February 2026

RESERVE STREET SAFETY ACTION PLAN



Missoula, MT

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February 2026

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1. Executive Summary

WHY RESERVE STREET?

Reserve Street (US-93) was selected for a Safety Action Plan because:

REGIONAL IMPORTANCE:

Reserve Street carries some of the highest traffic volumes in Montana and connects people to homes, jobs, schools, and businesses throughout the city and surrounding valley. As such, it serves a key role in the regional and local transportation systems, which can have competing needs.

SAFETY CHALLENGES:

The corridor experiences more crashes—particularly high severity crashes—compared to other roadways in the Missoula region, affecting people driving, walking, and biking.

FUTURE GROWTH AND CORRIDOR COMPLEXITY:

Traffic volumes are expected to increase as the corridor continues to support freight movement, commercial activity, and a mix transportation modes.

These factors underscore the urgency of addressing safety challenges facing Reserve Street to prevent crashes that result in fatal or serious injuries while also supporting its essential role in regional mobility.

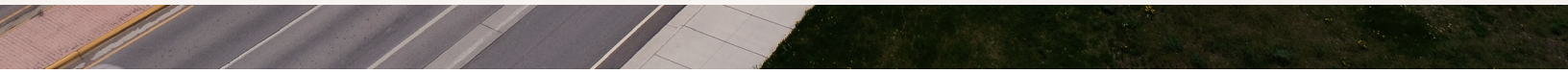


From 2019 - 2023, there were:

1,664
total crashes on Reserve Street from 2019 to 2023

3 fatal crashes
1 pedestrian-involved crash
2 turning crashes

63 serious injury crashes



WHAT IS A SAFETY ACTION PLAN?

This Safety Action Plan (SAP) combines safety data analysis and community and agency input to lay out a vision for a safer Reserve Street. It focuses on reducing fatal and serious-injury crashes through proven and innovative design and policy strategies, with recommended short-, medium-, and long-term actions to inform future investments. Some of the projects are lower cost and targeted on a specific behavior, while others would transform how an intersection or the corridor itself operates. The plan aligns with MDT's Vision Zero goal and the City's Complete Streets and Vision Zero commitments.

The Safety Action Plan is grounded in the Safe System Approach, a framework adopted by the USDOT that recognizes human error as inevitable. As such, its primary goal is not eliminating all crashes, but instead it emphasizes designing roadway systems to minimize the risk of fatal or severe outcomes when crashes do happen.

WHO DEVELOPED THE PLAN?

The Missoula Metropolitan Planning Organization (MPO), Montana Department of Transportation (MDT), and City of Missoula developed the Reserve Street Safety Action Plan to identify key safety issues and establish a data-driven roadmap for reducing fatal and serious injury crashes along the corridor. The Plan was funded through the Safe Streets and Roads for All (SS4A) federal grant from the U.S. Department of Transportation (USDOT).

The goal of the Safety Action Plan is to reduce fatal and serious injuries on Reserve Street.

Objectives

Identify actions that will improve safety for all users of Reserve Street.

Engage business owners, residents, commuters, and other travelers to understand existing safety concerns and how Reserve Street is used and to obtain feedback on proposed solutions.

Create an implementation roadmap that prioritizes and phases actions.

Expected Outcome

A STREET THAT IS SAFER FOR EVERYONE USING IT.



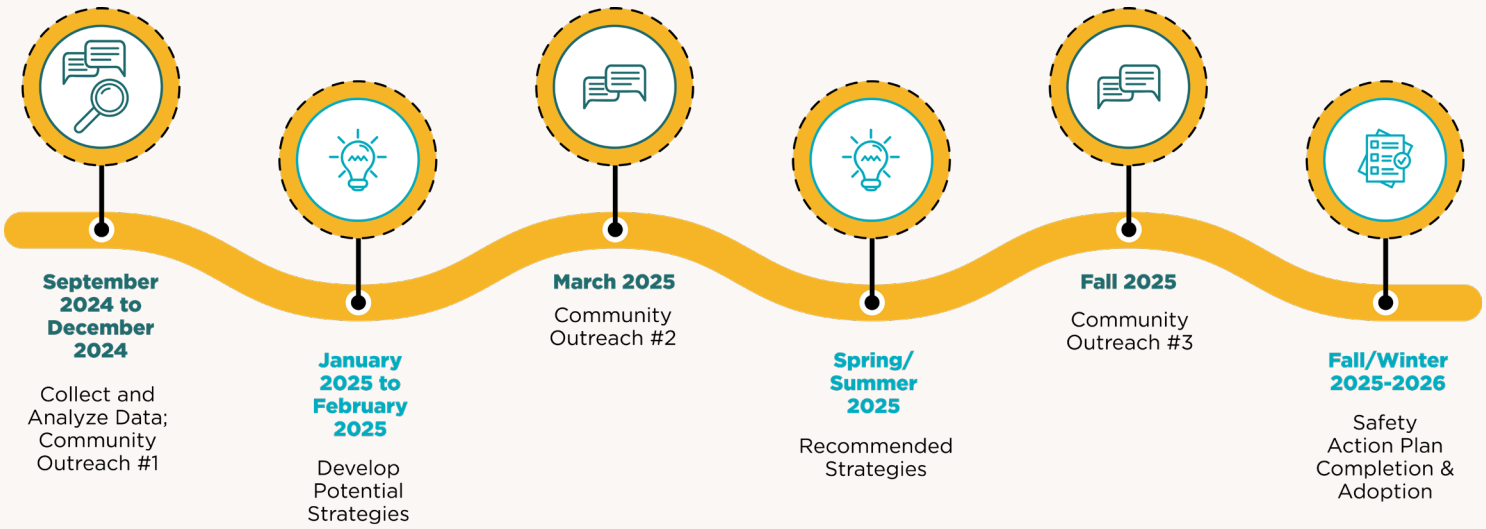
PLAN PROCESS

The Reserve Street Safety Action Plan was developed using a combination of data analysis and community input to guide practical, evidence-based solutions.

The project team analyzed crash data to identify high-risk locations and traffic patterns to assess multimodal needs for walking, biking, transit, and driving. Community perspectives were gathered through three rounds of public meetings, surveys, and stakeholder interviews, helping the team understand local priorities, concerns, and opportunities for improvement.

These efforts informed the selection of key safety strategies and priority locations along Reserve Street, which were then refined into five priority projects for further evaluation based on additional community feedback.





WHAT WE HEARD

Community engagement was conducted in three phases, with input gathered from corridor users and key community groups. This input identified safety concerns and community ideas from users of Reserve Street, which directly informed the strategies and recommendations included in this plan.



19
COMMUNITY GROUP MEETINGS



5
IN-PERSON EVENTS
(open houses, pop-ups, and a walk audit)
WITH 80 TOTAL ATTENDEES



>200
VIRTUAL INTERACTIONS, INCLUDING WEBSITE COMMENTS, MAP INTERACTIONS, AND SURVEY RESPONSES

COMMUNITY OUTREACH #1

Fall 2024

Purpose: Raise awareness, define outcomes, identify safety challenges

Activities: Interactive webpage, community group briefings

COMMUNITY OUTREACH #2

Spring 2025

Purpose: Share findings from Phase 1, gather feedback on initial strategies

Activities: Webpage with survey/map, walk audit, open houses, community group meetings

COMMUNITY OUTREACH #3

Fall 2025

Purpose: Present proposed strategies, gather input on five priority projects

Activities: Webpage with surveys, open house, community briefings

Concerns

Vehicle Speeds and Dangerous Intersections

- Vehicle speeds feel high
- Difficulty turning at unsignalized intersections
- Lighting feels inadequate at certain locations

Safety of People Walking and Biking

- Narrow, unprotected bike lanes
- Conflicts between vehicles and people walking and biking at business accesses
- Limited locations with crossings that feel safe
- Most people avoid Reserve Street and choose alternate routes to walk or bike on, when possible

Other Concerns

- Congestion, especially at intersections and in areas with driveways and businesses
- Future growth will exacerbate existing concerns
- Competing interests between local access and regional through-traffic



Ideas and Priorities

Reduce posted speed limit and implement traffic calming to reduce vehicle speeds	Safer options for walking/ biking is a high priority. There is a need to improve existing crossings and implement additional safe, protected crossings	Optimize signal timing, add/ lengthen turn lanes, and reconfigure intersections to improve traffic flow	Add traffic signals or roundabouts and implement access management to minimize conflicts and improve safety and traffic flow	Improve pavement markings, signage, and lighting	Intersection control improvements at River Road were the top priority among the locations presented

SAFETY EMPHASIS AREAS

Guided by community input and technical analysis, the project team identified five key safety emphasis areas. These emphasis areas represent the corridor's most critical safety challenges.



Vulnerable Road User Crashes

Crashes involving people walking or biking are overrepresented among fatal and serious injury crashes and require targeted interventions to protect these users.



Speed Management

The community identified high speeds as a concern along the corridor. Speed can increase the severity of crashes when they occur.



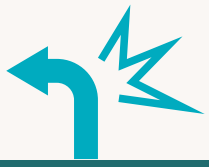
Rear-End Crashes

Rear-end crashes are the most common on Reserve Street and can result in injury or fatality when they occur at high-speeds



Right-Angle Crashes

Right-angle crashes represented 15% of all intersection crashes, but 30% of serious injury crashes occurring at intersections.



Turning Crashes

Two out of the three fatal crashes on Reserve Street during the five-year study period involved left-turning vehicles.

SAFETY SOLUTIONS

The plan recommends evidence-based infrastructure improvements, policies, and actions organized into near-, medium-, and long-term steps to address Reserve Street's key safety challenges. This flexible approach allows lower-cost strategies to be implemented quickly while coordinating higher-cost improvements with the MPO, MDT, and the City.

Safety solutions focus on



INTERSECTION CONTROL



ACCESS MANAGEMENT



INCREASING SAFETY FOR VULNERABLE ROAD USERS



LOW-COST ROADWAY SAFETY COUNTERMEASURES

supporting the City's and MDT's Vision Zero goal of reducing crashes with fatal or severe injury outcomes.

PRIORITY PROJECT PACKAGES

From the recommended safety solutions, five priority treatment packages were identified through evaluation and community input to advance further:

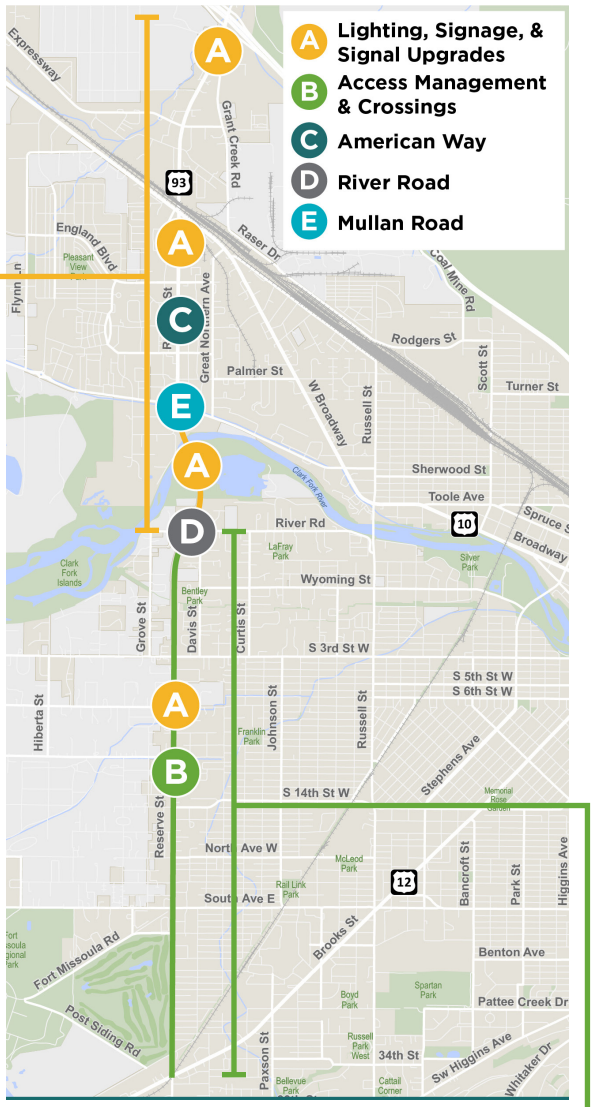
Package A – Lighting, Signage, and Signal Upgrades (multiple locations)

Package B – Access Management & Crossings (Clark Fork River to Brooks Street)

Package C – Reserve Street/American Way Intersection Control Improvement

Package D – Reserve Street/River Road Intersection Control Improvement

Package E – Reserve Street/Mullan Road Intersection Improvements



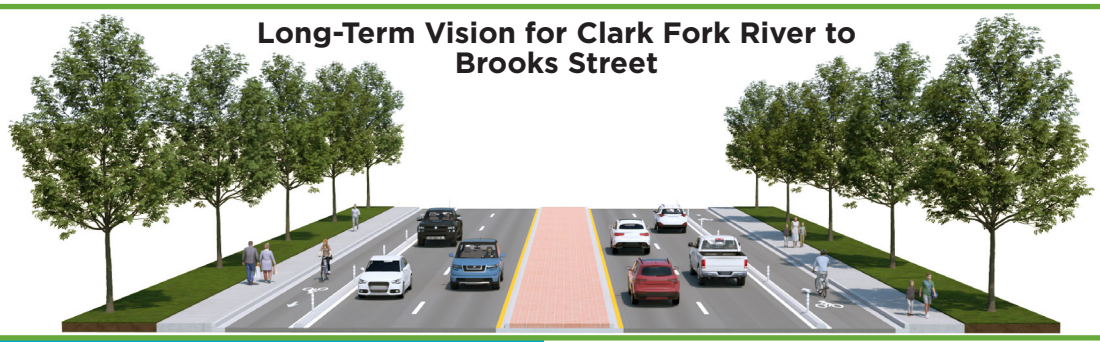
NEXT STEPS

With adoption of the Reserve Street Safety Action Plan, the Missoula region can move forward with implementing the priority projects in coordination with partner agencies and organizations.

Long-Term Vision for I-90 to Clark Fork River



Long-Term Vision for Clark Fork River to Brooks Street



2. Introduction

Reserve Street (US-93) is one of Missoula's most critical transportation corridors, stretching north-south on the western edge of the city. From I-90 and US-12, the 5.4-mile corridor carries some of the highest traffic volumes in Montana and connects people to neighborhoods, schools, jobs, and businesses within the Missoula and the surrounding valley. As such, Reserve Street serves a variety of roles and road users: a freight route, commercial corridor, and local city street for people driving, walking, biking, and using mobility devices to reach daily destinations.

Reserve Street has also experienced more crashes – particularly high severity crashes – than other roadways in the Missoula region.[1]

From 2019 - 2023, there were:



1,664
total crashes on Reserve Street from 2019 to 2023



3 fatal crashes
1 pedestrian-involved crash
2 turning crashes



63 serious injury crashes



Rear-end and right-angle crashes are the most common crash types resulting in fatal or serious injuries.



Crashes are more likely to result in a fatal or serious injury for right angle, head-on, pedestrian-involved, and bicycle-involved crashes.



Most crashes, including those involving a fatal or serious injury, occur at intersections

- Signalized intersections see a higher overall number of crashes.
- Crashes at unsignalized intersections tend to be more severe than those at signalized intersections.

[1] *Based on findings reported in the Missoula Connect 2050 Long Range Transportation Plan.*

As travel demand grows and the corridor continues to serve freight, commercial activity, and a mix of road users, there is a growing urgency to address the safety challenges facing Reserve Street to prevent crashes that result in fatal or serious injuries.

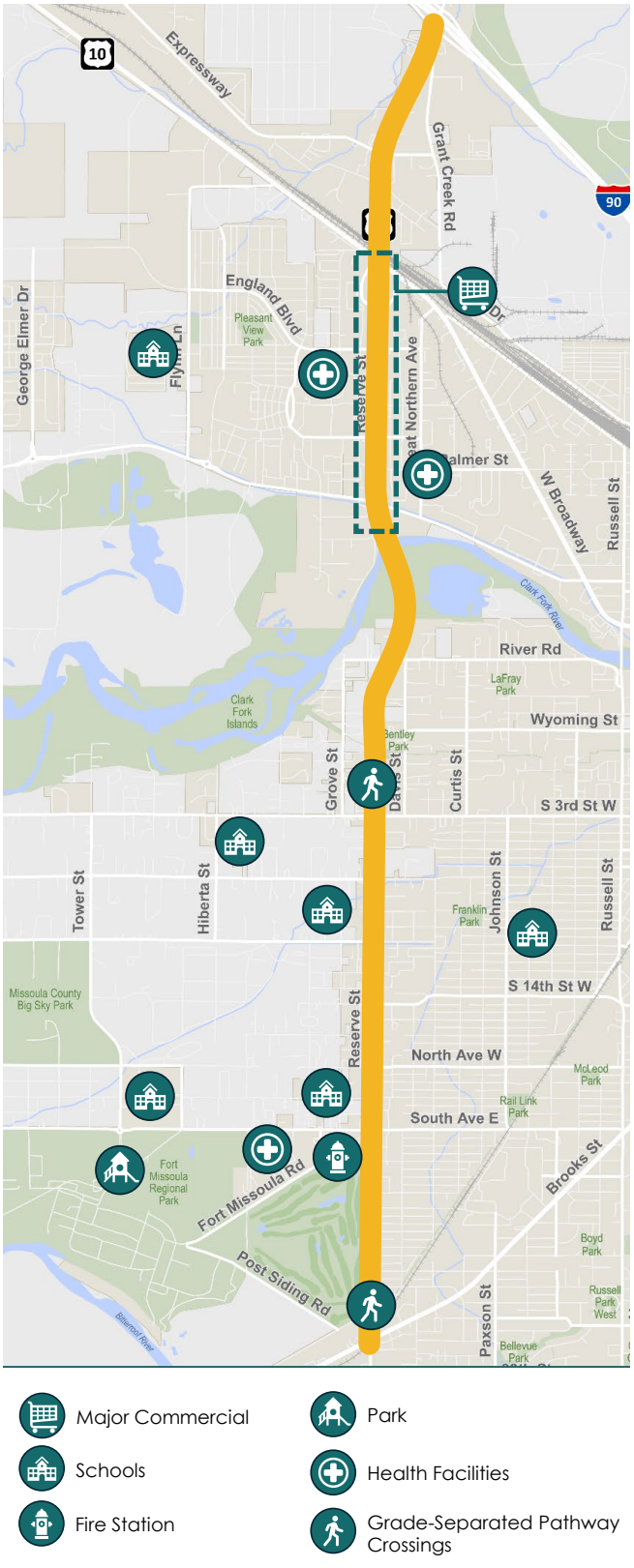
This Reserve Street Safety Action Plan (SAP) is a coordinated, data-driven effort to address these challenges and establish a strategic approach to improving safety along the study area corridor, shown in **Figure 1**. The Missoula Metropolitan Planning Organization (MPO), the City of Missoula (City), and the Montana Department of Transportation (MDT) partnered to develop this SAP, advancing the City's and MDT's commitments to reducing fatal and serious injury crashes. The plan builds on local and state safety frameworks, including the City's Vision Zero goal (Resolution 8633, 2018), the 2018 Community Transportation Safety Plan (CTSP), MPO Long Range Transportation Plan safety objectives, and MDT's statewide Vision Zero goal.

This SAP is organized into the following sections:

- **Public Outreach and Engagement -** *Outreach methods and what we heard*
- **Reserve Street Today -** *Existing travel and safety patterns*
- **How We Can Improve Safety -** *Infrastructure and policy strategies*
- **Corridor Improvement Packages -** *Five recommended priorities*
- **Implementation and Next Steps -** *Funding opportunities and monitoring*

The goal of the Safety Action Plan is to reduce fatal and serious injuries on Reserve Street.

Figure 1: Study Corridor



WHAT IS A SAFETY ACTION PLAN?

A SAP integrates detailed crash analysis, multimodal system needs, and community and stakeholder input to develop a coordinated approach to advance local and statewide safety goals. SAPs focus on eliminating severe crashes by identifying evidence-based countermeasures (physical treatments) and non-infrastructure (policy) strategies to address a corridor or network's unique safety needs. This results in recommended near-, medium-, and long-term implementation options to support decision-making as funding opportunities become available.

A SAP is not a comprehensive corridor plan that addresses broader traffic and development considerations. It does not replace planning efforts that guide overall mobility or economic development. Instead, it complements ongoing planning in the region by providing a data-driven framework to guide future investments that prioritize reducing fatal and serious injury crashes.

This effort aligns with MDT's Vision Zero goal and the City's local commitment to safer streets through its Complete Streets policy (Resolution 8098) and the Vision Zero commitment (Resolution 8633).

Given the high number of severe crashes (those which result in fatal or serious injuries) and the growing safety challenges along the corridor, the SAP provides the Missoula region with a data-driven framework to guide coordinated safety investments along the corridor. The SAP identifies key factors that have contributed to severe crashes on Reserve Street and outlines targeted strategies to address them.

A SAFE SYSTEM APPROACH

This SAP is grounded in the Safe System Approach (SSA), a framework adopted by the US Department of Transportation (USDOT) for reducing crash-related fatalities and serious injuries.[2] The SSA recognizes that humans make mistakes, and roadway systems must be designed to ensure those mistakes do not result in life-changing consequences. The SSA addresses five aspects of roadway safety: *Safe Road Users, Safe Vehicles, Safe Speeds, Safe Roads,* and *Post-Crash Care*. These reflect the numerous factors that contribute to the safety risks embedded within the transportation system. As such, strategies intended to improve safety can and should look to address deficiencies in all these areas.



Source: FHWA.

City of Missoula Vision Zero Policy (Resolution 8633): This policy formally commits the City of Missoula to the goal of eliminating all traffic-related deaths and severe injuries, aligning with the Vision Zero framework.

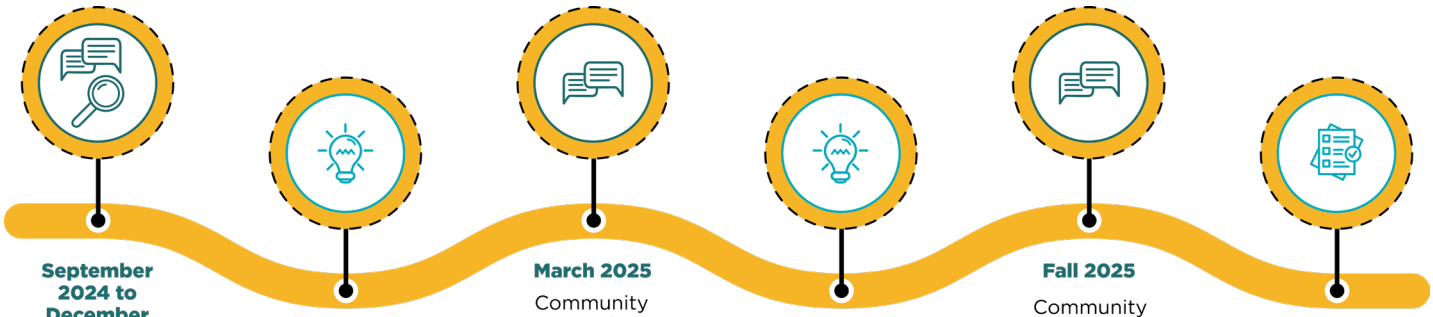
City of Missoula Complete Streets Policy (Resolution 8098): This policy promotes the design and operation of streets that are safe and accessible for all modes of travel—walking, biking, driving, and public transit. The City also commits to periodically updating this policy to reflect evolving best practices and innovative safety treatments.

MDT Vision Zero: Montana's Comprehensive Highway Safety Plan is MDT's plan for achieving the goal of zero deaths and zero serious injuries on Montana's roadways.

[2] *Federal Highway Administration (FHWA). (2025). Proven Safety Countermeasures. https://highways.dot.gov/safety/proven-safety-countermeasures*

PLAN DEVELOPMENT PROCESS

The Reserve Street SAP was developed through a comprehensive process (illustrated below) that resulted in recommended strategies intended to directly address the corridor's characteristics and crash history and reduce, and eventually eliminate, crashes that result in a fatality or serious injury. The safety recommendations developed are intended to be evidence-based, feasible, cost-effective, and effective in responding to the needs of corridor users. The project team analyzed crash trends, roadway characteristics, and travel patterns to identify contributing factors and priority locations for investments. Community and stakeholder input provided critical insights into lived experiences and the public's safety priorities on the corridor.



September 2024 to December 2024

Collect and Analyze Data; Community Outreach #1

January 2025 to February 2025

Develop Potential Strategies

March 2025

Community Outreach #2

Spring/ Summer 2025

Recommended Strategies

Fall 2025

Community Outreach #3

Fall/Winter 2025-2026

Safety Action Plan Completion & Adoption



3. Outreach and Engagement

Providing opportunities for meaningful input from the people who live, work, shop, go to school, and travel along Reserve Street was a critical component of the SAP's development. Corridor users, businesses, and schools provided insights into existing safety issues and concerns that helped inform the SAP's recommendations.

Engagement was conducted in three phases at key project milestones to ensure the SAP's strategies and priority projects directly reflected community-identified needs and concerns. More detailed summaries of each phase are provided in **Appendix A**.

PHASE 1 OUTREACH

(September – December 2024)

Purpose:

- Raise awareness of, and identify desired outcomes for, the project
- Understand what people and businesses value along the corridor
- Pinpoint key challenges and opportunities related to roadway safety

Activities:

- Virtual web page with interactive map
- Listening sessions with community groups

PHASE 2 OUTREACH

(March – April 2025)

Purpose:

- Communicate existing conditions and Engagement Round #1 findings
- Present and obtain feedback on initial strategy recommendations for Reserve Street

Activities:

- Virtual web page with a survey and interactive map
- Walk audit
- In-person open houses
- Feedback meetings with community groups

PHASE 3 OUTREACH

(October – November 2025)

Purpose:

- Present proposed strategies to address safety challenges on Reserve Street
- Gather input and feedback on the five priority project packages

Activities:

- Virtual web page with surveys
- In-person open house
- Feedback meetings with community groups

ADVERTISING METHODS

A variety of advertising methods were implemented to reach a broad audience:

- PROJECT INFORMATION AND LINKS TO ONLINE ENGAGEMENT MATERIALS THROUGH THE ENGAGE MISSOULA WEBSITE (HTTPS://WWW.ENGAGEMISSOULA.COM/)
- MEDIA COVERAGE AND INTERVIEWS
- RADIO AND BILLBOARD
- INDOOR FLYERS IN BUSINESSES
- MPO SOCIAL MEDIA AND NEWSLETTER OUTREACH
- EMAIL OUTREACH TO COMMUNITY GROUPS

KEY THEMES WE HEARD

CONCERNS

- High vehicle speeds and dangerous intersections, especially when making left turns.
- Safety of people walking and biking.
- Congestion at intersections and in areas with higher concentration of driveways and businesses.
- Concerns about future growth worsening existing safety challenges.

SUPPORTED IDEAS

- Provide safer options for people walking and biking, including infrastructure like separated pathways, bike lanes, and pedestrian signals to increase the safety of people crossing.
- Reduce posted speed limits and manage speeds.
- Add traffic signals or roundabouts and limit business access points to minimize conflict points.
- Improve lighting, pavement markings, signage, and striping.
- Evaluate safety treatments that maintain traffic flow.







4. Reserve Street Today

As a US highway (US-93) and key connection between I-90 and US-12, Reserve Street is one of the most critical corridors in the Missoula region. It provides access to a variety of adjacent land uses, including commercial areas, schools, and residential neighborhoods, all of which generate travel by a range of modes. It also serves through-traffic traveling between I-90 and other regional routes, such as freight movement. As such, Reserve Street is essential for the movement of people, goods, and services, both locally and throughout the region. Balancing the competing needs of local and regional traffic is one of the key safety-related challenges this plan aims to address.

This section summarizes the key characteristics, travel patterns, and crash trends of Reserve Street that influence existing safety conditions. These set the stage for recommended treatments described in the *How We Can Improve Safety* section of this plan. The technical analyses details of the existing and future conditions analysis for this corridor are documented in detail in the *Existing and Future Conditions Memorandum* (**Appendix B**).

CORRIDOR CONTEXTS

The SAP study limits extend from I-90 to US-12, comprising three distinct segments (shown in **Figure 2**) that differ in character and user needs:

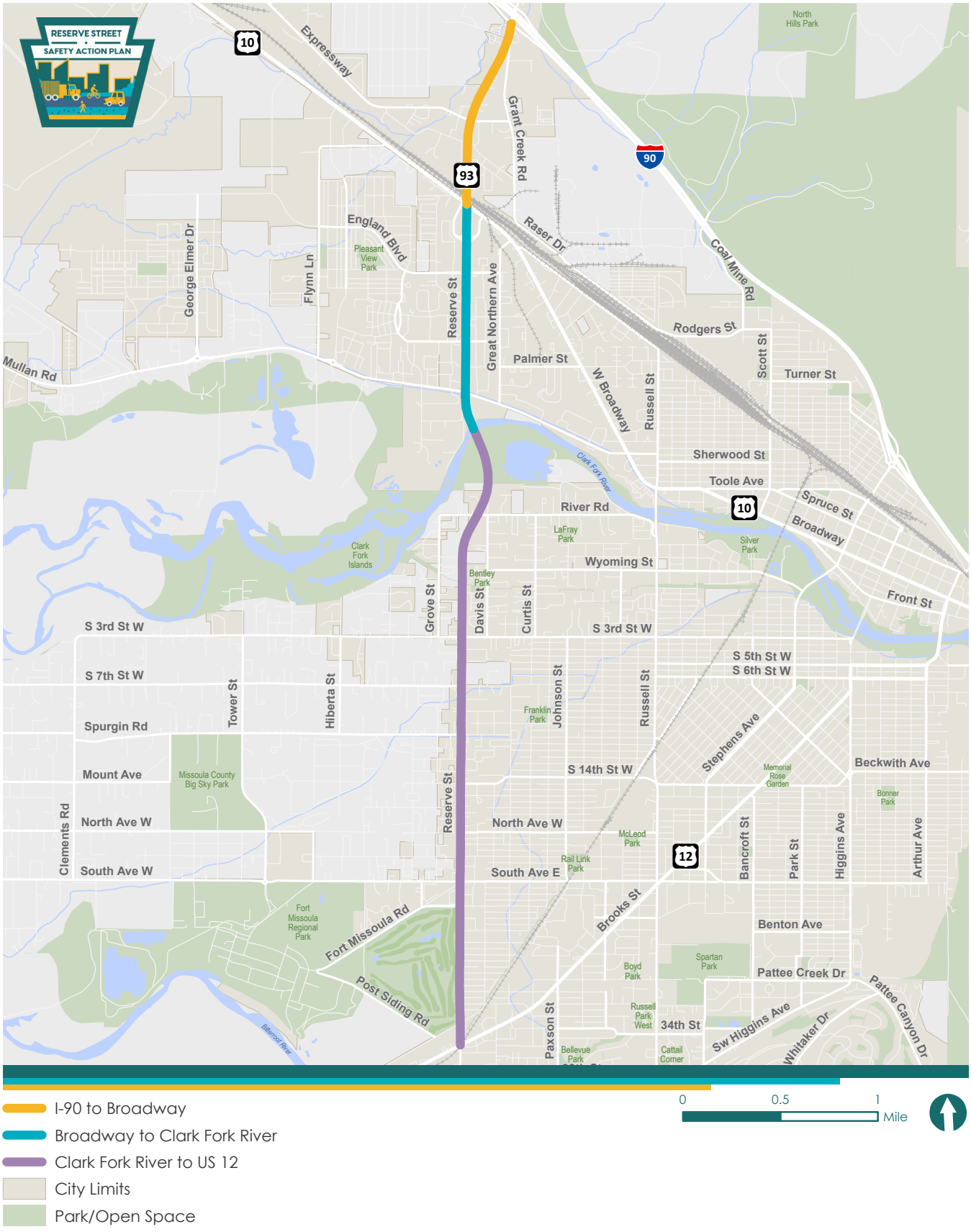






1. **I-90 to Broadway Street:** This segment is characterized by a mix of highway-oriented commercial and industrial uses. Land uses are strongly influenced by the presence of I-90, with several hotels and restaurants serving regional travelers. Aside from the highway ramp terminals, pedestrian crossings are limited to a single uncontrolled, mid-block crossing near the Homewood Suites hotel and one signalized intersection at Expressway.
2. **Broadway Street to Clark Fork River:** This segment is characterized by big-box and outparcel commercial development that serve both local and regional traffic. Access is generally limited to public street intersections (most of which are not signalized), as well as right-in/right-out driveways. Pedestrian crossing opportunities are limited to signalized intersections spaced over 1,000 feet apart. Grade separation of the railroad tracks and Broadway Street creates a different character and user experience in this area.
3. **Clark Fork River to US-12:** This segment is primarily residential with more locally oriented commercial fronting Reserve Street, especially on the southern end of the corridor. There are three schools along this section (C.S. Porter Middle School, Big Sky Middle School, and Valley Christian School), as well as Fort Missoula Regional Park and Community Medical Center. There are limited controlled or enhanced crossing opportunities and Reserve Street bifurcates the surrounding residential areas. The Milwaukee and Bitterroot trails have grade-separated crossings under and over Reserve Street, respectively.

Figure 2: Study Corridor



Data Sources: City of Missoula, Missoula County

Reserve Street Corridor

POPULATIONS RELYING ON THE CORRIDOR

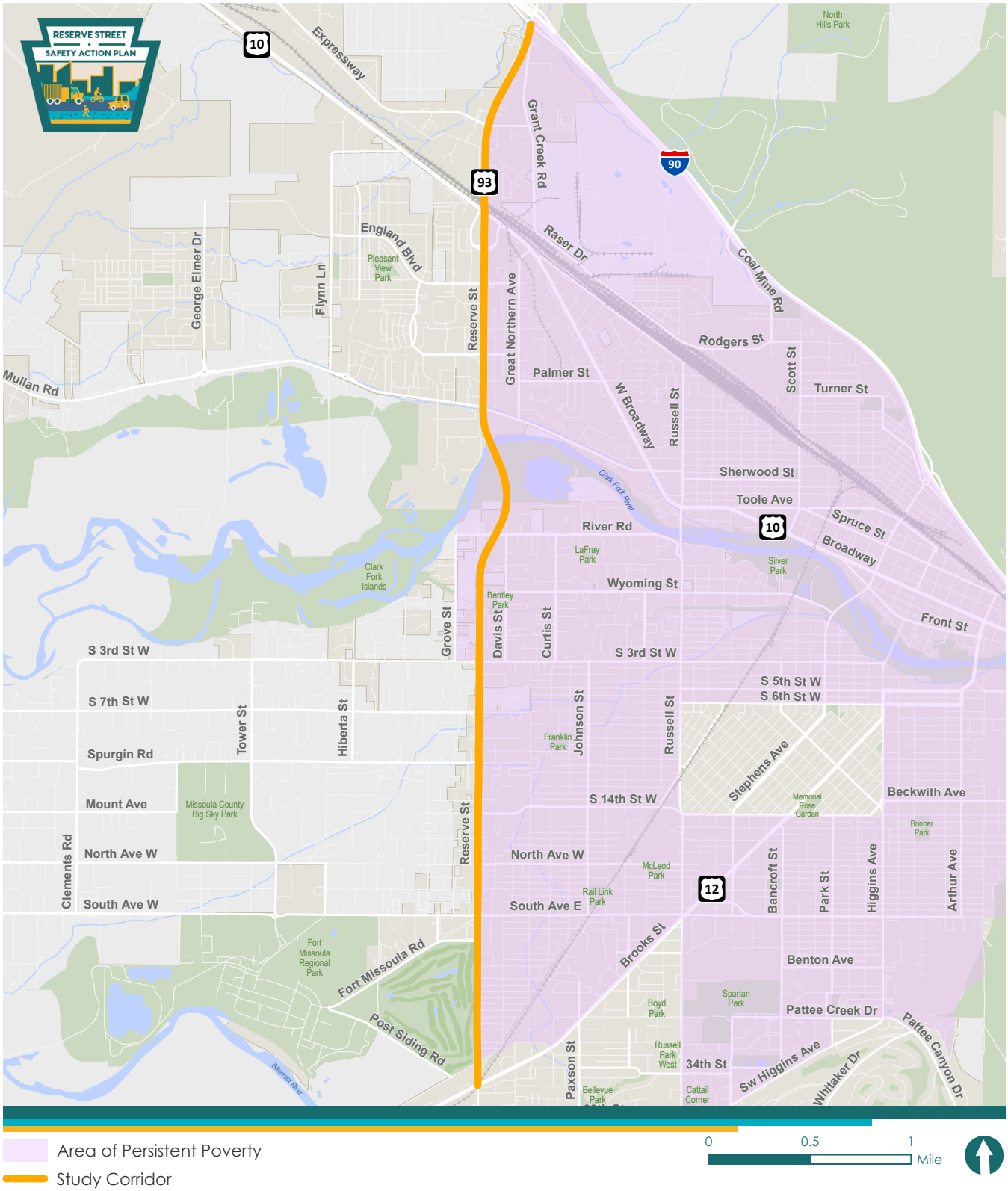
Reserve Street serves a diverse range of populations who rely on the corridor for safe access to jobs, services, and daily destinations. The corridor directly borders multiple Areas of Persistent Poverty (APP) on the east side (**Figure 3**); these are defined by USDOT as Census Tracts where the poverty rate is at least 20% (as measured by the American Community Survey). APP designations (most recently updated in 2023) play a key role in the Safe Streets and Roads for All (SS4A) program; USDOT prioritizes safety investments in APP because these areas consistently experience higher rates of fatal and serious injury crashes.[3] Additionally, these populations tend to have less access to vehicles, and are more reliant on walking, biking, and transit modes.

While the west side of Reserve Street is not a designated APP, this area serves a regional hospital and associated clinics, senior living facilities, and social services for other vulnerable populations. These land uses emphasize the importance of providing safe pedestrian, bicycle, and transit access for residents who may be transportation-disadvantaged.



[3] The most recent Safe Streets and Roads for All Notice of Funding Opportunity for FY 25 states that investments in underserved communities, consistent with the definition of APP from the Infrastructure Investments and Jobs Act, are prioritized for grant funding.

Figure 3: Underserved Populations (Areas of Persistent Poverty)



Data Sources: USDOT

Areas of Persistent Poverty

HOW PEOPLE TRAVEL ON RESERVE STREET

Travel patterns on Reserve Street reflect its role as both a major regional corridor and an important connection to local destinations. The corridor serves between 23,000 and 37,000 daily trips, split nearly evenly between local trips and regional or pass-through trips. This mix of trip types results in different user needs and behaviors depending on their use of the corridor. Regional drivers may prefer more consistent traffic flow at higher speeds, while local users need to make more frequent turning movements to access local destinations. These competing operational needs emphasize the challenges in addressing safety on this corridor and provide context that helps explain some crash patterns observed.

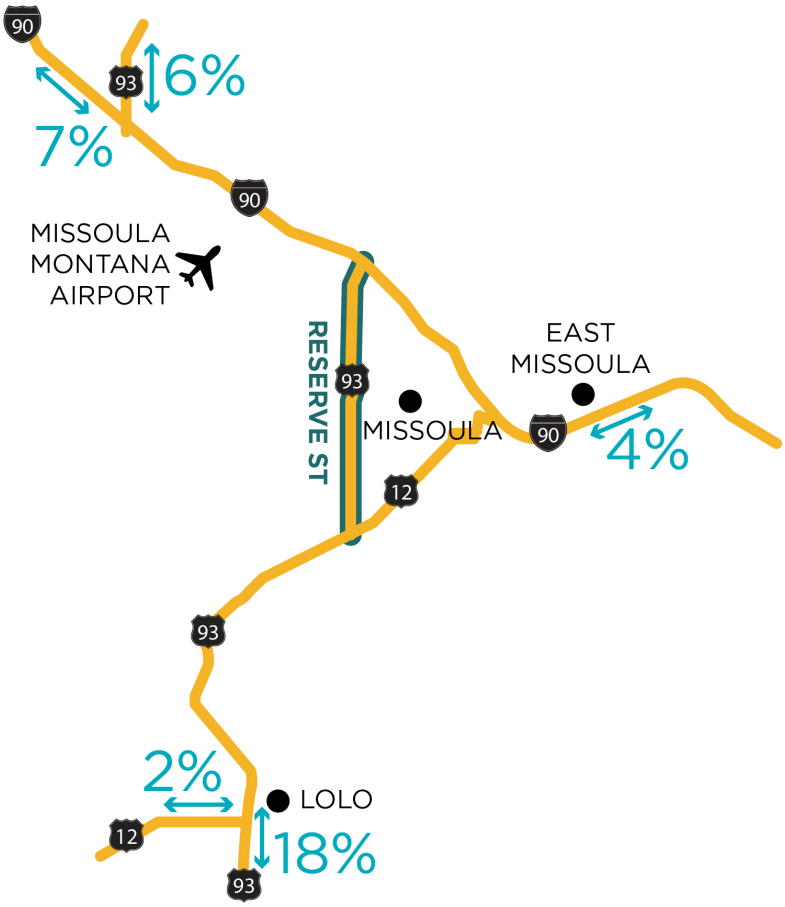
RESERVE STREET CARRIES 23,000 TO 37,000 VEHICLE TRIPS PER DAY

94%-97%
of trips are done by **car**

3%-6%
of trips are **heavy vehicles or freight**

About 1%
of peak hour trips are done by **walking or biking**

WHERE ARE TRIPS ON RESERVE STREET GOING TO AND COMING FROM?



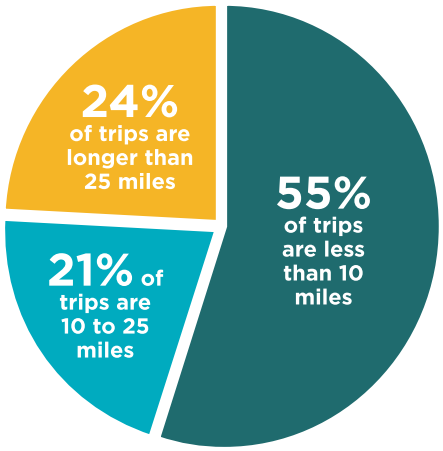
Data Source: Replica Data (Represents Weekday Travel Data in 2023), Montana Department of Transportation (Traffic Count Database System), Weekday AM/PM Peak Hour Intersection Counts from October 2024.

HOW MANY TRIPS ARE LOCAL OR REGIONAL?

50% of trips on Reserve Street stay within the **City of Missoula**

75% of trips on Reserve Street stay within **Missoula County**

HOW LONG ARE TRIPS ON RESERVE STREET?



Travel Speeds

Although the posted speed limit on Reserve Street is 45 mph, observed 85th-percentile speeds reach nearly 60 mph between Mullan Road and River Road, along the Clark Fork River bridge. Higher vehicle speeds make it more difficult for drivers to react to turning vehicles or users that are crossing the roadway, particularly more vulnerable users that are walking and biking, and increase the severity of crashes when they occur. Periods of the day with greater congestion can lead to lower vehicle speeds, particularly between Broadway and Mullan Road.

Traffic Operations

Today, most intersections on Reserve Street meet traffic operational standards. However, while most intersections still have unused capacity, certain movements operate at or near capacity. The corridor will continue to accommodate regional and pass-through traffic as a major arterial and highway. Therefore, the safety treatments presented in the *How We Can Improve Safety* section consider operational implications. Detailed technical analyses of speed and traffic conditions are provided in **Appendix B**.

What Reserve Street May Look Like in the Future

With Missoula's ongoing and projected growth, the land use, form, and intensity of the built environment around Reserve Street is expected to change. The recently adopted *Our Missoula 2045 Land Use Plan* (Missoula Land Use Plan) was developed to guide decision-making around Reserve Street's future. The plan guides ongoing growth and development in the city and seeks to align the built environment with the surrounding transportation networks. It also develops a framework for the urban area using defined Street Types and Place Types. By integrating these two typologies, Missoula aims for greater consistency between land use and transportation and a more functional transportation network.

STREET TYPE

Reserve Street, as US-93, is a National Highway System route, which lends the corridor particular importance for regional and freight mobility.

The City of Missoula's *Our Missoula 2045* Land Use Plan has designated Reserve Street a *Regional Connector* (RC). RC streets are intended to accommodate high volumes of motor vehicle traffic (including freight, transit, and emergency services), while also supporting connectivity among neighborhoods, job centers, and other regional corridors. Although RC streets have historically prioritized vehicle travel, the City expects a growing emphasis on improving multimodal connectivity. Treatments to provide such connectivity on RC streets typically include controlled intersections, appropriately sized lanes, continuous sidewalks with tree-lined buffers, limited access points, and enhanced pedestrian crossings.

The recommendations provided in this plan consider Reserve Street's role in the National Highway System and the community's desires expressed through the RC designation.

PLACE TYPE

Land use is a key determinant of the travel patterns – how much traffic, types of vehicles, time-of-day, and more. Much of the land along the Reserve Street corridor falls into one of two Place Types: *Limited Urban Mixed-Use* (LUM) and *Urban Mixed-Use High* (UMH). LUM is characterized by automobile influence, large shopping centers, department stores, and businesses. These areas are primarily commercial, providing neighborhood and community-scale businesses and services, with residential uses allowed but not prioritized – although the City of Missoula expects more mixed-use developments to emerge in these areas. Reserve Street also includes pockets of UMH areas that are envisioned as activity hubs, combining high-density residential, diverse businesses, and a variety of transportation options. In contrast to the LUM Place Type, UMH seeks to prioritize street-level character and active use.

Given this level of activity, Reserve Street will continue to serve high volumes of both regional and local traffic. Direct access to businesses and other destinations will need to be weighed against the conflicts that this access can generate on a high-volume/high-speed corridor like Reserve Street. As more residential and mixed-uses materialize along the corridor, greater comfort and safety for active modes will need to be prioritized.

SAFETY CONDITIONS

This section summarizes the methods and key findings from the Reserve Street safety analysis. The crash analysis included two components:

- **Corridor-Wide Crash Patterns:** A comprehensive review of MDT's most recent five years of crash data (January 1, 2019, to December 31, 2023[4]) to identify trends, including crash locations, highest injury severities, collision types, and other characteristics commonly associated with fatal or serious injuries.
- **Corridor Screening:** A screening of roadway segments and intersections to identify areas with the highest relative crash severity based on historical crash data and to assess infrastructure characteristics associated with these higher severity crashes.

Findings from the crash analysis, along with input from the public, directly informed the safety treatments presented in the *How We Can Improve Safety* section and the recommendations in the *Corridor Improvement Packages* section. More details on the crash analysis findings and methods are provided in **Appendix B**.



[4] This data includes all crashes reported by the Montana Highway Patrol and may not represent the total number of crashes along the corridor, as some crashes go unreported if emergency responders or law enforcement are not contacted.

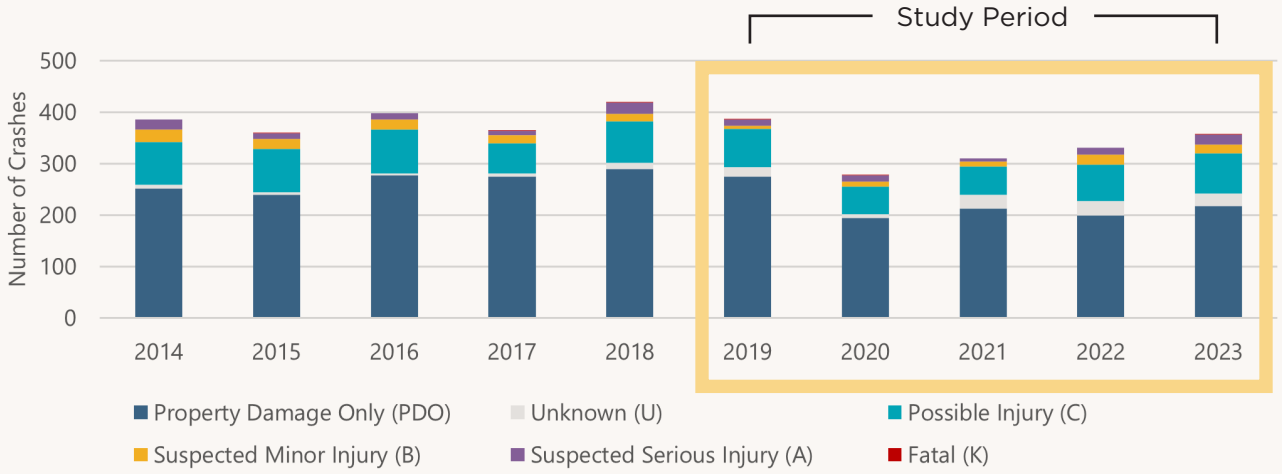
Crash Patterns

Crash patterns are summarized based on the highest severity injury experienced by any person involved in the crash using the KABCO Injury Classification Scale: fatal (K), suspected serious injury (A), suspected minor injury (B), possible injury (C), and property damage only (PDO). While a single crash may involve multiple injuries of varying severities, this assessment focuses only on the highest injury severity.

Crash data over the most recent 10-year period of available data shows that annual crashes on Reserve Street fluctuated, ranging from about 280 to over 400 per year (**Figure 4**). Total crashes peaked in 2018, followed by a sharp decline in 2020 – likely attributed to reduced travel during the COVID-19 pandemic. Since 2020, total crashes have gradually increased towards pre-2020 levels.

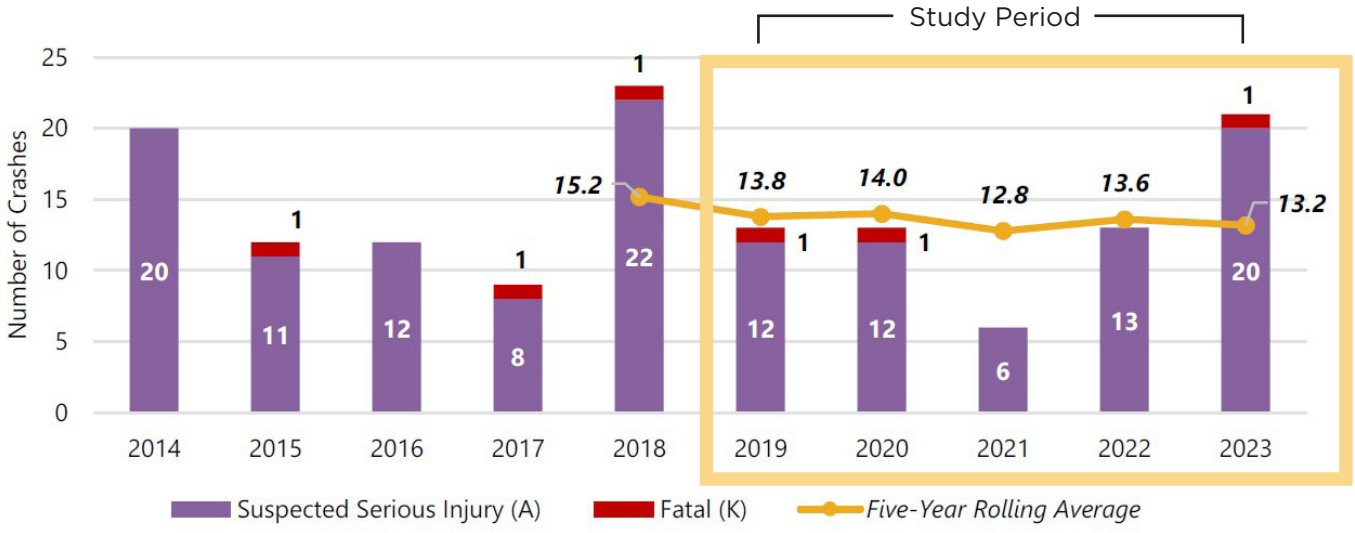
This Plan focused on the latest five years of available crash data because that is the period evaluated in the Safe Streets and Roads for All grant program.

Figure 4: Crashes by Severity by Year



Total fatal and serious injury crashes also fluctuated in the 10-year period, but their proportion of total crashes has increased in the past three years (**Figure 5**). This indicates that while overall crashes are still below pre-2020 totals, severe crashes are making up a larger proportion of them.

Figure 5: Fatal and Serious Injury Crashes by Year

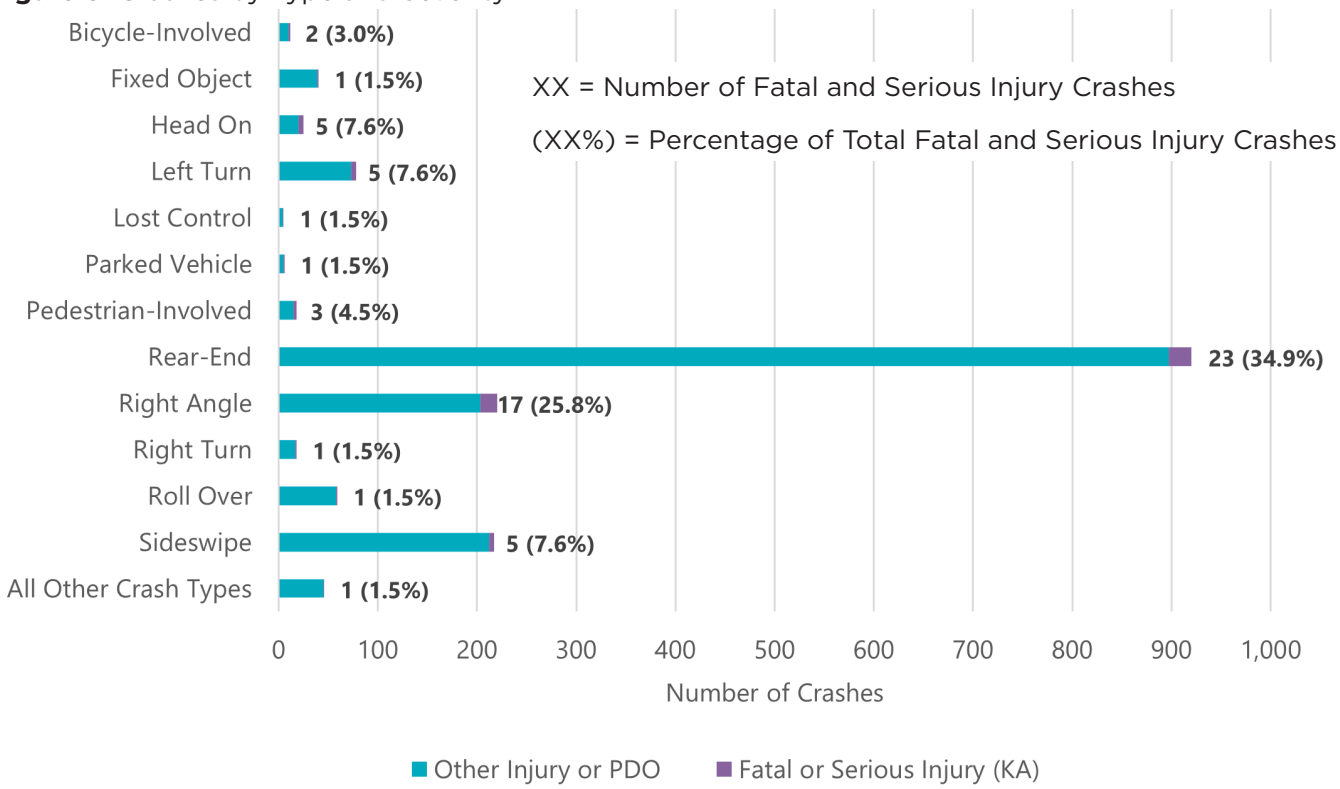


CRASH TYPES

This analysis focuses on crashes in the most recent five-year period (2019-2023). In this period, there were 1,664 total crashes, including three fatal crashes and 63 serious injury crashes. One of the fatal crashes involved a pedestrian. More recently, in summer 2025, a person using a mobility scooter was fatally struck at the Reserve Street/American Way intersection.

Crash types along the corridor vary in both frequency and severity, with some crash types more likely to result in fatal or serious injuries than others (**Figure 6**).

Figure 6: Crashes by Type and Severity



The most common crash types across all crashes as well as fatal and serious injury crashes, as well as crash types resulting in a disproportionate amount of fatal and serious injury crashes were rear-end, right angle, side swipe, and left-turn crashes. Additionally, several less common crash types account for a disproportionately higher share of fatal or serious injury crashes. Right-angle, head-on, left-turn, pedestrian-involved, and bicycle-involved crashes all account for a greater proportion of fatal and serious injury crashes than they do for total crashes, indicating that these crashes tend to be more severe than other crash types.



Rear-end**

55% of crashes, 35% of fatal and serious injury crashes



Right angle*

13% of crashes, 26% of fatal or serious injury crashes



Sideswipe*

13% of crashes, 8% of fatal or serious injury crashes



Left-Turn**

5% of all crashes, 8% of fatal or serious injury crashes



Head-on*

1.5% of crashes, 8% of fatal and serious injury crashes



Pedestrian-Involved*

1% of all crashes, 5% of fatal and serious injury crashes



Bicycle-Involved*

<1% of all crashes, 3% of fatal and serious injury crashes

* **Most Common Fatal and Serious Injury Crash Types**

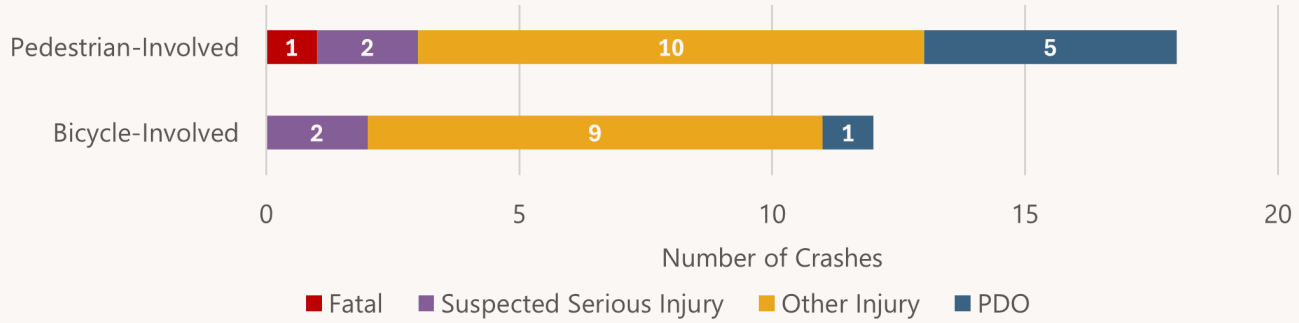
* **Crash Types Disproportionately Resulting in a Fatal or Serious Injury Crash**

VULNERABLE ROAD USER CRASHES

Vulnerable road users are those without the protective elements of a vehicle surrounding them (e.g., people walking and biking) and are exposed to greater risk of fatalities and injuries on roadways. This is evident within the study period, as pedestrian-involved and bicycle-involved crashes represented 1.8% of all crashes, but 7.6% of all fatal and suspected serious injury crashes.

Pedestrian- and bicycle-involved crashes are summarized by severity in **Figure 7**. There was one pedestrian-involved crash that resulted in a fatality and four crashes that resulted in a suspected serious injury (two pedestrian, two bicycle). According to City staff, it's possible that some reported pedestrian involved crashes actually involved bicyclists, as police officers sometimes classify people on bikes in the crosswalk as pedestrians to be consistent with state law.

Figure 7: Pedestrian- and Bicyclist-Involved Crashes by Severity



CRASH LOCATIONS

Knowing where crashes occur is critical for identifying treatments that can most effectively reduce fatal and serious injury crashes. The following statistics and **Figures 8 and 9** summarize crash patterns for the five-year period by location, including intersection versus non-intersection crashes and signalized versus unsignalized intersections. Total and fatal and serious injury crashes are mapped in **Figure 10**, and pedestrian and bicycle-involved crashes are mapped in **Figure 11**.

88% of all crashes occur at intersections

- 77% percent of pedestrian- or bicycle-involved crashes occurred at an intersection

91% of all fatal and serious injury crashes occur at intersections, including all three fatalities in the most recent five-year period

- One pedestrian-involved fatal crash occurred at the Mullan Road intersection

62% of all intersection-related crashes occur at signalized intersections, but only 38% of intersection fatal and serious injury crashes occur at signalized locations

- At signalized intersections, rear-end crashes are the most common for both total crashes and fatal or suspected serious injury crashes.

62% of all fatal and serious injury intersection-related crashes occur at unsignalized intersections. However, unsignalized locations only account for 38% of all intersection-related crashes.

- At unsignalized intersections, rear-end crashes are the most common crash type, followed by right-angle. Right-angle crashes are more likely to result in fatal or serious injury crashes.

Figure 8: Crashes by Location Type

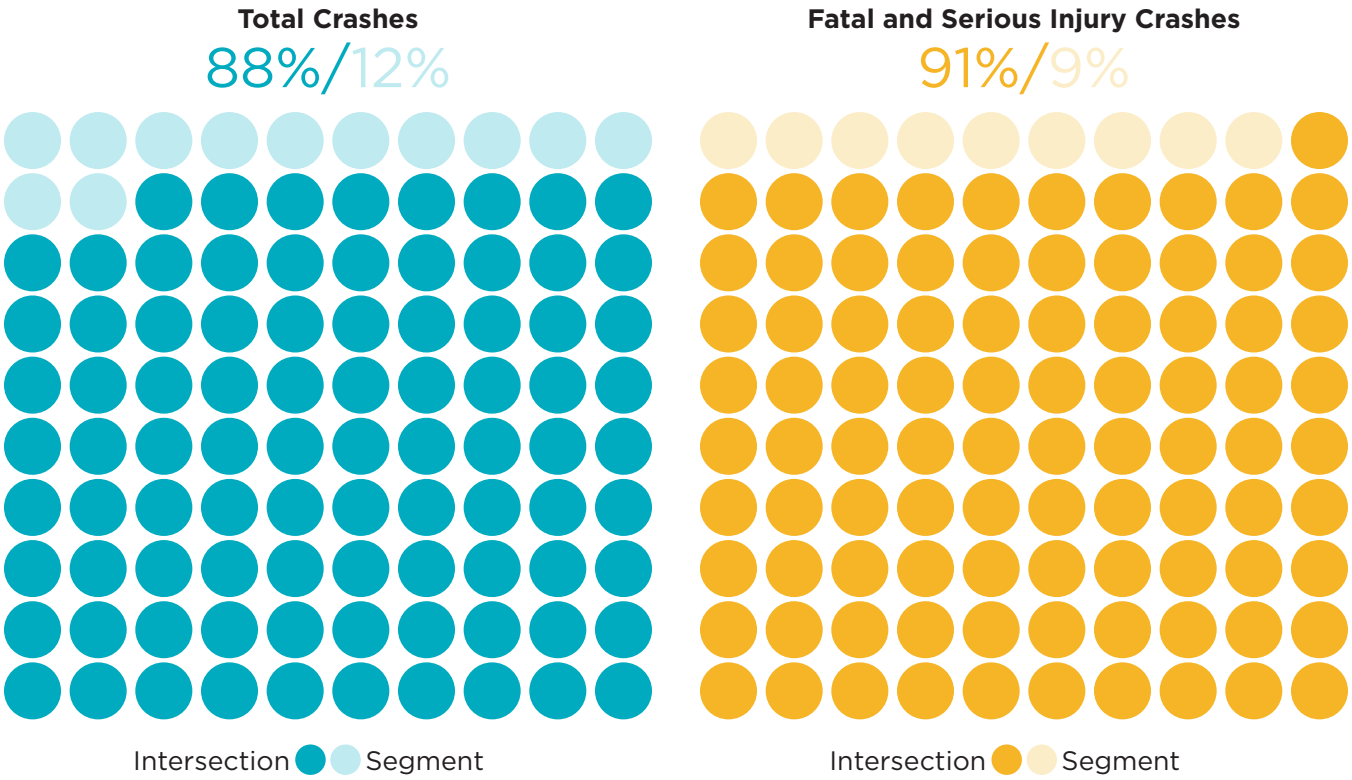


Figure 9: Intersection-Related Crashes by Traffic Control

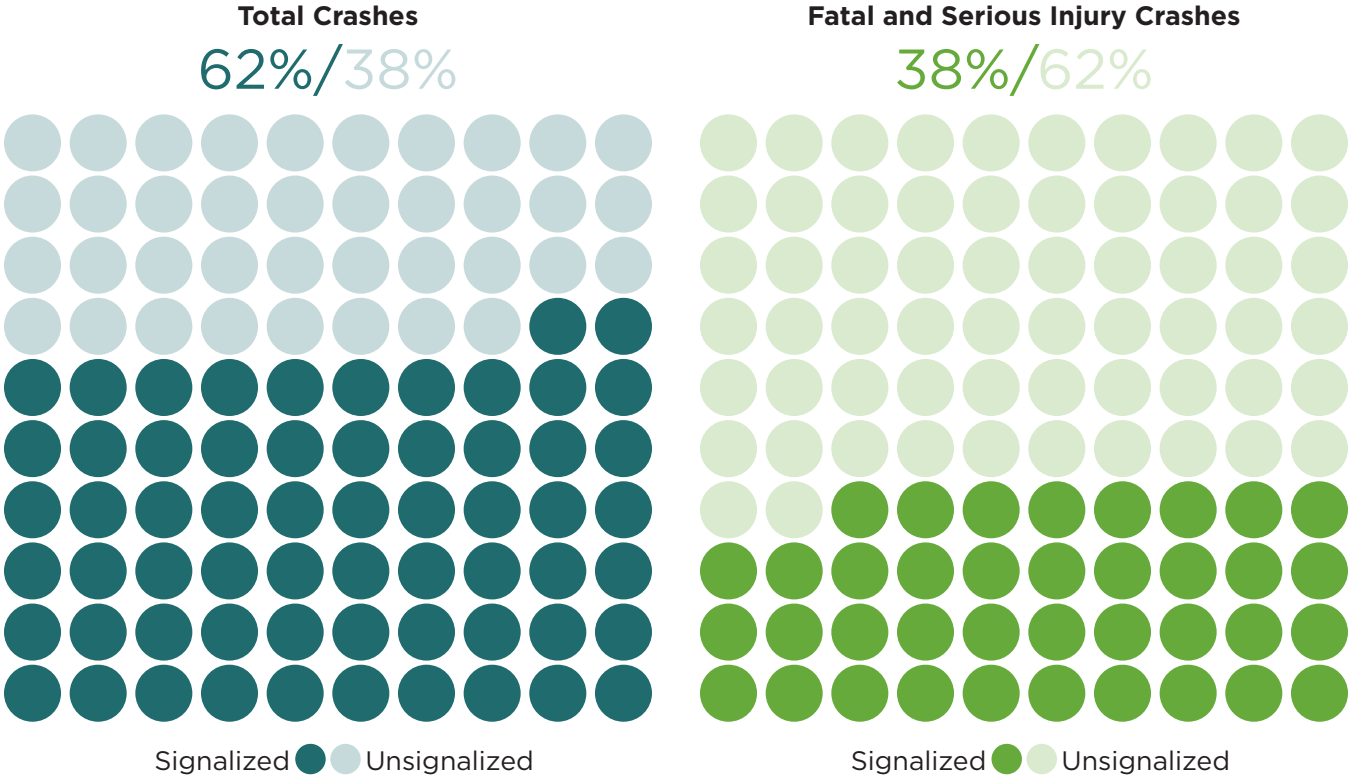
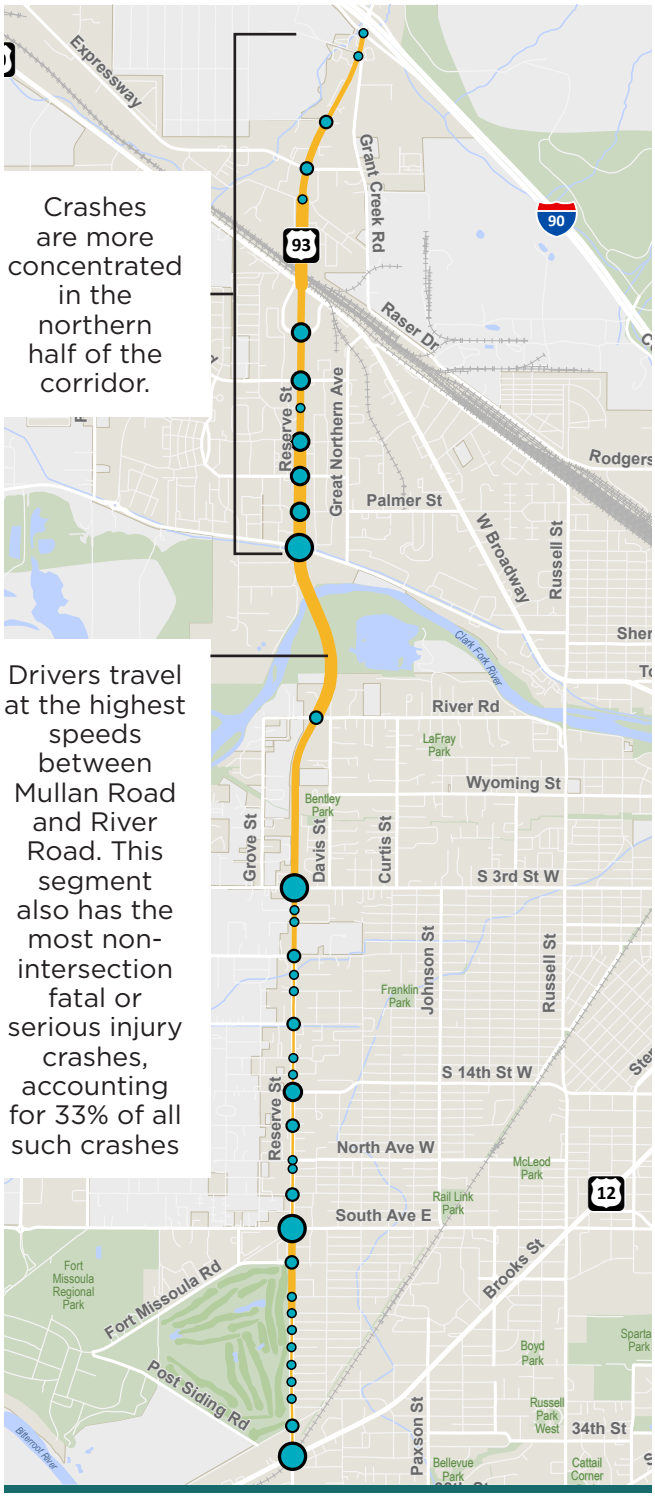


Figure 10: Total and Fatal and Serious Injury Crashes by Location

Total Intersection Crashes



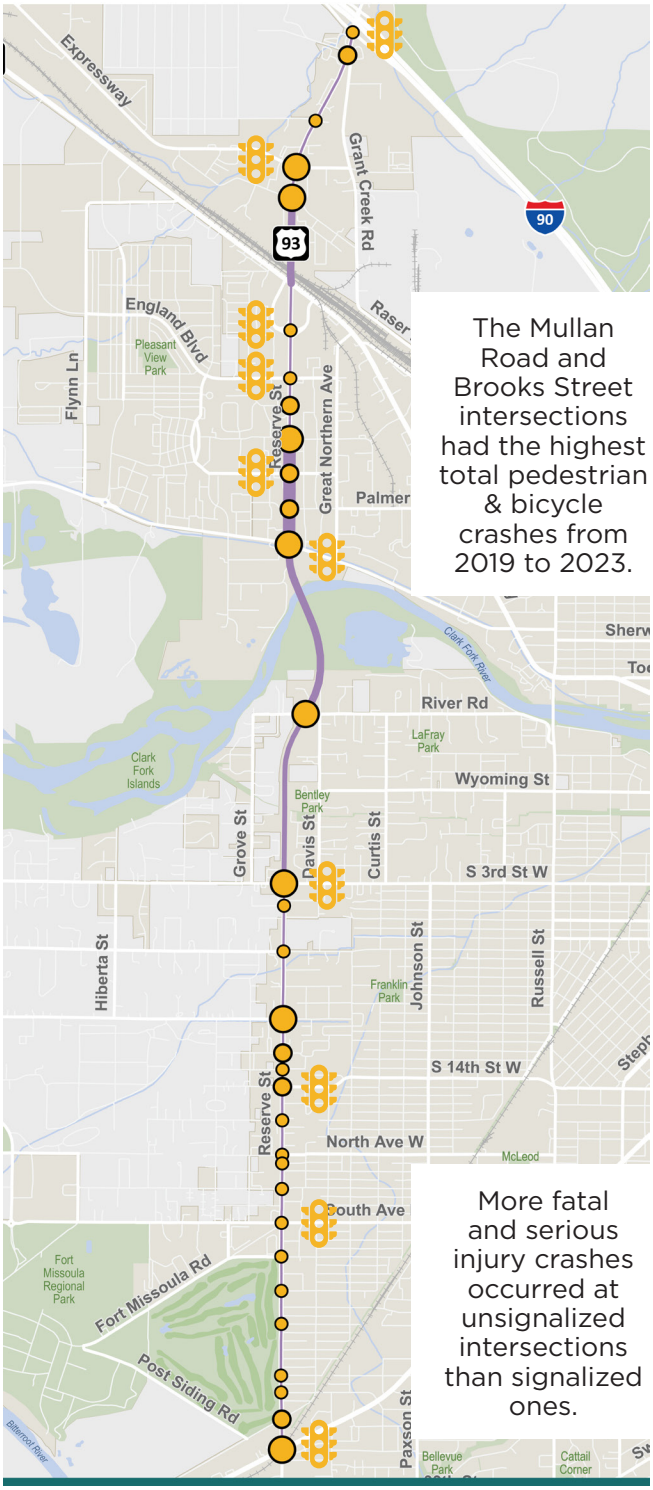
Crashes are more concentrated in the northern half of the corridor.

Drivers travel at the highest speeds between Mullan Road and River Road. This segment also has the most non-intersection fatal or serious injury crashes, accounting for 33% of all such crashes

Total Intersection Crashes
- Lowest
- Highest

Segment Crashes per Mile
- Lowest
- Highest

Fatal and Serious Injury Crashes



The Mullan Road and Brooks Street intersections had the highest total pedestrian & bicycle crashes from 2019 to 2023.

More fatal and serious injury crashes occurred at unsignalized intersections than signalized ones.

Intersection Fatal and Serious Injury Crashes
- Lowest
- Highest (Three or more fatal or serious injury crashes)

Segment Fatal and Serious Injury Crashes per Mile
- Lowest
- Highest

Figure 11: Pedestrian- and Bicycle-Involved Crashes



Pedestrian-Involved Crashes

- Fatal or Suspected Serious Injury Crash (3)
- Other Injury (9)
- PDO or Unknown Injury (6)

Bicycle-Involved Crashes

- Suspected Serious Injury (2)
- Other Injury (8)
- PDO or Unknown Injury (2)

Data Sources: City of Missoula, Missoula County

Pedestrian and Bicycle Crashes

Corridor Screening

This section summarizes findings from two corridor screening assessments: an Equivalent Property Damage Only (EPDO) assessment and an Infrastructure Indicators assessment. These assessments aim to identify focus areas that could benefit from safety improvements by analyzing locations with the highest severity crashes, as well as locations with roadway or environmental characteristics that are commonly associated with these high severity crashes.

The EPDO analysis methodology places greater emphasis on crash severity compared to other common methods that only consider crash frequency or rate, providing insight into locations that have low crash frequency but have experienced one or more fatal or suspected serious injury crashes. The results of the EPDO screening, which quantifies the cost of crashes at a location on a consistent scale, are shown in **Figure 12** and more information on this method can be found in **Appendix B**.

The factors evaluated in the infrastructure indicators screening are listed below. These characteristics include roadway design and environmental factors that may be correlated with higher crash severity. These characteristics can influence vehicle speed, driver behavior, and the presence of vulnerable users.



Permissive left-turn signal phasing – Can result in conflicts between left-turning vehicles and through vehicles and people in the crosswalk.



Right-turn slip lane – Leads to higher speed right turns and can create another conflict point with people walking or biking.



Skewed unsignalized intersection – Reduces sight distance for vehicles making turns or trying to cross the street.



Locations within ½ mile of a school – Can indicate the location is in an area with higher pedestrian, bicycle, and other vulnerable road user activity, especially children.

Other corridor-wide characteristics include:



45 mph speed limit – Higher speeds result in greater energy transfer when a crash occurs, which can increase crash severity.



High driveway density – Driveways, especially those without turn restrictions, create conflict points.



Lack of protected bicycle facilities – People biking must either share a lane with motor vehicle traffic or share the sidewalk with people walking.



Limited pedestrian and bicycle crossings in many locations – People walking or biking across Reserve Street often need to travel over a half mile out-of-direction to cross at a signal or enhanced crossing.

Figure 12: Crash Frequency and Severity Screening



Data Sources: City of Missoula, Missoula County

Future Safety Conditions

According to the updated travel model developed for the Missoula Connect 2050 Long-Range Transportation Plan, traffic on Reserve Street is expected to be higher in 2050 than it is today. Growth is anticipated to be highest on the section north of Broadway Street, with daily traffic volumes projected to increase by 25% to 35%. South of Clark Fork River, between S 3rd Street and Brooks Street, growth is expected to be a more modest 10%. A few intersecting corridors, including International Drive, River Road, and Mary Avenue, are also projected to experience notable traffic increases. In turn, greater traffic volumes will increase the potential for conflicts and severe crashes between users, further emphasizing the need to balance targeted safety improvements with maintaining the operational performance of the corridor.

Safety Emphasis Areas

The findings from the existing and future conditions analysis, combined with input from the public, helped establish five safety emphasis areas for Reserve Street. These areas focus on crash types and travel behaviors that contribute most to fatal and serious injury crashes along the corridor.



Vulnerable Road User Crashes

Crashes involving people walking or biking are overrepresented among fatal and serious injury crashes and require targeted interventions to protect these users.

Speed Management

The community identified high speeds as a concern along the corridor. Speed can increase the severity of crashes when they occur.

Rear-End Crashes

Rear-end crashes are the most common on Reserve Street and can result in injury or fatality when they occur at high-speeds

Right-Angle Crashes

Right-angle crashes represented 15% of all intersection crashes, but 30% of serious injury crashes occurring at intersections.

Turning Crashes

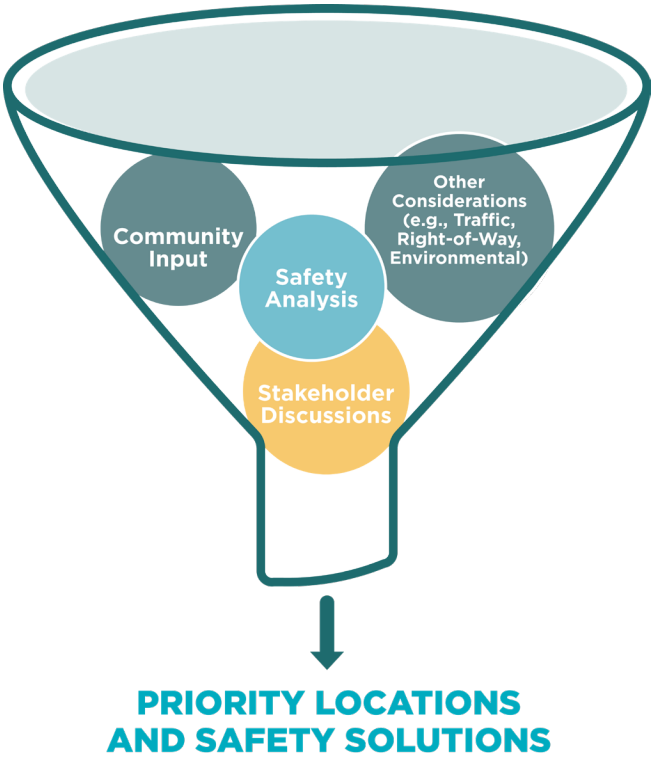
Two out of the three fatal crashes on Reserve Street during the five-year study period involved left-turning vehicles.

5. How We Can Improve Safety

Improving safety along Reserve Street requires a comprehensive approach. The strategies presented in this section include both infrastructure and non-infrastructure measures.

Infrastructure strategies were identified and prioritized based on their effectiveness at addressing the SAP's emphasis areas above. Strategies include proven countermeasures, as identified by FHWA[5] and the National Highway Traffic Safety Administration (NHTSA)[6], that may reduce fatal and serious injury crashes in alignment with the SSA, as well as those that have been shown to be effective in other research at addressing the types of crashes and risk factors seen on Reserve Street.

Physical interventions that reduce or remove conflict points between vehicles, pedestrians, and bicyclists are expected to most improve safety. In locations where local access and crossings must be maintained, treatments that separate conflicts in time or manage vehicle speeds are also essential.



The core infrastructure strategies along Reserve Street focus on:

- Reducing conflict points and speeds through certain intersections by implementing new traffic controls, such as roundabouts and traffic signals, and implementing dynamic speed feedback signs.
- Removing conflicts between turning/crossing vehicles and through vehicles on Reserve Street through access management strategies.
- Providing more controlled opportunities for crossing Reserve Street by all modes of travel through upgraded intersection controls and enhanced pedestrian crossings.
- Physically separating people walking and biking from motor vehicle traffic by adding shared-use paths on both sides of the street or providing grade-separated crossings.

Non-infrastructure strategies complement physical interventions and support a more holistic approach to safety. Together, these measures form a coordinated, corridor-wide framework for reducing crashes, improving safety for all users, and balancing mobility and access needs.

[5] *Federal Highway Administration (FHWA). (2025). Proven Safety Countermeasures. https://highways.dot.gov/safety/proven-safety-countermeasures*

[6] *National Highway Traffic Safety Administration (NHTSA). (2024). Countermeasures That Work. https://www.nhtsa.gov/book/countermeasures/countermeasures-that-work*

SPEED

The posted speed limit on Reserve Street is 45 mph. Community feedback consistently emphasized that managing speed, whether by reducing the posted limit or addressing speeding behavior, should be a priority. Speed plays a direct role in crash severity because higher speeds increase the amount of kinetic energy transferred in a collision, increasing the likelihood of serious injury or fatal outcomes. For this reason, speed is a key emphasis area in the Safe System Approach.

The posted and operating speeds on Reserve Street were a key consideration in strategy development. This plan contains a number of strategies related to speed, including evaluating reducing the posted speed limit, installing dynamic speed feedback signs, and considering variable speed limits (which are not yet approved for use in Montana). Further, several of the infrastructure strategy recommendations (e.g., installing a roundabout) may reduce operating speeds at specific locations. Other strategies will remove or control conflict points (e.g., traffic signals, access management, enhanced pedestrian crossings).



THE SAFE SYSTEM ROADWAY DESIGN HIERARCHY

To identify the most effective strategies for addressing Reserve Street's safety emphasis areas, potential treatments were evaluated using FHWA's *Safe System Roadway Design Hierarchy*. This framework, which is a key component of the SSA, organizes countermeasures into four tiers that are generally ranked by their expected effectiveness at reducing severe crashes (**Figure 13**). Strategies higher in the hierarchy focus on physically removing severe conflicts, while lower tiers rely on managing risk through traffic control or raising awareness.

Tier 1 – Remove Severe Conflicts: Includes countermeasures that separate people and vehicles moving at different speeds or directions. Potential Tier 1 countermeasures on Reserve Street might include roundabouts, access management, or protected bike lanes.

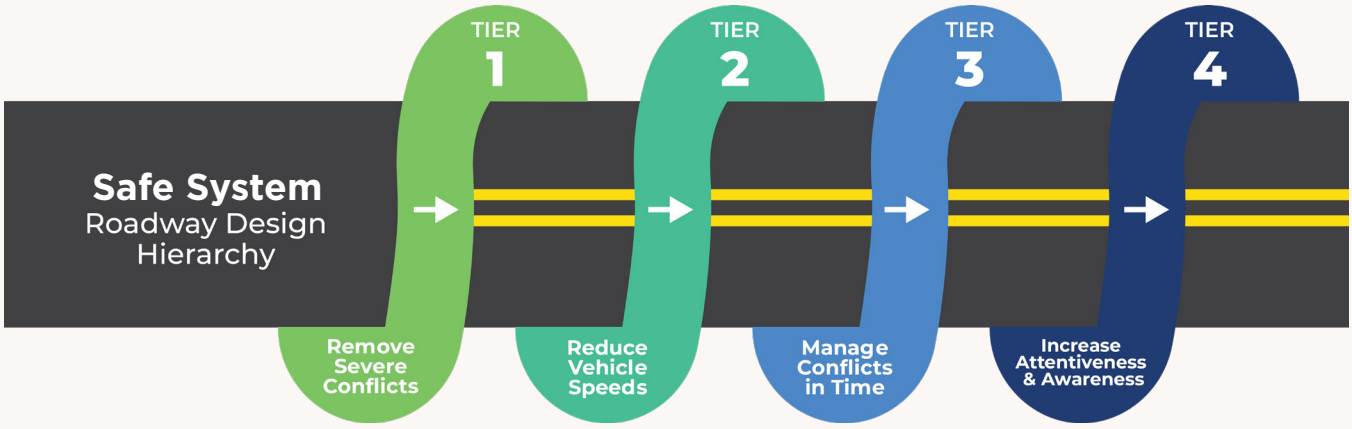
Tier 2 – Reduce Vehicle Speeds: Includes countermeasures that reduce vehicle speeds, thereby reducing the likelihood of a crash and the severity of a crash should one occur. Potential Tier 2 countermeasures on Reserve Street might include a reduced corridor-wide speed limit with additional speed management strategies and enforcement.

Tier 3 – Manage Conflicts in Time: Includes countermeasures that separate users in time using traffic control devices to reduce conflicts. Potential Tier 3 countermeasures on Reserve Street might include conversion of permitted left-turn phasing to protected phasing at signalized intersections or the implementation of pedestrian hybrid beacons or signals at crossings.

Tier 4 – Increase Attentive and Awareness: Includes countermeasures that alert people to potential conflicts. Potential Tier 4 countermeasures on Reserve Street might include improved lighting or advance warning signs.

Strategies in different tiers can be combined together to create a more impactful approach (e.g., a roundabout may also have enhanced pedestrian crossings and lighting).

Figure 13: Safe System Roadway Design Hierarchy



INFRASTRUCTURE SOLUTIONS

This section presents the recommended infrastructure solutions for Reserve Street and identifies priority locations for their implementation. These strategies were selected and prioritized based on their ability to address the corridor's safety emphasis areas, their placement within the Safe System Hierarchy, and their relative cost. The recommended solutions include a mix of higher- and lower-cost treatments, supporting long-term planning and investment along the corridor.

The solutions aim to align with the contexts of the three distinct segments of Reserve Street previously shown in **Figure 2**:

1. I-90 to Broadway Street
2. Broadway Street to Clark Fork River
3. Clark Fork River to US-12 (Brooks Street)

The range of potential recommendations for each segment provides flexibility in implementation to ensure that safety improvements can advance even as funding levels and/or priorities evolve. Treatments can be prioritized or combined based on funding availability, allowing near-term implementation of lower-cost strategies while coordinating on higher-cost options among the MPO, MDT, and the City.

From these recommended solutions, five priority treatment packages were identified through the evaluation process. These packages are presented in the next section, Corridor Improvement Packages. A detailed assessment of the strategy selection process and evaluation is provided in the *Safety Strategies Memorandum* (**Appendix C**).

I-90 to Broadway Street Ramps

Context

This segment is characterized by a mix of highway-oriented commercial and industrial uses. Land uses are strongly influenced by the presence of I-90, with several hotels and restaurants serving regional travelers.

Infrastructure Strategies

Key infrastructure strategies for reducing fatal and serious injury crashes on Reserve Street from I-90 to the Broadway Street Ramps are shown below.

Table 1 identifies recommended solutions for this segment of Reserve Street.



