects touch safety, travelers on the road share responsibility for safe travel and must be engaged with useful guidance on how they can play their part on the road. Recommendations in this category touch on how safety issues are defined (e.g., speed as a systemwide factor) or how they are communicated meaningfully to travelers. Recommendations in this category may come from outside City staff; from sources like state, regional, and local nonprofit and advocacy groups; and from the public safety space through State Highway Safety Offices. Regardless of outside partner leadership, it is important for the City to engage and coordinate the use of messages targeted to safe travel behaviors.

Together, these changes support a consistent, systemwide approach to delivering safer streets. Together, these changes support a consistent, systemwide approach to delivering safer streets.

Emphasis Area Strategy

The eight emphasis areas outlined below were derived from Rapid City crash data, South Dakota's Strategic Highway Safety Plan, and SS4A planning guidance. Each emphasis area is analyzed at both the crash-event level and systemic level. These categories reflect the five elements of the SSA and allow Rapid City to consider not only where crashes have occurred but also where risk conditions exist and can be addressed before crashes happen through targeted design, behavior modification, and policy interventions.

The eight emphasis areas:

- Angle Crashes
- Vulnerable Road User (VRU)
- Speed-Related
- Lighting Conditions
- Alcohol/Impairment
- Motorcycles
- Young Drivers
- Older Drivers

Figure 2. FHWA Safe System Roadway Design Hierarchy



The order of these emphasis areas is intentional and based on the Safe System Roadway Design Hierarchy (**Figure 2**). Angle crashes and VRU safety are closely related to Tier 1, which involves the removal of severe conflicts and has the highest potential for severe crash reduction or elimination. Then, speeding is related to Tier 2. Lighting is the last design-focused emphasis area and is most closely related to Tier 4.

While the remaining emphasis areas are not design or engineering focused, alcohol and impairment have some potential to be addressed by the City through policy and law enforcement activity. Motorcycles, young drivers, and older drivers are users of the system, but working with these users on behavior modifications may take partnerships for the City to implement. Even so, street designs and policy can change to better accommodate these users.

Angle Crashes

Primary Strategy: Policy + Roadway Conflict Reduction

Angle crashes often occur at intersections or driveways in the transportation network. Many severe angle crashes involve turning movements and the lack of signal protection for movements crossing high-speed travel paths.

Policy-Level Approach:

- Support adoption of intersection design policies that primarily emphasize roundabouts and reduced conflict designs where feasible and secondarily emphasize protected turning movements and signal timing changes over additional signage or striping.
- Consider corridor-level access management strategies and driveway consolidation during City capital projects, including resurfacing and reconstruction due to projects like water main and utility relocations.

Proactive Prevention:

- Apply reflective backplates, protected-phase left turn signals, and advanced warning signage at intersections with documented angle crashes.
- Evaluate reduced conflict (also called 3/4 and right-in, right-out) intersections or roundabouts at skewed intersections or two-way stop control locations on higher-speed corridors.

Behavior Modification:

- Use public awareness campaigns focused on intersection navigation and visibility, particularly for older and younger drivers who may struggle with complex geometries.

Enforcement:

- Prioritize targeted enforcement of red-light running and failure-to-yield violations at high-crash intersections.

Vulnerable Road Users

Primary Strategy: Safe Crossings + Separation

VRUs, including pedestrians, bicyclists, and micromobility users, are disproportionately affected by crashes in the downtown core and on arterial corridors with limited crossings.

Policy-Level Approach:

- Establish a Complete Streets policy to guide infrastructure decisions with VRU safety in mind. Implementation of the Complete Streets policy will likely require the development or adoption of a Complete Street toolkit or design guide for public works and its contracted support.
- Include VRU countermeasures as required elements in project scopes for any resurfacing or redesign.

Proactive Prevention:

- Implement rectangular rapid flashing beacon (RRFBs), high-visibility crosswalks, pedestrian refuge islands, and sidewalk gap closures on identified VRU corridors, regardless of site-specific crash history.

Behavior Modification:

- Develop signage and outreach materials reminding drivers of pedestrian yielding laws, particularly at midblock crossings.

Enforcement:

- Conduct regular pedestrian crosswalk enforcement operations at priority crossings and corridors.

Speed

Primary Strategy: Speed Management + Self-Enforcing Design

Speed-related crashes are among the most common across all emphasis areas, often tied to wide cross-sections, long block lengths, or downhill grades. Speeds can vary widely based on driver preferences, but in multimodal contexts, multiple design opportunities exist to encourage (or have the street self-explain) the most appropriate travel speed.

Policy-Level Approach:

- Establish a Citywide speed management review process, including speed limit setting based on context, not just functional class, and speed audits near VRUs and communities.

Proactive Prevention:

- Implement lane narrowing and corridor management strategies on streets with speed-related crash history.
- Install radar speed signs near schools and key crosswalks, which can help with drivers self-correcting. (Speed safety cameras can play a similar role but must be legally allowable before being considered for deployment.)

Behavior Modification:

- Educate the public on speeding risks through driver feedback tools, neighborhood campaigns, and traffic-calming demonstrations.

Enforcement:

- Expand high-visibility speed enforcement on corridors with a history of speed-related crashes.

Lighting Conditions

Primary Strategy: Visibility Enhancement

Poor lighting conditions contribute to increased crash risk, especially for VRUs and at intersections.

Policy-Level Approach:

- Develop or update a municipal lighting policy that prioritizes illumination (vehicle and pedestrian-scale) on high-risk corridors and midblock crossings.
- Integrate lighting audits into the capital improvement plan (CIP) and corridor planning processes.

Proactive Prevention:

- Add or upgrade lighting at intersections and known VRU conflict points, especially in areas with high nighttime crash rates.

Behavior Modification:

- Include nighttime visibility education (e.g., pedestrian reflectors, headlight use) in public outreach strategies.

Enforcement:

- Enforce headlight-use compliance and impaired-driving checks during nighttime hours.

Alcohol/Impairment

Primary Strategy: Enforcement + Impairment Reduction

A significant portion of fatal and serious injury crashes involve alcohol, often in the downtown area or on scenic drives prone to late-night travel.

Policy-Level Approach:

- Collaborate with law enforcement to increase impaired-driving checkpoints or saturation patrols on known high-risk corridors.

Proactive Prevention:

- Coordinate with South Dakota's Highway Safety Plan and Impaired Driving Plan to determine whether any operational or infrastructure countermeasures are appropriate.

Behavior Modification:

- Partner with local bars, breweries, and event organizers to promote designated driver programs or ride-share partnerships.

Enforcement:

- Increase targeted impaired-driving patrols during high-risk times (e.g., weekend nights, holidays, special events).

Motorcycles

Primary Strategy: Risk Awareness + Visibility

Motorcycle crashes, while fewer in number, often result in serious injuries. These crashes are concentrated on wide arterials and scenic drives.

Policy-Level Approach:

- Encourage helmet use and motorcycle safety training through state and local partnerships.

Proactive Prevention:

- Improve visibility through better signage, reflective backplates, and enhanced delineation along curves and multilane roads.

Behavior Modification:

- Consider seasonal public campaigns during high-riding months focused on driver awareness of motorcycles.

Enforcement:

- Conduct seasonal enforcement of unsafe passing, speeding, and impaired riding during peak motorcycle season.

Young Drivers (Under 25)

Primary Strategy: Behavior Modification + Education

Crashes involving younger drivers often stem from inexperience, speed, or distraction. These crashes cluster near schools, commercial areas, and wider arterial roadways.

Policy-Level Approach:

- Coordinate with local schools and law enforcement to support safe driving programs targeting new drivers.
- Consider school zone speed enforcement policies or youth-targeted road safety programs.

Proactive Prevention:

- Target lower-cost interventions such as radar feedback signs and speed displays on corridors with recurring crashes involving younger drivers.

Behavior Modification:

- Promote education initiatives and media campaigns tailored to early drivers, including social media-based outreach. Use the City's reputable voice to share and amplify already funded education campaigns by State Highway Safety Offices and seek public relations and media training opportunities to grow local roles in safety messaging.

Enforcement:

- Increase graduated driver's license compliance checks and targeted patrols around schools and youth gathering areas.

Older Drivers (Over 65)

Primary Strategy: Design for Clarity + Simplification

Age-related changes in vision, reaction time, and mobility can increase crash risks for older drivers, especially at complex intersections or on higher-speed corridors.

Policy-Level Approach:

- Evaluate adoption of all-age-and-ability friendly design guidelines for City-owned streets. Such guidelines might limit the use of crossings or intersections to a smaller number of lanes for stop-controlled intersections and similar design that simplify choices in safe gaps by drivers.

- Encourage enhanced lighting and clarity review and decluttering of signage and pavement markings as part of standard asset rehab programs.

Proactive Prevention:

- Improve intersection legibility through larger signs (particularly regulatory signs like stop signs), clearer pavement markings, and reduced decision-making complexity.

Behavior Modification:

- Partner with local aging services and healthcare providers to distribute safety materials related to navigation and safe driving practices.
- Work with public health and social services to discuss travel and mobility options for older travelers.

Enforcement:

- Support targeted enforcement of failure-to-yield and red-light violations in areas with high concentrations of older drivers.

Processes Enabling Safety Policy

The above policy strategies are effective methods of reducing multimodal crashes, but they may not be actionable if the next steps are not clear and if the City does not have resources reserved to cover both staff time and any contracted services. The overarching safety action plan may also be too broad to define precise next steps for specific emphasis areas. The SS4A program from the U.S. Department of Transportation defines a valuable next step of the CSAP as conducting supplemental planning. Supplemental planning can help delve into key approaches and actions targeted to specific street types and contexts, specific users, and specific parts of the project development process. While the policy and process change aspect of the CSAP identifies existing processes and plans and their potential opportunities, the related recommendations to change policy and process may just be a starting point.

Table 1 enumerates processes and plans that can use well-established models to help begin to enact enhanced safety policy.