Proposed Long-Term Vision for this Section of Reserve Street

Table 1: Infrastructure Solutions Recommended for I-90 to Broadway Street Ramps

LOCATION	STRATEGY	TIMEFRAME	NOTES/CONSIDERATIONS
Mid-Block Crossing			
Reserve St Crossing (between Grant Creek Rd and Schramm St)	PHB or RRFB[1]	Short Term	PHB preferred due to motor vehicle volumes and speeds. Engineering study to consider MDT and MUTCD guidance needed to select final treatment. Grade-separated crossing to be considered pending maintenance discussions between MDT and City.
Intersections			
Michael Rd	Turn movement restrictions[2]	TBD – See notes	Only recommended if Michael Rd is extended to future development.
Schramm St	Traffic signal	TBD (expected to be built by development)	If constructed, also consider: • Signal timing/phasing strategies[3] • Protected intersection elements • Intersection bicycle treatments
Expressway Rd-Howard Raser Dr	Signal modifications[3]	Short Term	LPIs likely feasible with existing hardware
	Intersection bicycle treatments	Short Term	-
	Protected intersection elements	Long Term	-
International Dr-Stockyard Rd	Turn movement restrictions[2]	Short Term	Could be implemented on a trial basis using quick-build treatments
	Traffic signal or Roundabout[4]	Long Term	If signal is constructed, also consider: • Signal enhancements[3] • Protected intersection elements • Intersection bicycle treatments Expected to meet volume warrants by 2050
	Intersection reconfiguration	Long Term	Reduce skew or reduce offset
Broadway St NB Ramp	PHB or RRFB[1]	Short Term	This is for the crossing of the uncontrolled ramp lane, not Reserve Street.
Broadway St SB Ramp	Evaluate all-red and yellow times	Short Term	-
	Advance intersection warning signage (and beacons)	Medium Term	Overhead signs could include flashing beacons. If included, further study of operations in similar locations should be conducted to determine optimal setup

[1] MDT's 2019 memorandum titled "Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations" should be referenced when conducting a study to justify a specific crossing treatment at a specific location.

[2] Could include restricting to right-in/right-out access only or right-in/right-out/left-in access.

[3] Recommended signal modifications (or enhancements for proposed signals) include: LPIs, RTOR restrictions, all-red and yellow time evaluations, and protected left-turn phasing.

[4] When considering a change in traffic control (e.g., traffic signal or roundabout), an intersection control evaluation (ICE) that considers safety, operational, and other impacts (including on adjacent intersections, if applicable) should be completed to determine the ultimate intersection control and configuration.

LOCATION	STRATEGY	TIMEFRAME	NOTES/CONSIDERATIONS
Segments			
Broadway St Bridge	Dynamic speed feedback signs	Short Term	Signs would be installed in both directions to manage speeds. Maintenance is subject to agreement between MDT and City, both of which are interested in studying the effectiveness of such signage among the recommended locations

Broadway Street Ramps to Clark Fork River

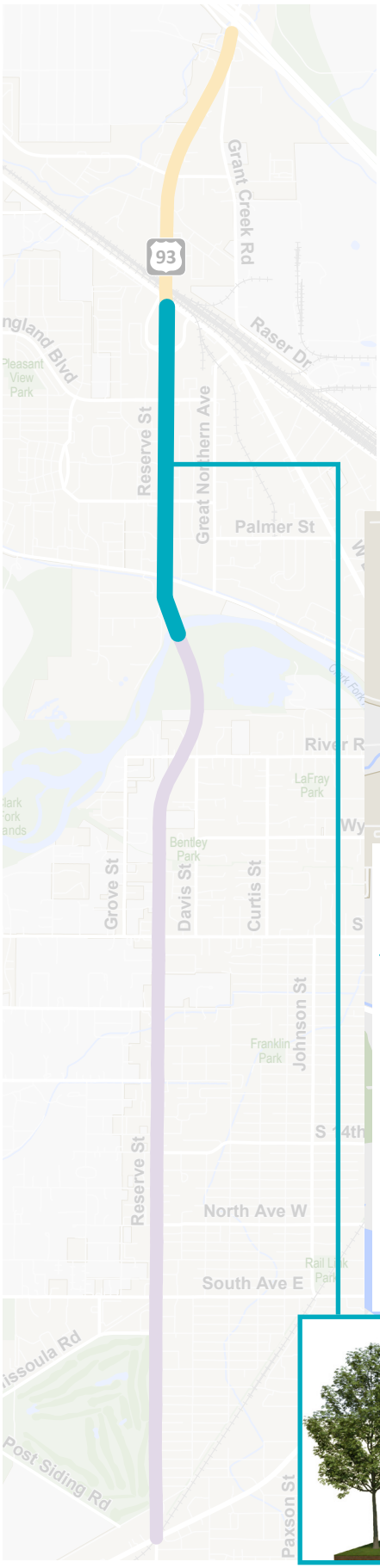
Context

This segment of Reserve Street is characterized by big box stores and strip mall shopping destinations. It is located on the eastern edge of Missoula's Sxwtpqyen master planned area. Access is generally limited to public street intersections as well as right-in/right-out driveways. It benefits from parallel roads that provide alternative access to businesses and residential areas.

Infrastructure Strategies

Key infrastructure strategies for reducing fatal and serious injury crashes on Reserve Street from the Broadway Street Ramps (south of the railroad) to the Clark Fork River are shown below.

Table 2 identifies recommended solutions for this segment of Reserve Street.





Proposed Long-Term Vision for this Section of Reserve Street



Table 2: Infrastructure Solutions Recommended for Broadway Street to Clark Fork River

LOCATION	STRATEGY	TIMEFRAME	NOTES/CONSIDERATIONS
England Blvd	Signal modifications[1]	Short Term	APS needed to install LPIs. Could also consider replacing westbound split phasing with dual left turns to help reduce access conflicts with queues on England.
	Intersection bicycle treatments	Short Term	-
	ADA improvements	Medium Term	-
	Access management on side streets within influence area	Medium Term	-
	Protected intersection elements	Long Term	-
American Way	Turn movement restrictions[2]	Medium Term	-
	Traffic signal or Roundabout[3]	Long Term	If signal is constructed, also consider: • Protected intersection elements • Intersection bicycle treatments Evaluation should consider impact on travel patterns on parallel routes. Further study should be coordinated with Mullan Rd study
Union Pacific St	Signal modifications[1]	Short Term	APS needed to install LPIs.
	Intersection bicycle treatments	Short Term	-
Palmer St	Turn movement restrictions[2]	Short Term	Restrictions already exist on the eastbound approach.
	Traffic signal or Roundabout[3]	Long Term	If signal is constructed, also consider: • Protected intersection elements • Intersection bicycle treatments Expected to meet volume warrants by 2050. Evaluation should consider impact on travel patterns on parallel routes.
Mullan Rd	Signal modifications[1]	Short Term	LPIs likely feasible with existing hardware
	Intersection bicycle treatments	Short Term	-
	ADA improvements	Medium Term	-
	Access management on side streets within influence area	Medium Term	-
	Alternative intersection configuration	Long Term	Consider Median U-Turn (MUT) – with roundabouts at Clark Fork Dr and Great Northern Ave – or quadrant intersection in further study. Further study should be coordinated with American Way study.
	Protected intersection elements	Long Term	-

[1] Recommended signal modifications (or enhancements for proposed signals) include: LPIs, RTOR restrictions, all-red and yellow time evaluations, and protected left-turn phasing.

[2] Could include restricting to right-in/right-out access only or right-in/right-out/left-in access.

[3] When considering a change in traffic control (e.g., traffic signal or roundabout), an intersection control evaluation (ICE) that considers safety, operational, and other impacts (including on adjacent intersections, if applicable) should be completed to determine the ultimate intersection control and configuration.

Clark Fork River to US-12 (Brooks Street)

Context

This segment of Reserve Street is characterized by residential neighborhoods and small-scale commercial businesses. There are limited controlled intersections and a greater number of full-access driveways onto Reserve Street than on other sections.

Infrastructure Strategies

Key infrastructure strategies for reducing fatal and serious injury crashes on Reserve Street from the Clark Fork River to US-12 (Brooks Street) are shown below.

Table 3 identifies recommended solutions for this segment of Reserve Street.



Table 3: Infrastructure Solutions Recommended for Clark Fork River to US-12 (Brooks Street)

LOCATION	STRATEGY	TIMEFRAME	NOTES/CONSIDERATIONS
Clark Fork River bridge	Lighting	Short Term	Illumination to be installed on the bridge as designed through engineering study. City desires to consider Dark Sky best practices.
	Dynamic speed feedback signs	Short Term	Placed heading into the horizontal curve on bridge in both directions. Maintenance subject to MDT and City agreement, both of which are interested in studying the effectiveness of such signage among the recommended locations.
	Variable speed limits[1]	Medium Term	-
River Rd	Sight distance improvements	Short Term	-
	Advance intersection warning signage (and beacons)	Medium Term	Beacons may be constant or actuated by side-street approaching vehicles
	Overhead beacons	Short Term	Yellow for Reserve St; red for River Rd.
	Turn movement restrictions[2]	Medium Term	Southbound left-turn could be signalized.
	Roundabout or Traffic signal[3]	Long Term	-
S 3rd St	Signal modifications[4]	Short Term	APS and FYA needed to install LPIs
	Intersection bicycle treatments	Short Term	-
	Advance intersection warning signage (and beacons)	Medium Term	Signage such as Be Prepared to Stop When Flashing or Signal Ahead may be most appropriate. Overhead signs could include flashers coordinated with the signal.
	ADA improvements	Medium Term	-
	Reduce curb radii	Medium Term	-
	Protected intersection elements	Long Term	-

[1] The MDT Transportation Commission must approve VSLs and speed limit changes before they can be enacted on Reserve Street.

[2] Could include restricting to right-in/right-out access only or right-in/right-out/left-in access.

[3] When considering a change in traffic control (e.g., traffic signal or roundabout), an intersection control evaluation (ICE) that considers safety, operational, and other impacts (including on adjacent intersections, if applicable) should be completed to determine the ultimate intersection control and configuration.

[4] Recommended signal modifications (or enhancements for proposed signals) include: LPIs, RTOR restrictions, all-red and yellow time evaluations, and permissive-to-protected left-turn phasing.

LOCATION	STRATEGY	TIMEFRAME	NOTES/CONSIDERATIONS
S 7th St	PHB or RRFB[5]	Short Term	PHB preferred due to motor vehicle volumes and speeds. Engineering study considering MDT and MUTCD guidance needed to select final treatment. Evaluate need for crossing at S 7th St or Spurgin Rd If installed, include: • Continental markings • Pedestrian refuge island • Advance intersection warning signage (and beacons) • Turn movement restrictions Grade-separated crossing to be considered as an alternative, pending maintenance discussions between MDT and City.
	Dynamic speed feedback signs	Short Term	Installed upstream of intersection in both directions. Maintenance subject to MDT and City agreement, both of which are interested in studying the effectiveness of such signage among the recommended locations.
	Sight distance improvements	Medium Term	-
	ADA improvements	Medium Term	-
	Traffic signal or Roundabout[2]	Long Term	May meet volume warrants by 2050
Spurgin Rd	PHB or RRFB[4]	Short Term	PHB preferred due to motor vehicle volumes and speeds. Engineering study considering MDT and MUTCD guidance needed to select final treatment. Evaluate need for crossing at S 7th St or Spurgin Rd If installed, include: • Continental markings • Pedestrian refuge island • Advance intersection warning signage (and beacons) • Turn movement restrictions Grade-separated crossing to be considered as an alternative, pending maintenance discussions between MDT and City.
	Sight distance improvements	Medium Term	-
	ADA improvements	Medium Term	-
	Traffic signal or Roundabout[2]	Long Term	-

[5] *MDT's 2019 memorandum titled "Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations" should be referenced when conducting a study to justify a specific crossing treatment at a specific location.*

LOCATION	STRATEGY	TIMEFRAME	NOTES/CONSIDERATIONS
Mount Ave	Signal modifications[3]	Short Term	APS and FYA needed to install LPIs
	ADA improvements	Medium Term	-
	Intersection bicycle treatments	Medium Term	-
	Protected intersection elements	Long Term	-
Central Ave	PHB	Medium Term	The signalized school crossing could be converted to a PHB if others are installed on Reserve Street so treatments are consistent.
	ADA improvements	Medium Term	-
South Ave	Signal modifications[3]	Short Term	FYA needed to install LPIs Evaluate options to improve geometry of east and west legs to eliminate split phasing
	ADA improvements	Medium Term	-
	Intersection bicycle treatments	Medium Term	-
	Reduce curb radii	Medium Term	-
	Protected intersection elements	Long Term	-
Mary Ave	PHB or RRFB[4]	Short Term	If installed, include: • Continental markings • Pedestrian refuge island • Advance intersection warning signage (and beacons) • ADA improvements
	Traffic signal or Roundabout[2]	Long Term	Expected to meet volume warrants by 2050
Old US 93	Turn movement restrictions1	Medium Term	Consider effects on Brooks Street
Brooks St	Signal modifications[3]	Short Term	APS and FYA needed to install LPIs
	Intersection bicycle treatments	Short Term	-
	Quadrant intersection	Medium Term	Explore using Old US 93 and/or 39th St to reroute left turns away from Brooks Street
Segments			
Segment-wide	Access management	Near Term	Requires further engagement with adjacent property and business owners. Priority locations based on potential near-term feasibility are listed in Appendix D.

Infrastructure Solutions for the Entire Corridor

Infrastructure solutions that are applicable to all, or most, of the Reserve Street corridor are identified in **Table 4**.

Table 4: Infrastructure Solutions Recommended for Entire Reserve Street Corridor

LOCATION	STRATEGY	TIMEFRAME	NOTES/CONSIDERATIONS
All segments	Reduce posted speed	Short Term	Roadway design may need to change to result in lower speed limit
	Pavement marking enhancements	Short Term	
	Advance street names signs and/or larger street signs	Short Term	
	Reduce lane widths to 11'	Medium Term	
	Lighting improvements	Medium Term	Clark Fork River bridge is the highest priority.
	Separated bike lanes	Medium/Long Term	The existing bike lanes south of the river could potentially be modified to have physical separation. This could be accomplished in the near-term through adding flexposts or other vertical elements to the existing bike lanes. In the longer term, lane widths could be reduced so a more permanent vertical element could be installed. Intersection bicycle treatments, such as those described in the previous tables, would help complete the bicycle network.
	Shared-use path	Long Term	This treatment preferred north of the river where the existing sidewalk can potentially be widened to shared-use path width.



Quick Build Solutions

Some safety strategies could be implemented using quick-build approaches, including access management and separating people biking from vehicular traffic. Quick build treatments can reduce conflict points that contribute to fatal and serious injury crashes and are lower cost, faster to implement, and easier to modify after installing than capital improvements. They can also be temporary and before-after studies of their performance can be used to refine solutions before committing to long-term designs. These treatments typically use durable, temporary materials, such as pavement markings, plastic bollards, and flexible delineators.

Quick-build treatments could be used to implement access management by restricting turning movements at driveways and intersections along sections of Reserve Street where long-term access management is recommended. **Appendix D** contains a map that identifies locations that may have the greatest potential for these treatments. They have been identified in locations where alternate access is readily available. Prior to implementing any quick-build treatments, further engagement of affected property and business owners should be conducted. MDT should also develop a plan for maintaining the selected treatments when designing them. Before-after studies of any locations where they are implemented should also be considered to inform future quick-build treatments at other locations, as well as more permanent installation at these locations.

Quick-build strategies can also improve safety for people walking and biking. Bicycle lanes could be physically separated from motor vehicle traffic in the near-term using plastic flexposts or modular curb treatments.



Flexible delineators, Ziclas, and prefabricated medians are used to manage speeds and separate bicycle and motor vehicle traffic on Rose Hill Street in Boise, ID. Source: Kittelson & Associates



Quick-build median treatment to enforce a RI/RO restriction at the Frontage Road/Wings Way intersection in Belgrade, MT. Source: Google Streetview

NON-INFRASTRUCTURE STRATEGIES

Non-infrastructure strategies are a critical component of the SSA framework and complement the infrastructure improvements identified for Reserve Street. These strategies focus on policies, programs, education, enforcement, and operational actions that improve safety for all roadway users. The City and MDT have already developed policy initiatives to advance safety efforts. Together with the MPO, these agencies also collaborated on the Missoula Community Transportation Safety Plan (MCTSP), completed in 2019, that focused on Intersection Crashes, Non-Motorized Users, and High-Risk Behaviors. This SAP aligns with these objectives by evaluating and incorporating the MCTSP's identified strategies and recommen

Strategy Recommendations

The following actions are recommended to further enhance safety along Reserve Street and support the broader goals of the region's transportation safety framework:



IMPLEMENT EMERGING TECHNOLOGIES:

Continuously evaluate and integrate new technologies to enhance roadway safety and efficiency on Reserve Street, including advancements in Intelligent Transportation Systems (ITS).

- Key Partners: City of Missoula, MDT
- MDT is in the process of completing an Automated Traffic Signal Performance Measures (ATSPM) pilot on the Reserve Street corridor and is retiming the corridor's signals using ITS technology.



DATA COLLECTION AND MONITORING:

Coordinate with Missoula Police Department (MPD) to share, interpret, and publicize data, and use it to deploy traffic and patrol resources to those areas. Leverage existing and emerging data sources (such as Replica or INRIX) to monitor and analyze driver speeds and behaviors before and after the implementation of treatments on Reserve Street.

- Key Partners: City of Missoula, Missoula MPO, MDT, MPD



SAFE ROUTES TO SCHOOL PROGRAMS:

Continue partnerships with Missoula County Public Schools (MCPS) and the Hellgate School District on the Safe Routes to School Program and City CIP Neighborhood Traffic Management Program to further initiatives on Reserve Street in areas where schools are nearby to provide and promote safe routes for students to walk and bicycle to school and, in particular, cross Reserve Street. The City has previously coordinated with C.S. Porter Middle School to improve crossings to the school.

- Key Partners: MCPS, Hellgate School District, City of Missoula, MDT, Missoula City-County Health Department



ACCESS MANAGEMENT:

Develop an access management plan for Reserve Street to establish strategies and policies for consolidating and managing access points, thereby reducing conflicts as development and redevelopment occur.

- Key Partners: City of Missoula, MDT



CORRIDOR EDUCATION CAMPAIGN:

Conduct a driver education campaign focused on Reserve Street promoting safer behaviors among all roadway users. The campaign would target education around key issues on Reserve Street, including speed compliance and driver alertness at intersections and crossings. Outreach efforts may include social media campaigns and targeted ads about speeding and safety along Reserve Street, signage or temporary digital message signs at key locations (e.g., ahead of Clark Fork River Bridge or near schools), and partnerships with nearby schools, bike/ped coalitions, driver education programs, and law enforcement.

- Key Partners: City of Missoula, Missoula MPO, MDT, MPD, Hellgate School District, MCPS, Missoula City-County Health Department

Other Region-Wide Strategies

In addition to strategies specific to Reserve Street, the MCTSP identifies several region-wide strategies designed to encourage safer driving behavior across the Missoula region. These strategies include:



EDUCATION AND OUTREACH

- Distribute public information on safe driving practices by coordinating and conducting outreach with colleges and K-12 schools, driver education programs, law enforcement and emergency medical services (EMS), and non-motorized advocacy groups.
- Focus safety education on crash contributing factors including non-motorist impairment, visibility at night, and yielding at crossings.
- Educate bicycle/ pedestrian/ motorcycle roadway users on intersection safety, including proper crossing behavior at a pedestrian countdown signal.



POLICIES, LAWS, AND ENFORCEMENT

- Pursue a local policy for the consideration of roundabouts at local intersections, where appropriate, based on a review of respective jurisdictional authority. The policy must include consideration of the needs of all modes and users.
- Consider adoption of a county-wide ordinance regarding the use of cell phones while driving.
- Update intersection design guidance periodically to incorporate the latest technologies and treatments, ensuring consistency in implementation.
- Work with law enforcement to prioritize traffic enforcement near locations where patterns of crashes related to speed violations have been observed. Post patrols at intersections known to have issues with red light running, speeding, failure to stop, and failure to yield the right-of-way.

6. Corridor Improvement Packages

This section presents five corridor improvement packages born from the safety treatments identified in the *How We Can Improve Safety* section. The packages apply select strategies at priority locations along Reserve Street identified by the PMT. Together, they balance near-term improvements with longer-term strategies to improve safety for all users.

The corridor packages include:

- **Package A** – Lighting, Signage, and Signal Upgrades (multiple locations)
- **Package B** – Access Management & Crossings (Clark Fork River to Brooks Street)
- **Package C** – Reserve Street/American Way Intersection
- **Package D** – Reserve Street/River Road Intersection
- **Package E** – Reserve Street/Mullan Road Intersection

All treatments presented in these packages are planning-level concepts intended to guide future project development and funding decisions. Additional engineering analysis and study – such as intersection control evaluations, crossing treatment studies, and illumination assessments – will be required to confirm feasibility, refine designs, and identify preferred solutions prior to implementation.

A detailed assessment of each corridor improvement package, including key considerations and the rationale for selecting specific treatments, is provided in the *Implementation Plan Memorandum* (**Appendix D**).



Priority Project

PACKAGE A: LIGHTING, SIGNAGE, AND SIGNAL UPGRADES

Description: This package addresses multimodal safety through lighting, speed management, warning signs, crossing enhancements, and signal upgrades at multiple locations.

Why is this package needed?

SAFETY CHALLENGES ADDRESSED:

SPEED | LIGHTING | PEDESTRIAN CROSSINGS | REAR-END CRASHES

TREATMENTS PROPOSED

Per MDT guidance, some type of actuated crossing should be considered for any pedestrian crossings on Reserve Street. A **Pedestrian Hybrid Beacon (PHB)** is recommended due to the speeds and number of lanes crossed on Reserve Street. An engineering study will be required to determine the final treatment and location.

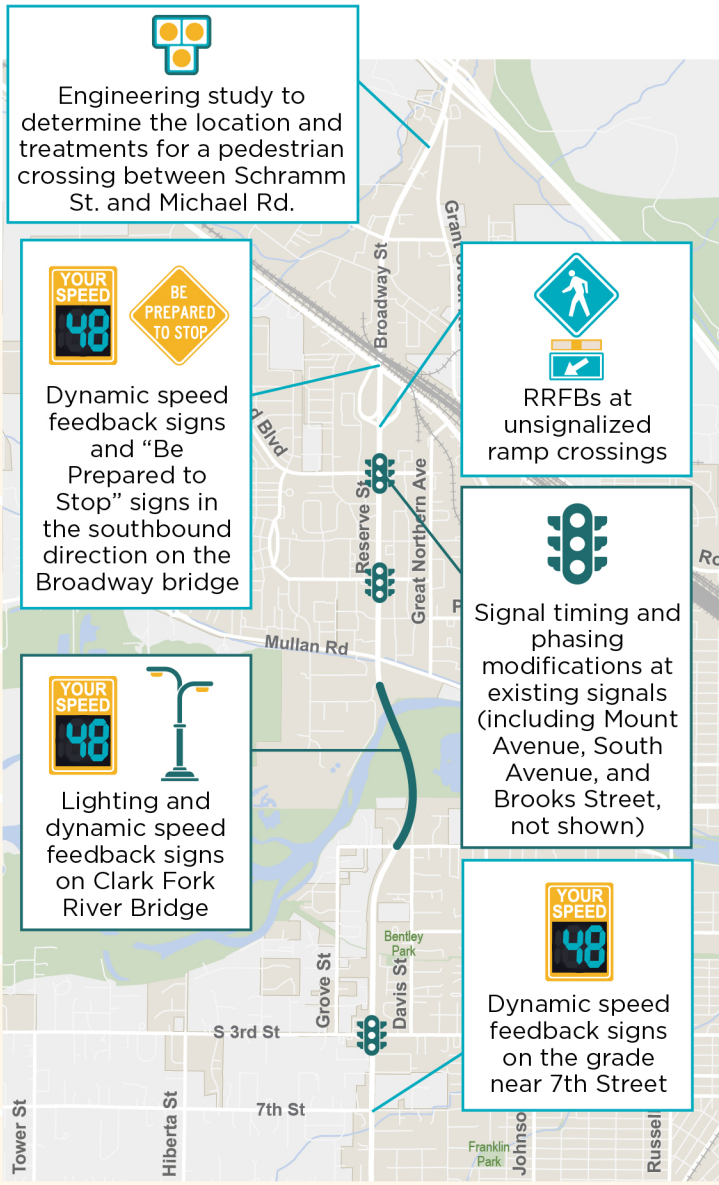
Dynamic speed feedback signs can increase driver alertness and encourage slower speeds. Locations shown here are at risk for speeding due to the distance between intersections or downgrades.

Advanced warning signage can prepare drivers for the upcoming signal and potential queues that may not be visible from the other side of the bridge. Dynamic flashers coordinated with the signal should also be considered.

Rectangular Rapid Flashing Beacons (RRFBs) alert drivers of crossing pedestrians and can increase driver yielding at the Broadway ramp crossings, which have higher speeds and don't have signals.

Drivers travel at the highest speeds on the Clark Fork River Bridge (Mullan Road to River Road), which is currently the only section of Reserve Street without **lighting**.

Safety-focused signal timing and phasing upgrades, including **Flashing Yellow Arrows** and **Accessible Pedestrian Signals** at the locations shown, can reduce turning conflicts and improve accessibility for people crossing Reserve Street.



Implementation Considerations

- Evaluate locations and installation methods for signage and lighting on bridges while considering dark sky impacts.
- Conduct pedestrian studies to confirm the need for PHBs and RRFBs.
- Study queuing at the Broadway bridge to determine placement of advance warning signage. Placement will determine the need for a new overhead structure instead of retrofitting to the bridge.
- Conduct an engineering study at the Homewood Suites crossing to assess queuing and overhead structure needs with the PHB improvement.
- Conduct before-and-after studies to evaluate the effectiveness of speed feedback signs.

Planning-Level Cost Estimate

$-$$

(Varies depending on treatment)

Priority Project

PACKAGE B: ACCESS MANAGEMENT & CROSSINGS

Description: This project reduces the potential for severe crashes on the south half of Reserve Street, -including angle, rear-end, turning, and pedestrian crossing crashes- by eliminating conflicts through access management and controlling conflicts through enhanced crossings and intersection control.

Why is this package needed?

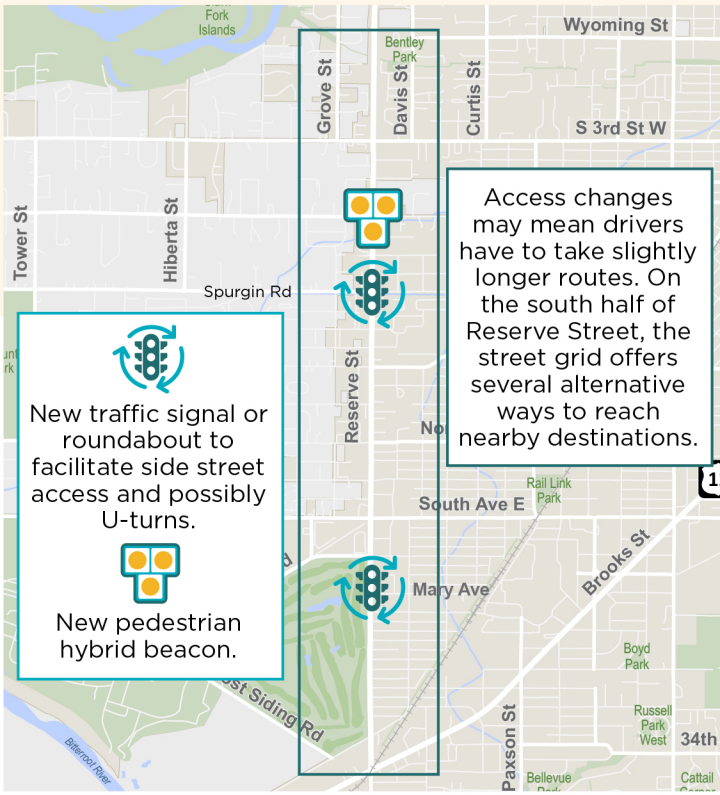
In a 5-year period there were:

- **35** FATAL AND SERIOUS INJURY CRASHES
- **62** TURNING CRASHES
- **5** PEDESTRIAN CRASHES
- **102** ANGLE CRASHES
- **455** REAR-END CRASHES

This segment of Reserve Street serves important community destinations, including schools and residential neighborhoods on both sides of the street.

SAFETY CHALLENGES ADDRESSED:

- TURNING CRASHES
- ANGLE CRASHES
- PEDESTRIAN CROSSINGS
- REAR-END CRASHES



TREATMENTS PROPOSED

Access management has the most benefits on the southern portion of Reserve Street because of the high density of uncontrolled side streets and business accesses.

TURNING MOVEMENT RESTRICTIONS



PEDESTRIAN HYBRID BEACON



TRAFFIC SIGNAL



ROUNDABOUT



RAISED MEDIAN



Quick Build

Quick-build treatments, such as interim turning movement restrictions can provide near-term safety benefits while longer-term improvements are planned. High-priority locations include streets or driveways with alternate access and a history of treatable crashes.

Implementation Considerations

- Access modifications may need to be phased in with development/ redevelopment or capital projects on Reserve Street or adjacent streets.
- Some improvements may not be possible until alternative access to side streets or U-turn opportunities are provided on Reserve Street.
- Engagement with adjacent property owners and businesses should be completed prior to implementing access management.
- An access management study will be required before most of the recommended treatments can be installed.

Planning-Level Cost Estimate

$-$$$

(Varies depending on treatment)

Priority Project

PACKAGE C: RESERVE STREET/ AMERICAN WAY INTERSECTION

Description: This project would re-design the intersection to improve safety for all roadway users while also considering access to adjacent businesses and interactions with nearby traffic signals.

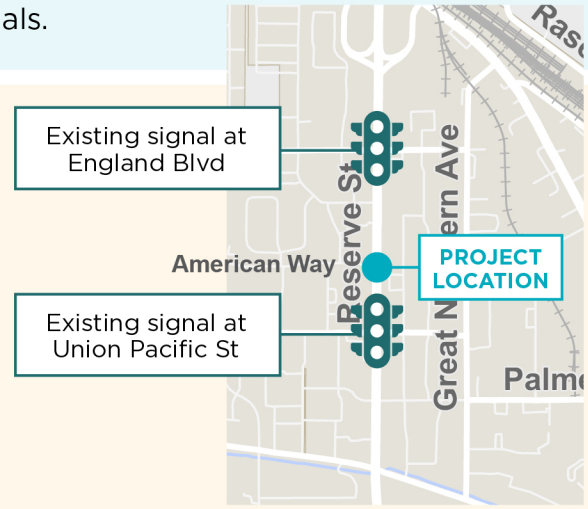
Why is this package needed?

In a 5-year period there were:

- **55** TOTAL CRASHES
- **5** FATAL AND SERIOUS INJURY CRASHES
- **10** TURNING AND ANGLE CRASHES

SAFETY CHALLENGES ADDRESSED:

- ANGLE CRASHES
- PEDESTRIAN CROSSINGS
- TURNING CRASHES
- REAR-END CRASHES



Three alternatives aimed at improving safety and reducing crash risk are being considered:

CONSIDERATION	1. TURNING MOVEMENT RESTRICTIONS[1]	2. TRAFFIC SIGNAL	3. ROUNDABOUT
SAFETY	✓ Reduces left-turn and angle conflicts ✓ May increase rear-end crashes ✓ Expected to reduce total crashes by 5-45%, and fatal and serious injury crashes by 23 to 80%	✓ Controls left-turn and angle conflicts ✓ Will likely increase rear-end crashes ✓ Expected to reduce total crashes by 5% and fatal and serious injury crashes by 23%	✓ Slows speeds, reducing crash severity ✓ Eliminates left-turn and angle conflicts ✓ Expected to reduce total crashes by 12%, and fatal and serious injury crashes by 68%
CAPACITY	✓ May introduce delay on Reserve Street (if signalized) ✓ Shifts traffic *to* other intersections	✓ Introduces delay on Reserve Street ✓ May shift traffic *from* other intersections	✓ Introduces delay on Reserve Street (less than signal) ✓ May shift traffic *from* other intersections
MULTIMODAL	✓ Depending on final configuration, may remove crossing	✓ Provides signalized crossings	✓ Shortens crossings and slows vehicle speeds
IMPLEMENTATION	✓ Likely no right-of-way (ROW) required	✓ Likely no ROW required	✓ May impact surrounding properties
COST	**$-$$**	**$$**	**$$$**
OTHER CONSIDERATIONS	✓ Restricts access to/from American Way ✓ Potential for some crashes to shift to other intersections	✓ Improves access to/from American Way	✓ Improves access to/from American Way

[1] right-turns only out of American Way or right-turns into, and possibly left-turns (with a signal) into American Way

Priority Project

PACKAGE D: RESERVE STREET/ RIVER ROAD INTERSECTION

Description: This project will re-design the intersection to improve multimodal safety for all roadway users, while also considering access needs of surrounding neighborhoods.

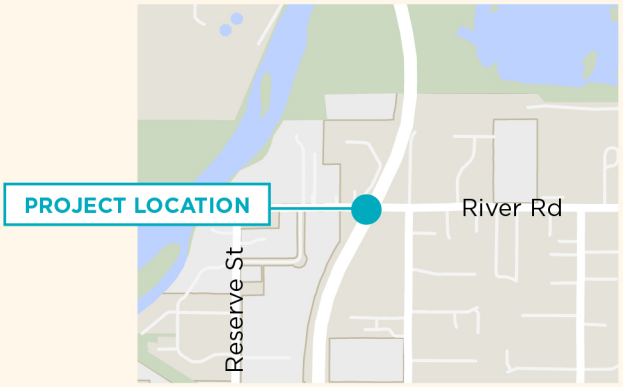
Why is this package needed?

In a 5-year period there were:

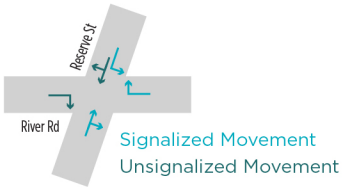
- **41** TOTAL CRASHES
- **3** FATAL AND SERIOUS INJURY CRASHES
- **8** TURNING AND ANGLE CRASHES

SAFETY CHALLENGES ADDRESSED:

- ANGLE CRASHES
- PEDESTRIAN CROSSINGS
- TURNING CRASHES
- REAR-END CRASHES



Three alternatives aimed at improving safety and reducing crash risk were evaluated:

CONSIDERATION	 1. TURNING MOVEMENT RESTRICTIONS[1]	2. TRAFFIC SIGNAL	3. ROUNDABOUT
SAFETY	✓ Reduces left-turn conflicts ✓ Expected to reduce total crashes by 5 to 45%, and fatal and serious injury crashes by 23 to 80% ✓ May increase rear-end crashes	✓ Controls left-turn and angle conflicts ✓ Will likely increase rear-end crashes ✓ Expected to reduce total crashes by 5% and fatal and serious injury crashes by 23%	✓ Slows speeds, reducing crash severity ✓ Eliminates left-turn and angle conflicts ✓ Reduces total crashes by up to 12%, and fatal and serious injury crashes by up to 68%
CAPACITY	✓ Introduces some delay on northbound Reserve Street ✓ Shifts traffic to S 3rd St, adding congestion	✓ Introduces delay on Reserve Street ✓ May shift traffic from other intersections	✓ Introduces delay on Reserve Street (less than signal) ✓ May shift traffic from other intersections
MULTIMODAL	✓ Provides pedestrian-activated signal and reduces crossing distance ✓ Reduces conflicts between vehicles and people crossing	✓ Provides signalized crossings	✓ Shortens crossings and slows vehicle speeds
IMPLEMENTATION	✓ Likely won't require right-of-way (ROW)	✓ Likely no ROW required	✓ May impact surrounding properties
COST	**$-$$**	**$$**	**$$-$$$**
OTHER CONSIDERATIONS	✓ Restricts access to/from River Road ✓ Potential for some crashes to move to other intersections	✓ Improves access to/from River Road	✓ Improves access to/from River Road

[1] right-turns only out of River Road or right-turns into and southbound left-turn (with a signal) allowed into River Road

Priority Project

PACKAGE E: RESERVE STREET/ MULLAN ROAD INTERSECTION

Description: Reduces conflicts and increases capacity by relocating left turn movements away from the Reserve Street/Mullan Road intersection with a partial Median U-Turn configuration. Provides near-term crossing improvements to enhance pedestrian safety.

Why is this package needed?

In a 5-year period there were:

145 TOTAL CRASHES

3 FATAL AND SERIOUS INJURY CRASHES

SAFETY CHALLENGES ADDRESSED AT MULLAN RD:

- TURNING CRASHES
- PEDESTRIAN CROSSINGS
- REAR-END CRASHES

The project team evaluated several potential safety improvements at Mullan Road. To improve safety and keep Reserve Street moving efficiently, the project recommends **exploring** the partial MUT configuration further.

This configuration would:

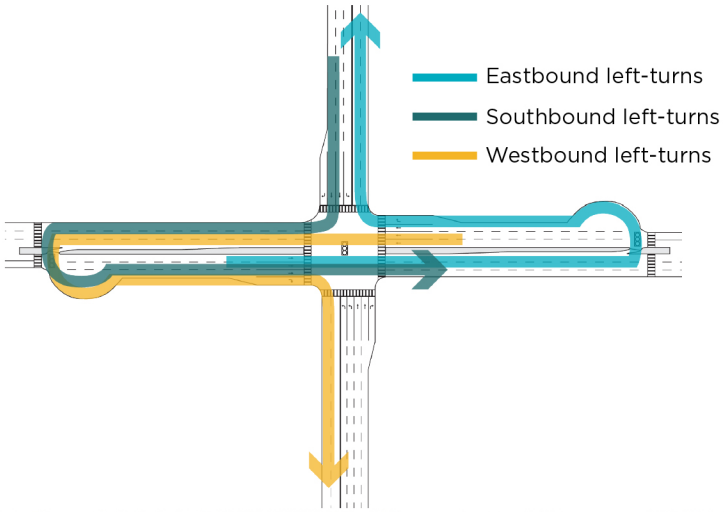
- Reduce left-turn conflicts, while also freeing more signal time for through traffic on Reserve Street and Mullan Road, which will reduce queuing and opportunities for rear-end crashes.
- Shorten crossing distances and reduce wait times for people crossing Reserve Street.

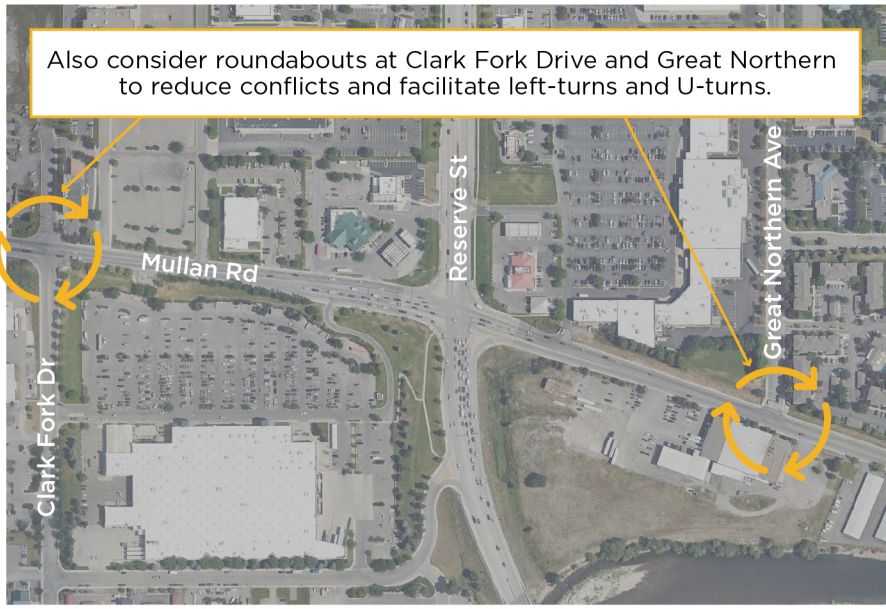
Near-term improvements that can be implemented before the partial MUT is constructed include:

- Leading pedestrian intervals
- ADA upgrades
- Access management on side streets
- No right-turn on red at Mullan Road
- Continental crosswalk striping
- Extend southbound left-turn lane storage

Median U-Turn (MUT) Intersection

A partial MUT removes eastbound, westbound, and southbound left-turns and relocates them to other intersections. Instead of turning left at the main intersection, drivers make U-turn movements at an intersection a short distance downstream.





Implementation Considerations

- Relocating traffic to other intersections may potentially increase conflicts and congestion. Roundabouts at these locations can significantly reduce fatal or serious injury crash risk and improve traffic flow.
- This configuration will result in heavy eastbound right-turn volume. Options to accommodate this traffic includes a channelized right-turn (would replace the right-turn lane on Reserve Street into Clark Fork Way) or dual right-turn lanes.

Planning-Level Cost Estimate

$$$

7. Implementation and Next Steps

Table 5 outlines recommended next steps to move each package from planning-level concepts toward project development, design, and delivery. These next steps are intended to guide coordination, further study, and decision-making as the MPO, MDT, and partner agencies work to implement safety improvements along the Reserve Street corridor.

Additional details on technical considerations for each package recommendation are available in **Appendix D**.

Table 5: Summary of Packages

PACKAGE	TREATMENTS	NEXT STEPS
Package A: Lighting and Speed Management	• ADA upgrades, PHB, and other crossing enhancements to existing crossing near the Homewood Suites	• Conduct full evaluation to determine location, preferred treatment, and necessary ADA upgrades
	Broadway Street Ramps and Bridge • RRFBs at ramp crossings • Advance warning signs and beacons on bridge (southbound direction)	• Install RRFBs across uncontrolled crossings of Broadway ramps once treatments are confirmed by engineering study • Install signage based on results of an engineering study, including placement, mounting, and implementation and operation of flashing beacons, if applicable.
	• Clark Fork River Bridge lighting	• Install appropriate lighting according to results of illumination and engineering study
	• Dynamic speed feedback signs on the Clark Fork River Bridge, Broadway bridge, and at S 7th Street	• Install dynamic speed feedback signs according to results of engineering study to determine placement - After implementing one dynamic speed feedback sign, conduct a before and after speed study to determine its effectiveness
	• Signal and phasing upgrades (FYA, APS) at England Blvd, Union Pacific Street, S 3rd Street, Mount Avenue, South Avenue, and Brooks Street	• Design upgrades based on results of signal timing and phasing study

PACKAGE	TREATMENTS	NEXT STEPS
Package B: Clark Fork River to Brooks Street Access Management	Access management to reduce conflicts at intersections and driveways, including turning movement restrictions and a raised center median	• Conduct a full access management study consistent with MDT requirements, including ICE studies for new traffic control at intersections. • Access management treatments may be able to be phased such that the long-term outcome for Reserve Street is a Restricted Crossing / U-Turn (RCUT) corridor. An access management study would be needed to determine the feasibility and appropriate locations of such treatments. • Install enhanced crossing at S 7th Street (or alternate location) depending on results of engineering study . • Coordinate with MDT and property owners to implement quick-build access management treatments at high-priority locations
Package C: American Way	Alternative 1: Signal with movement restrictions Alternative 2: Full Traffic Signal Alternative 3: Multilane Roundabout	• Identify potential funding sources- Once funding is secured, conduct a full Intersection Control Evaluation per MDT requirements to determine optimal intersection control.
Package D: River Road	Alternative 1: Signal with movement restrictions Alternative 2: Full Traffic Signal Alternative 3: Multilane Roundabout	• Identify potential funding sources- Once funding is secured, conduct a full Intersection Control Evaluation per MDT requirements to determine optimal intersection control.- Consider implementing the turning movement restrictions alternative as a near-term, lower-cost option.
Package E: Mullan Road	• Median U-Turn intersection; • Potential roundabouts at Great Northern Avenue and Clark Fork Lane	• Implement near-term safety treatments • Conduct full Intersection Control Evaluations for all three intersections to determine preferred intersection improvements

FUNDING OPPORTUNITIES

Successfully implementing the priority packages and recommended treatments in this Plan will require substantial investment from each of the MPO, the City, and MDT. Funding for planning, construction, and ongoing maintenance is limited, so securing a combination of federal, state, and local resources will be essential to realizing the vision for Reserve Street.

The MPO has integrated this Plan's recommendations into an amendment to the Missoula Connect 2050 Long-Range Transportation Plan. This amendment inserts key project components from Package A into the medium-term project list, with the remaining projects being placed into the grant-contingent project list. The likely funding source for the projects in Packages B, C, D and E are federal discretionary transportation infrastructure grant opportunities such as the Safe Streets and Roads for All (SS4A) and Better Utilizing Investments to Leverage Development (BUILD) Grant programs. Other potential funding sources are described in **Appendix D**.

MONITORING

The MPO, MDT, and City should regularly review the Reserve Street Safety Action Plan (SAP) to evaluate progress, consider emerging trends and technologies, and determine whether updates are needed. As new strategies are identified, the City may revise goals and assign updated priorities for specific projects, policies, or programs.

This Plan uses MDT crash data from 2019 to 2023 as a baseline for understanding current safety conditions along Reserve Street. It is recommended that the MPO and its partner agencies periodically review updated crash data and compare it to the findings in this Plan to assess progress and identify emerging issues.

To evaluate the effectiveness of the SAP and track progress in addressing the identified safety emphasis areas, the following metrics should be monitored over a five-year period:

- Total crashes
- Total crashes resulting in a fatal or serious injury
- Total crashes involving a person walking or bicycling
- Total number of right-angle, turning-related, and rear-end crashes over a five-year period – and number that result in a fatal or serious injury

By consistently monitoring these metrics, the City, MPO, and MDT can evaluate the effectiveness of implemented strategies, identify areas needing additional attention, and ensure Reserve Street continues to become a safer corridor for all users.



Appendix A

Community Engagement
Round #1 Summary

SEPTEMBER 2024 TO DECEMBER 2024

The first round of engagement for the Reserve Street Safety Action Plan (SAP) took place from September 2024 to December 2024. The engagement activities included:

- Virtual webpage with project information and interactive map
- Eleven briefings with community groups (e.g., neighborhood groups, schools)

The objectives of this round of engagement were to:

1. Raise awareness of, and identify desired outcomes for, the project
2. Understand what people and businesses value along the corridor
3. Pinpoint key challenges and opportunities related to roadway safety

The input gathered in Round 1 will guide the development of a corridor vision and project recommendations that align with this vision in the next phase of the Reserve Street SAP.

FEEDBACK STATISTICS

Outreach

~5,000
RESIDENTS AND BUSINESSES NOTIFIED VIA MAILER

38
EMAILS AND CONVERSATIONS

10
PIECES OF MEDIA COVERAGE, INCLUSIVE OF MEDIA INTERVIEWS

2
WEEKS OF RADIO ADVERTISING

Feedback

820
WEBSITE VISITS

100
INTERACTIONS ON VIRTUAL WEBPAGE

11
COMMUNITY GROUP MEETINGS

What We Heard



CONCERNS

Vehicle Speeds and Dangerous Intersections

- Vehicle speeds feel high
- Difficulty turning at unsignalized intersections
- Lighting feels inadequate at certain locations

Safety of People Walking and Biking

- Narrow, unprotected bike lanes
- Conflicts between vehicles and people walking and biking at business accesses
- Limited locations with crossings that feel safe
- Most people avoid Reserve Street and choose alternate routes to walk or bike on, when possible

Other Concerns

- Congestion, especially at intersections and in areas with driveways and businesses
- Future growth will exacerbate existing concerns
- Competing interests between local access and regional through-traffic

IDEAS

Reduce posted speed limit and implement traffic calming to reduce vehicle speeds

Install protected bike lanes or separated pathways, pedestrian islands, and pedestrian signals to enhance safety for people walking and biking

Optimize signal timing, add/ lengthen turn lanes, and reconfigure intersections to improve traffic flow

Add traffic signals or roundabouts and limit business access points to minimize conflicts and improve safety and traffic flow

Improve pavement markings, signage, and lighting

Community Engagement
Round #2 Summary

WHAT WERE THE ROUND #2 ENGAGEMENT ACTIVITIES?

The second round of engagement for the Reserve Street Safety Action Plan (SAP) took place from **March 1st – April 4th**. The engagement activities included:

- Virtual webpage with a survey, interactive comment map, and project information
- Walk audit with MPO, City, MDT, consultant staff, technical experts, and community members
- Two open houses at Hellgate Elementary School
- Three briefings with community groups (e.g., neighborhood groups, schools)
- Working group meeting with MDT, MPO, City, County, and other agency representatives.

The objectives of this round of engagement activities were to:

- Communicate existing conditions and Engagement Round #1 findings
- Present and obtain feedback on initial strategy recommendations for Reserve Street

The input gathered in Round 2 will guide the identification and prioritization of strategies for Reserve Street.

FEEDBACK STATISTICS

Outreach

MPO SOCIAL MEDIA AND NEWSLETTER

2
WEEKS OF RADIO AND BILLBOARD ADVERTISING

6
PIECES OF MEDIA COVERAGE, INCLUDING INTERVIEWS

2
WEEKS OF RADIO ADVERTISING

Feedback

2
OPEN HOUSES

40
TOTAL VISITORS

15
WALK AUDIT PARTICIPANTS

3
COMMUNITY GROUP BRIEFINGS

19
ONLINE SURVEY RESPONDENTS

13
COMMENTS ON ONLINE COMMENT MAP

Community Engagement
Round #3 Summary

WHAT WERE THE ROUND #3 ENGAGEMENT ACTIVITIES?

The third and final round of public engagement for the Reserve Street Safety Action Plan (SAP) took place from **October 14th – 17th, 2025**. The engagement activities included:

- Virtual webpage with project background, proposed strategies, and surveys for each priority project package
- In-person open house at the Missoula library and pop-up event in Grant Creek Town Center on Reserve Street
- Five briefings with representatives from eight community groups—Including Missoula Chamber of Commerce, Missoula Midtown Association, Franklin to the Fort Neighborhood, River Road Neighborhood, CS Porter Middle School, Missoula County Public Schools Transportation, and Let's Improve Missoula's Reserve Street Working Group

Objectives

The objectives of this round of engagement activities were to:

- Present proposed strategies to address safety challenges on Reserve Street
- Gather input and feedback on the five priority project packages

Input gathered in this round will help refine, and guide the prioritization of, projects for Reserve Street.



Library Open House


Pop-Up Event at Grant Creek Town Center

FEEDBACK STATISTICS

2 IN-PERSON EVENTS

~25 TOTAL VISITORS

5 COMMUNITY GROUP BRIEFINGS

91 ONLINE SURVEY RESPONDENTS

OUTREACH

2 WEEKS OF RADIO ADVERTISING

11 PIECES OF MEDIA COVERAGE & INTERVIEWS

1 MONTH OF INDOOR ADVERTISING FLYERS IN BUSINESSES ALONG RESERVE STREET

MPO SOCIAL MEDIA & NEWSLETTER OUTREACH

What We Heard

The project team collected input on the five priority projects, shown in the map. Feedback for each is described below.

Package A – Lighting and Signage

- Lighting on the Clark Fork River Bridge was the highest priority.
- Light pollution was also a common concern.
- Some respondents questioned whether dynamic speed feedback signs would be effective.

Package B – Access Management & Crossings

- Most respondents already travel out of direction to use signals to turn onto or cross Reserve Street.
- Most agreed that proposed intersections for new control or crossings should be prioritized.
- Left turns were a commonly cited safety concern.

Package C – American Way

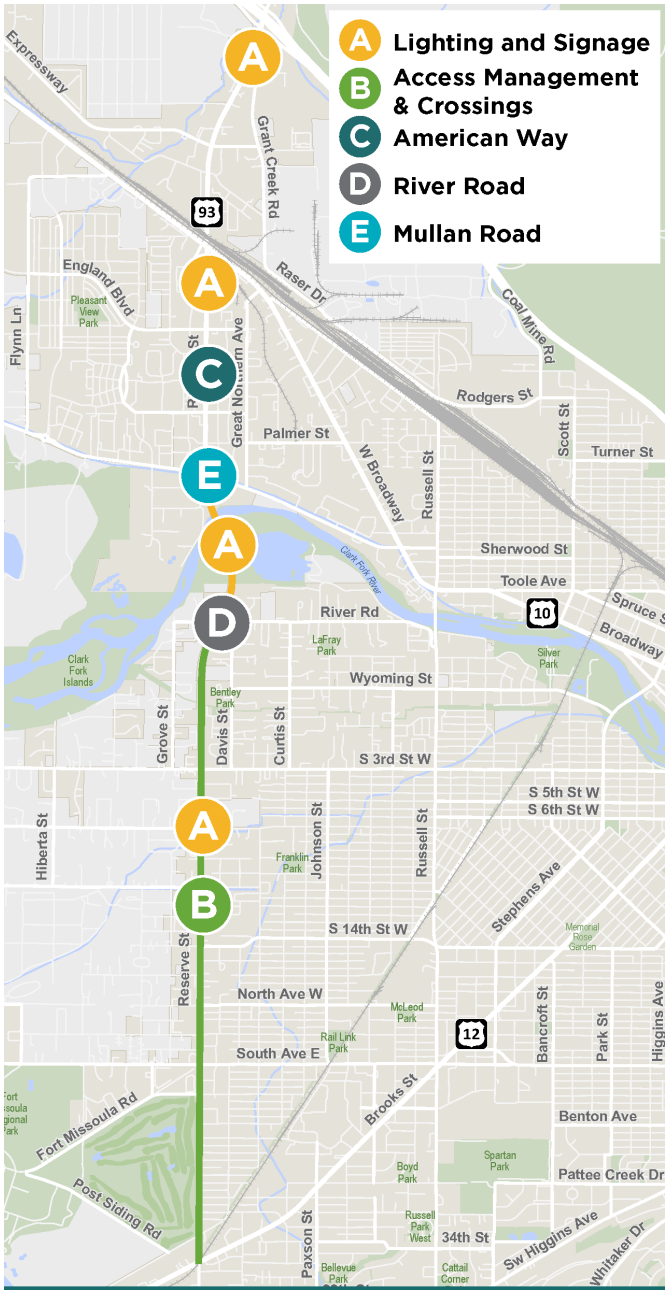
- Across all alternatives, top priorities were improving safety and maintaining traffic flow.
- Most common concerns with the alternatives were lack of crossings and potential for added delay.
- Alternative 3 (Multilane Roundabout) received the most first-place rankings but also the most third-place rankings.
- Alternative 1 (Turn Movement Restrictions) was the least supported.

Package D – River Road

- Across all alternatives, top priorities were improving safety and maintaining traffic flow.
- Most common concerns with the alternatives were lower vehicle speeds, the potential for additional stops affecting traffic flow, and ensuring that access to residences and businesses on River Street is maintained.
- Alternative 3 (Multilane Roundabout) received the most first-place rankings but also the most third-place rankings.
- Alternative 1 (Turn Movement Restrictions) was the least supported.

Package E – Mullan Road

- Most respondents supported further study of this intersection.
- Key concerns included driver confusion, added congestion, right-turn conflicts with pedestrians, and questions about the MUT's effectiveness.
- Reducing congestion was the most desired outcome, followed by roundabouts at Clark Fork Lane and Great Northern Avenue.



Overall Comments

- Package D (River Road) was the highest priority. Remaining packages received relatively similar levels of support.

What We Heard

The following information summarizes feedback received during Community Engagement Round #2 activities:

Providing Safer Options for Walking/Biking was the highest priority for survey respondents and was a common theme among open house participants.

Safely Crossing Reserve Street: Participants stressed the need to improve existing crossings or implement additional safe, protected crossings. Priority areas for crossing improvements included at Mullan Street and between South Ave and 3rd St.

Alternative Routes: While participants acknowledged the need to improve walking and biking facilities on Reserve Street, many noted that they may still avoid Reserve Street even with improvements, and that alternate walking and biking routes were a higher priority. There are no alternate routes near Reserve Street on the river and railroad crossings, so there is a need to improve walking and biking conditions on those sections or provide an alternate route.

Accessibility Improvements: Participants in the walk audit noted accessibility challenges along Reserve Street, including a lack of audible push-buttons at traffic signals, cracks or debris on sidewalks, lack of connections to adjacent development, and deficient curb ramps and landing areas at driveways or intersections.

Support for Additional Traffic Signals or Roundabouts

Participants generally supported implementing new traffic signals or roundabouts on Reserve Street.

Traffic Signals: Participants liked that traffic signals provided dedicated crossing opportunities but were concerned about potential increases in vehicle delay.

Roundabouts: Participants supported roundabouts for multiple reasons, including their effectiveness at reducing fatal and serious injury crashes, their ability to slow traffic speeds, and their ability to improve access to and from side streets. Some respondents had concerns about the safety of pedestrian crossings at multilane roundabouts.

Locations: While participants noted multiple locations where they would support a traffic signal or a roundabout, River Road had the highest amount of interest.

Other Feeback The following themes were also common in the feedback received:

- Safety and traffic concerns will be exacerbated by **future growth**. Consider prioritizing treatments at locations most likely to be affected by future development.
- Participants liked the potential for **access management** to improve congestion and safety but were concerned about local access impacts.
- Strategies that encourage **safer vehicle speeds** were a high-priority for participants.

Appendix B

KITTELSON & ASSOCIATES
101 South Capitol Boulevard, Suite 600
Boise, ID 83702
P 208.338.2683

TECHNICAL MEMORANDUM

May 29, 2025 Project #: 30013

To: Glenn Ingram and Charlie Menefee, Missoula MPO

From: Nick Foster, AICP, RSP$_1$; Mark Heisinger, PE; Katie Popp, Robert Olney

CC: Joel Boucher, Vicki Crnich, and Joan Redeen, MDT; Aaron Wilson, City of Missoula

RE: Reserve Street Safety Action Plan Existing and Future Conditions

Introduction

The Missoula Metropolitan Planning Organization (MPO), Montana Department of Transportation (MDT), and the City of Missoula are developing a Safety Action Plan (SAP) for the Reserve Street corridor. The purpose of the SAP is to identify feasible and effective strategies to reduce fatal and serious injury crashes on Reserve Street in alignment with the Federal Highway Administration's (FHWA) Safe System Approach[1].

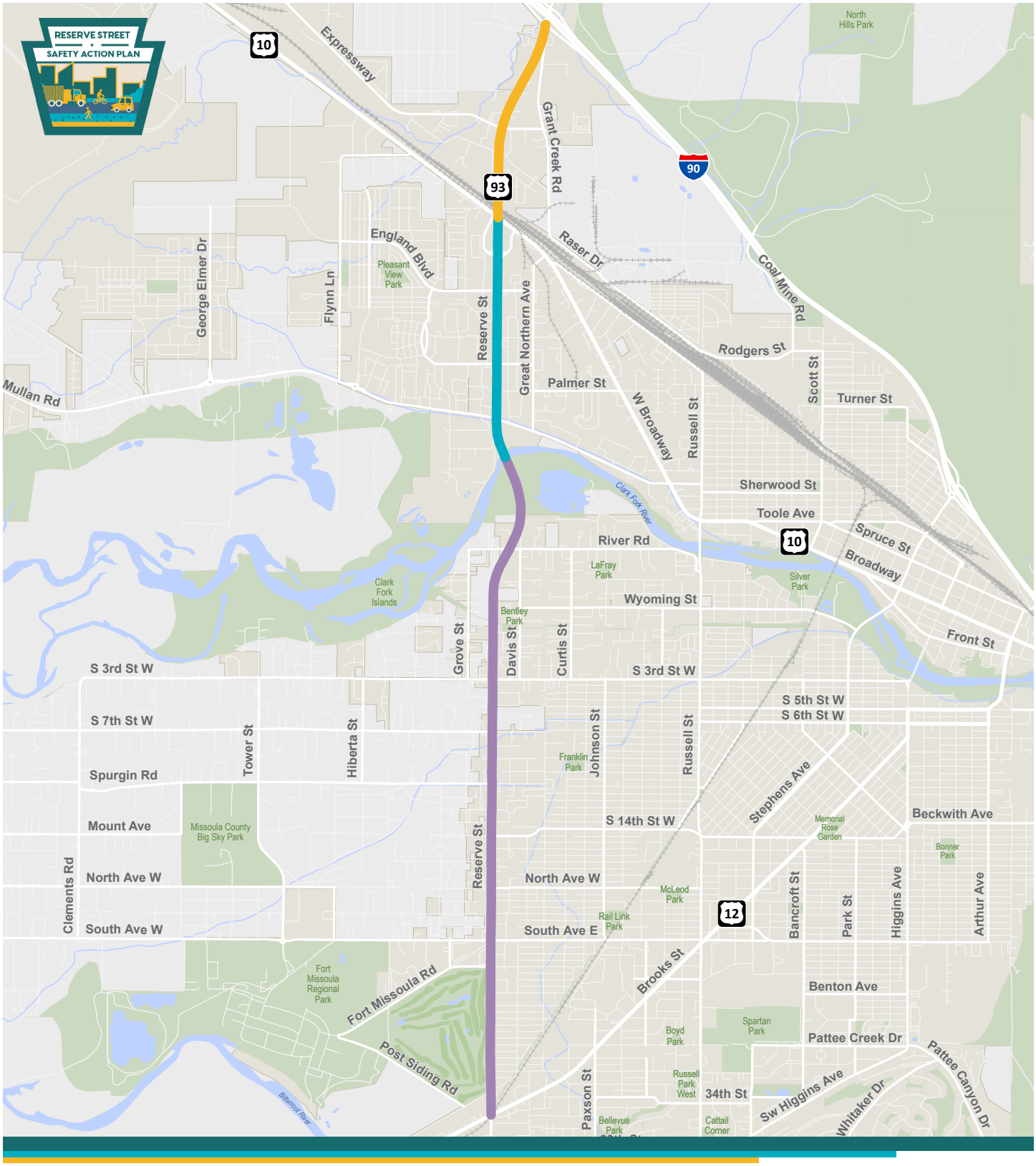
This memorandum summarizes existing plans, projects, and existing conditions along the Reserve Street corridor. The findings contained in this memorandum will be used to develop projects and strategies to improve roadway safety. Projects and strategies will prioritize reducing fatal and serious injury crashes, while ensuring that Reserve Street continues to serve the diverse needs of the surrounding land uses and people traveling along the corridor.

STUDY CORRIDOR

Reserve Street (US-93) is one of the most critical corridors in the Missoula region. It provides access to a variety of adjacent land uses, including commercial areas, schools, and residential neighborhoods, which generate travel by a range of modes. It also serves through-traffic traveling to and from I-90 and other regional routes, including freight movement. As such, Reserve Street is essential for the movement of people, goods, and services, locally and throughout the region. Balancing the competing needs of local and regional traffic is one of the key safety-related challenges this plan will need to consider.

The SAP will cover Reserve Street from I-90 to US 12. This unique and complex corridor is comprised by three distinct sections, illustrated in Figure 1 and described below.

[1] Federal Highway Administration. *What is a Safe System Approach?* https://www.transportation.gov/NRSS/SafeSystem



I-90 to Broadway

Broadway to Clark Fork River

Clark Fork River to US 12

City Limits

Park/Open Space

0 0.5 1 Mile

Figure 1

Reserve Street Corridor

Data Sources: City of Missoula, Missoula County

1. **I-90 to Broadway**: This segment is characterized by a mix of highway-oriented commercial and industrial uses. Land uses are influenced by the presence of I-90, with several hotels and restaurants serving regional travelers. Outside the highway ramps, pedestrian crossings are limited to one uncontrolled midblock crossing at the Homewood Suites hotel and one signalized intersection at Expressway.
2. **Broadway to Clark Fork River**: This segment is characterized by big-box and outparcel commercial development, serving local and regional traffic. Access is generally limited to public street intersections, most of which are not signalized, as well as right-in/right-out driveways. Pedestrian crossing opportunities are limited to signalized intersections spaced over 1,000 feet apart. Grade separation of the railroad tracks and Broadway creates a different character and user experience in this area.
3. **Clark Fork River to US 12**: This segment is primarily residential with some more locally oriented commercial fronting Reserve Street, especially on the southern end of the corridor. There are two schools along this section (C S Porter Middle School and Big Sky High School), as well as Fort Missoula Regional Park and Community Medical Center. There are limited controlled or enhanced crossing opportunities and Reserve Street divides the surrounding residential areas. The Milwaukee and Bitterroot trails have grade-separated crossings under and over Reserve Street.

TRANSPORTATION-DISADVANTAGED POPULATION

Following guidance from the Infrastructure Investment and Jobs Act, the U.S. Department of Transportation (USDOT) adopted a definition and methodology for determining Areas of Persistent Poverty (APPs). APPs are Census tracts where the poverty rate is at least 20% as measured by the 2014-18 American Community Survey.

Figure 2 shows APPs near Reserve Street, which include all tracts adjacent to the east side of Reserve Street. While the west side of Reserve Street is not a designated APP, this area serves a regional hospital and associated clinics, senior living facilities, and social services for other vulnerable populations.

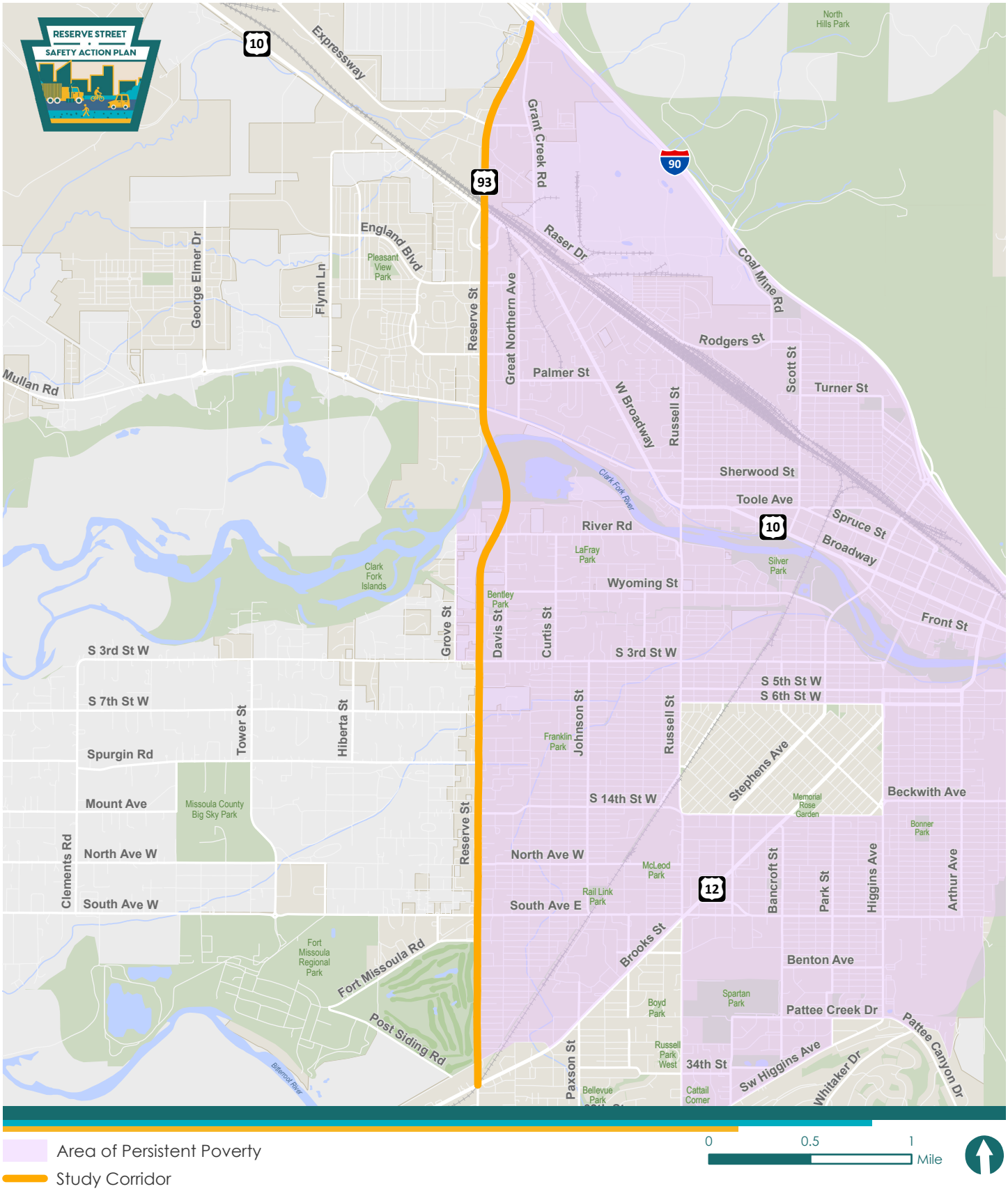


Figure 2

Areas of Persistent Poverty

Data Sources: USDOT

Document Review

This section identifies adopted and in-process plans that are relevant to this project. Specifically, it reviews previously identified projects that impact transportation on Reserve Street. The project team reviewed the documents listed in Table 1. Figure 1 illustrates planned projects and studies in the area.

Table 1 Planning Documents Relevant to Reserve Street

Document (Year)	Description
Missoula Connect: 2050 Long Range Transportation Plan (2020)	Identifies Reserve St. as a critical corridor for the local and regional economies. Identifies two segments on Reserve St. having among the five highest crash rates in the Missoula area.
Long Range Transportation Plan Update (In Progress)	Will update the Missoula Connect plan with new data.
Our Missoula 2045 Land Use Plan (2024)	Establishes guidelines and recommendations to inform zoning and development decisions in the City of Missoula. Includes Place Types and Street Types, which provides design objectives, typical treatment options, desired function, and mode emphasis for roadway classifications. Identifies Reserve Street as a Regional Connector – a critically important roadway to the regional travel network that should generally serve as a gateway to the urban core, where it can transition to Regional or Community Mixed-Use facilities.
Missoula Active Transportation Plan (2011)	Identifies Reserve St. north of River Rd as having the second highest number of pedestrian-involved/bicycle-involved crashes (among high-volume corridors) despite relatively low ped/bike volumes
Missoula Community Transportation Safety Action Plan (2019)	Addresses changes in safety concerns, crash trends, mitigation strategies, innovative technologies, and federal requirements since prior plan in 2013. Identifies three emphasis areas for subsequent five years: Intersection Crashes, Non-Motorized Users, and High-Risk Behavior. Identified multiple intersections on Reserve St. as having high crash numbers.
Pedestrian Facilities Master Plan (2018)	Assesses the pedestrian network and anticipated needs within the Missoula urban area and evaluates project prioritization processes and funding recommendations. Identifies multiple intersections on Reserve St. as high priorities for intersection improvements.
Bicycle Facilities Master Plan (2017)	Identifies locations on Reserve St. with high crash counts, as well as network gaps on Reserve St. Entirety of current project extents are scored BLTS 4.
Reserve Street Community Input Project (2021)	Gathered community experiences and input on how to improve Reserve St. and recommended ways to facilitate increased public awareness of projects, efforts, and planning. Identified emphasis areas including multimodal transportation, accessibility, and beautification.
2035 Our City Growth Policy (2015)	Identifies congestion on Reserve St. as a challenge for emergency responders. Identified Reserve Street as a source of frustration for drivers and pedestrians. Identified Reserve Street as far and away the focus of most residents' concerns, including issues with travel times, congestion, crossing by bike or foot, and lack of alternative routes.

Document (Year)	Description
Mullan Area Neighborhoods Master Plan (2020)	Lays out the shared planning effort between City and County for what is now known as the Sxʷtpqyen Neighborhoods Master Plan
Bicycle and Pedestrian Count Program (2018)	Analyzes bicycle and pedestrian counts taken throughout the city, including two locations on Reserve St. Data was used in multiple grant applications, including a Transportation Alternatives request to fund sidewalk and bike lane improvements along South Ave between Reserve St. and Fort Missoula Regional Park.
Unified Planning Work Program (2023)	Describes transportation planning activities to occur during the following fiscal year in the MPO's planning area.
Montana Comprehensive Highway Safety Plan (2020)	Identifies four emphasis areas for reducing crashes statewide: Roadway departure and intersection crashes, Impaired driving, Unrestrained vehicle occupants, and Emergency response and post-crash care.
Montana Vulnerable Road User Safety Assessment (2023)	Analyzes statewide trends in VRU crashes and identifies factors related to crash risks, including traffic volumes, posted speeds, lighting, and urban environments. Also identifies Missoula as a location with a high number of VRU crashes.
Active MDT Projects in or adjacent to study area	US 93 Corridor Study – Missoula to Florence

The following documents were also reviewed, but do not have projects directly affecting Reserve Street:

- MDT Statewide Transportation Improvement Plan, 2024-2028 (2024)
- Missoula Transportation Improvement Program, FY2024-FY2028 (2023-2024)
- 2035 Our City Growth Policy 5-Year Review (2021)
- Missoula Transportation Options Action Plan (2023)
- Missoula Area Transportation Survey (2019)

Safety Analysis

This section describes the methods and findings of the crash analysis conducted for Reserve Street, described below:

- **Corridor-Wide Crash Patterns**: A comprehensive review of the most recent five years of crash data to identify trends, including crash locations, highest injury severities, collision types, and other characteristics commonly associated with fatal or serious injuries.
- **Corridor Screening:** A screening of roadway segments and intersections to identify areas with the highest relative crash severity based on historical crash data and to assess infrastructure characteristics associated with these higher severity crashes.

Crash patterns are summarized based on the highest severity injury experienced by any person involved in the crash using the KABCO Injury Classification Scale, a system recognized by the Federal Highway Administration.[2] The KABCO scale assigns a letter to the highest severity type resulting from a crash: fatal (K), suspected serious injury (A), suspected minor injury (B), possible injury (C), unknown injury (U), and property damage only (PDO). While a single crash may involve multiple injuries of varying severities, this assessment focuses only on the highest injury severity. For example, a "fatal crash" means that there was at least one fatality resulting from the crash.

CORRIDOR-WIDE CRASH PATTERNS

This section summarizes the crash patterns and trends on the Reserve Street corridor, based on the most recent five years of crash data (January 1, 2019, to December 31, 2023) provided by MDT. This data includes all crashes reported by the Montana Highway Patrol and may not represent the total number of crashes along the corridor, as some crashes go underreported if emergency responders or law enforcement are not contacted.

Historically, Reserve Street has had some of the highest crash rates within the MPO. The *Missoula Connect 2050 Long Range Transportation Plan* identifies two sections of Reserve Street (Broadway Street to Mullan Road and 3rd Street to 39th Street) as having some of the highest crash rates in the planning area. Reserve Street also has a high frequency of crashes compared to other corridors within the MPO. As shown in Table 2, there have been more total, fatal and serious injury, and bicycle and pedestrian crashes on Reserve Street than similar sections of Broadway Street and Brooks Street.

[2] Federal Highway Administration. (N.D.). *KABCO Injury Classification Scale and Definitions by State*. https://safety.fhwa.dot.gov/hsip/spm/conversion_tbl/pdfs/kabco_ctable_by_state.pdf

Table 2 Comparison of Crash Frequencies on Corridors in Missoula (Data from 2019-2023)

Crash Totals (2019 - 2023)	Reserve St (Brooks St to I-90)	Broadway St (Reserve St to Van Buren St)	Brooks St (Reserve St to Higgins)
Fatal or Serious Injury	66	49	13
Bicycle/Pedestrian	30	27	8
Total Crashes	1664	965	711

In the 10-year period between January 1st, 2014, and December 31st, 2023, there were 3,593 crashes on Reserve Street between the I-90 ramps and US 12 (Brooks Street). Figure 3 summarizes crashes severity and year and Figure 4 focuses on fatal and suspected serious injury crashes by year for the 10-year period.

Figure 3 Crashes by Severity by Year

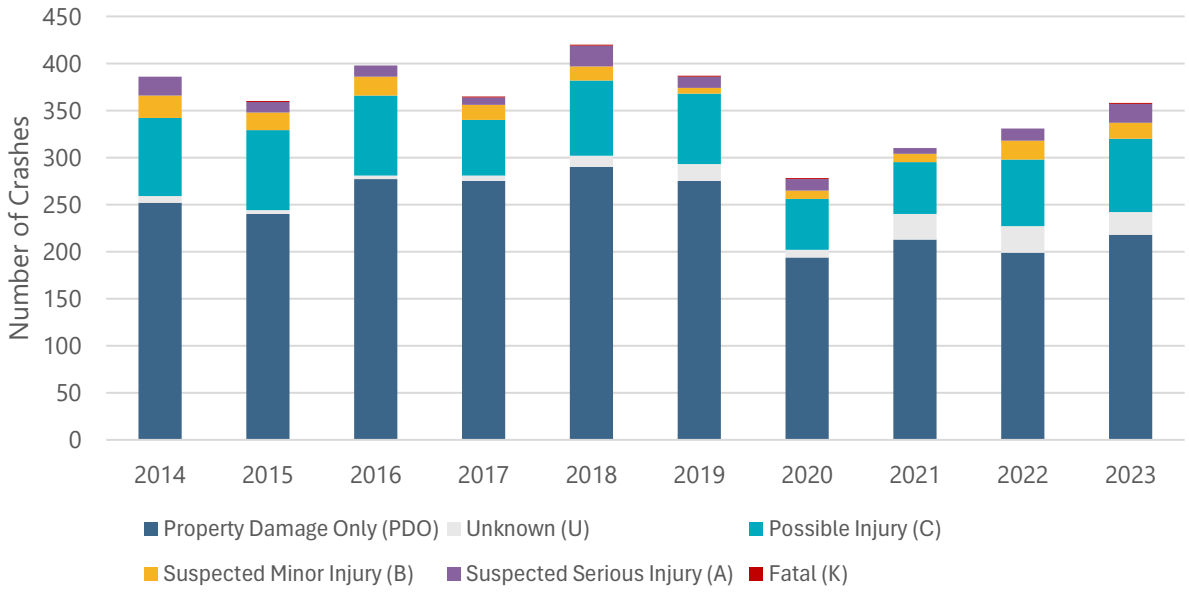
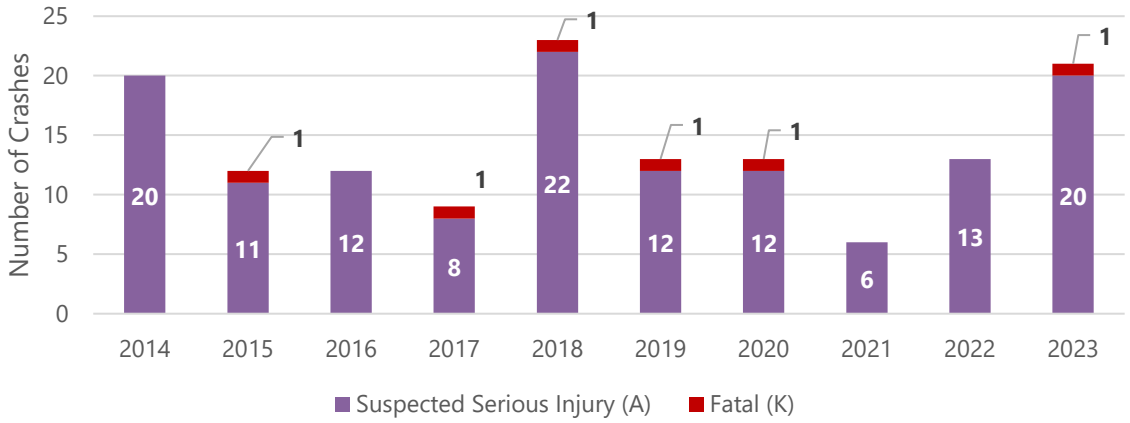


Figure 4 Fatal and Suspected Serious Injury Crashes by Year



In the 10-year period, the total number of crashes varied between 278 and 387 crashes per year. The highest number of crashes occurred in 2018, while 2020 had the lowest, reflecting a 28% decrease from the previous year. This sharp decline can likely be attributed to reduced traffic volumes during the COVID-19 pandemic. However, fatal and serious injury crashes remained the same between 2019 and 2020 and were similar in 2023 (21 crashes) as compared to 2018 (23 crashes), despite there being fewer total crashes in 2023.

This analysis focuses on crashes in the most recent five-year period (2019-2023). Fatal and suspected serious injury crashes during this period are relatively similar to what has been seen during the 10-year period shown in the preceding figures, though total crash numbers have been lower during this time.

Crash Severity & Crash Type

Crashes are displayed by severity in Figure 5 and summarized by crash type in Figure 6. In Figure 6, the values at the end of each bar indicate the total number of fatal and suspected serious injury crashes, followed by the proportion of those crashes relative to all fatal or suspected serious injury crashes (e.g., rear-end crashes accounted for 23 fatal and suspected serious injury crashes, which represents 35% of all fatal and suspected serious injury crashes). Appendix A contains a more detailed breakdown of crashes by type and severity.

Figure 5 Crashes by Severity

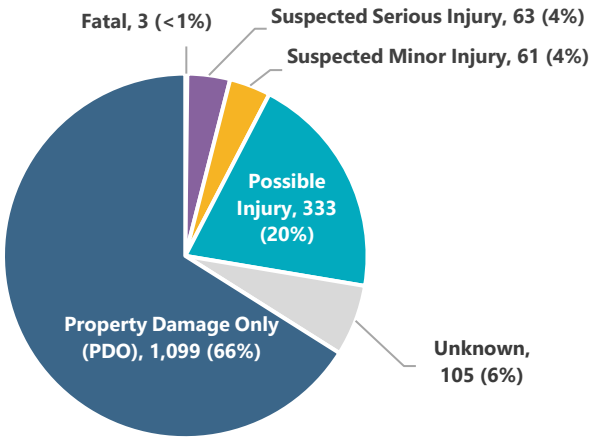
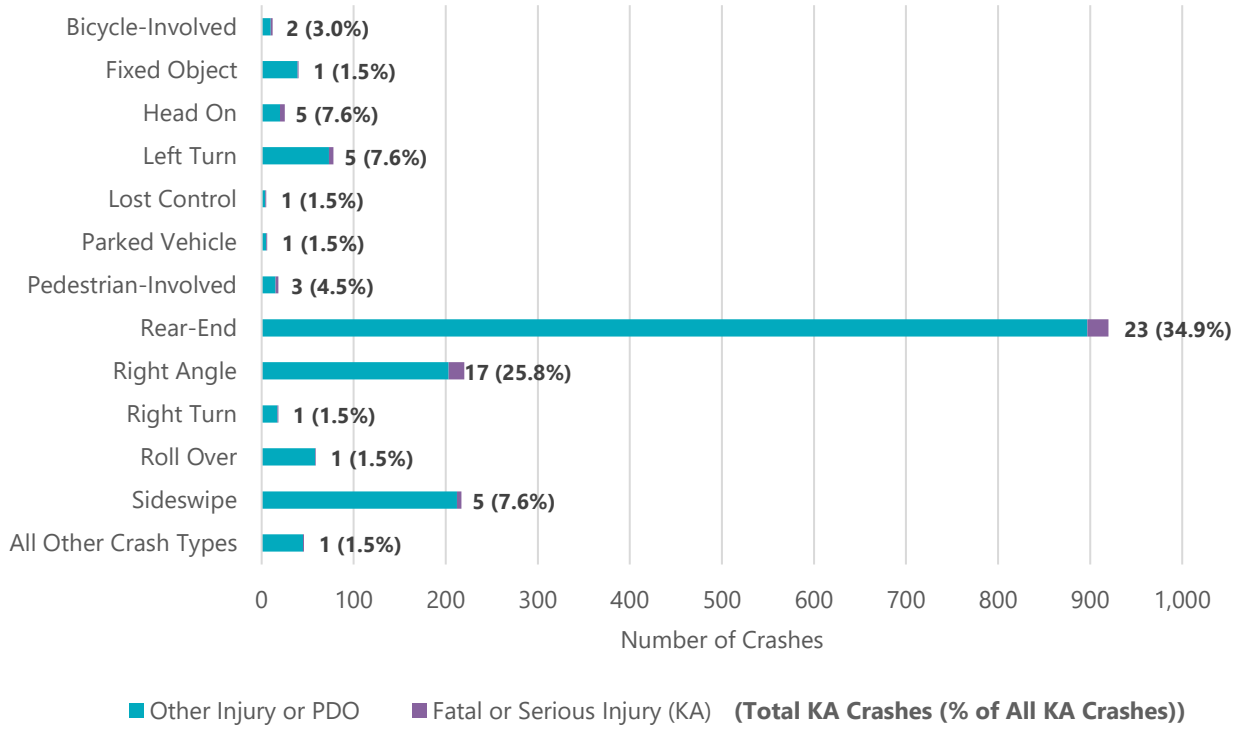


Figure 6 Crash Types by Severity



The four most frequent crash types are rear-end (55% of all crashes), right angle (13%), sideswipe (13%), and left turn (5%).

Rear-end crashes also account for the highest proportion of fatal and serious injury crashes, though at a lower proportion (35%) than for total crashes (55%). Right angle crashes account for the second greatest proportion of fatal and serious injury crashes (26%). Head-on, left turn, and sideswipe crashes each represent about 8% of fatal and serious injury crashes, tying for the third-highest proportion. Right-angle, head-on, left-turn, pedestrian-involved, and bicycle-involved crashes all account for a greater proportion of fatal and serious injury crashes than for total crashes, indicating these crashes tend to be more severe than other crash types.

Key attributes of the three crashes resulting in fatalities include:

- All occurred at an intersection, with one each reported at the Schramm Street, International Drive, and Mullan Road intersections.
- Two were left turn-opposite direction crashes at unsignalized intersections. One of these crashes occurred with snow on the roadway surface.
- One was a reported pedestrian-involved crash at Mullan Road while crossing the Mullan Road approach.

Key attributes of the 63 crashes resulting in a suspected serious injury include:

- Most crashes (90%) occurred at intersections. Of these, 68% were at unsignalized intersections and 32% were at traffic signals. Rear end crashes represented the highest proportion of suspected serious injury crashes (32%), followed by right angle crashes (29%).
- Of the six crashes resulting in a suspected serious injury that occurred on segments between intersections, five were rear-end crashes.

Crash Location

Crash patterns for intersections and segments shown are detailed in the following sections. Figure 7 shows the distribution of all crashes by location type, and Figure 8 shows the distribution for just fatal and serious injury crashes.

Figure 7 Crashes by Location Type

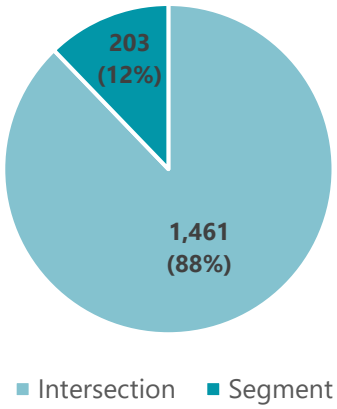


Figure 8 Fatal and Serious Injury Crashes by Location Type

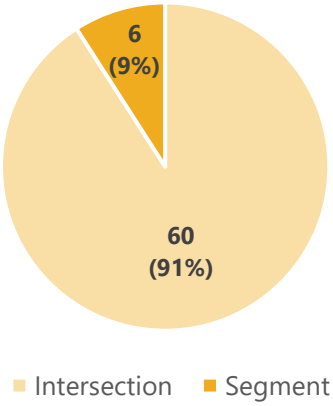
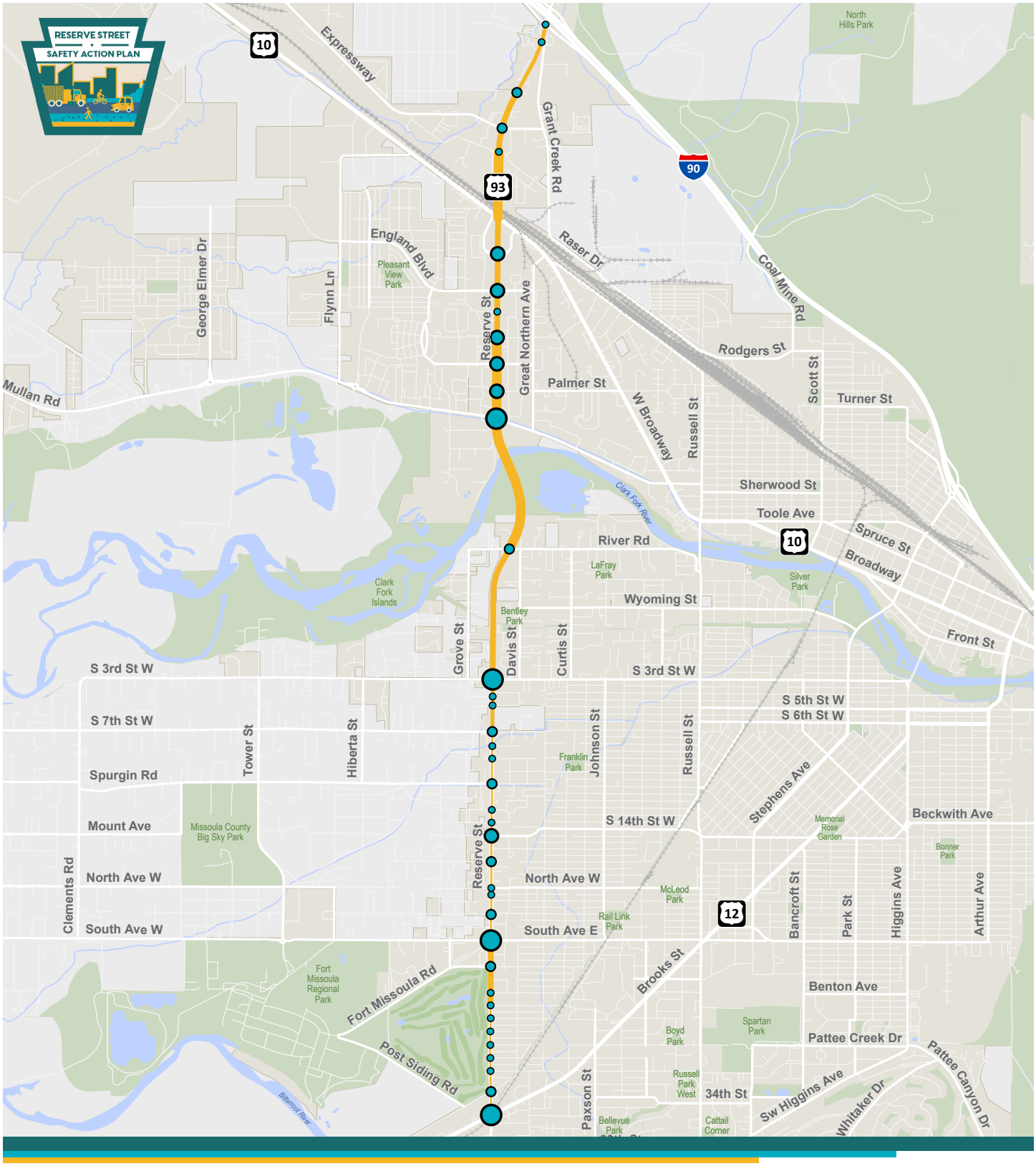


Figure 9 summarizes all crashes by location, and Figure 10 summarizes fatal and serious injury crashes by location.



Total Intersection Crashes

- < 24
- 25 - 49
- 50 - 99
- 100 or more

Segment Crashes per Mile

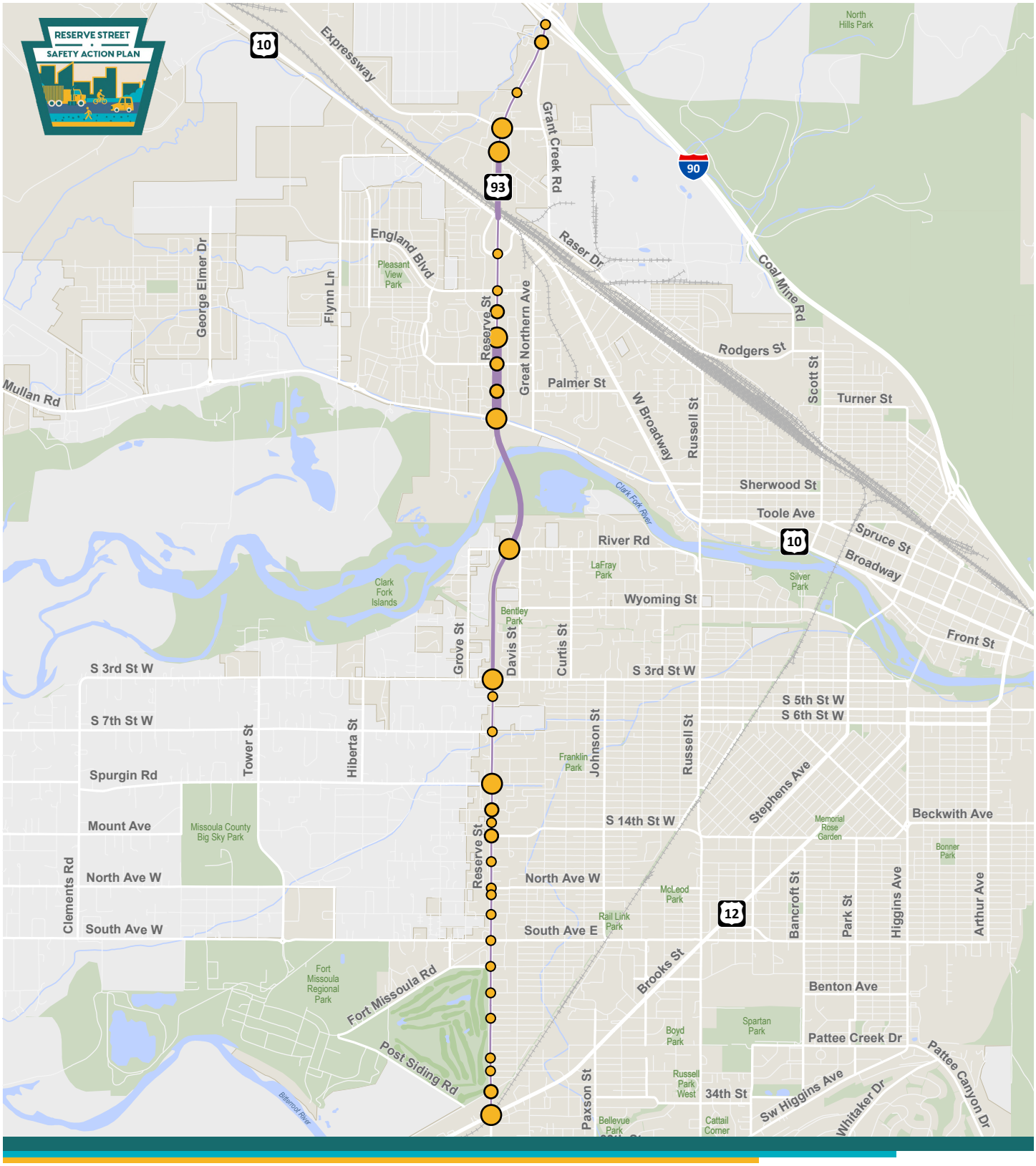
- < 10
- 10 - 20
- 20 - 50
- > 50

0 0.5 1 Mile

Figure 9

Crash Summary

Data Sources: City of Missoula, Missoula County, MDT



Intersection Fatal and Serious Injury Crashes

- 0
- 1
- 2
- 3 - 5

Segment Fatal and Serious Injury Crashes per Mile

- 0.0
- 0.1 - 1.6
- 1.7 - 3.2
- 3.3 - 5.1

0 0.5 1 Mile

Data Sources: City of Missoula, Missoula County

Figure 10

Crash Severity

INTERSECTIONS

There were 1,461 intersection-related crashes within the five-year study period, representing 88% of all crashes on Reserve Street. Of these crashes, three crashes resulted in a fatality and 57 resulted in a suspected serious injury. Table 3 summarizes these crashes by severity for each intersection on Reserve Street. Crash rates (crashes per million entering vehicles (MEV)) are calculated for intersections where traffic volumes were counted for this project. Intersections displayed in **bold** had three or more fatal or serious injury crashes within the 5-year period.

Table 3 Intersections by Crash Severity and Crash Rate (Crashes per Million Entering Vehicles)

Intersection	Traffic Control	Crash Severity						Total Crashes (% of Total)	Crash Rate (per MEV)
		K	A	B	C	PDO	U		
I-90 Eastbound Ramps	Signalized	0	1	2	3	16	0	22 (1.5%)	-
Grant Creek/ Michael Rd	Unsignalized	0	2	1	5	10	0	18 (1.2%)	-
Schramm St	Unsignalized	1	0	2	4	22	0	29 (2%)	-
Expressway Rd	**Signalized**	**0**	**3**	**4**	**4**	**32**	**5**	**48 (3.3%)**	**0.93**
International Dr	Unsignalized	1	2	1	4	14	2	24 (1.6%)	0.48
Broadway Ramps	Signalized	0	1	1	6	76	2	86 (5.9%)	1.46
England Blvd	Signalized	0	1	1	23	56	8	89 (6.1%)	1.35
Tina Ave	Unsignalized	0	2	1	3	14	0	20 (1.4%)	-
American Way	**Unsignalized**	**0**	**5**	**3**	**13**	**31**	**3**	**55 (3.8%)**	**1.05**
Union Pacific St	Signalized	0	2	3	27	55	3	90 (6.2%)	1.45
Palmer St	Unsignalized	0	2	1	8	37	5	53 (3.6%)	0.97
Mullan Rd	**Signalized**	**1**	**2**	**5**	**26**	**102**	**9**	**145 (10%)**	**1.74**
River Rd	**Unsignalized**	**0**	**3**	**1**	**9**	**25**	**3**	**41 (2.8%)**	**0.63**
S 3rd St	**Signalized**	**0**	**5**	**6**	**28**	**76**	**9**	**124 (8.5%)**	**1.56**
Olofson	Unsignalized	0	1	0	0	9	2	12 (<1%)	-
S 5th St	Unsignalized	0	0	0	1	2	1	4 (<1%)	-
7th St	Unsignalized	0	1	0	7	24	3	35 (2.4%)	-
S 8th St	Unsignalized	0	0	1	0	5	0	6 (<1%)	-
S 9th St	Unsignalized	0	0	0	0	1	0	1 (<1%)	-
Spurgin Rd	**Unsignalized**	**0**	**3**	**0**	**10**	**21**	**2**	**36 (2.5%)**	**0.61**
Sunset Ln	Unsignalized	0	2	1	4	6	3	16 (1.1%)	-
S14th St	Unsignalized	0	1	0	1	3	0	5 (<1%)	-
Mount Ave	Signalized	0	2	1	12	33	3	51 (3.5%)	0.81
Strand Ave/ Pool Ln	Unsignalized	0	1	2	8	14	1	26 (1.8%)	-
North Ave	Unsignalized	0	1	0	4	11	1	17 (1.2%)	-
Kent Ave	Unsignalized	0	1	0	1	4	2	8 (<1%)	-

Intersection	Traffic Control	Crash Severity						Total Crashes (% of Total)	Crash Rate (per MEV)
		K	A	B	C	PDO	U		
Central Ave	Unsignalized	0	1	1	8	17	0	27 (1.8%)	0.52
South Ave	Signalized	0	1	2	20	69	8	100 (6.8%)	1.36
Dearborn Ave	Unsignalized	0	1	5	7	25	3	41 (2.8%)	0.74
Benton Ave	Unsignalized	0	1	0	5	7	2	15 (1%)	-
Mary Ave	Unsignalized	0	0	0	2	0	1	3 (<1%)	0.06
Agnes Ave	Unsignalized	0	1	2	0	1	1	5 (<1%)	-
Harve Ave	Unsignalized	0	0	0	1	2	0	3 (<1%)	-
Ernest Ave	Unsignalized	0	0	1	0	2	1	4 (<1%)	-
Dixon Ave	Unsignalized	0	1	1	0	2	0	4 (<1%)	-
McDonald Ave	Unsignalized	0	1	0	0	5	0	6 (<1%)	-
Old US 93	Unsignalized	0	2	2	5	28	4	41 (2.8%)	0.86
Brooks Street	**Signalized**	**0**	**4**	**3**	**23**	**113**	**8**	**151 (10%)**	**1.96**
Grand Total		**3**	**57**	**54**	**282**	**970**	**95**	**1,461 (100%)**	**N/A**

Crash rates are provided here as another data point for comparing locations within Reserve Street. However, this plan is focused on reducing fatal and serious injury crashes, so the number of these crashes is the primary metric used for identifying locations for further review.

Figure 11 shows distribution of intersection-related crashes by traffic control (i.e., signalized vs. unsignalized), and Figure 12 shows the same distribution for just fatal and suspected serious injury crashes.

Figure 11 Total Intersection-Related Crashes

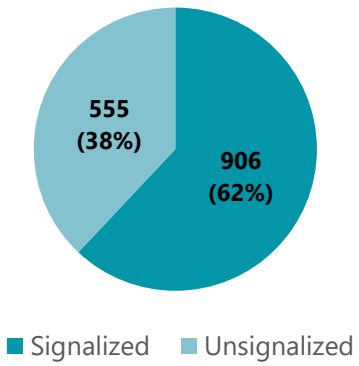
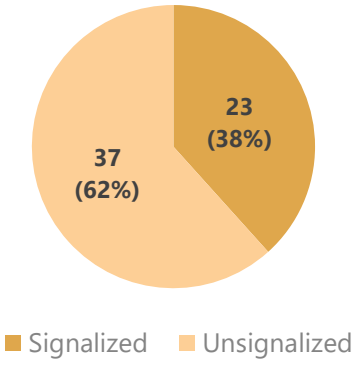


Figure 12 Intersection-Related Fatal and Serious Injury Crashes



Crashes at unsignalized intersections disproportionately resulted in fatal or suspected serious injuries, accounting for only 38% of all intersection-related crashes but 62% of intersection crashes resulting in fatal or suspected serious injuries.

Figure 13 and Figure 14 show the top crash types for signalized and unsignalized intersections, respectively. The values at the end of each bar indicate the total number of crashes resulting in fatal and serious injuries, followed by the proportion of those crashes relative to all fatal and serious injury crashes for each traffic control type (e.g., rear-end crashes accounted for nine serious injury crashes (zero fatalities), which represents 39% of all of these crashes at signalized intersections).

Figure 13 Top Signalized Intersection-Related Crash Types

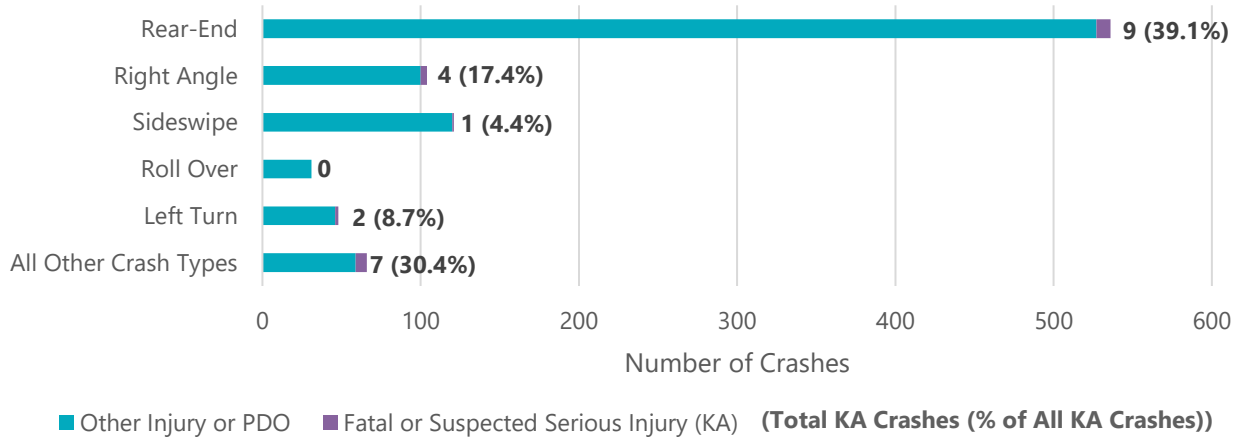
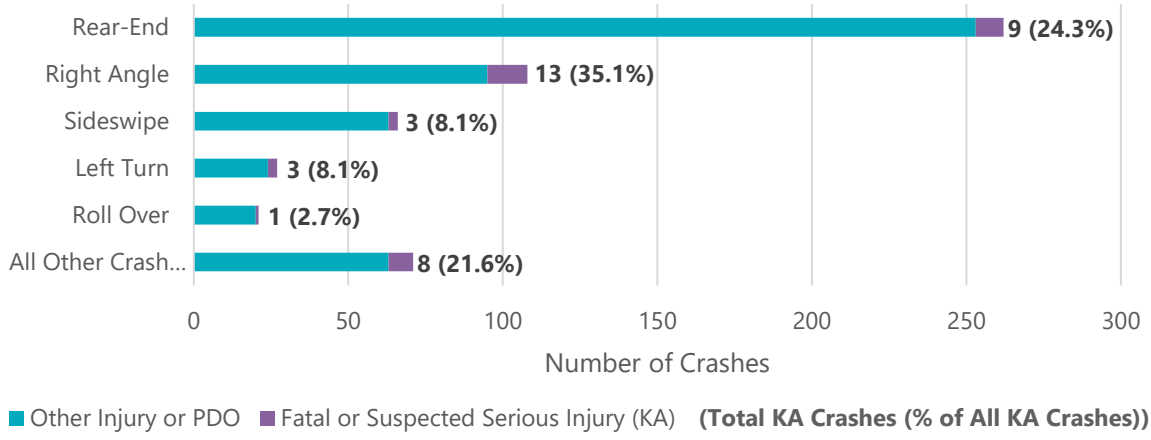


Figure 14 Top Unsignalized Intersection-Related Crash Types



Notable observations include:

- Fatal and suspected serious injury crashes are distributed at intersections throughout the corridor, with 30 of the 37 intersections having at least one of these types of crashes.
    - American Way and South 3rd Street had the most suspected serious injury crashes per intersection, with five of these crashes at each location. Brooks Street (US 12) was the next highest intersection, with four suspected serious injury crashes.
- Brooks Street had the highest crash rate (1.96), highest total number of crashes (151), and the third-highest fatal and suspected serious injury crash count over the five-year period (four total fatal and suspected serious injury crashes).
- Rear-end crashes represent the highest proportion of total crashes and fatal and suspected serious injury crashes at signalized intersections.
    - Seven of the ten signalized intersections had over 15 crashes per year, including Broadway Ramps, England Boulevard, Union Pacific Street, Mullan Road, S 3rd Street, South Avenue, and Brooks Street.
        - Ramp terminals generally have fewer conflict points compared to typical signalized intersections; however, the Broadway ramps exhibit a higher crash frequency compared to most other intersections on the corridor, with 90% of crashes being rear-end crashes.
- The most common crash type at unsignalized intersections is rear-end, followed by right angle. However, right angle crashes are more likely to result in a fatal or suspected serious injury compared to rear-end crashes.
    - Rear end crashes at unsignalized intersections may occur when people do not react in time to a vehicle slowing down to make a turn off of Reserve Street or to a vehicle turning onto Reserve Street from a driveway or side street.
    - Between Brooks Street and River Road, drivers can use the center turn lane to complete two-stage left turns. However, between the I-90 ramps and River Road, dedicated left-turn pockets on Reserve Street prevent two-stage left turns from side streets. Nine of the thirteen right-angle crashes resulting in a serious injury occurred in this section where two-stage turns are not possible.

SEGMENTS

There were 203 segment crashes within the five-year study period. Of these crashes, none resulted in a fatality, but six resulted in a suspected serious injury. Figure 15 shows the top crash types for segment crashes. As shown, rear-end crashes are the most common crash type for all crash severities, as well as suspected serious injury crashes (60% of segment crashes and 83% of segment suspected serious injury crashes). The next most common crash type is sideswipe (15% of segment crashes and 17% of segment suspected serious injury crashes).

Figure 15 Top Crash Types for Segment Crashes

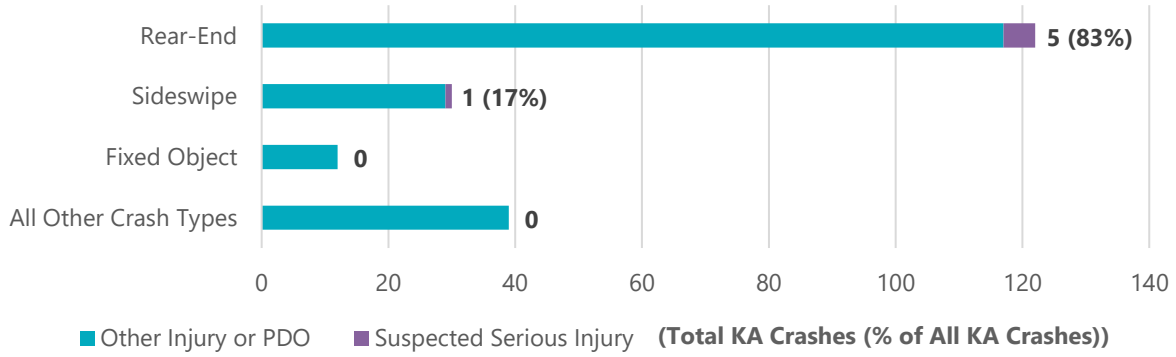


Table 4 summarizes crash severity and crash rate (crashes per vehicle miles traveled (VMT)) for roadway segments. These segments were determined based on changes in the 2023 Average Annual Daily Traffic (AADT) data from MDT. As described in the Intersections section, crash rates are most reliable when comparing segments within Reserve Street. Segments that are displayed in **bold** had two or more serious injury crashes.

Table 4 Segment Crashes by Severity and Crash Rate per Million VMT

Crash Segment	A	B	C	PDO	U	Total	Crash Rate per Million VMT
I-90 Interchange to Schramm St	0	0	2	5	0	7 (3.4%)	0.47
Schramm St to International Dr	0	0	1	10	0	11 (5.4%)	0.86
International Dr to Broadway St Bridge	1	1	4	11	0	17 (8.3%)	0.98
Broadway St Bridge to American Way	0	0	4	21	1	26 (13%)	0.74
American Way to Mullan Rd	**2**	**1**	**5**	**13**	**2**	**23 (11%)**	**0.96**
Mullan Rd to River Rd	**2**	**2**	**20**	**38**	**5**	**67 (33%)**	**1.55**
River Rd to S 3rd St W	1	3	6	16	1	27 (13%)	0.62
S 3rd St to S 7th St	0	0	0	4	0	4 (2%)	0.24
S 7th St to Mount Ave	0	0	1	0	0	1 (<1%)	0.03
Mount Ave to South Ave	0	0	3	2	0	5 (2.5%)	0.16
South Ave E to Mary Ave	0	0	5	7	1	13 (6.4%)	0.74
Mary Ave to Brooks St	0	0	0	2	0	2 (1%)	0.07
Total	**6**	**7**	**51**	**129**	**10**	**203**	**-**

Notable segment observations include:

- Mullan Road to River Road has the highest crash rate, followed by International Drive to Broadway Street Bridge and American Way to Mullan Road.
- The Mullan Road to River Road segment represents 33% of all crashes and 33% of all segment suspected serious injury crashes.
- The International Drive to Broadway Street Bridge segment represents 8% of segment crashes and 17% of segment suspected serious injury crashes
- The River Road to S 3rd St W segment represents 13% of segment crashes and 17% of segment suspected serious injury crashes.

Vulnerable Road Users

Vulnerable road users, such as people walking and biking, are exposed to higher risk of fatalities and injuries on roadways. This is evident within the study period, as pedestrian-involved and bicycle-involved crashes represented 1.8% of all crashes, but 7.6% of all fatal and suspected serious injury crashes.

Pedestrian- and bicycle-involved crashes are summarized by severity in Figure 16. Overall, there was one pedestrian-involved crash that resulted in a fatality and four crashes that resulted in a suspected serious injury (two pedestrian, two bicycle). According to City staff, it's possible that some reported pedestrian involved crashes actually involved bicyclists, as police officers sometimes classify people on bikes in the crosswalk as pedestrians to be consistent with state law.

Figure 16 Pedestrian- and Bicyclist-Involved Crashes by Severity

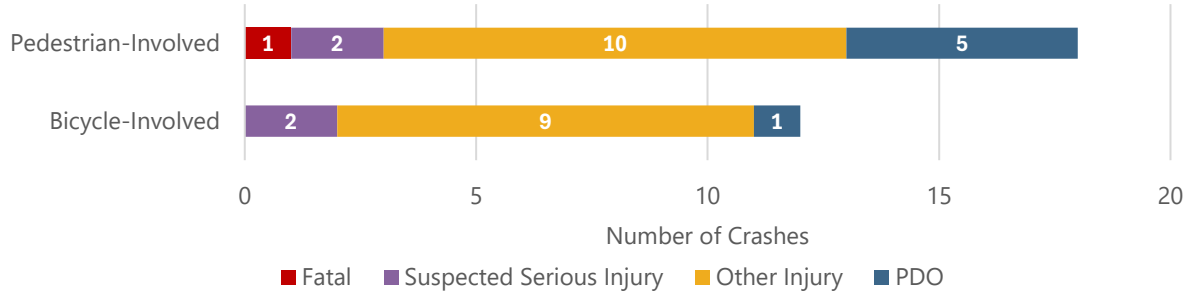


Figure 17 maps all pedestrian-involved and bicycle-involved crashes within the study period. Seventy-seven percent of pedestrian- or bicycle-involved crashes occurred at an intersection, including the one crash involving a pedestrian fatality at the Mullan Road intersection.



Pedestrian-Involved Crashes

- Fatal or Suspected Serious Injury Crash (3)
- Other Injury (9)
- PDO or Unknown Injury (6)

Bicycle-Involved Crashes

- Suspected Serious Injury (2)
- Other Injury (8)
- PDO or Unknown Injury (2)

0 0.5 1 Mile

Figure 17

Pedestrian and Bicycle Crashes

Data Sources: City of Missoula, Missoula County

CORRIDOR SCREENING

This section summarizes findings from two corridor screening assessments, the Equivalent Property Damage Only (EPDO) assessment and the Infrastructure Indicators assessment. These assessments aim to identify focus areas that could benefit from safety improvements by analyzing locations with the highest severity crashes, as well as locations with roadway or environmental characteristics that are commonly associated with these high severity crashes.

Equivalent Property Damage Only (EPDO) Assessment

High severity and high frequency crash locations were identified using the Equivalent Property Damage Only (EPDO) method, one of the safety network screening performance measures included in the *Highway Safety Manual*.[3]

The EPDO analysis methodology places greater emphasis on crash severity compared to other common methods that only consider crash frequency or rate, providing insight into locations that have low crash frequency but have experienced one or more fatal or suspected serious injury crashes. The EPDO method assigns societal costs to each crash by KABCO severity level to develop an equivalent property-damage only value based on magnitude relative to a PDO crash.

Table 5 EPDO Weights by Severity

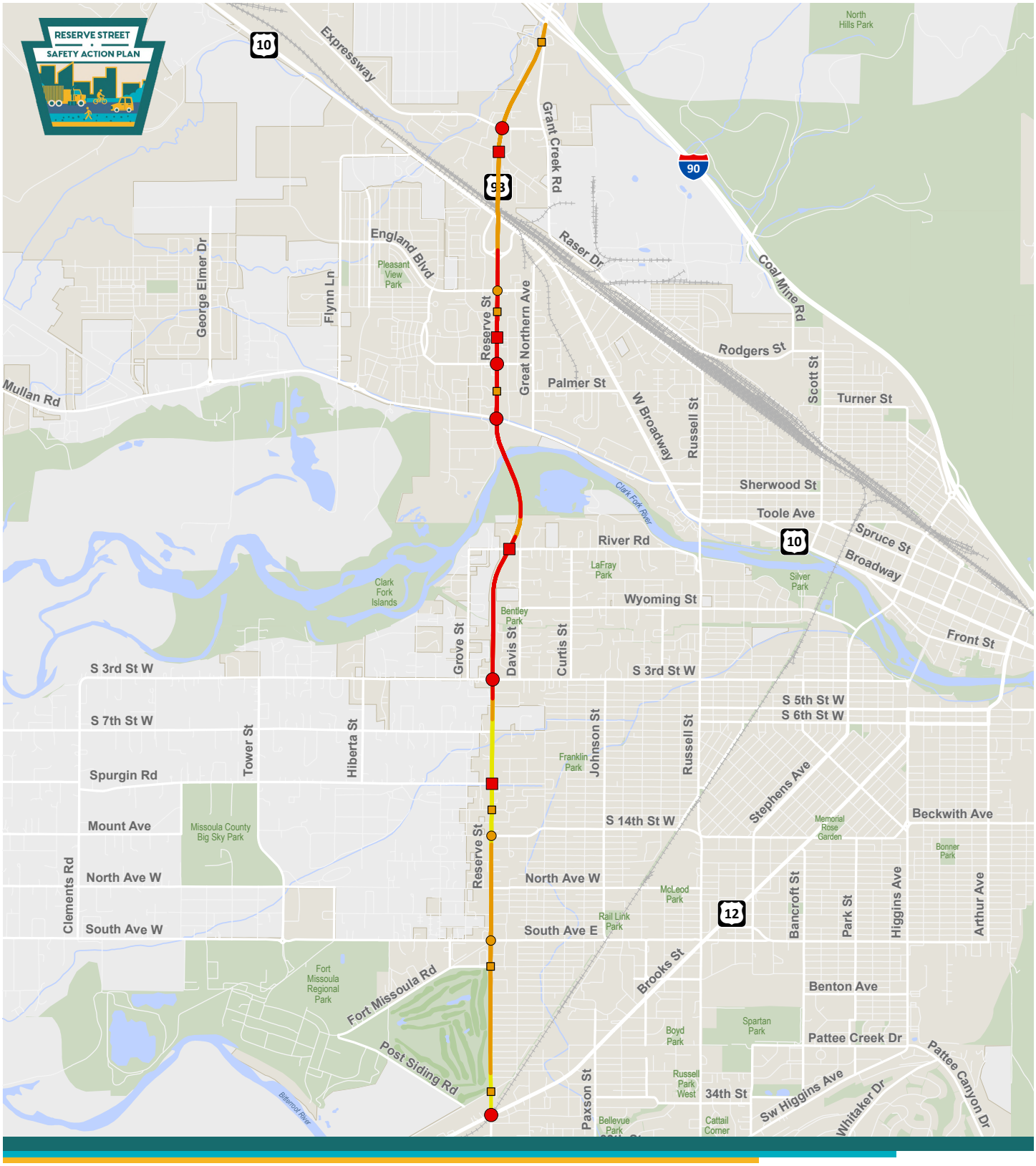
Severity (KABCO)	Societal Cost	EPDO Weight
K – Fatal Crash	**$$$$**	270.99
A – Suspected Serious Injury Crashes	**$$$$**	270.99
B – Visible Injury Crash	**$$$**	38.74
C – Possible Injury Crash	$$	19.79
O – Property Damage Only Crash	$	1.00

Source: Federal Highway Administration, Benefit-Cost Analysis Guidance for Discretionary Grant Programs (2022)[4]

**Note: For this analysis, fatal and suspected serious injury crashes are weighted the same based on best practices to reduce the weight of fatal crashes and better identify high crash locations, in alignment with Safe System Approach's focus on preventing both fatal and serious injury crashes.*

[3] Association of American State Highway Transportation Officials. (2010). *Highway Safety Manual.* https://www.highwaysafetymanual.org/Pages/default.aspx

[4] Monetized values were developed based on the FHWA's 2022 *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*. The monetized values for B, C, and O crashes align with those from FHWA, while adjustments were made to the values for K and A crashes through a weighted average approach to prevent any one K crash from overly affecting the final EPDO score.



Equivalent Property Damage Only (EPDO) Rankings

Top 25%

- Signalized
- Unsignalized
- Roadway Segment

Top 50%

- Signalized
- Unsignalized
- Roadway Segment

0 0.5 1 Mile

Figure 18

Crash History Screening

Data Sources: City of Missoula, Missoula County

INTERSECTIONS

Table 6 summarizes the intersections with the top 25% of EPDO scores.

Table 6 Top 25% EPDO Intersections

Rank	Intersection	Traffic Control	EPDO Score
1	International Dr	Unsignalized	678.6
2	S 3rd St	Signal	445.3
3	Brooks St	Signal	355.3
4	Mullan Rd	Signal	326.4
5	Union Pacific St	Signal	250.1
6	American Way	Unsignalized	223.9
7	Expressway Rd	Signal	139.6
8	River Rd	Unsignalized	134.4
9	Spurgin Rd	Unsignalized	129.6

SEGMENTS

The roadway segment EPDO analysis was conducted using the 'sliding window' method, as recommended by the *Highway Safety Manual*, to effectively compare roadway segments of equal length. The sliding window method calculates EPDO by evaluating total EPDO in 0.5-mile segments (i.e., "windows"), and then sliding the window along the roadway 0.1-miles at a time. This method reduces the possibility of splitting locations with high concentrations of crashes into separate segments, which would reduce the EPDO value for segments that start and end in high-crash spots.

Reserve Street between the Broadway Ramps and S 3rd Street generally has higher EPDO scores compared to the rest of the corridor. The highest scoring 0.5-mile segment is between American Way and Clark Fork Drive.

Infrastructure Indicators

The project team also screened the corridor for locations with characteristics, or "infrastructure indicators," that are common to high severity or high frequency crash locations. While these locations may not have notable severe crash trends within the study period, they have characteristics that are observed at locations that have high-severity crashes, as identified from corridor-wide crash patterns, the EPDO screening results, and statewide and national research.

The factors evaluated in the infrastructure indicators screening are listed below. The characteristics include roadway design and environmental factors that may be correlated with higher crash severity. These characteristics can influence vehicle speed, driver behavior, and the presence of vulnerable users.

- Permissive left-turn signal phasing – Can result in conflicts between left-turning vehicles and through vehicles and people in the crosswalk.
- Right-turn slip lane – Leads to higher speed right turns and can create another conflict point with people walking or biking.
- Skewed unsignalized intersection – Reduces sight distance for vehicles making turns or trying to cross the street.
- Within ½ mile of a school – Can indicate the location is in an area with higher pedestrian, bicycle, and other vulnerable road user activity, especially children.

Other corridor-wide characteristics include:

- 45 miles-per-hour (MPH) speed limit – Higher speeds result in more kinetic energy when a crash occurs, which can increase crash severity.
- High driveway density – Driveways create conflict points.
- Lack of protected bicycle facilities – People biking must either share a lane with motor vehicle traffic or share the sidewalk with people walking.
- Limited pedestrian and bicycle crossings in some locations – Enhanced crossings can increase driver yielding to people crossing.

Figure 19 displays where these characteristics are present along the corridor.

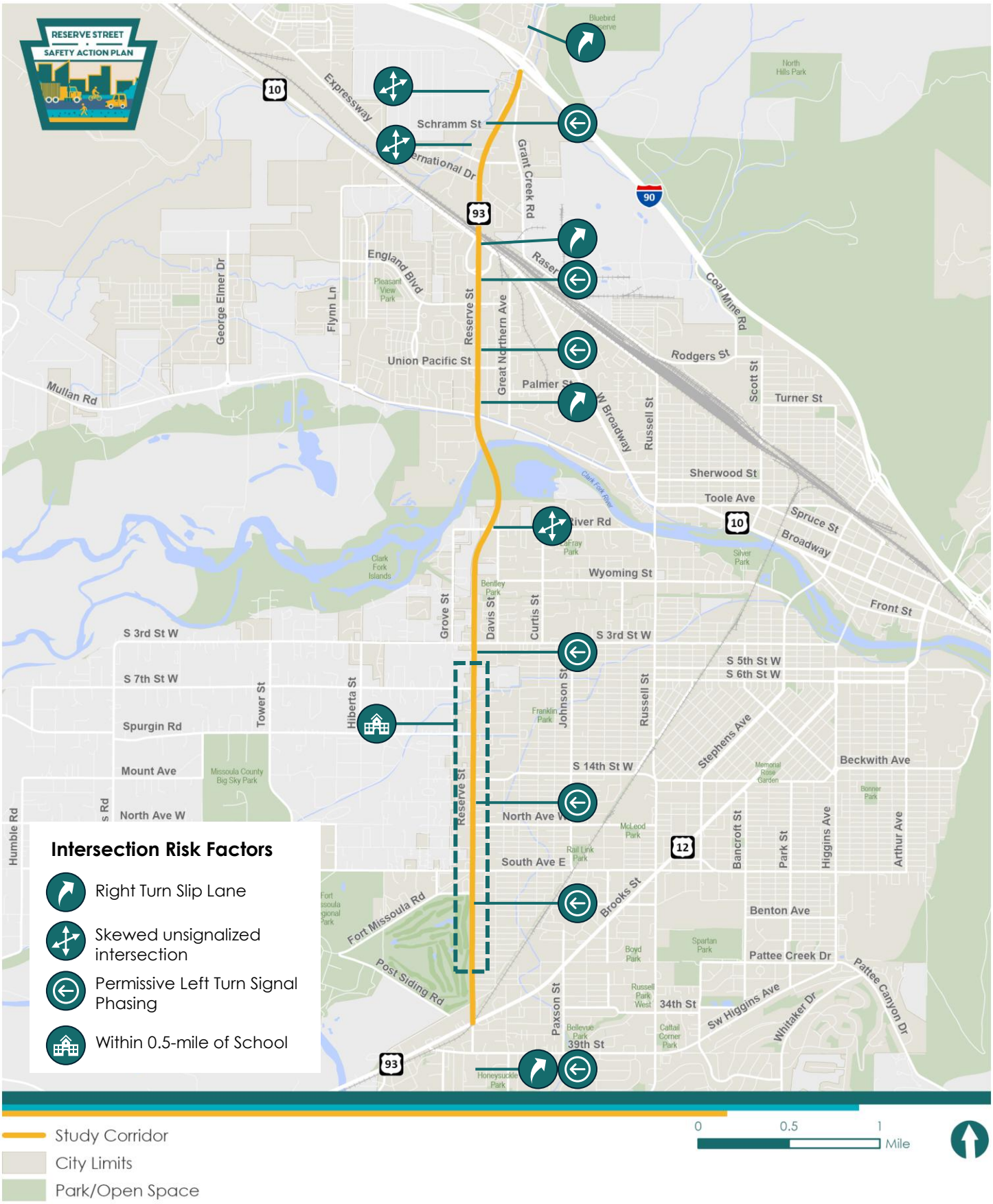


Figure 19

Infrastructure Indicators

Data Sources: City of Missoula, Missoula County

Travel Patterns and Traffic Operations Analysis

This section summarizes an evaluation of existing travel patterns and an analysis of traffic operations at intersections along the Reserve Street corridor.

EXISTING TRAVEL PATTERN EVALUATION

The evaluation of existing travel patterns seeks to understand how Reserve Street is being used. The project team used Replica, a big-data provider, to analyze origin-destination patterns and trip lengths for those using Reserve Street. Data was collected in the fall season of 2023 and includes a dataset of approximately 76,000 trips. Figure 20 illustrates some of the key findings from that analysis.

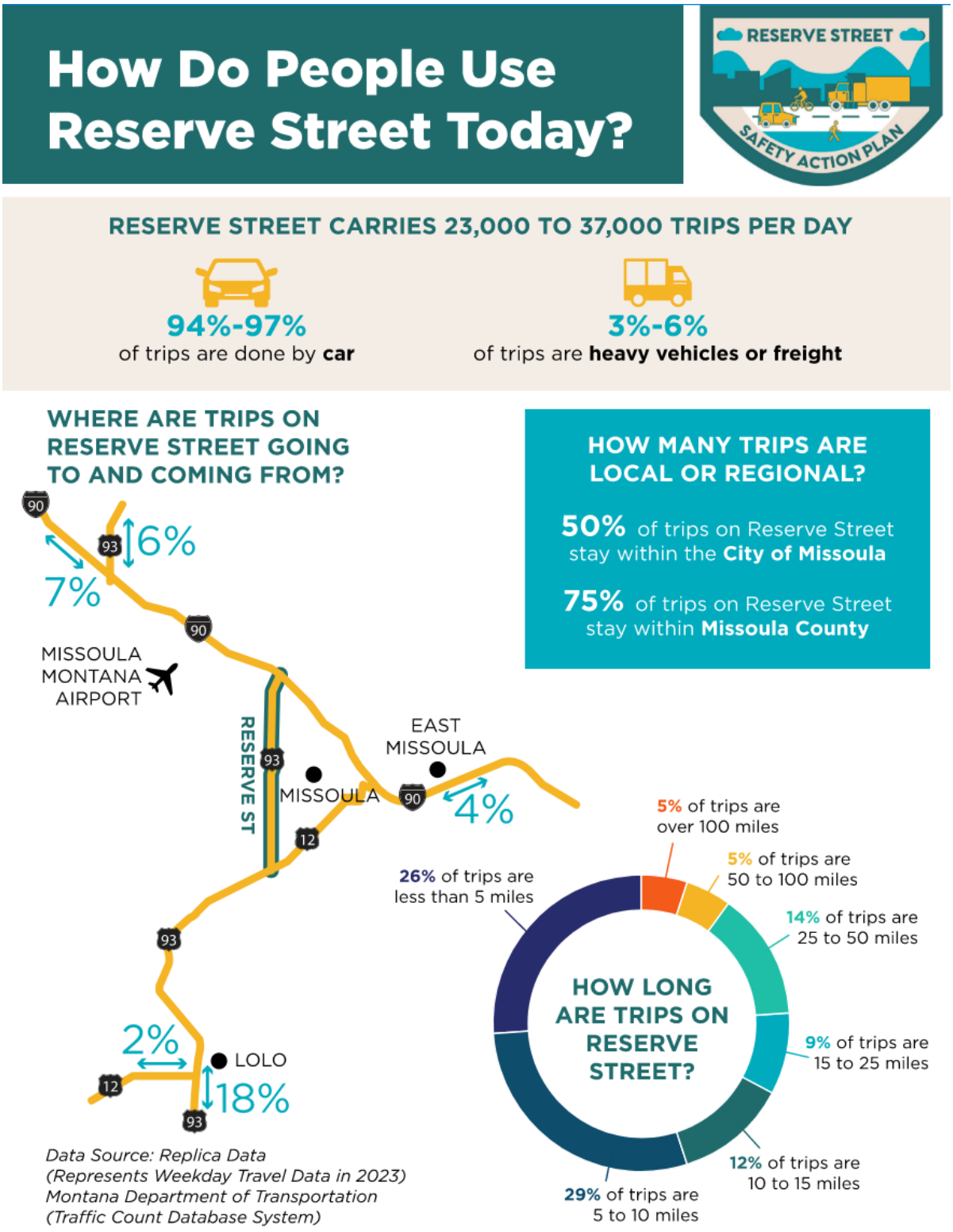
The number of trips per day on Reserve Street ranges from 23,000 (south of I-90) to 37,000 (between South Avenue and 3rd Street). Trips on Reserve Street are predominately completed by car or truck as opposed to by active transportation modes. Almost half of these trips are local and start and end within Missoula. Approximately 45% of trips are over 10 miles in length, including about 10% of trips being over 50 miles long. These findings indicate that Reserve Street serves significant portions of both local trips (generally staying in the city of Missoula or vicinity) and regional or pass-through trips (trips traveling from outside the city of Missoula). Future improvements to Reserve Street should take into consideration the needs of these two different types of trips.

A similar evaluation of existing travel patterns was performed for trips on Brooks Street to provide a comparison to travel patterns on Reserve Street. Key findings from that analysis are as follows:

- Average trip lengths on Reserve Street are about 25% higher than on Brooks Street.
- Approximately 60% of trips on Brooks Street begin and end within the City of Missoula, compared to 50% of trips on Reserve Street.
- The proportion of trips on Reserve Street and Brooks Street that begin and end within Missoula County is similar (approximately 75%).

This comparison of travel patterns between Reserve Street and Brooks Street show that Reserve Street likely serves a higher proportion of regional traffic than does Brooks Street. Both streets serve more regional traffic than does Higgins Avenue (i.e., about 80% of trips passing through the Hip Strip are less than 10 miles in length), which was previously analyzed similarly using Streetlight data for the Higgins Avenue Corridor Plan.

Figure 20 Reserve Street Travel Patterns



EXISTING TRAFFIC OPERATIONS ANALYSIS

The traffic operations analysis examines how certain intersections along Reserve Street function during the weekday AM and PM peak periods with their existing traffic controls and lane configurations. The purpose of this analysis is to provide a baseline that can be referenced when considering the potential trade-offs of safety treatments along Reserve Street (e.g., how would traffic operations change at an intersection if left-turn phasing was changed from permitted to protected?).

Study Intersections

The project team identified 18 intersections along the study corridor to analyze. These were selected through considerations of known traffic operations conditions, crash history, and to ensure a mix of coverage along the corridor. Table 7 summarizes the study intersections. The existing lane configurations for these intersections are shown in Appendix B.

Table 7. Traffic Analysis Study Intersections

ID	Intersection	Configuration	Traffic Control
1	Reserve St / Expressway Rd-Howard Raser Ave	Four-leg	Signalized
2	Reserve St / International Dr-Stockyard Rd	Four-leg	Unsignalized
3	Reserve St / Broadway Ramps	Two (divided) three-leg	Signalized/ Unsignalized
4	Reserve St / England Blvd	Four-leg	Signalized
5	Reserve St / American Way	Four-leg	Unsignalized
6	Reserve St / Union Pacific St	Four-leg	Signalized
7	Reserve St / Palmer St	Four-leg	Unsignalized
8	Reserve St / Mullan Rd	Four-leg	Signalized
9	Reserve St / River Rd	Four-leg	Unsignalized
10	Reserve St / S 3rd St	Four-leg	Signalized
11	Reserve St / Spurgin Rd	Four-leg	Unsignalized
12	Reserve St / Mount Ave	Four-leg	Signalized
13	Reserve St / Central Ave	Four-leg	Unsignalized
14	Reserve St / South Ave	Four-leg	Signalized
15	Reserve St / Dearborn Ave	Four-leg	Unsignalized
16	Reserve St / Mary Ave	Three-leg	Unsignalized
17	Reserve St / Old US 93	Four-leg	Unsignalized
18	Reserve St / Brooks St	Four-leg	Signalized

Traffic Volumes

Turning movement counts were collected at the study intersections on a typical midweek day in early October 2024 during clear weather conditions. Counts were conducted during the AM and PM peak periods; intersections were then analyzed using individual peak hours. Volumes were not adjusted to account for any seasonal factor because the seasonal factor – collected from the MDT Traffic Adjustment Factors – for October was less than 1 (i.e., traffic volumes during October are generally higher than the annual average). Traffic count sheets and the relevant seasonal factor table are shown in Appendix C.

Traffic Operations Analysis

The City of Missoula and Missoula County do not have adopted mobility standards for signalized or unsignalized intersections. Guidance for roadway operations standards in the MDT Road Design Manual[5] identifies a target level-of-service (LOS) C for urban arterials. However, for projects on existing roadways in urban areas, LOS D or E and a volume-to-capacity ratio (v/c) of less than 1.0 are often acceptable. This analysis therefore uses LOS E or better and a v/c of 1.0 as the performance standards.

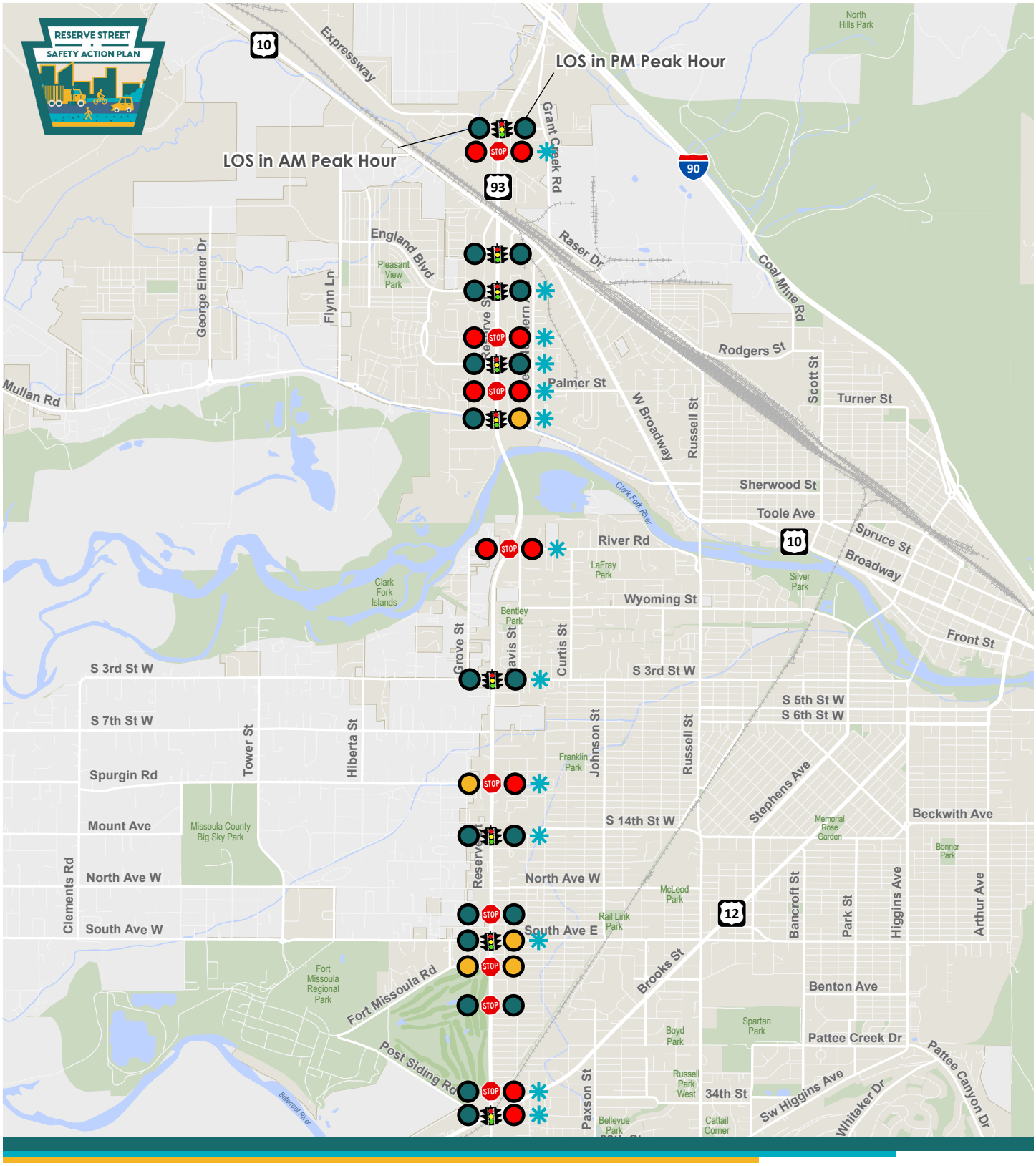
The analysis used Synchro 12 software and its *Highway Capacity Manual* (*HCM*) *7th Edition*[6] reports to summarize the intersection traffic operations. The performance measures are reported for the intersection critical movement at unsignalized intersections and for the overall intersection at signalized intersections. Figure 21 presents a high-level summary of the traffic operations analysis results. Existing peak hour traffic volumes at the study intersections and the resultant v/c ratios, delays, and levels of service (LOS) are provided in Appendix D.

Four unsignalized intersections – International Drive-Stockyard Road, American Way, Palmer Street, and River Road – have critical movements that operate at LOS F during both peak hours. While delays for movements crossing or turning onto Reserve Street are high (meeting the LOS F threshold), v/c ratios for these movements generally remain low (below 0.60). The exception is International Drive-Stockyard Road, where the westbound approach is at capacity. Volumes for the critical movements at these intersections – particularly for left turns onto Reserve Street – were typically fewer than ten vehicles in the peak hour. Two other intersections have critical movements that operate at LOS F during the PM peak hour: Spurgin Road and Old US 93. The intersection at Brooks Street, which is signalized, also operates at LOS F during the peak hour.

While most signalized intersections meet the performance target at the intersection level, individual movements may still perform at LOS F or have a high v/c ratio.

Table 8 summarizes movements performing at LOS F or with a v/c over 1.00. These movements are also marked by asterisks in Figure 21.

[5] Montana Department of Transportation. *Road Design Manual*. 2016.
[6] Transportation Research Board. *Highway Capacity Manual 7th Edition*. 2022.



Level of Service

- LOS A-D
- LOS E
- LOS F

Traffic Control

- Signal
- TWSC

✱ At least one movement at LOS F or with v/c > 1.0 in either peak hour

0 0.5 1 Mile

Data Sources: City of Missoula, Missoula County

Figure 21

Intersection Level of Service

Table 8 Movements at Intersections with LOS F or V/C > 1

Intersection	Traffic Control	Approach/Movement	Performance
AM Peak Hour			
Reserve St / International Dr-Stockyard Rd	Unsignalized	Westbound Left-Through-Right	LOS F; v/c > 1.0
Reserve St / American Way	Unsignalized	Eastbound Left	LOS F; v/c = 0.10
Reserve St / Union Pacific St	Signalized	Eastbound Through-Right	LOS F; v/c = 0.89
Reserve St / Palmer St	Unsignalized	Westbound Left	LOS F; v/c = 0.18
Reserve St / Mullan Rd	Signalized	Eastbound Right	LOS F; v/c = 1.11
		Northbound Left	LOS F; v/c = 0.87
Reserve St / River Rd	Unsignalized	Eastbound Through-Left	LOS F; v/c = 0.57
Reserve St / S 3rd St	Signalized	Eastbound Through	LOS F; v/c > 0.90
		Westbound Left	LOS F; v/c > 0.90
Reserve St / South Ave	Signalized	Eastbound Left	LOS F; v/c = 0.79
		Southbound Left	LOS F; v/c > 0.90
Reserve St / Brooks St	Signalized	Northbound Left	LOS F; v/c = 0.83
PM Peak Hour			
Reserve St / International Dr-Stockyard Rd	Unsignalized	Eastbound	LOS F; v/c = 0.78
		Westbound	LOS F; v/c > 1.0
Reserve St / England Blvd	Signalized	Eastbound Left	LOS F; v/c = 0.78
		Eastbound Through Right	LOS F; v/c > 0.90
		Westbound Right	LOS F; v/c = 1.05
Reserve St / American Way	Unsignalized	Eastbound Left	LOS F; v/c = 0.66
		Westbound Left	LOS F; v/c = 0.36
		Westbound Through Right	LOS F; v/c = 0.70
Reserve St / Union Pacific St	Signalized	Eastbound Through-Right	LOS F; v/c > 0.90
Reserve St / Palmer St	Unsignalized	Westbound Left	LOS F; v/c = 0.87
		Westbound Through Right	LOS F; v/c = 0.84
Reserve St / Mullan Rd	Signalized	Westbound Left	LOS F; v/c = 0.89
		Westbound Through	LOS F; v/c > 0.90
		Northbound Left	LOS F; v/c > 0.90
Reserve St / River Rd	Unsignalized	Eastbound Through Left	LOS F; v/c = 0.63
		Westbound	LOS F; v/c = 0.78
Reserve St / S 3rd St	Signalized	Eastbound Through	LOS F; v/c = 0.89
		Westbound Right	LOS F; v/c = 0.73

Intersection	Traffic Control	Approach/Movement	Performance
Reserve St / Spurgin Rd	Unsignalized	Eastbound Left Through	LOS F; v/c = 0.17
Reserve St / Mount Ave	Signalized	Eastbound Left	LOS F; v/c = 0.50
Reserve St / South Ave	Signalized	Eastbound Left	LOS F; v/c > 0.90
		Westbound Left	LOS F; v/c = 0.86
Reserve St / Old US 93	Unsignalized	Eastbound Left Through	LOS F; v/c = 0.33
Reserve St / Brooks St	Signalized	Eastbound Left	LOS F; v/c > 1.0
		Northbound Left	LOS F; v/c > 0.90

[1]*Overall intersection v/c is calculated via the Transportation Research Board's Highway Capacity Manual 2000 methodology*

Future Conditions

With Missoula's ongoing and projected growth, the built environment around Reserve Street is expected to change in terms of land use, form, and intensity. The recently adopted *Our Missoula 2045 Land Use Plan* (Missoula Land Use Plan) will help shape Reserve Street's future. The Plan guides ongoing growth and development in the city and seeks to align the built environment with the surrounding transportation networks.

This section describes the Missoula Land Use Plan's vision for Reserve Street in terms of the "Place Type" and "Street Type" framework presented in the plan. It also includes future volume projections and describes anticipated projects on Reserve Street.

FUTURE CONTEXT[7]

The Missoula Land Use Plan develops a framework for the urban area using defined Place Types and Street Types. By integrating Place Types with Street Types, Missoula aims for greater consistency between land use and transportation and a more functional transportation network.

Place Type

Reserve Street has the following adopted Place Types:

- *Limited Urban Mixed-Use* from I-90 south to the Clark Fork River and from 3rd Street south to Brooks Street, except for pockets of *Urban Mixed-Use High*.
- *Parks and Conservation Land*, *Limited Urban Residential*, and *Urban Residential Low* from the Clark Fork River south to 3rd Street.

[7] The content in this section is based on information from the Missoula Land-Use Plan and incorporates text drafted by MPO staff

Much of the corridor is designated *Limited Urban Mixed-Use (LUM)*. This Place Type is characterized by automobile influence, large shopping centers, department stores, and businesses. These areas are primarily commercial, providing neighborhood and community-scale businesses and services, with residential uses allowed but not prioritized. The MPO expects the LUM areas of Reserve Street evolve toward more mixed-use environments, maintaining their commercial focus but gradually incorporating more residential elements, artisanal manufacturing, and adaptive reuse of existing structures. Future change could include new big-box retail, office buildings, and large apartment complexes, with building heights reaching up to six stories.

Reserve Street also includes pockets of *Urban Mixed-Use High (UMH)* at the intersections of Brooks Street, South Avenue, Mount Avenue, and 3rd Street. UMH envisions these areas as activity hubs, combining high-density residential, diverse businesses, and a variety of transportation options. Development is characterized by a wide variety of housing options, including multi-dwelling and large mixed-use apartment complexes. MPO staff expect that UMH areas on Reserve Street will see higher densities, greater proximity to services, and more support for active modes of travel. New construction will be encouraged to maximize height and density to create environments that feel more like a city center. The UMH place type seeks to prioritize street-level character and active use.

Street Type Context

The full extent of Reserve Street, from Brooks Street to I-90, is designated as *Regional Connector (RC)*. These streets are designed to accommodate high volumes of motor vehicle traffic, including freight, transit, and emergency services, while supporting connectivity between neighborhoods, job centers, and other regional corridors. Although RC streets have historically prioritized vehicle travel, the MPO expects a growing emphasis on improving multimodal connectivity.

For these street types, the plan recommends typical treatments that include controlled intersections, appropriately sized lanes, continuous sidewalks with tree-lined buffers, limited access points, and enhanced pedestrian crossings. RC streets seek to balance providing for higher motor vehicle volumes while not creating a barrier to cross for adjacent land-uses and neighborhoods. The plan expects the corridor to balance regional mobility needs with safe, equitable access for all users.

FUTURE PROJECTS

MDT is planning to conduct a traffic signal retiming study on Reserve Street. The project will identify signal retiming recommendations and plans for implementation. It is anticipated that this project will begin in 2025.

FUTURE TRAFFIC OPERATIONS ANALYSIS

The future traffic operations analysis explores how study intersections are expected to function in the future (year 2050) with anticipated traffic growth. Projected traffic volumes were developed using existing volumes and the MPO's updated travel demand model, which takes into consideration anticipated future growth patterns and changes to the region's transportation network. This information can be used to further assess trade-offs of potential safety treatments on Reserve Street.

Future Traffic Volumes

The MPO has developed an updated travel demand model (TDM) as part of its Missoula Connect 2050 Long-Range Transportation Plan. The model estimates volumes on roadway links for the years 2022 and 2050; volumes are estimated for daily, AM peak hour, and PM peak hour timeframes. The 2022 and 2050 AM and PM model volumes were used to project future turning movement volumes at the 18 study intersections. The projection methodology described in NCHRP Report 765[8] was used. This methodology grows the existing observed volumes, provided in Appendix D, by approximately the ratio of 2050 to 2022 model volumes and distributes roadway link volumes to turning movements at intersections. The resulting projected future volumes, which were used to estimate future traffic operations at the study intersections, are provided in Appendix D.

Figure 22 illustrates the expected growth in daily traffic volumes by 2050 on segments at each leg of the study intersections. As shown, higher growth is expected on Reserve Street north of the railroad compared to the section south of the river crossing. Daily volumes north of the railroad are expected to grow between 25% and 35% total; daily volumes between Brooks Street and S 3rd Street are expected to grow approximately 10%. Higher growth rates are expected on International Drive (west of Reserve Street), River Road (east of Reserve Street), and Mary Avenue (east of Reserve Street). In select cases, the model predicted negative growth on Reserve Street approaches; in these instances, the project team assumed zero growth.

Future Traffic Operations

As in the existing conditions analysis above, the future conditions analysis used Synchro 12 software and its *Highway Capacity Manual* (*HCM*) *7th Edition* reports to summarize the intersection traffic operations. Table 9 summarizes *new* movements performing at LOS F or with a v/c over 1.00 under future conditions. These movements are also marked by asterisks in Figure 23. While most signalized intersections meet the performance target at the intersection level, individual movements may still perform at LOS F or have a high v/c ratio.

[8] NCHRP Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design (2014)

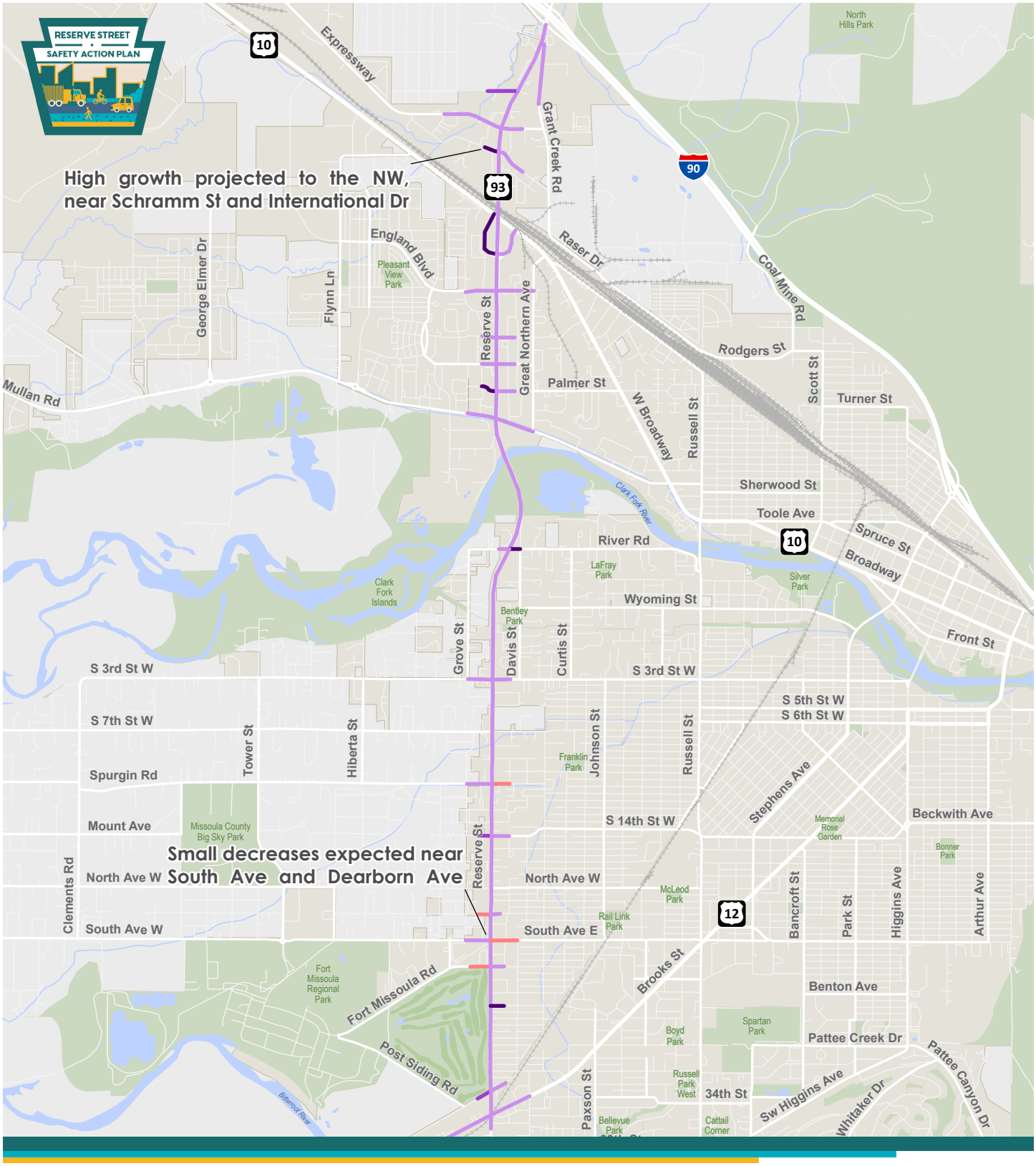
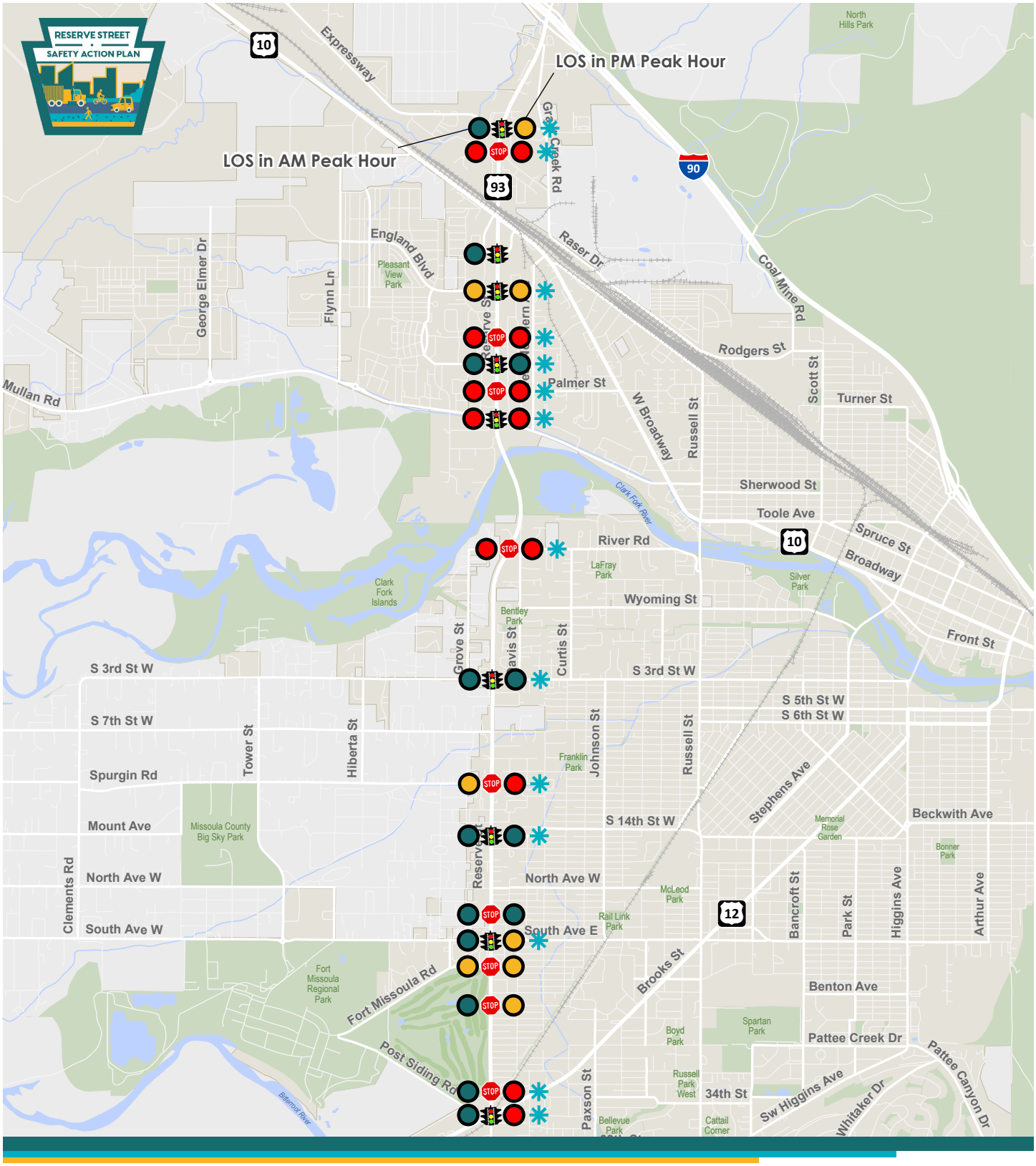


Figure 22

Projected Traffic Volume Growth by 2050

Data Sources: City of Missoula, Missoula County



Level of Service

- LOS A-D
- LOS E
- LOS F

At least one movement at LOS F or with v/c > 1.0 in either peak hour

Traffic Control

- Signal
- TWSC

0 0.5 1 Mile

Data Sources: City of Missoula, Missoula County

Figure 23

Future Intersection Level of Service

Table 9. Newly Deficient Movements at Intersections with LOS F or V/C > 1

Intersection	Traffic Control	Approach/Movement	Performance
AM Peak Hour			
Reserve St / International Dr-Stockyard Rd	Unsignalized	Eastbound Left-Through-Right	LOS F; v/c > 1.00
Reserve St / England Blvd	Signalized	Eastbound Left	LOS F; v/c > 0.90
		Southbound Through-Right	LOS F; v/c > 1.00
Reserve St / Mullan Rd	Signalized	Eastbound Through	LOS F; v/c > 1.00
Reserve St / River Rd	Unsignalized	Westbound Left-Through-Right	LOS F; v/c > 1.00
Reserve St / Mount Ave	Signalized	Eastbound Left	LOS F; v/c > 0.90
Reserve St / South Ave	Signalized	Northbound Right	LOS F; v/c > 0.90
PM Peak Hour			
Reserve St / Expressway Rd/Howard Raser Ave	Signalized	Westbound Left	LOS F; v/c > 1.00
		Northbound Through-Right	LOS F; v/c > 0.90
Reserve St / Union Pacific St	Signalized	Eastbound Left	LOS F; v/c = 0.88
		Westbound Left	LOS F; v/c > 1.00
		Westbound Through-Right	LOS F; v/c > 1.00
Reserve St / Mullan Rd	Signalized	Eastbound Left	LOS F; v/c = 0.88
		Eastbound Through	LOS F; v/c > 0.90
		Eastbound Right	LOS F; v/c > 1.00
Reserve St / S 3rd St	Signalized	Eastbound Left	LOS F; v/c > 0.90
		Westbound Through	LOS F; v/c > 0.90
Reserve St / South Ave	Signalized	Northbound Left	LOS F; v/c = 0.87
		Southbound Through	LOS F; v/c > 1.00
Reserve St / Old US 93	Unsignalized	Westbound Left-Through	LOS F; v/c = 0.05
Reserve St / Brooks St	Signalized	Westbound Through	LOS F; v/c > 1.0

Priority Items to Evaluate Further

Table 10 provides a draft list of 21 items, including individual locations and systemic issues, identified for further evaluation; items with a specific location are mapped in Figure 24. This draft list is based on findings from the existing conditions analysis, represented by a checkmark in the table for the following:

- Crash History: Checkmark indicates that this location is in the top 25% of EPDO scores, has three or more fatal or suspected serious injury crashes, or has 20 or more total crashes per year.
- Infrastructure Indicators: Checkmark indicates that this location has at least one of the infrastructure indicators.
- Community Input: *To be determined as feedback is still being gathered.*

These priorities will be the subject of further evaluation in the next stage of this project to identify potential treatments and strategies.

Table 10 Priority Items for Further Evaluation

Location/ Issue	Type	Crash History	Infrastructure Indicators	Community Input
I-90 Eastbound Ramps	Intersection (Signalized)		✓	
Michael Rd/Grant Creek Rd (S of I-90)	Intersection (Unsignalized)	✓		✓
Schramm St	Intersection (Unsignalized)		✓	✓
Expressway Rd	Intersection (Signalized)	✓	✓	✓
International Drive	Intersection (Unsignalized)	✓	✓	✓
Broadway Ramps	Intersection (Signalized)		✓	✓
England Boulevard	Intersection (Signalized)		✓	✓
American Way	Intersection (Unsignalized)	✓		
Union Pacific Street	Intersection (Signalized)	✓	✓	✓
Mullan Rd	Intersection (Signalized)	✓	✓	✓
River Road	Intersection (Unsignalized)	✓	✓	✓
S 3rd Street	Intersection (Signalized)	✓	✓	✓
Spurgin Road	Intersection (Unsignalized)	✓	✓	✓
Mount Ave	Intersection (Signalized)		✓	✓
South Avenue	Intersection (Signalized)	✓	✓	✓
Brooks Street	Intersection (Signalized)	✓	✓	✓
American Way to Mullan Road	Segment	✓		✓
Mullan Road to River Road	Segment	✓		✓
South 3rd Street to Ernest Ave	Segment		✓	✓
45 MPH Speed Limit	Corridor-Wide/ Systemic		✓	✓
High Driveway Density	Corridor-Wide/ Systemic		✓	✓
Limited Crossing Locations for Pedestrians and Bicyclists	Corridor-Wide/ Systemic		✓	✓

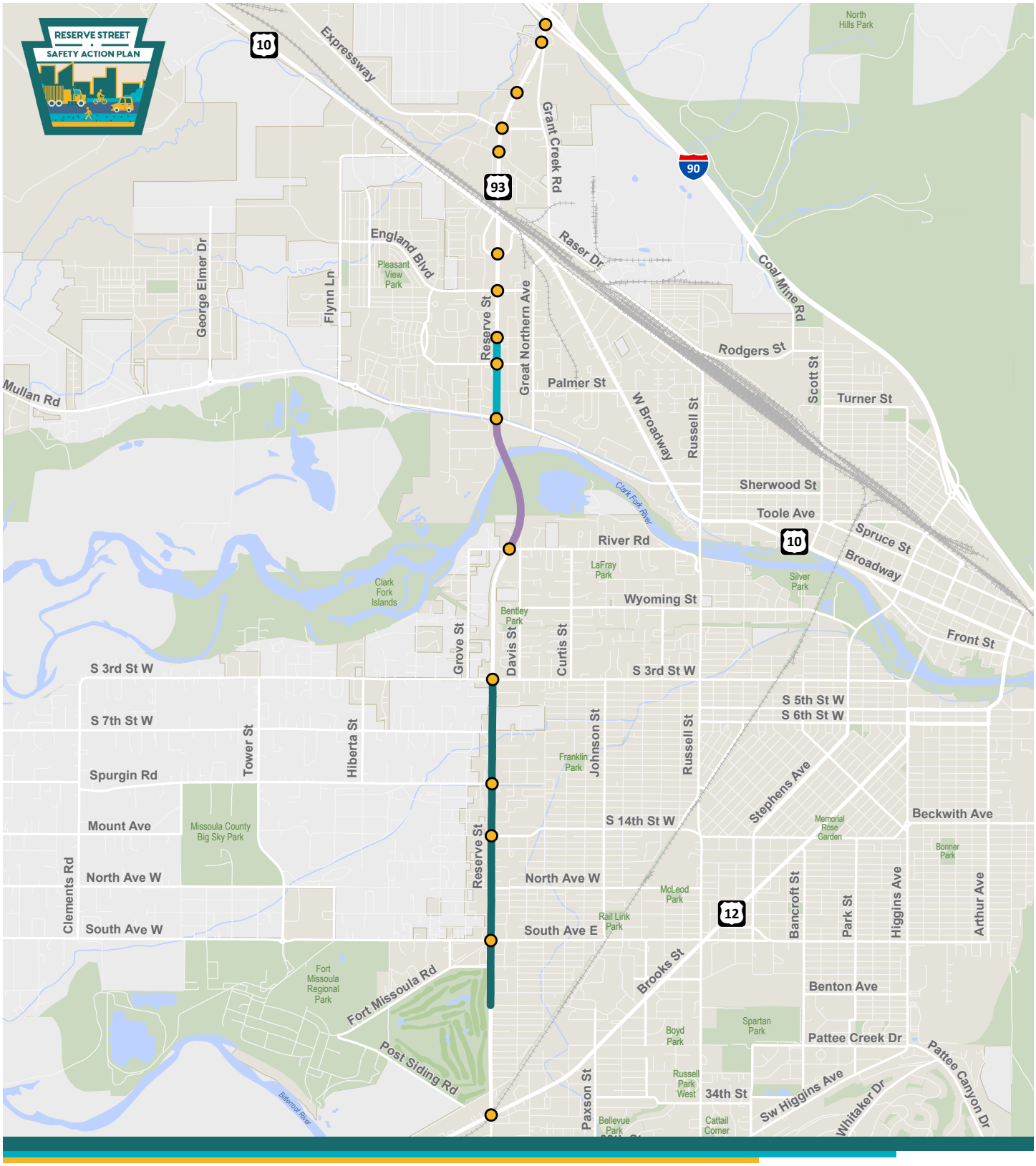


Figure 24

Priority Items to Evaluate Further

Data Sources: City of Missoula, Missoula County

Corridor Context and Vision

The findings of this memorandum were presented to the public and other community groups during Round #2 of Community Engagement in March 2025. These outreach efforts included a working session with the MPO, MDT, and City staff to discuss the existing and future contexts and vision for Reserve Street. This visioning session, public feedback received during Community Engagement Rounds #1 and #2 and in prior efforts, and information from the Missoula Land Use Plan, support a vision for the Reserve Street corridor with the following considerations:

- **Regional Connectivity:** Reserve Street is the predominate MDT route through Missoula. It connects the Bitterroot area to I-90 and the rest of Montana, as well as continuing north to Canada and south to Arizona. There is an existing and future need to maintain regional connectivity on this route. Alternate routes (e.g., Higgins Avenue and Brooks Street) have limited capacity to support this regional connectivity and new routes (e.g., a bypass) are not anticipated in the medium or even long terms.
- **Safety is the Highest Priority:** The MPO, MDT, and City recognize the existing safety challenges on Reserve Street and agree that improving safety should be the highest priority for the corridor.
- **Land-Use Vision:** The City's land-use vision for the area anticipates mixed-uses with a higher-density than existing conditions. The highest densities will likely be away from Reserve Street since many parts of the corridor are unlikely to redevelop for a while. This development is anticipated to increase demand for crossings of Reserve Street, by all modes of travel, and support more active modes of travel, in comparison to existing land-uses. These land-use changes are already evident and beginning to develop in certain locations along the corridor (e.g., west of Reserve Street north of Mullan Road). As land-use contexts change, Reserve Street will need to provide safe and accessible options for all modes of transportation to cross or travel along the corridor.
- **Solutions Should be Context Sensitive:** Treatments and strategies that are considered for certain parts of the Reserve Street corridor may not be applicable to the entire corridor. For example, the portion of Reserve Street north of the railroad is anticipated to serve a higher concentration of industrial and heavy commercial uses than other parts of the corridor.

Achieving a safer Reserve Street within the context of this vision will require a balance between maintaining regional connectivity and adapting to on-going and future changes in land-use to provide for local access and circulation. Solutions will need to consider the different users of Reserve Street, including regional commercial traffic, and their specific needs.

Summary & Next Steps

This memorandum highlights several key findings related to safety and travel patterns on the Reserve Street Corridor.

SAFETY FINDINGS

- Corridor-wide crash patterns:
    - Intersections account for most crashes, as well as fatal and serious injury crashes.
        - Crashes at unsignalized intersections are more likely to be severe than at signalized intersections. However, signalized intersections have higher traffic volumes, and more crashes occur at them.
    - Rear end and right-angle crashes are the most common crashes resulting in fatal and serious injuries.
    - Crashes are more likely to be severe for right-angle, head-on, left-turn, pedestrian-involved, and bicycle-involved crashes (i.e., they represent a higher percentage of fatal and suspected serious injury crashes compared to percentage of total crashes).
- Where fatal and serious injury crashes are occurring:
    - There were three or more fatal or serious injury crashes at the following intersections: Expressway Road, American Way, Mullan Road, River Road, S 3rd Street, Spurgin Road, and Brooks Street.
    - The segment of Reserve Street from Mullan Road to River Road (i.e., the Clark Fork river crossing) has the highest amount of non-intersection fatal or serious injury crashes.
    - Crashes are more heavily concentrated on the north half of the corridor.
    - The highest concentrations of crashes involving people walking or biking are at or in the vicinity of the Mullan Road and Brooks Street intersections.
- Other characteristics, or "infrastructure indicators," that are common to high severity crashes and are present:
    - At intersections: Permissive left-turn signal phasing, right-turn slip lanes, and skewed unsignalized intersections.
        - A time-of-day assessment of left-turning crashes at intersections is provided in Appendix F. A higher frequency of left-turning crashes occur in the afternoon peak hour, which coincides with the period of the heaviest congestion at intersections along Reserve Street.
    - Corridor-wide: 45 miles-per-hour (MPH) speed limit, accesses, lack of protected bicycle facilities, and limited pedestrian and bicycle crossings.

TRAVEL PATTERNS

- Reserve Street serves similar amounts of local trips (generally staying in the city of Missoula or vicinity) and regional or pass-through trips (trips traveling to/from outside the city of Missoula).
- Most movements along the corridor meet performance targets; however some movements experience heavy delay and/or at, or near, capacity during peak periods.

- Travel on Reserve Street is likely to increase as the Missoula region continues to grow.
    - As Reserve Street evolves toward more mixed-use environments, there will be an increased need to balance regional and local mobility with safe, equitable access for all users.

OTHER FINDINGS

- Insights from Areas of Persistent Poverty highlight that there are transportation disadvantaged populations on the Reserve Street corridor that should be considered when developing a vision for the corridor and identifying and prioritizing safety treatment strategies.

NEXT STEPS

The findings of this memo will be used to identify safety treatment strategies and evaluate candidate locations for those strategies. Strategies will be identified and prioritized based on the unique characteristics of the Reserve Street corridor (i.e., corridor-wide crash trends/infrastructure indicators and the locations shown in Figure 24), implementation considerations (i.e., costs, constructability, and trade-offs), and effectiveness of the strategies at reducing fatal and serious injury crashes. The effectiveness of the strategies will be evaluated through the lens of the Safe System Approach, as expressed through FHWA's *Safe System Roadway Design Hierarchy*, which provides four tiers of countermeasures (with Tier 1 typically being the most effective):

- **Tier 1- Remove Severe Conflicts**: Includes countermeasures that separate people and vehicles moving at different speeds or directions. Potential Tier 1 countermeasures on Reserve Street could include raised medians or protected bike lanes.
- **Tier 2- Reduce Vehicle Speeds**: Includes countermeasures that reduce vehicle speeds, thereby reducing the likelihood of a crash and the severity of a crash should one occur. Potential Tier 2 countermeasures on Reserve Street could include a reduced, corridor-wide speed limit with additional speed management strategies (e.g., enforcement, traffic signals coordinated to lower vehicle speeds).
- **Tier 3 – Manage Conflicts in Time:** Includes countermeasures that separate users in time using traffic control devices to reduce conflicts. Potential Tier 3 countermeasures on Reserve Street could include conversion of permitted left-turn phasing to protected at signalized intersections or the implementation of pedestrian hybrid beacons or signals at crossings.
- **Tier 4 – Increase Attentive and Awareness:** Includes countermeasures that alert people to potential conflicts. Potential Tier 4 countermeasures on Reserve Street could include improved lighting or dynamic feedback signs.

In addition to the identification and prioritization of potential strategies on Reserve Street, the project team will work with MDT, the MPO, and the City to define a future vision for Reserve Street. The draft strategies, draft vision for Reserve Street, and findings from this memorandum will be presented to the public through a multi-day public outreach effort in March. The feedback received at the outreach effort will be used to refine the vision for Reserve Street and the strategies.