Table 13. Recommended Safety Processes

Safety Study or Process	Aligned Emphasis Areas	Description	Cost	References
Complete Streets Policy	Speeding; Angle Crashes; VRU; Lighting	Complete Streets is an approach to planning, designing, and building streets that enables safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities. Developing and enacting a Complete Streets policy provides a framework for accommodating VRU needs and conditions that implement a safer road for all users.	\$\$	Complete Streets
Road Safety Audits	All	Develop City guidance for Road Safety Audit implementation into traffic studies and planning efforts.	\$\$	Road Safety Audits
Intersection Control Evaluation (ICE)	Angle Crashes; VRU; Lighting	The ICE policy should evaluate safety, traffic, and transit operations; active transportation access; cost; and right-of-way impact, among other factors. Adhering to an ICE policy enables a uniform and data-driven approach that will include the consideration of community and agency priorities, especially from a safety aspect.	\$	Intersection Control Evaluation
Traffic Impact Study (TIS)	Angle Crashes; VRU; Lighting	A TIS policy should include safety and crash analysis at its core. All development projects (including infill) of a certain size would trigger the requirement for a study of safe access generated and traveling adjacent to the site, with clarity on cost and responsibility share between the public and private sector. The policy developed can also accomplish safe standards for access management of all development projects, even those that do not meet specific traffic impact thresholds.	\$	Traffic Impact Studies
Traffic-Calming Policy	Speeding; VRU	Develop and maintain a policy to identify eligible locations and prioritize interventions for traffic-calming projects. This policy will implement projects that reduce speed and promote a safer environment for all users in a systemic fashion. Factors for identification should include multimodal traffic volume, existing geometry, and vehicular speeds.	\$\$	Traffic Calming
Speed Management Plan	Speeding; VRU; Motorcycle;	A speed management plan contains several key elements such as Citywide data collection and analysis, review of	\$	Speed Management Program

Safety Study or Process	Aligned Emphasis Areas	Description	Cost	References
	Young Driver; Older Driver	speed limit setting practices, traffic-calming strategies, enforcement strategies, public education, and awareness.		
Sidewalk and Trail Snow Removal	VRU	The snow removal strategies should prioritize critical active transportation pathways and Safe Routes to Schools pathways and bus routes or areas that are a higher risk for VRUs. Prioritizing snow removal for these areas builds trust and reliability in non-motorized travel methods in the community. This also improves safety for VRUs in higher-risk transportation conditions.	\$\$	Sidewalk Snow Removal

Systemic and Location-Specific Safety Project Strategies

A comprehensive safety strategy must address both location-specific, high-risk corridors and systemic conditions that contribute to preventable crashes across the roadway network. While major capital investments will be necessary to mitigate crash severity on the High-Injury Network, systemic safety projects play a vital role in reducing risk exposure, modifying behavior, and enhancing roadway conditions Citywide.

This dual-pronged approach aligns with the SSA, which emphasizes layered protection by recognizing that human error is inevitable and roadway design, speed, visibility, and predictability can reduce the consequences of those mistakes. Whether location-specific or systemic, effective safety planning focuses on continual monitoring and refinement, which is why one foundational approach is the development and use of a Safer Streets Toolkit before moving into how and where the toolkit is recommended for application.

Safer Streets Toolkit

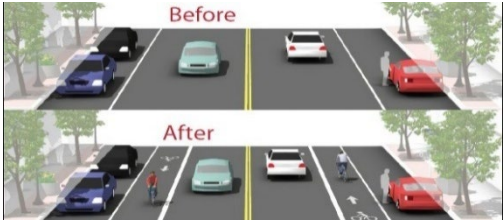
The Safer Streets Toolkit includes safety countermeasures proven to provide safety benefits. Implementing any of the countermeasures would lead to a reduction in the number of crashes, including fatal and serious injury crashes. These strategies align with the SSA, which recognizes that because “people make mistakes,” the system must be proactive and include layers of redundancy. Therefore, these countermeasures can be used independently or in conjunction depending on existing conditions and the needs of the community. The safety countermeasures

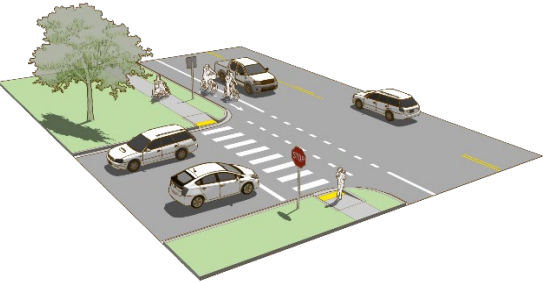
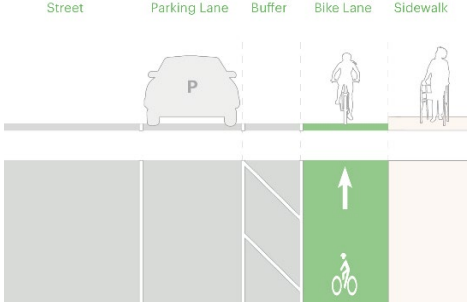
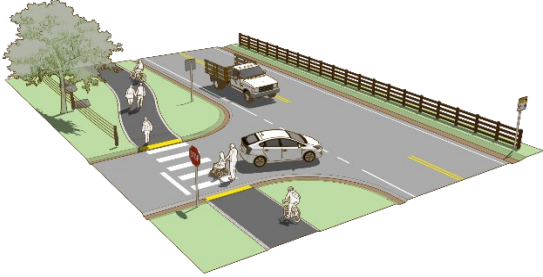
comprising the Safer Streets Toolkit are described in **Table 2**. The Toolkit itself is broken into sections for segment countermeasures and for intersection countermeasures for ease of future application.

Table 24. Safer Streets Toolkit Outline

Toolkit Feature	Description
Countermeasure Name	Name of the countermeasure
Image	Visual depiction of the strategy
Description	Description of the countermeasure
Crash Types	Crash types addressed by the countermeasure: • Lane Departure: Fixed object, head-on, overturn, sideswipe, parked vehicle, single vehicle • Rear-end • Angle: Left-turn, right angle • Bike/Ped: Bicyclists and pedestrians
Crash Reduction Factor	Potential reduction in all crash severities and types owing to implementation of the countermeasure
Project Type	Each countermeasure is grouped into either major project or systemic project depending on the impact of implementation and required funding
Cost	The estimated cost for implementation of the countermeasure: • \$ = <\$10k • \$\$ = \$10k – \$100k • \$\$\$ = \$100k - \$1M • \$\$\$\$ = \$1M+
Traffic Considerations	Factors that help determine whether a countermeasure may be a good fit for a potential location or project. Some examples include roadway geometry, traffic volume, and speed limits.
References	Links to industry resources and references that provide additional information on each countermeasure.

Table 3. Safety and Countermeasure Toolkit.

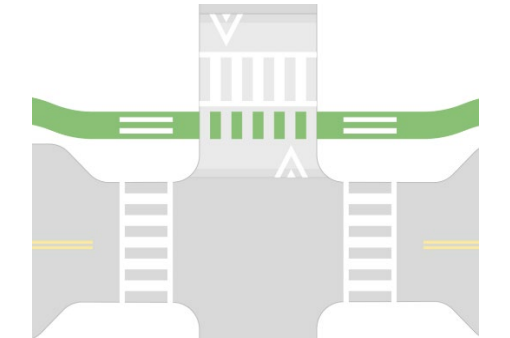
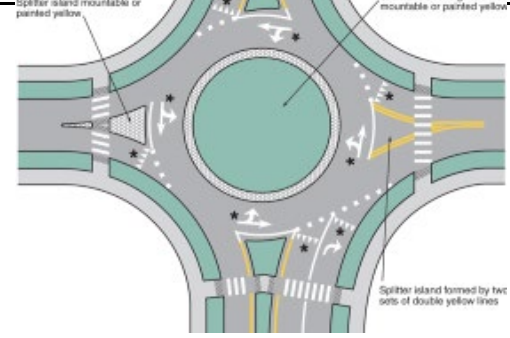
Segment Countermeasures								
Countermeasure	Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
VRU Facilities/Traffic Calming	Horizontal Traffic Calming  Source: NACTO	Horizontal traffic-calming techniques slow traffic and improve safety. Examples include: • Chicanes • Curb extensions/ bulb-outs • Refuge islands • Pinch points • Lane shifts	All	30%	Systemic Project	\$	<20,000 ADT	Speed Reduction Mechanisms
	Vertical Traffic Calming  Source: NACTO	Vertical-traffic calming techniques slow traffic and improve safety. Examples include: • Speed humps • Raised crosswalks/ intersections • Traffic circles	Speed Bike/Ped Departure Angle	30%	Systemic Project	\$\$	<10,000 ADT Ensure Compliant with EMS Vehicles	Vertical Speed Control Elements
	Landscaped Buffers/On-Street Parking  Source: PEDSAFE	Landscaped buffers, on-street parking, and street trees implemented in conjunction or separately can slow traffic and improve safety.	All	–	Major Project	\$\$\$	Evaluate Line of Sight at Intersections	On-Street Parking Enhancements Landscaping
	Lane Narrowing  Source: Braintree, MA	Lane narrowing reduces roadway width while maintaining the existing lane count, which slows traffic, shortens pedestrian crossings, and adds space for bike/ pedestrian areas.	Speed Bike/Ped Departure	25%	Systemic Project	\$\$	Avoid on Truck Routes	Lane Narrowing

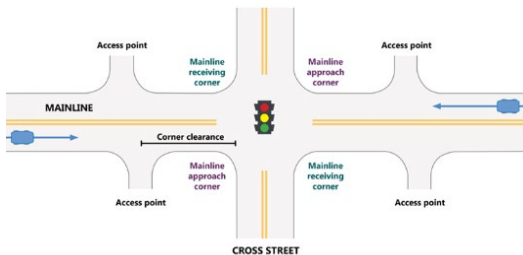
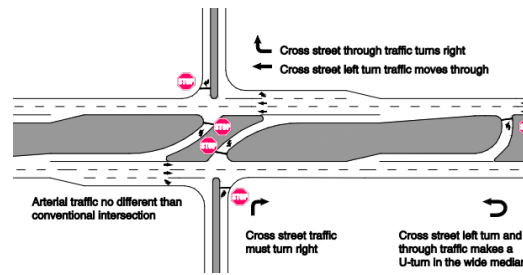
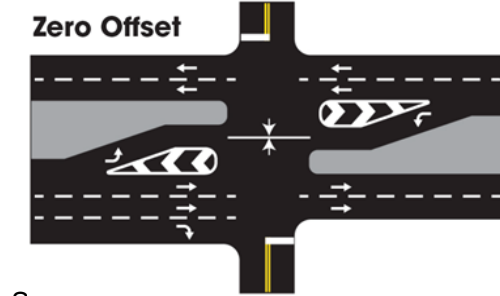
Segment Countermeasures								
Countermeasure	Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
Sidewalks	 Source: NACTO	Sidewalks improve pedestrian and cyclist safety by providing designated spaces separate from traffic, including ADA-compliant features.	Ped/Bike	90% (where sidewalks are missing)	Major Project	\$\$-\$\$\$		Walkways
Bicycle Lanes	 Source: Rural Design Guide	Bicycle lanes make cycling safer and more comfortable by separating cyclists from traffic and pedestrian facilities using paint or physical barriers.	Ped/Bike	45%	Major Project	\$\$	<6,000 AADT <35 MPH	Bicycle Lanes
Protected Bicycle Lanes/Cycle Tracks	 Source: NACTO	Protected bike lanes separate cyclists from traffic with physical barriers, significantly reducing collisions and improving safety.	Ped/Bike	55%	Major Project	\$\$\$	6,000 - 20,000 AADT <45 MPH Evaluate Exclusive Turn-Lanes and Protected Turn Signal Phasing	Separating Protected Bike Lanes
Shared Use Paths	 Source: Rural Design Guide	Shared use paths (off-street trails) improve safety and accessibility for active transportation and recreation by separating users from traffic.	Ped/Bike	25%	Major Project	\$\$-\$\$\$	>20,000 AADT >45 MPH	Paths