Appendix

A. Crashes by Type and Severity
B. Existing Lane Configurations and Traffic Controls
C. Traffic Count Sheets
D. Existing Peak Hour Volumes, V/C Ratios, Delay, and LOS
E. Future Peak Hour Volumes, V/C Ratios, Delay, and LOS
F. Left-Turning Crashes Time of Day Summary

Appendix A
Crashes by Type and Severity

Table A.1 Crash by Type and Severity

Collision Type	Crash Severity						KA Crashes (% of Total KA)	Total Crashes (% of Total)
	K	A	B	C	U	PDO		
Bicycle	0	2	4	4	1	1	2 (3.0%)	12 (<1%)
Fixed Object	0	1	2	6	4	27	1 (1.5%)	40 (2.4%)
Head On	0	5	3	3	0	14	5 (7.6%)	25 (1.5%)
Left Turn	2	3	1	19	1	52	5 (7.6%)	78 (4.7%)
Lost Control	0	1	0	1	1	2	1 (1.5%)	5 (<1%)
Parked Vehicle	0	1	0	0	0	5	1 (1.5%)	6 (<1%)
Pedestrian	1	2	4	5	1	5	3 (4.5%)	18 (1%)
Rear-End	0	23	20	222	54	601	23 (34.9%)	920 (55.3%)
Right Angle	0	17	20	50	11	122	17 (25.8%)	220 (13.2%)
Right Turn	0	1	0	2	0	15	1 (1.5%)	18 (1.1%)
Roll Over	0	1	1	6	3	48	1 (1.5%)	59 (3.6%)
Sideswipe	0	5	5	9	23	175	5 (7.6%)	217 (13%)
All Other Crash Types	0	1	1	6	6	32	1 (1.5%)	46 (2.8%)
Grand Total	**3**	**63**	**61**	**333**	**105**	**1,099**	**66**	**1,664**

Table A.2 Crashes by Road Conditions and Severity

Road Conditions	Crash Severity						Total Crashes (% of Total)
	K	A	B	C	PDO	U	
Dry	2	51	52	243	818	82	1,248 (75%)
Ice/Frost	0	0	0	17	56	3	76 (4.6%)
Other	0	0	0	1	3	1	5 (<1%)
Snow	1	2	2	21	78	2	106 (6.4%)
Wet	0	10	7	51	1	3	222 (13.3%)
Unknown	0	0	0	0	141	13	4 (<1%)
Not Reported	2	0	0	0	2	1	3 (<1%)
Grand Total	**3**	**63**	**61**	**333**	**1,099**	**105**	**1664**

Table A.3 Crashes by Day of Week and Severity

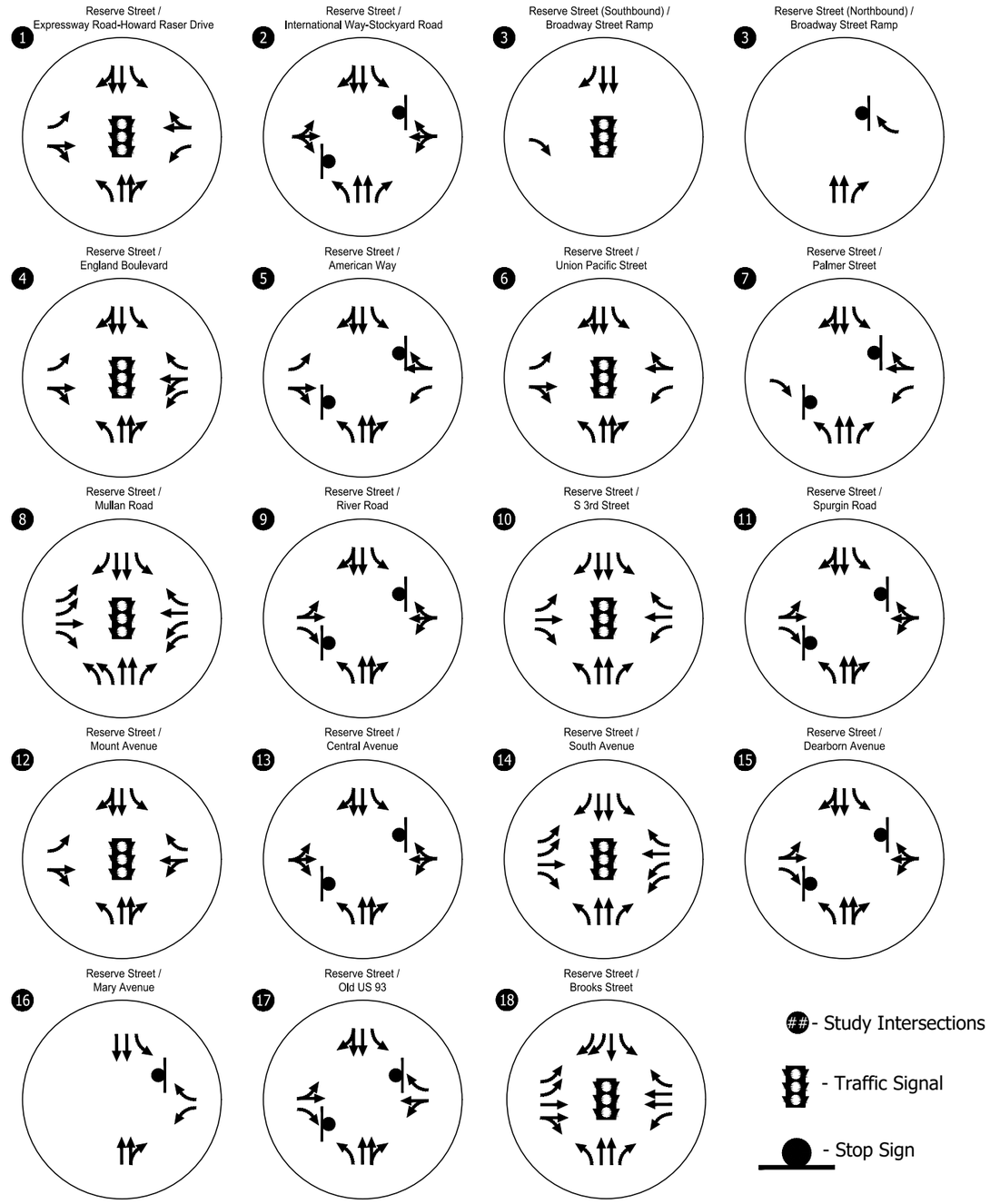
Road Conditions	Crash Severity						Total Crashes (% of Total)
	K	A	B	C	PDO	U	
Sunday	0	4	3	25	84	11	127 (7.6%)
Monday	1	9	11	57	161	17	256 (15.4%)
Tuesday	0	6	9	55	163	11	244 (14.7%)
Wednesday	1	9	11	54	175	18	268 (16.1%)
Thursday	0	12	6	56	188	11	273 (16.4%)
Friday	0	16	15	54	209	26	320 (19.2%)
Saturday	1	7	6	32	119	11	176 (10.6%)
Grand Total	**3**	**63**	**61**	**333**	**1,099**	**105**	**1,664**

Table A.4 Crashes by Time of Day and Severity

Road Conditions	Crash Severity						Total Crashes (% of Total)
	K	A	B	C	PDO	U	
12 AM	0	2	0	2	4	1	9 (<1%)
1 AM	0	0	0	0	3	1	4 (<1%)
2 AM	0	0	0	0	2	1	3 (<1%)
3 AM	0	0	0	1	1	0	2 (<1%)
4 AM	0	0	1	1	1	0	3 (<1%)
5 AM	0	0	0	1	6	2	9 (<1%)
6 AM	0	2	3	13	40	7	65 (3.9%)
7 AM	0	2	2	7	53	3	67 (4.0%)
8 AM	0	1	0	12	35	4	52 (3.1%)
9 AM	0	3	1	9	42	1	56 (3.4%)
10 AM	0	1	5	12	48	3	69 (4.2%)
11 AM	0	7	6	25	91	3	132 (7.9%)
12 PM	0	5	3	33	104	12	157 (9.4%)
1 PM	0	8	5	26	113	5	157 (9.4%)
2 PM	0	5	5	30	80	8	128 (7.7%)
3 PM	0	10	5	28	98	15	156 (9.4%)
4 PM	0	8	8	37	108	13	174 (10.5%)
5 PM	1	7	5	34	92	9	148 (8.9%)
6 PM	1	2	8	25	68	4	108 (6.5%)
7 PM	1	0	2	16	36	5	60 (3.6%)
8 PM	0	0	1	7	29	3	40 (2.4%)
9 PM	0	0	0	8	24	1	33 (2.0%)
10 PM	0	0	0	2	13	2	17 (1.0%)
11 PM	0	0	1	4	8	2	15 (<1%)
Grand Total	**3**	**63**	**61**	**333**	**1,099**	**105**	**1,664**

Appendix B
Existing Lane Configurations and Traffic Controls





Existing Lane Configurations & Traffic Control Devices
Missoula, Montana

Appendix B

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Appendix C
Traffic Count Sheets

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: S Reserve St (US-93) -- Spurgin Rd

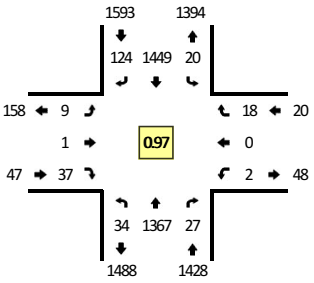
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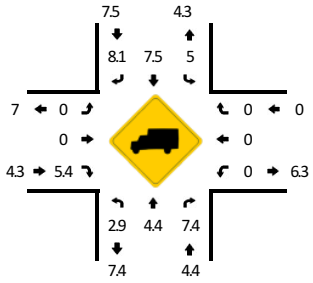
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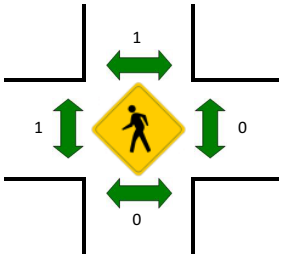
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Peak 15-Min: 7:45 AM -- 8:00 AM

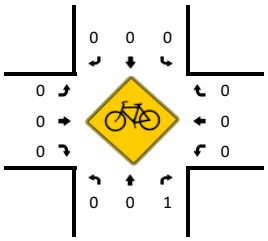


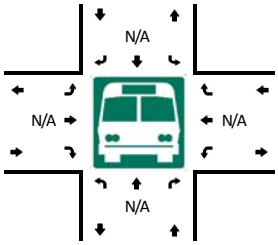


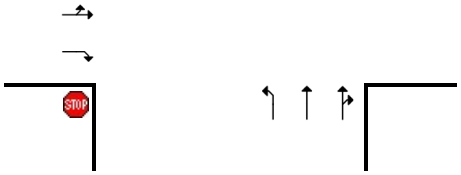


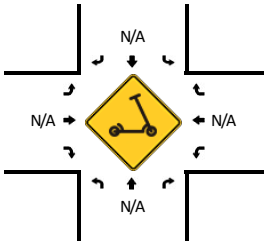












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Spurgin Rd (Eastbound)				Spurgin Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	7	291	1	0	2	211	10	0	1	0	5	0	1	1	5	0	535	
7:15 AM	4	310	2	0	6	282	18	0	2	1	6	0	0	1	2	0	634	
7:30 AM	5	349	3	0	3	347	20	0	3	1	8	0	1	0	4	0	744	
7:45 AM	10	366	10	0	6	363	27	0	1	0	9	0	0	0	7	0	799	2712
8:00 AM	13	324	6	0	8	364	37	0	3	0	9	0	0	0	3	0	767	2944
8:15 AM	6	328	8	0	3	375	40	0	2	0	11	0	1	0	4	0	778	3088
8:30 AM	8	314	5	0	4	345	21	0	4	0	15	0	0	0	3	0	719	3063
8:45 AM	11	335	5	0	5	329	17	0	4	1	15	0	0	0	6	0	728	2992

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	40	1464	40	0	24	1452	108	0	4	0	36	0	0	0	28	0	3196
Heavy Trucks	0	52	8		0	64	0		0	0	4		0	0	0		128
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

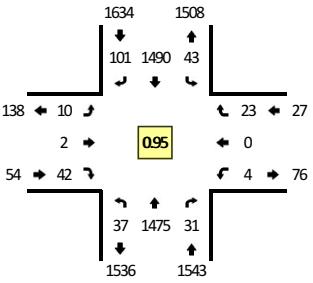
Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

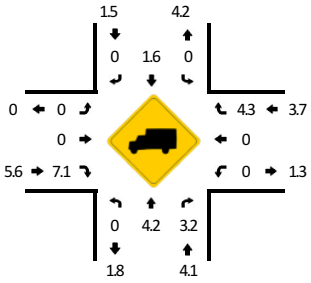
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

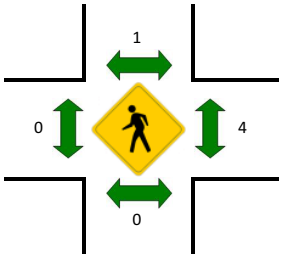
LOCATION: S Reserve St (US-93) -- Spurgin Rd | **QC JOB #:** 16794724
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

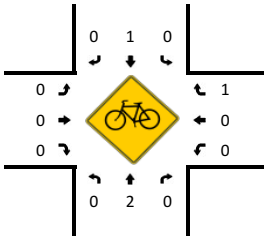


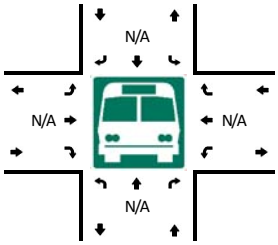


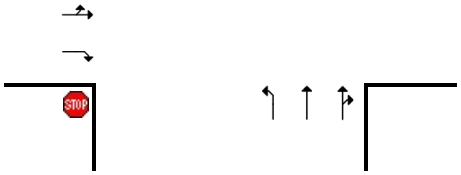


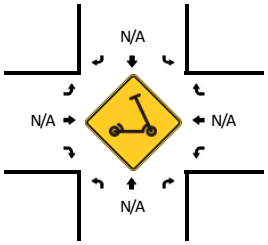












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Spurgin Rd (Eastbound)				Spurgin Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	13	361	11	0	6	381	17	0	5	0	19	0	1	0	6	0	820	
4:15 PM	11	386	8	0	11	382	23	0	1	0	10	0	0	0	4	0	836	
4:30 PM	7	368	6	0	7	322	28	0	0	0	14	0	0	0	3	0	755	
4:45 PM	8	333	5	0	14	352	29	0	3	1	13	0	0	0	7	0	765	3176
5:00 PM	13	398	11	0	7	365	25	0	2	0	11	0	1	0	7	0	840	3196
5:15 PM	9	367	7	0	11	413	29	0	3	1	7	0	2	0	4	0	853	3213
5:30 PM	7	377	8	0	11	360	18	0	2	0	11	0	1	0	5	0	800	3258
5:45 PM	13	351	2	0	5	339	13	0	2	0	9	0	0	0	3	0	737	3230

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	1468	28	0	44	1652	116	0	12	4	28	0	8	0	16	0	3412
Heavy Trucks	0	52	4		0	12	0		0	0	0		0	0	4		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	4	0		0	0	0		0	0	0		0	0	4		8
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

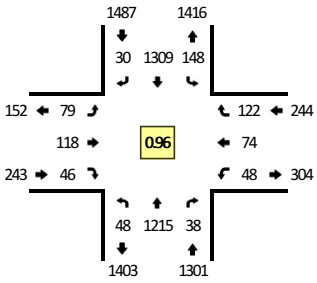
Type of peak hour being reported: Intersection Peak

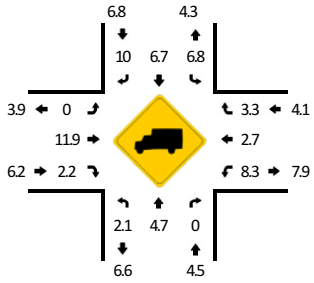
Method for determining peak hour: Total Entering Volume

LOCATION: S Reserve St (US-93) -- Mount Ave
CITY/STATE: Missoula, MT

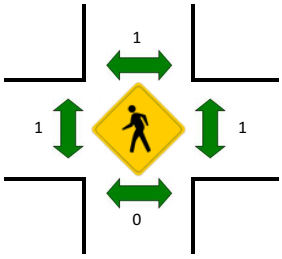
QC JOB #: 16794725
DATE: Tue, Oct 15 2024

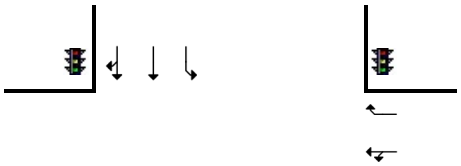
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

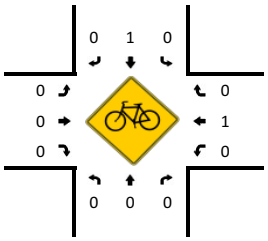


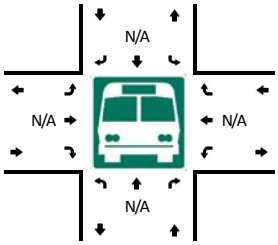


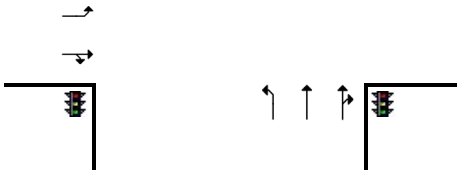
TRUE DATA TO IMPROVE MOBILITY

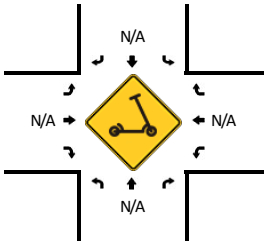












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Mount Ave (Eastbound)				Mount Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	4	295	8	0	20	183	1	0	8	3	0	0	4	5	13	0	544	
7:15 AM	9	277	8	0	35	250	0	0	13	9	5	0	19	4	19	0	648	
7:30 AM	14	290	10	0	28	303	2	0	29	37	5	0	23	7	22	0	770	
7:45 AM	24	326	16	0	40	313	6	0	20	23	10	0	13	23	39	0	853	2815
8:00 AM	12	298	8	0	33	332	7	0	23	40	22	0	11	19	26	0	831	3102
8:15 AM	4	291	6	0	47	325	11	0	19	29	5	0	17	23	29	0	806	3260
8:30 AM	8	300	8	0	28	339	6	0	17	26	9	0	7	9	28	0	785	3275
8:45 AM	5	300	16	0	38	285	9	0	18	10	2	0	9	7	31	0	730	3152

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	1304	64	0	160	1252	24	0	80	92	40	0	52	92	156	0	3412
Heavy Trucks	0	60	0		4	52	4		0	0	0		4	4	4		132
Buses																	
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

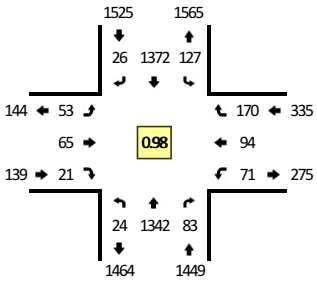
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

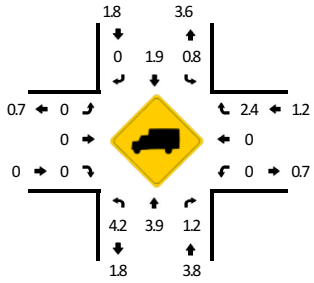
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: S Reserve St (US-93) -- Mount Ave
CITY/STATE: Missoula, MT

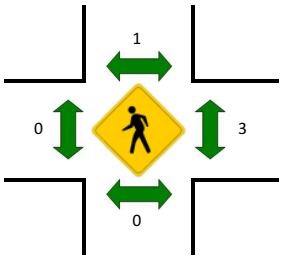
QC JOB #: 16794726
DATE: Tue, Oct 15 2024

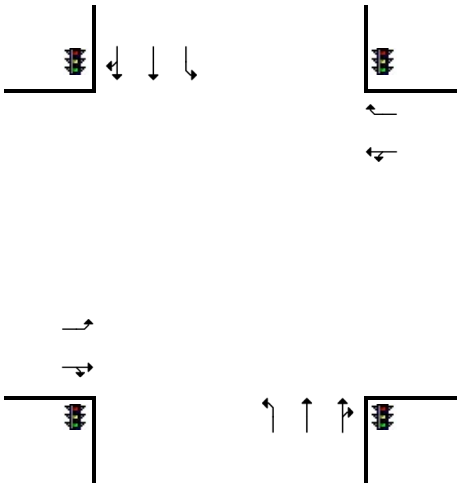
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

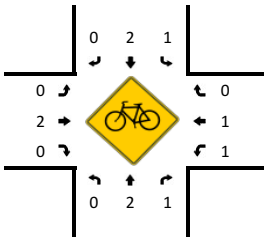


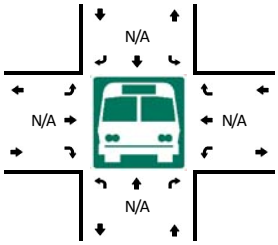


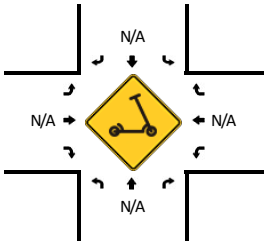
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Mount Ave (Eastbound)				Mount Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	311	21	0	47	355	8	0	22	36	5	0	8	20	44	0	880	
4:15 PM	5	349	15	0	33	363	5	0	21	16	8	0	14	19	42	0	890	
4:30 PM	10	335	17	0	40	312	3	0	13	26	5	0	6	27	43	0	837	
4:45 PM	11	289	14	0	33	339	6	0	10	18	9	0	12	17	35	0	793	3400
5:00 PM	6	356	23	0	29	329	5	0	20	28	6	0	16	24	41	0	883	3403
5:15 PM	6	310	19	0	34	359	11	0	15	18	6	0	18	32	54	0	882	3395
5:30 PM	5	360	24	0	28	343	7	0	11	12	6	0	15	21	36	0	868	3426
5:45 PM	7	316	17	0	36	341	3	0	7	7	3	0	22	17	39	0	815	3448

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	1424	92	0	116	1316	20	0	80	112	24	0	64	96	164	0	3532
Heavy Trucks	0	48	4		0	28	0		0	0	0		0	0	8		88
Buses																	
Pedestrians		0				4				0				12			16
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

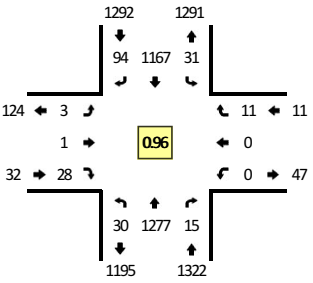
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

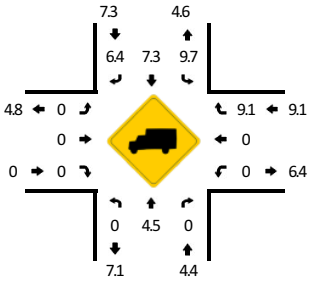
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

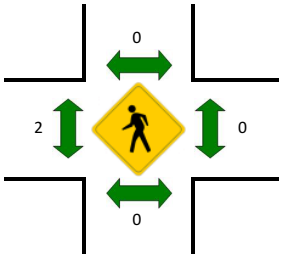
LOCATION: S Reserve St (US-93) -- W Central Ave | **QC JOB #:** 16794729
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

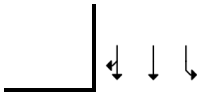
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

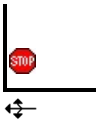
TRUE DATA TO IMPROVE MOBILITY

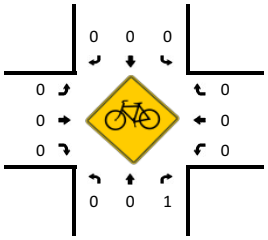


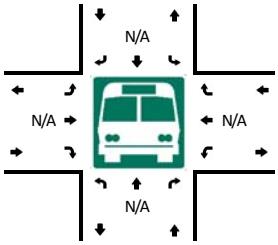


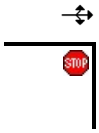


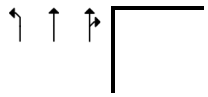


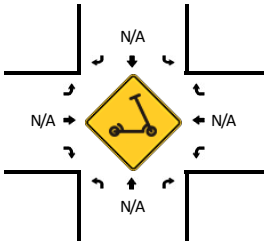












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				W Central Ave (Eastbound)				W Central Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	268	1	0	1	139	7	0	4	1	6	0	0	0	3	0	435	
7:15 AM	11	299	3	0	0	209	22	0	1	0	1	0	0	0	1	0	547	
7:30 AM	16	312	3	0	7	283	37	0	1	0	14	0	0	0	5	0	678	
7:45 AM	5	357	4	0	11	287	20	0	0	0	7	0	0	0	0	0	691	2351
8:00 AM	5	317	2	0	5	312	17	0	0	0	5	0	0	0	3	0	666	2582
8:15 AM	4	291	6	0	8	285	20	0	2	1	2	0	0	0	3	0	622	2657
8:30 AM	1	317	0	0	5	321	12	0	1	0	4	0	1	0	7	0	669	2648
8:45 AM	1	302	4	0	3	276	6	0	0	0	1	0	0	0	5	0	598	2555

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	1428	16	0	44	1148	80	0	0	0	28	0	0	0	0	0	2764
Heavy Trucks	0	56	0		0	48	4		0	0	0		0	0	0		108
Buses																	
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

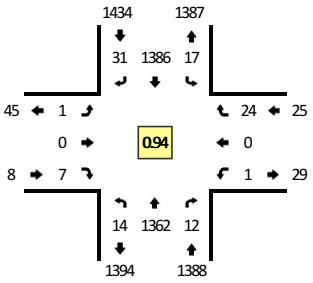
Type of peak hour being reported: Intersection Peak

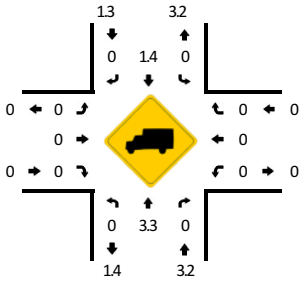
Method for determining peak hour: Total Entering Volume

LOCATION: S Reserve St (US-93) -- W Central Ave
CITY/STATE: Missoula, MT

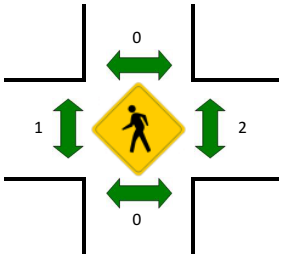
QC JOB #: 16794730
DATE: Tue, Oct 15 2024

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

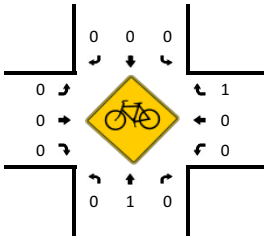


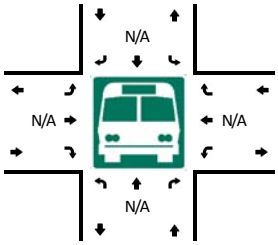


TRUE DATA TO IMPROVE MOBILITY

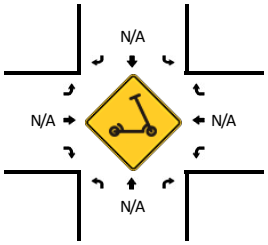












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				W Central Ave (Eastbound)				W Central Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	320	7	0	9	321	4	0	0	0	5	0	0	0	14	0	688	
4:15 PM	1	339	4	0	5	364	6	0	0	0	3	0	0	0	8	0	730	
4:30 PM	5	342	4	0	5	292	2	0	1	0	9	0	1	0	6	0	667	
4:45 PM	0	306	8	0	5	351	3	0	0	0	0	0	0	0	11	0	684	2769
5:00 PM	4	346	2	0	7	312	4	0	0	0	2	0	0	0	11	0	688	2769
5:15 PM	1	330	2	0	4	368	5	0	0	0	2	0	0	0	6	0	718	2757
5:30 PM	4	355	5	0	3	376	9	0	0	0	1	0	0	0	4	0	757	2847
5:45 PM	5	331	3	0	3	330	13	0	1	0	2	0	1	0	3	0	692	2855

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	1420	20	0	12	1504	36	0	0	0	4	0	0	0	16	0	3028
Heavy Trucks	0	28	0		0	28	0		0	0	0		0	0	0		56
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

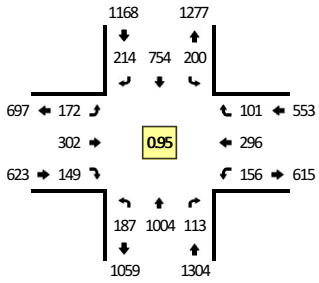
Type of peak hour being reported: Intersection Peak

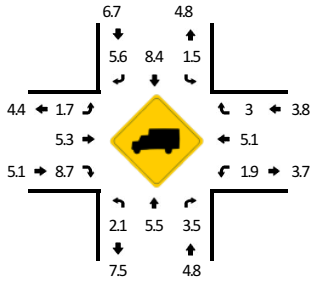
Method for determining peak hour: Total Entering Volume

LOCATION: S Reserve St (US-93) -- South Ave W
CITY/STATE: Missoula, MT

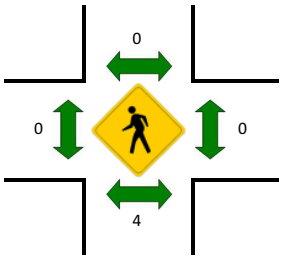
QC JOB #: 16794731
DATE: Tue, Oct 15 2024

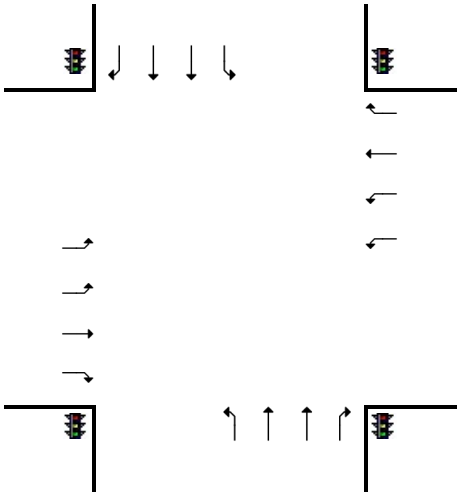
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

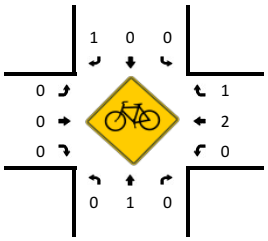


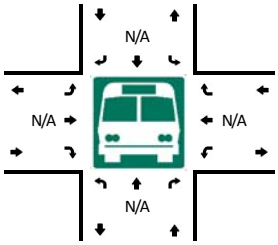


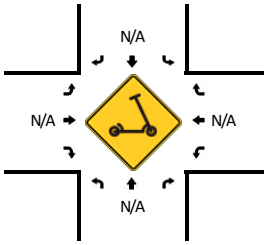
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				South Ave W (Eastbound)				South Ave W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	30	232	13	0	18	116	33	0	20	25	15	0	20	29	18	0	569	
7:15 AM	43	240	14	0	29	138	38	0	36	39	22	0	28	40	18	0	685	
7:30 AM	51	256	22	0	41	175	53	0	37	69	34	0	32	63	28	0	861	
7:45 AM	47	278	31	0	52	186	49	0	50	80	38	0	37	81	26	0	955	3070
8:00 AM	45	244	32	0	50	188	59	0	45	78	40	0	45	71	30	0	927	3428
8:15 AM	55	234	25	0	47	174	45	0	38	73	37	0	31	81	22	0	862	3605
8:30 AM	40	248	25	0	51	206	61	0	39	71	34	0	43	63	23	0	904	3648
8:45 AM	32	228	27	0	51	161	56	0	37	56	27	0	49	48	30	0	802	3495

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	188	1112	124	0	208	744	196	0	200	320	152	0	148	324	104	0	3820
Heavy Trucks	4	48	8		0	44	4		0	20	12		0	4	0		144
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	4		0	0	0		0	4	4		12
Scooters																	

Comments:

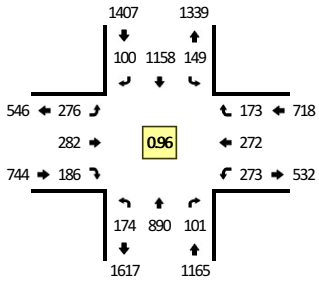
Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

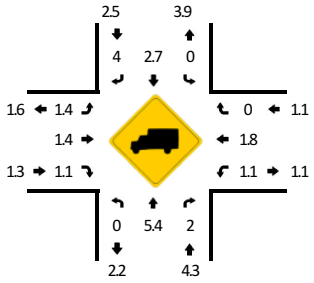
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

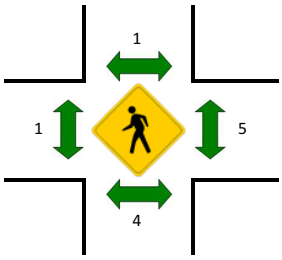
LOCATION: S Reserve St (US-93) -- South Ave W | **QC JOB #:** 16794732
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

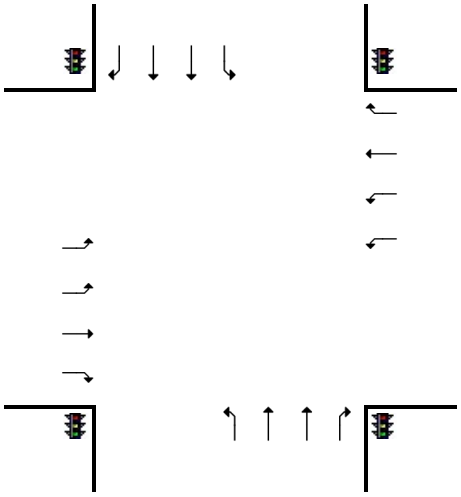
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

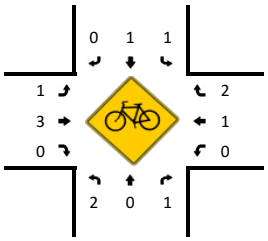


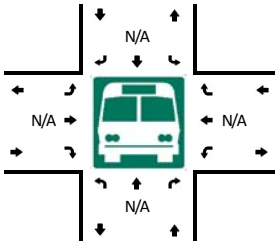


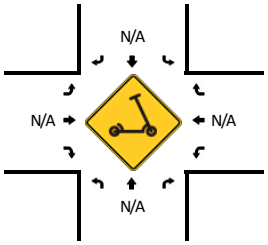












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				South Ave W (Eastbound)				South Ave W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	39	210	36	0	29	269	24	0	76	81	64	0	61	69	45	0	1003	
4:15 PM	51	217	22	0	57	265	24	0	90	66	59	0	60	74	36	0	1021	
4:30 PM	49	208	26	0	27	254	20	0	80	80	53	0	74	82	48	0	1001	
4:45 PM	45	196	24	0	28	300	23	0	68	74	39	0	74	67	37	0	975	4000
5:00 PM	50	224	19	0	33	261	20	0	74	79	50	0	76	62	51	0	999	3996
5:15 PM	41	239	30	0	42	291	29	0	61	65	53	0	53	70	36	0	1010	3985
5:30 PM	38	231	28	0	46	306	28	0	73	64	44	0	70	73	49	0	1050	4034
5:45 PM	47	229	20	0	33	268	41	0	58	58	37	0	37	71	38	0	937	3996

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	152	924	112	0	184	1224	112	0	292	256	176	0	280	292	196	0	4200
Heavy Trucks	0	36	0		0	28	4		0	0	0		0	4	0		72
Buses																	
Pedestrians		8				0				4				0			12
Bicycles	0	0	4		0	0	0		0	8	0		0	0	0		12
Scooters																	

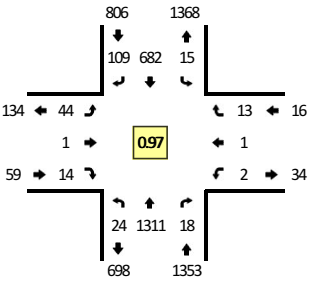
Comments:

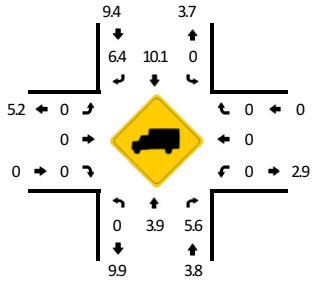
Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

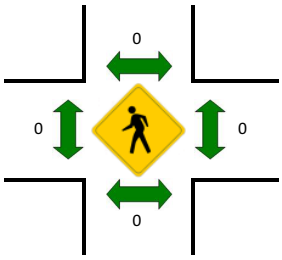
LOCATION: S Reserve St (US-93) -- Old US Hwy 93 | **QC JOB #:** 16794733
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

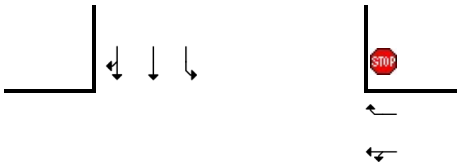
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

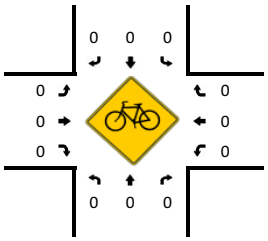


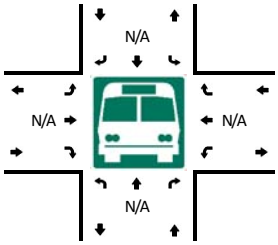


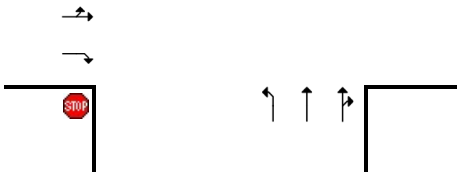
TRUE DATA TO IMPROVE MOBILITY

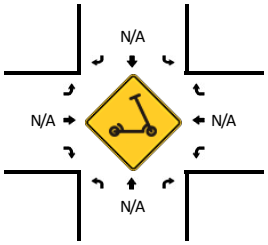












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Old US Hwy 93 (Eastbound)				Old US Hwy 93 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	4	285	1	0	2	106	15	0	7	0	2	0	2	0	0	0	424	
7:15 AM	4	312	7	0	5	141	18	0	10	1	0	0	0	0	4	0	502	
7:30 AM	4	359	6	0	2	161	32	0	6	0	1	0	1	0	3	0	575	
7:45 AM	7	331	4	0	7	157	26	0	19	1	2	0	0	1	4	0	559	2060
8:00 AM	7	321	5	0	2	196	24	0	11	0	6	0	1	0	2	0	575	2211
8:15 AM	6	300	3	0	4	168	27	0	8	0	5	0	0	0	4	0	525	2234
8:30 AM	9	290	9	0	5	182	32	0	3	0	7	0	1	0	3	0	541	2200
8:45 AM	4	271	6	0	3	161	24	0	11	0	4	0	2	1	6	0	493	2134

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	1436	24	0	8	644	128	0	24	0	4	0	4	0	12	0	2300
Heavy Trucks	0	56	4		0	56	20		0	0	0		0	0	0		136
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

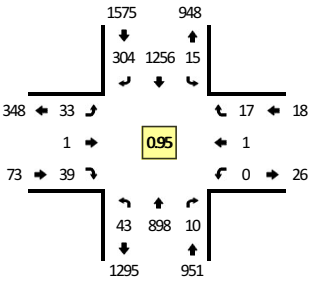
Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

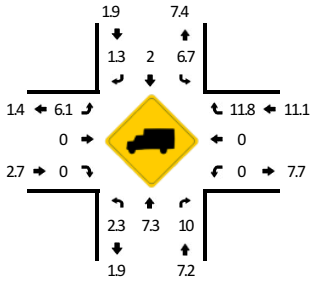
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

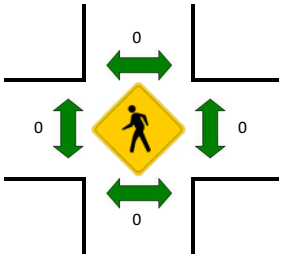
LOCATION: S Reserve St (US-93) -- Old US Hwy 93 | **QC JOB #:** 16794734
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

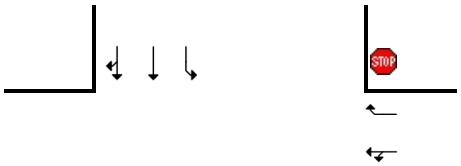
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

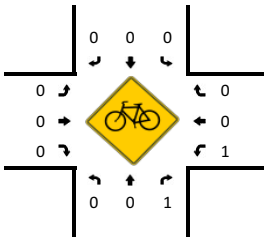


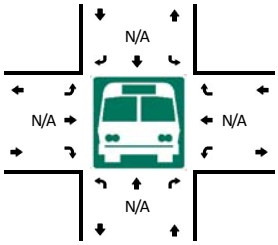


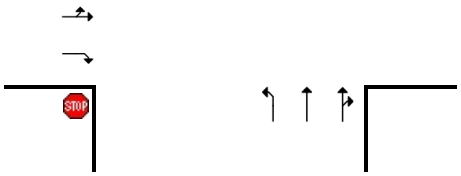


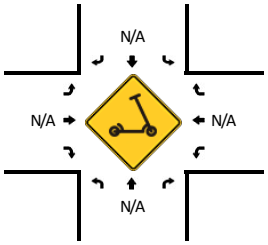












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Old US Hwy 93 (Eastbound)				Old US Hwy 93 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	16	227	3	0	4	304	76	0	7	0	14	0	0	0	5	0	656	
4:15 PM	10	257	2	0	4	327	66	0	7	1	12	0	0	0	4	0	690	
4:30 PM	6	215	3	0	3	302	87	0	6	0	7	0	0	1	5	0	635	
4:45 PM	11	199	2	0	4	323	75	0	13	0	6	0	0	0	3	0	636	2617
5:00 PM	10	215	2	0	0	328	58	0	7	1	13	0	0	0	2	0	636	2597
5:15 PM	6	223	4	0	1	312	78	0	12	1	10	0	0	2	4	0	653	2560
5:30 PM	10	214	1	0	2	334	62	0	8	0	7	0	1	1	1	0	641	2566
5:45 PM	13	247	1	0	2	313	42	0	9	0	10	0	1	0	4	0	642	2572

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	40	1028	8	0	16	1308	264	0	28	4	48	0	0	0	16	0	2760
Heavy Trucks	0	68	0		0	28	4		0	0	0		0	0	0		100
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

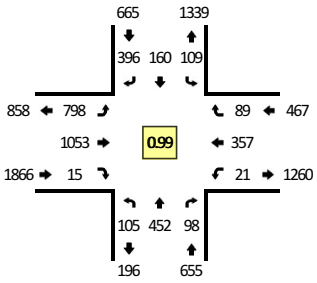
Type of peak hour being reported: Intersection Peak

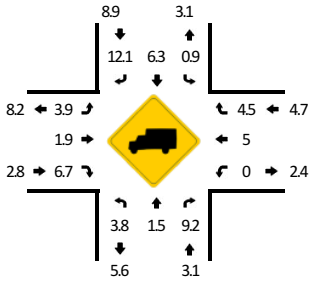
Method for determining peak hour: Total Entering Volume

LOCATION: S Reserve St (US-93) -- Brooks St
CITY/STATE: Missoula, MT

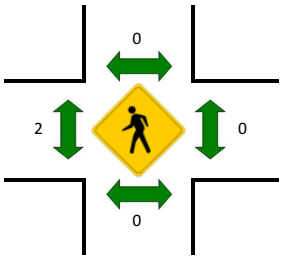
QC JOB #: 16794735
DATE: Tue, Oct 15 2024

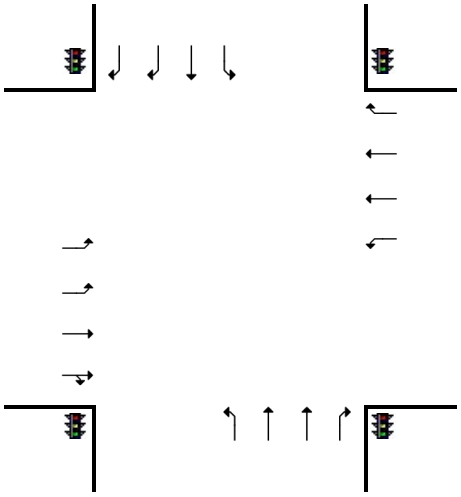
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

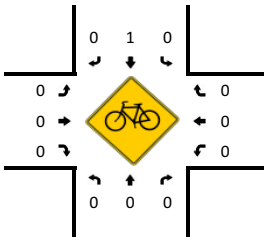


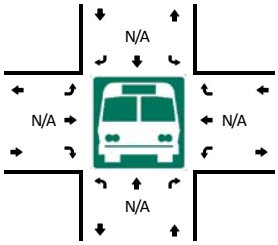


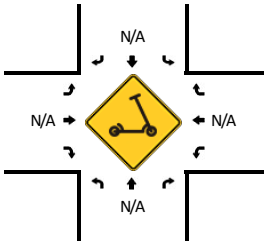
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Brooks St (Eastbound)				Brooks St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	11	69	11	0	9	16	73	0	200	165	1	0	3	56	21	0	635	
7:15 AM	18	105	11	0	12	44	76	0	190	217	0	0	5	55	25	0	758	
7:30 AM	27	132	24	0	18	40	96	0	210	274	2	0	2	74	25	0	924	
7:45 AM	34	122	26	0	25	41	88	0	195	267	2	0	7	92	20	0	919	3236
8:00 AM	21	105	24	0	34	38	105	0	199	235	2	0	3	105	25	0	896	3497
8:15 AM	23	93	24	0	32	41	107	0	194	277	9	0	9	86	19	0	914	3653
8:30 AM	24	81	14	0	42	48	92	0	178	219	1	0	6	85	35	0	825	3554
8:45 AM	23	94	22	0	18	51	105	0	153	219	2	0	7	81	25	0	800	3435

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	108	528	96	0	72	160	384	0	840	1096	8	0	8	296	100	0	3696
Heavy Trucks	12	16	0		0	12	56		24	4	0		0	24	12		160
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

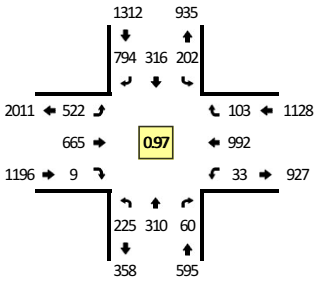
Type of peak hour being reported: Intersection Peak

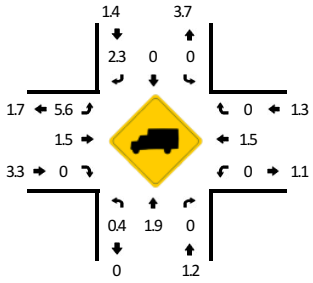
Method for determining peak hour: Total Entering Volume

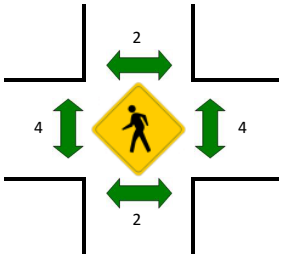
LOCATION: S Reserve St (US-93) -- Brooks St
CITY/STATE: Missoula, MT

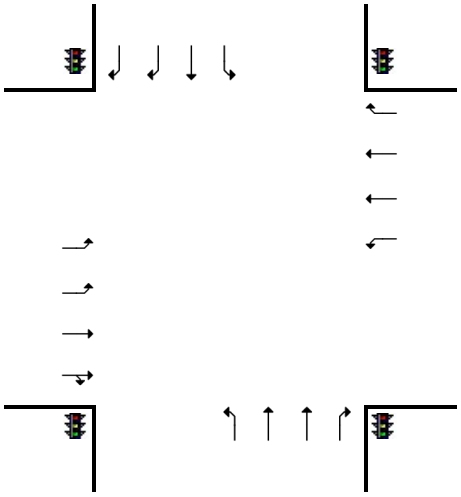
QC JOB #: 16794736
DATE: Tue, Oct 15 2024

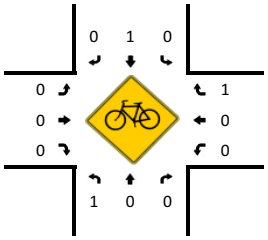
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

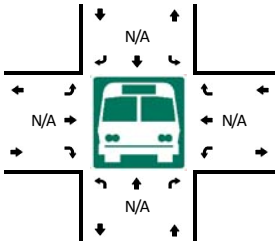


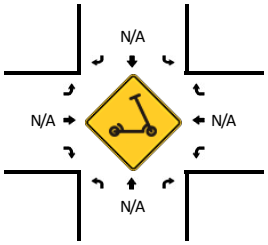












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Brooks St (Eastbound)				Brooks St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	44	77	19	0	57	84	181	0	122	144	4	0	12	250	36	0	1030	
4:15 PM	52	101	7	0	50	80	192	0	133	120	3	0	8	254	29	0	1029	
4:30 PM	59	71	11	0	43	74	196	0	118	137	4	0	7	274	32	0	1026	
4:45 PM	53	68	8	0	47	73	205	0	122	144	5	0	7	259	18	0	1009	4094
5:00 PM	55	69	12	0	60	76	196	0	121	139	3	0	7	266	32	0	1036	4100
5:15 PM	58	77	16	0	50	80	197	0	143	195	2	0	8	256	13	0	1095	4166
5:30 PM	56	72	17	0	44	80	205	0	132	173	1	0	10	252	18	0	1060	4200
5:45 PM	56	92	15	0	48	80	196	0	126	158	3	0	8	218	40	0	1040	4231

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	232	308	64	0	200	320	788	0	572	780	8	0	32	1024	52	0	4380
Heavy Trucks	0	0	0		0	0	16		28	20	0		0	24	0		88
Buses																	
Pedestrians		0				8				16				4			28
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

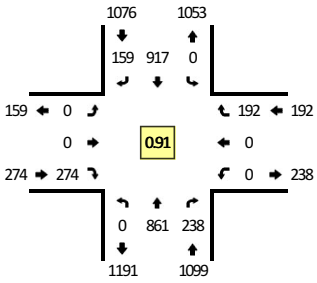
Report generated on 10/25/2024 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

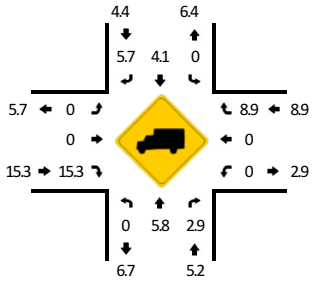
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

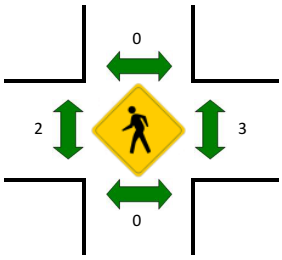
LOCATION: N Reserve St (US-93) -- Broadway Ramps | **QC JOB #:** 16794737
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

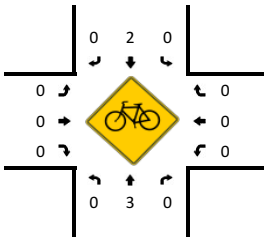


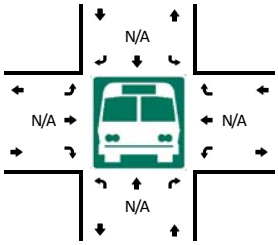




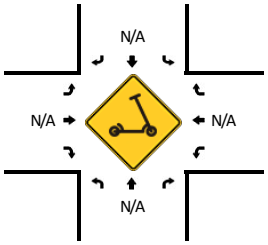












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Broadway Ramps (Eastbound)				Broadway Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	149	53	0	0	133	32	0	0	0	38	0	0	0	18	0	423	
7:15 AM	0	182	62	0	0	179	29	0	0	0	66	0	0	0	25	0	543	
7:30 AM	0	212	71	0	0	190	39	0	0	0	53	0	0	0	30	0	595	
7:45 AM	0	232	66	0	0	249	48	0	0	0	69	0	0	0	65	0	729	2290
8:00 AM	0	201	44	0	0	258	34	0	0	0	82	0	0	0	43	0	662	2529
8:15 AM	0	216	57	0	0	220	38	0	0	0	70	0	0	0	54	0	655	2641
8:30 AM	0	199	38	0	0	189	39	0	0	0	80	0	0	0	47	0	592	2638
8:45 AM	0	184	59	0	0	179	40	0	0	0	68	0	0	0	52	0	582	2491

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	928	264	0	0	996	192	0	0	0	276	0	0	0	260	0	2916
Heavy Trucks	0	36	0		0	28	12		0	0	36		0	0	20		132
Buses																	
Pedestrians		0				0				4				0			4
Bicycles	0	4	0		0	4	0		0	0	0		0	0	0		8
Scooters																	

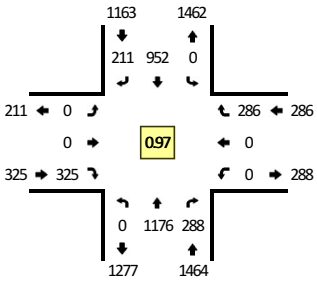
Comments: Northbound is not signalized and westbound is stop controlled.

Report generated on 10/25/2024 10:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

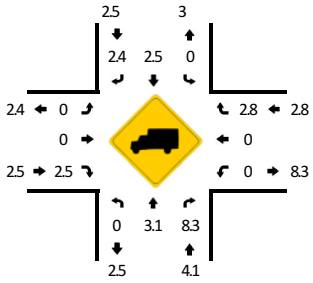
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

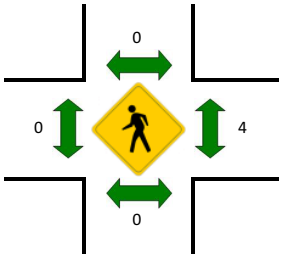
LOCATION: N Reserve St (US-93) -- Broadway Ramps | **QC JOB #:** 16794738
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

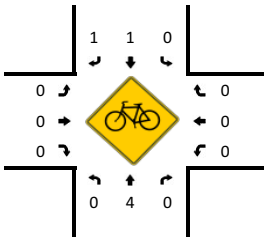


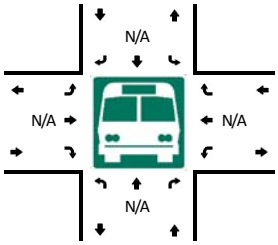




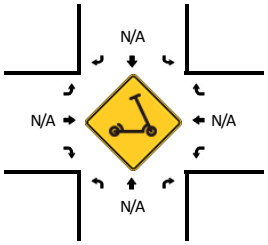












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Broadway Ramps (Eastbound)				Broadway Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	287	83	0	0	270	39	0	0	0	71	0	0	0	59	0	809	
4:15 PM	0	303	58	0	0	265	54	0	0	0	78	0	0	0	47	0	805	
4:30 PM	0	260	94	0	0	254	48	0	0	0	68	0	0	0	60	0	784	
4:45 PM	0	307	65	0	0	226	49	0	0	0	76	0	0	0	72	0	795	3193
5:00 PM	0	296	63	0	0	219	63	0	0	0	105	0	0	0	86	0	832	3216
5:15 PM	0	313	66	0	0	253	51	0	0	0	76	0	0	0	68	0	827	3238
5:30 PM	0	291	75	0	0	218	40	0	0	0	84	0	0	0	53	0	761	3215
5:45 PM	0	254	65	0	0	213	47	0	0	0	76	0	0	0	55	0	710	3130

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1184	252	0	0	876	252	0	0	0	420	0	0	0	344	0	3328
Heavy Trucks	0	36	32		0	16	4		0	0	16		0	0	8		112
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	8	0		0	4	4		0	0	0		0	0	0		16
Scooters																	

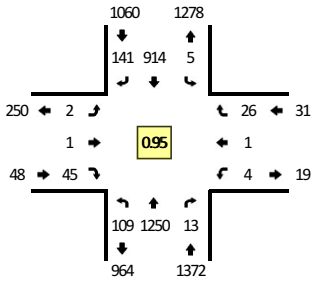
Comments: Northbound is not signalized and westbound is stop controlled.

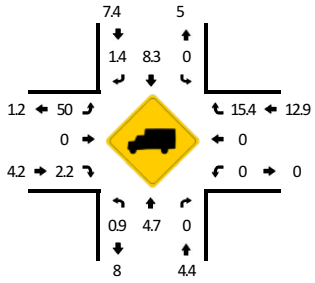
Report generated on 10/25/2024 10:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

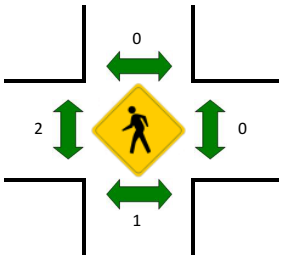
LOCATION: S Reserve St (US-93) -- Dearborn Ave | **QC JOB #:** 16794739
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

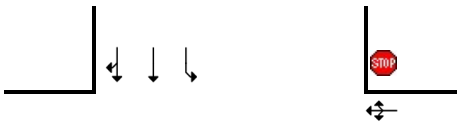
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:00 AM -- 8:15 AM

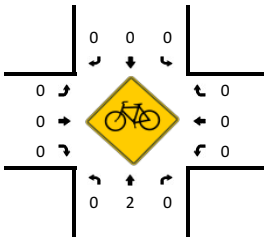


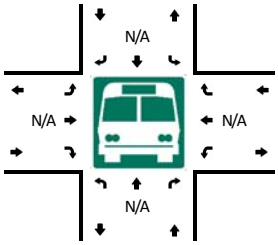


TRUE DATA TO IMPROVE MOBILITY

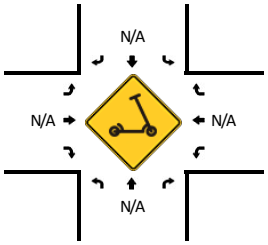












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Dearborn Ave (Eastbound)				Dearborn Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	7	290	1	0	1	124	17	0	0	1	1	0	0	0	1	0	443	
7:15 AM	15	301	2	0	3	168	21	0	0	0	6	0	0	0	2	0	518	
7:30 AM	17	340	3	0	4	205	29	0	1	0	8	0	0	0	6	0	613	
7:45 AM	31	329	4	0	0	209	42	0	0	0	8	0	0	0	9	0	632	2206
8:00 AM	28	329	5	1	4	237	36	0	0	1	13	0	1	0	6	0	661	2424
8:15 AM	31	293	2	0	1	214	30	0	1	0	16	0	2	0	6	0	596	2502
8:30 AM	18	299	2	0	0	254	33	0	1	0	8	0	1	1	5	0	622	2511
8:45 AM	22	272	8	0	2	200	37	0	1	1	11	0	1	0	3	0	558	2437

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	112	1316	20	4	16	948	144	0	0	4	52	0	4	0	24	0	2644
Heavy Trucks	0	56	0		0	72	8		0	0	4		0	0	4		144
Buses																	
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

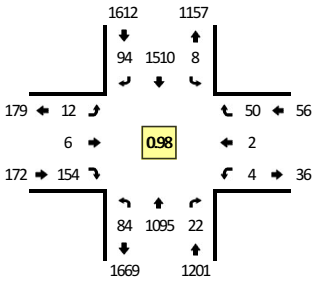
Comments:

Report generated on 10/25/2024 10:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

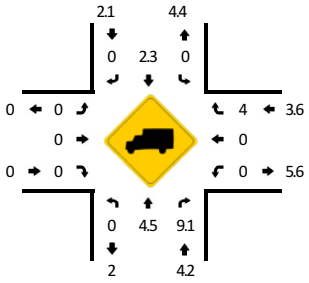
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

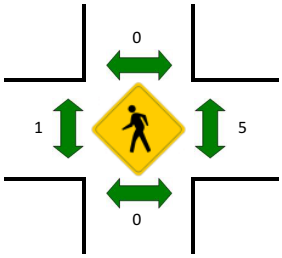
LOCATION: S Reserve St (US-93) -- Dearborn Ave | **QC JOB #:** 16794740
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

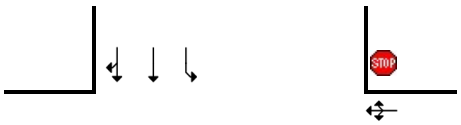
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

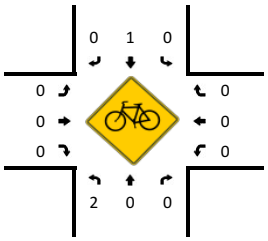


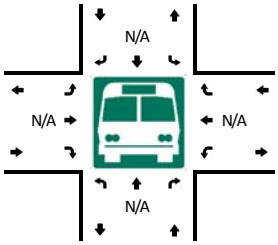




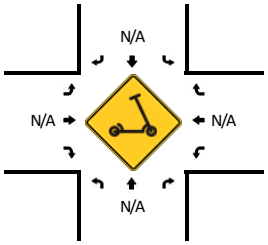












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Dearborn Ave (Eastbound)				Dearborn Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	15	260	11	0	3	361	24	0	4	2	69	0	2	0	22	0	773	
4:15 PM	19	276	2	0	3	355	27	0	7	2	41	0	1	0	6	0	739	
4:30 PM	19	265	10	0	3	355	29	0	3	1	45	0	2	0	10	0	742	
4:45 PM	14	252	6	0	1	382	24	0	2	1	45	0	2	1	10	0	740	2994
5:00 PM	24	282	7	0	0	367	23	0	1	0	42	0	0	0	10	0	756	2977
5:15 PM	24	301	6	1	3	369	20	0	7	1	32	0	1	0	13	0	778	3016
5:30 PM	21	260	3	0	4	392	27	0	2	4	35	0	1	1	17	0	767	3041
5:45 PM	11	275	5	0	3	322	19	0	6	0	30	0	0	1	6	0	678	2979

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	1204	24	4	12	1476	80	0	28	4	128	0	4	0	52	0	3112
Heavy Trucks	0	44	0		0	20	0		0	0	0		0	0	4		68
Buses																	
Pedestrians		0				0				4				8			12
Bicycles	4	0	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

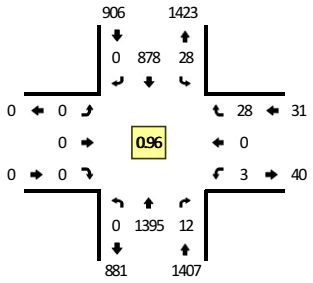
Comments:

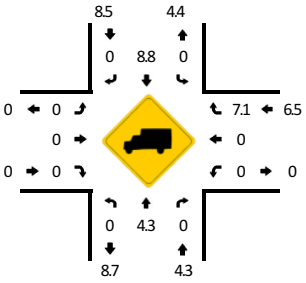
Report generated on 10/25/2024 10:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

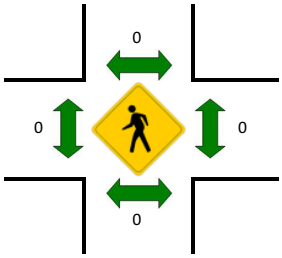
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

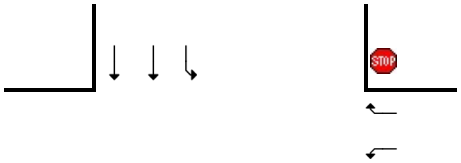
LOCATION: S Reserve St (US-93) -- Mary Ave | **QC JOB #:** 16794741
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

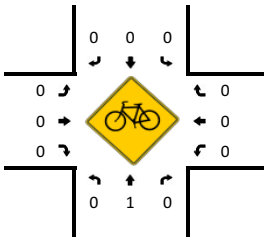
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 8:00 AM -- 8:15 AM

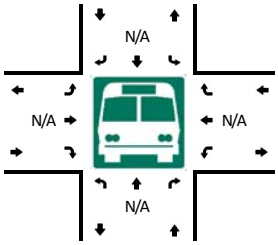




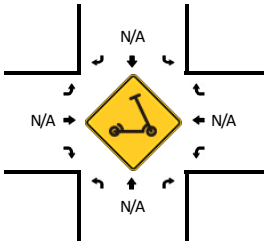












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Mary Ave (Eastbound)				Mary Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	304	0	0	5	121	0	0	0	0	0	0	2	0	5	0	437	
7:15 AM	0	307	1	0	8	161	0	0	0	0	0	0	3	0	2	0	482	
7:30 AM	0	373	2	0	2	215	0	0	0	0	0	0	0	0	7	0	599	
7:45 AM	0	356	5	0	10	203	0	0	0	0	0	0	1	0	3	0	578	2096
8:00 AM	0	349	3	0	9	242	0	0	0	0	0	0	1	0	6	0	610	2269
8:15 AM	0	317	2	0	7	218	0	0	0	0	0	0	1	0	12	0	557	2344
8:30 AM	0	313	3	0	10	245	0	0	0	0	0	0	1	0	12	0	584	2329
8:45 AM	0	297	2	0	15	194	0	0	0	0	0	0	1	0	7	0	516	2267

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1396	12	0	36	968	0	0	0	0	0	0	4	0	24	0	2440
Heavy Trucks	0	44	0		0	84	0		0	0	0		0	0	4		132
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

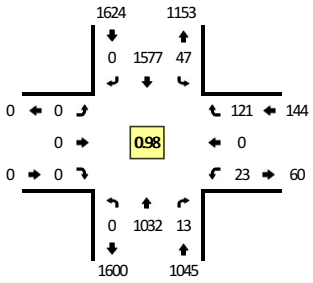
Comments:

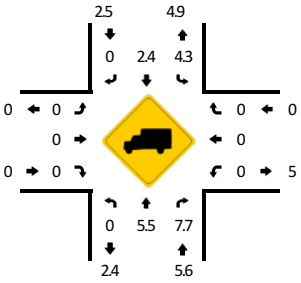
Report generated on 10/25/2024 10:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

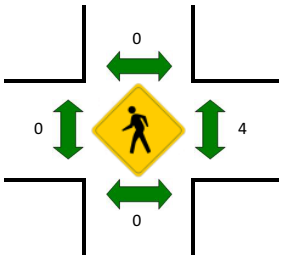
LOCATION: S Reserve St (US-93) -- Mary Ave | **QC JOB #:** 16794742
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

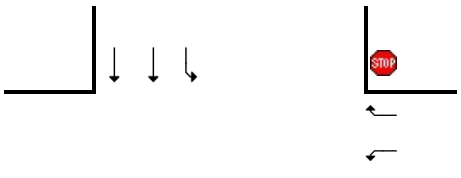
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

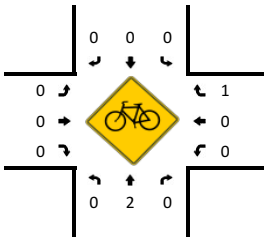


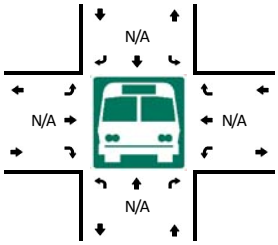


TRUE DATA TO IMPROVE MOBILITY

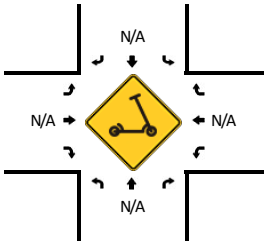












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				Mary Ave (Eastbound)				Mary Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	258	4	0	24	403	0	1	0	0	0	0	1	0	24	0	715	
4:15 PM	0	278	2	0	8	387	0	1	0	0	0	0	3	0	18	0	697	
4:30 PM	0	254	4	0	12	393	0	0	0	0	0	0	6	0	22	0	691	
4:45 PM	0	238	5	0	16	403	0	0	0	0	0	0	6	0	25	0	693	2796
5:00 PM	0	263	3	0	11	394	0	0	0	0	0	0	5	0	39	0	715	2796
5:15 PM	0	277	1	0	8	387	0	0	0	0	0	0	6	0	35	0	714	2813
5:30 PM	0	245	3	0	12	411	0	0	0	0	0	0	5	0	13	0	689	2811
5:45 PM	0	274	6	0	18	335	0	0	0	0	0	0	2	0	19	0	654	2772

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1052	12	0	44	1576	0	0	0	0	0	0	20	0	156	0	2860
Heavy Trucks	0	44	0		0	36	0		0	0	0		0	0	0		80
Buses																	
Pedestrians		0				0				0				8			8
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 10/25/2024 10:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Adjustment Factors By Day and Month for 1/1/2023 - 12/31/2023

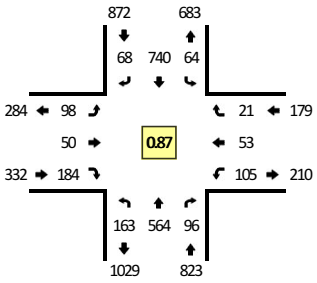
Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
UPA	**Jan**	1.709	1.14	1.022	0.99	0.98	0.979	1.34
	Feb	1.563	1.048	1.03	1.036	0.997	0.945	1.204
	Mar	1.547	1.03	0.977	0.97	0.962	0.944	1.197
	Apr	1.391	0.964	0.925	0.918	0.901	0.867	1.106
	May	1.298	0.912	0.878	0.87	0.863	0.835	1.083
	Jun	1.247	0.903	0.863	0.853	0.842	0.828	1.066
	Jul	1.233	0.871	0.842	0.837	0.832	0.822	1.056
	Aug	1.269	0.906	0.873	0.862	0.852	0.845	1.071
	Sep	1.334	0.916	0.88	0.875	0.87	0.835	1.092
	Oct	1.413	0.952	0.912	0.939	0.931	0.889	1.137
	Nov	1.498	0.966	0.933	0.934	0.925	0.957	1.225
	Dec	1.548	0.996	1	0.958	0.952	0.922	1.219

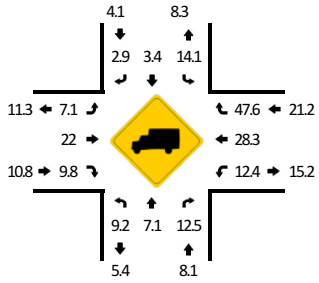
Axle Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
NI_URB	**Jan**	0.998	0.989	0.987	0.986	0.984	0.987	0.995
	Feb	0.997	0.987	0.988	0.989	0.987	0.988	0.996
	Mar	0.997	0.988	0.987	0.984	0.986	0.987	0.997
	Apr	0.997	0.973	0.969	0.971	0.975	0.984	0.997
	May	0.997	0.977	0.976	0.974	0.98	0.985	0.996
	Jun	0.996	0.974	0.968	0.971	0.976	0.98	0.994
	Jul	0.996	0.974	0.979	0.974	0.973	0.976	0.992
	Aug	0.995	0.974	0.975	0.973	0.974	0.978	0.995
	Sep	0.995	0.968	0.968	0.973	0.966	0.977	0.993
	Oct	0.993	0.978	0.975	0.971	0.976	0.979	0.991
	Nov	0.994	0.973	0.976	0.978	0.975	0.981	0.994
	Dec	0.993	0.973	0.978	0.975	0.975	0.983	0.994

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

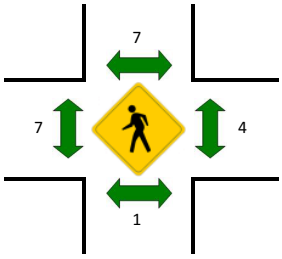
LOCATION: N Reserve St (US-93) -- Express Way Rd/Howard Raser Ave | **QC JOB #:** 16794703
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

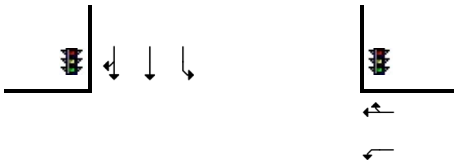
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

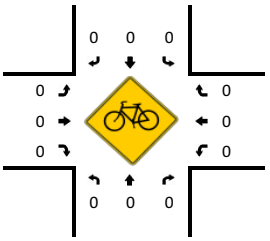


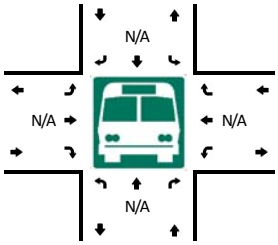


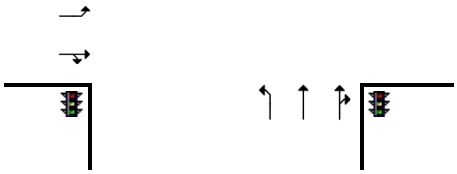
TRUE DATA TO IMPROVE MOBILITY

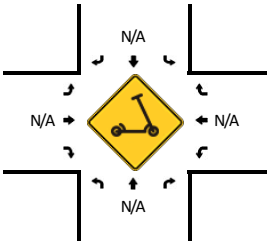












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Express Way Rd/Howard Raser Ave (Eastbound)				Express Way Rd/Howard Raser Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	36	84	13	0	11	113	16	0	14	5	36	0	12	9	8	0	357	
7:15 AM	53	95	14	0	20	141	11	0	18	11	43	0	13	12	1	0	432	
7:30 AM	46	126	13	0	13	172	20	0	36	18	38	0	16	12	8	0	518	
7:45 AM	42	143	34	0	21	245	24	0	18	18	50	0	21	14	5	0	635	1942
8:00 AM	35	130	27	0	15	174	13	0	31	11	52	0	30	14	6	0	538	2123
8:15 AM	42	143	18	0	12	159	14	0	23	10	43	0	25	12	2	0	503	2194
8:30 AM	44	148	17	0	16	162	17	0	26	11	39	0	29	13	8	0	530	2206
8:45 AM	39	119	11	0	20	129	15	0	23	16	47	0	34	19	9	0	481	2052

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	168	572	136	0	84	980	96	0	72	72	200	0	84	56	20	0	2540
Heavy Trucks	16	40	0		8	28	4		4	16	28		16	20	12		192
Buses																	
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

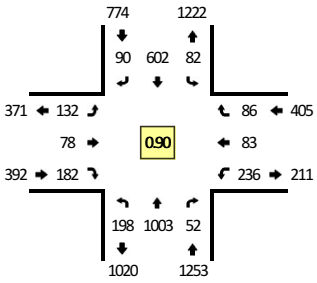
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: N Reserve St (US-93) -- Express Way Rd/Howard Raser Ave | **QC JOB #:** 16794704

CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

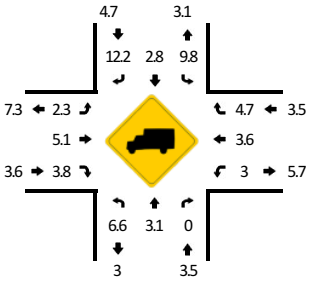
Peak-Hour: 4:30 PM -- 5:30 PM

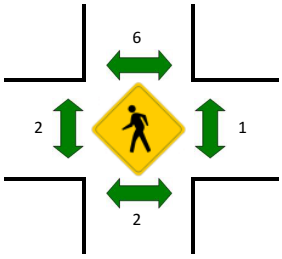
Peak 15-Min: 5:00 PM -- 5:15 PM

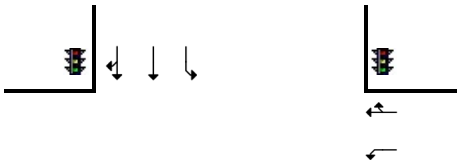


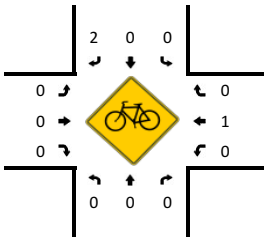


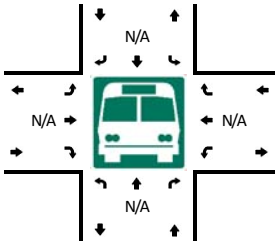
TRUE DATA TO IMPROVE MOBILITY

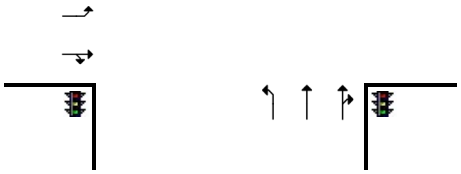


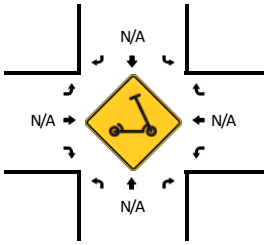












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Express Way Rd/Howard Raser Ave (Eastbound)				Express Way Rd/Howard Raser Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	50	216	20	0	15	137	13	0	19	26	61	0	74	22	13	0	666	
4:15 PM	46	232	11	0	17	186	26	0	27	12	60	0	53	13	13	0	696	
4:30 PM	51	221	10	0	23	152	21	0	27	25	50	0	62	19	20	0	681	
4:45 PM	49	236	14	0	22	143	25	1	29	12	38	0	51	22	13	0	655	2698
5:00 PM	48	277	13	0	14	154	24	0	45	21	55	0	80	25	30	0	786	2818
5:15 PM	50	269	15	0	22	153	20	0	31	20	39	0	43	17	23	0	702	2824
5:30 PM	50	229	12	0	17	179	25	0	28	11	47	0	26	13	14	0	651	2794
5:45 PM	36	234	14	0	20	166	17	0	23	8	35	0	49	13	16	0	631	2770

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	192	1108	52	0	56	616	96	0	180	84	220	0	320	100	120	0	3144
Heavy Trucks	16	32	0		12	12	8		4	0	4		4	4	0		96
Buses																	
Pedestrians		0				12				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

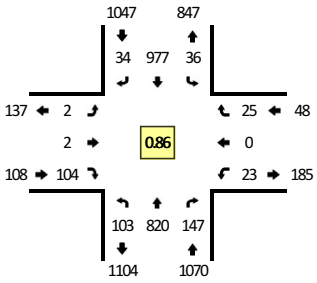
Type of peak hour being reported: Intersection Peak

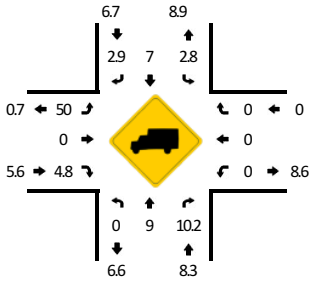
Method for determining peak hour: Total Entering Volume

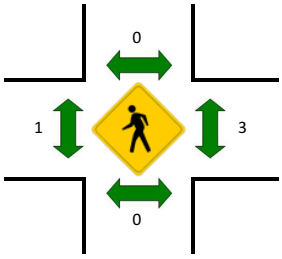
LOCATION: N Reserve St (US-93) -- International Dr/Stockyard Rd
CITY/STATE: Missoula, MT

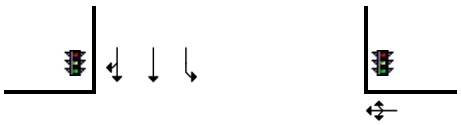
QC JOB #: 16794705
DATE: Tue, Oct 15 2024

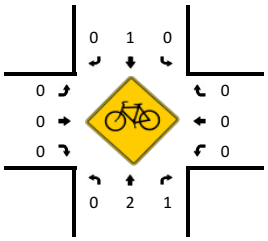
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

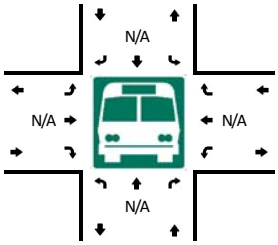




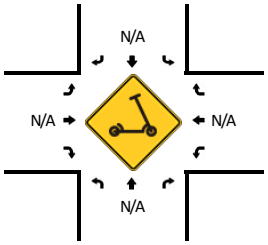












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				International Dr/Stockyard Rd (Eastbound)				International Dr/Stockyard Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	27	133	16	0	4	153	3	0	0	0	10	0	9	0	4	0	359	
7:15 AM	18	168	30	0	6	175	11	0	0	1	20	0	4	0	3	0	436	
7:30 AM	28	190	29	0	5	206	11	0	0	0	20	0	3	0	3	0	495	
7:45 AM	34	214	43	0	14	296	14	0	0	1	36	0	4	0	8	0	664	1954
8:00 AM	28	189	36	0	5	246	5	0	2	1	25	0	5	0	7	0	549	2144
8:15 AM	27	208	42	0	10	216	10	0	0	0	25	0	8	0	5	0	551	2259
8:30 AM	14	209	26	0	7	219	5	0	0	0	18	0	6	0	5	0	509	2273
8:45 AM	22	185	37	0	8	201	6	0	1	0	21	0	3	0	6	0	490	2099

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	136	856	172	0	56	1184	56	0	0	4	144	0	16	0	32	0	2656
Heavy Trucks	0	48	12		4	84	4		0	0	8		0	0	0		160
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

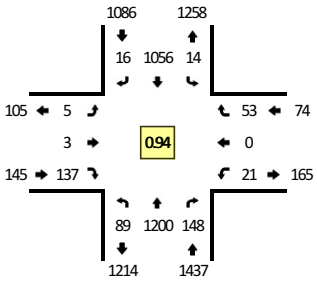
Report generated on 10/25/2024 10:17 AM

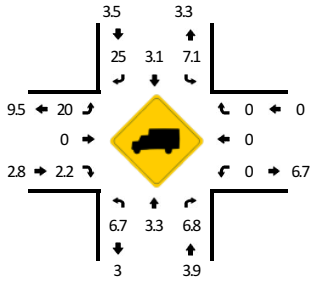
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

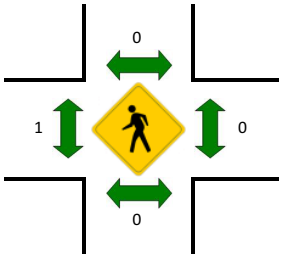
LOCATION: N Reserve St (US-93) -- International Dr/Stockyard Rd | **QC JOB #:** 16794706
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

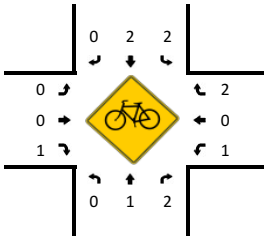


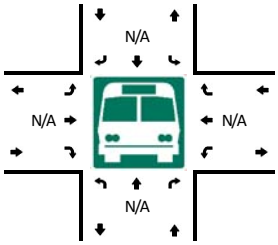


TRUE DATA TO IMPROVE MOBILITY

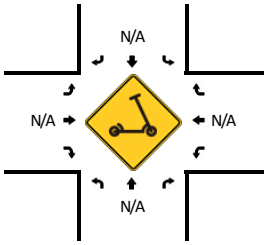












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				International Dr/Stockyard Rd (Eastbound)				International Dr/Stockyard Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	22	294	33	0	5	270	2	0	0	0	50	0	10	0	9	0	695	
4:15 PM	18	303	43	0	5	287	9	0	2	1	30	0	3	0	12	0	713	
4:30 PM	16	273	24	0	1	253	6	0	1	1	30	0	7	0	8	0	620	
4:45 PM	26	311	40	0	3	229	1	0	1	1	43	0	5	0	20	0	680	2708
5:00 PM	29	313	41	0	5	287	0	0	1	0	34	0	6	0	13	0	729	2742
5:15 PM	20	334	41	0	8	227	2	0	2	0	21	0	7	0	15	0	677	2706
5:30 PM	18	304	27	0	10	230	6	0	0	0	17	0	7	0	5	0	624	2710
5:45 PM	10	270	25	0	13	243	1	0	3	0	25	0	8	1	9	0	608	2638

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	116	1252	164	0	20	1148	0	0	4	0	136	0	24	0	52	0	2916
Heavy Trucks	12	40	4		4	20	0		0	0	0		0	0	0		80
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

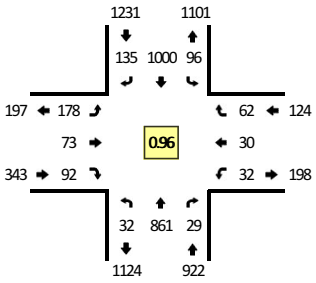
Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

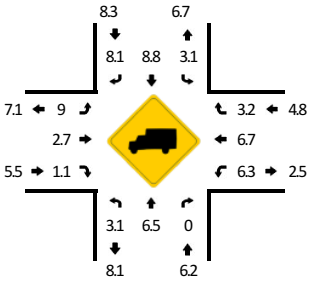
LOCATION: N Reserve St (US-93) -- England Blvd
CITY/STATE: Missoula, MT

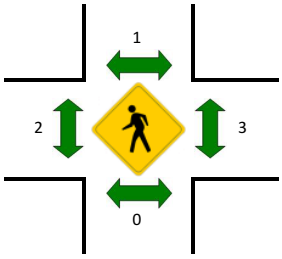
QC JOB #: 16794707
DATE: Tue, Oct 15 2024

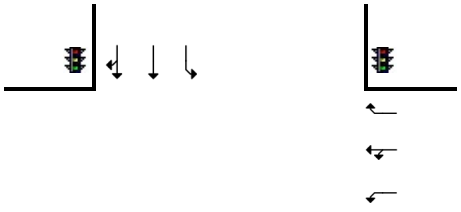
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

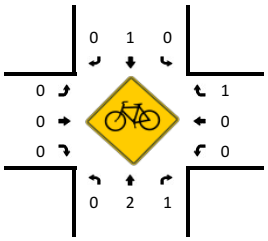


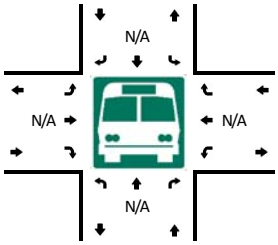


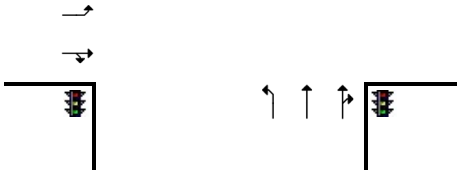


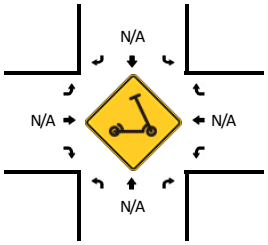












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				England Blvd (Eastbound)				England Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	8	181	8	0	8	155	14	0	18	3	12	0	3	1	4	0	415	
7:15 AM	4	201	2	0	13	209	25	0	26	8	10	0	2	3	18	0	521	
7:30 AM	5	226	11	0	16	210	25	0	45	14	18	0	5	10	16	0	601	
7:45 AM	9	238	6	0	24	257	35	0	38	19	23	0	8	10	18	0	685	2222
8:00 AM	10	195	3	0	34	276	50	0	40	20	31	0	7	6	12	0	684	2491
8:15 AM	8	202	9	0	22	257	25	0	55	20	20	0	12	4	16	0	650	2620
8:30 AM	8	189	7	0	25	233	26	0	26	22	14	0	9	12	21	0	592	2611
8:45 AM	15	192	13	0	23	222	15	0	37	14	10	0	12	8	17	0	578	2504

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	952	24	0	96	1028	140	0	152	76	92	0	32	40	72	0	2740
Heavy Trucks	0	48	0		8	72	8		0	8	0		0	4	0		148
Buses																	
Pedestrians		0				4				0				12			16
Bicycles	0	4	0		0	4	0		0	0	0		0	0	0		8
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

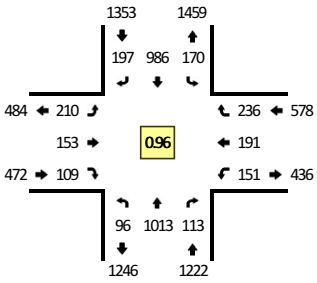
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

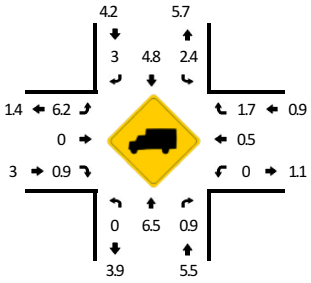
LOCATION: N Reserve St (US-93) -- England Blvd
CITY/STATE: Missoula, MT

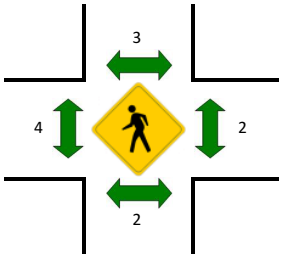
QC JOB #: 16794708
DATE: Tue, Oct 15 2024

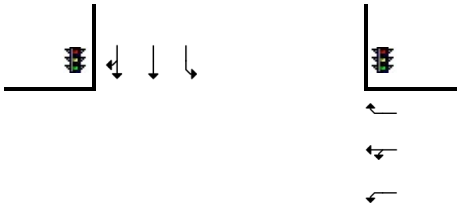
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

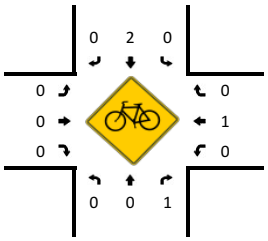


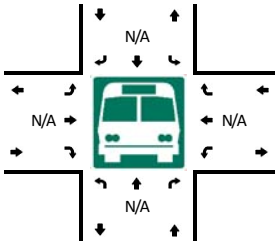


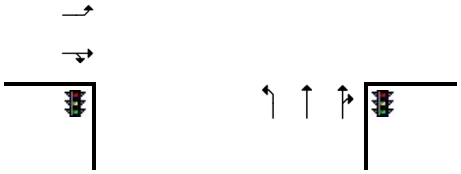


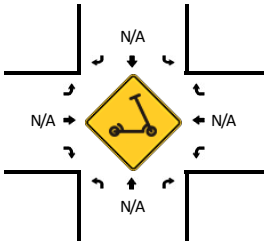












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				England Blvd (Eastbound)				England Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	23	253	27	0	44	239	53	0	55	46	21	0	42	46	61	0	910	
4:15 PM	23	260	35	0	46	261	57	0	52	43	23	0	42	44	54	0	940	
4:30 PM	26	257	26	0	42	248	38	0	42	32	42	0	30	54	60	0	897	
4:45 PM	24	243	25	0	38	238	49	0	61	32	23	0	37	47	61	0	878	3625
5:00 PM	31	234	21	0	25	231	50	0	63	25	33	0	46	48	66	0	873	3588
5:15 PM	34	257	16	0	41	238	63	0	49	31	29	0	40	40	76	0	914	3562
5:30 PM	35	259	28	0	27	221	55	0	45	27	27	0	40	38	63	0	865	3530
5:45 PM	28	236	30	0	33	217	61	0	33	29	32	0	28	27	47	0	801	3453

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	92	1040	140	0	184	1044	228	0	208	172	92	0	168	176	216	0	3760
Heavy Trucks	0	76	0		8	44	8		4	0	0		0	0	0		140
Buses																	
Pedestrians		0				4				12				0			16
Bicycles	0	0	4		0	4	0		0	0	0		0	0	0		8
Scooters																	

Comments:

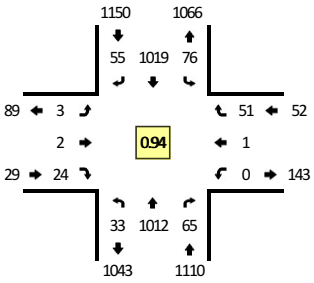
Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

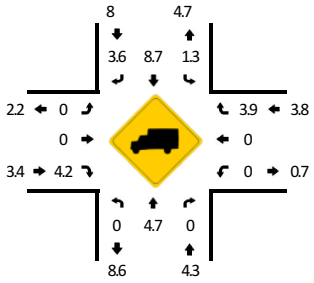
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

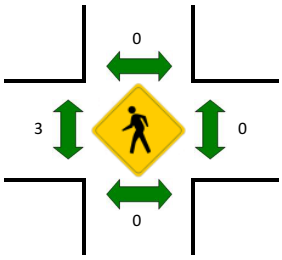
LOCATION: N Reserve St (US-93) -- American Way | **QC JOB #:** 16794709
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

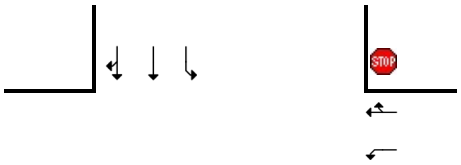
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

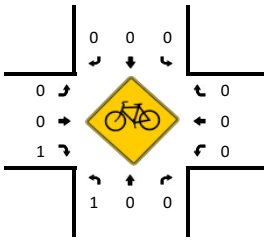


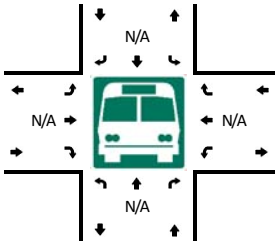


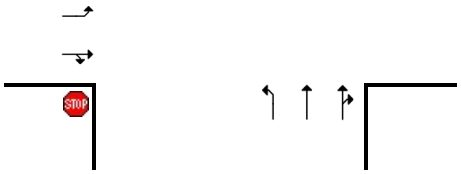


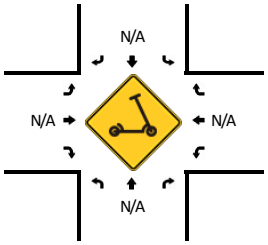












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				American Way (Eastbound)				American Way (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	7	207	20	0	13	159	3	0	2	1	2	0	4	2	7	0	427	
7:15 AM	12	224	17	0	8	210	17	0	0	0	5	0	0	3	4	0	500	
7:30 AM	15	268	12	0	12	213	13	0	0	2	6	0	0	0	8	0	549	
7:45 AM	8	268	21	0	27	258	15	0	1	0	10	0	0	0	17	0	625	2101
8:00 AM	2	216	9	0	19	278	17	0	0	0	2	0	0	0	20	0	563	2237
8:15 AM	8	260	23	0	18	270	10	0	2	0	6	0	0	1	6	0	604	2341
8:30 AM	5	224	13	0	24	235	17	0	1	0	5	0	1	1	20	0	546	2338
8:45 AM	7	240	18	0	18	219	22	0	1	1	7	0	2	0	11	0	546	2259

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	1072	84	0	108	1032	60	0	4	0	40	0	0	0	68	0	2500
Heavy Trucks	0	32	0		4	72	0		0	0	0		0	0	0		108
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	4		0	0	0		4
Scooters																	

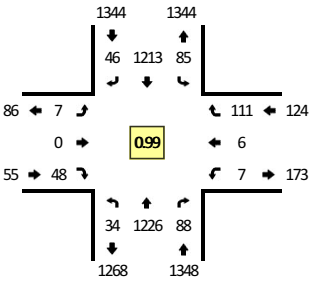
Comments:

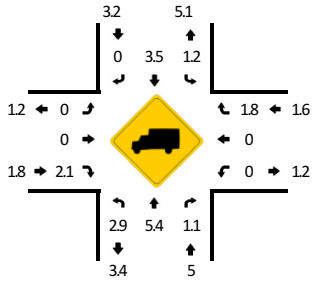
Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

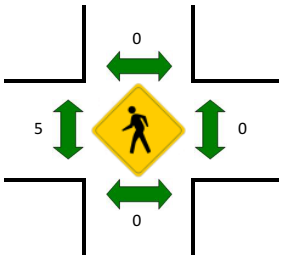
LOCATION: N Reserve St (US-93) -- American Way | **QC JOB #:** 16794710
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

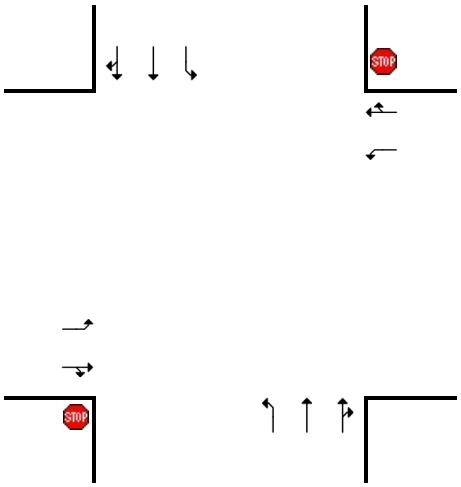
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

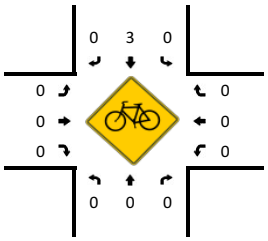


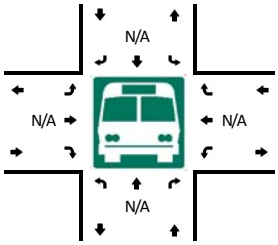


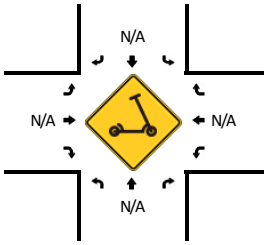
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				American Way (Eastbound)				American Way (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	315	20	0	25	278	18	0	2	1	12	0	3	3	24	0	705	
4:15 PM	6	306	24	0	21	309	16	0	0	0	17	0	1	4	22	0	726	
4:30 PM	5	315	26	0	28	302	12	0	2	0	8	0	2	0	28	0	728	
4:45 PM	10	311	22	0	14	288	8	0	2	0	9	0	1	1	24	0	690	2849
5:00 PM	13	294	16	0	22	314	10	0	3	0	14	0	3	1	37	0	727	2871
5:15 PM	5	319	26	0	27	288	14	0	1	1	9	0	2	3	24	0	719	2864
5:30 PM	6	326	23	0	26	267	15	0	3	0	15	0	2	0	27	0	710	2846
5:45 PM	9	298	26	0	23	259	20	0	1	0	9	0	4	2	27	0	678	2834

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	1260	104	0	112	1208	48	0	8	0	32	0	8	0	112	0	2912
Heavy Trucks	0	56	0		0	68	0		0	0	4		0	0	0		128
Buses																	
Pedestrians		0				0				8				0			8
Bicycles	0	0	0		0	4	0		0	0	0		0	0	0		4
Scooters																	

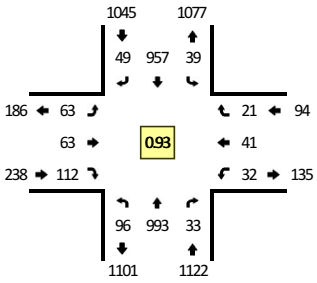
Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

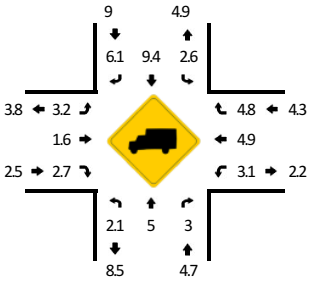
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

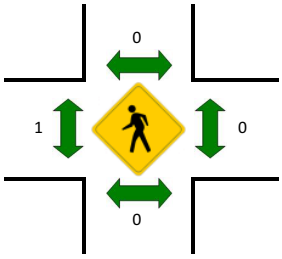
LOCATION: N Reserve St (US-93) -- Union Pacific | **QC JOB #:** 16794711
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

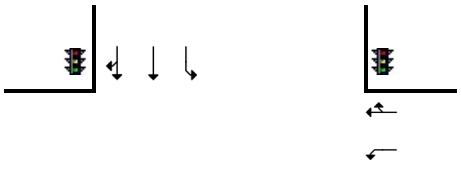
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

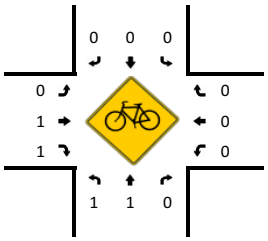


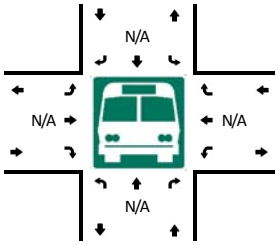


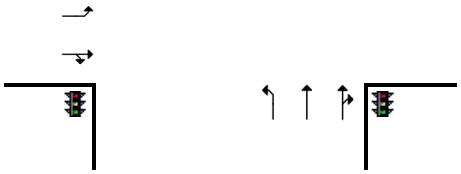


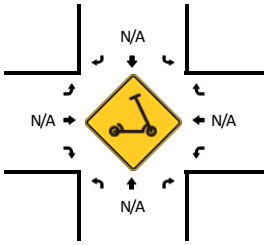












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Union Pacific (Eastbound)				Union Pacific (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	226	8	0	0	158	7	0	10	3	16	0	7	2	3	0	443	
7:15 AM	18	233	4	0	9	200	12	0	13	11	22	0	8	5	2	0	537	
7:30 AM	13	279	4	0	6	209	9	0	9	11	26	0	5	9	4	0	584	
7:45 AM	34	267	12	0	10	241	13	0	14	13	34	0	14	11	6	0	669	2233
8:00 AM	22	202	9	0	12	242	13	0	16	20	24	0	8	10	6	0	584	2374
8:15 AM	27	245	8	0	11	265	14	0	24	19	28	0	5	11	5	0	662	2499
8:30 AM	27	204	9	1	10	223	5	0	16	19	16	0	12	13	9	0	564	2479
8:45 AM	39	233	15	0	19	181	16	0	20	11	23	0	6	12	7	0	582	2392

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	136	1068	48	0	40	964	52	0	56	52	136	0	56	44	24	0	2676
Heavy Trucks	0	32	4		0	92	4		0	0	0		0	4	0		136
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

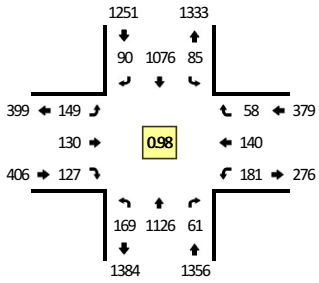
Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

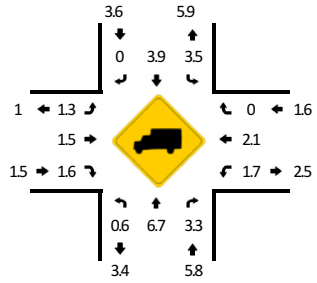
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: N Reserve St (US-93) -- Union Pacific
CITY/STATE: Missoula, MT

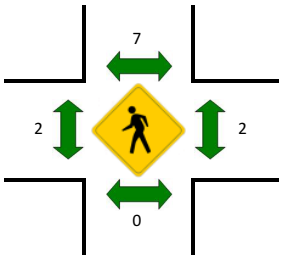
QC JOB #: 16794712
DATE: Tue, Oct 15 2024

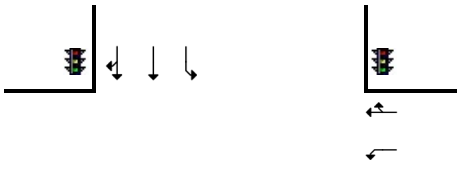
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

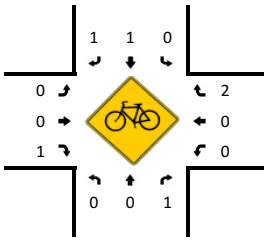


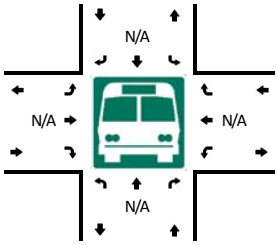


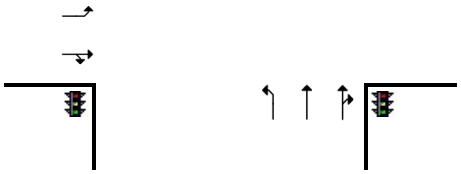
TRUE DATA TO IMPROVE MOBILITY

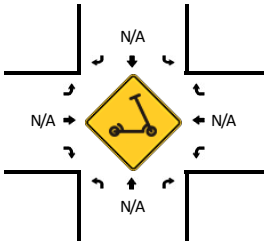












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Union Pacific (Eastbound)				Union Pacific (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	45	288	19	0	25	264	19	0	29	27	28	0	32	34	20	0	830	
4:15 PM	43	279	15	0	25	275	27	0	42	29	26	0	47	42	12	0	862	
4:30 PM	37	284	20	0	23	262	24	0	32	42	32	0	42	33	19	0	850	
4:45 PM	48	286	14	0	18	263	20	0	44	31	40	0	39	31	13	0	847	3389
5:00 PM	41	277	12	0	19	276	19	0	31	28	29	0	53	34	14	0	833	3392
5:15 PM	44	293	15	0	24	256	24	0	30	22	29	0	39	37	18	0	831	3361
5:30 PM	47	295	11	0	15	259	18	0	43	28	24	0	38	37	14	0	829	3340
5:45 PM	46	291	14	0	20	226	20	0	32	18	26	0	30	28	10	0	761	3254

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	172	1116	60	0	100	1100	108	0	168	116	104	0	188	168	48	0	3448
Heavy Trucks	0	72	4		8	32	0		0	8	0		0	4	0		128
Buses																	
Pedestrians		0				8				0				0			8
Bicycles	0	0	0		0	4	4		0	0	0		0	0	0		8
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

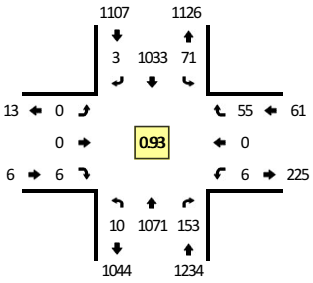
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

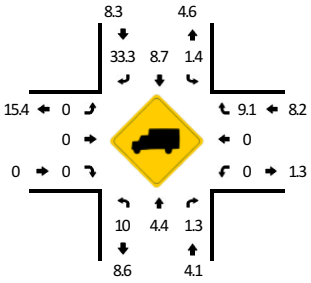
LOCATION: N Reserve St (US-93) -- Palmer St
CITY/STATE: Missoula, MT

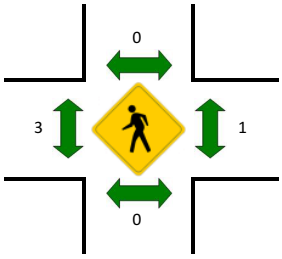
QC JOB #: 16794713
DATE: Tue, Oct 15 2024

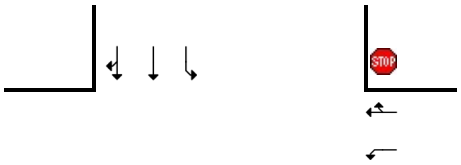
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

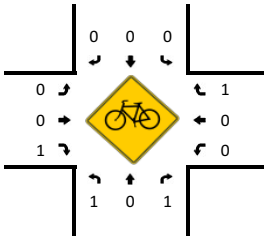


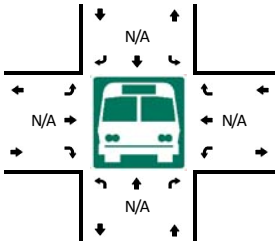




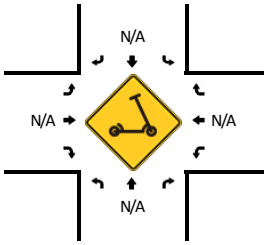












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Palmer St (Eastbound)				Palmer St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	234	25	0	13	165	1	0	0	1	0	0	1	0	7	0	448	
7:15 AM	0	235	21	0	15	208	1	0	0	0	1	0	1	0	8	0	490	
7:30 AM	4	277	37	0	18	214	1	0	0	0	4	0	0	0	12	1	568	
7:45 AM	2	299	35	0	22	268	0	0	0	0	1	0	2	0	17	0	646	2152
8:00 AM	2	222	42	0	12	259	0	0	0	0	0	0	1	0	13	0	551	2255
8:15 AM	2	273	39	0	19	292	2	0	0	0	1	0	2	0	13	0	643	2408
8:30 AM	4	237	29	0	11	228	2	0	0	0	6	0	3	0	14	0	534	2374
8:45 AM	4	272	32	0	15	201	1	0	0	0	2	0	0	0	19	0	546	2274

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	1196	140	0	88	1072	0	0	0	0	4	0	8	0	68	0	2584
Heavy Trucks	0	24	0		0	76	0		0	0	0		0	0	8		108
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	4		0	0	4		8
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: N Reserve St (US-93) -- Palmer St

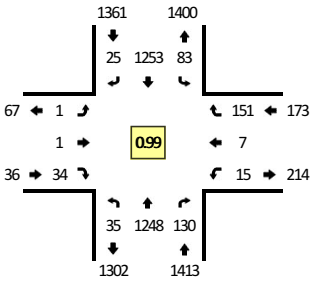
CITY/STATE: Missoula, MT

QC JOB #: 16794714

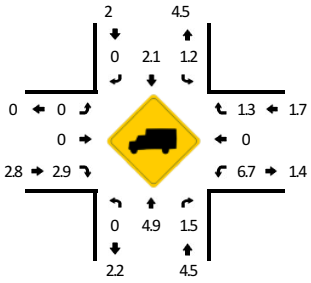
DATE: Tue, Oct 15 2024

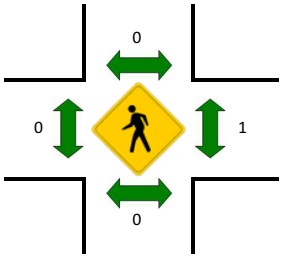
Peak-Hour: 4:45 PM -- 5:45 PM

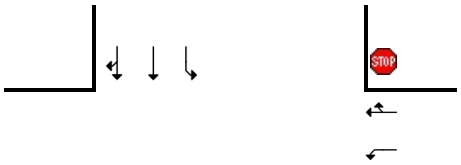
Peak 15-Min: 5:15 PM -- 5:30 PM

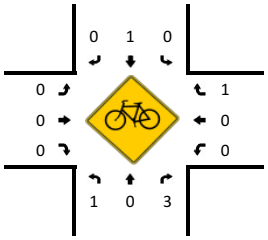


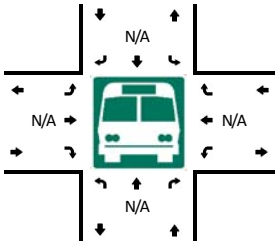




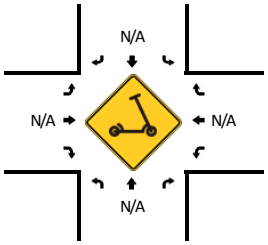












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Palmer St (Eastbound)				Palmer St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	337	23	0	18	294	4	0	0	0	15	0	1	1	40	0	741	
4:15 PM	6	305	37	0	10	331	8	0	0	0	4	0	2	0	34	0	737	
4:30 PM	2	299	37	0	21	317	8	0	0	0	5	0	3	2	36	0	730	
4:45 PM	9	309	35	0	17	320	3	0	0	0	7	0	2	0	41	0	743	2951
5:00 PM	4	303	37	0	26	326	4	0	0	0	7	0	2	2	37	0	748	2958
5:15 PM	11	317	24	0	20	310	10	0	0	1	9	0	6	2	41	0	751	2972
5:30 PM	11	319	34	0	20	297	8	0	1	0	11	0	5	3	32	0	741	2983
5:45 PM	8	318	32	0	18	278	7	0	1	0	5	0	1	0	28	0	696	2936

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	44	1268	96	0	80	1240	40	0	0	4	36	0	24	8	164	0	3004
Heavy Trucks	0	56	8		0	8	0		0	0	0		4	0	0		76
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	4		0	0	0		0	0	0		0	0	4		8
Scooters																	

Comments:

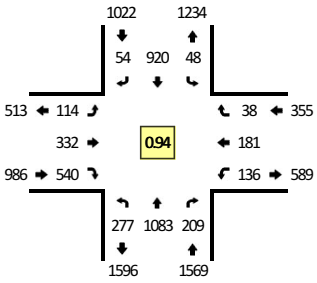
Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

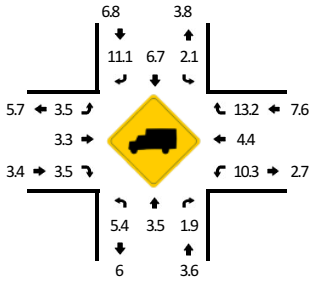
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

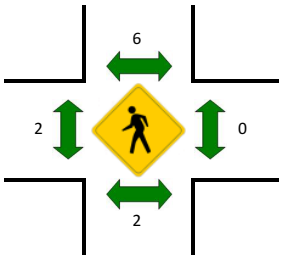
LOCATION: N Reserve St (US-93) -- Mullan Rd | **QC JOB #:** 16794715
CITY/STATE: Missoula, MT | **DATE:** Tue, Oct 15 2024

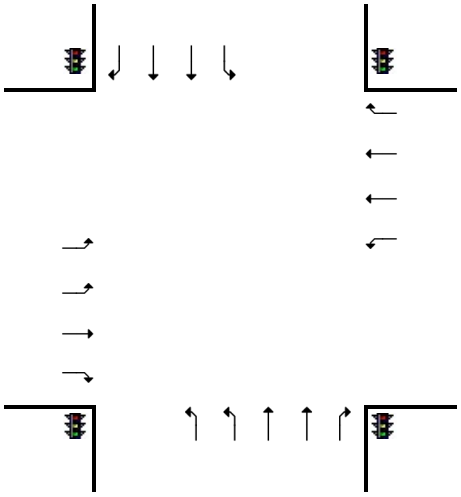
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

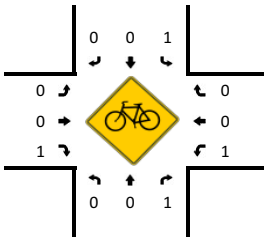


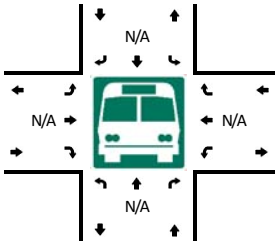


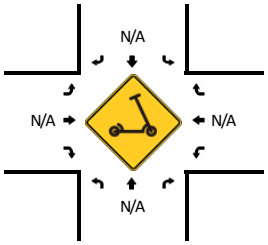












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Mullan Rd (Eastbound)				Mullan Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	60	247	35	0	8	124	11	0	32	54	85	0	21	24	2	0	703	
7:15 AM	53	240	46	0	10	172	13	0	28	81	117	0	22	34	6	0	822	
7:30 AM	69	294	32	0	14	200	8	0	29	78	128	0	27	39	10	0	928	
7:45 AM	74	298	60	0	10	237	17	0	23	96	148	0	27	48	12	0	1050	3503
8:00 AM	65	229	62	0	10	233	15	0	33	80	142	1	40	52	5	0	967	3767
8:15 AM	69	262	55	0	14	250	14	0	28	78	122	0	42	42	11	0	987	3932
8:30 AM	60	228	70	0	17	214	14	0	31	80	111	0	41	45	7	0	918	3922
8:45 AM	56	259	44	0	19	171	14	0	43	78	103	0	35	53	10	0	885	3757

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	296	1192	240	0	40	948	68	0	92	384	592	0	108	192	48	0	4200
Heavy Trucks	20	52	0		0	52	8		4	16	8		8	0	0		168
Buses																	
Pedestrians		0				16				0				0			16
Bicycles	0	0	4		4	0	0		0	0	4		0	0	0		12
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

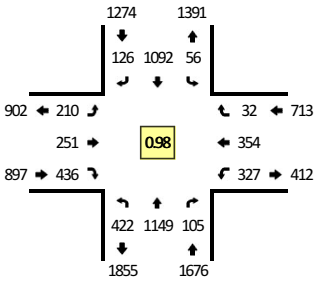
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

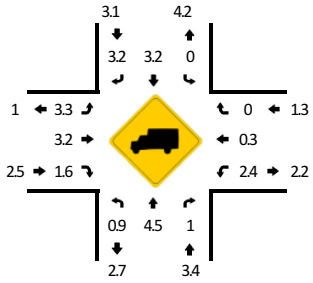
LOCATION: N Reserve St (US-93) -- Mullan Rd
CITY/STATE: Missoula, MT

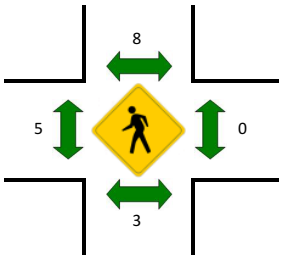
QC JOB #: 16794716
DATE: Tue, Oct 15 2024

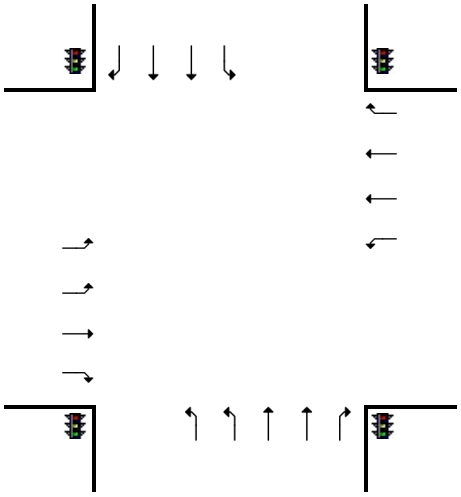
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

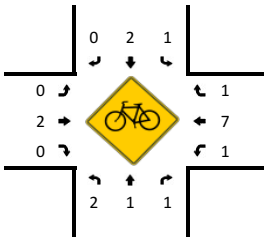


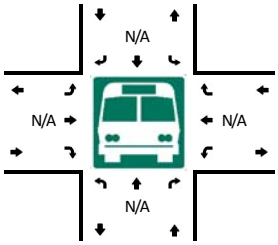


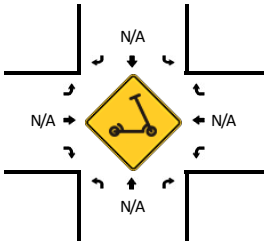












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				Mullan Rd (Eastbound)				Mullan Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	109	289	20	0	21	236	33	0	62	58	102	0	94	85	17	0	1126	
4:15 PM	103	282	29	0	15	269	33	0	56	62	128	0	70	86	11	0	1144	
4:30 PM	104	287	32	0	13	272	31	0	54	70	105	0	73	78	7	0	1126	
4:45 PM	107	292	27	0	14	270	33	0	45	57	98	0	79	98	8	0	1128	4524
5:00 PM	108	288	17	0	14	281	29	0	55	62	105	0	105	92	6	0	1162	4560
5:15 PM	102	286	20	0	13	276	28	0	51	68	105	0	78	97	9	0	1133	4549
5:30 PM	70	281	19	0	9	268	39	1	51	45	81	0	92	101	13	0	1070	4493
5:45 PM	104	278	17	0	17	235	26	0	67	65	64	0	50	88	14	0	1025	4390

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	432	1152	68	0	56	1124	116	0	220	248	420	0	420	368	24	0	4648
Heavy Trucks	4	64	0		0	28	4		12	0	0		0	0	0		112
Buses																	
Pedestrians		0				8				0				0			8
Bicycles	8	0	0		0	4	0		0	0	0		0	4	0		16
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

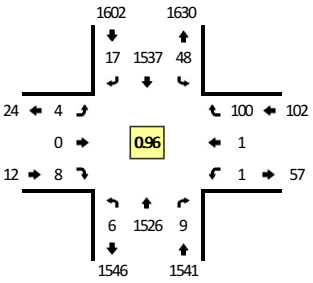
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

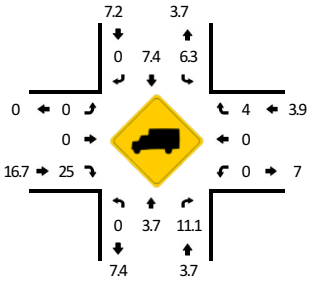
LOCATION: N Reserve St (US-93) -- River Rd
CITY/STATE: Missoula, MT

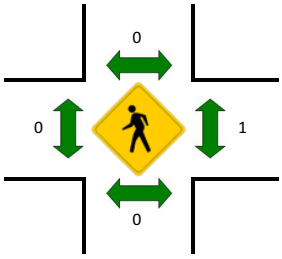
QC JOB #: 16794717
DATE: Tue, Oct 15 2024

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

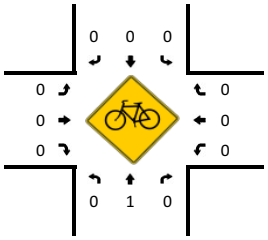


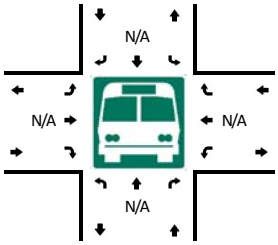




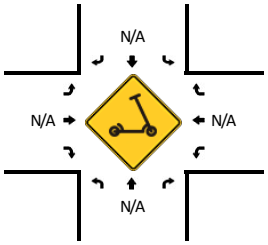












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				River Rd (Eastbound)				River Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	291	2	0	7	221	3	0	3	1	0	0	2	1	18	0	550	
7:15 AM	0	342	1	0	17	287	3	0	0	0	1	0	0	0	13	0	664	
7:30 AM	0	409	2	0	9	333	2	0	1	0	3	0	0	0	28	0	787	
7:45 AM	3	409	1	0	11	395	7	0	0	0	3	0	1	1	20	0	851	2852
8:00 AM	3	349	2	0	20	406	1	0	1	0	0	0	0	0	24	0	806	3108
8:15 AM	0	359	4	0	8	403	7	0	2	0	2	0	0	0	28	0	813	3257
8:30 AM	1	354	4	0	13	355	4	0	2	0	2	0	2	0	14	0	751	3221
8:45 AM	1	353	3	0	15	296	2	0	0	0	1	0	0	1	19	0	691	3061

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	1636	4	0	44	1580	28	0	0	0	12	0	4	4	80	0	3404
Heavy Trucks	0	44	0		4	76	0		0	0	4		0	0	8		136
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

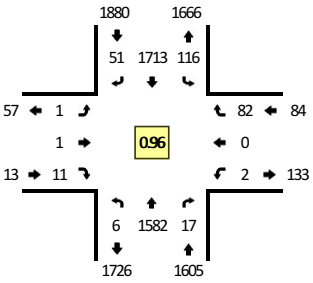
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

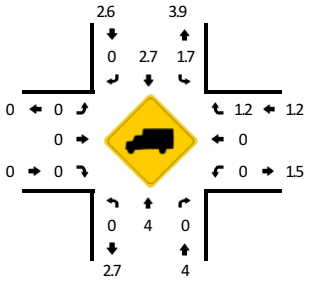
LOCATION: N Reserve St (US-93) -- River Rd
CITY/STATE: Missoula, MT

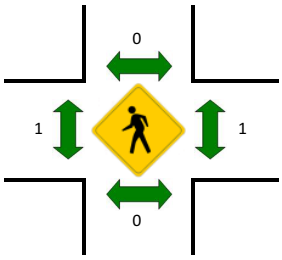
QC JOB #: 16794718
DATE: Tue, Oct 15 2024

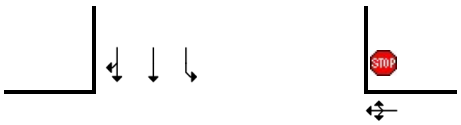
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

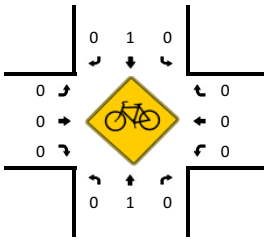


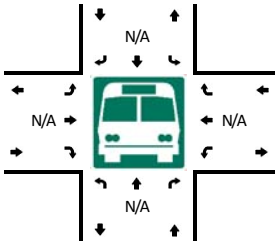




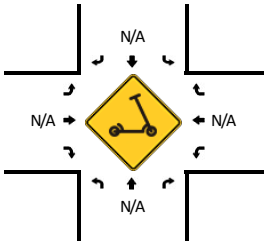












15-Min Count Period Beginning At	N Reserve St (US-93) (Northbound)				N Reserve St (US-93) (Southbound)				River Rd (Eastbound)				River Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	438	9	0	23	428	12	0	0	0	6	0	0	0	22	0	941	
4:15 PM	4	390	6	0	14	452	9	1	0	0	1	0	0	0	17	0	894	
4:30 PM	1	404	5	0	26	423	10	0	1	0	1	0	0	0	17	0	888	
4:45 PM	1	383	6	0	35	402	7	1	0	0	3	0	0	0	19	0	857	3580
5:00 PM	1	382	3	0	26	450	16	0	0	1	4	0	1	0	23	0	907	3546
5:15 PM	3	413	3	0	28	438	18	0	0	0	3	0	1	0	23	0	930	3582
5:30 PM	1	378	6	0	28	407	13	0	0	0	2	0	0	0	21	0	856	3550
5:45 PM	0	329	3	0	24	326	11	0	1	0	2	0	0	0	12	0	708	3401

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	1652	12	0	112	1752	72	0	0	0	12	0	4	0	92	0	3720
Heavy Trucks	0	56	0		0	24	0		0	0	0		0	0	0		80
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	4	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

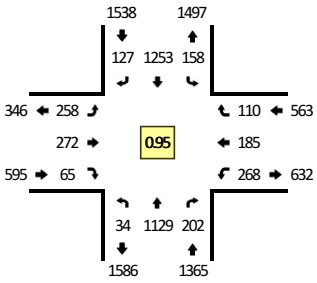
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

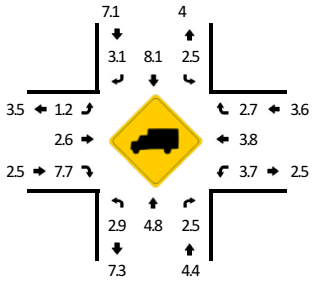
LOCATION: S Reserve St (US-93) -- S 3rd St W
CITY/STATE: Missoula, MT

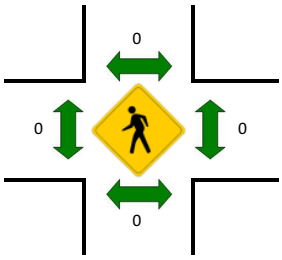
QC JOB #: 16794719
DATE: Tue, Oct 15 2024

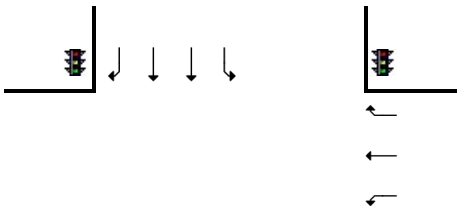
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

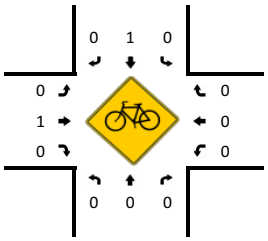


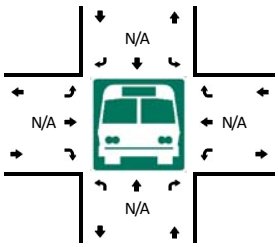


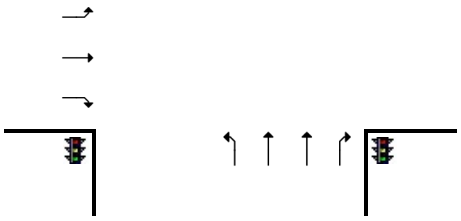


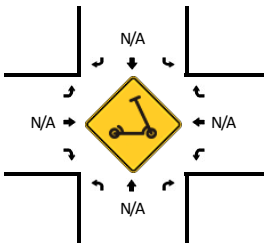












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				S 3rd St W (Eastbound)				S 3rd St W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	6	260	37	0	15	196	14	0	30	26	9	0	36	16	22	0	667	
7:15 AM	2	267	37	0	24	244	19	0	42	36	12	0	57	16	22	0	778	
7:30 AM	7	300	38	0	41	276	24	0	66	58	14	0	73	32	30	0	959	
7:45 AM	10	314	61	0	37	316	25	0	58	70	19	0	67	56	32	0	1065	3469
8:00 AM	5	246	47	0	36	323	42	0	71	76	15	0	68	61	23	0	1013	3815
8:15 AM	12	269	56	0	44	338	36	0	63	68	17	0	60	36	25	0	1024	4061
8:30 AM	9	254	55	0	27	298	35	0	56	58	22	0	54	32	35	0	935	4037
8:45 AM	6	275	63	0	34	253	27	0	37	54	20	0	54	35	37	0	895	3867

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	40	1256	244	0	148	1264	100	0	232	280	76	0	268	224	128	0	4260
Heavy Trucks	0	52	4		4	60	4		4	0	4		4	12	8		156
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

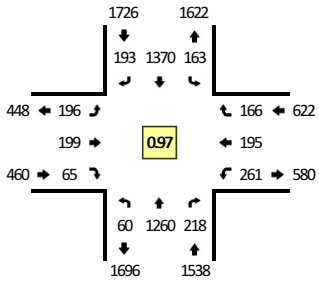
Type of peak hour being reported: Intersection Peak

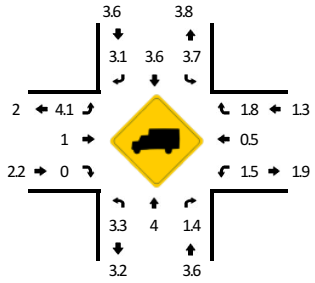
Method for determining peak hour: Total Entering Volume

LOCATION: S Reserve St (US-93) -- S 3rd St W
CITY/STATE: Missoula, MT

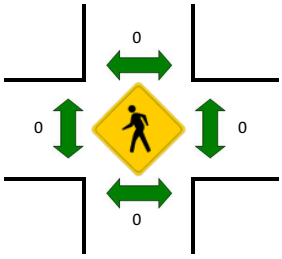
QC JOB #: 16794720
DATE: Tue, Oct 15 2024

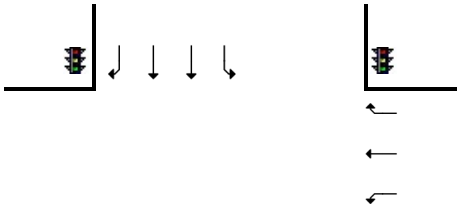
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

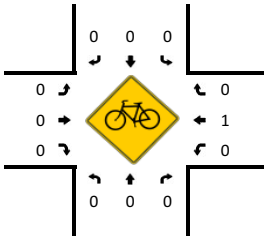


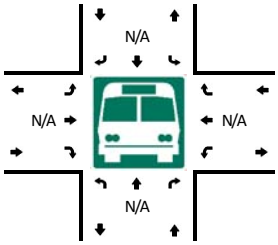


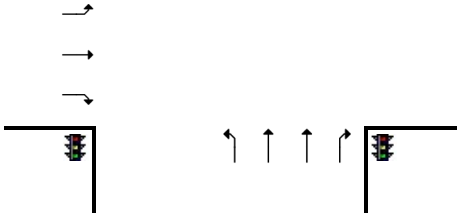
TRUE DATA TO IMPROVE MOBILITY

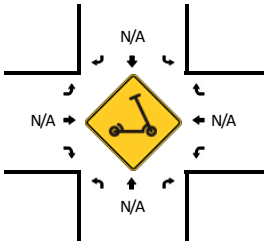












15-Min Count Period Beginning At	S Reserve St (US-93) (Northbound)				S Reserve St (US-93) (Southbound)				S 3rd St W (Eastbound)				S 3rd St W (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	13	324	45	0	40	341	40	0	74	67	20	0	61	53	39	0	1117	
4:15 PM	18	325	51	0	37	361	40	0	38	40	18	0	66	50	41	0	1085	
4:30 PM	11	309	58	0	41	335	57	0	44	49	13	0	71	42	39	0	1069	
4:45 PM	18	302	64	0	45	333	56	0	40	43	14	0	63	50	47	0	1075	4346
5:00 PM	22	307	56	0	33	324	64	0	26	50	13	0	70	61	45	0	1071	4300
5:15 PM	14	309	64	0	33	377	67	0	40	54	16	0	50	55	52	0	1131	4346
5:30 PM	18	307	63	0	34	325	40	0	41	56	18	0	56	59	37	0	1054	4331
5:45 PM	29	253	59	0	38	290	28	0	34	46	16	0	67	53	42	0	955	4211

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	1296	180	0	160	1364	160	0	296	268	80	0	244	212	156	0	4468
Heavy Trucks	0	48	4		4	44	0		0	8	0		4	0	4		116
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/25/2024 10:17 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix D

Existing Peak Hour Volumes, V/C Ratios, Delays, and LOS



1 Reserve Street / Expressway Road-Howard Raser Drive
98 50 184 | 68 340 64 | 21 53 105 | LOS=C Del=23.2 V/C=0.67 | 163 564 66

2 Reserve Street / International Way-Stockyard Road
<5 <5 104 | 34 977 36 | 25 <5 23 | Critical=WB LOS=F Del>100 V/C=>1.00 | 103 823 147

3 Reserve Street (Southbound) / Broadway Street Ramp
274 | 159 977 | LOS=B Del=12.5 V/C=0.55

3 Reserve Street (Northbound) / Broadway Street Ramp
192 | Critical=WB LOS=C Del=16.6 V/C=0.41 | 861 238

4 Reserve Street / England Boulevard
178 73 92 | 135 1000 96 | 62 30 32 | LOS=C Del=29.6 V/C=0.64 | 32 825 229

5 Reserve Street / American Way
<5 <5 24 | 55 1019 70 | 51 <5 <5 | Critical=EBL LOS=F Del>100 V/C=0.10 | 33 1,053 65

6 Reserve Street / Union Pacific Street
63 63 112 | 49 957 39 | 21 41 32 | LOS=B Del=10.9 V/C=0.55 | 96 993 33

7 Reserve Street / Palmer Street
6 | <5 1033 71 | 55 <5 6 | Critical=WBL LOS=F Del>100 V/C=0.18 | 10 1,071 153

8 Reserve Street / Mullan Road
114 332 540 | 54 1020 48 | 38 181 136 | LOS=D Del=53.2 V/C=0.91 | 277 1,209 209

9 Reserve Street / River Road
<5 <5 8 | 17 1537 48 | 100 <5 <5 | Critical=EBLT LOS=F Del>100 V/C=0.57 | 6 1,536 9

10 Reserve Street / S 3rd Street
258 272 65 | 177 1253 158 | 110 185 268 | LOS=D Del=44.8 V/C=0.91 | 54 1,128 202

11 Reserve Street / Spurgin Road
9 <5 37 | 104 1449 20 | 18 <5 <5 | Critical=EBLT LOS=E Del=47.0 V/C=0.11 | 34 1,367 27

12 Reserve Street / Mount Avenue
79 118 46 | 30 1038 148 | 122 74 48 | LOS=D Del=38.2 V/C=0.70 | 48 1,215 38

13 Reserve Street / Central Avenue
<5 <5 28 | 94 1167 31 | 11 <5 <5 | Critical=EB LOS=C Del=17.4 V/C=0.10 | 30 1,270 15

14 Reserve Street / South Avenue
172 302 149 | 214 1354 200 | 101 296 156 | LOS=D Del=50.9 V/C=0.88 | 187 1,084 113

15 Reserve Street / Dearborn Avenue
<5 <5 45 | 141 914 5 | 26 <5 <5 | Critical=EBLT LOS=E Del=37.8 V/C=0.03 | 109 1,299 13

16 Reserve Street / Mary Avenue
1,305 | 878 1020 28 | 28 <5 | Critical=WBL LOS=D Del=26.9 V/C=0.02 | 12

17 Reserve Street / Old US 93
44 <5 14 | 109 1122 15 | 13 <5 <5 | Critical=WBLT LOS=D Del=30.7 V/C=0.02 | 24 1,311 18

18 Reserve Street / Brooks Street
798 1,053 15 | 396 1601 109 | 89 357 21 | LOS=D Del=46.5 V/C=0.77 | 105 452 98

Critical - Worst-performing lane group

LOS - Level of Service (intersection or critical lane group)

Del - Delay, in seconds (intersection or critical lane group)

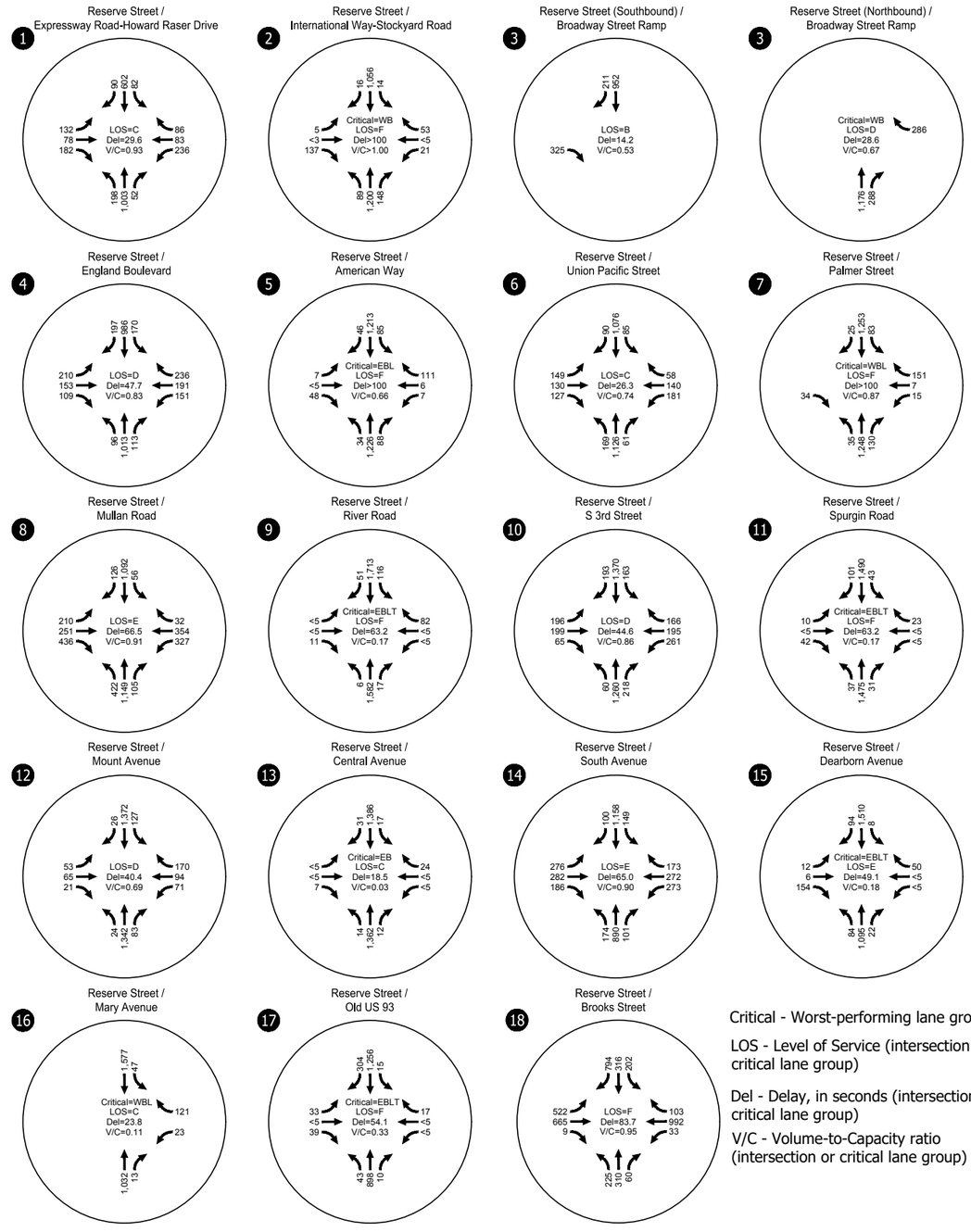
V/C - Volume-to-Capacity ratio (intersection or critical lane group)

Existing Traffic Volumes
AM Peak Hour
Missoula, Montana

Appendix
D

C:\Users\rolney\appdata\local\temp\AcPublish_44492\30013_Figures.dwg Dec 05, 2024 - 4:59pm - rolney Layout Tab: Existing AM





Critical - Worst-performing lane group

LOS - Level of Service (intersection or critical lane group)

Del - Delay, in seconds (intersection or critical lane group)

V/C - Volume-to-Capacity ratio (intersection or critical lane group)

Existing Traffic Volumes
PM Peak Hour
Missoula, Montana

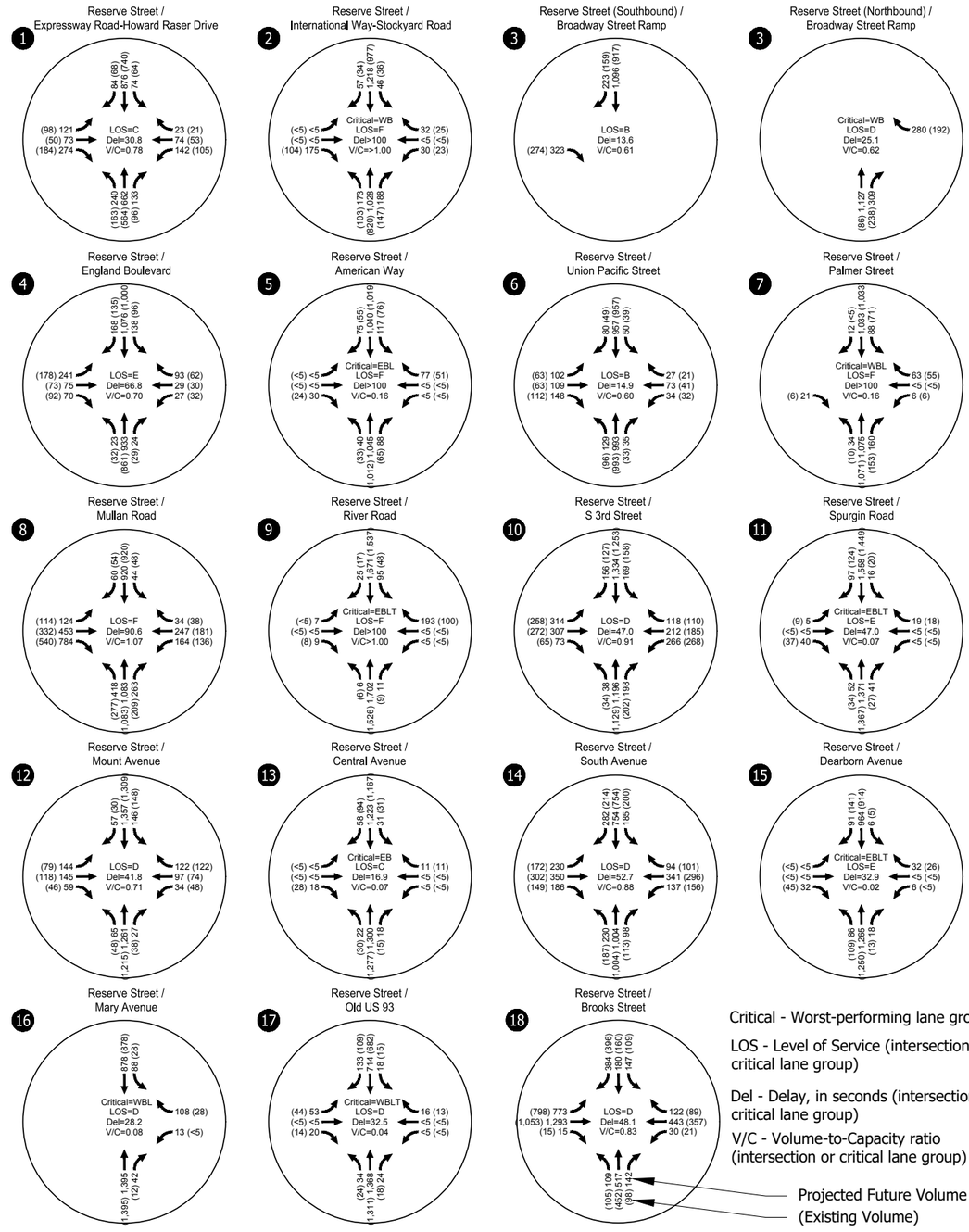
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KITTELSON & ASSOCIATES

Appendix E
Future Peak Hour Volumes, V/C Ratios, Delays, and LOS



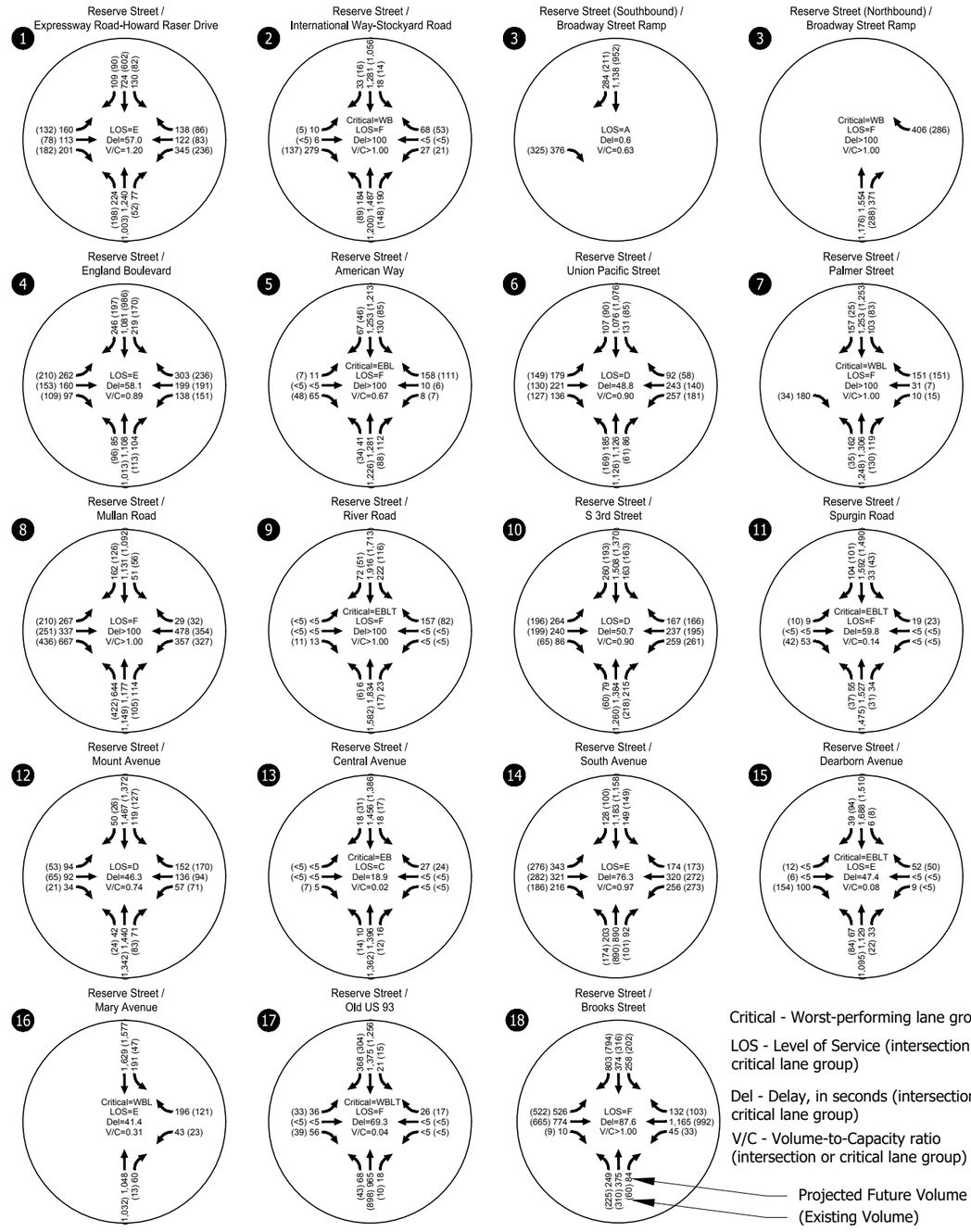


Estimated Future Year 2050 Traffic Volumes and Operations
AM Peak Hour
Missoula, Montana

Appendix
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Estimated Future Year 2050 Traffic Volumes and Operations
PM Peak Hour
Missoula, Montana

Appendix **E**

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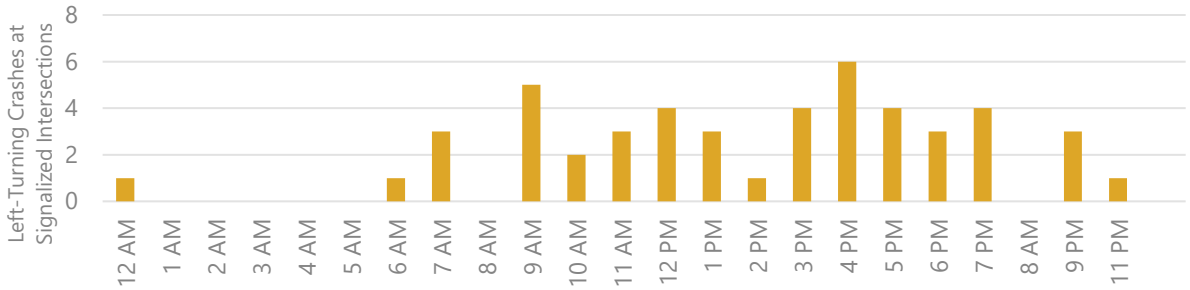
Appendix F

Left-Turning Crashes Time of Day Summary

APPENDIX F: LEFT TURNING CRASHES TIME-OF-DAY SUMMARY

A time-of-day summary of left-turning crashes at signalized intersections on Reserve Street is shown in Figure F.1. From 2019 to 2023, there were 48 total left-turning crashes at these intersections. These crashes were most frequent during afternoon peak hour traffic, with 44% of crashes taking place between 3 p.m. and 8 p.m. The hour with the highest frequency of left-turning crashes was from 4 p.m. to 5 p.m. with 6 crashes, followed by 9 a.m. to 10 a.m. with 5 crashes. This pattern indicates that left-turning crashes are more likely to occur at times where there are higher traffic volumes at intersections, particularly in the afternoon or late morning when intersections on Reserve Street experience increased congestion.

Figure F.1 Time-of-Day Summary of Left Turn Crashes at Signalized Intersections (2019 - 2023)



Appendix C

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FINAL TECHNICAL MEMORANDUM

October 7, 2025 Project# 30013

To: Glenn Ingram and Charlie Menefee, Missoula MPO

From: Nick Foster, AICP, RSP$_1$; Mark Heisinger, PE; Robert Olney; Katie Popp

CC: Joel Boucher, Vicki Crnich, Joan Redeen, and Geoff Streeter, MDT; Aaron Wilson, City of Missoula

RE: Reserve Street Safety Action Plan – Safety Strategies

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Executive Summary

This memorandum recommends a set of strategies for reducing fatal and serious injury crashes on Reserve Street. Data analysis, public and agency input, Reserve Street's role in the local and regional transportation system, and the Safe System Approach (SSA) have informed strategy selection. The strategies presented in this memo range from low-cost signal timing and phasing modifications that could potentially be implemented in the near-term, to capital projects that reimagine intersection control and the cross-section of the street and will require further study, including engineering analyses and engagement, to determine the final project.

Reserve Street serves regional and local traffic. As such, there is demand for local access, crossings, as well as freight and regional mobility. These demands are expected to increase as Missoula and the region grow. The strategies that are expected to have the greatest effect on achieving this project's goal are those that physically remove conflict points. However, given the need to provide for local access and crossings, treatments that can separate conflicts in time, as well as potentially manage speeds, are also important. These core strategies include:

- Reducing conflict points and speeds through certain intersections by providing roundabouts.
    - Where roundabouts are not provided for funding or other reasons, upgrade certain stop-controlled intersections to signals and update existing signal timing and phasing to reduce conflicts.
- Removing conflicts between turning/crossing vehicles and through vehicles on Reserve Street through raised medians, driveway consolidation, and other access management techniques.
- Providing more controlled opportunities for crossing Reserve Street by all modes of travel through upgraded intersection control and enhanced pedestrian crossings.
- Physically separating people walking and biking from motor vehicle traffic by adding protected bike lanes or shared-use paths on both sides of the street.

Packaged together, these strategies support a comprehensive, corridor-wide approach to reducing crashes, while still considering mobility and access demands.

Introduction

This memorandum presents safety solutions and strategies for the Reserve Street Safety Action Plan (Plan). These strategies have been developed based on findings from the safety analysis, input gathered from the public, and outcomes of discussions with stakeholders, including work sessions with regional transportation agencies, including Missoula Metropolitan Planning Organization (MPO), Montana Department of Transportation (MDT), Mountain Line, Missoula County, and the City of Missoula (City). The strategies have been identified through the lens of the Safe System Approach (SSA) and include infrastructure strategies and non-infrastructure strategies.

Consistent with the SSA, the project team considered a variety of infrastructure solutions and non-infrastructure strategies to support a corridor-focused approach that focuses on reducing fatal and serious injury crashes. The proposed solutions and strategies cover a range of low-cost, near-term actions, as well as longer-term, larger investments, including intersection reconfigurations and new intersection control types like roundabouts, signal modifications, crossing treatments, and access management (e.g., turning movement restrictions, center median). Non-infrastructure strategies, such as education campaigns, enforcement initiatives, and policy updates, are also included to support implementation of infrastructure solutions.

Strategy Development Process

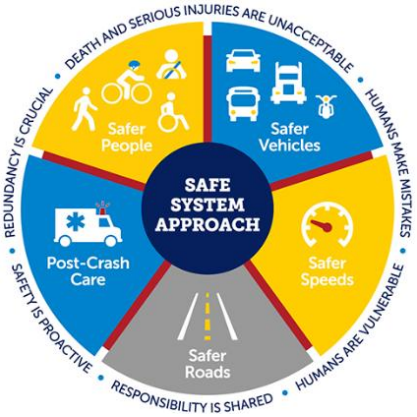
Figure 1 depicts the strategy selection process. The team analyzed the most recent five years of crash data (2019 - 2023) to identify hotspot locations and systemic crash trends along Reserve Street. The analysis, along with input from Round 1 of engagement that took place in Fall 2024, highlighted specific locations and areas of focus to evaluate further. Through discussions with the project team, an initial list of priority locations was developed. These findings were presented in the *Existing Conditions Technical Memorandum*.

Figure 1. Strategy Identification Sources



Candidate strategies were then identified and initially prioritized based on the unique characteristics of the Reserve Street corridor (e.g., crash trends, existing infrastructure, land-use context), implementation considerations (i.e., likely costs, constructability considerations, and trade-offs), and expected effectiveness of the strategies at addressing the SAP's emphasis areas identified in the *Existing Conditions Technical Memorandum*, which included speed management as well as rear-end, right-angle, turning, and vulnerable road user crashes. Strategies include proven countermeasures, as identified by the Federal Highway Administration (FHWA)[1] and National Highway Traffic Safety Administration (NHTSA)[2], that may reduce fatal and serious injury crashes in alignment with SSA, as well as those that have been shown to be effective in other research at addressing the types of crashes and risk factors seen on Reserve Street.

Figure 2. The Safe System Approach (Source: USDOT)



The project team reviewed these initial candidate strategies and further refined the list based on safety performance considerations, agency outreach, and implementation considerations.

SAFE SYSTEM APPROACH

The identification and evaluation of strategies was guided by the Safe System Approach (SSA), a framework adopted by the USDOT for reducing fatalities and serious injuries resulting from crashes.[3] The SSA, depicted in Figure 2, addresses five aspects of roadway

[1] Federal Highway Administration (FHWA). (2025). *Proven Safety Countermeasures.* https://highways.dot.gov/safety/proven-safety-countermeasures
[2] National Highway Traffic Safety Administration (NHTSA). (2024). *Countermeasures That Work*. https://www.nhtsa.gov/book/countermeasures/countermeasures-that-work
[3] United States Department of Transportation (USDOT). (2022). *National Roadway Safety Strategy.* https://www.transportation.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf

safety: *Safe Road Users, Safe Vehicles, Safe Speeds, Safe Roads,* and *Post-Crash Care*. These aspects recognize that there are numerous factors that contribute to the risks embedded within the transportation system. As such, strategies intended to improve safety can and should look to address all these aspects.

To assess the effectiveness of the draft proposed safety solutions through the lens of the Safe System Approach (SSA), the project team evaluated each strategy according to FHWA's *Safe System Roadway Design Hierarchy*, which provides four tiers of countermeasures, depicted in Figure 3 and described here:

- **Tier 1- Remove Severe Conflicts**: Includes countermeasures that separate people and vehicles moving at different speeds or directions. Potential Tier 1 countermeasures on Reserve Street could include roundabouts, access management, or protected bike lanes.
- **Tier 2- Reduce Vehicle Speeds**: Includes countermeasures that reduce vehicle speeds, thereby reducing the likelihood of a crash and the severity of a crash should one occur. Potential Tier 2 countermeasures on Reserve Street could include a reduced corridor-wide speed limit with additional speed management strategies and enforcement.
- **Tier 3 – Manage Conflicts in Time**: Includes countermeasures that separate users in time using traffic control devices to reduce conflicts. Potential Tier 3 countermeasures on Reserve Street could include conversion of permitted left-turn phasing to protected phasing at signalized intersections or the implementation of pedestrian hybrid beacons or signals at crossings.
- **Tier 4 – Increase Attentive and Awareness**: Includes countermeasures that alert people to potential conflicts. Potential Tier 4 countermeasures on Reserve Street could include improved lighting or advance warning signs.

Figure 3. Safe System Roadway Design Hierarchy (Source: USDOT)



The tiers are generally organized by order of expected effectiveness (i.e., strategies that remove severe conflicts are likely to be more effective than those that only make people more aware of the conflict existing). Strategies can be combined together to create a more impactful approach (e.g., a roundabout may also have enhanced pedestrian crossings).

ROUND #2 ENGAGEMENT

In March 2025, a second round of public engagement invited input on potential strategies for Reserve Street. This round of engagement included a walk audit, virtual web page with a survey and interactive commenting map, two open houses, and community group briefings. The goal of this round was to present and obtain feedback on initial strategy recommendations for Reserve Street. Two key themes emerged from the feedback received from the public:

- Strong demand for safer options for walking and biking, including improved crossings on Reserve Street, enhancing alternative routes, and implementing accessibility improvements; and
- Support for additional traffic controls (traffic signals or roundabouts) on Reserve Street.

There was also interest in speed and access management and concern about how future growth could exacerbate existing challenges, or lead to new ones. These themes (and their intricacies and caveats) were considered by the project team when developing treatment recommendations. Further details regarding the engagement activities are provided in Attachment A.

CORRIDOR VISION & SOLUTIONS WORKSHOPS

The project team conducted two workshops with regional agency staff including Missoula MPO, MDT, City of Missoula, Missoula County, Missoula Ravalli Transportation Management Association (MRTMA), University of Montana, and Mountain Line to review findings from existing conditions and public outreach, and to identify potential solutions for Reserve Street. The first workshop included all of these agencies, while the second included Missoula MPO, City of Missoula, and MDT staff.

In these discussions, participants emphasized the importance of identifying a range of solutions that balance immediate safety needs with the long-term vision for Reserve Street. The group emphasized the need for an actionable plan that considers how future land use changes and development will influence the character of Reserve Street and how these changes will affect safety and mobility on the corridor. The group discussed a range of potential solutions, from low-cost, near-term improvements, such as signal timing adjustments, enhanced pedestrian and bicycle crossings, and access management, to more transformative options like a regional bypass or frontage road, roundabouts, and other alternative intersection designs. Another key theme in the discussions was recognizing that sections of the corridor have distinctly different existing and future land-use contexts and serve different types of trips. These characteristics should be taken into consideration when identifying strategies.

These priorities guided the development of the draft proposed solutions, which focus on both small, near-term improvements, as well as long-term capital projects, that align with both current challenges and future development along Reserve Street.

Evaluation and Prioritization

The project team considered a set of criteria to evaluate candidate strategies and guide recommendations for each priority location along the Reserve Street corridor. The evaluation focused on the following factors:

- Safety emphasis areas (e.g., speed management, crash types) addressed
- Potential safety effectiveness (based on its Safe System Roadway Design Hierarchy tier)
- Relative cost
- Potential effects on multimodal access and connectivity
- Potential impacts to adjacent properties
- Potential effects on regional mobility

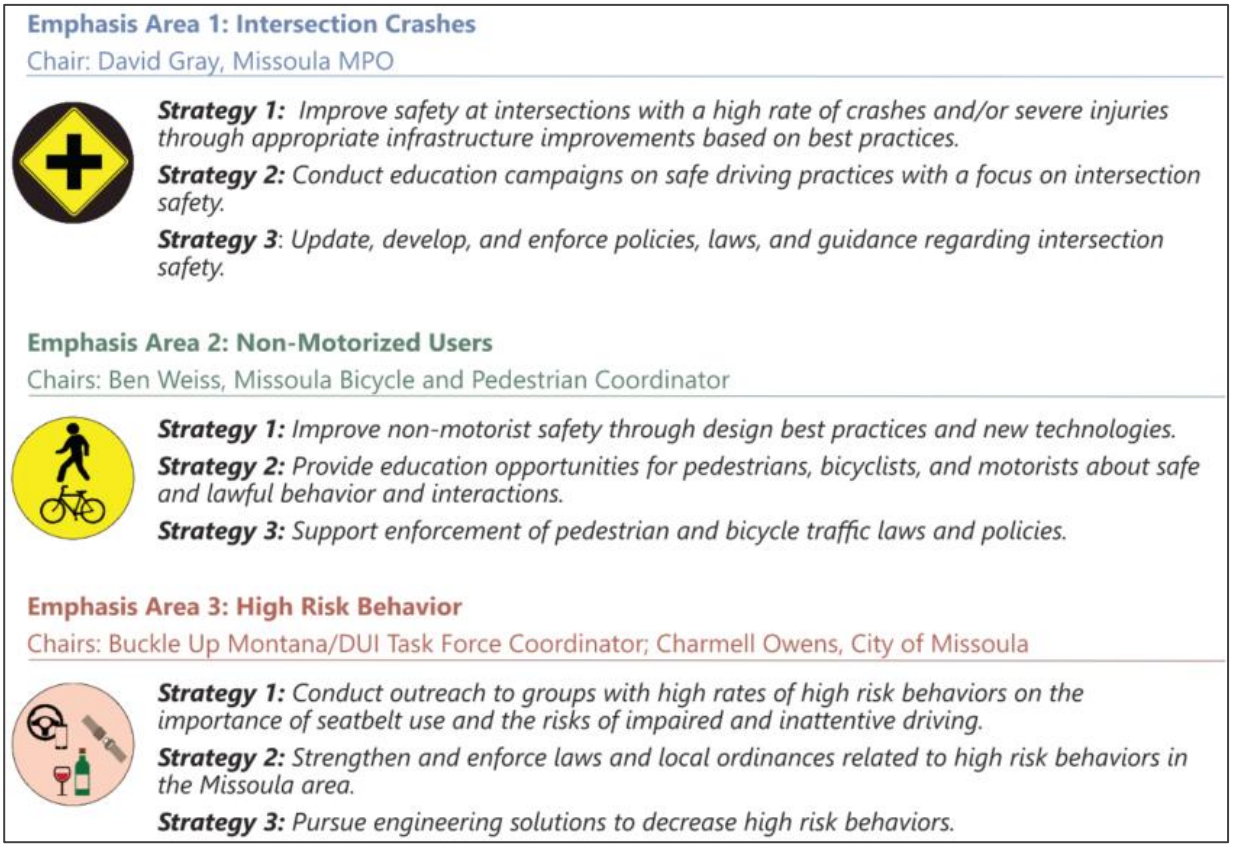
The project team used this evaluation to develop draft recommended strategies. Each recommended strategy was then assigned to one of three timeframes: near-term, mid-term, or long-term. Near-term treatments tend to be lower-cost applications that do not affect surrounding properties. Long-term treatments may require more extensive efforts and funding that would likely only be secured over a longer horizon or they may require other actions be taken first.

Non-Infrastructure Strategies

Non-infrastructure strategies are essential components of implementing the SSA framework. The City, MPO, and MDT have coordinated efforts to create the Missoula Community Transportation Safety Plan (MCTSP). Completed by the MPO in 2019, it provides a foundation for advancing the region's safety priorities by outlining strategy and policy actions. The Reserve Street SAP builds on this foundation by applying these strategies to Reserve Street.

The MCTSP provides strategies aimed at improving roadway safety for all users, with a focus on three emphasis areas – Intersection crashes, Non-Motorized Users, and High-Risk Behavior. A summary of the emphasis areas and safety strategies from the 2019 plan is shown in Figure 4.

Figure 4. Missoula Community Transportation Safety Plan - Strategies Summary



The Reserve Street SAP aligns with the objectives of the plan by evaluating and incorporating the plan's identified strategies and recommending their application to specific locations and conditions observed along Reserve Street. The specific strategies and related actions that are most applicable to Reserve Street are summarized in the following section.

EXISTING POLICIES

Efforts to improve safety on Reserve Street are supported by recent policy actions adopted by the City of Missoula. These policies help integrate safety priorities into the overall transportation planning framework. Key policy actions include:

- **City of Missoula Vision Zero Policy** (Resolution 8633): This policy formally commits the City of Missoula to the goal of eliminating all traffic-related deaths and severe injuries, aligning with the Vision Zero framework.
- **City of Missoula Complete Streets Policy** (Resolution 8098): This policy promotes the design and operation of streets that are safe and accessible for all modes of travel—walking, biking, driving, and public transit. The City also commits to periodically updating this policy to reflect evolving best practices and innovative safety treatments.

STRATEGY RECOMMENDATIONS

The following actions are recommended to further enhance safety along Reserve Street and support the broader goals of the region's transportation safety framework:

- **Implement Emerging Technologies**: Continuously evaluate and integrate new technologies to enhance roadway safety and efficiency on Reserve Street, including advancements in Intelligent Transportation Systems (ITS).
  - **Key Partners**: City of Missoula, MDT
  - MDT is in the process of completing an Automated Traffic Signal Performance Measures (ATSPM) pilot on the Reserve Street corridor and is retiming the corridor's signals using ITS technology.
- **Safe Routes to School Programs**: Continue partnerships with Missoula County Public Schools (MCPS) and the Hellgate School District on the Safe Routes to School Program and City CIP Neighborhood Traffic Management Program to further initiatives on Reserve Street in areas where schools are nearby to provide and promote safe routes for students to walk and bicycle to school and, in particular, cross Reserve Street. The City has previously coordinated with C.S. Porter Middle School to improve crossings to the school.
  - **Key Partners**: MCPS, Hellgate School District, City of Missoula, MDT
- **Data Collection and Monitoring**: Coordinate with Missoula Police Department to share, interpret, and publicize data, and use it to deploy traffic and patrol resources to those areas. Leverage existing and emerging data sources, such as Replica or INRIX, to monitor and analyze driver speeds and behaviors before and after the implementation of treatments on Reserve Street.
  - **Key Partners**: City of Missoula, Missoula MPO, MDT, Missoula Police Department (MPD)
- **Access Management**: Develop an access management plan for Reserve Street to establish strategies and policies for consolidating and managing access points, thereby reducing conflicts as development and redevelopment occur.
  - **Key Partners**: City of Missoula, MDT
- **Corridor Education Campaign**: Conduct a driver education campaign focused on Reserve Street promoting safer behaviors among all roadway users. The campaign would target education around key issues on Reserve Street, including speed compliance and driver alertness at intersections and crossings. Outreach efforts may include social media campaigns and targeted ads about speeding and safety along Reserve Street, signage or temporary digital message signs at key locations (e.g., ahead of Clark Fork River Bridge or near schools), and partnerships with nearby schools, bike/ ped coalitions, driver education programs, and law enforcement.
  - **Key Partners**: City of Missoula, Missoula MPO, MDT, MPD, Hellgate School District, MCPS

OTHER REGION-WIDE STRATEGIES

In addition to strategies specific to Reserve Street, the MCTSP identifies several region-wide strategies designed to encourage safer driving behavior across the Missoula region. These strategies include:

- Education and Outreach
  - Distribute public information on safe driving practices by coordinating and conducting outreach with colleges and K-12 schools, driver education programs, law enforcement and emergency medical services (EMS), and non-motorized advocacy groups.
  - Focus safety education on crash contributing factors including non-motorist impairment, visibility at night, and yielding at crossings.
  - Educate bicycle/ pedestrian/ motorcycle roadway users on intersection safety, including proper crossing behavior at a pedestrian countdown signal.
- Policies, Laws, and Enforcement
  - Pursue a local policy for the consideration of roundabouts at local intersections, where appropriate, based on a review of respective jurisdictional authority. The policy must include consideration of the needs of all modes and users.
  - Consider adoption of a county-wide ordinance regarding the use of cell phones while driving.
  - Update intersection design guidance periodically to incorporate the latest technologies and treatments, ensuring consistency in implementation.
  - Work with law enforcement to prioritize traffic enforcement near where patterns of crashes related to speed violations have been observed. Post patrols at intersections known to have issues with red light running, speeding, failure to stop, and failure to yield the right-of-way.

Infrastructure Solutions

Infrastructure solutions involve physical changes to Reserve Street, as well as signal timing modifications. These elements help shape how users of the transportation system experience and interact with their surroundings and other users. For example, how a roadway is constructed can influence the speed that drivers choose to drive; similarly, the distribution and quality of crossings can influence where and how people walking and biking choose to cross a corridor.

Table 1 summarizes the infrastructure solutions that were considered for the Reserve Street SAP. The table is organized into location types where the treatments can be implemented (signalized intersections, crossings, etc.). Each treatment is described according to its place in the Safe System Roadway Design Hierarchy (see Figure 3), its relative cost ($, $$, or $$$), and the emphasis area(s) that it can address. These emphasis areas are depicted as follows:

 - Vulnerable Road User (VRU) Crashes

 - Speed Management

 - Rear-End Crashes

 - Right-Angle Crashes

 - Turning Crashes

Table 1. Infrastructure Solutions

Strategy	Safe System Hierarchy Tier	Relative Cost	Emphasis Area Addressed
Signalized Intersections			
Dedicated right-turn lanes	Tier 1	$$	
Permissive to protected left turn phasing	Tier 3	$	
Restrict right-turns on red (RTOR)	Tier 3	$	
Evaluate all-red and yellow times	Tier 3	$	
Leading pedestrian intervals *	Tier 3	$	
Unsignalized Intersections			
Turn movement restrictions	Tier 1	$$	
Traffic signal	Tier 3	$$	
Flashing overhead beacons	Tier 4	$	
Signalized or Unsignalized Intersections			
Reduced left-turn conflict intersections (e.g., Median U-Turn (MUT)**)	Tier 1	$$$	
Access management within influence area on side streets	Tier 1	$$	
Roundabout	Tier 1 & 2	$$$	
Reduce curb radii	Tier 2	$$	
Replace right-turn slip lanes with controlled, dedicated turn lanes	Tier 2 & 3	$$	
Larger and advance street name signs	Tier 4	$	
Advance intersection warning signage (and beacons)	Tier 4	$$	

Strategy	Safe System Hierarchy Tier	Relative Cost	Emphasis Area Addressed
Intersection reconfiguration (e.g., reduce skew, reduce offset)	Tier 4	$$$	
Roadway Segments			
Access management (e.g., turn movement restrictions, access consolidation)	Tier 1	$$	
Separated bike lanes	Tier 1	$$	
Sidewalk improvements (widening, buffers)	Tier 1/4	$$	
Shared-use paths	Tier 1	$$$	
Dynamic speed feedback signs	Tier 2	$	
Variable speed limits ***	Tier 2	$	
Reduce lane widths to 11' ****	Tier 2	$	
Reduce posted speed ***	Tier 2	$	
Pavement warning markings (e.g., Optical Speed Bars)	Tier 4	$	
Lighting improvements	Tier 4	$	
Uncontrolled Crossings			
Pedestrian refuge islands	Tier 1	$$	
Bicycle/Pedestrian over or under crossings	Tier 1	$$$	
Protected intersection elements (e.g., corner islands)**	Tier 2	$$	
Pedestrian Hybrid Beacons (PHBs) or Rectangular Rapid Flashing Beacons (RRFBs)	Tier 3 (PHB)/ 4 (RRFB)	$$	
Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)	Tier 4	$	
Continental crosswalk striping	Tier 4	$	

Strategy	Safe System Hierarchy Tier	Relative Cost	Emphasis Area Addressed
ADA improvements	Varies	$$	

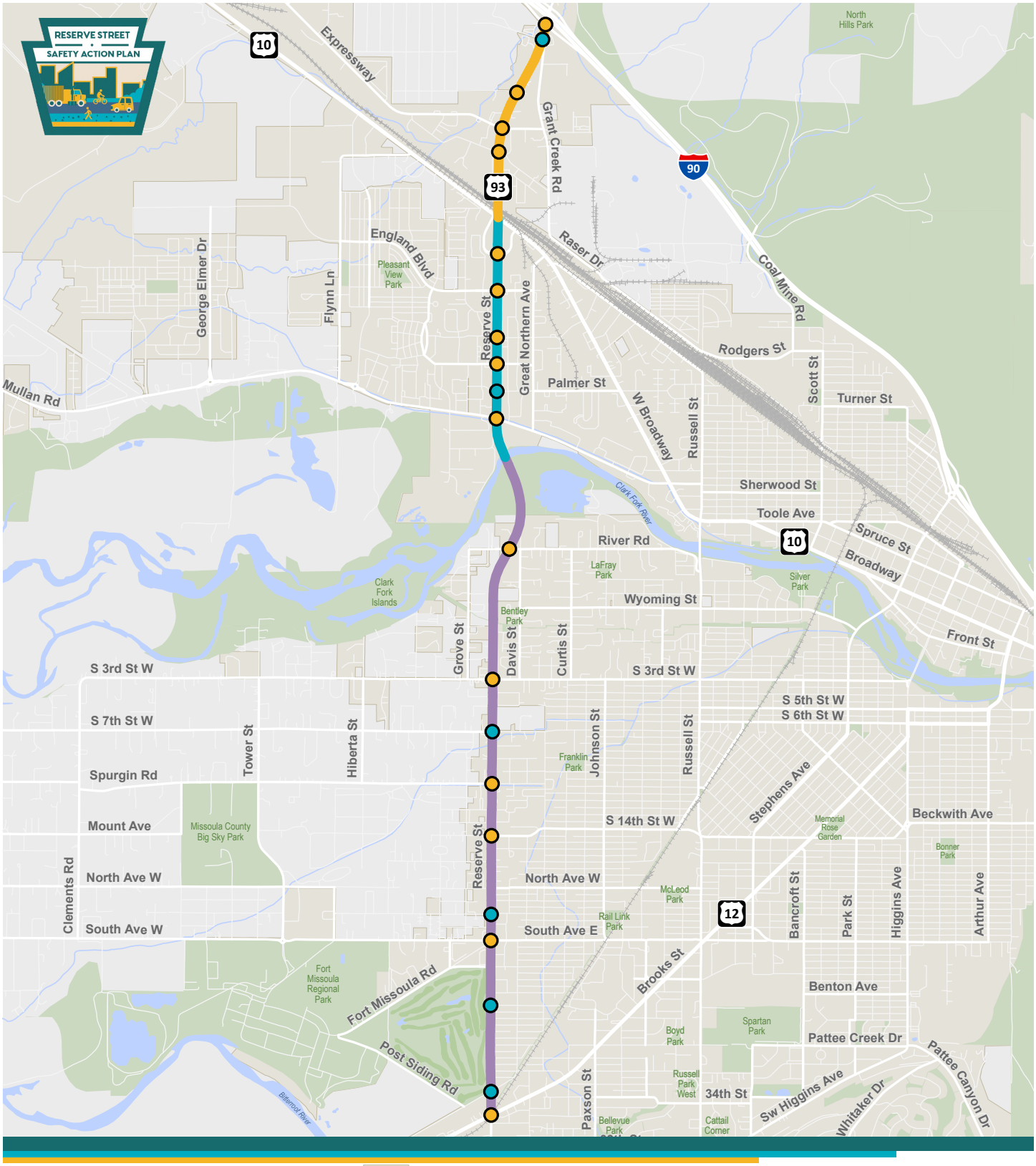
* Per draft guidance from MDT, Leading Pedestrian Intervals (LPIs) require Accessible Pedestrian Signals (APS) and adequate left-turn phasing for vehicles – either protected-only or protected-permissive with Flashing Yellow Arrow (FYA) indication.
** Attachment B and Attachment C contain further details on the MUT and protected intersection treatments.
*** The MDT Transportation Commission must approve is VSLs and speed limit changes before they can be enacted on Reserve Street.
**** Reducing lane widths below 12' will require a design variance from FHWA.

PRIORITY LOCATIONS & CORRIDOR CONTEXT

This section presents key infrastructure strategies and identifies priority locations to implement them on different sections of the street. Reserve Street is a complex corridor characterized by diverse land uses and varied access and mobility demands for all roadway users. The *Existing and Future Conditions Technical Memorandum* describes the three distinct sections of the corridor:

1. I-90 to Broadway Street
2. Broadway Street to Clark Fork River
3. Clark Fork River to US 12 (Brooks Street)

The *Existing and Future Conditions Technical Memorandum* also identified locations for further evaluation of potential treatments. Discussions with the PMT and other agency members resulted in additional locations being considered. These locations – and the three distinct sections above – are illustrated in Figure 5. The project team evaluated the solutions in Table 1 at these locations according to the criteria described in the Evaluation and Prioritization section of this memorandum. While there are similarities across the corridor, each section has unique challenges and opportunities. As such, recommendations are tailored to address the specific needs of each segment. The following section outlines key themes in the recommended safety treatments and describes how they align with the context of each corridor segment. Recommended infrastructure solutions for each location are provided in each corridor section in Table 2 through Table 4. Some infrastructure solutions are recommended for the entire Reserve Street corridor; these recommendations are listed in Table 5. The full results of this evaluation are shown in Attachment D. Additional considerations for the recommended treatments are described in the subsequent sections.



Priority Locations and Source

- Identified by Safety Analysis
- Identified from Agency Feedback

Segment

- I-90 to Broadway
- Broadway to Clark Fork River
- Clark Fork River to US 12

City Limits

Park/Open Space

0 0.5 1 Mile

Data Sources: City of Missoula, Missoula County

Figure 5

Priority Locations and Source

I-90 to Broadway Street Ramps

This section describes the context, presents key infrastructure strategies, and identifies priority locations to implement strategies on Reserve Street from I-90 to the Broadway Street Ramps (south of the railroad).

CONTEXT

Reserve Street from I-90 to the Broadway Street Ramps can be characterized by:

- highway-oriented commercial and industrial uses, including hotels and restaurants,
- relatively high access density,
- ongoing residential and commercial development, which is expected to increase demand for access to/from/across Reserve Street, and
- limited controlled crossings (present only at the I-90 ramps and the Howard Raser Drive/Expressway intersections).

KEY STRATEGIES

Key infrastructure strategies for reducing fatal and serious injury crashes on Reserve Street from I-90 to the Broadway Street Ramps include:

- **Intersection Control:** Upgrading traffic control to remove and/or control conflict points, especially for future development demand, at Schramm Street (planned for a signal) and International Drive/Stockyard Road (roundabout preferred to reduce conflict points coming off the bridge).
- **Access Management:** To the extent possible, limiting full access to key public street connections – Schramm Street, Howard Raser Avenue/Expressway Drive, and International Drive/Stockyard Road – and restricting other streets and driveways to right-in/right-out (RI/RO) or right-in/right-out/left-in (RI/RO/LI).
    - Access modifications may need to be phased in with development/redevelopment or capital projects on Reserve Street or adjacent streets.
    - Many businesses have direct, or shared, access to these major streets. RI/RO/LI access may be the most appropriate access modification for businesses with direct access to Reserve Street but circuitous access to these side streets.
- **Vulnerable Road Users:**
    - *Crossings* - The additional signal and roundabout would add two more crossings, as would upgrading the existing marked crossing by Homewood Suites, between Michael Road and Schramm Street. Additional crossings should be considered as development occurs.
    - *Walking/biking along Reserve Street* – The landscaped buffered sidewalks are recommended to be widened to shared-use paths.

Table 2 identifies recommended solutions for this segment of Reserve Street.

Table 2. Infrastructure Solutions Recommended for I-90 to Broadway Street Ramps

Location	Strategy	Timeframe	Notes/Considerations
Mid-Block Crossing			
Reserve St Crossing (between Grant Creek Rd and Schramm St)	PHB or RRFB[1]	Short Term	PHB preferred due to motor vehicle volumes and speeds. Engineering study to consider MDT and MUTCD guidance needed to select final treatment.
Intersections			
Michael Rd	Turn movement restrictions[2]	TBD – See notes	Only recommended if Michael Rd is extended to future development.
Schramm St	Traffic signal	TBD (expected to be built by development)	If constructed, also consider: – Signal timing/phasing strategies[3] – Protected intersection elements – Intersection bicycle treatments
Expressway Rd-Howard Raser Dr	Signal modifications[3]	Short Term	LPIs likely feasible with existing hardware
	Intersection bicycle treatments	Short Term	
	Protected intersection elements	Long Term	
International Dr-Stockyard Rd	Turn movement restrictions[2]	Short Term	
	Traffic signal or Roundabout[4]	Long Term	If signal is constructed, also consider: – Signal enhancements[3] – Protected intersection elements – Intersection bicycle treatments Expected to meet volume warrants by 2050
	Intersection reconfiguration	Long Term	Reduce skew or reduce offset
Broadway St NB Ramp	PHB or RRFB[1]	Short Term	This is for the crossing of the uncontrolled ramp lane, not Reserve Street.
Broadway St SB Ramp	Evaluate all-red and yellow times	Short Term	
	Advance intersection warning signage (and beacons)	Medium Term	Overhead signs could include flashers coordinated with the signal.

[1] MDT's 2019 memorandum titled "Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations" should be referenced when conducting a study to justify a specific crossing treatment at a specific location.

[2] Could include restricting to right-in/right-out access only or right-in/right-out/left-in access.

[3] Recommended signal modifications (or enhancements for proposed signals) include: LPIs, RTOR restrictions, all-red and yellow time evaluations, and protected left-turn phasing.

[4] When considering a change in traffic control (e.g., traffic signal or roundabout), an intersection control evaluation (ICE) that considers safety, operational, and other impacts (including on adjacent intersections, if applicable) should be completed to determine the ultimate intersection control and configuration.

Broadway Street Ramps to Clark Fork River

This section describes the context, presents key infrastructure strategies, and identifies priority locations to implement strategies on Reserve Street from the Broadway Street Ramps to the Clark Fork River.

CONTEXT

Reserve Street from the Broadway Street Ramps to the Clark Fork River can be characterized by:

- big-box retail and outparcel commercial development,
- business access is primarily provided from side streets,
- three signalized intersections, each spaced more than 1,000 feet apart, being the only controlled multimodal crossing and access opportunities, and
- increasing development west of Reserve Street that is likely to increase multimodal crossing and access demand, especially prior to the planned non-motorized bridge being constructed over the Clark Fork River west of Reserve Street.