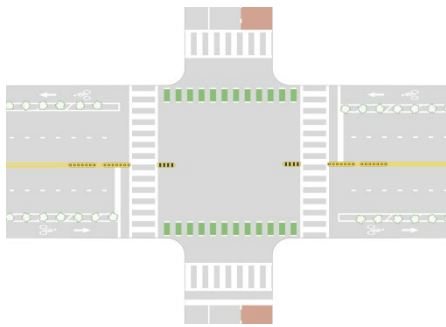
Segment Countermeasures								
Countermeasure	Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
Roadway Reconfiguration	Source: FHWA	Roadway reconfigurations reduce the number of lanes, resulting in a decrease in conflict points, crossing distances, and vehicle speeds.	All	30%	Major Project	\$\$-\$\$\$	4-to-3 lanes: <20,000 ADT	Roadway Reconfiguration
Raised Median & Access Management	Source: FHWA	Medians separate traffic, reducing head-on collisions and providing safe havens for pedestrians. Limiting driveways improves access management and reduces traffic conflicts.	All	40%	Major Project	\$\$\$\$	>12,000 ADT	Corridor Access Management Raised Medians
Additional Countermeasures	Source: NACTO	Converting one-way streets to two-way streets calms traffic, increases connectivity, and creates safer streets for all users.	Bike/Ped	30%	Major Project	\$\$\$	Evaluate Signal Modifications, Access, and Turn Lanes	One-Way to Two-Way Street Conversion
	Source: FHWA	Street lighting improves visibility, especially at intersections, crosswalks, and other high traffic areas, which reduces crashes and enhances pedestrian safety.	Bike/Ped Angle	20%	Systemic Project	\$\$		Lighting

Segment Countermeasures								
Countermeasure	Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
	Dynamic Speed Feedback Sign  Source: Department of Transportation	Speed feedback signs display approaching drivers' speeds to make them aware of their current speed, with flashing numbers indicating speeding.	Speed	5%	Systemic Project	\$		Dynamic Speed Feedback Sign
	Shoulder Installation / Widening  Source: PEDSAFE	Installing or widening shoulders provides space for disabled vehicles, maintenance, and other safety activities.	Departure	25%	Major Project	\$\$\$	Most effective when ADTs >1,000	Shoulders and Walkways
	Curve Delineation Modifications  Source: FHWA	Enhanced curve delineation uses reflective chevrons and advance warning signs to significantly reduce curve crashes, especially at night and in rural areas.	Departure	30%	Systemic Project	\$\$	History of Roadway Departure or Nighttime Crashes	Enhanced Delineation for Horizontal Curves

Intersection Countermeasures								
Countermeasure	Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
Systemic Traffic Signal Modifications	Systemic Traffic Signal Modifications  Source: PEDSAFE	Traffic signal modifications improve safety and efficiency through both hardware and software upgrades such as: • Hardware: Signal light upgrades, retroreflective backplates, pedestrian countdowns, and stop-bar/crosswalk striping, • Software: Updated timings, leading pedestrian intervals, and intelligent transportation systems implementation.	All	15%	Systemic Project	\$\$		Traffic Signal Enhancements
	Systemic Crossing Modifications  Source: FHWA	Systemic crossing modifications improve pedestrian safety and accessibility across busy streets with marked crosswalks, lighting, refuge islands, and clear signage.	Ped/Bike	30%	Systemic Project	\$\$	See FHWA STEP Guide, Table 1	Marked Crosswalks Crosswalk Visibility Enhancements
Systemic Crossing Modifications	Rectangular Rapid-Flashing Beacon  Source: PEDSAFE	RRFBs use flashing lights to improve safety at unsignalized crosswalks, especially crossings of two lanes or less and under 40 mph.	Ped/Bike	45%	Major Project	\$\$	See FHWA STEP Guide, Table 1	Rectangular Rapid Flashing Beacons (RRFB)

Intersection Countermeasures								
Countermeasure	Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
	Pedestrian Hybrid Beacon  Source: FHWA	PHBs use flashing lights to improve driver yielding to pedestrians at unsignalized crossings, especially on higher-speed roadways.	Ped/Bike	55%	Major Project	\$\$\$	See FHWA STEP Guide, Table 1	Pedestrian Hybrid Beacons
	Raised Crossing  Source: FHWA	Raised crossings improve pedestrian safety and accessibility by slowing traffic and providing a level crossing surface.	Ped/Bike	30%	Major Project	\$\$	See FHWA STEP Guide, Table 1	Design Tools for Intersections
Roundabout	Roundabouts  Source: FHWA	• Single-lane reduce traffic speeds, eliminate dangerous angle crashes, and shorten crossing distances for pedestrians. • Multilane handle more traffic but have more conflicts than single-lane roundabouts. • Mini-roundabouts are smaller, single-lane versions of traditional roundabouts with traversable centers for larger vehicles without requiring additional ROW.	All	65%	Major Project	\$\$-\$\$\$\$	<30,000 AADT <45,000 AADT <20,000 AADT	Roundabouts

Intersection Countermeasures									
Countermeasure		Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
Access Management	Raised Medians and Access Management		Medians separate traffic, reducing head-on collisions and providing safe havens for pedestrians. Limiting driveways improves access management and reduces traffic conflicts.	All	40%	Major Project	\$\$\$\$	>12,000 ADT	Corridor Access Management Raised Medians
		Source: FHWA							
Intersection Reconfiguration	Reduced Conflict Intersections		Reduced conflict intersections redesign left turns to reduce crashes and improve safety. Common types include restricted cross U-turns and median U-turns. Right-in, right-out and three-quarter intersections simplify traffic flow by restricting side-street movements, forcing right turns, and reducing crossing paths.	Bike/Ped Angle Rear-End	35%	Major Project	\$\$\$\$	Prior Condition Stop-Controlled	Reduced Left-Turn Conflict Intersections
	Turn-Lane Additions		Adding auxiliary lanes separates turning traffic, reducing crashes while improving visibility.	Angle Rear-End	45%	Major Project	\$\$\$	Visibility Concerns History of Left Turn-Related or Rear-End Crashes	Dedicated Left- and Right-Turn Lanes at Intersections
	Source: FHWA								

Intersection Countermeasures								
Countermeasure	Image	Description	Crash Types	Crash Reduction Factor	Project Type	Cost	Traffic Considerations	References
Additional Countermeasures	All-Way Stop-Control Conversion  Source: FHWA	All-way stop control converts either two-stops or unwarranted signals to four-way stops, reducing wait times and making intersections more predictable.	Bike/Ped Angle	50%	Major Project	\$	<12,000 ADT (each approach) <=2 thru-lanes (each approach)	Stop-Controlled Intersections
	Curb Extensions  Source: PEDSAFE	Curb extensions and bulb-outs shorten crossing distances, improve visibility, and increase pedestrian comfort at intersections.	Bike/Ped Angle	30%	Systemic Project	\$\$	See FHWA STEP Guide, Table 1 Avoid at High Truck Volume Intersections	Curb Extensions
	Left Turn Hardening  Source: NACTO	Left turn hardening reduces vehicle turning speed and increases vehicle yielding to pedestrians by guiding vehicles to take wider turns.	Speed Bike/Ped Angle	30%	Systemic Project	\$\$	Avoid at High Truck Volume Intersections	Left-Turn Hardening
	Systemic Stop-Control Modifications  Source: FHWA	Systemic stop-control modifications improve intersection visibility with advanced warning signs, retroreflective panels, enlarged signs, rumble strips, and cross-traffic warning signs.	Departure Angle Rear-End	40%	Systemic Project	\$\$	History of Stop-sign Running or Nighttime Crashes	Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections

Systemic Projects

Systemic projects aim to reduce risk conditions Citywide, even in locations without a significant crash history, by applying proven countermeasures to similar roadway environments. These projects are typically low to moderate in cost and are ideal for implementation during routine maintenance, resurfacing, or asset preservation cycles.

Low-Cost Safety Enhancements

Systemic safety projects may include low-cost safety enhancements, such as:

- High-visibility crosswalks and advance yield markings
- Reflective signal backplates
- Radar speed feedback signs
- Pedestrian refuge islands
- Lighting enhancements at intersections and midblock crossings
- RRFBs at uncontrolled pedestrian crossings
- Edge line rumble strips on curves and rural transitions
- Chevron signs and dynamic curve warnings
- Speed cushions or striping changes to narrow perceived lane widths

These improvements are not corridor specific but rather context specific, based on adjacent land uses to the roadway, crash type history, geometry, and user conflict potential.

Policy and Planning Integration

Rapid City's systemic safety approach can integrate with ongoing City processes and capital planning cycles. Systemic safety treatments will become most effective when incorporated into:

- **CIP project programming** – by using the Safer Streets Toolkit in concept development and sequencing and intentionally reserving some funding for safety projects (potentially to serve as match for federal or state safety funds).
- **Asset rehabilitation processes and resurfacing schedules** – by applying context-sensitive and street rightsizing principles.

- **Land development permit and land use or zoning change requests** – by focusing reviews on access management policies and safety impact mitigation from traffic impact studies.
- **Community and economic development projects** (particularly in areas of persistent poverty) – by intentionally scoping improvements to fill gaps in limited pedestrian infrastructure and reduce crashes in historically overrepresented streets and intersections affecting certain user types.

Integration with Crash Emphasis Areas

Each systemic project should align with one or more emphasis areas from the safety analysis. **Table 3** illustrates examples of applicable countermeasures mapped to specific crash types. The following pages focus deeper on combining observed safety needs from individual emphasis areas to targeted portions of the Rapid City streets network where each emphasis area is prevalent and could be treated with systemic strategies.