KEY STRATEGIES

Key infrastructure strategies for reducing fatal and serious injury crashes on Reserve Street from the Broadway Street Ramps (south of the railroad) to the Clark Fork River include:

- **Intersection Control:**
    - Upgrading traffic control at American Way (crash and/or volume warrants likely to be met) and Palmer Street (regional connectivity, coordination, and/or related to Mullan Road changes) would provide more regular crossings of Reserve Street by all modes of traffic. This could spread demand from future development and potentially improve the coordination of the corridor.
    - A reduced left-turn conflict intersection, such as a MUT, is recommended for consideration at Mullan Road to move left-turning and other conflicts to areas with lower volumes (and potentially lower conflicts).
- **Access Management:** Access in this section is already mostly limited to side streets or restricted access to Reserve Street. There are opportunities to further enforce existing restrictions by extending the center median across driveways where porkchop islands are used to restrict access. Current full access driveways may need to be revisited with redevelopment or capital projects due to lack of alternative access. The Tina Avenue intersection could also be evaluated for access modifications.
- **Vulnerable Road Users:**
    - *Crossings* - The additional signals will increase crossing opportunities between most key destinations and access points.
    - *Walking/biking along Reserve Street* – The landscaped buffered sidewalks are recommended to be widened to shared-use paths. The City is planning a non-motorized bridge over the river west of River Street. Until that time, interim separated bike lanes on the Reserve Street bridge should be considered.

Table 3 identifies recommended solutions for this segment of Reserve Street.

Table 3. Infrastructure Solutions Recommended for Broadway Street to Clark Fork River

Location	Strategy	Timeframe	Notes/Considerations
England Blvd	Signal modifications[1]	Short Term	APS needed to install LPIs. Could also consider replacing westbound split phasing with dual left turns to help reduce access conflicts with queues on England.
	Intersection bicycle treatments	Short Term	
	ADA improvements	Medium Term	
	Access management on side streets within influence area	Medium Term	
	Protected intersection elements	Long Term	
American Way	Turn movement restrictions[2]	Medium Term	
	Traffic signal or Roundabout[3]	Long Term	If signal is constructed, also consider: – Protected intersection elements – Intersection bicycle treatments Expected to meet volume warrants by 2050. Evaluation should consider impact on travel patterns on parallel routes.
Union Pacific St	Signal modifications[1]	Short Term	APS needed to install LPIs.
	Intersection bicycle treatments	Short Term	
Palmer St	Turn movement restrictions[2]	Short Term	Restrictions already exist on the eastbound approach.
	Traffic signal or Roundabout[3]	Long Term	If signal is constructed, also consider: – Protected intersection elements – Intersection bicycle treatments Expected to meet volume warrants by 2050. Evaluation should consider impact on travel patterns on parallel routes.
Mullan Rd	Signal modifications[1]	Short Term	LPIs likely feasible with existing hardware
	Intersection bicycle treatments	Short Term	
	ADA improvements	Medium Term	
	Access management on side streets within influence area	Medium Term	
	Median U-Turn (MUT)	Long Term	
	Protected intersection elements	Long Term	

[1] Recommended signal modifications (or enhancements for proposed signals) include: LPIs, RTOR restrictions, all-red and yellow time evaluations, and protected left-turn phasing.
[2] Could include restricting to right-in/right-out access only or right-in/right-out/left-in access.
[3] When considering a change in traffic control (e.g., traffic signal or roundabout), an intersection control evaluation (ICE) that considers safety, operational, and other impacts (including on adjacent intersections, if applicable) should be completed to determine the ultimate intersection control and configuration.

Clark Fork River to US 12 (Brooks Street)

This section describes the context, presents key infrastructure strategies, and identifies priority locations to implement strategies on Reserve Street from the Clark Fork River to US 12 (Brooks Street).

CONTEXT

Reserve Street from the Clark Fork River to US 12 (Brooks Street) can be characterized by:

- adjacent land-use that is primarily residential with some more locally oriented commercial fronting Reserve Street,
- multiple schools and other community destinations along or adjacent to the corridor,
- the highest speeds on Reserve Street (Clark Fork River bridge to S 3rd Street),
- a surrounding local street grid network,
- limited controlled or enhanced crossing opportunities (there is one mid-block signalized pedestrian crossing and the Milwaukee and Bitterroot Trails have grade-separated crossings under and over Reserve Street), and
- a relatively high density of public street connections, residential driveways/alleys, and business accesses.

KEY STRATEGIES

Key infrastructure strategies for reducing fatal and serious injury crashes on Reserve Street from the Clark Fork River to US 12 (Brooks Street) include:

- **Intersection Control:** Upgrading traffic control at River Road, S 7th Street, Spurgin Road, and Mary Avenue would remove and/or control access points and provide crossing locations to serve the surrounding residential areas, schools, and other destinations.
    - A roundabout could be especially beneficial at River Road to indicate a change in context as vehicles transition from the Clark Fork River bridge to the southern end of the corridor.
    - Roundabouts should also be evaluated as the first choice for upgraded control at S 7th Street, Spurgin Road, and Mary Avenue (already a roundabout corridor to the east).
    - A quadrant intersection could be evaluated to remove left-turn conflicts from the high-volume Brooks Street intersection. This could involve using 39th Street and McDonald Avenue as connector roadways for eastbound and southbound left-turns, respectively.

- **Access Management:** To the extent possible, limiting full access to key public street connections (i.e., existing signalized intersections and the intersections noted for upgrades). For most side streets, this will involve limited out-of-direction travel. However, not all properties have access options outside of Reserve Street.
- **Vulnerable Road Users:**
    - *Crossings* – Upgraded intersection control will provide more crossing opportunities. In the interim, pedestrian hybrid beacons (PHBs) or rectangular rapid flashing beacons (RRFBs) with refuge islands could be considered at S 7th Street, Mary Avenue, and/or Spurgin Road. PHBs are generally the preferred treatment for higher speed, higher traffic roadways like Reserve Street. MDT's 2019 memorandum titled "Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations" should be referenced when conducting a study to justify a specific crossing treatment at a specific location.
    - *Walking/ biking along Reserve Street* – Sidewalks are recommended to be widened to 6 feet with a landscape buffer. The bike lanes south of the Clark Fork River are recommended to be physically separated from motor vehicle traffic. This could be done in the near-term through plastic flexposts, but a harder barrier, along with widening the lanes and narrowing the motor vehicle lanes to 11 feet is recommended for the long-term.

Table 4 identifies recommended solutions for this segment of Reserve Street.

Table 4. Infrastructure Solutions Recommended for Clark Fork River to US 12 (Brooks Street)

Location	Strategy	Timeframe	Notes/Considerations
River Rd	Sight distance improvements	Short Term	
	Advance intersection warning signage (and beacons)	Medium Term	Beacons may be constant or actuated by side-street approaching vehicles
	Overhead beacons	Short Term	Yellow for Reserve St; red for River Rd.
	Turn movement restrictions[1]	Medium Term	Southbound left-turn could be signalized.
	Roundabout or Traffic signal[2]	Long Term	Expected to meet volume warrants by 2050
S 3rd St	Signal modifications[3]	Short Term	APS and FYA needed to install LPIs
	Intersection bicycle treatments	Short Term	
	Advance intersection warning signage (and beacons)	Medium Term	Signage such as Be Prepared to Stop When Flashing or Signal Ahead may be most appropriate. Overhead signs could include flashers coordinated with the signal.
	ADA improvements	Medium Term	
	Reduce curb radii	Medium Term	
	Protected intersection elements	Long Term	

Location	Strategy	Timeframe	Notes/Considerations
S 7th St	PHB or RRFB[4]	Short Term	PHB preferred due to motor vehicle volumes and speeds. Engineering study considering MDT and MUTCD guidance needed to select final treatment. Evaluate need for crossing at S 7th St or Spurgin Rd If installed, include: – Continental markings – Pedestrian refuge island – Advance intersection warning signage (and beacons) – Turn movement restrictions
	Sight distance improvements	Medium Term	
	ADA improvements	Medium Term	
	Traffic signal or Roundabout[2]	Long Term	May meet volume warrants by 2050
Spurgin Rd	PHB or RRFB[4]	Short Term	PHB preferred due to motor vehicle volumes and speeds. Engineering study considering MDT and MUTCD guidance needed to select final treatment. Evaluate need for crossing at S 7th St or Spurgin Rd If installed, include: – Continental markings – Pedestrian refuge island – Advance intersection warning signage (and beacons) – Turn movement restrictions
	Sight distance improvements	Medium Term	
	ADA improvements	Medium Term	
	Traffic signal or Roundabout[2]	Long Term	Expected to meet volume warrants by 2050
Mount Ave	Signal modifications[3]	Short Term	APS and FYA needed to install LPIs
	ADA improvements	Medium Term	
	Intersection bicycle treatments	Medium Term	
	Protected intersection elements	Long Term	
Central Ave	PHB or Pedestrian Signal[4]	Short Term	If the school desires, this could replace the existing mid-block pedestrian signal north of Central Ave
	ADA improvements	Medium Term	
South Ave	Signal modifications[3]	Short Term	FYA needed to install LPIs Evaluate options to improve geometry of east and west legs to eliminate split phasing
	ADA improvements	Medium Term	
	Intersection bicycle treatments	Medium Term	
	Reduce curb radii	Medium Term	

Location	Strategy	Timeframe	Notes/Considerations
	Protected intersection elements	Long Term	
Mary Ave	PHB or RRFB[4]	Short Term	If installed, include: – Continental markings – Pedestrian refuge island – Advance intersection warning signage (and beacons) – ADA improvements
	Traffic signal or Roundabout[2]	Long Term	Expected to meet volume warrants by 2050
Old US 93	Turn movement restrictions[1]	Medium Term	Consider effects on Brooks Street
Brooks St	Signal modifications[3]	Short Term	APS and FYA needed to install LPIs
	Intersection bicycle treatments	Short Term	
	Quadrant intersection	Medium Term	Explore using Old US 93 and/or 39th St to reroute left turns away from Brooks Street
Segments			
River Crossing	Dynamic speed feedback signs	Short Term	Maintenance of signs subject to agreement between MDT and City
	Variable speed limits[5]	Medium Term	
	Lighting improvements	Medium Term	

[1] Could include restricting to right-in/right-out access only or right-in/right-out/left-in access.
[2] When considering a change in traffic control (e.g., traffic signal or roundabout), an intersection control evaluation (ICE) that considers safety, operational, and other impacts (including on adjacent intersections, if applicable) should be completed to determine the ultimate intersection control and configuration.
[3] Recommended signal modifications (or enhancements for proposed signals) include: LPIs, RTOR restrictions, all-red and yellow time evaluations, and permissive-to-protected left-turn phasing.
[4] MDT's 2019 memorandum titled "Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations" should be referenced when conducting a study to justify a specific crossing treatment at a specific location.
[5] The MDT Transportation Commission must approve VSLs and speed limit changes before they can be enacted on Reserve Street.

Infrastructure Solutions for the Entire Corridor

Infrastructure solutions that are applicable to all, or most, of the Reserve Street corridor are identified in Table 5.

Table 5. Infrastructure Solutions Recommended for Entire Reserve Street Corridor

Location	Strategy	Timeframe	Notes/Considerations
All segments	Reduce posted speed	Short Term	
	Pavement marking enhancements	Short Term	
	Advance street names signs and/or larger street signs	Short Term	
	Reduce lane widths to 11'	Medium Term	
	Lighting improvements	Medium Term	Clark Fork River bridge is the highest priority.
	Separated bike lanes	Medium/Long Term	The existing bike lanes south of the river could potentially be modified to have physical separation. This could be accomplished in the near-term through adding flexposts or other vertical elements to the existing bike lanes. In the longer term, lane widths could be reduced and a more permanent vertical element could be installed.
	Shared-use path	Long Term	This treatment preferred north of the river where the existing sidewalk can potentially be widened to shared-use path width.

Figure 6 through Figure 8 illustrate potential cross-sections of Reserve Street with the changes described in Table 5.

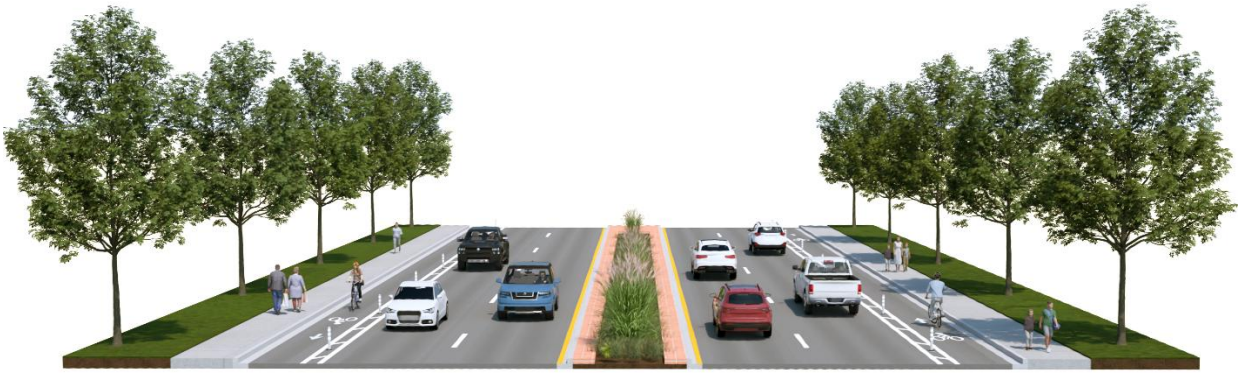


Figure 6 Clark Fork River to Brooks Street, Interim Separated Bike Lanes



Figure 7 Clark Fork River to Brooks Street, Permanent Separated Bike Lanes

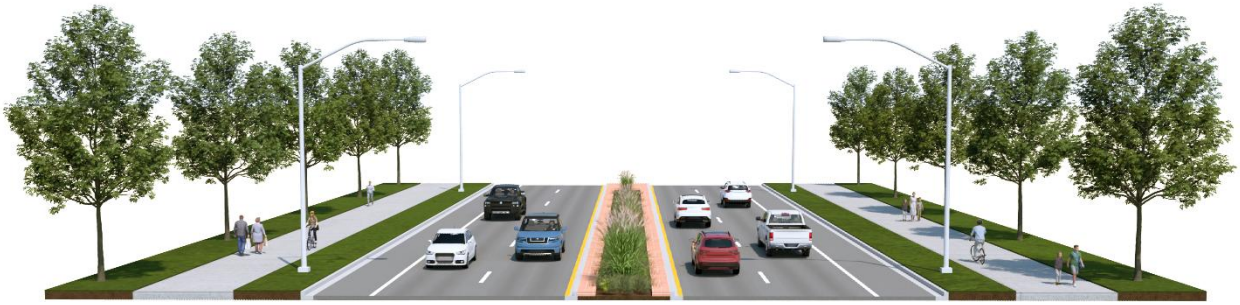


Figure 8 I-90 to Clark Fork River, Shared-Use Paths

ADDITIONAL CONSIDERATIONS

This section provides additional context for specific treatments, including why they either were or were not recommended in the section above. Most recommendations above will require greater evaluation to determine their suitability for each location.

Pedestrian Crossings

Providing new, or enhancing existing, crossings was identified as a top priority in public and stakeholder outreach. MDT policy requires that an engineering study be conducted to justify the implementation of specific crossing treatments. MDT's 2019 memorandum "Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations" contains procedures for determining whether to consider a crossing at a certain location and what types of treatments may be most appropriate. The recommendations in this memo are based on this guidance and the speed and volume of motor vehicles and number of lanes on Reserve Street. This guidance should be referred to during any engineering studies for crossings of Reserve Street.

Any PHB or RRFB installed on Reserve Street is expected to require an overhead structure, per MDT guidance. As such, these are both assumed to be medium-term and medium-cost projects (although PHBs are more expensive to install than RRFBs). Lastly, PHBs may also affect capacity and vehicle queues if they are installed near signalized intersections on Reserve Street.

Intersection Control Evaluations

An in-depth Intersection Control Evaluation (ICE) should be completed prior to changing the control of an intersection (e.g., from stop-controlled to a roundabout or traffic signal). An ICE considers multiple potential intersection forms (e.g., signal, roundabout, alternative lane configurations and levels of access) and a range of performance measures, such as safety and operational performance, cost, construction feasibility, utility and right-of-way impacts, surrounding land-uses, and larger network considerations.

Traffic Signal Warrants

The MUTCD provides nine warrants to assess when considering installing a new traffic signal. These include volume-based warrants, crash warrants, and other context-based warrants. This review conducted a cursory assessment of volume and crash warrants for the locations in Table 2 through Table 4 where traffic signals are listed as a potential strategy. Volume and/or crash warrants are expected to be met by 2050 in most of these locations. Further engineering studies considering these warrants, and other factors, should be conducted prior to installing a new signal. More information on the warrants analysis is provided in Attachment E.

Signal Modifications

MDT is in the process of completing an Automated Traffic Signal Performance Measures (ATSPM) pilot on the Reserve Street corridor. As a part of this, MDT is retiming the signals on Reserve Street between the I-90 interchange ramps and Brooks Street.[4] This project may also evaluate the recommended signal modifications in Table 2 through Table 4. This evaluation could result in these modifications being implemented at some, or all intersections, or it may determine that additional hardware upgrades are needed before they can be fully evaluated.

LEFT-TURN PHASING

Many of the signalized intersections along the corridor offer some form of permissive left-turn phasing. This can result in conflicts between left-turning vehicles and through vehicles or people walking or biking. Providing more instances of protected-only left-turn phasing could reduce these conflicts and resulting crashes. The left-turn phasing strategies recommended in this memorandum include considering:

- *Full-time protected-only phasing* – this is the most restrictive form and is currently present at the Mullan Road intersection. Studies have shown significant reduction, about 67%[5] to 99%[6], in left-turning and angle crashes when protected-permissive (PPLT) or permissive-only phasing is changed to protected-only phasing. This type of left-turn phasing likely provides the greatest safety benefit for all users, including crossing pedestrians since left-turns and conflicting movements are always separated in the signal phasing.

[4] The project includes I-90 westbound and eastbound ramps, Schramm Street (future signal), Expressway Road, Broadway Ramp, England Boulevard, Union Pacific Street, Mullan Road, S 3rd Street, Mount Avenue, Kent (pedestrian signal), South Avenue, and Brooks Street.
[5] FHWA CMF Clearinghouse – CMF ID 11162. https://cmfclearinghouse.fhwa.dot.gov/detail.php?facid=11162.
[6] FHWA CMF Clearinghouse – CMF ID 339. https://cmfclearinghouse.fhwa.dot.gov/detail.php?facid=339.

- *Protected-permissive phasing with pedestrian crossing restrictions* – This type of phasing is intended to reduce conflicts between people using the crosswalk and left-turning vehicles. In this situation, PPLT phasing is the typical approach, but the permissive phase is not provided if there is a pedestrian crossing call across a conflicting crosswalk (e.g., if a person is crossing the west leg of an intersection, the northbound left-turn would only receive a protected phase and would be prohibited from making a left-turn while the Walk or Flashing Don't Walk signal indications are provided across the western crosswalk).
- *Protected-permissive phasing with time-of-day restrictions* – This type of phasing is intended to reduce conflicts during the times they are most present (i.e., when traffic volumes are highest) by providing protected-only left-turn phasing during certain periods. Analysis for this project showed that most left-turning crashes at signals occurred during the p.m. peak hour and 44% of left-turning crashes occurred between 3 p.m. and 8 p.m. These times are potentially also when the capacity benefit of the permissive left-turning phase is limited to fewer vehicles due to the amount of opposing volume. In this scenario, the permissive left-turn phase would not be provided during select hours (e.g., p.m. peak hour, all peak periods) but would be provided when opposing volumes are lower and the crash risk is also lower. MDT is implementing Automated Traffic Signal Performance Measures (ATSPM's) on traffic signals on the Reserve Street corridor, which can be used to measure the number of permissive left-turns during certain hours. This information should be used to evaluate the potential implementation of time-of-day restrictions for protected-only phasing.

The two special case restriction scenarios can be implemented together or separately. They do require specific signal hardware to implement, which may not be present at all intersections. The ongoing signal timing project may evaluate different left-turn phasing scenarios, which may or may not result in the implementation of more protected phasing scenarios; however, hardware upgrades and/or further study may be required at some intersections.

LEADING PEDESTRIAN INTERVALS

Leading Pedestrian Intervals (LPIs) provide dedicated time for pedestrians to enter the crosswalk before a vehicle phase begins. This allows pedestrians to improve their visibility and establish themselves in the crosswalk. Per draft guidance from MDT, LPIs require Accessible Pedestrian Signals (APS) and adequate left-turn phasing for vehicles – either protected-only or protected-permissive with Flashing Yellow Arrow (FYA) indication. As indicated in Table 2 through Table 4, the following signalized intersections on Reserve Street would require the addition of either or both of these features in order to allow for LPIs:

- Reserve Street / England Boulevard (needs APS)
- Reserve Street / Union Pacific Street (needs APS)
- Reserve Street / S 3rd Street (needs APS and improved left-turn phasing)
- Reserve Street / Mount Avenue (needs APS and improved left-turn phasing)
- Reserve Street / South Avenue (needs improved left-turn phasing)
- Reserve Street / Brooks Street (needs APS and improved left-turn phasing)

Turn-Movement Restrictions





Medians, porkchop islands, and plastic flexposts are used today on and near Reserve Street to manage access.

Restricting movements across Reserve Street can remove potentially severe conflicts that result in angle and turning crashes, while also supporting regional mobility. This could include restricting side streets and driveways to right-in/right-out (RIRO) access only or right-in/right-out/left-in access (RIROLI). Raised center medians can be used to provide both types of restrictions. Plastic flexposts can be used instead of raised medians to provide for more near-term implementation and/or to test out the effects of the restrictions before making them permanent with raised medians.

While beneficial for reducing conflicts and improving regional mobility, these restrictions can reduce access to adjacent parcels and side streets. This can result in out-of-direction travel and business impacts. For this reason, parcel and/or side street access and circulation effects should be considered when evaluating where and what type of turning movement restrictions to implement. Attachment D summarizes the peak hour traffic volumes impacted by potential turning movement restrictions at the intersections identified Table 2.

Right-Turn Lanes

Table 1 presented two right-turn lane related strategies. One was providing dedicated right-turn lanes and the other was changing right-turn slip lanes to standard right-turn lanes. Ultimately, neither one of these treatments is recommended at any of the locations above. Dedicated turn lanes remove slowing vehicles from through lanes and thereby reduce rear-end crashes. This can have a significant safety benefit in certain contexts, particularly high-speed rural roadways. However, in urban contexts, they lengthen pedestrian crossing distances, which increases their exposure and adds additional conflict points. They can be costly in urban environments. It also lengthens the minor street split time when there is a pedestrian crossing due to the longer crossing time needed. Further, right-turn volumes are not particularly high at the signalized intersections that do not already have them. Therefore, this memorandum recommends addressing rear-end crashes on Reserve Street mostly through strategies that reduce travel speeds.

The project team evaluated each location where a right-turn slip lane is present. Ultimately, none are recommended for removal at this time since they are typically already controlled by a signal and/or the unique geometry of the location may not result in an increased safety benefit if it is replaced by a standard turn lane. More information on these locations can be found in Attachment D.

Roundabouts

Roundabouts have some benefits over signalized intersections, particularly in terms of safety, access management, and multimodal connectivity:[7]

- **Safety Performance**: Compared to traffic signals, roundabouts reduce the likelihood and severity of crashes by eliminating left turning conflicts and often slowing vehicles down as they enter and maneuver the circulatory roadway. Converting a two-way stop-controlled or signalized intersection to a multi-lane roundabout can reduce injury crashes by about 70%.
- **Access Management**: Roundabouts complement access management strategies like turning movement restrictions and center medians by facilitating U-turn movements. When operating within capacity, roundabouts can also reduce delay for left-turning vehicles compared to stop-controlled or signalized intersections.
- **Multi-Modal Connectivity**: Roundabouts have several features that support people walking and biking, including median splitter islands that provide refuge areas, allowing users to cross in two stages and reducing their exposure to traffic. For multi-lane roundabouts, RRFBs are encouraged to enhance driver awareness of people crossing. Additionally, roundabouts can be designed to encourage slower speeds for entering and circulating vehicles, which can improve driver awareness of people crossing and lowering the severity of a crash should one occur. Roundabouts can also feature shared-use paths around the circulatory roadway.

While roundabouts provide significant safety and other benefits, there are some tradeoffs compared to traffic signals. Roundabout footprints are typically larger than what's required to construct a traffic signal, which can lead to higher upfront construction costs and right-of-way impacts. However, roundabouts generally have longer service lives and lower maintenance costs compared to traffic signals. They also contribute to lower societal costs over time due to fewer high severity crashes. In cases where RRFBs or PHBs are implemented at crossings, some signal equipment is required, but maintenance costs for this equipment are lower than what would be required for a full traffic signal system.

Reserve Street currently has signals at major intersections. These signals could potentially be replaced by roundabouts in the long term. However, in the interim, introducing roundabouts would create a hybrid corridor of signalized and roundabout-controlled intersections. This hybrid corridor configuration raises several key considerations:

- **Corridor Travel Time and Signal Coordination**: Introducing roundabouts on Reserve Street would interrupt the progression of coordinated traffic signals, effectively segmenting the corridor. However, this segmentation may offer operational benefits by creating shorter coordination segments. Research has shown that introducing roundabouts within a signalized corridor can have minimal impact on overall travel time.[8]
- **Queuing and Congestion**: In sections with closely spaced intersections and high traffic volumes (such as from Broadway Street to Clark Fork River), queue spillback into roundabouts is a concern during peak hours. To address this, roundabouts may be metered, functioning as all-way stop controlled intersections during peak congestion to control the flow of traffic. In multi-

[7] NCHRP 1043 Guide for Roundabouts (2023)
[8] NCHRP 772: Evaluating the Performance of Corridors with Roundabouts

lane roundabouts, pedestrian hybrid beacons (PHBs) and other signal hardware can be installed and coordinated with nearby traffic signals to manage vehicle movements during peak times.

- **Access Management**: Roundabouts support access management by reducing conflict points and providing safer options for turning movements, particularly U-turns. These benefits are most effective when multiple roundabouts are implemented in conjunction along a corridor, but an individual roundabout within a hybrid system can also support left-turning and U-turning vehicles.

Variable Speed Limits

Variable speed limits (VSLs) allow the posted speed to be changed based on a variety of factors. Inclement weather is a common use-case, as are traffic volumes and speeds. For instance, speed limits may be lower when the road is snow covered or during peak traffic periods with congestion. The goals of VSLs are to reduce speed differentials and improve driver expectations (e.g., understanding that they may be coming into an area where speeds are lower due to current conditions). Research has shown positive safety trends related to this treatment on freeways[9].

MDT is currently studying the efficacy of variable speed limits and has not yet approved their use. The Transportation Commission would need to approve their use before VSLs can be implemented on Reserve Street. Therefore, this is likely a longer-term treatment to be considered if and when MDT approves VSLs. At such a time, the corridor could be re-examined to determine if and where VSLs could be effective. Upgrades to intersection control and changes to posted speed limits could limit the potential application of VSLs.

Striping Modifications and Additions

Striping changes and enhancements are often considered low-cost, near-term treatments. However, our understanding is that the striping on Reserve Street is inlaid into the surface. Therefore, restriping treatments above are generally considered to be at least medium-term treatments. These include enhancing existing markings as well as adding new markings that may require the modification of existing markings (such as implementing bike boxes). However, some treatments may be implemented using surface paint or thermoplastic, such as enhanced crosswalks or optical speed bars where there is not already striping.

[9] Avelar, R., E.S. Park, S. Ashraf, K. Dixon, M. Li, and B. Dadashova. "Development of Crash Modification Factors for Variable Speed Limits" Report No. FHWA-HRT-21-053. Federal Highway Administration, Office of Safety Research and Development. McLean, Virginia. (2021).

Next Steps

The project team will further evaluate and develop projects at multiple locations on Reserve Street. These locations, listed below, were determined in conjunction with the Project Management Team (PMT).

1. Clark Fork River Bridge
2. Reserve Street / Broadway Street Ramps and Broadway Street Bridge
3. Reserve Street / 7th Street intersection
4. Pedestrian Crossing near Homewood Suites
5. Clark Fork River to Brooks Street segment
6. Reserve Street / American Way intersection
7. Reserve Street / River Road intersection
8. Reserve Street / Mullan Road intersection

Attachments

A. Community Engagement Round #2 Summary
B. Median U-turn (MUT) and Protected Intersection Details
C. Median U-Turn (MUT) Considerations at Mullan Road/ Reserve Street
D. Infrastructure Solutions Evaluation
E. Signal Warrant Assessments

ATTACHMENT A. COMMUNITY ENGAGEMENT ROUND #2 SUMMARY

Community Engagement
Round #2 Summary

WHAT WERE THE ROUND #2 ENGAGEMENT ACTIVITIES?

The second round of engagement for the Reserve Street Safety Action Plan (SAP) took place from **March 1st – April 4th**. The engagement activities included:

- Virtual webpage with a survey, interactive comment map, and project information
- Walk audit with MPO, City, MDT, consultant staff, technical experts, and community members
- Two open houses at Hellgate Elementary School
- Three briefings with community groups (e.g., neighborhood groups, schools)
- Working group meeting with MDT, MPO, City, County, and other agency representatives.

The objectives of this round of engagement activities were to:

- Communicate existing conditions and Engagement Round #1 findings
- Present and obtain feedback on initial strategy recommendations for Reserve Street

The input gathered in Round 2 will guide the identification and prioritization of strategies for Reserve Street.

FEEDBACK STATISTICS

Outreach

MPO SOCIAL MEDIA AND NEWSLETTER

2
WEEKS OF RADIO AND BILLBOARD ADVERTISING

6
PIECES OF MEDIA COVERAGE, INCLUDING INTERVIEWS

2
WEEKS OF RADIO ADVERTISING

Feedback

2
OPEN HOUSES

40
TOTAL VISITORS

15
WALK AUDIT PARTICIPANTS

3
COMMUNITY GROUP BRIEFINGS

19
ONLINE SURVEY RESPONDENTS

13
COMMENTS ON ONLINE COMMENT MAP

What We Heard

The following information summarizes feedback received during Community Engagement Round #2 activities:

Providing Safer Options for Walking/Biking was the highest priority for survey respondents and was a common theme among open house participants.

Safely Crossing Reserve Street: Participants stressed the need to improve existing crossings or implement additional safe, protected crossings. Priority areas for crossing improvements included at Mullan Street and between South Ave and 3rd St.

Alternative Routes: While participants acknowledged the need to improve walking and biking facilities on Reserve Street, many noted that they may still avoid Reserve Street even with improvements, and that alternate walking and biking routes were a higher priority. There are no alternate routes near Reserve Street on the river and railroad crossings, so there is a need to improve walking and biking conditions on those sections or provide an alternate route.

Accessibility Improvements: Participants in the walk audit noted accessibility challenges along Reserve Street, including a lack of audible push-buttons at traffic signals, cracks or debris on sidewalks, lack of connections to adjacent development, and deficient curb ramps and landing areas at driveways or intersections.

Support for Additional Traffic Signals or Roundabouts

Participants generally supported implementing new traffic signals or roundabouts on Reserve Street.

Traffic Signals: Participants liked that traffic signals provided dedicated crossing opportunities but were concerned about potential increases in vehicle delay.

Roundabouts: Participants supported roundabouts for multiple reasons, including their effectiveness at reducing fatal and serious injury crashes, their ability to slow traffic speeds, and their ability to improve access to and from side streets. Some respondents had concerns about the safety of pedestrian crossings at multilane roundabouts.

Locations: While participants noted multiple locations where they would support a traffic signal or a roundabout, River Road had the highest amount of interest.

Other Feeback The following themes were also common in the feedback received:

- Safety and traffic concerns will be exacerbated by **future growth**. Consider prioritizing treatments at locations most likely to be affected by future development.
- Participants liked the potential for **access management** to improve congestion and safety but were concerned about local access impacts.
- Strategies that encourage **safer vehicle speeds** were a high-priority for participants.

ATTACHMENT B. MEDIAN U-TURN AND PROTECTED INTERSECTION DETAILS

Median U-Turn Intersections

The median U-turn (MUT) configurations improve the safety and operational performance of intersections by relocating left turning movements away from the main intersection. Instead of turning left at the intersections, drivers make U-turn movements at a designated intersection a short distance downstream. An MUT configuration can be applied to both major and minor approaches, or both.

By eliminating left turns at the main intersection, MUT configurations reduce the number and complexity of vehicle, pedestrian, and bicycle conflict points, simplify signal phasing, and reduce delays and congestion.

CONSIDERATIONS

MUT configurations typically require a median width of 40 to 70 feet, depending on the turning radius needed to accommodate the turning paths of larger vehicles. Where space for a median isn't available, a bulb-out or "loon" may be necessary to accommodate larger vehicles. MUTs are most applicable at signalized intersections on medium- to high-speed multi-lane roadways. If this width of median is not available, a bulb-out or "loon" is necessary to accommodate large trucks. Accesses or driveways should not be located within close proximity to the u-turn crossover points.

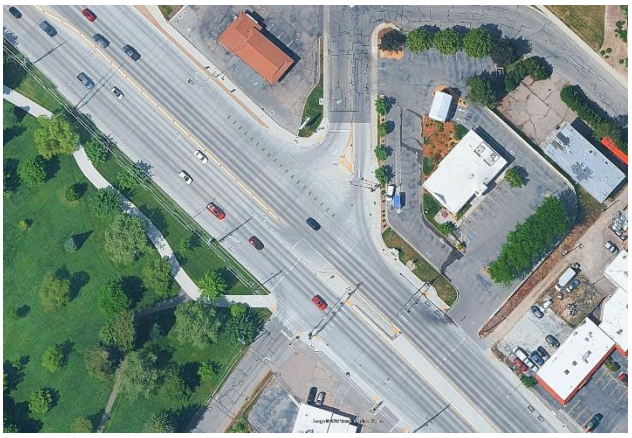


Figure B.1. Median U-Turn Configuration at State Street and Dewey Street, upstream of Veterans Memorial Parkway in Boise, ID (Source: Google Earth)

An MUT configuration was constructed at the Veterans Memorial Parkway and State Street intersection in Boise, ID, shown in Figure A.1.

Specific considerations for applying an MUT at the Reserve Street/Mullan Road intersection are included in Attachment C.

RESOURCES

- Federal Highway Administration (FHWA) Median U-Turn Intersection Informational Guide (2024)

Protected Intersections

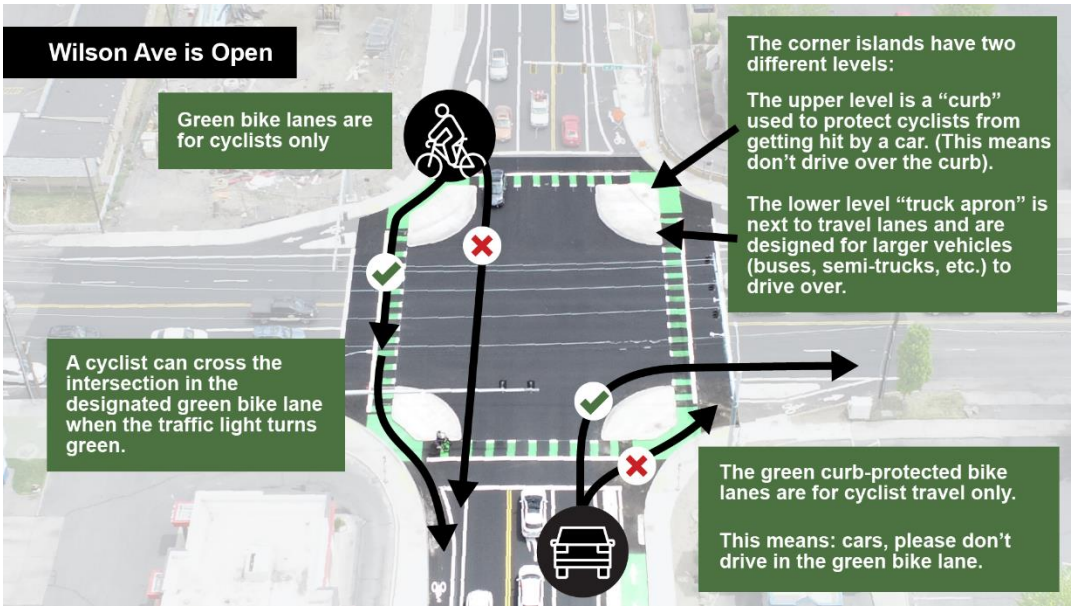
Protected intersections enhance safety and comfort for people walking and biking by physically separating bicyclists and pedestrians from motor vehicle traffic at intersections using corner islands, setback crossings, and leading pedestrian/ bicycle intervals.

CONSIDERATIONS

Protected intersections are most appropriate where there are high volumes of people walking and biking. The smaller corner radii can also reduce the speeds of turning vehicles. Corner islands can be constructed to be mountable to accommodate the turning radii of trucks.

An intersection with protected elements was constructed at the Wilson Avenue and 3rd Street intersection in Bend, Oregon. A graphic showing key elements and user navigation is shown in Figure B.1.

Figure B.1. Elements of the Wildon Avenue and 3rd Street Protected Intersection (Source: City of Bend)



RESOURCES

- Federal Highway Administration (FHWA) Safety Evaluations of Innovative Intersection Designs for Pedestrians and Bicyclists (2023)
- Federal Highway Administration (FHWA) Separated Bike Lane Planning and Design Guide
- NCHRP Report 926 Guidance to Improve Pedestrian and Bicyclist Safety at Intersections

ATTACHMENT C. MEDIAN U-TURN CONSIDERATIONS AT RESERVE STREET

Missoula, MT

Preliminary Design Subject to Change
May 2025

N

Access Road

Clark Fork Lane

Reserve Street

Palmer Street

Great Northern Ave

600 ft from Mullan Road*

Existing Traffic Signal
Approx. 1150' from Reserve Street intersection

600 ft from Reserve Street*

51 (SBL - 2050 PM Peak)

276 (EBL - 2050 PM Peak)

367 (WBL - 2050 PM Peak)

644 (NBL - 2050 PM Peak)

600 ft from Reserve Street*

Approx. 900' from Reserve Street

Embankment restricts ability to widen on the south leg of Reserve Street

600 ft from Mullan Road*

North Leg: Additional analysis is needed to evaluate the feasibility of accommodating a northbound left U-turn at the Palmer Street intersection with a new traffic signal.

The west side of the intersection likely requires widening to accommodate u-turning movements of larger vehicles.

One to two additional lanes needed in the northbound direction of Reserve Street between Mullan Road and Palmer Street to accommodate northbound u-turning vehicles coming from Mullan Road.

West Leg: Additional analysis is needed to evaluate the feasibility of accommodating a northbound left U-turn at the Clark Fork Lane or Access Road intersections with a new traffic signal, as well as the potential impacts on side street operations to ensure sufficient green time for Reserve Street mainline traffic.

The south side of the intersection likely requires widening to accommodate u-turning movements of larger vehicles.

One to two additional lanes needed in the westbound direction of Mullan Road to accommodate westbound u-turning vehicles coming from Reserve Street.

South Leg: Embankment and bridge restrict ability to widen for a u-turn on the south leg.

East Leg: Additional analysis is needed to evaluate the feasibility of accommodating a eastbound left U-turn at Great Northern Ave intersection with a new traffic signal.

The north side of the intersection likely requires widening to accommodate u-turning movements of larger vehicles.

One to two additional lanes needed in the westbound direction of Mullan Road to accommodate westbound u-turning vehicles coming from Reserve Street.

Scale: 1" = 175'

0

*The spacing from the main intersection to the U-turn crossover varies in practice. AASHTO recommends spacing of 400 to 600 ft, depending on signal timing and spacing.

KITTELSON & ASSOCIATES
PHONE: 208.338.2683 CONTACT: Nick Foster

Reserve Street/ Mullan Road Intersection

Median U-Turn Considerations

I:\30\30913 - Reserve Street SSAA Action Plan\design\Exhibits\30913_ReserveStreetSAP_Concepts_v2.dwg May 06, 2025 - 3:39pm kjopp Layout Tab: Mullan Rd MUT

ATTACHMENT D. INFRASTRUCTURE SOLUTIONS EVALUATION

Location	Type	Subtype	Treatment	Speed Management	Rear End Crashes	Right Angle Crash	Turning Crashes	Vulnerable Road User Crashes	Safe System Hierarchy	Relative Cost	Potential Timeframe
Michael Rd	Intersection	TWSC	Turn movement restrictions		X	X	X	X	Tier 1	$$	TBD
N Reserve Street Crossing	Crossing		Pedestrian Hybrid Beacons or Rectangular Rapid Flashing Beacons (RRFBs)					X	Tier 3/4	$$	Short Term
Schramm St	Intersection	TWSC	Traffic Signal	X		X	X	X	Tier 3	$$	TBD (built by development)
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Same as Signal
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Same as Signal
			Leading Pedestrian Intervals					X	Tier 3	$	Same as Signal
			ADA improvements					X	-	$$	Same as Signal
			Restrict RTOR				X	X	Tier 3	$	Same as Signal
Expressway-Raser Dr	Intersection	Signalized	Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Short Term
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Long Term
			Dedicated right-turn lanes		X				Tier 1	$$	Long Term
International Dr-Stockyard Rd	Intersection	TWSC	Turn movement restrictions		X	X	X	X	Tier 1	$$	Short Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Long Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Same as Signal
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Same as Signal
			Intersection reconfiguration (e.g., reduce skew, reduce offset)	X		X	X	X	Tier 4	$$$	Long Term
Broadway St NB Ramp	Intersection	TWSC	Pedestrian Hybrid Beacons or Rectangular Rapid Flashing Beacons (RRFBs)					X	Tier 3/4	$$	Short Term
Broadway St SB Ramp	Intersection	Signalized	Advance intersection warning signage (and beacons)		X	X	X		Tier 4	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
England Blvd	Intersection	Signalized	Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Short Term
			ADA improvements					X	-	$$	Medium Term
			Access management on side streets within influence area			X	X	X	Tier 1	$$	Medium Term
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Long Term
American Way	Intersection	TWSC	Turn movement restrictions		X	X	X	X	Tier 1	$$	Short Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Medium/Long Term
			Dedicated right-turn lanes		X				Tier 1	$$	Medium Term
Union Pacific St	Intersection	Signalized	Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
			Dedicated right-turn lanes		X				Tier 1	$$	Medium Term
Palmer St	Intersection	TWSC	Turn movement restrictions		X	X	X	X	Tier 1	$$	Short Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Long Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
Mullan Rd	Intersection	Signalized	Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Short Term
			ADA improvements					X	-	$$	Medium Term
			Access management on side streets within influence area		X	X	X	X	Tier 1	$$	Medium Term
			Median U-Turn (MUT)/Restricted Crossing U-Turn (RCUT)			X	X	X	Tier 1	$$$	Long Term
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Long Term
			Replace right-turn slip lanes with controlled, dedicated turn lanes	X			X	X	Tier 2/3	$$	Long Term
			Intersection reconfiguration (e.g., reduce skew, reduce offset)	X		X	X	X	Tier 4	$$$	Long Term
River Rd	Intersection	TWSC	Sight distance improvements (e.g., landscaping, relocating stop bars)		X	X	X	X	Tier 4	$	Short Term
			Advance intersection warning signage (and beacons)		X	X	X		Tier 4	$	Short Term
			Flashing beacons		X		X		Tier 4	$	Short Term
			Turn movement restrictions		X	X	X	X	Tier 1	$$	Medium Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Long Term
			Intersection reconfiguration (e.g., reduce skew, reduce offset)	X		X	X	X	Tier 4	$$$	Long Term

Location	Type	Subtype	Treatment	Speed Management	Rear End Crashes	Right Angle Crash	Turning Crashes	Vulnerable Road User Crashes	Safe System Hierarchy	Relative Cost	Potential Timeframe
S 3rd St			Advance intersection warning signage (and beacons)		X	X	X		Tier 4	$	Short Term
			Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Short Term
			ADA improvements					X	-	$$	Medium Term
			Reduce curb radii	X		X	X	X	Tier 2	$$	Medium Term
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Long Term
			Median U-Turn (MUT)/Restricted Crossing U-Turn (RCUT)			X	X	X	Tier 1	$$$	Long Term
S 7th St	Intersection	TWSC	Pedestrian Hybrid Beacons or Rectangular Rapid Flashing Beacons (RRFBs)					X	Tier 3/4	$$	Short Term
			Enhanced crossings (Continental striping)					X	Tier 4	$	Short Term
			Pedestrian refuge islands	X				X	Tier 1	$$	Short Term
			Advance intersection warning signage (and beacons)		X	X	X		Tier 4	$	Short Term
			Sight distance improvements (e.g., landscaping, relocating stop bars)		X	X	X	X	Tier 4	$	Medium Term
			Turn movement restrictions		X	X	X	X	Tier 1	$$	Medium Term
			ADA improvements					X	-	$$	Medium Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Long Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
Spurgin Rd	Intersection	TWSC	Pedestrian Hybrid Beacons or Rectangular Rapid Flashing Beacons (RRFBs)					X	Tier 3/4	$$	Short Term
			Enhanced crossings (Continental striping)					X	Tier 4	$	Short Term
			Pedestrian refuge islands	X				X	Tier 1	$$	Short Term
			Advance intersection warning signage (and beacons)		X	X	X		Tier 4	$	Short Term
			Sight distance improvements (e.g., landscaping, relocating stop bars)		X	X	X	X	Tier 4	$	Short Term
			Turn movement restrictions		X	X	X	X	Tier 1	$$	Medium Term
			ADA improvements					X	-	$$	Medium Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Long Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
Mount Ave	Intersection	Signalized	Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
			Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			ADA improvements					X	-	$$	Medium Term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Medium Term
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Long Term
Central Ave	Intersection	TWSC	Pedestrian Hybrid Beacons or Rectangular Rapid Flashing Beacons (RRFBs)					X	Tier 3/4	$$	Short Term
			ADA improvements					X	-	$$	Medium Term
South Ave	Intersection	Signalized	Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Evaluate all-red and yellow times			X	X		Tier 3	$	Short Term
			ADA improvements					X	-	$$	Medium term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Medium Term
			Reduce curb radii	X		X	X	X	Tier 2	$$	Medium Term
			Protected intersection elements (e.g., corner islands)	X				X	Tier 3	$$	Long Term
Mary Ave	Intersection	TWSC	Pedestrian Hybrid Beacons or Rectangular Rapid Flashing Beacons (RRFBs)					X	Tier 3/4	$$	Short Term
			Enhanced crossings (Continental striping)					X	Tier 4	$	Short Term
			Pedestrian refuge islands	X				X	Tier 1	$$	Short Term
			Advance intersection warning signage (and beacons)		X	X	X		Tier 4	$	Short Term
			ADA improvements					X	-	$$	Short Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Long Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
Old US 93	Intersection	TWSC	Turn movement restrictions		X	X	X	X	Tier 1	$$	Medium Term
			Traffic Signal	X		X	X	X	Tier 3	$$	Medium/Long Term
			Roundabout	X	X	X	X		Tier 1/2	$$$	Long Term
Brooks St	Intersection	Signalized	Permissive to protected left turn phasing			X	X	X	Tier 3	$	Short Term
			Leading Pedestrian Intervals					X	Tier 3	$	Short Term
			Restrict RTOR				X	X	Tier 3	$	Short Term
			Evaluate all-red and yellow times				X		Tier 3	$	Short Term
			Intersection bicycle treatments (e.g., bike boxes, two-stage left-turn boxes)					X	Tier 3	$	Short Term
			Quadrant intersection				X		Tier 1	$$	Medium Term
River Crossing	Segment		Dynamic speed feedback signs	X	X	X	X	X	Tier 2	$	Short Term
			Pavement warning markings	X	X				Tier 4	$	Short Term

Location	Type	Subtype	Treatment	Speed Management	Rear End Crashes	Right Angle Crash	Turning Crashes	Vulnerable Road User Crashes	Safe System Hierarchy	Relative Cost	Potential Timeframe
River Crossing	Segment		Variable speed limits	X					Tier 2	$	Short Term
			Lighting improvements			X	X	X	Tier 4	$	Medium Term
Reserve Street Corridor	Segment		Reduce posted speed	X	X	X	X	X	Tier 2	$	Short Term
			Lighting improvements			X	X	X	Tier 4	$	Medium Term
			Separated bike lanes					X	Tier 1	$$	Medium Term
			Shared-use path					X	Tier 1	$$$	Long Term
			Pavement marking enhancements						Tier 4	$	Short Term
			Advance street name signs and/or larger street signs		X				Tier 4	$	Short Term
			Reduce lane widths to 11'	X					Tier 2	$	Short/Medium Term
			Develop Access Management Plan		X		X	X	Tier 1	$$	Short Term

ATTACHMENT E. SIGNAL WARRANT ASSESSMENTS

KITTELSON & ASSOCIATES

Project #: 30013
Project Name: Reserve Street SS4A Action Plan
Analyst: RXO
Analysis Date: 5/21/2025
File: H:\30\30013 - Reserve Street SS4A Action Plan\Task 4 - Safety Strategies\Task 4.1 Strategy Development\analysis\warrants\RT
Intersection: Reserve St / International Dr-Stockyard Rd
Scenario:
Data Date: 1/29/2025

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

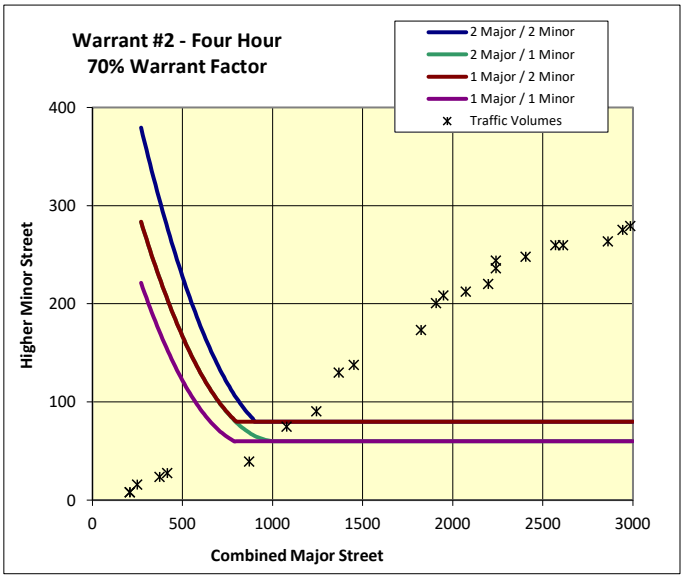
Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
4:35 PM	5:35 PM	1861	1332	295	95
2nd Highest Hour		1740	1246	279	90
3rd Highest Hour		1716	1228	275	89
4th Highest Hour		1668	1194	264	85
5th Highest Hour		1523	1090	260	84
6th Highest Hour		1498	1073	260	84
7th Highest Hour		1402	1003	248	80
8th Highest Hour		1305	934	244	79
9th Highest Hour		1305	934	236	76
10th Highest Hour		1281	917	220	71
11th Highest Hour		1208	865	212	68
12th Highest Hour		1136	813	208	67
13th Highest Hour		1112	796	201	65
14th Highest Hour		1063	761	173	56
15th Highest Hour		846	605	138	44
16th Highest Hour		798	571	130	42
17th Highest Hour		725	519	90	29
18th Highest Hour		628	450	75	24
19th Highest Hour		508	363	39	13
20th Highest Hour		242	173	28	9
21st Highest Hour		218	156	24	8
22nd Highest Hour		145	104	16	5
23rd Highest Hour		121	86	8	3
24th Highest Hour		121	86	8	3

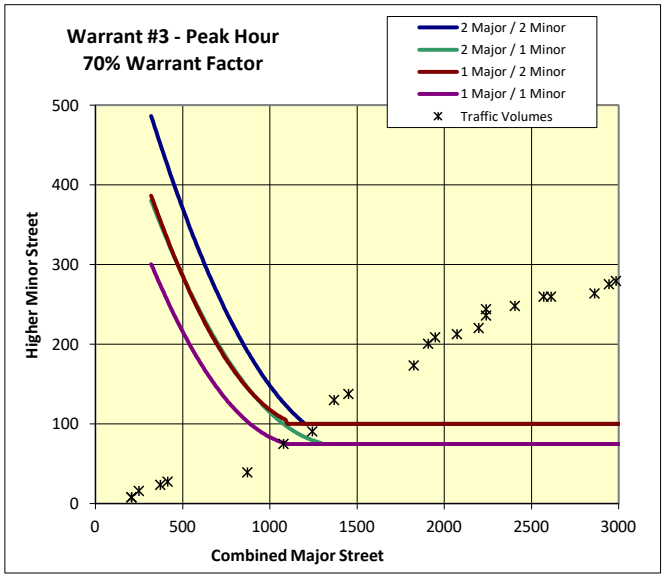
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	14	Yes	**Yes**
	B	900	75	18	Yes	
80%	A	480	120	16	Yes	**Yes**
	B	720	60	18	Yes	
70%	A	420	105	16	Yes	**Yes**
	B	630	53	18	Yes	
56%	A	336	84	17	Yes	**Yes**
	B	504	42	18	Yes	





KITTELSON & ASSOCIATES

Project #: 30013
Project Name: Reserve Street SS4A Action Plan
Analyst: RXO
Analysis Date: 5/21/2025
File: H:\30\30013 - Reserve Street SS4A Action Plan\Task 4 - Safety Strategies\Task 4.1 Strategy Development\analysis\warrants\RT
Intersection: Reserve St / American Way
Scenario:
Data Date: 1/29/2025

Analysis Traffic Volumes

Hour Begin	Hour End	Major Street NB	Major Street SB	Minor Street EB	Minor Street WB
4:35 PM	5:35 PM	1434	1450	76	176
2nd Highest Hour		1341	1356	72	167
3rd Highest Hour		1322	1337	71	164
4th Highest Hour		1285	1299	68	157
5th Highest Hour		1173	1186	67	155
6th Highest Hour		1155	1168	67	155
7th Highest Hour		1080	1092	64	148
8th Highest Hour		1006	1017	63	145
9th Highest Hour		1006	1017	61	141
10th Highest Hour		987	998	57	131
11th Highest Hour		931	942	55	127
12th Highest Hour		875	885	54	124
13th Highest Hour		857	866	52	120
14th Highest Hour		819	829	45	103
15th Highest Hour		652	659	35	82
16th Highest Hour		615	621	33	77
17th Highest Hour		559	565	23	54
18th Highest Hour		484	490	19	45
19th Highest Hour		391	395	10	23
20th Highest Hour		186	188	7	16
21st Highest Hour		168	169	6	14
22nd Highest Hour		112	113	4	9
23rd Highest Hour		93	94	2	5
24th Highest Hour		93	94	2	5

Warrant Summary

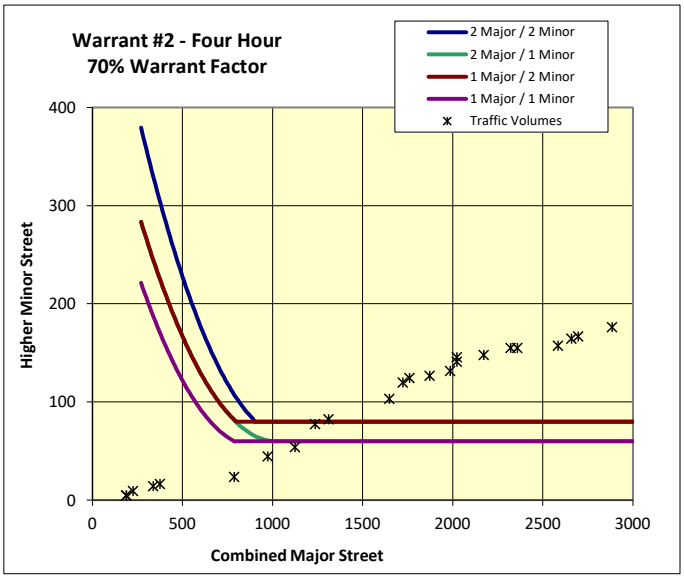
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

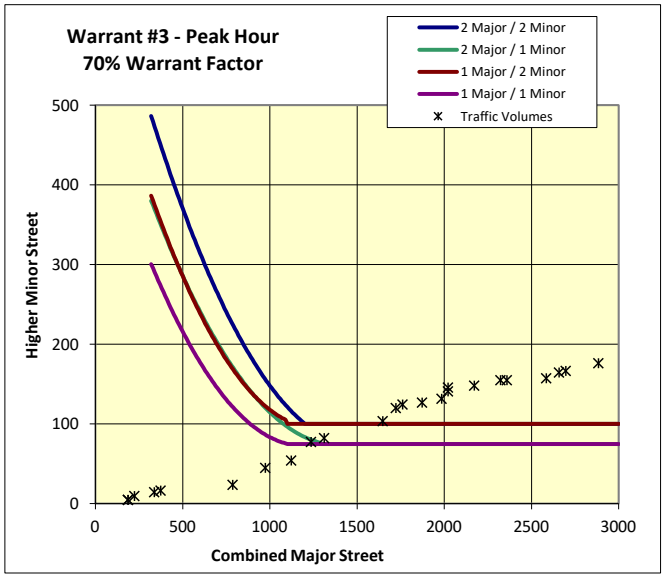
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	6	No	**Yes**
	B	900	75	16	Yes	
80%	A	480	120	13	Yes	**Yes**
	B	720	60	16	Yes	
70%	A	420	105	13	Yes	**Yes**
	B	630	53	17	Yes	
56%	A	336	84	14	Yes	**Yes**
	B	504	42	18	Yes	





KITTELSON & ASSOCIATES

Project #: 30013
Project Name: Reserve Street SS4A Action Plan
Analyst: RXO
Analysis Date: 5/22/2025
File: H:\30\30013 - Reserve Street SS4A Action Plan\Task 4 - Safety Strategies\Task 4.1 Strategy Development\analysis\warrants\RT
Intersection: Reserve St / Palmer St
Scenario:
Data Date: 1/29/2025

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
4:35 PM	5:35 PM	1587	1513	180	192
2nd Highest Hour		1484	1415	170	182
3rd Highest Hour		1463	1395	168	179
4th Highest Hour		1422	1356	161	172
5th Highest Hour		1298	1238	158	169
6th Highest Hour		1278	1218	158	169
7th Highest Hour		1195	1140	151	161
8th Highest Hour		1113	1061	149	159
9th Highest Hour		1113	1061	144	154
10th Highest Hour		1092	1041	134	143
11th Highest Hour		1031	982	130	138
12th Highest Hour		969	924	127	136
13th Highest Hour		948	904	122	131
14th Highest Hour		907	865	106	113
15th Highest Hour		721	688	84	90
16th Highest Hour		680	648	79	84
17th Highest Hour		618	589	55	59
18th Highest Hour		536	511	46	49
19th Highest Hour		433	413	24	26
20th Highest Hour		206	196	17	18
21st Highest Hour		185	177	14	15
22nd Highest Hour		124	118	10	10
23rd Highest Hour		103	98	5	5
24th Highest Hour		103	98	5	5

Warrant Summary

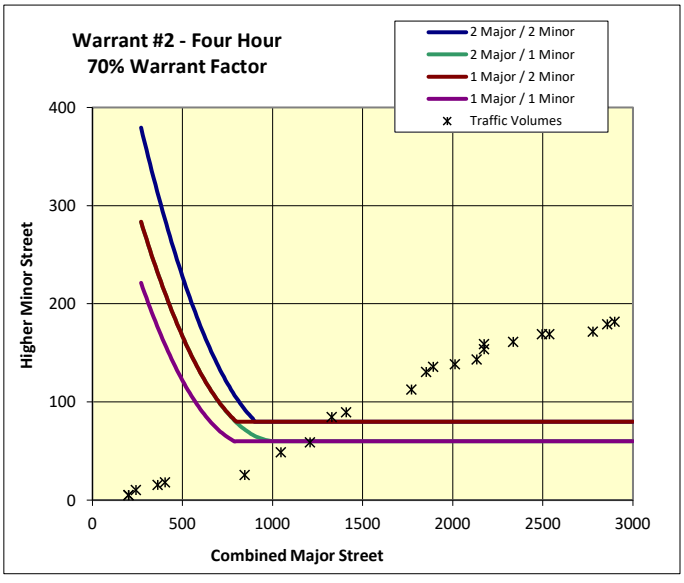
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

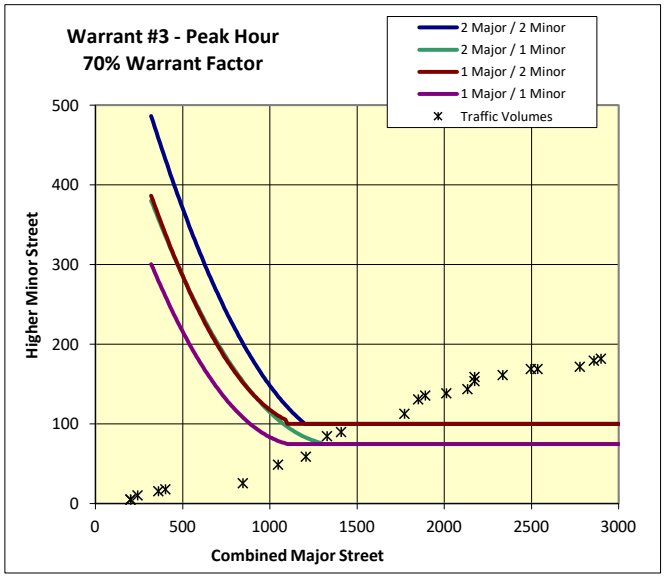
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	9	Yes	**Yes**
	B	900	75	16	Yes	
80%	A	480	120	13	Yes	**Yes**
	B	720	60	16	Yes	
70%	A	420	105	14	Yes	**Yes**
	B	630	53	17	Yes	
56%	A	336	84	16	Yes	**Yes**
	B	504	42	18	Yes	





KITTELSON & ASSOCIATES

Project #: 30013
Project Name: Reserve Street SS4A Action Plan
Analyst: RXO
Analysis Date: 5/21/2025
File: H:\30\30013 - Reserve Street SS4A Action Plan\Task 4 - Safety Strategies\Task 4.1 Strategy Development\analysis\warrants\RT
Intersection: Reserve St / River Rd
Scenario:
Data Date: 1/29/2025

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

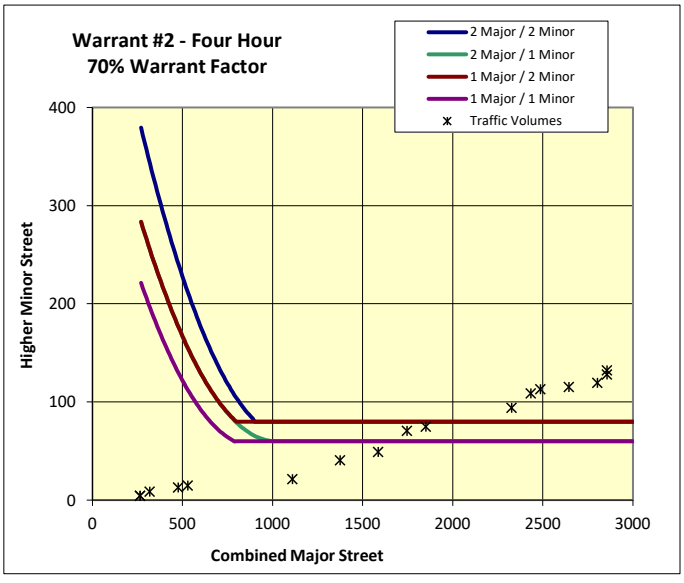
Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
4:35 PM	5:35 PM	1863	2210	17	160
2nd Highest Hour		1742	2066	16	151
3rd Highest Hour		1718	2038	16	149
4th Highest Hour		1669	1980	15	143
5th Highest Hour		1524	1808	15	141
6th Highest Hour		1500	1779	15	141
7th Highest Hour		1403	1665	14	134
8th Highest Hour		1307	1550	14	132
9th Highest Hour		1307	1550	14	128
10th Highest Hour		1282	1521	13	119
11th Highest Hour		1210	1435	12	115
12th Highest Hour		1137	1349	12	113
13th Highest Hour		1113	1320	12	109
14th Highest Hour		1065	1263	10	94
15th Highest Hour		847	1005	8	75
16th Highest Hour		798	947	7	70
17th Highest Hour		726	861	5	49
18th Highest Hour		629	746	4	41
19th Highest Hour		508	603	2	21
20th Highest Hour		242	287	2	15
21st Highest Hour		218	258	1	13
22nd Highest Hour		145	172	1	9
23rd Highest Hour		121	144	0	4
24th Highest Hour		121	144	0	4

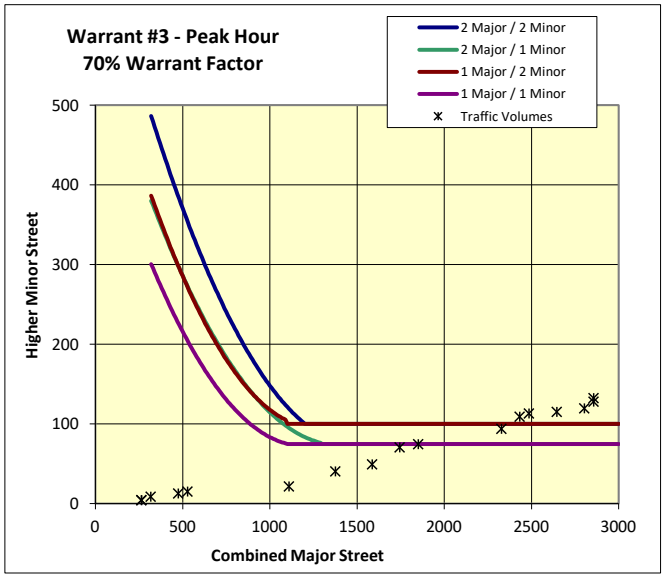
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	3	No	**Yes**
	B	900	75	15	Yes	
80%	A	480	120	10	Yes	**Yes**
	B	720	60	16	Yes	
70%	A	420	105	13	Yes	**Yes**
	B	630	53	16	Yes	
56%	A	336	84	14	Yes	**Yes**
	B	504	42	17	Yes	





KITTELSON & ASSOCIATES

Project #: 30013
Project Name: Reserve Street SS4A Action Plan
Analyst: RXO
Analysis Date: 5/21/2025
File: H:\30\30013 - Reserve Street SS4A Action Plan\Task 4 - Safety Strategies\Task 4.1 Strategy Development\analysis\warrants\RT
Intersection: Reserve St / Spurgin Rd
Scenario:
Data Date: 1/29/2025

Analysis Traffic Volumes

Hour Begin	Hour End	Major Street NB	Major Street SB	Minor Street EB	Minor Street WB
4:35 PM	5:35 PM	1616	1729	64	24
2nd Highest Hour		1511	1617	61	23
3rd Highest Hour		1490	1594	60	22
4th Highest Hour		1448	1549	57	21
5th Highest Hour		1322	1415	56	21
6th Highest Hour		1301	1392	56	21
7th Highest Hour		1217	1302	54	20
8th Highest Hour		1133	1213	53	20
9th Highest Hour		1133	1213	51	19
10th Highest Hour		1112	1190	48	18
11th Highest Hour		1049	1123	46	17
12th Highest Hour		986	1055	45	17
13th Highest Hour		965	1033	44	16
14th Highest Hour		923	988	38	14
15th Highest Hour		735	786	30	11
16th Highest Hour		693	741	28	11
17th Highest Hour		630	674	20	7
18th Highest Hour		546	584	16	6
19th Highest Hour		441	472	9	3
20th Highest Hour		210	225	6	2
21st Highest Hour		189	202	5	2
22nd Highest Hour		126	135	3	1
23rd Highest Hour		105	112	2	1
24th Highest Hour		105	112	2	1

Warrant Summary

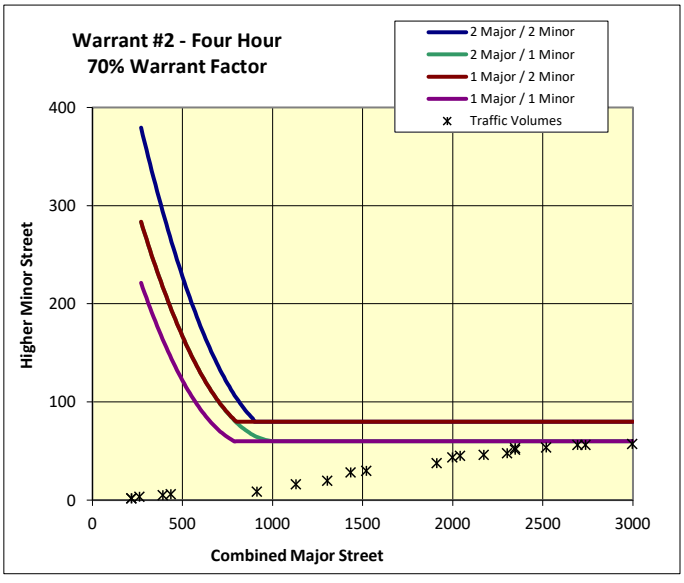
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

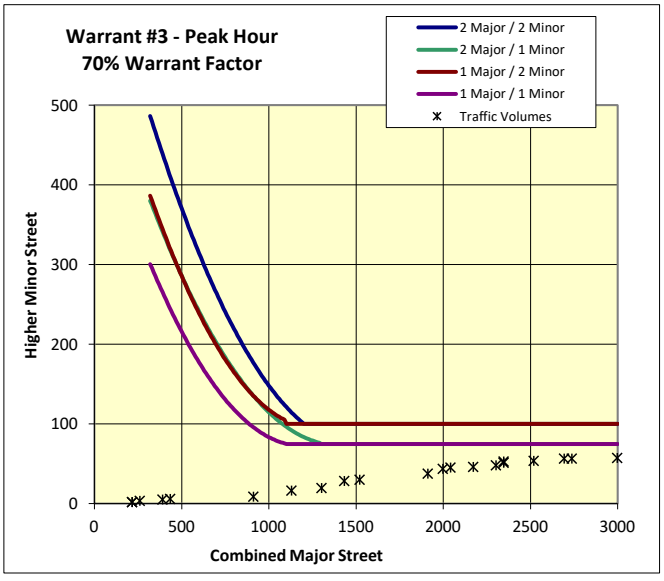
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	**No**
	B	900	75	0	No	
80%	A	480	120	0	No	**No**
	B	720	60	3	No	
70%	A	420	105	0	No	**Yes**
	B	630	53	8	Yes	
56%	A	336	84	0	No	**Yes**
	B	504	42	13	Yes	





KITTELSON & ASSOCIATES

Project #: 30013
Project Name: Reserve Street SS4A Action Plan
Analyst: RXO
Analysis Date: 5/21/2025
File: H:\30\30013 - Reserve Street SS4A Action Plan\Task 4 - Safety Strategies\Task 4.1 Strategy Development\analysis\warrants\RT
Intersection: Reserve St / Mary Ave
Scenario:
Data Date: 1/29/2025

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

Analysis Traffic Volumes

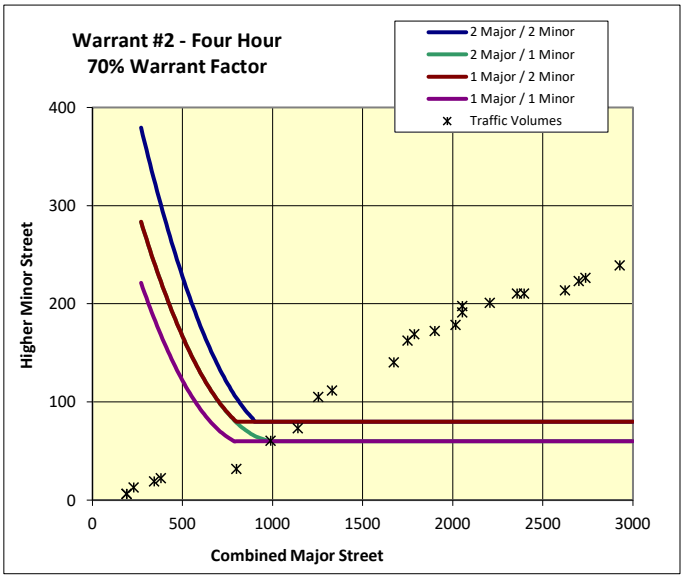
Hour Begin	Hour End	Major Street NB	Major Street SB	Minor Street EB	Minor Street WB
4:35 PM	5:35 PM	1108	1820	0	239
2nd Highest Hour		1036	1702	0	226
3rd Highest Hour		1022	1678	0	223
4th Highest Hour		993	1631	0	214
5th Highest Hour		907	1489	0	210
6th Highest Hour		892	1465	0	210
7th Highest Hour		835	1371	0	201
8th Highest Hour		777	1276	0	198
9th Highest Hour		777	1276	0	191
10th Highest Hour		763	1253	0	178
11th Highest Hour		719	1182	0	172
12th Highest Hour		676	1111	0	169
13th Highest Hour		662	1087	0	163
14th Highest Hour		633	1040	0	140
15th Highest Hour		504	827	0	112
16th Highest Hour		475	780	0	105
17th Highest Hour		432	709	0	73
18th Highest Hour		374	615	0	61
19th Highest Hour		302	496	0	32
20th Highest Hour		144	236	0	22
21st Highest Hour		130	213	0	19
22nd Highest Hour		86	142	0	13
23rd Highest Hour		72	118	0	6
24th Highest Hour		72	118	0	6

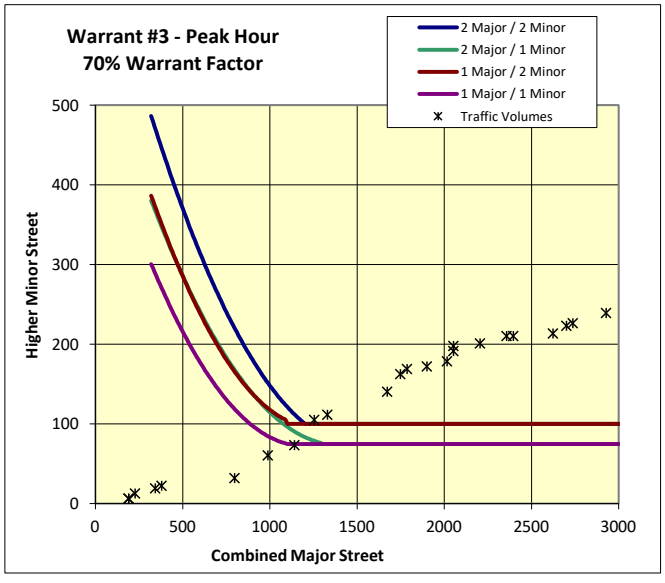
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	13	Yes	**Yes**
	B	900	75	16	Yes	
80%	A	480	120	14	Yes	**Yes**
	B	720	60	18	Yes	
70%	A	420	105	16	Yes	**Yes**
	B	630	53	18	Yes	
56%	A	336	84	16	Yes	**Yes**
	B	504	42	18	Yes	





KITTELSON & ASSOCIATES

Project #:	30013
Project Name:	Reserve Street SS4A Action Plan
Analyst:	RXO
Analysis Date:	5/21/2025
File:	H:\30\30013 - Reserve Street SS4A Action Plan\Task 4 - Safety Strategies\Task 4.1 Strategy Development\analysis\warrants\RT
Intersection:	Reserve St / Old US 93
Scenario:	
Data Date:	1/29/2025

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	NB	SB	EB	WB
4:35 PM	5:35 PM	1051	1764	94	28
2nd Highest Hour		983	1649	89	27
3rd Highest Hour		969	1627	88	26
4th Highest Hour		942	1581	84	25
5th Highest Hour		860	1443	83	25
6th Highest Hour		846	1420	83	25
7th Highest Hour		792	1329	79	24
8th Highest Hour		737	1237	78	23
9th Highest Hour		737	1237	75	22
10th Highest Hour		723	1214	70	21
11th Highest Hour		682	1145	68	20
12th Highest Hour		642	1077	66	20
13th Highest Hour		628	1054	64	19
14th Highest Hour		601	1008	55	16
15th Highest Hour		478	802	44	13
16th Highest Hour		450	756	41	12
17th Highest Hour		409	687	29	9
18th Highest Hour		355	596	24	7
19th Highest Hour		287	481	13	4
20th Highest Hour		136	229	9	3
21st Highest Hour		123	206	8	2
22nd Highest Hour		82	137	5	1
23rd Highest Hour		68	115	3	1
24th Highest Hour		68	115	3	1

Warrant Summary

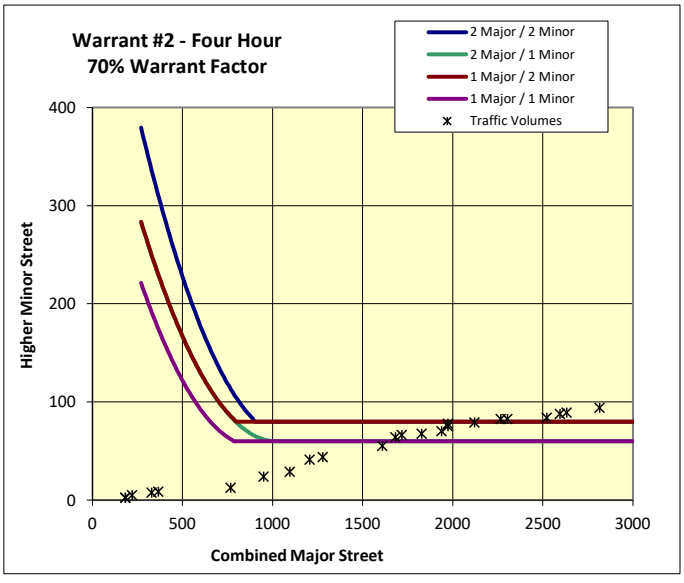
Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-
#9	Intersection Near a Grade Crossing	No	-

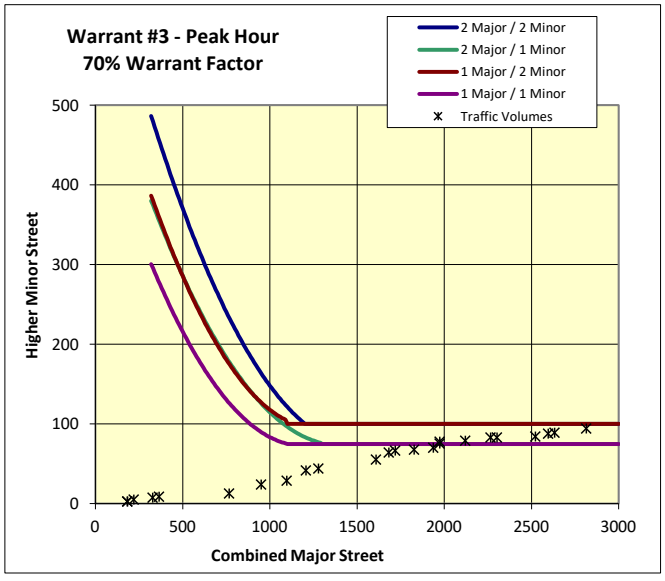
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	90%
Major Street: 8th-Highest Hour / Peak Hour	70%
Minor Street: 4th-Highest Hour / Peak Hour	89%
Minor Street: 8th-Highest Hour / Peak Hour	83%

Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	600	150	0	No	**Yes**
	B	900	75	9	Yes	
80%	A	480	120	0	No	**Yes**
	B	720	60	13	Yes	
70%	A	420	105	0	No	**Yes**
	B	630	53	14	Yes	
56%	A	336	84	4	No	**Yes**
	B	504	42	16	Yes	





Appendix D

KITTELSON & ASSOCIATES
101 South Capitol Boulevard, Suite 600
Boise, ID 83702
P 208.338.2683

DRAFT TECHNICAL MEMORANDUM

January 28, 2026 Project# 30013

To: Glenn Ingram and Charlie Menefee, Missoula MPO

From: Katie Popp; Mark Heisinger, PE; Nick Foster, AICP, RSP$_1$; and Robert Olney

CC: Joel Boucher, Vicki Crnich, Joan Redeen, and Geoff Streeter, MDT; Aaron Wilson, City of Missoula

RE: Reserve Street Safety Action Plan – Implementation Plan DRAFT

Disclaimer: Pursuant to 23 U.S.C. § 407, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of Title 23, U.S.C., or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data. This publication is not intended to waive any of the State of Montana's rights or privileges under 23 U.S.C. § 407.

Introduction

Following Technical Memorandum #4 (Safety Strategies), the project management team (PMT) selected five "packages" of safety treatments to further evaluate.

- Package A – Lighting, Signage, and Signal Upgrades (multiple locations)
- Package B – Access Management & Crossings (Clark Fork River to Brooks Street)
- Package C – Reserve Street/American Way Intersection
- Package D – Reserve Street/River Road Intersection
- Package E – Reserve Street/Mullan Road Intersection

This memorandum describes the proposed treatments and initial evaluations of them. Attachment A includes summary sheets for each package.

These treatments address safety-related challenges identified at priority locations along the corridor. They were selected based on crash histories, community and agency input, and a desire to balance short-term and long-term efforts. Three intersections have been selected for potential intersection control upgrades, and other intersections and segments are evaluated for other targeted safety treatments. A fourth intersection, International Drive-Stockyard Road is also evaluated for potential quick-build treatments at the request of City staff.

The treatments in these packages are planning-level concepts. In some cases, further studies are needed to determine feasibility or select a preferred treatment. Further engineering and study (e.g., intersection control evaluations, crossing treatment or illumination studies) are required for all proposed treatments.

Priority Packages

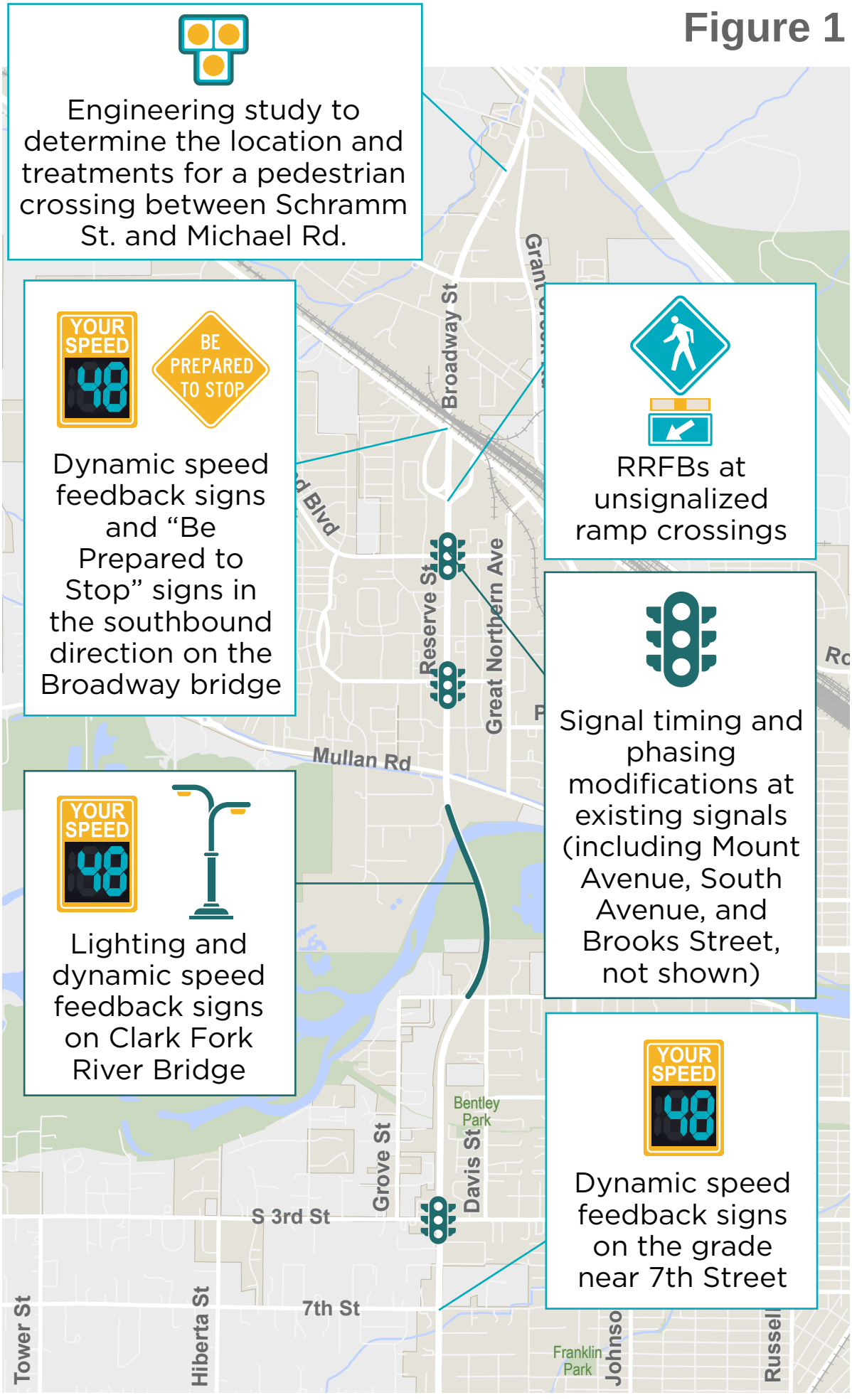
The following sections discuss these five packages, including the reason for selecting each location, as well as safety and operational performance, costs, and other considerations. Specific next steps are provided for each package. A summary of the treatments in each package can be found in Table 17 in the Conclusion section.

PACKAGE A: LIGHTING, SIGNAGE, AND SIGNAL UPGRADES

Package A addresses multimodal safety through lighting, speed management, warning signs, crossing enhancements, and signal upgrades at multiple locations. The treatments in Package A reflect projects with relatively lower barriers to implementation, making them candidates for near-term construction, potentially with local funding.

Figure 1 illustrates most of the treatments recommended at each specific location, aside from the signal modifications described in the Signal Upgrades section. Treatments include new lighting, Pedestrian Hybrid Beacons (PHBs) and Rectangular Rapid Flashing Beacons (RRFBs), dynamic speed feedback signs, and advance warning signs. These are all intended to enhance driver awareness along key segments and at crossings on Reserve Street.

Figure 1


Engineering study to determine the location and treatments for a pedestrian crossing between Schramm St. and Michael Rd.
YOUR SPEED 48
BE PREPARED TO STOP
Dynamic speed feedback signs and "Be Prepared to Stop" signs in the southbound direction on the Broadway bridge
RRFBs at unsignalized ramp crossings
Signal timing and phasing modifications at existing signals (including Mount Avenue, South Avenue, and Brooks Street, not shown)
YOUR SPEED 48
Lighting and dynamic speed feedback signs on Clark Fork River Bridge
YOUR SPEED 48
Dynamic speed feedback signs on the grade near 7th Street
Broadway St
Reserve St
Great Northern Ave
Mullan Rd
Bentley Park
Grove St
Davis St
S 3rd St
7th St
Tower St
Hiberta St
Franklin Park

Enhancements to Existing Crossing near Homewood Suites

There is an existing crossing at the north end of the corridor near Homewood Suites, pictured in Figure 2. The crossing has a median refuge and one overhead crossing sign for both directions of Reserve Street. While the crossing is a relatively long distance from adjacent crossing opportunities at traffic signals, observed pedestrian volumes indicate relatively low usage. Providing an enhanced crossing (or replacing it in a new location) may improve usage by pedestrians and bicyclists on a section of Reserve Street with few crossing opportunities – especially if more development occurs in the vicinity.

Figure 2. Existing Crossing (Source: Kittelson)



Based on discussions with the City and MDT, it is recommended that an engineering study adhering to MDT's crossing guidance be completed to determine the appropriate location and treatments for a crossing between Schramm Street and Michael Road. This location may coincide with the existing location or may be a different location. A cursory assessment based on MDT's *Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations (2019)* and FHWA's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (2018)* (provided in Attachment B) and using the number of lanes, posted speed, and average annual daily traffic (AADT) on Reserve Street, indicates that a PHB should be considered as the crossing treatment at the chosen location. An engineering study considering MDT and MUTCD requirements will be required to be completed before any treatment is installed.

If the existing location were to be maintained and a PHB were installed, the existing overhead structures may not have sufficient load-bearing strength for multiple PHB heads. Therefore, the planning recommendation would be to replace the existing overhead structures and locate the new poles adjacent to the crossing ramps. This would ensure that the overhead arms reach both travel lanes in each direction and would provide mounts for the pedestrian signal heads and pushbuttons. Lastly, the existing ramps may not meet current accessibility standards (e.g., tactile warning strips are absent) and would need to be evaluated for upgrades.

A grade-separated crossing should be explored as a potential alternative to enhancing (and/or relocating) the existing at-grade crossing. If pursued, additional coordination among MDT, the City, and the MPO would be needed to determine maintenance responsibilities for a grade-separated crossing.