Table 35. Emphasis Area to Applicable Systemic Strategies Alignment

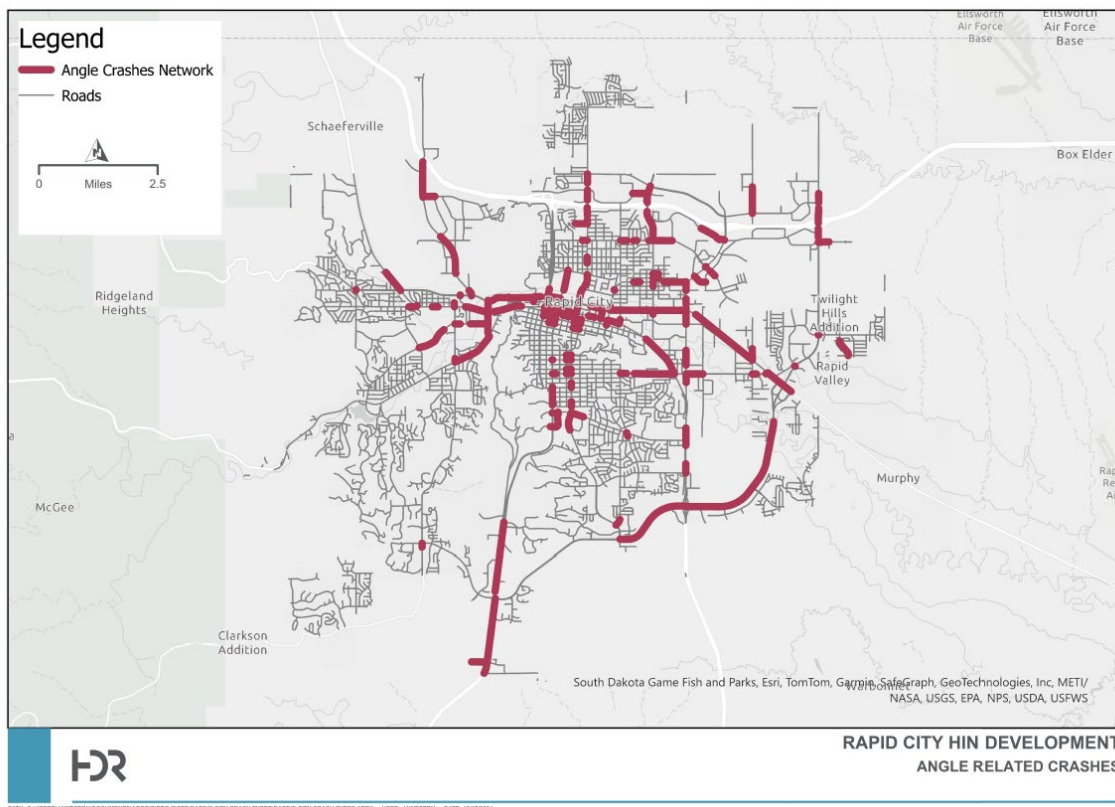
Emphasis Area	Applicable Systemic Strategies
Angle Crashes	Reflective backplates, protected left-turn phasing, access management, roundabouts
Young Drivers	Radar feedback signs, simplified signage, painted centerlines
Older Drivers	Larger font signage, advanced warning signs, simplified intersection geometry
Lighting Conditions	LED lighting retrofits, illumination at key intersections and crossings
Vulnerable Road Users	RRFBs, midblock crossings, sidewalk gap closures, curb extensions, pedestrian refuges
Motorcycles	Enhanced curve delineation, dynamic speed signs, friction surface treatments
Alcohol	Rumble strips, lighting, speed cushions, nighttime speed enforcement
Speed	Road diets, speed feedback signage, narrowed travel lanes, chicanes

Angle-Related Crashes (Systemic Focus)

Angle crashes in Rapid City occur frequently at both signalized and unsignalized intersections, particularly on multilane arterials and where crossroads are skewed or offset. Several high-risk nodes are located along the urban grid and on approach corridors to Interstate 90 (I-90). Risk factors include higher approach speeds on major roads intersecting with two-lane minor roads, skewed geometry that reduces sight distance, and permissive left-turn phasing at high-volume locations. Inconsistent channelization, faded markings, and closely spaced access points can compound these issues.

Systemic countermeasures for these locations include conversion to roundabouts, restricted crossing U-turns (RCUTs)/J-turns on higher-speed divided corridors, and right in-right out access at minor legs. Signal phasing improvements—such as converting to protected/permitted or protected lefts, adding flashing yellow arrows with proper clearance intervals, and retiming for reduced dilemma-zone exposure—can address operational risks. Geometric improvements such as reduced skew, tightened corner radii, and enhanced intersection lighting, along with driveway consolidation, can further reduce angle crash potential.

Figure 3. Angle-Related Crashes Network.

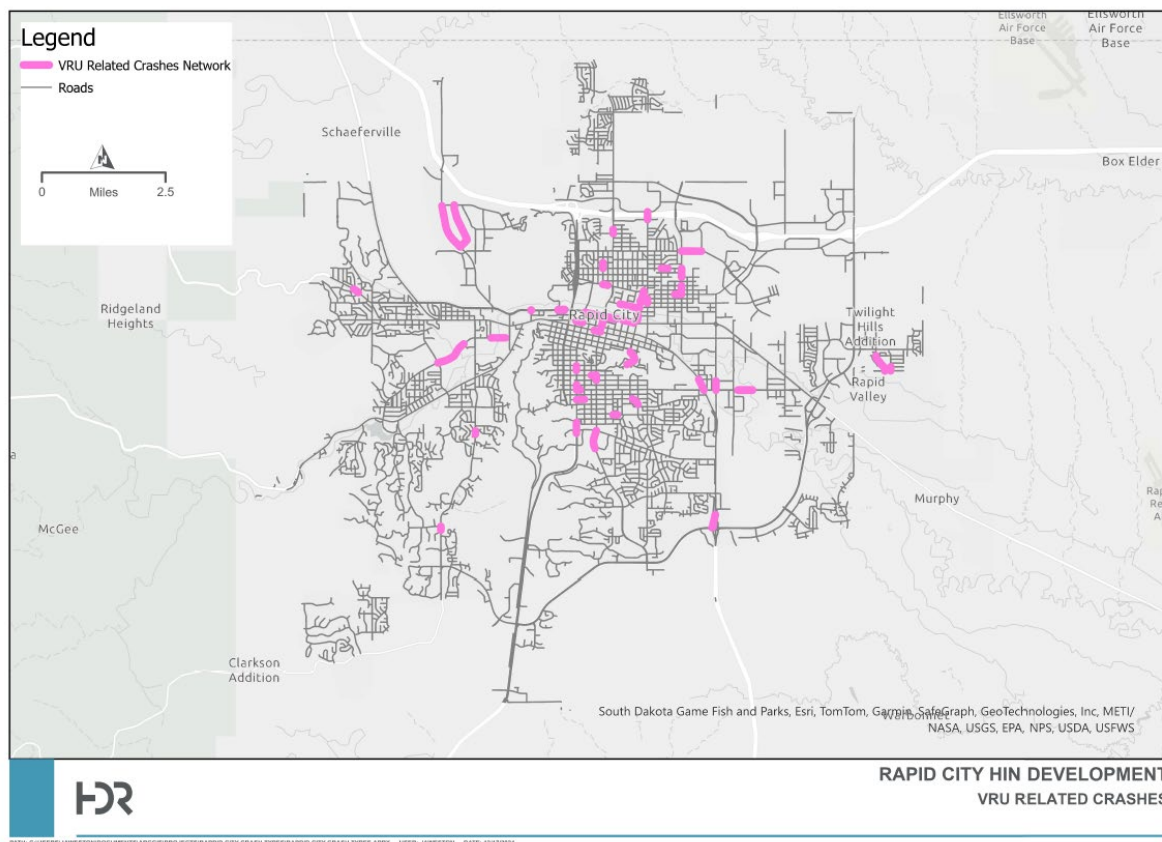


Vulnerable Road Users (Systemic Focus)

VRU-related crashes in Rapid City are concentrated on multilane arterials with long distances between controlled crossings and in activity centers such as downtown, commercial corridors, and approaches to Rapid City. These locations often have four or more lanes with posted speeds of 35 to 45 mph, missing or discontinuous pedestrian and bicycle infrastructure, and inadequate nighttime lighting. Turning conflicts at wide intersections and slip lanes further elevate risk for nonmotorized users.

Systemic countermeasures include adding crossings to meet spacing guidelines, installing refuge islands, and adding leading pedestrian intervals (LPI) and enhanced treatments such as RRFBs or pedestrian hybrid beacons at midblock generators. Filling sidewalk gaps, adding buffered or protected bike lanes, and creating traffic-calmed bike boulevards on parallel streets can improve network connectivity. Corridor speed management, pedestrian-scale lighting, and daylighting at intersections and driveways can further improve VRU safety.

Figure 4. Vulnerable Road Users Network.

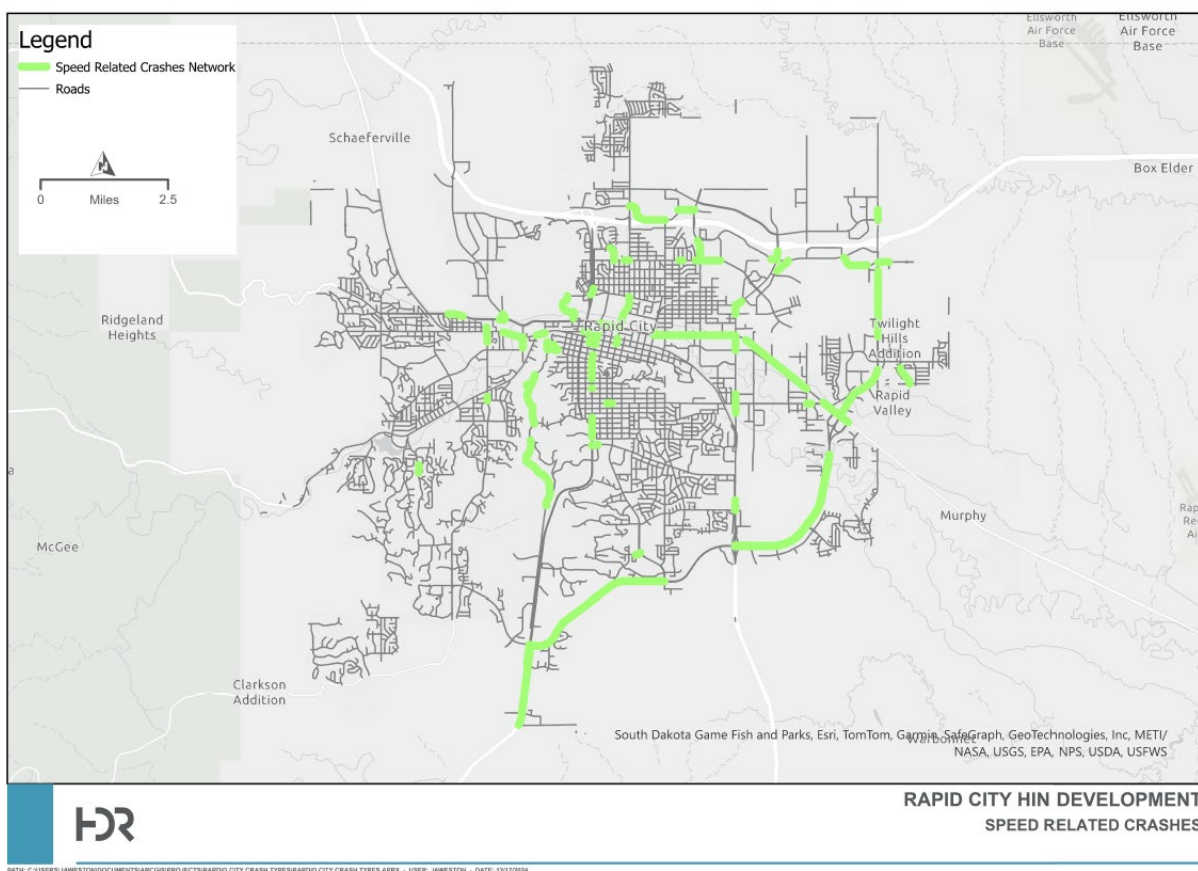


Speed-Related Network (Systemic Focus)

Speed-related crash concentrations in Rapid City occur along continuous arterial segments with posted speeds of 35 to 45 mph, long signal spacing, and wide cross-sections, especially on I-90 connectors and approaches to Rapid City. Wide lanes, extended tangents, and sparse crossing opportunities create conditions for high-operating speeds. Multilane undivided segments with frequent access points further increase exposure to high-severity crashes.

Systemic countermeasures include narrowing lanes, installing center medians, enhancing roadside friction with streetscape elements, and adding speed cushions or tables on local and bike boulevard routes. Operational strategies such as speed feedback signs, enforcement waves, and retimed signal coordination can complement physical changes. Additional crossings, refuge islands, LPIs, and RRFBs, as well as targeted speed management plans, can support safer travel speeds Citywide.

Figure 5. Speed-Related Network.

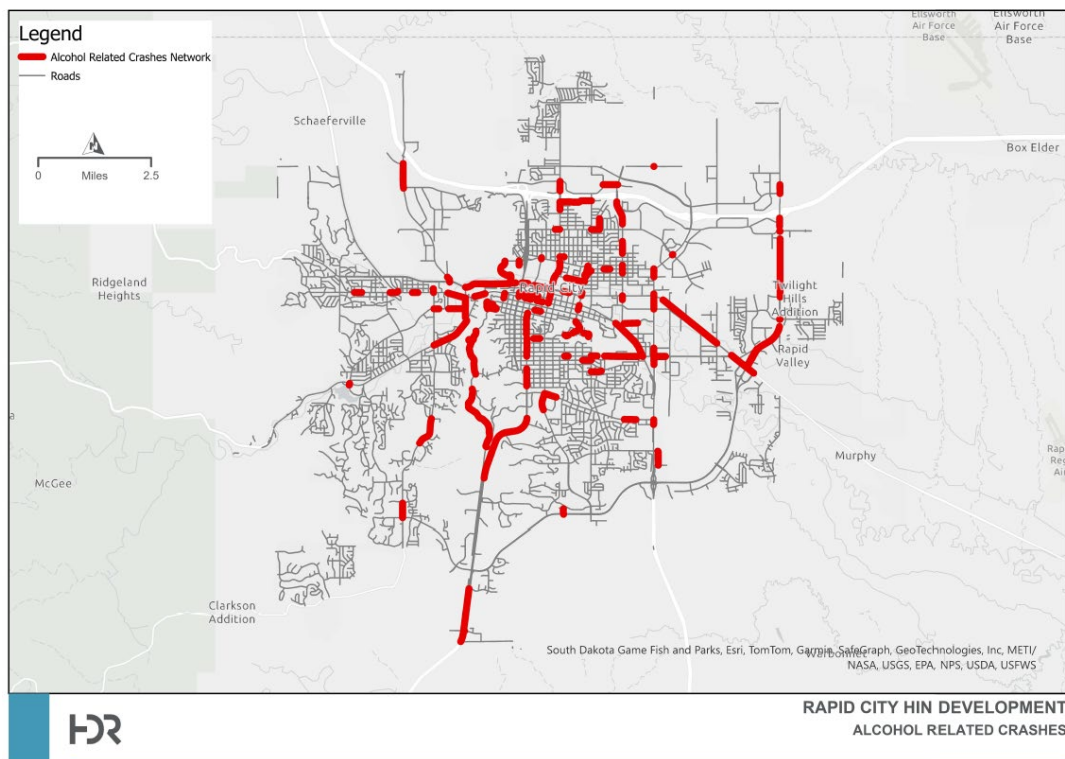


Alcohol-Related Crashes (Systemic Focus)

Crash analysis shows that alcohol-involved crashes in Rapid City tend to cluster along evening-activity corridors and higher-speed arterials that connect entertainment and dining areas to I-90 interchanges. These patterns are especially evident in the core street grid and east toward Rapid City, where recurring late-night incidents have been recorded. These corridors often feature 4 to 5 lane cross-sections with posted speeds between 35 and 45 mph, frequent driveways, and wide intersections with permissive left turns. Nighttime and low-light conditions further elevate risk, particularly where lighting is inconsistent or nonuniform. The combination of commercial land uses, weekend peaking, and complex access points creates high conflict potential for impaired drivers.

Systemic countermeasures may include access consolidation, addition of medians or turn pockets, and road diets to narrow lanes where feasible. Intersection treatments such as protected or protected/permissive lefts, LPIs, targeted lighting upgrades, and minor leg turn restrictions can reduce risk. Operational and policy measures, like targeted impaired-driving enforcement, late-night transit options, and ignition interlock advocacy, paired with seasonal “Drive Sober” campaigns and ride-hailing partnerships, can complement engineering solutions.

Figure 6. Alcohol-Related Crashes Network.



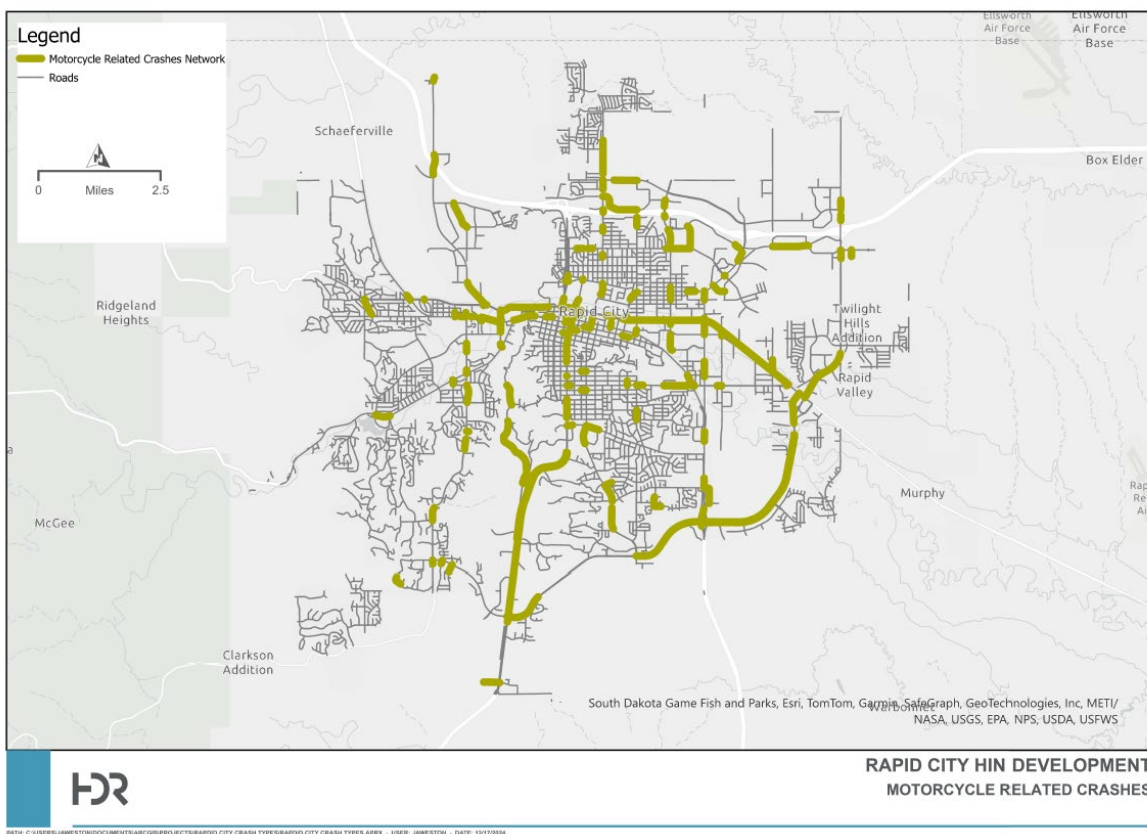
Motorcycle-Related Crashes (Systemic Focus)

Motorcycle crashes are concentrated along higher-speed corridors and curvilinear roadway segments on the urban fringe, as well as at intersections in the City's arterial network. Seasonal peaks align with major regional motorcycle events and tourism.

Key risk factors include high-operating speeds, limited recovery space on shoulders, curves with inconsistent advisory signing or pavement friction, and intersection conflicts where motorcycles are not easily detected by other drivers. Changes in pavement surface, such as utility covers or painted areas, can create additional hazards for riders.

Systemic countermeasures should focus on enhanced curve delineation, dual-posted advisory speeds, high-friction surface treatments, and rumble stripes designed to be motorcycle friendly. Intersection safety can be improved with daylighting, larger signal backplates, protected left turns where warranted, and targeted lighting upgrades. Regular maintenance of surface conditions, detection system calibration for motorcycles, and seasonal safety messaging during peak Sturgis Rally periods can provide additional benefits.

Figure 7. Motorcycle-Related Crashes Network.