Pedestrian Crossing near Homewood Suites
Missoula, MT

Figure
3

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Broadway Street Ramps and Bridge over Railroad

The intersections with the Broadway Street ramps experienced 86 crashes in a five-year period, including 77 rear-end crashes and one pedestrian crash. To help address these types of crashes, the following treatments are recommended, as illustrated in Figure 5:

- RRFBs at the uncontrolled pedestrian crossings on the ramps
- Flashing beacons and advanced warning signs on Reserve Street (southbound) upstream of the signal on Reserve Street at the southbound ramps connecting to Broadway.
- Dynamic speed feedback signs on bridge over Broadway Street

Three of the four Broadway Street ramps have uncontrolled pedestrian crossings, with the other part of the southbound traffic signal. Based on the posted speeds, traffic volumes, and MDT's *Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations*, enhanced crossings are recommended at the unsignalized ramp crossings. Additionally, this plan recommends RRFBs to provide active indications to people driving that someone may be crossing or waiting to cross.

Separately, the vertical curvature of the bridge over the railroad affects sight distance in both directions. This can mean queues from the traffic signal may not be visible to southbound drivers until they approach the top of the curve. In the southbound direction, advance traffic control signs – potentially with flashing beacons interconnected with the southbound traffic signal or queues – may enhance driver awareness of queues beyond the crest of the bridge. This may reduce the risk of rear-end crashes related to the signal.

Figure 4. Overhead Advance Traffic Control Signs and Beacons (Ogletown Road, Newark, Delaware). Source: Google Streetview



Further study will be required to determine if flashing beacons should be installed and how they should operate. Typically, flashing beacons are activated when arriving drivers should expect to have to stop at a signal (an example is shown in Figure 4). Observations provided by MDT indicate that southbound queues can fail to clear within green times. This could result in southbound vehicles arriving to find stopped or slow-moving vehicles even when the flashing beacons are not activated. Additional study should examine the likelihood of such situations occurring and examine similar installations in other areas to evaluate whether such a scenario might result in decreased safety performance. Some similar locations (e.g., urban, multilane highways) that could be considered in such a study include:

- SR 273/Ogletown Road (Newark, Delaware)
- US 93 (Kalispell, Montana)
- OR 99W (Newberg, Oregon)
- Newport Boulevard (Orange County, California)
- Capital Boulevard (Raleigh, North Carolina)

This package includes installing dynamic speed feedback signs on the bridge in both directions in order to manage speeds. Maintenance of these signs would be subject to agreement between MDT and the City of Missoula. MDT and the City are also interested in studying the effectiveness of these signs. They could be installed and studied at one of the three recommended locations (i.e., Broadway bridge, Clark Fork River

bridge, S 7th Street). Depending on their performance, they could then be installed at other locations, modifications to their design or placement could be explored, or alternative speed management treatments could be considered.

There is some concern that multiple dynamic signs along the corridor could limit their effectiveness. Therefore, MDT and the City should continue to evaluate the effectiveness of these signs as more are installed to monitor whether their effectiveness is affected by additional signs added along the corridor and to modify implementation plans accordingly.

Clark Fork River Bridge

These treatments address illumination and speed management between Mullan Road and S 3rd Street. A concept is provided in Figure 6.

ILLUMINATION

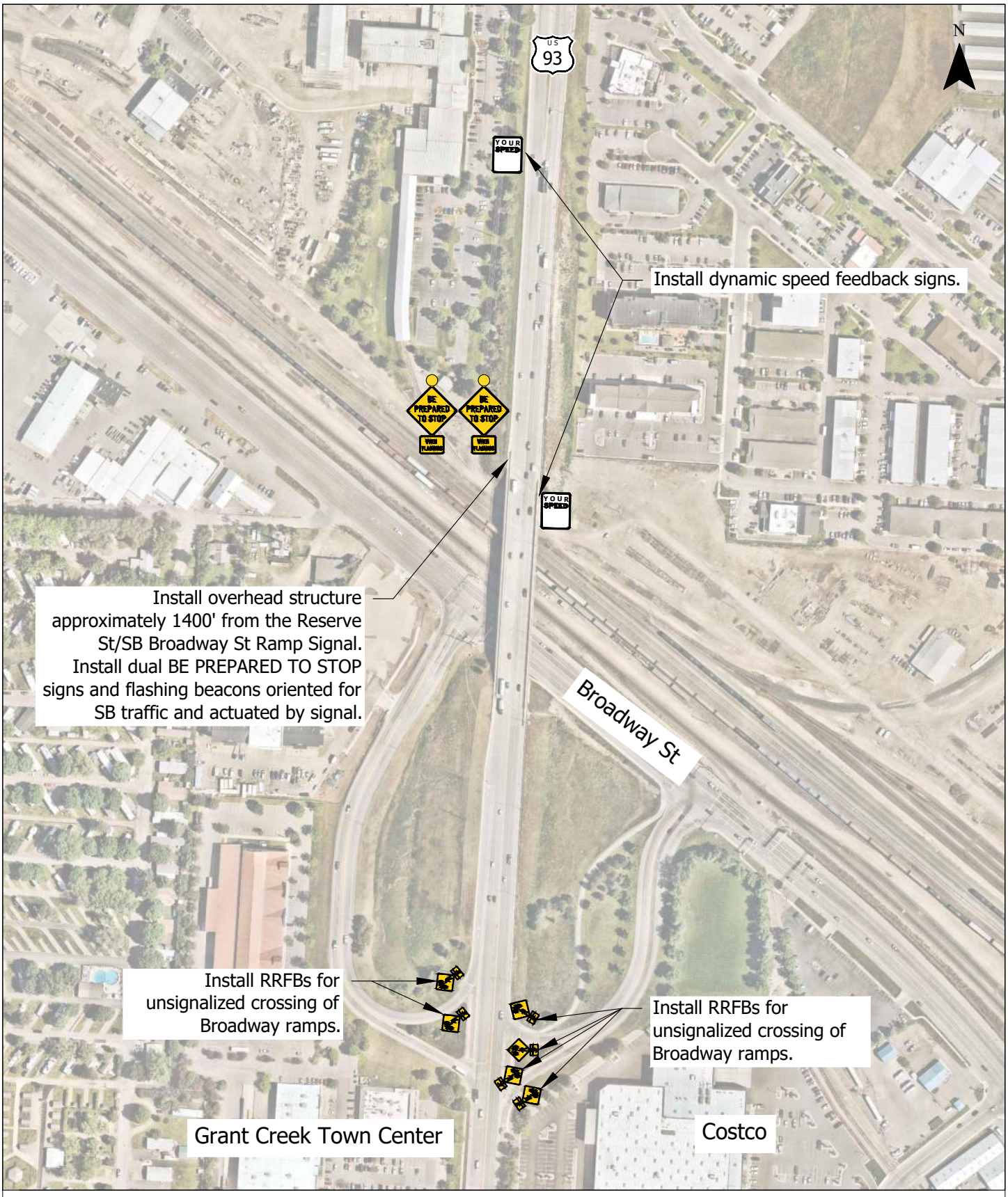
The section of Reserve Street from River Road to just south of Mullan Road currently has no artificial illumination. Installing luminaires along the bridge would improve visibility for drivers and potentially enhance the usability of the existing sidewalks. An engineering study should be completed to determine the final spacing and design of the lighting. For cost-estimate purposes, this package assumes that light poles would be installed at approximately 300-foot spacing on either side of Reserve Street, offset 150 feet with the opposite side. Spacing may need to be closer on the bridge if an environmental review limits the brightness of these luminaires. The City has also expressed a desire to consider Dark Sky best practices during lighting design. There are multiple possible construction methods for installing lighting on the Clark Fork River bridge:

- Concrete bump-outs added to the bridge deck
- Retrofitting of existing railings to support poles
- Installing poles directly into one of the sidewalks.

The existing sidewalks are likely too narrow to allow for pedestrians to pass light poles if they were installed directly into one sidewalk; this would force pedestrians to one side of the bridge without a nearby crossing to do so. A full engineering and illumination study is needed to determine final needs.

SPEED MANAGEMENT

TomTom (a big data provider) was used to collect travel-speed metrics along Reserve Street. Travel speeds on the Clark Fork River Bridge were found to be the highest of any location along Reserve Street; 85th-percentile speeds reached nearly 60 miles per hour. Dynamic speed feedback signs heading into the horizontal curve on the bridge in both directions could help manage speeds along this long segment between intersections. Maintenance of these signs would be subject to agreement between MDT and the City of Missoula. MDT and the City are also interested in studying the effectiveness of these signs. They could be installed and studied at one of the three recommended locations (i.e., Broadway bridge, Clark Fork River bridge, S 7th Street). Depending on their performance, they could then be installed at other locations, modifications to their design or placement could be explored, or alternative speed management treatments could be considered.



Reserve St & Broadway St Ramps
Missoula, MT

Figure
5

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Clark Fork River Bridge Lighting
Missoula, MT

Figure 6

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Signage at S 7th Street

The Reserve Street/S 7th Street intersection experienced 35 crashes over a five-year period, including one serious injury crash. Reserve Street at S 7th Street has vertical curvature that may affect potential sight distance. Public feedback has noted that this is an uncomfortable location to cross with no crossing treatments provided across the five-lane cross section. A big data source (TomTom) indicates that 85th-percentile speeds are around 50 mph.

The intersection may also benefit from an enhanced crossing treatment, such as a PHB (see Package B below). In the near term, however, dynamic speed feedback signs are recommended as a low-cost treatment to enhance driver awareness and reduce travel speeds, which may improve experiences for people crossing Reserve Street. Dynamic speed feedback signs would be installed on Reserve Street upstream of the S 7th Street intersection in both directions. Maintenance of these signs would be subject to agreement between MDT and the City of Missoula. MDT and the City are also interested in studying the effectiveness of these signs. They could be installed and studied at one of the three recommended locations (i.e., Broadway bridge, Clark Fork River bridge, S 7th Street). Depending on their performance, they could then be installed at other locations, modifications to their design or placement could be explored, or alternative speed management treatments could be considered.

A concept is provided in Figure 7.



Reserve St & 7th St
Missoula, MT

Figure 7

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Signal Upgrades

This study previously recommended safety-focused signal timing and phasing related modifications at signalized intersections on Reserve Street (e.g., Leading Pedestrian Intervals (LPIs), Flashing Yellow Arrow (FYA) operations for left turns, Accessible Pedestrian Signals (APS), and time-of-day or pedestrian call restrictions on permissive left-turn phases). A signal timing project on Reserve Street is considering many of these recommendations. The signal timing project team has identified locations where hardware upgrades are needed to introduce these modifications. These needed upgrades are typically installing FYA and/or APS. These upgrades are included in this package at the following locations with the following treatments:

- England Boulevard (APS)
- Union Pacific Street (APS)
- S 3rd Street (FYA, APS)
- Mount Avenue (FYA, APS)
- South Avenue (FYA)
- Brooks Street (FYA, APS)

Cost Considerations

Planning-level cost estimates for the treatments discussed above are summarized below in Table 1. These include estimates for construction costs, as well as mobilization, design, contingencies, and inflation.

Table 1. Package A Cost Estimates

Location	Assumed Treatments	Estimated Cost
Pedestrian Crossing (near Homewood Suites)	- Overhead structures - PHBs - ADA & marking improvements	$350,000 [1]
Broadway Street Ramps	- Overhead structures - Advance warning signs & flashing beacons - Dynamic speed feedback signs - RRFBs at three crossings	$465,000 [2, 3]
Clark Fork River Bridge	- Lighting - Dynamic speed feedback signs	$1,875,000 [4]
S 7th Street	- Dynamic speed feedback signs	$50,000 [3]
Various signals	- Signal upgrades (LPIs – and FYA, APS where needed)	$500,000 [5]
	Total	**$3,240,000**

[1] Assumes the existing crossing would be upgraded, including full replacement of the existing overhead structures (as these may not be suitable for supporting PHBs), as well as ADA upgrades to the ramps.
[2] Assumes the need for an overhead structure to support warning signage on the bridge (per MDT's requirements).
[3] Assumes the dynamic speed feedback signs would be installed on the side of the roadway. Should these signs be required to be installed using an overhead structure above Reserve Street, the expected cost would be significantly higher.
[4] Assumes that concrete bump-outs are added to the bridge deck to support light poles. Dynamic speed feedback signs are assumed to be mounted on the bridge railings, although the feasibility of this should be determined in a full engineering study.
[5] Only includes implementation of proposed signal upgrades; does not include any reconstruction of crossing ramps to meet ADA standards.

Public Input

An online survey was conducted to collect feedback on the proposed locations and treatments in Package A. Key takeaways from this survey include:

- Lighting on the Clark Fork River Bridge was the highest priority of the proposed treatments.
    - However, Dark Sky impacts from more lighting was also a common concern.
- The most common concern about the proposed treatments was that dynamic speed feedback signs would not be effective.

Next Steps

These recommendations have been made at the planning level. Each of the treatments comes with next steps to carry them forward.

- Crossing near Homewood Suites
    - Enhance and/or relocate existing crossing according to outcomes of engineering study following MDT's *Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations (2019)*.
- Broadway ramps crossings
    - Install RRFBs across uncontrolled crossings of Broadway ramps once treatments are confirmed by engineering study following MDT's *Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations (2019)*.
- Advance warning signage
    - Install signage according to results of engineering study to determine placement and mounting of signs, as well as to determine if flashing beacons should be included and, if so, how they should be operated.
- Dynamic speed feedback signs
    - Install at one location and conduct before and after speed studies to determine their effectiveness.
    - Multiple dynamic signs are recommended in Package A. As noted above, there is concern that deploying too many may limit their effectiveness. MDT and the City should continue to monitor their effectiveness as more are installed and revise implementation plans accordingly based on the results.
- Lighting on Clark Fork River Bridge
    - Install appropriate lighting according to results of illumination and engineering study to determine the desired type and location of lighting.
- Signal upgrades
    - Design upgrades and confirm extent of signal timing and phasing modifications to be made.

PACKAGE B: ACCESS MANAGEMENT AND CROSSINGS

Package B focuses on improving corridor safety along Reserve Street between the Clark Fork River and Brooks Street, a high-speed segment of the corridor with a higher density of uncontrolled access points compared to other segments. This segment serves important community destinations, including schools and residential neighborhoods on both sides of the street, where access management and crossing enhancements could be implemented to reduce the number of conflict points and improve crossings of Reserve Street.

In the latest five-year period of available crash data, there were 835 crashes on this section, including 35 fatal or serious injury crashes. There were 25 head-on or sideswipe (opposite direction) crashes, 62 turning crashes, 102 angle crashes, and 455 rear-end crashes. Five crashes involved a pedestrian.

To address these crash patterns, Package B provides a conceptual set of treatments to reduce the potential for severe crashes, particularly angle, rear-end, turning, and pedestrian crashes, through access management, enhanced crossings, and intersection control improvements.

Treatment locations and types are identified based on feasibility and safety benefits. This package presents priority locations where median installations, crossing enhancements, and driveway or other access consolidations could be pursued in the near term or integrated into long-term development and a full access management plan. It also identifies areas where it may make more sense to wait until U-turn opportunities can be provided on Reserve Street at existing signals or by installing new signals, roundabouts, or other U-turn opportunities or further building out a local street network.

Concepts are provided in Figure 8 and Figure 9, where three types of treatments are shown:

- **Access management** – Includes locations for medians, turning movement restrictions, and driveway consolidation and closures
- **Intersection control changes** – Includes locations for new traffic signals or roundabouts to help facilitate left-turns onto Reserve Street, crossings of Reserve Street, and potentially also U-turns.
- **Crossing enhancements**- Includes locations for enhanced crossings with PHBs and possibly also median refuges.

Safety benefits and considerations for each treatment type are detailed in the following sections.

Reserve St - Clark Fork River to Mount Ave

Conceptual Layout Subject to Change
Date: January 2026

N

Potential access management locations to reduce crashes along Reserve Street are shown. Further study and coordination with property owners, businesses, and the public will be required to finalize improvements.

RI/ RO at S 4th Street. Full access is available at 5th Street, which is farther from S 3rd Street and less affected by queuing from the signal.

Full access remains along segment until alternative access to 3rd Street or 7th Street, or u-turn opportunities on Reserve Street, are provided.

Potential PHB (preferred) or an RRFB. An engineering study needed to confirm the final treatment.

Restrict 7th Street to RI/ RO. Traffic would shift to S 3rd Street or Spurgin Road via Eaton Street to the east and Hiberta Street or 26th Avenue to the west, which could result in up to 1/2-mile of out-of-direction travel for some individuals. This treatment is best paired with a traffic signal or roundabout at Spurgin Road to facilitate left turns and/or u-turns. Coordination with Fire Department will be required, as 7th Street is currently designated as a fire route.

Construct new traffic signal or roundabout. Spurgin Road is projected to meet signal warrant #1 by 2050. The intersection is also identified for a spot improvement in the 2017 Bicycle Facilities Master Plan to support safe pedestrian and bicycle crossings.

Restrict Sunset Ln and McIntosh Loop to RI/ RO. Sunset Lane traffic would shift to Spurgin Road or Mount Avenue via 26th Avenue to the west, and McIntosh Loop traffic would be accommodated with U-turns at Spurgin Road. This option is best paired with a traffic signal or roundabout at Spurgin Road to facilitate left turns and/or u-turns.

Alternatively, full access could be maintained at McIntosh until U-turn opportunities are provided.

Milwaukee Trail
US 93
S 3rd St W
S 4th St W
S 5th St W
S 7th St W
S 8th St W
S 9th St W
26th Ave
Eaton St
Margaret St
Spurgin Rd
27th Ave
Sunset Ln
26th Ave
Mount Ave

Scale: 1" = 500'
500 250 0 500

LEGEND

- Potential Median Location (Alternative Access Available)
- Potential Median Location (U-Turns at Signalized Intersections or Roundabouts Required)
- Full Access Maintained
- Priority Locations for Near-Term Access Management (Potential Quick-Build Locations)
- Existing Traffic Signal
- Potential Traffic Signal or Roundabout
- Potential Pedestrian Hybrid Beacon (PHB)
- Potential Access Consolidation
- Routes where traffic will likely redistribute with shown turning movement restrictions.

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Potential Access Management Locations

Figure 8

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Reserve St - Mount Ave to Brooks St

Conceptual Layout Subject to Change
Date: January 2026

N

Potential access management locations to reduce crashes along Reserve Street are shown. Further study and coordination with property owners, businesses, and the public will be required to finalize improvements.

Restrict Burlington Ave to RI/ RO. Traffic shifts to Mount Ave via Clark St.

Full access remains at North Ave until u-turn opportunities on Reserve Street are provided.

Restrict Central Ave and Kent Ave to RI/RO. Traffic would shift to North Ave or South Ave W via 26th Ave to the west or via Clark St or Margaret St to the east.

Restrict Dearborn Ave to RI/ RO. Traffic would shift to South Ave W via Old Fort Rd to the west or via Clark Street to the east.

Construct new traffic signal or roundabout. Mary Ave is projected to meet signal warrants #1, #2, and #3 by 2050.

Harve Ave does not continue through Clark St, so use of the alley between Agnes Ave and Harve Ave would be necessary to access Clark St.

Construct center median from S 3rd St to Brooks Street, restricting intersection movements to RI/ RO, and potentially left-in (LI). Traffic is distributed to signals at South Ave, Mary Ave, and Brooks St via Clark St, Dore Ln, and McDonald Ave, where u-turns can take place.

Old US 93 is projected to meet signal volume warrants #1, #2, and #3 and the crash warrant by 2050. However, since it is located approximately 0.1 mile from the existing signal at Brooks Street, this location does not meet MDT's minimum signal spacing standards. Eastbound left and through traffic would shift to Brooks St via Old US 93 to the west, and westbound left and through traffic would shift to Brooks Street via McDonald Ave and Dore Lane.

Mount Ave
Clark St
Burlington Ave
Strand Ave
US 93
Margaret St
North Ave
27th Ave
C S Porter Middle School
Central Ave
W Kent Ave
South Ave W
Old Fort Rd
Dearborn Ave
Benton Ave
Mary Ave
Agnes Ave
Harve Ave
Ernest Ave
Dixon Ave
McDonald Ave
Dore Ln
Old US 93
Brooks St

Scale: 1" = 250'
250 125 0 250

LEGEND

- Potential Median Location (Alternative Access Available)
- Potential Median Location (U-Turns at Signalized Intersections or Roundabouts Required)
- Full Access Maintained
- Priority Locations for Near-Term Access Management (Potential Quick-Build Locations)
- Existing Traffic Signal
- Potential Traffic Signal or Roundabout
- Potential Pedestrian Hybrid Beacon (PHB)
- Existing Pedestrian Signal
- Potential Access Consolidation
- Routes where traffic will likely redistribute with shown turning movement restrictions.

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Potential Access Management Locations

Figure 9

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Access Management

Access management is a Tier 1 safety treatment in the Federal Highway Administration's Safe System Roadway Design Hierarchy[1] because it reduces severe conflicts. On this segment of Reserve Street, access management strategies include:

- **Turning movement restrictions**: Medians can be used to restrict driveways or public street intersections to right-in/right-out or right-in/right-out/left-in only access.
    - Installing right-in/ right-out operations at stop-controlled intersections can result in a 45% reduction of all crashes and 60% reduction and fatal and serious injury crashes [2.]
    - In locations where medians are implemented, lighting will be required if it is not already present.
- **Access consolidation or removal**: Eliminating or combining driveways creates fewer conflict points along the street.
    - Reducing driveway density can result in 25-31% reduction in fatal and serious injury crashes along urban/suburban arterials.[3]

Along Reserve Street between the Clark Fork River and Brooks Street, much of the corridor presents opportunities for median installation due to the availability of alternative access routes on the surrounding grid network. In some areas, providing U-turn opportunities at signalized intersections or roundabouts could be considered to reduce out-of-direction travel or cut-through traffic on the local street network. There are also opportunities for joint-use driveways along shared property lines to further reduce the number of approaches. Potential locations for these treatments are illustrated in Figure 8 and Figure 9.

An MDT access management study will be required before most of the recommended treatments can be installed (exceptions may include access management implemented through the development process and the potential near-term quick-build locations, discussed later in this section). This study will include more extensive community engagement, including with adjacent businesses and property owners, as well as further coordination with the City of Missoula Fire Department to evaluate potential effects on fire routes. Public engagement conducted for this plan has so far revealed broad support for access management treatments along the corridor, with many survey respondents indicating they already travel out-of-direction to use a signal to turn left onto, or cross, Reserve Street. This study may also include intersection control evaluation (ICE) studies at intersections where upgraded control is recommended.

[1] Federal Highway Administration (FHWA). (2024). Safe System Roadway Design Hierarchy. <https:/highways.dot.gov/sites/fhwa.dot.gov/files/2024-01/Safe_System_Roadway_Design_Hierarchy.pdf>

[2] (CMF ID: 9821, 9823) Le et. Al, Safety Effects of Turning Movement Restrictions at Stop-Controlled Intersections, (2018).

3 (CMF ID: 179,178) Elvik, R. and Vaa, T., Handbook of Road Safety Measures. Oxford, United Kingdom, Elsevier, (2004).

POTENTIAL NEAR-TERM QUICK-BUILD INSTALLATIONS

In the near term, access management strategies could be implemented in some locations via "quick-build" treatments that restrict turning movements at driveways and intersections. These treatments are typically lower cost, faster to implement, and easier to modify after installing than capital improvements. They can also be temporary and before-after studies of their performance can be completed to refine solutions before committing to long-term designs. These treatments typically use durable, temporary materials, such as pavement markings, plastic bollards, and flexible delineators.

Figure 8 and Figure 9 identify potential locations for quick-build access management treatments. These locations have been identified since they have the alternate access readily available and therefore may have the greatest potential for near-term implementation.

MDT has previously installed quick-build treatments in other locations, such as along Frontage Road near Bozeman Yellowstone International Airport (see Figure 10). However, MDT may need to determine if quick-build treatments are appropriate for Reserve Street. Prior to implementing any quick-build treatments, further engagement of affected property and business owners should be conducted. MDT should also develop a plan for maintaining the selected treatments when designing them. Before-after studies of any locations where they are implemented should also be considered to inform future quick-build treatments at other locations, as well as more permanent installation at these locations.

Figure 10. Quick-Build Median near Bozeman Yellowstone International Airport. Source: Google Streetview



A preliminary benefit-cost analysis was conducted using the five-year crash history of the potential quick-build locations identified in Figure 8 and Figure 9 to provide an approximate estimate of the potential return on investment. The analysis assumes that quick-build medians are used to enforce right-in/right-out (RI/RO) only movements at these locations. This analysis only considers benefits related to crash reduction and does not consider benefits or disbenefits related to travel time changes, health or environmental considerations, or change in maintenance costs. It assumes a 5-year service life of the treatments and follows crash cost and discounting guidance provided by USDOT's *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*[4]. As such, the benefit-cost ratios that would be calculated for MDT's Highway Safety Improvement Program, which uses different inputs, or a federal discretionary grant program, which may require a more comprehensive analysis, are likely to differ from these results. The results of this analysis are summarized in Table 2 and presented in Attachment C.

[4] https://www.transportation.gov/sites/dot.gov/files/2025-12/Benefit%20Cost%20Analysis%20Guidance%202026%20Update%20%28Final%29.pdf. December 2025

Table 2. Quick-Build Safety Benefit-Cost Analysis

	Quick-Build (RI/RO) at Nine Locations
Crash Costs/Year (2019-23)	$2,152,800
Estimated Crash Costs/Year After Treatment	$447,885
Estimated Crash Cost Benefit/Year	$1,704,915
Estimated Crash Cost Benefit (Five Years)	$6,990,488
Estimated Implementation Costs	$349,000[1]
Expected Benefit-Cost Ratio (BCR)	**20.0**

[1]Assumes $100/linear foot for materials ($230,000) and $119,000 in outreach and contingency costs.

This preliminary analysis found that the quick-build treatments are expected to provide a return on investment approximately 20 times greater than the construction costs, in terms of reduced crashes. It assumes that installation of the treatments is completed by agency maintenance forces. Construction costs may be higher if a contractor is hired.

RCUT ALTERNATIVE

Another alternative to explore as part of a comprehensive access management plan for this section of Reserve Street would be to create a Restricted Crossing U-Turn (RCUT) corridor. This could include converting all unsignalized intersections into right-in/right-out movements only and removing left-turns from signalized intersections. U-turns would be provided along Reserve Street, and its side streets, where necessary, at key locations to replace the restricted through and left-turn movements. These treatments would remove conflict points. There would also be operational benefits, as the signals would be simplified to two-phase operations. According to FHWA, an RCUT intersection would be expected to reduce crashes by 54% at a previously two-way stop-controlled intersection and 22% at a previously signalized intersection[5]. Key potential trade-offs to consider when evaluating an RCUT corridor include the level of out-of-direction travel induced and the availability of space to provide for U-turns.

IMPLEMENTATION THROUGH DEVELOPMENT

As redevelopment occurs, MDT will coordinate with the City and development team to remove or relocate direct accesses to Reserve Street and shift access to the local street network wherever feasible.

[5] https://highways.dot.gov/safety/proven-safety-countermeasures/reduced-left-turn-conflict-intersections

Intersection Control Changes

Intersection control changes, such as new traffic signals or roundabouts, are recommended at Spurgin Avenue and Mary Avenue to facilitate access management by concentrating side street turning movements to controlled locations. U-turns could also be provided at these locations. These locations were identified based on crash history, the role they play in the surrounding transportation system, and their ability to help facilitate access management along the corridor. Intersection control evaluations will be required to confirm final configurations and verify the locations of all proposed intersection control improvements. Each location is described further below.

SPURGIN AVENUE

- In the most recent five-year period, this intersection experienced 36 total crashes, including three fatal or serious injury crashes and nine turning or angle crashes.
- By 2050, it is projected to meet Manual on Uniform Traffic Control Devices (MUTCD) signal warrant #1 based on a planning-level analysis.
- The 2017 Bicycle Facilities Master Plan identifies Spurgin Avenue for spot improvements to enhance pedestrian and bicycle crossings.
- Spurgin Avenue also provides east-west connectivity to residential areas on both sides of Reserve Street.

MARY AVENUE

- Although this intersection had fewer crashes over the five-year period (3 total crashes), implementing new intersection control here, combined with restricting access at nearby locations, could prevent turning and angle crashes along the corridor.
    - Adjacent locations between Dearborn Avenue and McDonald Avenue recorded 81 total crashes, including 5 fatal or serious injury crashes and 19 angle or turning crashes.
- Mary Avenue is projected to meet MUTCD signal warrants #1, #2, and #3 by 2050 based on planning-level analysis.
- The intersection also provides an additional east-west connection to Brooks Street via the newly constructed Southgate Mall connection.

Additionally, Old US 93 was evaluated but not selected for an intersection control change due to its proximity to Brooks Street and available alternate access points at other locations.

Enhanced Crossings

An enhanced crossing with a PHB or RRFB is recommended near S 7th Street to improve pedestrian and bicyclist access to a controlled crossing. This recommendation is based on MDT's *Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations (2019)* (see Attachment B), which considers factors such as traffic volumes, speeds, and the number of lanes. The proposed location would significantly reduce the distance people walking and biking must cover to reach a signalized crossing. Currently, signalized crossings are spaced approximately 0.75 miles apart at S 3rd Street and Mount Avenue. A detailed pedestrian crossing study should be conducted to confirm the suitability of this location and treatment.

According to MDT guidance, the PHB or RRFB would require installing an overhead structure; therefore, the primary cost distinction between the two options is associated with the controllers, which are more expensive for the PHB but represent a relatively minor difference overall.

While S 7th Street is a priority location, additional crossing opportunities may emerge as medians are implemented along the corridor. Medians can provide space for refuge islands. Further engineering study is needed to identify these potential locations and select appropriate treatments.

The project team also met with CS Porter School partners to discuss the existing pedestrian signal between Kent Avenue and Central Avenue. Based on these discussions, the project team recommends keeping the current crossing location adjacent to the school. Should other PHBs be installed along the corridor, it may be prudent to convert the signal at this crossing to a PHB for consistency.

Grade-separated crossings should be explored as a potential alternative to enhanced, at-grade crossings. Should these be pursued for any location, additional coordination among MDT, the City, and the MPO would be needed to coordinate maintenance responsibilities of grade-separated crossings.

Cost Considerations

A range of cost estimates for Package B is provided in Table 3. These estimates include construction costs and auxiliary items such as mobilization, traffic control, right-of-way acquisition, permitting, construction administration, and a 30% contingency. The table presents two scenarios: a lower range that assumes traffic signals at Spurgin Road and Mary Avenue and RRFBs, and a higher range that assumes roundabouts at both locations and PHBs.

Table 3. Package B Cost Estimates

Alternative	Assumed Treatments	Estimated Cost
Lower-Cost (Traffic Signal and RRFBs)	• New Traffic Signals at Spurgin Rd and Mary Ave • RRFB at S 7th St [1]	$10,200,000
Higher-Cost (Roundabout and PHB)	• New Roundabouts at Spurgin Rd and Mary Ave • PHB on Reserve Street legs of both roundabouts • PHB at S 7th St[1]	$18,200,000

[1] Assumes the need for an overhead structure for RRFBs and PHBs (per MDT's requirements).

PRELIMINARY BENEFIT-COST ANALYSIS

A preliminary benefit-cost analysis was conducted using the five-year crash history of this segment and the estimated implementation costs in Table 3 to provide an approximate estimate of the potential return on investment. This analysis only considers benefits related to crash reduction and does not consider benefits or disbenefits related to travel time changes, health or environmental considerations, or change in maintenance costs. It assumes a 20-year service life of all treatments and follows crash cost and discounting guidance provided by USDOT's *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*[6]. As such, the benefit-cost ratios that would be calculated for MDT's Highway Safety Improvement Program, which uses different inputs, or a federal discretionary grant program, which may require a more comprehensive analysis, are likely to differ from these results. The results of this analysis are summarized in Table 4 and presented in Attachment C.

Table 4. Package B Safety Benefit-Cost Analysis

	Lower-Cost (Traffic Signals and RRFBs)	Higher-Cost (Roundabouts and PHBs)
Crash Costs/Year (2019-23)	$8,437,880	
Estimated Crash Costs/Year After Treatment	$2,395,140	$1,860,561
Estimated Crash Cost Benefit/Year	$6,042,740	$6,577,319
Estimated Crash Cost Benefit (Lifecycle)	$64,016,876	$69,680,213
Estimated Implementation Costs	$10,200,000	$18,200,000
Estimated Benefit-Cost Ratio (BCR)	**6.3**	**3.8**

This preliminary analysis found that both alternatives are expected to provide a return on investment greater than the construction costs, in terms of reduced crashes. The lower-cost alternative has a greater BCR, largely due to the lower cost of the signals compared to the roundabouts, and the higher-cost alternative has a greater overall benefit (approximately $70M compared to $64M).

[6] https://www.transportation.gov/sites/dot.gov/files/2025-12/Benefit%20Cost%20Analysis%20Guidance%202026%20Update%20%28Final%29.pdf. December 2025

Public Input

An online survey was conducted to collect feedback on the proposed locations and treatments in Package B. Key takeaways from this survey include:

- Most respondents already travel out-of-direction to access a signal and avoid having to turn, or cross Reserve Street, at unsignalized intersections on Reserve Street.
- Most respondents agreed that the intersections proposed for control or crossing improvements should be prioritized.
- Left turns were commonly cited as a key safety concern.

Next Steps

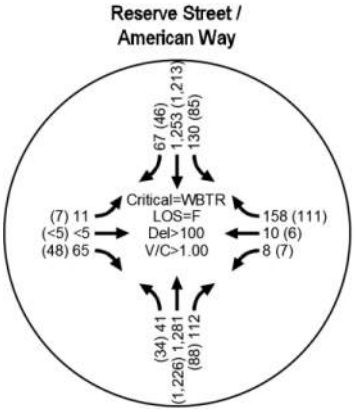
- Coordinate with agency partners, including MDT, City, and MPO, as well as community partners including property and business owners, schools, and the City of Missoula fire department to evaluate feasibility of near-term quick-build access management strategies.
- Conduct a full access management study consistent with MDT requirements, including ICE studies for new traffic control at intersections.
    - This study could consider the potential for an RCUT corridor.
- Install an enhanced crossing at S 7th Street (or alternate location) depending on results of engineering study following *MDT's Guidance for Determining Pedestrian Crossing Treatment at Uncontrolled Locations* (2019) at S 7th Street.

PACKAGE C: AMERICAN WAY

The Reserve Street/American Way intersection is the third worst-scoring location on the corridor for crashes. For the last five years of crash data, the intersection experienced the most crashes (55) out of all stop-controlled intersections, including five serious injury crashes. More recently, in June 2025, a pedestrian was killed in a crash while crossing Reserve Street at American Way.

Traffic through the Reserve Street/American Way intersection is expected to increase over the next 25 years due to local and regional growth (Figure 11 summarizes the existing and future projected PM peak hour traffic volumes at the intersection). Safety performance functions (SPFs) from the *Highway Safety Manual* were used to estimate how this growth might affect safety performance. Based on this analysis, fatal and injury crashes are projected to increase by 11%, and property damage only crashes are projected to increase by 17% by the year 2050 if no changes are made to the intersection.

Figure 11. Existing and Future Year 2050 Projected PM Peak Hour Traffic Volumes, American Way



A planning-level analysis of MUTCD signal warrants was conducted. While the total crash counts likely meet the warrant criteria from the five-year period, a final determination was not possible because the available crash data characteristics are not granular enough to determine how many of the crashes would have been avoided with a traffic signal. Further analysis is needed to determine if the warrant is met. MUTCD signal warrants #1 and #2, which are based on traffic volumes, were evaluated using existing and future projected PM peak hour traffic volumes. When right turns from American Way were excluded, as per MDT guidance, the warrants were not met (the volume warrants are met if right turns are included).

Treatment Alternatives

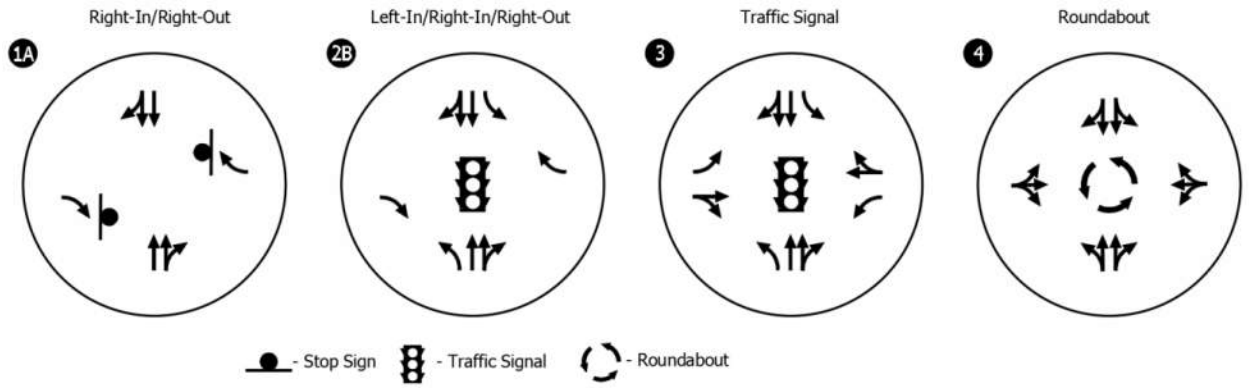
Three treatment alternatives were analyzed for the two-way stop-controlled intersection:

1. Turning Movement Restrictions
    A. Unsignalized Right-In/Right-Out (RI/RO)
    B. Signalized Left-In/Right-In/Right-Out (LI/RI/RO)
2. Traffic Signal
3. Multilane Roundabout

Under Alternative 1A, it was assumed that restricted traffic would shift to England Boulevard and Union Pacific Street. However, the added left-turn volumes at these nearby signals would cause some movements to be over-capacity. To help spread out this demand while reducing left-turn conflict points, the project team also developed Alternative 1B to retain left-turns from Reserve Street onto American Way. All movements are then signalized. This alternative envisions the northbound and southbound left-turns operating with protected-only phasing, at least during the peak hours, to reduce conflicts. The American Way approaches would still be right-out only, and their phasing could run in overlap with the Reserve Street left turns.

Alternative 2 signalizes all movements and retains full movements. The proposed roundabout in Alternative 3 is a 2x1 hybrid design, with two entry and exit lanes on the Reserve Street approaches and single entry and exit lanes on the American Way approaches. The respective lane configurations of each alternative are shown in Figure 12.

Figure 12. Lane Configurations of Package C Alternatives



Each concept was evaluated under 2050 no-build and build scenarios to understand the relative benefits and tradeoffs of each. Key considerations included safety performance, traffic operations, multimodal impacts, and other considerations, such as right-of-way and costs.

Safety

Crash modification factors (CMFs) were used to quantify the effects of the proposed alternatives on safety performance. These CMFs were obtained from FHWA's CMF Clearinghouse and were readily available for the roundabout, signal, and RI/RO alternatives. The safety performance of the LI/RI/RO alternative is likely somewhere in between the RI/RO and full signal alternatives since it is signalized but restricts more movements than the full signal while retaining some left-turn movements, so a range is provided for this configuration.

Table 5 below presents the expected crash reductions associated with each alternative. The safety findings are also summarized in Attachment D.

Table 5. Comparison of Expected Safety Performance at American Way

Alternative	Expected Total Crash Reduction	Expected Fatal/Serious Injury Crash Reduction
Alternative 1A: RI/RO	-45%	-80%
Alternative 1B: LI/RI/RO Signal	-5% to -45%	-23% to -80%
Alternative 2: Traffic Signal	-5%	-23%
Alternative 3: Multilane Roundabout	-12%	-68%

As shown, the RI/RO and roundabout alternatives are expected to provide the greatest safety performance in terms of fatal and serious injury crash reduction. The RI/RO configuration would provide greater safety benefits than the RI/RO/LI configuration given the elimination of any left-turn conflicts. The signalized LI/RI/RO configuration and the full signal may increase rear-end crashes on Reserve Street due to stops introduced on Reserve Street by the signal control. A multilane roundabout is expected to have better safety performance than the signal and potentially comparable performance to the signalized LI/RI/RO configuration.

Roundabouts promote slower speeds and have fewer conflict points compared to a stop-controlled intersection or fully signalized intersection because of their curvature. As such, roundabouts have been shown to significantly decrease the likelihood and severity of crashes, especially fatal and serious injury crashes. Therefore, roundabouts are expected to achieve safety benefits that exceed those of a traffic signal and may be comparable to or slightly lower than the reductions associated with turning movement restrictions.

Traffic Operations

All four alternatives were analyzed under projected future year 2050 PM peak hour traffic conditions. Alternatives 1A, 1B, and 2 were analyzed using *Highway Capacity Manual (HCM)* methodologies in Synchro 12. For Alternative 1B, *HCM 2000* methodologies were used because the unique signal phasing did not satisfy *HCM, 7th Edition* methodologies. The signal analyses assumed a coordinated cycle length consistent with the Reserve Street signal system to maintain progression along the corridor. Left-turn

movements were evaluated with protected phasing. Alternative 3 was analyzed in accordance with the procedures in the SIDRA Standard *HCM* roundabout capacity model, using SIDRA 9.1 software.

Given that some people already travel out-of-direction to access signals, some volumes were assumed to re-route to the American Way intersection under Alternatives 2 and 3. This analysis assumes a quarter of relevant side-street volumes were assumed to reroute from the England Boulevard and Union Pacific Street intersections to American Way because of the added controlled access and its capacity.

Table 6 summarizes the projected operational performance of the three alternatives and Table 7 compares the respective projected queues. HCM methodologies are somewhat limited in their ability to model the interactions between closely-spaced intersections – particularly signalized intersections. Therefore, SimTraffic simulation software was used to create another reference point for understanding the effects of adjacent signals on potential queueing in Alternative 2.

Table 6. Projected Future PM Peak Hour Traffic Operations, American Way Alternatives

Alternative	Projected 2050 PM Peak Hour Performance		
	LOS	Delay (seconds)	V/C
No-Build	**F (WBTR)**	>100 (WBTR)	NBL: 0.08 SBL: 0.27 EBL: 0.17 WBL: 0.71 **>1.00 (WBTR)**
Alternative 1A: RI/RO	C	21.6	EBR: 0.17 WBR: 0.43
Alternative 1B: LI/RI/RO/ Signal	B	12.3	NBL: 0.46 NBT: 0.54 SBL: 0.73 SBT: 0.46 EBR: 0.04 WBR: 0.34
Alternative 2: Traffic Signal	C	27.6	NBL: 0.90 NBT: 0.78 SBL: 0.93 SBT: 0.66 **EBL: 1.28** EBT: 0.55 **WBL: 1.34** WBT: 0.94
Alternative 3: Multilane Roundabout	C	22.8	NB: 0.73 SB: 0.69 WB: 0.99 WB: 0.71

Table 7. Projected Future PM Peak Hour 95th-Percentile Queues, American Way Alternatives

Alternative	Movement	Projected Queue (feet [1]
No-Build	NBL	25
	SBL	50
	WBL	50
	WBTR	325
	EBL and EBR	25
Alternative 1A: RI/RO	WBR	25
	EBR	25
Alternative 1B: LI/RI/RO	NBL	75
	NBTR	75
	SBL	**200**
	SBTR	100
	EBR	0
	WBR	150
Alternative 2: Traffic Signal	NBL	200
	NBTR	475 – **850** [2]
	SBL	**300**
	SBTR	175
	EBL	275
	EBTR	250
	WBL	275
	WBTR	400
Alternative 3: Multilane Roundabout	NB	300
	SB	275
	EB	100
	WB	275

[1] Values in **bold** indicate where queues exceed existing storage.
[2] The range provided is due to differing results from Synchro 12 and SimTraffic 12 software. SimTraffic projects a shorter queue than Synchro does.

Alternatives 1A and 1B are projected to provide the best overall operations. However, Alternative 1B and Alternative 2 are expected to generate queues that exceed available storage for some movements on Reserve Street. Currently, storage for northbound and southbound left turns is constrained by a physical median. Those medians could be modified to allow for more left-turn storage.

Given the proximity of England Boulevard and Union Pacific Street, the northbound left and southbound left queues at those intersections, respectively, were evaluated to determine if southbound left and northbound left queues at American Way could obstruct their storage. It was found that the projected queues at England Boulevard and Union Pacific Street were not expected to be long enough to interact with those projected at American Way.

OPERATIONS AT ADJACENT SIGNALIZED INTERSECTIONS

Each of the alternatives discussed here would have significant impacts not just on travel at Reserve Street/American Way intersection, but also on nearby intersections – notably, Reserve Street/England Boulevard and Reserve Street/Union Pacific Street. Under an Alternative 1 where American Way is converted to RI/RO, northbound lefts, southbound lefts, eastbound lefts and throughs, and westbound lefts and throughs would be rerouted to England Boulevard and Union Pacific Street. This would result in higher left-turn and side-street through volumes at those intersections. (A LI/RI/RO configuration would shift fewer volumes, as left turns onto American Way would still be permitted.)

Under Alternatives 2 and 3, full movements would be allowed at American Way. This could have the opposite effect, whereby some volumes at England Boulevard and Union Pacific Street are drawn away from those intersections to American Way. Estimated volume changes (compared to future no-build volumes) for each alternative are shown in Figure 13.

Figure 13. Estimated Traffic Volume Changes Depending on Intersection Control

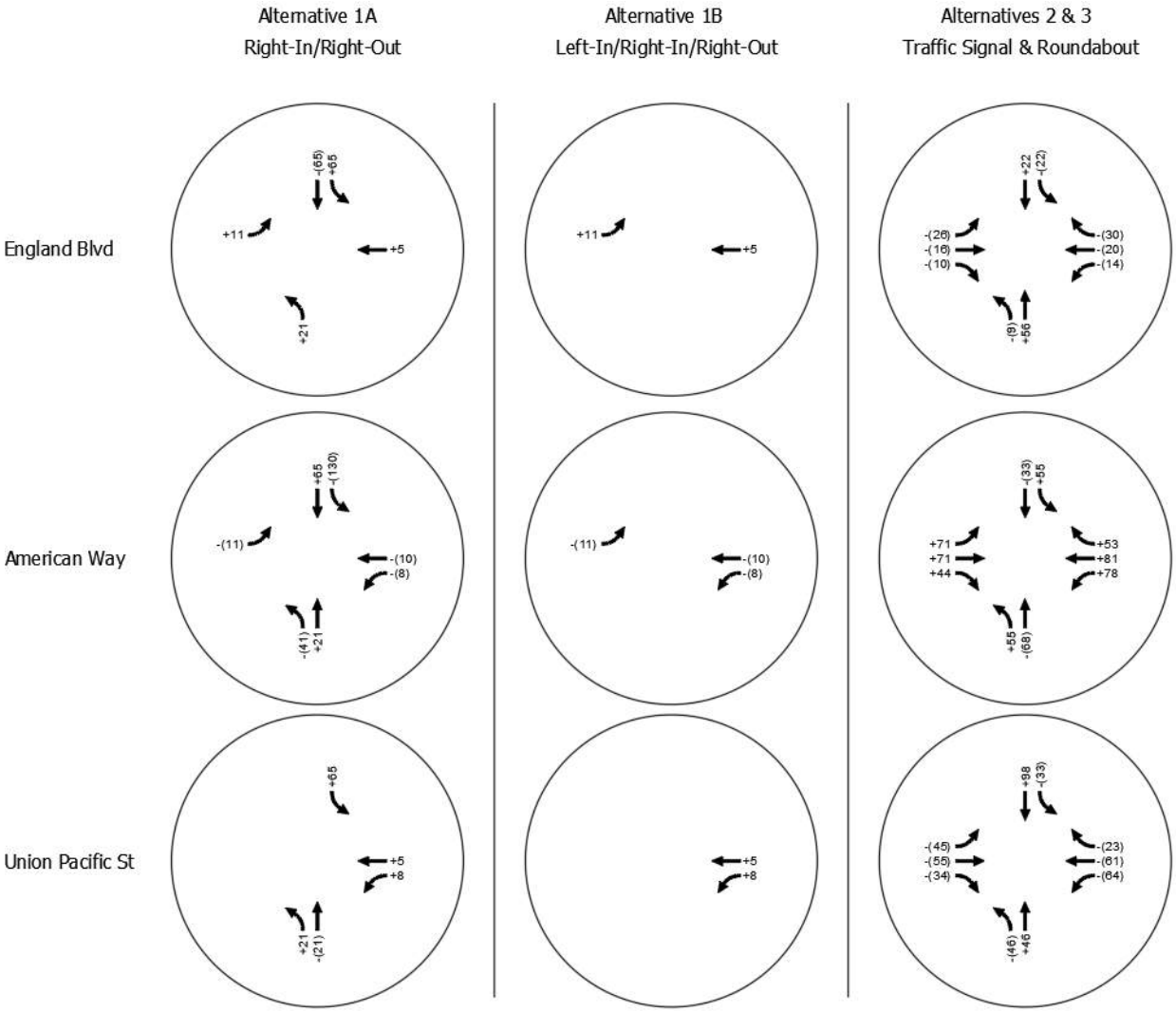


Table 8 compares how the operations at the England Boulevard and Union Pacific Street signals are expected to operate under each of the alternatives at American Way due to these rerouted volumes. A full signal and a roundabout are expected to draw approximately the same amount of traffic from the nearby signals, so the expected operations of England Boulevard and Union Pacific Street are the same in Alternatives 2 and 3.

Table 8. England Boulevard and Union Pacific Street Intersection Operations Under Alternatives

American Way Alternative	Intersection	Projected 2050 PM Peak Hour Performance			
		LOS	Delay (seconds)	V/C	
No Build	England Blvd	D	41.8	Overall: 0.94 NBL: 0.49 NBTR: 0.80 SBL: 0.59 SBTR: 0.79	EBL: 0.95 EBTR: 0.85 WBL: 0.65 WBT: 0.89 WBR: 0.24
	Union Pacific St	D	45.3	Overall: 0.90 NBL: 0.46 NBTR: 0.69 SBL: 0.37 SBTR: 0.68	EBL: 0.88 **EBTR: > 1.00** **WBL: >1.00** **WBTR: >1.00**
Alternative 1A: RI/RO	England Blvd	D	44.6	**Overall: >1.00** NBL: 0.53 NBTR: 0.84 SBL: 0.79 SBTR: 0.76	EBL: 0.99 EBTR: 0.85 WBL: 0.65 WBT: 0.89 WBR: 0.24
	Union Pacific St	D	46.5	Overall: 0.92 NBL: 0.50 NBTR: 0.71 SBL: 0.49 SBTR: 0.69	EBL: 0.88 **EBTR: > 1.00** **WBL: >1.00** **WBTR: >1.00**
Alternative 1B: RI/RO/LI Signal	England Blvd	D	43.0	Overall: 0.95 NBL: 0.49 NBTR: 0.81 SBL: 0.60 SBTR: 0.80	EBL: 0.99 EBTR: 0.85 WBL: 0.63 WBT: 0.90 WBR: 0.25
	Union Pacific St	D	46.6	Overall: 0.91 NBL: 0.46 NBTR: 0.69 SBL: 0.37 SBTR: 0.68	EBL: 0.88 **EBTR: > 1.00** **WBL: >1.00** **WBTR: >1.00**
Alternatives 2 & 3: Full Signal & Multilane Roundabout	England Blvd	D	35.1	Overall: 0.91 NBL: 0.42 NBTR: 0.78 SBL: 0.54 SBTR: 0.76	EBL: 0.93 EBTR: 0.82 WBL: 0.63 WBT: 0.87 **WBR: 0.08**
	Union Pacific St	C	22.2	Overall: 0.79 NBL: 0.38 NBTR: 0.67 SBL: 0.28 SBTR: 0.68	EBL: 0.58 EBTR: 0.94 WBL: 0.85 WBTR: 0.75

Under Alternative 1A, rerouted southbound left turns to England Boulevard would be expected to push that intersection's overall v/c to over 1.0. England Boulevard is expected to have some capacity still available under Alternative 1B. Union Pacific Street is expected to have sufficient capacity to absorb rerouted volumes under both Alternative 1 scenarios. Alternatives 2 and 3 are expected to result in less delay and more capacity available at England Boulevard and Union Pacific Street than in existing conditions, particularly for the eastbound and westbound movements at the latter intersection.

At certain times, queues on Reserve Street could extend upstream to either intersection, causing a degradation of performance. A more thorough intersection control evaluation (ICE) should be undertaken to better assess how these intersections would potentially interact.

Multimodal Considerations

Each alternative would provide a different level of accommodation and accessibility for people walking and biking. These differences are summarized in Table 9. As shown, Alternatives 2 and 3 would provide the most enhancements for multimodal users crossing Reserve Street.

Table 9. Multimodal Accessibility for Alternatives in Package C

American Way Alternative	Crossing Provided?	Other Considerations
No Build	Yes, uncontrolled	No median refuge provided
Alternative 1A: RI/RO	Yes, uncontrolled	Median refuge provided
Alternative 1B: LI/RI/RO	No	
Alternative 2: Traffic Signal	Yes, controlled	LPIs could also be installed
Alternative 3: Roundabout	Yes, refuge islands	RRFBs recommended for multilane legs

Cost Considerations

Due to its footprint and potential property impacts, the roundabout alternative (Alternative 3) is expected to be the most expensive treatment. There are commercial developments on all four corners of the intersection; the building on the southwest corner is particularly close to the intersection. The business on the northeast corner operates a drive-through whose drive aisle is also near the intersection. It is highly likely that Alternative 3 would require significant right-of-way acquisition to accommodate a sufficient footprint. Attachment D includes the estimated impacts of a roundabout in Alternative 3.

PRELIMINARY BENEFIT-COST ANALYSIS

A preliminary benefit-cost analysis was conducted using the five-year crash history of this intersection to provide an approximate estimate of the potential return on investment for Alternative 2 and quick-build versions of Alternatives 1A and 1B (no signal assumed for 1B). The project team estimated the potential crash reduction benefit of a quick-build LI/RI/RO configuration by assuming that angle crashes would be eliminated by removing through movements across Reserve Street and that head-on and sideswipe-opposite direction crashes would be reduced similarly to a RI/RO configuration. It conservatively does not assume any changes to left-turning related crashes, since data on which approach these crashes occurred were not available, or any other crash types. Otherwise, this analysis was conducted similarly to the analysis described for Package B, including construction cost assumptions for quick-build treatments. Table 10 presents the results of this analysis and Attachment C contains further details.

Table 10. Package C Safety Benefit-Cost Analysis

	Quick-Build 1A (RI/RO)	Quick Build 1B (LI/RI/RO)	Alternative 2: Traffic Signal
Crash Costs/Year (2019-2023)	$1,951,520		
Estimated Crash Costs/Year After Treatment	$411,479	$1,644,519	$1,513,560
Estimated Crash Cost Benefit/Year	$1,540,041	$307,002	$437,960
Estimated Crash Cost Benefit (Lifecycle)	$6,314,472	$1,258,767	$4,639,750
Estimated Implementation Costs	$38,000	$77,000	$938,000
Expected Benefit-Cost Ratio (BCR)	**166**	**16.4**	**5.0**

This preliminary analysis found that all three alternatives are expected to provide a return on investment greater than the construction costs, in terms of reduced crashes. Due to their low construction costs and removal of conflict points, the quick-build alternatives are expected to have the greatest return on initial investment, even assuming only five years of benefits on the initial investment, compared to 20 years for the signal. However, turning movement restrictions result in other trade-offs, discussed in the next section.

Additional Considerations

The turning movement restrictions in Alternatives 1A and 1B may affect access to businesses on American Way, as well as general connectivity in the area. As development continues to the west, restrictions at Reserve Street/American Way would route volumes to England Boulevard and Union Pacific Street. Conversely, Alternatives 2 and 3 could help balance the impacts of some of this potential growth and could improve access for destinations on American Way.

Restricting American Way to right-in/right-out access only could be implemented in the near-term with a low-cost quick-build approach to installing a median on Reserve Street through intersection. This could serve as a way to pilot the changes and study its impacts on safety, operations at adjacent intersections, and on adjacent businesses. If the median is not achieving the desired safety benefits or its impacts are determined to be too severe, the treatment could easily be removed. However, if the changes are determined to be effective and not have unacceptable impacts, they could be replaced with more permanent features (e.g., a concrete median) that better enforce the restriction and require less regular maintenance. Thorough outreach with nearby businesses and property owners, as well as emergency services, should be conducted before turn movement restrictions are installed.

Public Input

An online survey was conducted to get public feedback on the alternatives presented in Package C. Key takeaways from the survey include:

- Improving safety and minimizing impacts to traffic flow on Reserve Street were deemed the two most important considerations for any treatment.
- The most common concern about the proposed alternatives was not having a crossing for people walking and biking, followed by potentially having to stop at another intersection on Reserve Street.
- Alternative 1 (Turn Movement Restrictions) was the least popular.
- Alternative 3 (Multilane Roundabout) received the most first-place rankings among the three alternatives, but also the most third-place rankings. Turn-movement restrictions were the least popular treatment.

Next Steps

The most immediate next step is to obtain funding, either for a capital project or for a quick-build median treatment. Once funding is secured for a capital project, a full ICE should be completed for Reserve Street/American Way to determine which alternative should be developed further. It is recommended that analysis be coordinated with further study at Reserve Street/Mullan Road (discussed later in Package E) given the interconnected nature of this section of the corridor. Feedback from public input on these alternatives, and potentially also targeted outreach to adjacent properties, should also be considered in any future analysis.

PACKAGE D: RIVER ROAD

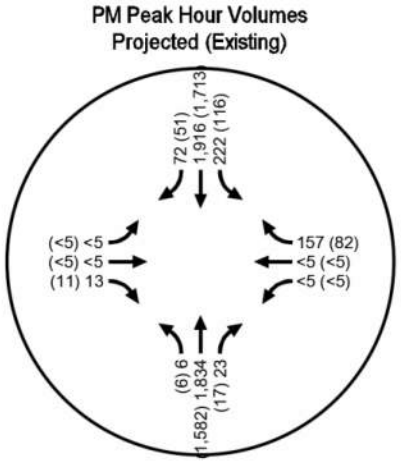
The Reserve Street/ River Road intersection has been identified as a high priority location for safety improvements due to a history of crashes, high travel speeds, and projected future congestion. Between 2019 and 2023, there were 41 crashes reported at this intersection, including three serious injury crashes and 13 other injury crashes. Eight were turning and angle crashes, and two of these crashes involved people on bikes.

The segment from Mullan Road to River Road also experiences some of the highest travel speeds on the corridor, with 85th-percentile speeds ranging from 52 to 60 miles per hour based on TomTom travel-speed data. The intersection is also skewed and located on a horizontal curve, which are factors that can potentially increase crash risk and severity.

Operational analysis indicates that while some side street movements currently operate at LOS F during peak hours, more significant congestion is expected by 2050, with all eastbound and westbound movements projected to operate at or beyond capacity (volume-to-capacity ratios greater than 1.0). Although the intersection likely does not currently meet MUTCD signal warrants, planning-level analysis suggests that warrants may be met by 2050 due to projected growth in traffic volumes if right-turning volumes are included in the analysis, which is not typical MDT practice.

Traffic demand at this intersection is influenced by its role as a connection between Reserve Street, Russell Street, and the River Road neighborhood. The intersection accommodates substantial southbound left-turn and westbound right-turn movements, which are expected to increase with continued development in the River Road area, as shown in Figure 14 for the PM peak hour.

Figure 14. Projected (2050) and Existing Turning Volumes for River Road



Treatment Alternatives

As with American Way, three alternative intersection controls were evaluated for the River Road intersection:

1. Turning Movement Restrictions (Signalized left-in (southbound only)/right-in/right-out)
2. Traffic Signal
3. Multilane Roundabout

Similarly, each concept was evaluated under 2050 no-build and build scenarios to understand the relative benefits and tradeoffs of each. Key considerations included safety performance, traffic operations, multimodal impacts, and other considerations, such as right-of-way needs and costs. The following sections present the comparative analysis and design considerations. The findings are summarized in Attachment E.

Safety

The same CMFs used for the American Way alternatives were also applied to the River Road intersection, as the configurations and operating conditions are comparable. Table 11 presents the expected crash reductions associated with each alternative.

Table 11. Comparison of Expected Safety Outcomes at American Way

Alternative	Expected Total Crash Reduction	Expected Fatal/Serious Injury Crash Reduction
Alternative 1: RI/RO/LI Signal	-5% to -45%	-23% to -80%
Alternative 2: Traffic Signal	-5%	-23%
Alternative 3: Multilane Roundabout	-12%	-68%

The turning movement restrictions and roundabout alternatives are projected to provide the greatest reductions in fatal and serious injury crashes. For the turning movement restrictions alternative, rear-end crashes for northbound through vehicles may increase due to signalization. There is also potential for crash patterns to shift downstream, although the available CMF research does not quantify this effect.

Roundabouts promote slower speeds and have fewer conflict points compared to a stop-controlled intersection or fully signalized intersection because of their curvature. As such, roundabouts have been shown to significantly decrease the likelihood and severity of crashes, especially fatal and serious injury crashes. Therefore, roundabouts are expected to achieve safety benefits that exceed those of a traffic signal and may be comparable to or slightly lower than the reductions associated with turning movement restrictions.

Traffic Operations

A right-in/right-out only access to River Road was evaluated assuming restricted traffic would shift to S 3rd Street. However, heavy southbound left-turn volumes from Reserve Street onto S 3rd Street (385, including the 222 that would be rerouted from River Road) would be expected to push the intersection and the southbound left-turn movement over capacity. Given the projected heavy peak hour southbound left-turn demand at River Road, the project team developed an alternative scenario that also allows southbound left-turns from Reserve Street onto eastbound River Road. This scenario envisions the southbound left-turn being signalized with protected-only phasing, at least during the peak hours, to reduce conflicts between southbound left-turns and northbound traffic.

Traffic signal analysis was performed using *HCM 2000* methodology in Synchro 12. *HCM, 7th Edition* reports were not available due to the unique signal phasing. The traffic signal alternative signalizes all movements. The analysis assumed a coordinated cycle length consistent with the Reserve Street signal system to maintain progression along the corridor. Left-turn movements were evaluated with protected-only phasing. Traffic signal analysis was performed using *HCM, 7th Edition* methodology in Synchro 12.

The proposed roundabout is a 2x1 hybrid design, with two entry and exit lanes on the Reserve Street approaches and single entry and exit lanes on the River Road approaches. The roundabout analysis was performed in accordance with the procedures in the SIDRA Standard *HCM* roundabout capacity model, using Sidra 9.1 software.

The lane configurations of the three alternatives are displayed in Figure 15.

Figure 15. Lane Configurations of Package D (River Road) Alternatives

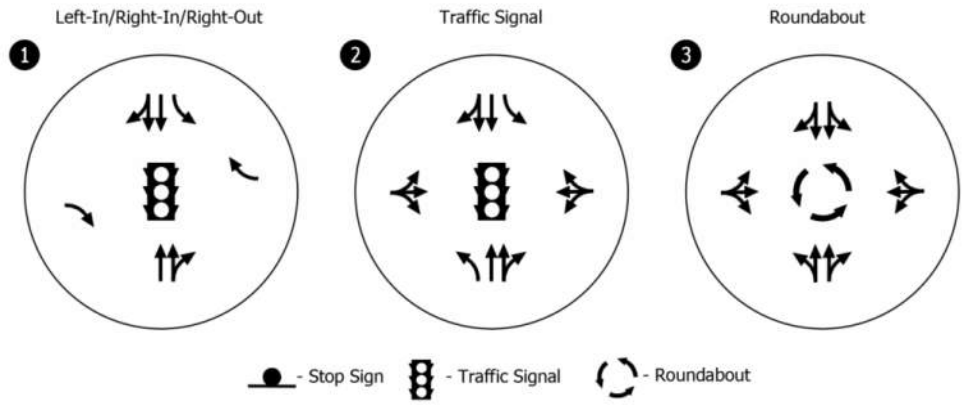


Table 12 summarizes the projected operational performance of the no-build condition and the three alternatives. Table 13 compares the respective projected queues.

Table 12. Projected Future PM Peak Hour Traffic Operations, River Road Alternatives

Alternative	Projected 2050 PM Peak Hour		
	LOS	Delay (seconds)	V/C
No-Build	F (EBL/WBL)	>100 (EBL/WBL)	**>1.00 (EBL/WBL)**
Alternative 1: RI/RO	B	15.5	NBT: 0.83 SBL: 0.78 WBR: 0.45 EBR: 0.01
Alternative 2: Traffic Signal	C	32.8	NBT: 0.87 SBT: 0.78 **SBL: >1.00** WB: 0.82 EB: 0.09
Alternative 3: Multilane Roundabout	C	19.6	NB: 0.90 SB: 0.84 WB: 0.67 EB: 0.09

Table 13. Existing/Projected Future PM Peak Hour 95th-Percentile Queues, River Road Alternatives

Alternative	Movement	Projected Queue (feet)
No Build	NBL	25
	SBL	150
	EBLT	50
	WB	25
Alternative 1: LI/RI/RO	NB	925
	SBL	**350**[1]
	EB	25
	WBR	250
Alternative 2: Traffic Signal	NB	1,025
	SBT/SBL	300/**350**[1]
	EB	50
	WB	100
Alternative 3: Multilane Roundabout	NB	825
	SB	500
	EB	25
	WB	75

[1] Projected queues extend past available storage.

As shown, Alternative 1 (LI/RI/RO) is projected to have the lowest overall delay and provides the most capacity, particularly for southbound movements. The full traffic signal alternative provides greater capacity for all Reserve Street movements, while the multilane roundabout operates below capacity and offers the most significant operational advantage for northbound traffic, with the shortest northbound queues among the options.

Most projected queues are expected to remain within available storage. An exception is the southbound left queue for the LI/RI/RO and signal alternatives, where the southbound left-turn queue is projected at 350 feet, exceeding the 175 feet of available storage. If these alternatives are advanced, the southbound left-turning storage would need to be extended, which would require removing some of the existing jersey barrier in the median north of River Road.

The curve at the start of the bridge is located approximately 200 feet north of the River Road intersection, and under all three alternatives, future PM peak hour queues are projected to extend to this location.

Multimodal Considerations

Alternative 1 reduces conflicts between pedestrians and vehicles by eliminating certain turning movements and adding a median refuge island. All crossings of Reserve Street would be directed to the south side of the intersections where a median refuge could shorten the crossing distance and a pedestrian-activated signal could stop southbound traffic.

Alternative 2 provides signalized crossings on all approaches. Safety performance could be further improved with Leading Pedestrian Intervals.

Alternative 3 includes center islands that serve as refuge areas, allowing pedestrians and bicyclists to complete crossings in two stages and reducing the distance traveled at one time. The roundabout would likely be designed to include a shared-use path around the circulatory roadway that separates non-motorized users from vehicular traffic. Additionally, the curvature of the roundabout approaches encourages slower vehicle speeds near crossings. Additional treatments, such as RRFBs or PHBs are recommended on the Reserve Street approaches of the roundabout to improve visibility of people crossing.

Cost Considerations

Similar to American Way, a multilane roundabout is expected to come with the highest construction costs. A commercial strip on the northwest corner currently has its only access about 25 feet from the intersection, which would likely be affected by the roundabout footprint. Additional analysis will be needed to evaluate alternative access options. Property impacts are also anticipated on the southwest and southeast corners of the intersection. The Reserve Street approaches to the roundabout would include either an RRFB or PHB, consistent with design guidance for multilane roundabouts.[7]

[7] National Academies of Sciences, Engineering, and Medicine. 2023. *Guide for Roundabouts*. Washington, DC: The National Academies Press. https:/doi.org/10.17226/27069.

PRELIMINARY BENEFIT-COST ANALYSIS

A preliminary benefit-cost analysis was conducted using the five-year crash history of this intersection to provide an approximate estimate of the potential return on investment for Alternative 3 and quick-build versions of Alternative 1 (no signal assumed for Alternative 1). This analysis was conducted similarly to the analysis described for Package C, including construction cost assumptions for quick-build treatments and the assumptions related to the crash reduction benefits of a quick-build LI/RI/RO configuration. Table 14 presents the results of this analysis and Attachment C contains further details.

Table 14. Package D Safety Benefit-Cost Analysis

	Quick-Build 1A (RI/RO)	Quick Build 1B (LI/RI/RO)	Alternative 3: Roundabout
Crash Costs/Year (2019-2023)	$1,223,560		
Estimated Crash Costs/Year After Treatment	$260,497	$921,850	$404,618
Estimated Crash Cost Benefit/Year	$963,063	$301,710	$818,942
Estimated Crash Cost Benefit (Lifecycle)	$3,948,748	$1,237,071	$8,675,881
Estimated Implementation Costs	$38,000	$77,000	$938,000
Expected Benefit-Cost Ratio (BCR)	**95.7**	**16.1**	**1.1**

This preliminary analysis found that all three alternatives are expected to provide a return on investment greater than the construction costs, in terms of reduced crashes. Due to their low construction costs and removal of conflict points, the quick-build alternatives are expected to have the greatest return on initial investment, even assuming only five years of benefits on the initial investment, compared to 20 years for the roundabout. The roundabout is expected to provide a greater annual crash reduction benefit than the quick-build LI/RI/RO configuration.

Access Considerations

Potential access impacts to the nail salon and nearby apartments are primarily a concern for the roundabout option, where the proposed footprint could conflict with existing access. Further evaluation is needed to determine how access could be accommodated or relocated within the roundabout design if it were moved forward.

Public Input

An online survey was conducted to collect feedback on the proposed locations and treatments in Package D. Key takeaways from this survey include:

- Alternative 3 (Multilane Roundabout) received the most first-place rankings among the three alternatives.
    - Respondents were in favor of a roundabout because of safety and mobility benefits, particularly for access to River Road.
    - The most noted concern for a roundabout was the potential for reduced traffic speeds to impact overall flow.
- Alternative 1 (LI/ RI/ RO) was the least preferred option.
    - The most noted concern for this option was the need for more access for residents and businesses, not less.
- Improving safety was noted as the most important consideration overall, as well as minimizing impacts to traffic flow on Reserve Street.
- The most common concern about the proposed alternatives was potentially having to stop at another intersection on Reserve Street.
- Some respondents noted there is less concern about people walking or on bikes at this intersection as the Milwaukie Trail is located just south of River Rd.

Next Steps

As with American Way, once funding for design and construction is obtained, a full ICE should be conducted for the Reserve Street/River Road intersection in accordance with MDT's ICE process to determine the most appropriate treatment.

As an interim treatment, the turning movement restrictions alternative (signalized SBLI/RI/RO) could be implemented to enhance intersection safety performance at a lower cost. If implemented, MDT and the MPO could monitor traffic operations, crash trends, and corridor growth over time to assess performance and determine the appropriate timing for constructing a traffic signal or multilane roundabout.

PACKAGE E: MULLAN ROAD

The Reserve Street/Mullan Road intersection was prioritized for further assessment because of its crash history and its importance in accommodating regional and local multimodal traffic, which is expected to increase as development in the Mullan area increases.

Between 2019 and 2023, there were 145 crashes reported, including one fatality, two serious injury crashes, and 40 other injury crashes. Of these crashes, 60% were rear-ends, 21% were sideswipe (same direction), 8% were turning or angle crashes, and 3% involved pedestrians. The fatality involved a pedestrian crossing Mullan Road, and the two serious injury crashes were rear-ends.

Traffic is expected to increase over the next 25 years due to local and regional growth, including significant amounts of new development to the west of the intersection. Safety performance functions (SPFs) from the *Highway Safety Manual* were used to estimate how this growth might affect safety performance. Based on this analysis, fatal and injury crashes are projected to increase by 20%, and property damage only crashes are projected to increase by 19% by the year 2050 if no changes are made to the intersection.

Treatment Alternatives

A variety of alternatives were discussed by the project team and PMT to reduce crashes,, while accommodating projected future traffic volumes at the Reserve Street/Mullan Road intersection. These alternatives included a median U-turn (MUT), quadrant intersection, diverging diamond, and fly-over/fly-under grade separation. The MUT and quadrant configurations were determine to be the most likely feasible alternatives, so they are evaluated further in this memo.

Median U-Turn

The project team conducted a preliminary assessment of a median U-turn (MUT) configuration. Further study, including engagement with adjacent property owners, will be needed to determine whether to move forward with a MUT, or other, configuration and the specific design details of any changes. A MUT reduces conflicts and improves operational performance by relocating left turn movements away from the main intersection. Instead of turning left at the main intersection, drivers make U-turn movements at a designated intersection a short distance downstream.

A full MUT was considered for the Reserve Street/Mullan Road intersection. However, the heavy northbound left-turn volumes (644 vehicles projected during the 2050 weekday PM peak hour) create operational challenges for relocating these movements to nearby intersections or potential safety concerns related to cut through traffic on local access roads. As a result, the project team evaluated a partial MUT configuration, visualized in Figure 16 and described below:

1. Southbound left-turning traffic would turn right at Mullan Road, then make a U-turn at Clark Fork Lane to continue eastbound on Mullan Road

2. Eastbound left-turning traffic would continue through the Reserve Street intersection, then make at U-turn at Great Northern Lane, followed by a right-turn at Reserve Street to continue north on Reserve Street
    a. Some individuals may also choose to turn left onto Great Northern Lane and use that street to access their destination or Reserve Street via the local street system
3. Westbound left-turning traffic would continue through the Reserve Street intersection, then make a U-turn at Clark Fork Lane, followed by a right-turn at Reserve Street to continue south on Reserve Street
    a. Some individuals may also choose to use Clark Fork Lane to access Reserve Street via Clark Fork Way

SAFETY

This configuration has fewer conflict points than a traditional signalized intersection and has been shown to reduce crashes compared to a conventional signalized intersection, even when factoring in crashes at the U-turn location.[8] This research has also found that a MUT configuration would be expected to reduce total crashes by about 37% and fatal and injury crashes by about 23% compared to a conventional 4-leg signalized intersection. *The proposed configuration for this intersection only removes left turns from three approaches, so the actual crash reduction benefit may be less than that cited above.*

MUTs are particularly effective at reducing angle crashes caused by left-turning vehicles. Removing left turns also frees up signal time for other movements, reducing queueing (see the Traffic Operations section below for potential effects at this intersection) and lowering the risk of rear-end crashes. The research cited previously found that MUTs reduce rear-end crashes, which are the most common serious injury crash type at this intersection, by about 47% (this increases to a 61% reduction of rear-ends behind left-turning vehicles). This could be especially beneficial for the northbound approach at this intersection given the bridge's curvature.

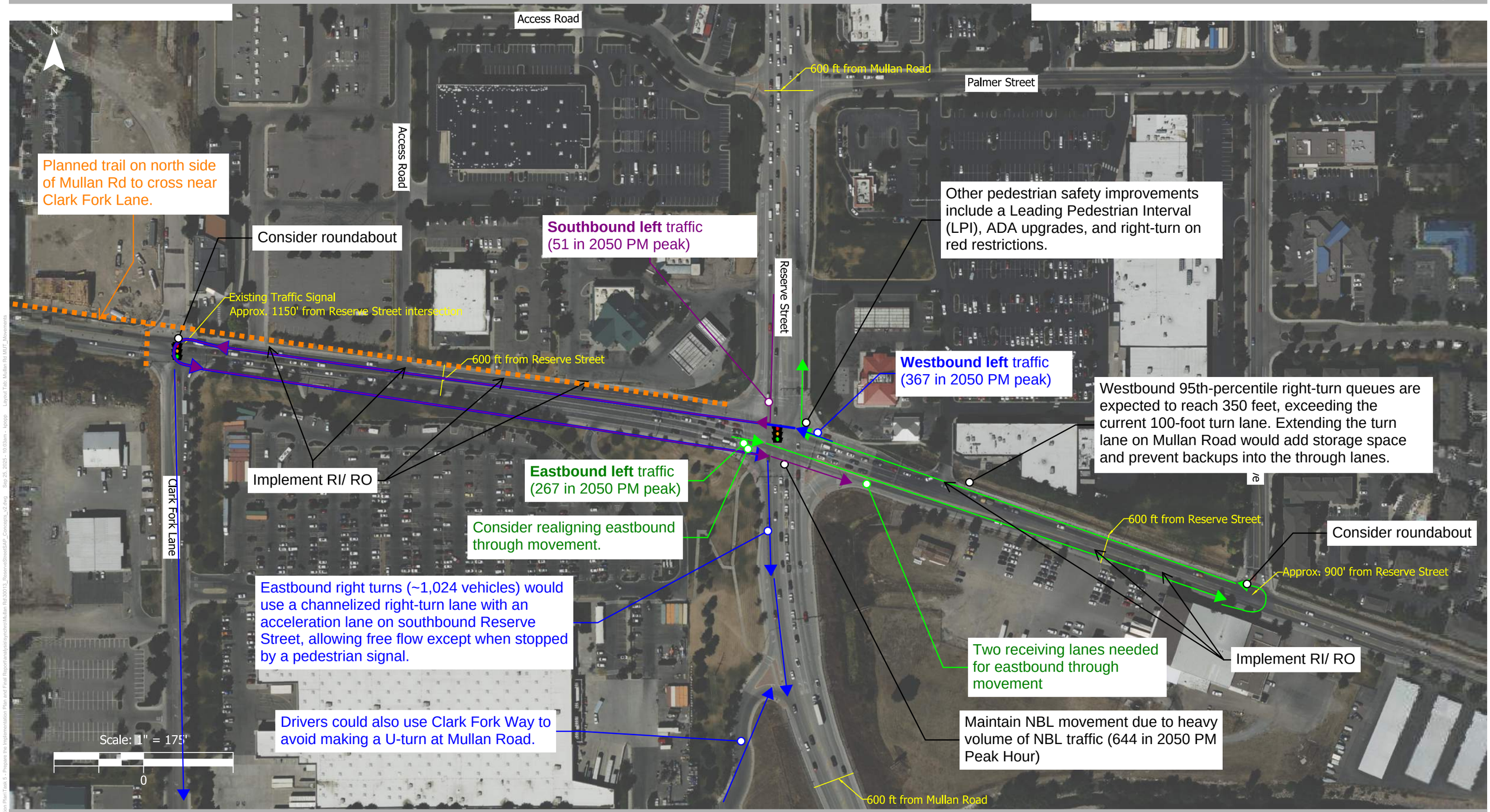
Conversely, the proposed MUT configuration would increase exposure to conflicts by increasing traffic volumes at the following locations:

1. The Clark Fork Lane and Great Northern Avenue intersections with Mullan Road due to relocated left-turns that would now be U-turns or left-turns at these intersections.
    a. The project team recommends considering roundabouts at these intersections to mitigate the increase in volumes, as well as to facilitate U-turns.
2. At the Reserve Street/Mullan Road intersection between people walking and biking across the intersection and the increased number of right-turning vehicles.
    a. The previously cited research noted that non-motorized crashes were higher at the studied MUT intersections compared to conventional signalized intersections.
    b. The project team recommends installing features to control, or increase awareness of these conflicts, such as leading pedestrian intervals (LPIs), restricting right-turns-on-red (RTOR), dynamic warning signs, and signalizing channelized right-turns.

[8] Al-Omari, M.M.A., M. Abdel-Aty, J. Lee, L. Yue, and A. Abdelrahman. "Safety Evaluation of Median U-Turn Crossover-Based Intersections". Transportation Research Record, Vol. 2674 (7), (2020) pp. 206-218. https:/journals.sagepub.com/doi/full/10.1177/0361198120921158

Missoula, MT

Conceptual Layout Subject to Change
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Figure 16. Reserve Street/ Mullan Road Intersection
Median U-Turn Considerations

TRAFFIC OPERATIONS

The intersection is projected to operate over capacity (v/c > 1.0) and at LOS F during the 2050 weekday PM peak hour if no changes are made. With the partial MUT configuration, it is projected to operate at a v/c of 0.95 and LOS D[9] assuming the lane configurations described below and shown in Figure 17.

- Removing one southbound left-turn lane, reducing the approach from four lanes to three lanes
- Removing one westbound left-turn lane and converting the other westbound left-turn lane to a through-lane, reducing the approach from four lanes to three lanes
- Removing one eastbound left-turn lane and converting the other eastbound left-turn lane to a through-lane, reducing the approach from four lanes to three lanes. This would require an additional receiving lane on the east side approach.
    - Because the westbound approach is reduced from four lanes to three lanes, there is room to accommodate the additional eastbound through receiving lane for the duration of the current westbound left-turn lane. Extending it beyond the current westbound left-turn lane would require road widening.
    - Because the new outside through-lane functions as an auxiliary lane with limited length, it is expected to have lower utilization due to necessary lane-change maneuvers upstream and downstream of the intersection. Based on national research, the utilization split was assumed to be 70/30 for planning purposes.[10] Further analysis is needed to develop a more precise lane utilization estimate for this location.
- Provides two signal-controlled eastbound right-turn lanes.
    - Providing a single channelized eastbound right-turn lane is an alternative option. This includes adding an acceleration lane on southbound Reserve Street so that this movement could run freely except when controlled by a pedestrian signal. This would likely involve removing the southbound right-turn into Clark Fork Way.
- Capacity and delay are forecast to improve primarily for westbound and northbound movements, except for the westbound right-turning movement which is forecast to have a slight decrease in capacity and a slight increase in delay.
    - All movements are projected to operate under capacity (v/c < 1.0), with the most congested movements projected to be the northbound left-turn and eastbound through, which are projected to operate with a v/c of 0.97.
- Forecast 95th-percentile queues are reduced for the northbound through movements. Notable queuing impacts are described below:
    - Northbound through queues are expected to decrease from approximately 625 feet to 175 feet, primarily due to the increased green time allocated to the northbound through and protected left-turn phases. With left turns removed from the other approaches, more signal time can be dedicated to these northbound movements, resulting in improved flow and shorter queues.
    - Southbound through queues are forecasted to be the same as the no-build condition and are still projected to extend to the Palmer Street intersection, which is approximately 575 feet from the Mullan Road intersection.

[9] Based on HCM 2000 methodology.
[10] National Academies of Sciences, Engineering, and Medicine. 2011. *Guidelines on the Use of Auxiliary Through Lanes at Signalized Intersections*. Washington, DC: The National Academies Press. https:/doi.org/10.17226/14617.

- Westbound right-turn queues are forecast to increase by 325 feet. Widening Mullan Road to extend the dedicated right-turn would provide additional right-turn storage, reducing spillback into through lanes.

- The no-build scenario assumes RTOR are permitted, while the build condition assumes RTOR is prohibited to eliminate right-turn conflicts and accommodate leading pedestrian interval (LPI) treatments.

Figure 17. Proposed Build Configuration - Median U-Turn

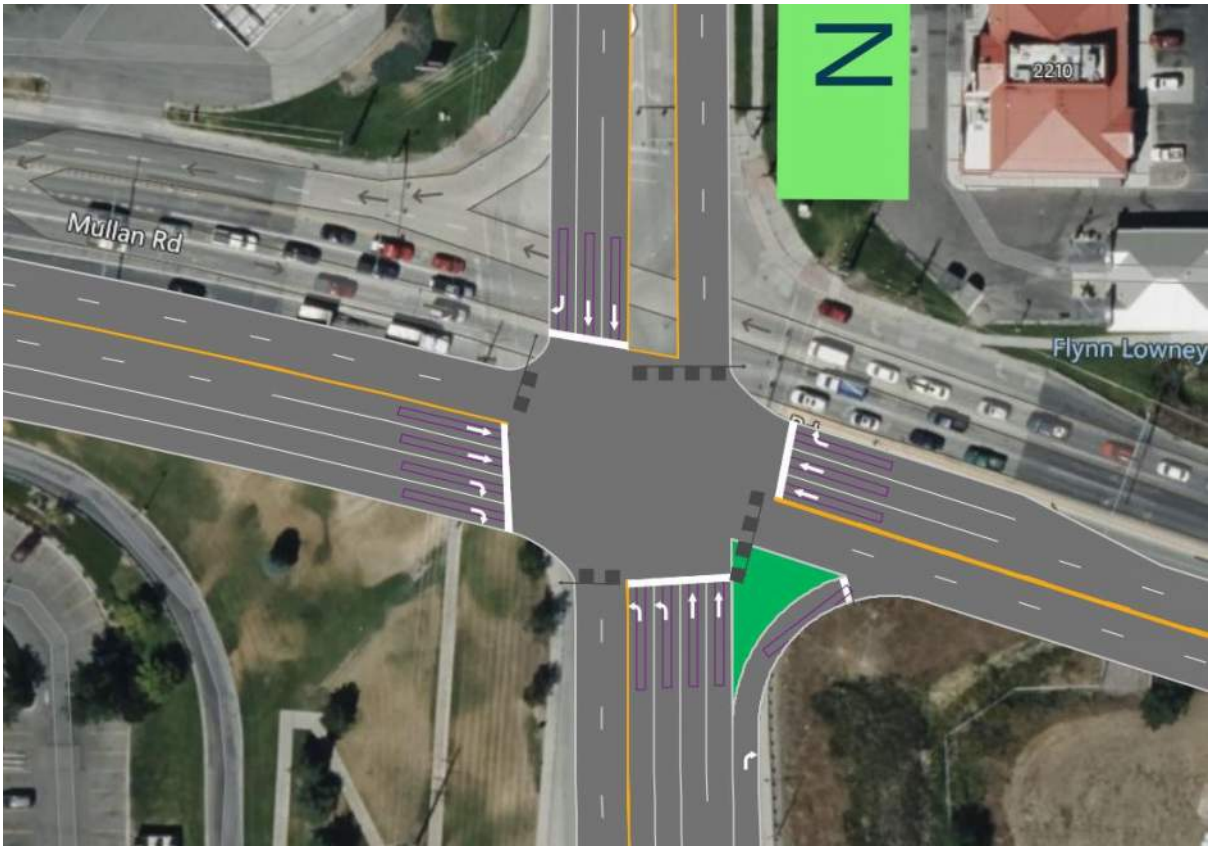


Table 15 summarizes a comparative analysis of traffic operations for each movement.

Table 15. Comparative Summary of 2050 Build and No-Build Conditions (Weekday PM Peak Hour)

	2050 No Build (PM Peak Hour)				2050 Build (PM Peak Hour)			
Movement*	v/c	LOS	Avg. Delay (s/ veh.)	95th %-ile Queue (feet)	v/c	LOS	Avg. Delay (s/ veh.)	95th %-ile Queue (feet)
EBL	0.88	F	100.5	250	-	-	-	-
EBT	0.94	F	102.3	625	0.93	E	78.1	725
EBR	1.15	F	146.8	900	0.73	E	59.3	350
WBL	0.90	F	97.0	300	-	-	-	-
WBT	1.16	F	161.5	925	0.86	E	66.1	600
WBR	0.01	A	1.0	25	0.57	D	54.5	350
NBL	1.48	F	305.0	650	0.97	F	99.6	475
NBT	0.93	E	62.1	625	0.60	A	8.6	175
NBR	0.03	A	7.6	25	0.11	A	3.4	25
SBL	0.28	E	70.9	75	-	-	-	-
SBT	0.92	D	53.1	725	0.95	E	59.9	725
SBR	0.11	A	8.1	100	0.35	D	37.0	150
Intersection	1.17	F	115.6	-	0.95	D	54.8	-

**First letter indicates direction (E = Eastbound, W = Westbound, N = Northbound, S = Southbound), second letters indicate the movement (L = left turn, T = through, R = right-turn).*
Shading key (only applies to numerical metrics): 0-50% reduction, 50+% reduction, <100% increase, >100% increase, No change

Key takeaways include:

- Capacity and delay are forecast to improve primarily for westbound and northbound movements, except for the westbound right-turning movement which is forecast to have a slight decrease in capacity and a slight increase in delay.
    - All movements are projected to operate under capacity (v/c < 1.0), with the most congested movements projected to be the northbound left-turn and eastbound through, which are projected to operate with a v/c of 0.95.
- Forecast 95th-percentile queues are reduced for the northbound through movements. Notable queuing impacts are described below:
    - Northbound through queues are forecast to drop significantly, from 625 ft to 175 ft.
    - Southbound queues are forecast to increase slightly and are still projected to extend to the Palmer Street intersection, which is approximately 575 feet from the Mullan Road intersection.
    - Westbound right-turn queues are forecast to increase by 325 feet. Widening Mullan Road to extend the dedicated right-turn would provide additional right-turn storage, reducing spillback into through lanes.