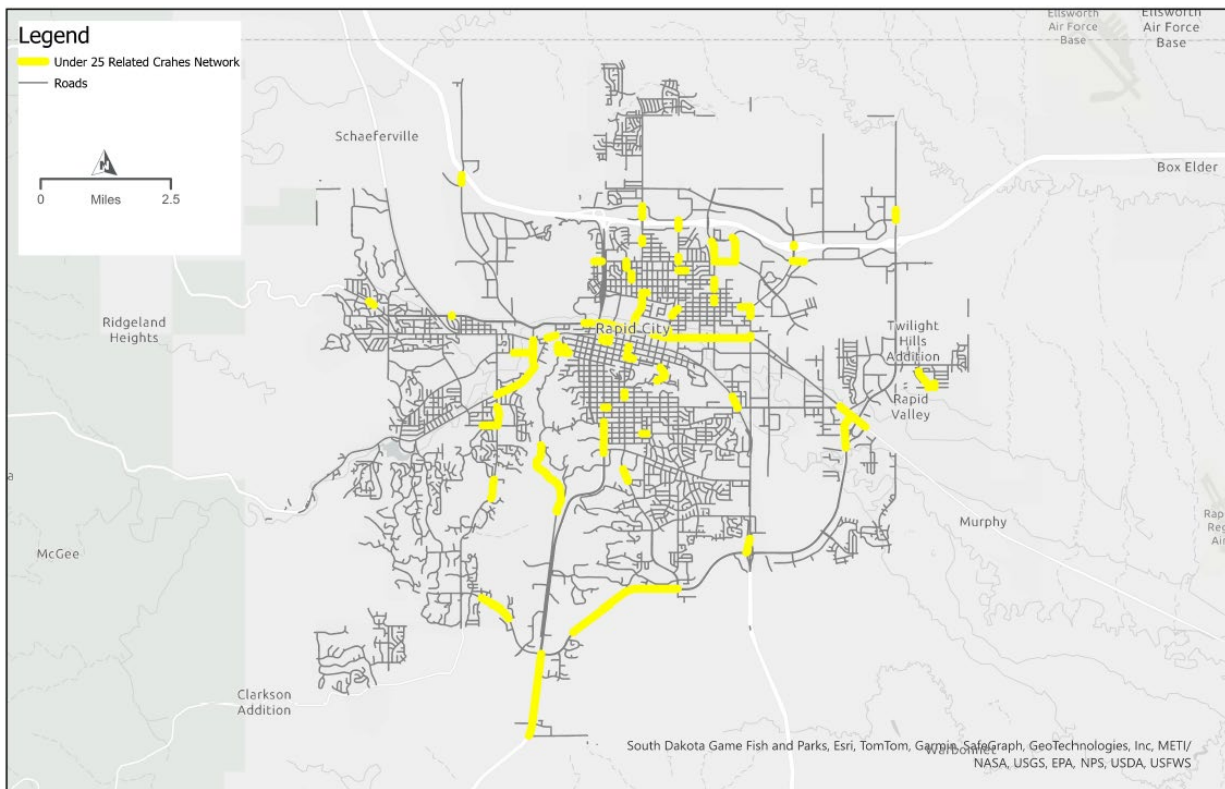


Young Driver-Related Crashes (Systemic Focus)

Crashes involving younger drivers in Rapid City tend to occur near schools, recreational areas, and commercial corridors, with a notable concentration during evenings and weekends. Risk factors include nighttime driving with passengers, distraction, high speeds, and permissive left turns at wide intersections. Access-dense arterials near youth-oriented destinations and inadequate lighting contribute to the risk environment.

Systemic countermeasures include corridor-calming measures such as median and turn pocket upgrades, access management, and conversion to roundabouts or RCUT intersections where appropriate, along with signal improvements such as protected/permitted left-turn phasing, lighting upgrades, and LPIs, can improve safety at intersections. Educational programs, peer-led campaigns, and targeted enforcement around high-risk time periods can complement engineering changes.

Figure 8. Young Driver-Related Crashes Network.

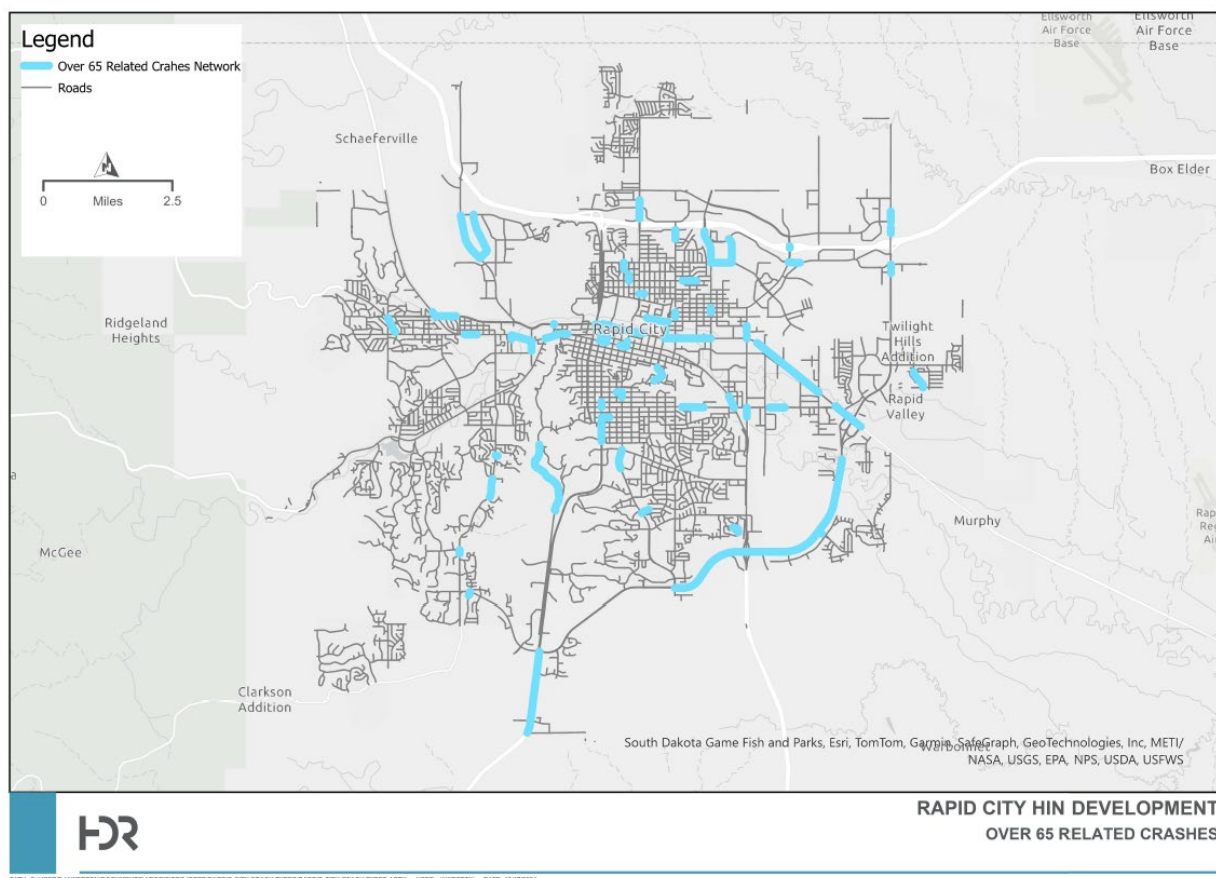


Older Driver-Related Crashes (Systemic Focus)

Older driver-involved crashes in Rapid City are concentrated near medical facilities, shopping areas, and civic destinations, as well as along corridors with complex lane configurations and wide intersections. Risk factors include shorter pedestrian clearance times, long crossing distances, multiple closely spaced driveways, and complex navigation with limited advance signage. Small guide sign legends and permissive left turns in high-volume environments can also contribute to these crashes.

Systemic countermeasures include extending pedestrian clearance intervals, adding LPIs, reducing right-turn radii, installing refuge islands, and adding midblock crossings in long segments. Larger guide signs and advance lane assignment can improve wayfinding, while protected left turns, driveway consolidation, and targeted speed management strategies can reduce conflict potential.

Figure 9. Older Driver-Related Crashes Network.

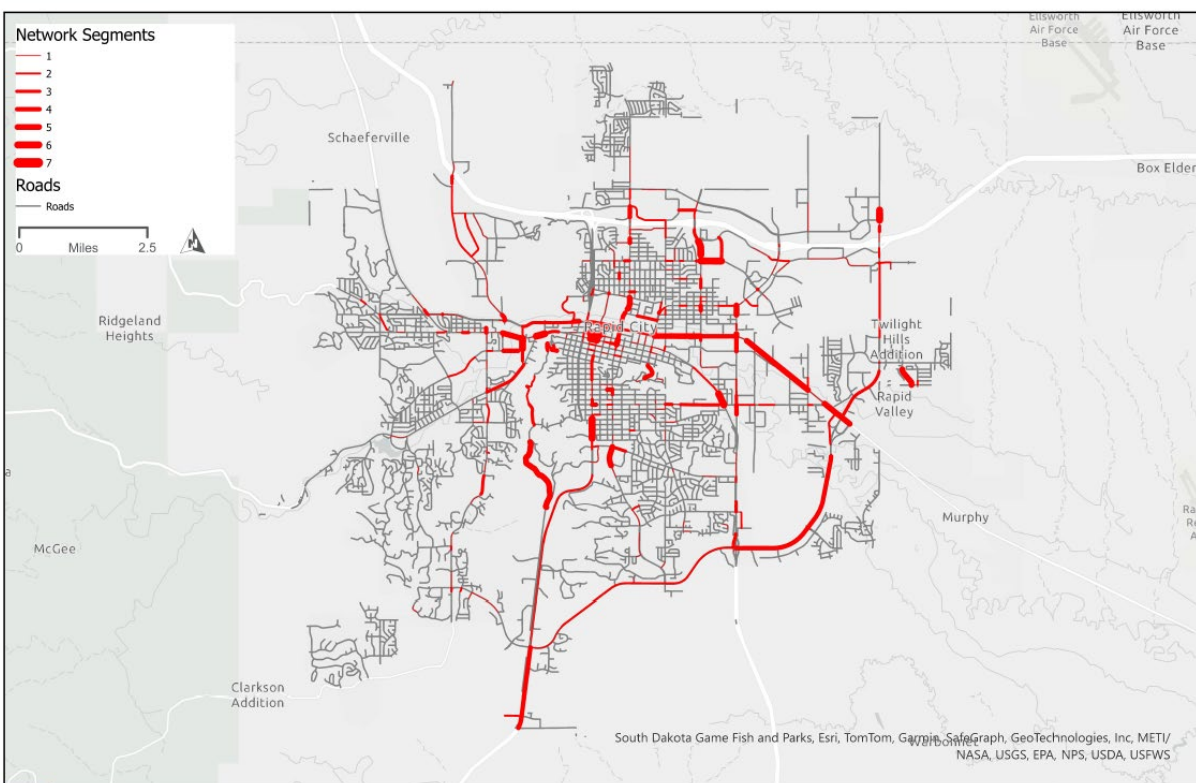


Multiple-Network Groupings (Compounding Risk)

Several corridors and nodes in Rapid City appear in three or more systemic crash networks (e.g., Speed + Angle + VRU or Alcohol + Speed + Under 25). These represent locations where multiple risk factors overlap, creating compounded safety challenges. Such corridors should be approached as programmatic priorities rather than isolated projects, with improvements bundled to address multiple risks simultaneously. This could include combinations of speed management, intersection safety, pedestrian and bicycle accommodations, and lighting improvements.

Systemic countermeasures may be prioritized using a scoring framework that considers the number of overlapping networks, severe crash share, proximity to sensitive land uses (schools, senior housing, activity centers), and equity factors. Quick-build treatments, such as temporary medians, hardened centerlines, and protected crossings, can be deployed to test solutions ahead of major capital investments.

Figure 10. Multiple-Network Groups Network



**RAPID CITY HIN DEVELOPMENT
MULTIPLE NETWORK SEGMENTS**

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Major Projects: High-Priority Capital Improvement

While systemic strategies address risk across the network, some corridors require significant capital investment due to the scale of safety issues. These **major projects** target locations with high concentrations of fatal and serious injury crashes, repeated appearance across multiple crash emphasis areas (including angle crashes, speed, and VRU incidents), and alignment with capital planning opportunities.

These corridors are not stand-alone safety efforts. Safety improvements will be integrated into larger capital projects through the City's **CIP**, ensuring that infrastructure upgrades address both current deficiencies and long-term safety priorities. Some corridors are already programmed in the CIP, while others may advance through separate funding sources or be addressed incrementally.

Typical project elements may include the following:

- Corridor reconstruction or redesign with integrated pedestrian and bicycle facilities
- Intersection conversions (e.g., roundabouts, reduced conflict intersections) as stand-alone or corridor-wide improvements
- Signalization upgrades
- Context-sensitive speed reduction design and access management strategies
- Multimodal enhancements, including lighting, Americans with Disabilities (ADA) upgrades, and drainage improvements

Preliminary priority corridors are identified in **Figure 11** and **Table 4**. In all cases, the Safety Action Plan should keep central in scoping, phasing, and delivering major projects. The City and partners should seek opportunities for these corridors with the most significant safety needs, even if the most effective approach based on available resources is to institute interim safety improvements where full reconstruction is not yet scheduled.

Figure 11. Projects Recommended on the High-Priority Network (City-Owned Streets)

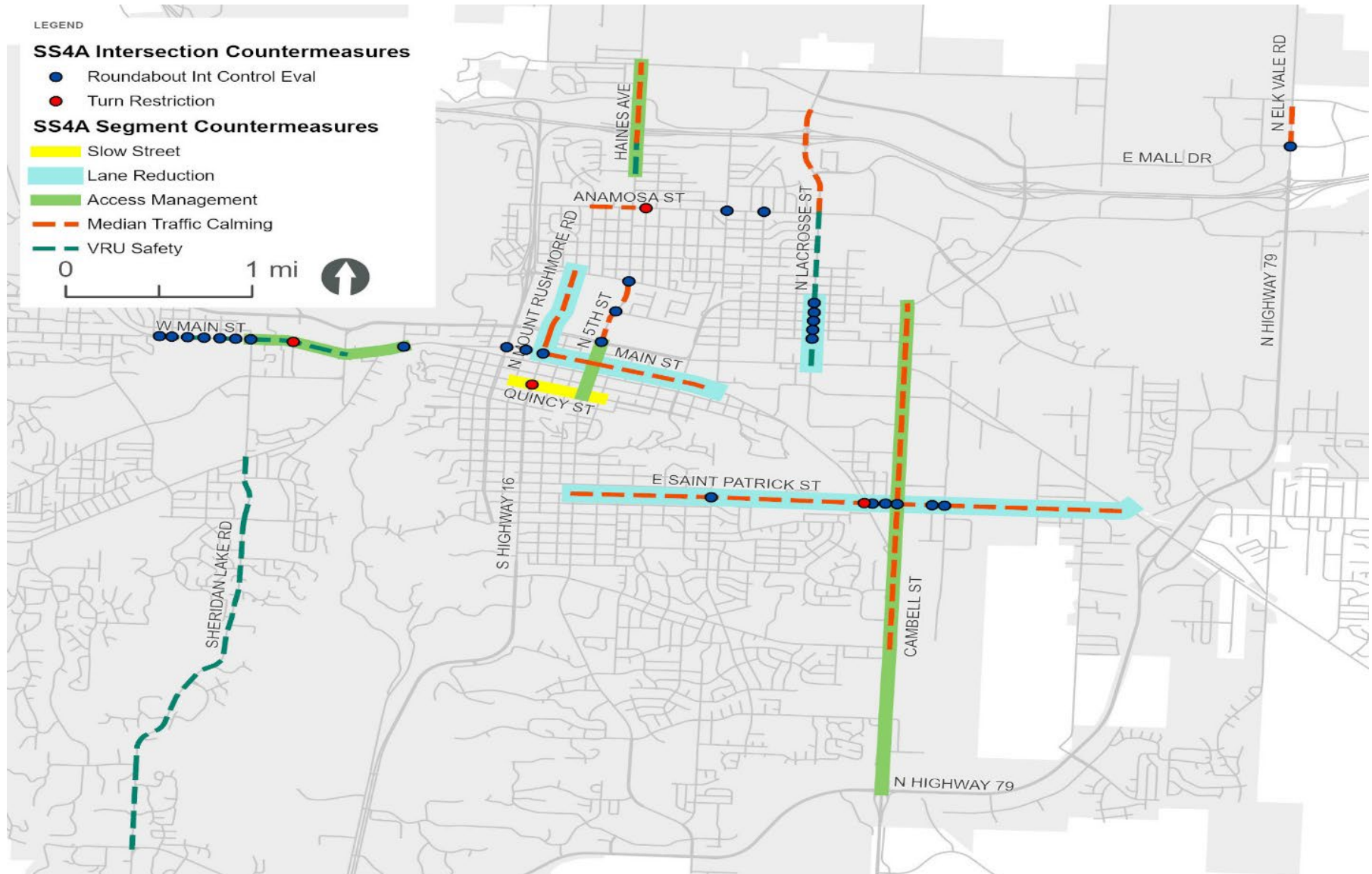


Table 46. Corridor List

Corridor	Starting Segment	Ending Segment	VRU Safety	Access Management	Lane Reduction	Median/Traffic Calming	Slow Street/ Bike Blvd	Turning Restrictions	Roundabout/ Intersection Control Evaluation
Haines Avenue	Lindbergh Avenue	I-90	X	X					
Haines Avenue	I-90	Mall Drive		X		X			
Haines Avenue	Mall Drive	Kathryn Avenue							
Main Street	32nd Street	Sheridan Lake Road	Crossings needed			X			X
Main Street	Sheridan Lake Road	SD 44	Crossings needed	X		Lane narrowing to improve buffer to trail		Dakota Drive - Prohibit NBL	
Main Street	SD 44	Cross Street		X					
Main Street	Cross Street	Mt Rushmore Road							X
Main Street	Mt Rushmore Road	5th Street			X				
Main Street	5th Street	Maple Avenue			X	Gateway at Omaha			
St. Patrick Street	5th Street	E St. Joseph Street			X	X			Maybe at Elm St
St. Patrick Street	E St. Joseph Street	Creek Drive			X	X		Near track and St. Joseph	X
St. Patrick Street	Creek Drive	SD 44			X	X			
Cambell Street	E North Street	E Fairmont Boulevard		X		X			
Cambell Street	E Fairmont Boulevard	E Minnesota Street		X					
Cambell Street	E Minnesota Street	U.S. 16		X					
Anamosa Street	Silver Street	I-190							
Anamosa Street	I-190	N 7th Street							
Anamosa Street	N 7th Street	Haines Avenue				X			
Anamosa Street	Haines Avenue	N Maple Street						At Wood Ave	At Maple
Anamosa Street	N Maple Street	N Lacrosse Street							At Milwaukee

Corridor	Starting Segment	Ending Segment	VRU Safety	Access Management	Lane Reduction	Median/Traffic Calming	Slow Street/ Bike Blvd	Turning Restrictions	Roundabout/ Intersection Control Evaluation
Anamosa Street	N Lacrosse Street	Luna Ave							
N 5th Street	North Street (Extend limits north to Anamosa)	SD 44			X				X
N 5th Street	SD 44	Quincy Street		X		X			
Lacrosse Street	E Disk Drive	Interstate 90				X			
Lacrosse Street	Interstate 90	E Anamosa Street				X			
Lacrosse Street	E Anamosa Street	E North Street	X			X			
Lacrosse Street	E North Street	E Philadelphia/ Limit down to SD 44	X	X	X				X
Quincy Street	9th Street	Mt Rushmore Road					X		
Quincy Street	Mt Rushmore Road	5th Street					X		at Rushmore Road
Quincy Street	5th Street	4th Street					X		
Skyline Drive	Tower Road	Quincy Street							
Sheridan Lake Road	SD 44	W Flormann Street	X			X			
Sheridan Lake Road	W Flormann Street	Corral Drive	X			X			
Sheridan Lake Road	Corral Drive	Catron Boulevard	X			X			
Mt Rushmore Road	North Street	SD 44			X	X			
Mt Rushmore Road	SD 44	Main Street			X	X			
Elk Vale Road	Seger Drive	E Mall Drive (Maybe switch to I-90)				X			Traffic Control at Mall

Crash Scoring Methodology and Policy Prioritization Framework

This section explains how Rapid City selected a focused set of strategies for early project development, drawing from a larger group of potential safety treatments. While the CSAP identifies many applicable countermeasures, only a subset is being advanced immediately due to resource availability, readiness, and alignment with near-term implementation pathways.

To support that narrowing, the City relied on a prioritization framework that blends crash data, local context, and project feasibility.

Prioritization Approach

Two core data elements formed the basis of the crash prioritization strategy:

- **High-Injury Network (HIN):** Identified based on crash severity, specifically corridors with elevated concentrations of fatal and serious injury crashes
- **High-Risk Networks (HRNs):** Developed for each crash emphasis area, identifying segments where specific crash types or contributing factors are overrepresented

These networks were overlaid to develop a High-Priority Network, which represents corridors and intersections where:

- Safety outcomes can be improved through targeted investments in the short to medium term.
- Strategies can be matched to observed crash types and conditions.
- Opportunities exist to integrate treatments with capital planning, maintenance, or external funding.

The High-Priority Network does not reflect a static list of projects. Rather, it represents an initial strategic filter used to identify corridors where Rapid City can most effectively begin advancing the SSA. As additional data, funding, and engagement evolve, new locations and strategies may be incorporated into future iterations of the plan.

Conclusion

This memo provides a structured path for improving transportation safety in Rapid City by aligning policy strategies, systemic treatments, and major capital investments under a unified framework. The emphasis areas and prioritization process ensure that both proactive and location-specific solutions address the City's most critical crash patterns. By integrating these strategies into the CIP and routine project delivery, Rapid City can systematically reduce fatal and serious injury crashes while building a safer, more consistent transportation network for all users.