MULTIMODAL CONSIDERATIONS

Benefits and tradeoffs for pedestrians and bicyclists include:

- Potentially increases conflicts between people walking and biking across the intersection and right-turning vehicles at the Reserve Street/Mullan Road intersection. The project team recommends installing features to control, or increase awareness of these conflicts, such as leading pedestrian intervals (LPIs), restricting RTOR, dynamic warning signs, and signalizing channelized right-turns.
- Reduces total crossing distance on the southbound approach (north leg) and eastbound approach (west leg) from six lanes to five lanes. Provides additional room for a median crossing island.
- Dual eastbound right-turn lanes could result in additional conflicts from vehicles turning right on red.
- Potentially increases conflicts for crossings at the Clark Fork Lane and Great Northern Ave intersections due to the increased traffic from relocated left-turns.
- A shared-use path is planned on the north side of Mullan Road from Reserve Street to Mary Jane Boulevard, with a crossing to the south near Clark Fork Lane. With the MUT configuration, lanes on the west side of Mullan Road are reduced, potentially providing additional space for constructing the path.
- Removes conflicts from southbound, eastbound, and westbound left-turning movements. However, because these movements currently operate under protected phasing, conflicts should only arise when someone is violating the signal.

Quadrant Intersection

A quadrant intersection reroutes all four left-turn movements onto a connector roadway that links the two intersecting roads. This configuration reduces conflicts and simplifies operations at the main intersection by reducing the number of signal phases and movements. Safety data on quadrant intersections is limited and CMFs are not yet available, but the design reduces conflict points from 32 at a conventional intersection to 28 more widely distributed conflicts.[11]

Within the Mullan Road and Reserve Street area, existing roadways in the surrounding network could potentially be configured to accommodate a quadrant intersection. Key considerations and movement summaries for both potential configurations are provided in Attachment F and described below.

Clark Fork Way/ Clark Fork Lane

This configuration consists of using Clark Fork Way-Clark Fork Lane as the connector roadway. The Clark Fork Way/Reserve Street intersection would likely need to be reconfigured as a t-intersection with new traffic control (signal or roundabout) to accommodate turning vehicles and freight truck turning movements. Key considerations for this configuration are described below.

[11] Federal Highway Administration. (2010). *Alternative Intersections/Interchanges: Information Report (AIIR)* (FHWA-HRT-09-060). U.S. Department of Transportation. https:/www.fhwa.dot.gov/publications/research/safety/09060/

- Removing left turns from Reserve St/ Mullan Rd would reduce conflicts and improve traffic operations.
- New traffic control (signal or roundabout) will likely be required at the Reserve St/Clark Fork Way intersection to accommodate redistributed traffic volumes.
    - Fitting dual northbound left-turn lanes will require widening of Reserve Street south of Clark Fork Way, which could be costly because of the bridge.
- Queue spillback from the Reserve St/ Mullan Rd intersection could have impacts to operations at Reserve St/ Clark Fork Way, making the eastbound left-turn from Clark Fork Way to Reserve St difficult.
- Queues from Reserve Street/ Mullan Rd already spill back onto the bridge, where sight distance and speeds are a concern. Increasing movements and traffic at Reserve Street/ Clark Fork Ln could exacerbate that spillback onto the bridge.
- The design introduces significant out-of-direction travel for southbound left-turn movements (51 vehicles) and westbound left-turn movements (367 vehicles).
- Removing left turns from Reserve St/ Mullan Rd could reduce the intersection footprint, allowing space for median refuge islands and shortening pedestrian crossing distances. Further operational analysis is needed to determine the necessary lane configurations at Reserve St/ Mullan Rd with this configuration.

This concept presents a full quadrant intersection configuration. However, some left-turn movements could be maintained to mitigate out-of-direction travel. For this option, maintaining southbound, eastbound, and/ or westbound left-turns may be considered to reduce out-of-direction travel for those movements.

Great Northern Avenue

This configuration consists of using Great Northern Avenue and Palmer Street as the connector roadway. The Great Northern Avenue/ Mullan Road intersection and Reserve Street/ Palmer Street intersections would likely need new traffic control (traffic signal or roundabout) to accommodate turning movements. Key considerations for this configuration are described below.

- Removing left turns from Reserve St/ Mullan Rd would reduce conflicts and improve traffic operations.
- New traffic control (signal or roundabout) will likely be required at Reserve St/Palmer St and at Great Northern Ave/Mullan Rd intersections to accommodate redistributed traffic volumes.
- The design introduces significant out-of-direction travel for westbound (367 vehicles) and northbound left-turning movements (644 vehicles).
- Redirecting northbound left-turning traffic through the quadrant intersection would introduce significant (644) volumes through multiple intersections (Reserve St/ Palmer St, Palmer St/ Great Northern Ave, and Great Northern Ave/Mullan Rd).
- Removing left turns from Reserve St/ Mullan Rd could reduce the intersection footprint, allowing space for median refuge islands and shortening pedestrian crossing distances. Further operational analysis is needed to determine the necessary lane configurations at Reserve St/ Mullan Rd with this configuration.

This concept presents a full quadrant intersection configuration. However, some left-turn movements could be maintained to mitigate out-of-direction travel. For this option, maintaining northbound left-

turns may be considered to mitigate operational impacts of redistributing 644 northbound left-turns throughout the network and to reduce out-of-direction travel for this heavy movement.

Near-Term Treatments

The following improvements could be built before a full intersection reconfiguration occurs:

- Upgrades to meet current ADA standards and best practices (e.g., accessible pedestrian signals, curb ramps).
- Continental crosswalk striping to increase driver awareness of pedestrian crossings.
- Leading Pedestrian Interval (LPI) to provide pedestrians a head start before conflicting vehicle movements.
    - The no-build scenario summarized in Table 15 assumes RTOR are permitted. If RTOR is prohibited to reduce right-turn conflicts and accommodate the LPI, intersection operations are expected to experience minimal overall change. No right-turn movements are projected to shift from under to over capacity. However, the eastbound right-turn (EBR) movement, which is already over capacity in the no-build condition, is forecast to increase in volume-to-capacity ratio from 1.15 to 1.35.
- Access management on side streets to reduce conflicts between vehicles and people walking and biking.
- Prohibit right-turn-on-red to reduce conflicts between right-turning vehicles and people in the crossing.
- Extend southbound left-turn lane storage

The MUT configuration at Reserve Street/Mullan Road may generate a need for control changes at nearby intersections, as this reconfiguration would shift southbound, eastbound, and westbound left turns to Clark Fork Lane and Great Northern Avenue. Roundabouts are recommended for consideration at both locations to facilitate U-turns and reduce conflicts between roadway users; however, full ICE studies will be required for these intersections to understand operational implications, access to adjacent businesses, appropriate design vehicles, environmental and utility considerations, as well as impacts to freight movements. Reconfiguration of Mullan Rd/ Clark Fork Way may also be needed to accommodate freight trucks.

Access management measures are recommended because Mullan Road has driveways and other access points near the Reserve Street intersection. Implementing access management strategies such as driveway consolidation or turning movement restrictions would reduce conflict points.

Cost Considerations

The MUT configuration would be relatively costly due to the extent of improvements included. Reconfiguring the Reserve Street/Mullan Road intersection to remove left turns would require reconstruction of the approaches, which could reduce the number of lanes needed and create opportunities for median refuge areas for pedestrians. Additional costs would be associated with extending the eastbound receiving lanes to two lanes east of the intersection and updating signal timing to reflect the new traffic patterns.

The MUT configuration also includes improvements at nearby intersections Clark Fork Lane/Mullan Road and Great Northern Avenue/Mullan Road, which further increase costs. A roundabout is proposed at Clark Fork Lane, and either a traffic signal or roundabout is proposed at Great Northern Avenue. These treatments, particularly roundabouts, would have larger footprints and likely result in property impacts. Additional costs are also anticipated for potential reconfiguration of the Clark Fork Way/Reserve Street intersection to improve alignment and accommodate freight truck turning movements.

The near-term treatments presented in a previous section, including signal timing changes, ADA and crossing upgrades, and access management interventions, provide lower-cost interim treatments that could have immediate safety benefits.

Public Input

An online survey was conducted to collect feedback on the proposed locations and treatments in Package E. Key takeaways from this survey include:

- Most respondents (66%) supported continuing to study improvements to Reserve Street/Mullan Road because of safety concerns and increases in traffic due to future growth.
    - Common concerns about the MUT concept included perceptions that it may be confusing for drivers, could contribute to congestion, and might not effectively address existing traffic issues.
- The potential for reduced congestion for through traffic on Reserve Street and Mullan Road was cited as the most desired benefit of the proposed alternative.
    - Roundabouts at Clark Fork Lane and Great Northern Avenue were identified as the second most desired improvement, providing additional safety and mobility benefits.
- The most common concern was the potential for increased conflicts between right-turning vehicles and pedestrians in crosswalks.
    - Other concerns included possible increases in conflicts at the Clark Fork Drive and Great Northern Avenue intersections and the potential for driver confusion with the proposed configuration.

Next Steps

Implementation of this package is seen as a long-term treatment for concerns at Reserve Street/Mullan Road. An ICE would need to be conducted to understand impacts to operations (including at nearby intersections) and potentially to adjacent properties.

Further analysis should also include full ICE studies at Mullan Road/Great Northern Avenue and Mullan Road/Clark Fork Lane to understand impacts to the surrounding network. It should also consider potential treatments at Reserve Street/American Way (see Package C above) given the interconnected nature of this section of the corridor. Outreach with adjacent property owners and business owners should also be carried out.

The analysis results and planning considerations presented herein are preliminary and cannot anticipate all design and construction challenges or significant modifications that may emerge during subsequent detailed design phases.

International Drive-Stockyard Road

City staff identified the Reserve Street/International Drive-Stockyard Road intersection as another location where quick-build turning movement restrictions could be tested to evaluate their effectiveness and effects on local traffic circulation and business access. The project team conducted a preliminary BCA based on the five-year crash history of this intersection similarly to the analyses completed for Packages C and D. The results are summarized in Table 16 and included in Attachment C.

Table 16. International Drive-Stockyard Road Safety Benefit-Cost Analysis

	Quick-Build (RI/RO)	Quick Build (LI/RI/RO)
Crash Costs/Year (2019-2023)	$3,520,900	
Estimated Crash Costs/Year After Treatment	$713,420	$2,114,300
Estimated Crash Cost Benefit/Year	$2,807,480	$1,406,600
Estimated Crash Cost Benefit (Lifecycle)	$11,511,222	$5,767,338
Estimated Implementation Costs	$40,860	$90,000
Expected Benefit-Cost Ratio (BCR)	**282**	**64.1**

This preliminary analysis found that both alternatives are expected to provide a return on investment greater than the construction costs, in terms of reduced crashes. The RI/RO configuration has the greatest expected return as it removes more conflict points than the LI/RI/RO configuration; however, it would also have greater impacts on local circulation and business access.

Conclusion

The analysis findings presented in this memorandum represent *preliminary* planning-level evaluations of potential segment safety and intersection control treatments. Particularly for Packages B, C, D, and E, further study, including engagement with adjacent property owners, will be needed to determine whether to move forward with configurations and specific design details of any changes. Package A includes more near-term treatments, but these will also need further study to determine if they are the most appropriate and desired treatments.

PACKAGE SUMMARY

Table 17 provides a summary of the Packages put forth in this memorandum and their respective components and expected benefits and costs.

Table 17. Summary of Packages

Package	Treatments	Key Safety Benefits	Traffic Operations Effects	Estimated Package Cost	Next Steps
Package A: Lighting and Speed Management	Existing Pedestrian Crossing: • PHBs; • ADA and crosswalk enhancements	Increase driver awareness of crossing and improve accessibility	N/A	$3,240,000	Conduct full evaluation of crossing to determine location and preferred treatment(s)
	Broadway Street Ramps and Bridge: • RRFBs at ramp crossings; • Dynamic speed feedback signs; • Advance warning signs and beacons on bridge (SB)	Increase driver awareness of uncontrolled crossings; Speed management; Increase driver awareness of southbound queues and signal	N/A		Conduct full evaluations of crossings to determine preferred treatment(s); Determine speed sign locations; Further study warning flashers to determine operations
	Clark Fork River Bridge: • Bridge lighting; • Dynamic speed feedback signs	Improved visibility for drivers and pedestrians; Speed management	N/A		Conduct illumination study to determine lighting needs; Determine sign locations
	S 7th Street: • Dynamic speed feedback signs	Speed management	N/A		Determine sign locations
	Signal Upgrades (FYA, APS)	Increase driver awareness of pedestrians	Lowers capacity		Design upgrades and confirm extent of signal timing/phasing modifications

Package	Treatments	Key Safety Benefits	Traffic Operations Effects	Estimated Package Cost	Next Steps
Package B: Clark Fork River to Brooks Street Access Management	Reduce access density through driveway closure, consolidation, or relocation; Restrict movements at driveways; Install raised medians to limit movements	Removes conflict points and consolidates turning and crossing movements to fewer, and oftentimes controlled, locations	Some out-of-direction travel expected	$10,200,000 - $18,200,000 (depending on treatments)	Conduct complete access management study for the corridor, per MDT requirements. Include coordination with key stakeholders on the corridor. Consider quick-build implementation.
Package C: American Way	Alternative 1: Signal with movement restrictions	All: Reduce crashes, particularly fatal and serious injury crashes; Alternatives 2 and 3: Provide dedicated crossing opportunities	Improves side-street operations; Increases delays and queues on Reserve Street	-	Obtain funding and conduct complete Intersection Control Evaluation per MDT requirements to determine optimal intersection control. Consider quick-build implementation.
	Alternative 2: Full Traffic Signal			$938,000	
	Alternative 3: Multilane Roundabout			-	
Package D: River Road	Alternative 1: Signal with movement restrictions	All: Reduce crashes, particularly fatal and serious injury crashes; Alternatives 2 and 3: Provide dedicated crossing opportunities	Improves side-street operations; Increase delays and queues on Reserve Street	-	Obtain funding and conduct complete Intersection Control Evaluation per MDT requirements to determine optimal intersection control. Consider quick-build implementation.
	Alternative 2: Full Traffic Signal			-	
	Alternative 3: Multilane Roundabout			$7,835,000	
Package E: Mullan Road	Median U-Turn intersection; Potential roundabouts at Great Northern Avenue and Clark Fork Lane	Reduce crashes, including fatal and serious injury crashes	Increase intersection capacity	$16,000,000	Obtain funding and conduct complete full Intersection Control Evaluations for all three intersections. Obtain funding for near-term projects.

POTENTIAL FUNDING OPPORTUNITIES

As requested by MPO staff, the project team evaluated potential funding opportunities for the priority packages. This evaluation primarily focused on two safety-focused funding programs: federal Safe Streets and Roads for All (SS4A) discretionary grants and Highway Safety Improvement Program (HSIP) funding administered by MDT. Each of these programs has criteria that tend to prioritize locations with recent severe crash history: SS4A grants consider the number of fatal and serious injury (FSI) crashes and the HSIP program incorporates a BCA.

Given these emphases on crash history and BCA results, our evaluation for these two programs focused on Packages B, C, and D, as well as quick-build improvements at International Drive-Stockyard Road. Table 18 summarizes the results of the BCA analyses and the number of FSI crashes at these locations.

Table 18 BCA Results and FSI Crash History

Package/Location	FSI Crashes (2019-2023)	Treatment	BC Ratio
B	Entire Segment: 9 (0 Fatal); Quick-Build Locations: 6 (0 Fatal)	Quick-build Access Management Only	20.0
		Lower Cost (Traffic Signals/RRFBs)	6.3
		Higher Cost (Roundabouts/PHBs)	3.8
C	5 (0 Fatal[1])	Quick-build (RI/RO)	166
		Quick-build (LI/RI/RO)	16.4
		Traffic Signal	5.0
D	3 (0 Fatal)	Quick-build (RI/RO)	95.7
		Quick-build (LI/RI/RO)	16.1
		Roundabout	1.1
International Drive-Stockyard Road	3 (1 Fatal)	Quick-build (RI/RO)	282
		Quick-build (LI/RI/RO)	64.1

[1]There was a fatality at this intersection in 2025, which may be able to be included in an SS4A grant application.

This preliminary analysis shows that all analyzed treatments have a BCR greater than 1.0; however, this analysis was conducted using USDOT parameters and not MDT HSIP parameters. As a result, MDT's analysis of these projects is likely to produce different results. Most notably, this means that the roundabout alternative for Package D may not pass MDT's minimum threshold to be considered for funding through the HSIP program.

Each package has had multiple FSI crashes in the data analyzed for this project, which could support an SS4A grant application, particularly if multiple locations were packaged together. The quick-build projects could be eligible for SS4A Demonstration grants, which could include funding for community outreach, before-after studies, and implementation and removal costs. These grants have been historically less competitive than Implementation grants and could provide an opportunity for the project partners to trial out the quick-build treatments at one more locations.

The lower-cost treatments in Packages A and E could potentially be funded through federal formula, state, or other funding sources. They could also be packaged with elements of Packages B, C, or D as part of a grant application.

Finally, the Mullan Road intersection is a key junction for regional growth. Given its potential role in future regional economic development it may also be a candidate for non-safety focused grants, such as BUILD grants.

Attachments

A. Package Summary Sheets
B. Crossing Assessment Using MDT and FHWA Uncontrolled Crossing Treatment Guidance
C. Benefit-Cost Analyses
D. American Way – Alternatives Comparison Table
E. River Road – Alternatives Comparison Table
F. Mullan Road – Quadrant Intersection Movement Summaries

Attachment A

Priority Project

PACKAGE A: LIGHTING, SIGNAGE, AND SIGNAL UPGRADES

Description: This package addresses multimodal safety through lighting, speed management, warning signs, crossing enhancements, and signal upgrades at multiple locations.

Why is this package needed?

SAFETY CHALLENGES ADDRESSED:

SPEED | LIGHTING | PEDESTRIAN CROSSINGS | REAR-END CRASHES

TREATMENTS PROPOSED

Per MDT guidance, some type of actuated crossing should be considered for any pedestrian crossings on Reserve Street. A **Pedestrian Hybrid Beacon (PHB)** is recommended due to the speeds and number of lanes crossed on Reserve Street. An engineering study will be required to determine the final treatment and location.



Dynamic speed feedback signs can increase driver alertness and encourage slower speeds. Locations shown here are at risk for speeding due to the distance between intersections or downgrades.



Advanced warning signage can prepare drivers for the upcoming signal and potential queues that may not be visible from the other side of the bridge. Dynamic flashers coordinated with the signal should also be considered.



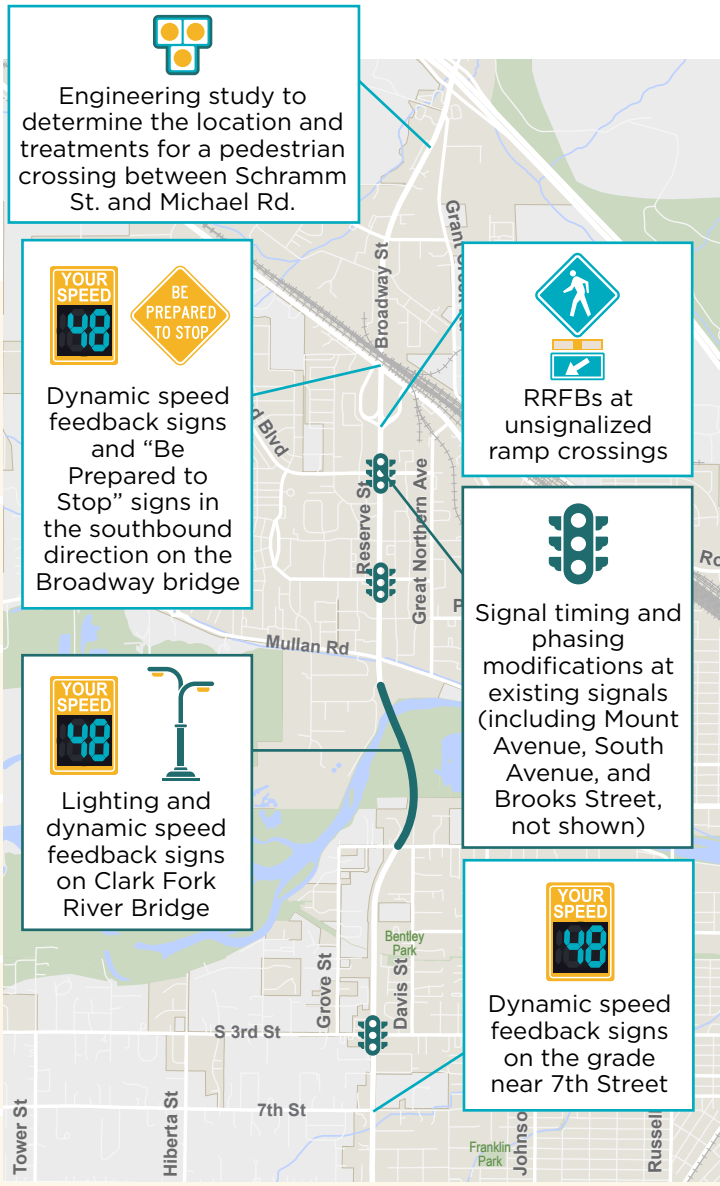
Rectangular Rapid Flashing Beacons (RRFBs) alert drivers of crossing pedestrians and can increase driver yielding at the Broadway ramp crossings, which have higher speeds and don't have signals.



Drivers travel at the highest speeds on the Clark Fork River Bridge (Mullan Road to River Road), which is currently the only section of Reserve Street without **lighting**.



Safety-focused signal timing and phasing upgrades, including **Flashing Yellow Arrows** and **Accessible Pedestrian Signals** at the locations shown, can reduce turning conflicts and improve accessibility for people crossing Reserve Street.



Implementation Considerations

- Evaluate locations and installation methods for signage and lighting on bridges while considering dark sky impacts.
- Conduct pedestrian studies to confirm the need for PHBs and RRFBs.
- Study queuing at the Broadway bridge to determine placement of advance warning signage. Placement will determine the need for a new overhead structure instead of retrofitting to the bridge.
- Conduct an engineering study at the Homewood Suites crossing to assess queuing and overhead structure needs with the PHB improvement.
- Conduct before-and-after studies to evaluate the effectiveness of speed feedback signs.

Planning-Level Cost Estimate

$-$$

(Varies depending on treatment)

Priority Project

PACKAGE B: ACCESS MANAGEMENT & CROSSINGS

Description: This project reduces the potential for severe crashes on the south half of Reserve Street, -including angle, rear-end, turning, and pedestrian crossing crashes- by eliminating conflicts through access management and controlling conflicts through enhanced crossings and intersection control.

Why is this package needed?

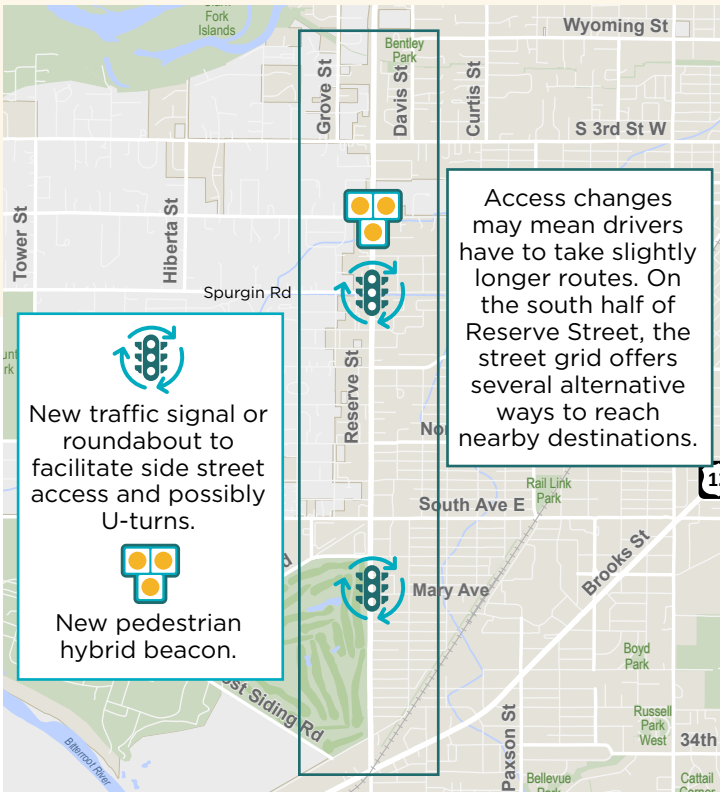
In a 5-year period there were:

- **35** FATAL AND SERIOUS INJURY CRASHES
- **62** TURNING CRASHES
- **5** PEDESTRIAN CRASHES
- **102** ANGLE CRASHES
- **455** REAR-END CRASHES

This segment of Reserve Street serves important community destinations, including schools and residential neighborhoods on both sides of the street.

SAFETY CHALLENGES ADDRESSED:

TURNING CRASHES | ANGLE CRASHES | PEDESTRIAN CROSSINGS | REAR-END CRASHES



TREATMENTS PROPOSED

Access management has the most benefits on the southern portion of Reserve Street because of the high density of uncontrolled side streets and business accesses.

TURNING MOVEMENT RESTRICTIONS



PEDESTRIAN HYBRID BEACON



TRAFFIC SIGNAL



ROUNDABOUT



RAISED MEDIAN



Quick Build

Quick-build treatments, such as interim turning movement restrictions can provide near-term safety benefits while longer-term improvements are planned. High-priority locations include streets or driveways with alternate access and a history of treatable crashes.

Implementation Considerations

- Access modifications may need to be phased in with development/ redevelopment or capital projects on Reserve Street or adjacent streets.
- Some improvements may not be possible until alternative access to side streets or U-turn opportunities are provided on Reserve Street.
- Engagement with adjacent property owners and businesses should be completed prior to implementing access management.
- An access management study will be required before most of the recommended treatments can be installed.

Planning-Level Cost Estimate

$-$$$

(Varies depending on treatment)

Priority Project

PACKAGE C: RESERVE STREET/ AMERICAN WAY INTERSECTION

Description: This project would re-design the intersection to improve safety for all roadway users while also considering access to adjacent businesses and interactions with nearby traffic signals.

Why is this package needed?

In a 5-year period there were:

55 TOTAL CRASHES

5 FATAL AND SERIOUS INJURY CRASHES

10 TURNING AND ANGLE CRASHES

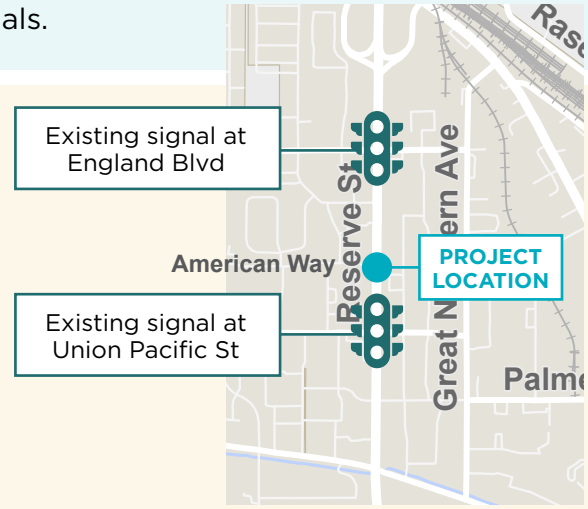
SAFETY CHALLENGES ADDRESSED:

ANGLE CRASHES

PEDESTRIAN CROSSINGS

TURNING CRASHES

REAR-END CRASHES



Three alternatives aimed at improving safety and reducing crash risk are being considered:

CONSIDERATION	1. TURNING MOVEMENT RESTRICTIONS[1]	2. TRAFFIC SIGNAL	3. ROUNDABOUT
SAFETY	✓ Reduces left-turn and angle conflicts ✓ May increase rear-end crashes ✓ Expected to reduce total crashes by 5-45%, and fatal and serious injury crashes by 23 to 80%	✓ Controls left-turn and angle conflicts ✓ Will likely increase rear-end crashes ✓ Expected to reduce total crashes by 5% and fatal and serious injury crashes by 23%	✓ Slows speeds, reducing crash severity ✓ Eliminates left-turn and angle conflicts ✓ Expected to reduce total crashes by 12%, and fatal and serious injury crashes by 68%
CAPACITY	✓ May introduce delay on Reserve Street (if signalized) ✓ Shifts traffic *to* other intersections	✓ Introduces delay on Reserve Street ✓ May shift traffic *from* other intersections	✓ Introduces delay on Reserve Street (less than signal) ✓ May shift traffic *from* other intersections
MULTIMODAL	✓ Depending on final configuration, may remove crossing	✓ Provides signalized crossings	✓ Shortens crossings and slows vehicle speeds
IMPLEMENTATION	✓ Likely no right-of-way (ROW) required	✓ Likely no ROW required	✓ May impact surrounding properties
COST	**$-$$**	**$$**	**$$$**
OTHER CONSIDERATIONS	✓ Restricts access to/from American Way ✓ Potential for some crashes to shift to other intersections	✓ Improves access to/from American Way	✓ Improves access to/from American Way

[1] right-turns only out of American Way or right-turns into, and possibly left-turns (with a signal) into American Way

Priority Project

PACKAGE D: RESERVE STREET/ RIVER ROAD INTERSECTION

Description: This project will re-design the intersection to improve multimodal safety for all roadway users, while also considering access needs of surrounding neighborhoods.

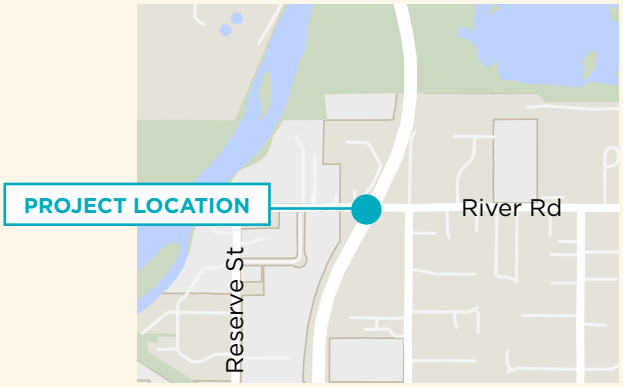
Why is this package needed?

In a 5-year period there were:

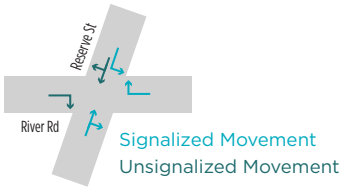
- **41** TOTAL CRASHES
- **3** FATAL AND SERIOUS INJURY CRASHES
- **8** TURNING AND ANGLE CRASHES

SAFETY CHALLENGES ADDRESSED:

- ANGLE CRASHES
- PEDESTRIAN CROSSINGS
- TURNING CRASHES
- REAR-END CRASHES



Three alternatives aimed at improving safety and reducing crash risk were evaluated:

CONSIDERATION	 1. TURNING MOVEMENT RESTRICTIONS[1]	2. TRAFFIC SIGNAL	3. ROUNDABOUT
SAFETY	✓ Reduces left-turn conflicts ✓ Expected to reduce total crashes by 5 to 45%, and fatal and serious injury crashes by 23 to 80% ✓ May increase rear-end crashes	✓ Controls left-turn and angle conflicts ✓ Will likely increase rear-end crashes ✓ Expected to reduce total crashes by 5% and fatal and serious injury crashes by 23%	✓ Slows speeds, reducing crash severity ✓ Eliminates left-turn and angle conflicts ✓ Reduces total crashes by up to 12%, and fatal and serious injury crashes by up to 68%
CAPACITY	✓ Introduces some delay on northbound Reserve Street ✓ Shifts traffic to S 3rd St, adding congestion	✓ Introduces delay on Reserve Street ✓ May shift traffic from other intersections	✓ Introduces delay on Reserve Street (less than signal) ✓ May shift traffic from other intersections
MULTIMODAL	✓ Provides pedestrian-activated signal and reduces crossing distance ✓ Reduces conflicts between vehicles and people crossing	✓ Provides signalized crossings	✓ Shortens crossings and slows vehicle speeds
IMPLEMENTATION	✓ Likely won't require right-of-way (ROW)	✓ Likely no ROW required	✓ May impact surrounding properties
COST	**$-$$**	**$$**	**$$-$$$**
OTHER CONSIDERATIONS	✓ Restricts access to/from River Road ✓ Potential for some crashes to move to other intersections	✓ Improves access to/from River Road	✓ Improves access to/from River Road

[1] right-turns only out of River Road or right-turns into and southbound left-turn (with a signal) allowed into River Road

Priority Project

PACKAGE E: RESERVE STREET/ MULLAN ROAD INTERSECTION

Description: Reduces conflicts and increases capacity by relocating left turn movements away from the Reserve Street/Mullan Road intersection with a partial Median U-Turn configuration. Provides near-term crossing improvements to enhance pedestrian safety.

Why is this package needed?

In a 5-year period there were:

145 TOTAL CRASHES

3 FATAL AND SERIOUS INJURY CRASHES

SAFETY CHALLENGES ADDRESSED AT MULLAN RD:

- TURNING CRASHES
- PEDESTRIAN CROSSINGS
- REAR-END CRASHES

The project team evaluated several potential safety improvements at Mullan Road. To improve safety and keep Reserve Street moving efficiently, the project recommends **exploring** the partial MUT configuration further.

This configuration would:

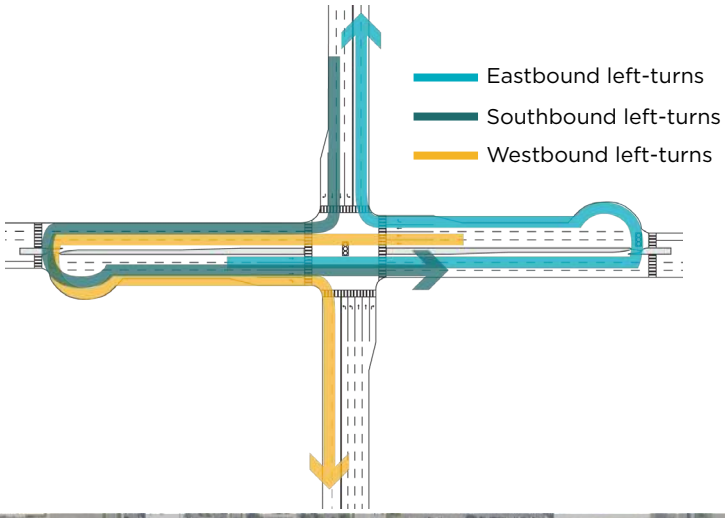
- Reduce left-turn conflicts, while also freeing more signal time for through traffic on Reserve Street and Mullan Road, which will reduce queuing and opportunities for rear-end crashes.
- Shorten crossing distances and reduce wait times for people crossing Reserve Street.

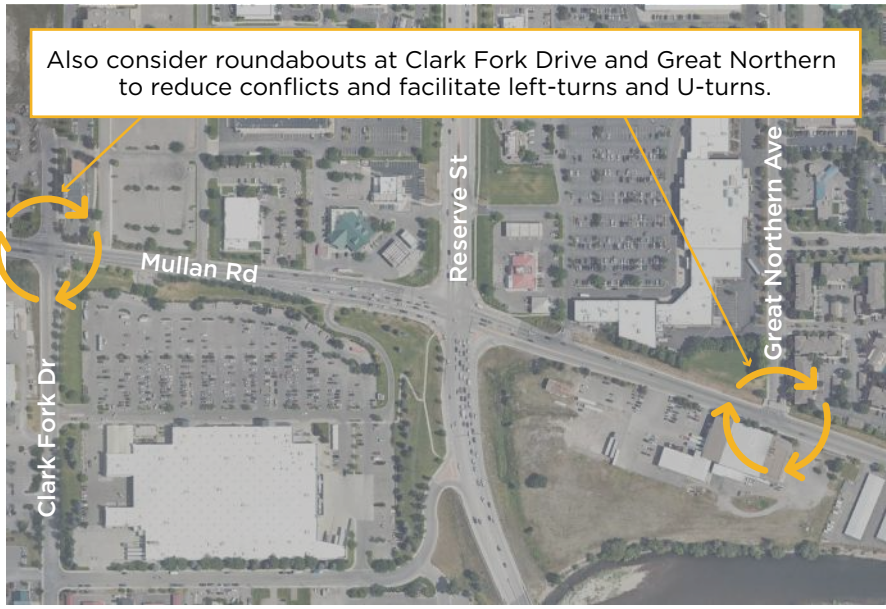
Near-term improvements that can be implemented before the partial MUT is constructed include:

- Leading pedestrian intervals
- ADA upgrades
- Access management on side streets
- No right-turn on red at Mullan Road
- Continental crosswalk striping
- Extend southbound left-turn lane storage

Median U-Turn (MUT) Intersection

A partial MUT removes eastbound, westbound, and southbound left-turns and relocates them to other intersections. Instead of turning left at the main intersection, drivers make U-turn movements at an intersection a short distance downstream.





Implementation Considerations

- Relocating traffic to other intersections may potentially increase conflicts and congestion. Roundabouts at these locations can significantly reduce fatal or serious injury crash risk and improve traffic flow.
- This configuration will result in heavy eastbound right-turn volume. Options to accommodate this traffic includes a channelized right-turn (would replace the right-turn lane on Reserve Street into Clark Fork Way) or dual right-turn lanes.

Planning-Level Cost Estimate

$$$

Attachment B

Crossing Evaluation for Reserve Street Approaches (MDT Guidance)

MDT PEDESTRIAN CROSSING TREATMENT SELECTION MATRIX

2 Lane Facility					
Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	C	C	C	E	A
35	C	C	E	E	A
40+	E	E	A	A	A

3 Lane Facility					
Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	C	[C], E	[C], E	[C], A	[E], A
35	C	[C], E	[C], E	[E], A	[E], A
40+	E	[E], A	[E], A	[E], A	A

4 Lane Facility					
Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	C	E	A	A	A
35	E	E	A	A	A
40+	E	A	A	A	A

5 Lane Facility					
Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	[C], E	[C], A	[E], A	A	A
35	[C], E	[C], A	[E], A	A	A
40+	[E], A	[E], A	A	A	A

*Treatment recommendations based on NCHRP Report 562, FHWA's *Safety Effects of Marked vs. Unmarked Crosswalks* , the MUTCD, and input from MDT Staff.

LEGEND	
An engineering study should be completed prior to selecting and installing any crossing treatments.	
C	Consider marked crosswalk with appropriate signage.
E	Consider marked crosswalk with enhancements, such as traffic calming, refuge islands, curb extensions, advanced yield markings, raised crosswalks, flashing beacons, or other high-visibility treatments.
A	Consider pedestrian-acuated beacons (i.e., rectangular rapid flashing beacons or pedestrian hybrid beacons) or pedestrian signal. MUTCD warrants for pedestrian hybrid beacons and pedestrian signals should be evalulated.
[X]	treatment option in brackets indicates treatment is applicable with installation of raised median

NOTES	
1	Use observed speed data if possible; otherwise use the posted speed limit of the street being crossed to determine the appropriate row to use
2	Higher degrees of treatments may be warranted if pedestrian crossing volumes are greater than 25 people per hour or if there is a significant amount of users with special needs (e.g. elderly, school-age children)
3	Refer to the MUTCD and MDT Road Design Manual for additional information on selecting & designing the appropriate treatment

Consider PHB

Crossing Evaluation for Reserve Street Approaches (FHWA Guidance)

Table 1. Application of pedestrian crash countermeasures by roadway feature.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	● 2 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6 7 9	○ 5 6 7 9	○ 5 6 ●
3 lanes with raised median (1 lane in each direction)	● 2 3 4 5 ● 7 9	● ● 5 7 9	○ ● 5 ● 9	○ 3 4 5 7 9	○ ● 5 ● 9	○ ● 5 ● 9	○ ● 4 5 7 9	○ ● 5 ● 9	○ ● 5 ●
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	● 2 3 4 5 6 7 9	● ● 5 6 7 9	○ ● 5 6 ●	○ 3 4 5 6 7 9	○ ● 5 6 ● 9	○ ● 5 6 ● 9	○ ● 4 5 6 7 9	○ ● 5 6 ● 9	○ ● 5 6 ●
4+ lanes with raised median (2 or more lanes in each direction)	● ● 5 7 8 9	● ● 5 7 8 9	○ ● 5 ● 8 ●	○ ● 5 7 8 9	○ ● 5 ● 8 ●	○ ● 5 ● 8 ●	○ ● 5 ● 7 8 ●	○ ● 5 ● 8 ●	○ ● 5 ● 8 ●
4+ lanes w/o raised median (2 or more lanes in each direction)	● ● 5 6 7 8 9	○ ● 5 ● 7 8 9	○ ● 5 ● 8 ●	○ ● 5 ● 7 8 9	○ ● 5 ● 8 ●	○ ● 5 ● 8 ●	○ ● 5 ● 7 8 ●	○ ● 5 ● 8 ●	○ ● 5 ● 8 ●

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

Crossing Evaluation for Broadway Ramps (MDT Guidance)

MDT PEDESTRIAN CROSSING TREATMENT SELECTION MATRIX

2 Lane Facility

Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	C	C	C	E	A
35	C	C	E	E	A
40+	E	E	A	A	A

3 Lane Facility

Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	C	[C], E	[C], E	[C], A	[E], A
35	C	[C], E	[C], E	[E], A	[E], A
40+	E	[E], A	[E], A	[E], A	A

4 Lane Facility

Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	C	E	A	A	A
35	E	E	A	A	A
40+	E	A	A	A	A

5 Lane Facility

Speed MPH	0 - 8,000 ADT	8,000 - 11,000 ADT	11,000 - 14,000 ADT	14,000 - 17,000 ADT	>17,000 ADT
0 - 30	[C], E	[C], A	[E], A	A	A
35	[C], E	[C], A	[E], A	A	A
40+	[E], A	[E], A	A	A	A

*Treatment recommendations based on NCHRP Report 562, FHWA's *Safety Effects of Marked vs. Unmarked Crosswalks* , the MUTCD, and input from MDT Staff.

LEGEND

An engineering study should be completed prior to selecting and installing any crossing treatments.

C	Consider marked crosswalk with appropriate signage.
E	Consider marked crosswalk with enhancements, such as traffic calming, refuge islands, curb extensions, advanced yield markings, raised crosswalks, flashing beacons, or other high-visibility treatments.
A	Consider pedestrian-acuated beacons (i.e., rectangular rapid flashing beacons or pedestrian hybrid beacons) or pedestrian signal. MUTCD warrants for pedestrian hybrid beacons and pedestrian signals should be evalulated.
[X]	treatment option in brackets indicates treatment is applicable with installation of raised median

NOTES

1	Use observed speed data if possible; otherwise use the posted speed limit of the street being crossed to determine the appropriate row to use
2	Higher degrees of treatments may be warranted if pedestrian crossing volumes are greater than 25 people per hour or if there is a significant amount of users with special needs (e.g. elderly, school-age children)
3	Refer to the MUTCD and MDT Road Design Manual for additional information on selecting & designing the appropriate treatment

Consider crossing enhancements

Crossing Evaluation for Broadway Ramps (FHWA Guidance)

Table 1. Application of pedestrian crash countermeasures by roadway feature.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	❶ 2 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6 7 9	① 5 6 7 9	① 5 6 ❾
3 lanes with raised median (1 lane in each direction)	❶ 2 3 4 5	❶ ❸ 5 7 9	① ❸ 5 ❼ ❾	① 3 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❼ ❾	① ❸ 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❾
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	❶ 2 3 4 5 6 7 9	❶ ❸ 5 6 7 9	① ❸ 5 6 ❾	① 3 4 5 6 7 9	① ❸ 5 6 ❼ ❾	① ❸ 5 6 ❾	① ❸ 4 5 6 7 9	① ❸ 5 6 ❾	① ❸ 5 6 ❾
4+ lanes with raised median (2 or more lanes in each direction)	❶ ❸ 5 7 8 9	❶ ❸ 5 7 8 9	① ❸ 5 8 ❾	① ❸ 5 7 8 9	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 8 ❾
4+ lanes w/o raised median (2 or more lanes in each direction)	❶ ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 8 ❾

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

Attachment C

Package B

		Scenario			
		Quick-Build	**Lower Cost Capital (Signals/RRFBs)**	**Higher Cost Capital (Roundabouts/PHBs)**	
Annual Benefit		$1,704,915	$6,042,740	$6,577,319	*Current year* *2026*
Discounted Benefits					*Discount Rate* *0.07*
	2027	$1,593,379	$5,647,421	$6,147,027	
	2028	$1,489,139	$5,277,963	$5,744,885	
	2029	$1,391,718	$4,932,676	$5,369,052	
	2030	$1,300,671	$4,609,978	$5,017,805	
	2031	$1,215,581	$4,308,390	$4,689,538	
	2032		$4,026,533	$4,382,746	
	2033		$3,763,115	$4,096,024	
	2034		$3,516,930	$3,828,060	
	2035		$3,286,850	$3,577,626	
	2036		$3,071,823	$3,343,576	
	2037		$2,870,862	$3,124,837	
	2038		$2,683,049	$2,920,408	
	2039		$2,507,522	$2,729,354	
	2040		$2,343,479	$2,550,798	
	2041		$2,190,167	$2,383,923	
	2042		$2,046,885	$2,227,966	
	2043		$1,912,977	$2,082,211	
	2044		$1,787,829	$1,945,991	
	2045		$1,670,868	$1,818,684	
	2046		$1,561,559	$1,699,704	
Total		**$6,990,488**	**$64,016,876**	**$69,680,213**	
Construction Cost		$ 349,000	$ 10,200,000	$ 18,200,000	
Benefit-Cost Ratio (BCR)		**20.03**	**6.28**	**3.83**	

American Way

		Scenario				
		Quick-Build (RI/RO)	**Quick-Build (LI/RI/RO)**	**Traffic Signal**		
Annual Benefit		$1,540,041	$307,002	$437,960	*Current year*	*2026*
Discounted Benefits					*Discount Rate*	*0.07*
	2027	$1,439,291	$286,917	$409,308		
	2028	$1,345,131	$268,147	$382,531		
	2029	$1,257,132	$250,605	$357,505		
	2030	$1,174,890	$234,210	$334,117		
	2031	$1,098,028	$218,888	$312,259		
	2032			$291,831		
	2033			$272,739		
	2034			$254,896		
	2035			$238,221		
	2036			$222,636		
	2037			$208,071		
	2038			$194,459		
	2039			$181,738		
	2040			$169,848		
	2041			$158,737		
	2042			$148,352		
	2043			$138,647		
	2044			$129,576		
	2045			$121,099		
	2046			$113,177		
Total		**$6,314,472**	**$1,258,767**	**$4,639,750**		
Construction Cost		$ 38,000	$ 77,000	$ 938,000		
Benefit-Cost Ratio (BCR)		**166.17**	**16.35**	**4.95**		

River Road

		Scenario				
		Quick-Build (RI/RO)	**Quick-Build (LI/RI/RO)**	**Traffic Signal**		
Annual Benefit		$963,063	$301,710	$818,942	*Current year*	*2026*
Discounted Benefits					*Discount Rate*	*0.07*
	2027	$900,059	$281,972	$765,366		
	2028	$841,177	$263,525	$715,295		
	2029	$786,146	$246,285	$668,500		
	2030	$734,716	$230,173	$624,767		
	2031	$686,651	$215,115	$583,894		
	2032			$545,696		
	2033			$509,996		
	2034			$476,632		
	2035			$445,450		
	2036			$416,308		
	2037			$389,073		
	2038			$363,620		
	2039			$339,832		
	2040			$317,600		
	2041			$296,822		
	2042			$277,404		
	2043			$259,256		
	2044			$242,295		
	2045			$226,444		
	2046			$211,630		
Total		**$3,948,748**	**$1,237,071**	**$8,675,881**		
Construction Cost		$ 41,250	$ 77,000	$ 7,835,000		
Benefit-Cost Ratio (BCR)		**95.73**	**16.07**	**1.11**		

International Drive-Stockyard Road		Scenario			
		Quick-Build (RI/RO)	**Quick-Build (LI/RI/RO)**		
Annual Benefit		$2,807,480	$1,406,600	*Current year*	*2026*
Discounted Benefits				*Discount Rate*	*0.07*
	2027	$2,623,813	$1,314,579		
	2028	$2,452,162	$1,228,579		
	2029	$2,291,740	$1,148,205		
	2030	$2,141,813	$1,073,088		
	2031	$2,001,694	$1,002,886		
Total		**$11,511,222**	**$5,767,338**		
Construction Cost		$ 40,860	$ 90,000		
Benefit-Cost Ratio (BCR)		**281.72**	**64.08**		

Attachment D

PROJECT CONCEPT #3 – AMERICAN WAY INTERSECTION CONTROL EVALUATION

This document summarizes the draft findings of the preliminary intersection control evaluation (ICE) for the Reserve Street/American Way intersection. The intersection is currently a two-way stop-controlled intersection. The purpose of the ICE is to evaluate potential intersection control changes that could reduce crashes, especially fatal and serious injury crashes, while considering multimodal traffic operations. The evaluation considered three intersection control concepts:

1. Turning Movement Restrictions (right-in/right-out (RI/RO) and a signalized left-in/right-in/right-out (LI/RI/RO were considered)
2. Traffic Signal
3. Roundabout

Each concept was evaluated under 2050 no-build and build scenarios to understand the relative benefits and tradeoffs of each. Key considerations included safety performance, traffic operations, multimodal impacts, and other considerations, such as right-of-way and costs. The following sections present the comparative analysis, design considerations, and the recommended treatment. The findings are summarized in the attached table.

SAFETY

This location was prioritized for further assessment because of its crash history. Between 2019 and 2023, there were 55 crashes reported at this intersection (tied for the most on the Reserve Street corridor), including five serious injury crashes.

NO-BUILD 2050 ANALYSIS

Traffic is expected to increase over the next 25 years due to local and regional growth. Safety performance functions (SPFs) from the *Highway Safety Manual* were used to estimate how this growth might affect safety performance. Based on this analysis, fatal and injury crashes are projected to increase by 11%, and property damage only crashes are projected to increase by 17% by the year 2050 if no changes are made to the intersection. The MUTCD crash warrant for a signal may already be met.

BUILD 2050 ANALYSIS

Crash modification factors (CMFs) were used to quantify the impacts of the proposed alternatives on safety performance. These CMFs were obtained from FHWA's CMF Clearinghouse and were readily available for the roundabout, signal, and RI/RO alternatives. The safety performance of the LI/RI/RO alternative is likely somewhere in between the RI/RO and full signal alternatives, so a range is provided for this configuration.

The turning movement restriction and roundabout alternatives are expected to provide the greatest safety performance in terms of fatal and serious injury crash reduction. The full findings are provided in the summary sheet at the end of this document.

TRAFFIC OPERATIONS

NO-BUILD 2050 ANALYSIS

The westbound American Way approach to Reserve Street is projected to operate over capacity (v/c > 1.0) and at LOS F during the 2050 weekday PM peak hour. A planning-level signal warrant assessment using 2050 PM peak hour volumes shows that Warrants #1 and #2 are not met. [1]

BUILD 2050 ANALYSIS

Turning Movement Restrictions

A right-in/right-out only scenario was evaluated assuming restricted traffic would shift to England Boulevard and Union Pacific Street. However, the added left-turn volumes at these nearby signals would cause some movements to be over-capacity.

To help spread out this demand while reducing left-turn conflict points, the project team developed an alternative scenario that retains left-turns from Reserve Street onto American Way but signalizes them. This scenario envisions the northbound and southbound left-turns being signalized with protected-only phasing, at least during the peak hours, to reduce conflicts. The American Way approaches would still be right-out only, and their phasing could run in overlap with the Reserve Street left-turns.

Traffic signal analysis was performed using Highway Capacity Manual (HCM) 2000 methodology in Synchro 12. HCM 7th edition reports were not available due to the unique signal phasing.

Traffic Signal

The traffic signal alternative signalizes all movements and retains full movements. Some volumes were rerouted from the England Boulevard and Union Pacific Street intersections to American Way given the added access and capacity. The analysis assumed a coordinated cycle length consistent with the Reserve Street signal system to maintain progression along the corridor. Left-turn movements were evaluated with protected phasing. Traffic signal analysis was performed using HCM 7th Edition methodology in Synchro 12.

Roundabout

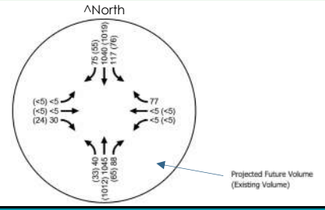
The proposed roundabout is a 2x1 hybrid design, with two entry and exit lanes on the Reserve Street approaches and single entry and exit lanes on the American Way approaches. As in the traffic signal alternative, some volumes were rerouted from the England Boulevard and Union Pacific Street intersections to American Way. The roundabout analysis was performed in accordance with the procedures in the SIDRA Standard Highway Capacity Manual (HCM) roundabout capacity model, using Sidra 9.1 software.

[1] Excluding right-turn volumes, per MDT guidance. If right-turn volumes are included, these two Warrants are met.

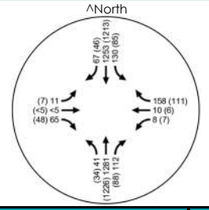
#3 RESERVE STREET & AMERICAN WAY

EXISTING & FUTURE (2050) TRAFFIC VOLUMES

WEEKDAY AM PEAK HOUR



WEEKDAY PM PEAK HOUR



PLANNING-LEVEL SIGNAL WARRANTS (MUTCD) – 2050 PM PEAK

Volume Warrant: **No** (#1, #2)[1] | Crash Warrant: **Yes**

FIVE-YEAR CRASH HISTORY

Fatal/Serious Injury: 5*	Property Damage: 31
Total Crashes: 55 (33 rear-end, 6 right-angle, 6 sideswipe)	

**The most suspected serious injury crashes on corridor*

RECOMMENDATION

TRAFFIC SIGNAL

FUTURE NO BUILD TRAFFIC OPERATIONS (WEEKDAY PM)

LOS	F (WBTR)
V / C	>1.00 (WBTR)
DELAY (SECONDS)	>100 (WBTR)

RIGHT-IN/RIGHT-OUT/LEFT-IN (SIGNALIZED)[2]



PM PEAK QUEUES (FEET)

NBL	NBT	SBL	SBT	WBR
75	75	200	100	150

LOS	DELAY (SEC.)	V/C
B	12.3	All: 0.56 NBL: 0.46 NBTR: 0.54 SBL: 0.73 SBTR: 0.46 EBR: 0.4 WBR: 0.34

Projected Crash Considerations

Quantitative crash projections for this treatment are not readily available. It is expected to reduce angle (due to turn movement restrictions).

Rear-end crashes for northbound and southbound through vehicles may increase due to the signal. The crash frequency is anticipated to fall between a right-in/right-out TWSC (greater reduction values in range below) and a full-movement signalized intersection (lower reduction values).

Expected total crashes (-5% to -45%);
Expected fatal + injury (F+I) crashes (-23% to -80%)

Multimodal Considerations

Left-turns become controlled, but crossing of Reserve not provided.

Other Considerations

Turn restrictions will reroute traffic to England and Union Pacific, which could add significant left-turn volumes at both intersections; May reduce vehicle speeds on Reserve Street by adding controlled stops.

TRAFFIC SIGNAL[3] [4]



PM PEAK QUEUES (FEET)

NBL	NBTR	SBL	SBTR	EBL	WBTR
200	475-850	325	175	275	400

LOS	DELAY (SEC.)	V/C
D	36.5	NBL: 0.90 NBTR: 0.78 SBL: 0.93 SBTR: 0.66 **EBL: >1.00** EBTR: 0.55 WBL: **>1.00** WBTR: 0.94

Projected Crash Considerations

Expected total crashes (-5%); Expected F+I crashes (-23%)

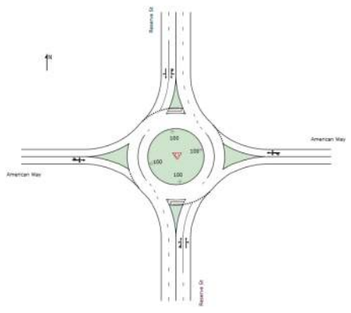
Multimodal Considerations

Provides signalized crossing for pedestrians and bicyclists.

Other Considerations

Longest queues on Reserve; Improves side-street access; May draw some volumes from England Blvd and Union Pacific St.; May reduce vehicle speeds on Reserve Street by adding controlled stops.

ROUNDABOUT (2 X 1)[4]



PM PEAK QUEUES (FEET)

NB	SB	EB	WB
300	275	100	275

LOS	DELAY (SEC.)	V/C
C	22.8	NB: 0.73 SB: 0.69 WB: 0.99 EB: 0.71

Projected Crash Considerations

Crash prediction models do not differentiate between hybrid and full multi-lane roundabouts. Due to fewer conflict points relative to full multi-lane roundabouts, hybrid designs may have lower crash rates. Therefore, the multi-lane roundabout crash reductions shown below may represent the upper bound of expected crash reductions.

Expected total crashes (-12%); Expected F+I crashes (-68%)

Multimodal Considerations

Provides two-stage crossing in the median islands, shortening crossing distance for pedestrians and bicyclists.

Other Considerations

Improves side-street access; May draw some volumes from England Blvd and Union Pacific St; Likely largest footprint of any alternative; Right-of-Way impacts will depend on size of roundabout; May slow vehicle speeds more than other alternatives.

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[1] Volume warrants not met under existing and future conditions. Volume warrants are met with side-street right-turn volumes included; warrants are not met when right-turn volumes are excluded.
[2] Results for this alternative provided by HCM 2000 due to non-standard phasing.
[3] Signal queues may extend to Union Pacific St., which is approximately 560' away. The ranges provided for NB and SB queues are due to differing results from Synchro and SimTraffic 12 software.
[4] Intersection LOS and delay are reported for signal and roundabout.

RECOMMENDATION

ULTIMATE CONFIGURATION

The project team recommends the project management team (PMT) consider selecting the **traffic signal alternative.** This recommendation is based on the expected safety performance of this alternative, as well as on its ability to provide access to surrounding properties and the larger transportation network, create a controlled crossing opportunity of Reserve Street, and to better fit within the existing built environment than the roundabout. If there is not a desire to retain full access at American Way, restricting turning movements would provide greater safety benefits at a lower construction cost, though this would impact operations at adjacent signalized intersections. Key benefits and considerations of the traffic signal are described below.

- **Safety**: The traffic signal reduces the likelihood of severe injury crashes by controlling left-turning and angle conflicts. However, rear-end crashes may increase. Vehicle speeds may be reduced. A traffic signal is projected to decrease fatal and serious injury crashes by approximately 23% and total crashes by 5%.
- **Traffic Operations**: The greatest traffic operations benefit for the traffic signal is improved access to/from American Way. Left-turns to/from American Way and through movements across Reserve Street will now be controlled, which could improve capacity for them, in addition to controlling conflicts. Some demand pressure at the nearby England Boulevard and Union Pacific Street intersections could be relieved as certain movements are made easier at American Way. This will likely become more impactful in the future as expected development in the area increases demand for access routes. The analysis shows that northbound queueing on Reserve Street may extend to the Union Pacific Street intersection during the future peak hour. The analysis also shows that signal timing may be able to manage queues to prevent this from occurring.
- **Multimodal Benefits**: The traffic signal provides controlled crossings for people walking and biking in a location where serious crashes involving vulnerable road users have occurred. Additional improvements, such as Leading Pedestrian Intervals, could be considered.
- **Corridor Context**: The section of Reserve Street from the Broadway Street ramps to Mullan Road is a coordinated signal corridor. This provides an opportunity to optimize coordination of a signal at American Way with nearby intersections. Implementing a signal here will require coordination within this corridor to manage queuing.
- **Cost**: A traffic signal is likely to have a lower construction cost than the roundabout alternative. This is primarily because it is expected to have less right-of-way impacts than the roundabout. Planning-level costs are being developed for the recommendation.

Right-of-way: For reference, the figures below illustrate two potential footprints of the roundabout alternative. They show the range of inscribed circle diameters (ICDs) recommended by the *Guide for Roundabouts* for a multi-lane roundabout, with Figure 1 showing the lower end of the range and Figure 2 the higher end. They also include an additional 16' of width around the ICD for buffers and shared-use paths.

Figure 1. Multi-Lane Roundabout - Small Footprint

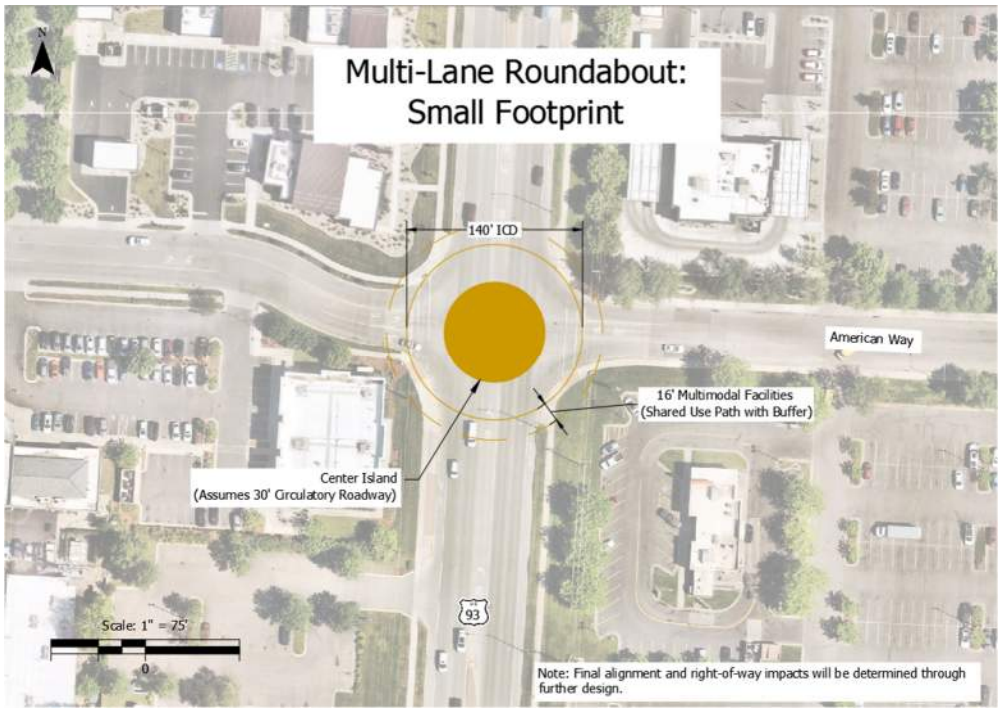
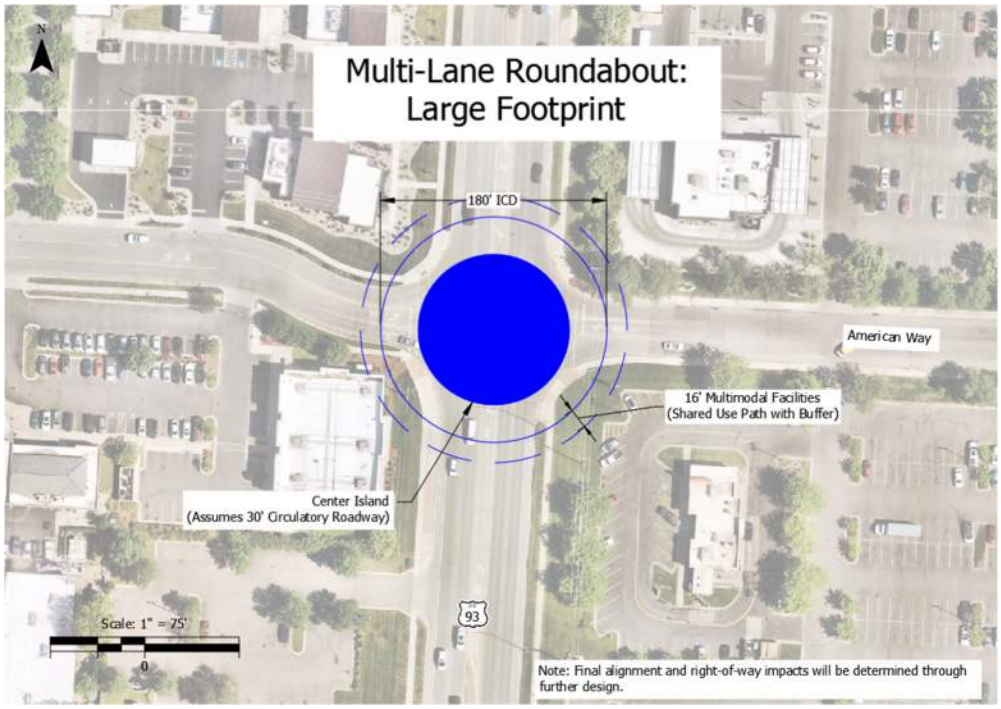


Figure 2. Multi-Lane Roundabout - Large Footprint



Attachment E

PROJECT CONCEPT #4 – RIVER ROAD INTERSECTION CONTROL EVALUATION

This document summarizes the draft findings of the preliminary intersection control evaluation (ICE) for River Road. The purpose of the ICE is to evaluate potential intersection control changes that could reduce crashes, especially fatal and serious injury crashes, while considering multimodal traffic operations. The evaluation considered three intersection control concepts:

1. Turning Movement Restrictions (right-in/right-out (RI/RO) and a signalized left-in (southbound only)/right-in/right-out (SBLI/RI/RO were considered)
2. Traffic Signal
3. Roundabout

Each concept was evaluated under 2050 no-build and build scenarios to understand the relative benefits and tradeoffs of each. Key considerations included safety performance, traffic operations, multimodal impacts, and other considerations, such as right-of-way and costs. The following sections present the comparative analysis, design considerations, and the recommended treatment. The findings are summarized in the attached table.

SAFETY

This location was prioritized for further assessment because of its crash history. Between 2019 and 2023, there were 41 crashes reported at this intersection, including three serious injury crashes and 13 other injury crashes. Two of these crashes involved people on bikes.

NO-BUILD 2050 ANALYSIS

Traffic is expected to increase over the next 25 years due to local and regional growth. Safety performance functions (SPFs) from the *Highway Safety Manual* were used to estimate how this growth might affect safety performance. Based on this analysis, fatal and injury crashes are projected to increase by 34%, and property damage only crashes are projected to increase by 26% by the year 2050 if no changes are made to the intersection.

BUILD 2050 ANALYSIS

Crash modification factors (CMFs) were used to quantify the impacts of the proposed alternatives on safety performance. These CMFs were obtained from FHWA's CMFClearinghouse and were readily available for the roundabout, signal, and RI/RO alternatives. The safety performance of the SBLI/RI/RO alternative is likely somewhere in between the RI/RO and full signal alternatives, so a range is provided for this configuration.

The turning movement restriction and roundabout alternatives are expected to provide the greatest safety performance in terms of fatal and serious injury crash reduction. The full findings are provided in the summary sheet at the end of this document.

TRAFFIC OPERATIONS

NO-BUILD 2050 ANALYSIS

The River Road approaches to Reserve Street are projected to operate over capacity (v/c > 1.0) and at LOS F during the 2050 weekday PM peak hour. A planning-level signal warrant assessment using 2050 PM peak hour volumes[1] shows that Warrants #1, #2, and #3 are expected to be met.

BUILD 2050 ANALYSIS

Turning Movement Restrictions

A right-in/right-out only access to River Road was evaluated assuming restricted traffic would shift to S 3rd Street. However, heavy southbound left-turn volumes from Reserve Street onto S 3rd Street (385, including the 222 that would be rerouted from River Road) would be expected to push the intersection and the southbound left-turn movement over capacity.

Given the projected heavy peak hour southbound left-turn demand at River Road, the project team developed an alternative scenario that also allows southbound left-turns from Reserve Street onto eastbound River Road. This scenario envisions the southbound left-turn being signalized with protected-only phasing, at least during the peak hours, to reduce conflicts between southbound left-turns and northbound traffic.

Traffic signal analysis was performed using Highway Capacity Manual (HCM) 2000 methodology in Synchro 12. HCM 7th edition reports were not available due to the unique signal phasing.

Traffic Signal

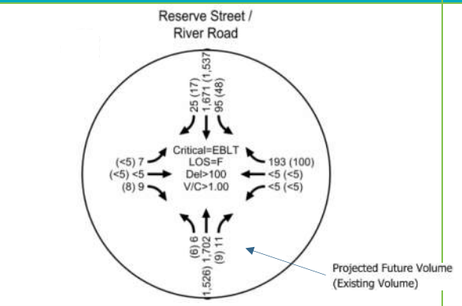
The traffic signal alternative signalizes all movements. The analysis assumed a coordinated cycle length consistent with the Reserve Street signal system to maintain progression along the corridor. Left-turn movements were evaluated with protected-only phasing. Traffic signal analysis was performed using HCM 7th Edition methodology in Synchro 12.

Roundabout

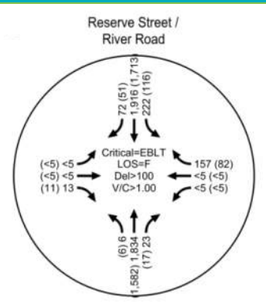
The proposed roundabout is a 2x1 hybrid design, with two entry and exit lanes on the Reserve Street approaches and single entry and exit lanes on the River Road approaches. The roundabout analysis was performed in accordance with the procedures in the SIDRA Standard Highway Capacity Manual (HCM) roundabout capacity model, using Sidra 9.1 software.

[1] Including right-turn volumes.

EXISTING AND FUTURE (2050) TRAFFIC VOLUMES (WEEKDAY AM PEAK HOUR)



EXISTING AND FUTURE (2050) TRAFFIC VOLUMES (WEEKDAY PM PEAK HOUR)



PLANNING-LEVEL SIGNAL WARRANTS (MUTCD) – 2050 PM PEAK

Volume Warrant: **Yes (#1, #2, #3)** | Crash Warrant: **No**

FIVE-YEAR CRASH HISTORY (2019-2023)

Fatal/ Serious Injury: 3 Other Injury: 13	Property Damage: 25
Total Crashes: 41	

49% of crashes were rear-end and 20% were angle or turning vehicles; two crashes involved bicycles

RECOMMENDATION

ROUNDABOUT

FUTURE NO BUILD TRAFFIC OPERATIONS (WEEKDAY PM)

LOS	F (EBL, WBL)
Critical Movement V/C	>1.0 (EBL, WBL)
Delay	>100s (EBL, WBL)

TURNING MOVEMENT RESTRICTIONS (RIGHT-IN/RIGHT-OUT/ SOUTHBOUND LEFT-IN)



PM PEAK QUEUES (FEET)

NB	SBL	EB	WBR
925	350 (SBL)	25	250

LOS	DELAY (SEC.)	V/C
B	15.5	NBT: 0.83 SBL: 0.78 WBR: 0.45 EBR: 0.01

PROJECTED CRASH CONSIDERATIONS

Quantitative crash projections for this treatment are not readily available. It is expected to reduce angle (due to turn movement restrictions) and left-turning (due to signal and movement restrictions crashes.

Rear-end crashes for northbound through vehicles may increase due to the signal. The crash frequency is anticipated to fall between a right-in/right-out (greater reduction values in range below) and a signalized intersection (lower reduction values).

Expected total crashes (-5% to -45%);
Expected fatal + injury (F+I) crashes (-23% to -80%)

MULTIMODAL CONSIDERATIONS

Turn movement restrictions would reduce conflicts for people crossing all approaches. A crossing could be provided by installing a median refuge island on the south side of the intersection, with a pedestrian-activated signal to stop southbound traffic.

OTHER CONSIDERATIONS

Potential for crashes to shift downstream, but research for this CMF was unable to quantify this trend.

Requires significant out-of-direction travel for eastbound left turns, but movement has low demand (<10 vehicles projected in any peak hour).

Curvature in Reserve Street may limit visibility queues; consider adding advance warning signage.

Traffic signal may slow northbound traffic approaching the bridge.

TRAFFIC SIGNAL



PM PEAK QUEUES (FEET)

NB	SB	EB	WB
1025	300 (SBT) / 350 (SBL)	50	100

LOS	DELAY (SEC.)[2]	V/C
C	32.8	NBT: 0.87 SBT: 0.78 SBL: >1.00 WB: 0.82 EB: 0.09

PROJECTED CRASH CONSIDERATIONS

Expected total crashes (-5%);
Expected F+I crashes (-23%)

MULTIMODAL CONSIDERATIONS

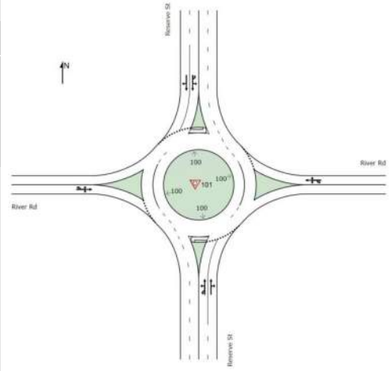
Provides signalized crossing for pedestrians and bicyclists.

OTHER CONSIDERATIONS

Traffic signals can slow vehicles by adding controlled stops.

Curvature in Reserve Street may limit visibility of queues; consider adding advance warning signage.

ROUNDABOUT (2X1)



PM PEAK QUEUES (FEET)

NB	SB	EB	WB
825	500	25	75

LOS	DELAY (SEC.)[2]	V/C
C	19.6	NB: 0.90 SB: 0.84 WB: 0.67 EB: 0.09

PROJECTED CRASH CONSIDERATIONS

Crash prediction models do not differentiate between hybrid and full multilane roundabouts. Due to fewer conflict points relative to full multi-lane roundabouts, hybrid designs may have lower crash rates. Therefore, the multi-lane roundabout crash reductions shown below may represent the upper bound of expected crash reductions.

Expected total crashes (-12%);
Expected F+I crashes (-68%)

MULTIMODAL CONSIDERATIONS

Provides two-stage crossings in the median islands, shortening crossing distance for pedestrians and bicyclists. RRFBs or PHBs would also be provided at the crossings. Roundabout will slow vehicle speeds at the crossings.

OTHER CONSIDERATIONS

Likely the largest footprint; right-of-way needs depends on ultimate roundabout size.

Could slow speeds better than other alternatives.

RECOMMENDATION

ULTIMATE CONFIGURATION

The project team recommends the project management team (PMT) consider selecting the **roundabout alternative.** This recommendation is based on the expected safety performance, including crash and speed reduction, of this option. Key benefits and considerations of the roundabout are described below.

- **Safety**: The roundabout reduces the likelihood and severity of crashes by elminating left-turning and angle conflicts and slowing vehicles as they enter and navigate the circulatory roadway. A 2x1 roundabout is projected to decrease fatal and serious injury crashes by approximately 68% and total crashes by 12%. These reductions are greater than expected for a traffic signal and potentially comparable to turning movement restrictions. These crash reductions contribute to lower societal costs over time due to fewer high-severity collisions and associated economic impacts.
- **Operations**: The greatest traffic operations benefit for the roundabout is that it is projected to have the lowest northbound queuing compared to the other options. The full traffic signal provides more capacity for the Reserve Street movements, and the turning movement restrictions option has the lowest delay for the southbound movement.
- **Multimodal Benefits**: The roundabout provides two-stage crossings for people walking and biking. Additionally, the ciurvature of the roadabout approaches promotes slower speeds as vehicles approach the crossings. Additionally, rectangular rapid flashing beacons (RRFBs) or pedestrian hybrid beacons (PHBs) are recommended on all approaches to increase visibility of people walking or biking across the approaches.
- **Corridor Context/ Speed Reduction**: Roundabouts slow speeds to approximately 15 to 25 mph.[2] This area has the highest speeds on the corridor.
- **Cost**: A mutlilane roundabout is likely to have a higher construction cost than the other alternatives. Planning-level costs are being developed for the recommendation. Longer-term roundabouts generally have longer service lives and lower maintenance costs compared to traffic signals. In cases where RRFBs or PHBs are implemented at crossings, some signal equipment is required, but maintenance costs for this equipment are lower than what would be required for a full traffic signal system
- **Right-of-way**: Figure 1 and Figure 2 illustrate potential footprints of the roundabout. They show the range of inscribed circle diameters (ICDs) recommended by the *Guide for Roundabouts* for a multi-lane roundabout, with Figure 1 showing the lower end of the range and Figure 2 the higher end. They also include an additional 16' of width around the ICD for buffers and shared-use paths.

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[2] National Academies of Sciences, Engineering, and Medicine. 2023. *Guide for Roundabouts*. Washington, DC: The National Academies Press. https://doi.org/10.17226/27069.

POTENTIAL INTERIM CONFIGURATION

As an interim treatment, the turning movement restrictions alternative (signalized SBLI/RI/RO) could be implemented to enhance intersection safety at a lower cost. If implemented, MDT and the MPO could monitor traffic operations, crash trends, and corridor growth over time to assess performance and determine the appropriate timing for constructing a multilane roundabout.

Figure 1. Multi-Lane Roundabout - Small Footprint

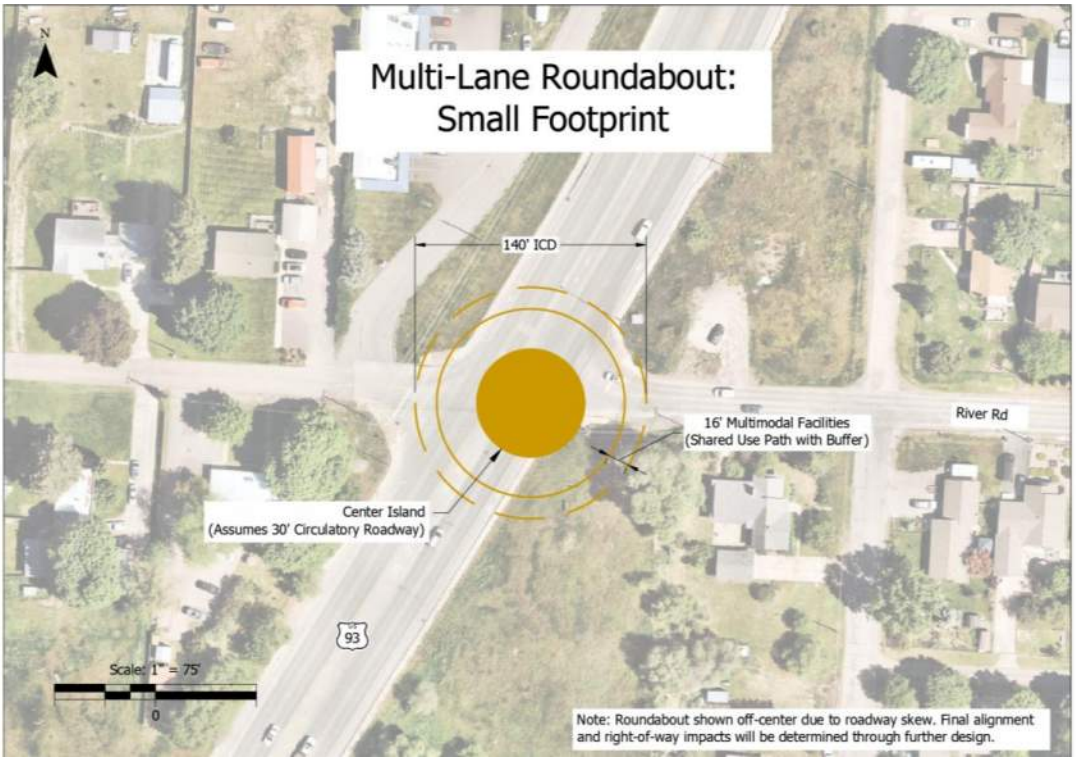
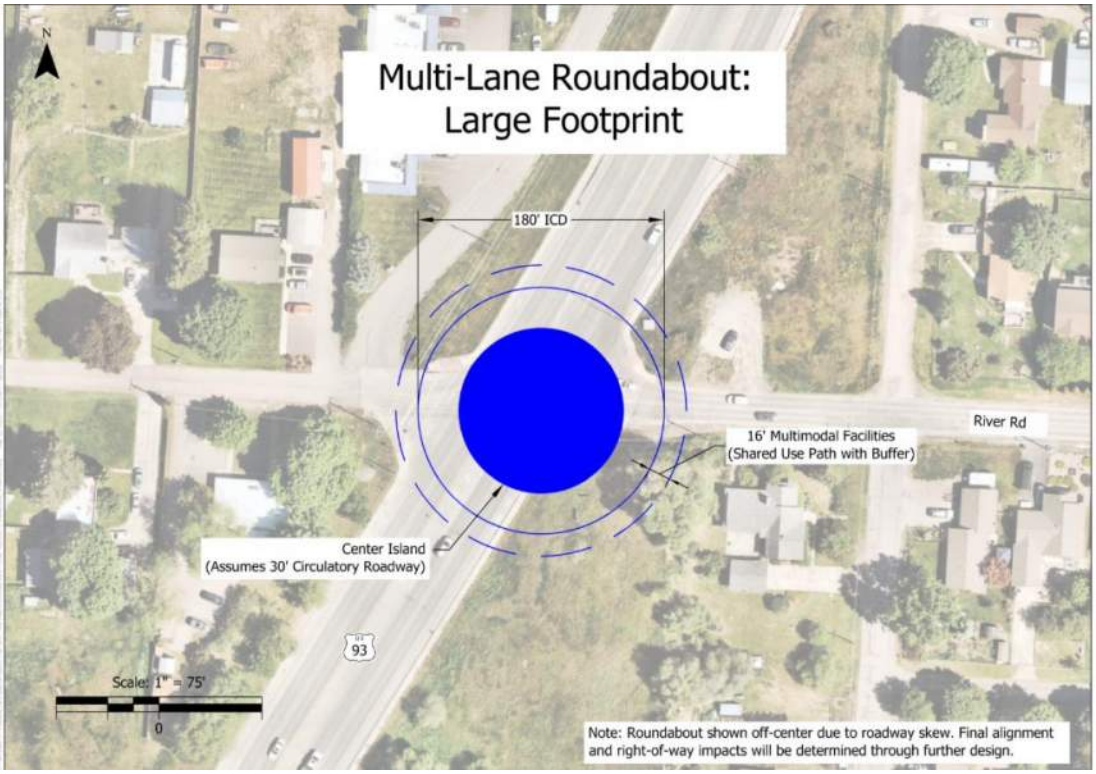


Figure 2. Multi-Lane Roundabout - Large Footprint



Attachment F

Eastbound left traffic
(267 in 2050 PM peak)

Westbound right traffic
(29 in 2050 PM peak)

Great Northern Ave

Remove background notes

Northbound left traffic
(644 in 2050 PM peak)

Reserve St

Great Northern Ave

Southbound right-turn movements are permitted at both the Reserve Street/Mullan Road intersection and at Great Northern Ave/ Mullan Rd, providing multiple options for traffic distribution.

Mullan Rd

Westbound left traffic
(367 in 2050 PM peak)

Mullan Rd

Southbound left traffic
(51 in 2050 PM peak)

Key Considerations (Great Northern Ave Option) - Full Quadrant Intersection

- Removing left turns from Reserve St/ Mullan Rd would reduce conflicts and improve traffic operations.
- New traffic control (signal or roundabout) will likely be required at Reserve St/Palmer St and at Great Northern Ave/Mullan Rd intersections to accommodate redistributed traffic volumes.
- The design introduces significant out-of-direction travel for westbound left-turn (367 vehicles) and northbound left-turning movements (644 vehicles).
- Redirecting northbound left-turning traffic through the quadrant intersection would introduce significant (644) volumes through multiple intersections (Reserve St/ Palmer St, Palmer St/ Great Northern Ave, and Great Northern Ave/Mullan Rd).
- Removing left turns from Reserve St/ Mullan Rd would reduce conflicts and improve traffic operations.
- Removing left turns from Reserve St/ Mullan Rd could reduce the intersection footprint, allowing space for median refuge islands and shortening pedestrian crossing distances. Further operational analysis is needed to determine the necessary lane configurations at Reserve St/ Mullan Rd with this configuration.

Scale: 1" = 200'

0

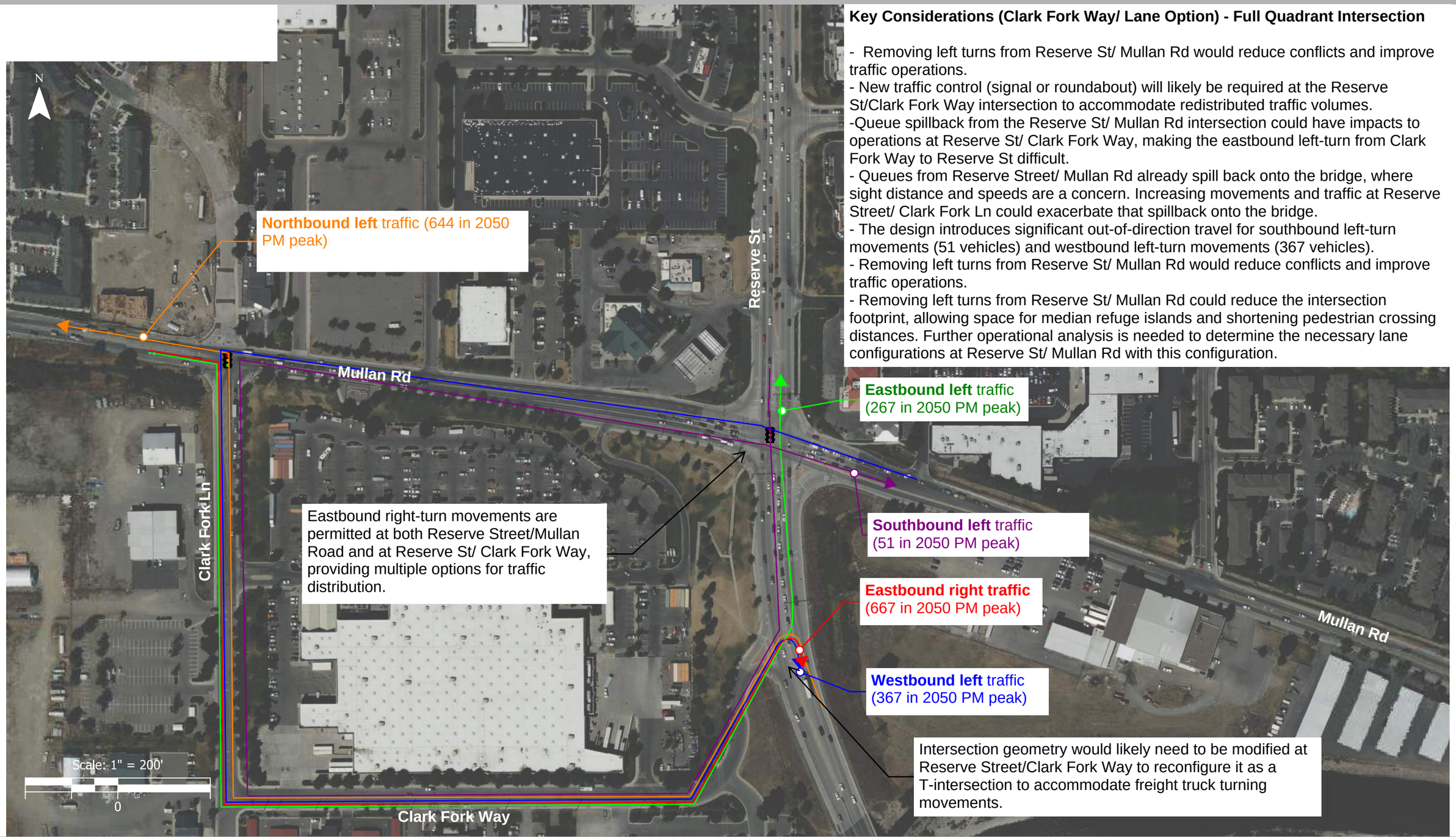
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Reserve Street/ Mullan Road Intersection
Quadrant Intersection Movements

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Key Considerations (Clark Fork Way/ Lane Option) - Full Quadrant Intersection

- Removing left turns from Reserve St/ Mullan Rd would reduce conflicts and improve traffic operations.
- New traffic control (signal or roundabout) will likely be required at the Reserve St/Clark Fork Way intersection to accommodate redistributed traffic volumes.
-Queue spillback from the Reserve St/ Mullan Rd intersection could have impacts to operations at Reserve St/ Clark Fork Way, making the eastbound left-turn from Clark Fork Way to Reserve St difficult.
- Queues from Reserve Street/ Mullan Rd already spill back onto the bridge, where sight distance and speeds are a concern. Increasing movements and traffic at Reserve Street/ Clark Fork Ln could exacerbate that spillback onto the bridge.
- The design introduces significant out-of-direction travel for southbound left-turn movements (51 vehicles) and westbound left-turn movements (367 vehicles).
- Removing left turns from Reserve St/ Mullan Rd would reduce conflicts and improve traffic operations.
- Removing left turns from Reserve St/ Mullan Rd could reduce the intersection footprint, allowing space for median refuge islands and shortening pedestrian crossing distances. Further operational analysis is needed to determine the necessary lane configurations at Reserve St/ Mullan Rd with this configuration.



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Reserve Street/ Mullan Road Intersection
Quadrant Intersection Movements

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