Appendix E. Roundabout Memo

Roundabout Memo
Rapid City, SD – June 2025

Introduction

Roundabouts are quickly growing in popularity due to their significant safety benefits. Compared to signalized and two-way stop-controlled intersections, roundabouts reduce fatal and injury crashes through slower speeds and a decrease in conflict points. Therefore, Rapid City's goal of reducing crashes and improving roadway safety can be supported through the introduction of roundabouts at key intersections.

This memo recommends actionable items to integrate roundabouts into the Rapid City community through identifying ideal locations, creating preliminary designs using best practices, and building public support through education and engagement. This includes programmatic strategies for community implementation and recommended design choices based on specific needs. The outlined recommendations act as a preliminary road map for the implementation of roundabouts through Rapid City's Comprehensive Safety Action Plan (CSAP).

Existing Data and Ongoing Analyses

Areas of high crash frequency exist throughout Rapid City. Vulnerable road user (VRU) crashes, which involve people unprotected by a vehicle shell, occur mostly downtown and are concentrated on urban arterial streets. Angle crashes occur throughout Rapid City, with 68 percent occurring on urban arterial streets. Speed-related crashes are concentrated in the southeast area of Rapid City and occur on City streets almost 50 percent of the time.

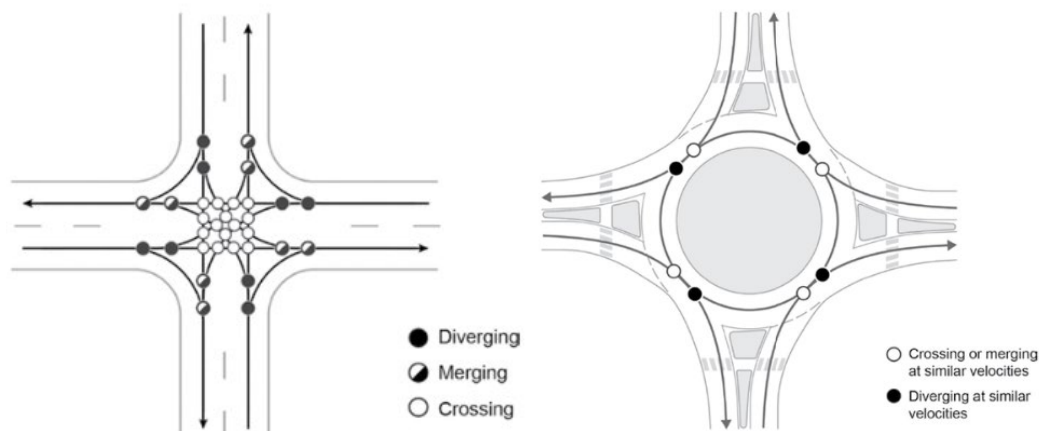
According to the Federal Highway Administration's (FHWA) Proven Safety Countermeasures,⁵ roundabouts decrease the occurrence of fatal and injury crashes by 78 percent when replacing a signalized intersections and by 82 percent when replacing two-way stop-controlled intersections. The curved approach causes vehicles to slow before entering the roundabout, leading to lower speeds. Slower

⁵ [Roundabouts | FHWA](#)

speeds give drivers more time to observe their surroundings, decreasing the necessary sight triangle and allowing them time to see and correct their actions. This creates a safer environment for other vehicles, pedestrians, and bicyclists, decreasing fatal and injury crashes.

Conflict points are key areas with potential for vehicle collisions. **Figure 1** shows a typical four-way intersection with 32 vehicle-to-vehicle conflict points, while a four-way roundabout has 8 vehicle-to-vehicle conflict points. This is a 75 percent decrease in conflict points, greatly decreasing the likelihood of a collision. Furthermore, slower, single-direction traffic in roundabouts decreases the likelihood of serious collisions resulting in injuries or fatalities.

Figure 1. (L) Typical four-way stop vehicle conflict points. (R) Typical roundabout vehicle conflict points.



Source: NCHRP Report 1043 (pg. 106–107)

Programmatic Best Practices

Community acceptance and behavior can be shaped through programmatic strategies, laying a foundation for successful implementation of roundabouts. Therefore, these strategies will play a large role in the inclusion of roundabouts in the CSAP.

Utilize Previous Successful Strategies

Roundabouts are successful in countless communities across the country. Utilizing other communities' strategies can lead to similar success in Rapid City. Showcasing the success of roundabouts in other communities can also increase the public confidence in the success roundabouts will have in their community. For example, Lincoln, Nebraska, a leading city in roundabout usage, added a roundabout at an intersection that had eight crashes resulting in injuries over a 4-year study period. In

the 2 years since the roundabout's installation, no fatal or injury crashes have occurred.

Build Buy-In

Building City staff buy-in through awareness will give the project a strong foundation to build on. Supporting the staff in understanding the benefits of roundabouts and how to implement them can build confidence in an unfamiliar area. The Iowa Department of Transportation (DOT) provides traffic safety engineering services ranging from design review to community engagement, which allows many of Iowa's municipalities to create successful projects.

Connecting with implementers is key to introducing roundabouts in a community. A roundabout team in Austin, Texas, held briefings with public agencies and key stakeholders to present the benefits of roundabouts from subject matter experts, expediting the understanding of roundabouts and growing their support among decision-makers.

Public buy-in can be gained through open public meetings and accessible online resources. The Missouri DOT connected with the community by working with journalists to create accessible informational content and appealing directly to apprehensive groups to answer their questions and address their concerns.

Sequence Implementation

A strong implementation strategy will greatly affect the success of this project. The first roundabouts in the area should be implemented in areas where there is likely higher acceptance. These areas can be identified with higher crash rates, simpler single-lane design, or minimal community disruption.

Develop an Education Plan

The success of roundabouts is dependent on motorists feeling confident while using them; therefore, creating an education plan on how to maneuver roundabouts is an important step in their implementation. The education plan must reach novice drivers, experienced drivers, and pedestrians. With almost 4 million tourists visiting Rapid City every year, having clear instructions for locals and nonlocals will also improve usage. Iowa DOT created an educational video that explained how to use a roundabout, which is applicable to any level of familiarity.

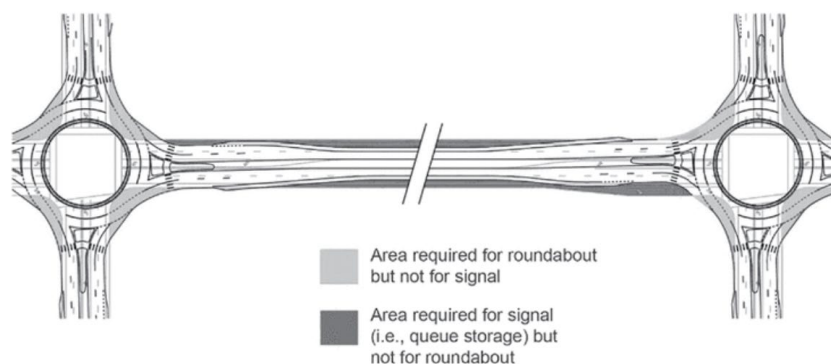
Infrastructure and Design Best Practices

Designing roundabout infrastructure guided by best design practices and local requirements will result in designs that safely meet the community's needs.

Land Utilization

The size of a roundabout varies based on the specifications for the specific intersection, ranging from 45 feet to 200 feet for the inner circle diameter. **Figure 2** shows the geometry of a roundabout, which will often call for more land usage than a four-way intersection; however, it will use less space on the approaching lanes. **Figure 2** shows the amount of land usage needed for both a roundabout and a four-way intersection. While roundabouts use more land, they save money through lower maintenance costs.

Figure 2. Area Required for a Signaled Intersection vs. Roundabout



Source: NCHRP Report 1043 (pg. 30)

Retrofit or New Development Design

Roundabouts can be retrofitted into existing intersections or implemented at new locations. Deciding factors on retrofitting an intersection include the following:

- Permitting right-of-way widths
- Existing geometry's alignment with a roundabout
- Constraints from existing utilities

Approach Design

Being prepared to properly maneuver the roundabout during the approach is an important element in the safety of roundabouts. Splitter islands can be painted but

are typically raised elements that separate entering and exiting traffic. They direct and control the speed of oncoming vehicles, slowing them down before they enter the roundabout. Yield lines can be used to signal entering vehicles to yield to oncoming traffic before entering the traffic circle.

Traffic Density Design

Roundabouts can accommodate many levels of traffic density. Areas with higher traffic volumes can call for multilane designs, while smaller intersections on two-lane roads can use a single-lane roundabout design. Multilane roundabouts use plentiful signage and pavement markings to make the use of the roundabout understandable for motorists at any comfort level.

Vehicle Needs Design

Intersections with small amounts of large truck traffic can use traversable elements. These elements will allow typical vehicles to use the roundabout normally, while larger vehicles can drive over the traversable elements if necessary to get through the intersection.

Pedestrian Design

Pedestrian pathways are typically set back approximately the length of one car from the roundabout entrance. A path of high-visibility markings along the road with a splitter island with an ADA-compliant break for the pedestrian walkway is typical in roundabout design. This allows pedestrians to have a refuge halfway across the road, so they only cross one direction of traffic at a time.

Implementation Pathways and Recommendations

Rapid City can begin roundabout implementation through the CSAP, focusing on implementing projects in phases that build sustainably. This allows public awareness to be slowly introduced, laying the groundwork for improved public opinion due to greater awareness and thought-out implementation in areas where need is strongest.

Identify Key Intersections

Intersection candidates for roundabout implementation can be identified using the following key features:

- The intersection has a history of severe crashes.

- The intersection has high potential of angle crashes.
- The intersection has a wide right-of-way width and sufficient space.
- The intersection is highly active.
- The intersection has multimodal uses.

Concept a Roundabout

After identifying an intersection that fits into the criteria outlined above, a concept design for a roundabout can be started. Data on the intersection, such as pedestrian usage and traffic density, should be used to identify important features needed in the roundabout.

Seek Key Stakeholder Buy-In

Support from key stakeholders can be sought using the roundabout concept and collected data used for its design. Gaining support from both the public and local leadership will drive the project forward. A workshop or seminar format for presenting the plan will create a good foundation for the public's understanding of the design concept. Using clear visualizations such as 2D and 3D drawings and video run-throughs of the conceptual roundabout design will further improve public understanding and support for the proposal. Early initiative in community engagement on the project will build support build on throughout the project.

Next Steps and Integration

This memo provides a framework for supporting the implementation of roundabouts in Rapid City that can be used in the CSAP. These recommendations will evolve as ideal locations for roundabouts are identified and designs are created.

Next steps include the following:

- Identify key intersection candidates through data analysis
- Create a collaborative plan to gather and incorporate public opinion throughout the project's timeline

A well-planned approach is needed to increase support for roundabouts and allow them to be a focal point in Rapid City's CSAP. Implementing roundabouts at key locations will result in a decrease in crashes and overall safer driving in the community.