Western Piedmont Transportation Safety Plan

Contents

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Introduction

Between 2016 and 2023, 1,483 crashes resulted in 443 people killed in traffic crashes in Alexander, Burke, Caldwell, and Catawba counties. During this same seven-year timeframe, 1,307 people were seriously injured in crashes on the Western Piedmont transportation network These roadway preventable tragedies can be effectively reduced or eliminated through innovative design, strategic policies and initiatives, and committed local leadership. The transportation network in Western Piedmont should be both safe and functional for all users.

The Greater Hickory Metropolitan Planning Organization (GHMPO) regional transportation planning agency representing Alexander, Burke, Caldwell, and Catawba counties. Metropolitan Planning Organizations (MPOs) play a crucial role in regional transportation planning, ensure that planning is comprehensive, continuous, and cooperative. The MPO process involves a collaborative partnership between local and state governments to make informed decisions about transportation planning in urbanized areas and to fulfill planning requirements set by federal transportation funding legislation.

GHMPO partnered with the North Carolina Department of Transportation (NCDOT) to develop a comprehensive safety action plan, the Western Piedmont Transportation Safety Plan (WPTSP). A comprehensive safety action plan is a strategic framework designed to enhance the safety of transportation systems by systematically identifying, analyzing, and addressing safety concerns.

Safety action plans are critical for preventing crashes, reducing fatalities and serious injuries, and improving safety for all road users, including motorists, pedestrians, bicyclists, and public transit riders. Developing a regional safety action plan helps prioritize safety improvements, allocate resources effectively, and create more safe and accessible transportation network across the region. By addressing transportation safety at a regional level, a safety action plan facilitates coordinated efforts across municipalities, promoting uniform safety standards and practices. This regional approach ensures that safety measures are consistent, effectively addressing cross-jurisdictional issues, and creating a comprehensive safety network that benefits all communities within the region.

WPTSP uses a data-informed approach to develop strategies to ensure that every roadway user gets to their destination safely and no preventable deaths or serious injuries occur on the regional transportation network.

The WPTSP sets a goal of eliminating fatal and serious injury crashes in the region by 2050 and reducing the number of fatal and serious injury crashes in half by 2035.

The Western Piedmont Transportation Safety Plan

The WPTSP is a partnership between NCDOT Traffic Safety Unity (TSU) and GHMPO. TSU funded the safety plan, and GHMPO is the project champion. The WPTSP builds upon existing GHMPO initiatives to prioritize and implement comprehensive safety measures in the region. This forward-thinking strategy enhances the process of project screening and selection, positioning the region for more efficient transportation planning that centers safety in all decision-making.

GHMPO's mission centers on ensuring safe, accessible, and efficient transportation throughout the area. The safety requirements of residents differ as the region's geographic and transportation conditions vary across rural, urban, and suburban areas.

The WPTSP planning process was organized under Guiding Principles and Goals.

Guiding Principals

1. **Transparency**: Ensure traffic safety data, analysis, and development of safety performance measures are reported and disseminated openly (free of charge), clearly and comprehensively.
2. **Data-Driven**: Use defensible and quantifiable data to identify safety priorities and develop safety projects and recommendations for all modes of transportation.
3. **Robust Public Involvement**: Engage all communities and stakeholders within the planning area. Incorporate robust public involvement efforts in historically underrepresented communities. Incorporate involvement of local government and elected officials.
4. **Equity**: Investigate disparate safety impacts among different demographic and population groups and develop corresponding mitigation strategies.
5. **Shared Impetus**: Work with local officials to identify projects that 1) Address identified safety issues 2) Meet the needs and expectations of the municipalities represented by the GHMPO.

6. **Affect cultural change** around transportation safety in the region via education and awareness initiatives.
7. **3C's**: Reliance on planning activities that are continuing, cooperative, and comprehensive.

Goals

8. Establish a timeline for significant reduction, toward elimination, of fatalities and serious injury crashes for all modes on the region's transportation system.
9. Identify safety issues and needs, including a High Injury Network.
10. Produce recommended crash reduction strategies, countermeasures and safety improvements.
11. Increase awareness of transportation safety risks.
12. Coordinate with and inform other regional efforts.

Planning Process

To accomplish the WPTSP planning goals, in alignment with the guiding principles, GHMPO committed to **following a data-drive approach**, **using the Safe System Approach**, and **ensuring outreach to residents from each county** and underserved or transportation disadvantage populations.

The Safe System Approach

The WPTSP is grounded in the Safe System Approach (SSA) principles. The Safe System Approach aims to effectively address and mitigate the risks within the vast and complex transportation network. Unlike traditional safety methods, the SSA focuses on both human error and vulnerability, designing a system with redundancies to protect all users. This approach creates multiple layers of protection to prevent crashes and minimize harm when they occur, offering a holistic and comprehensive framework for enhancing safety in transportation systems. The WTSP is built on the following six principles of the SSA:

- Roadway deaths and serious injuries are unacceptable and preventable
- Humans make mistakes
- Humans are vulnerable
- Responsibility is shared
- Safety is proactive
- Redundancy is crucial

Safe System Approaches have five objectives: safer people, safer roads, safer vehicles, safer speeds, and post-crash care.

Safe People: Encourage safe, responsible driving and behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.

Safe Vehicles: Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.

Safe Speeds: Promote safer speeds in all roadway environments through a combination of thoughtful, equitable, context-appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.

Safe Roads: Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safe behaviors, and to facilitate safe travel by the most vulnerable users.

Post Crash Care: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

The Components of a Safety Action Plan

The U.S. Department of Transportation (USDOT) established the Safe Streets and Roads for All (SS4A) program to support regional and local safety planning, encouraging a consistent national approach to addressing transportation safety. The USDOT provides guidance on key components that should be included in a safety action plan. These components, and a reference to their location in the WPTSP, are listed below.

1. **Leadership Commitment and Goal Setting**: Demonstrating a commitment from regional and local leadership to prioritize safety and establish clear, quantifiable safety goals.
    a. **Implementation and Monitoring**
2. **Planning Structure**: A committee, task force, implementation group, or similar body charged with oversight of the Action Plan development, implementation, and monitoring.
    a. **Public Involvement**
3. **Safety Analysis**: Gathering and analyzing safety data to identify problem areas and the underlying causes of risks within the transportation network across the region.
    a. **Safety Analysis**
4. **Engagement and Collaboration**: Engaging with the community through public meetings and consultations with various stakeholders to understand local safety issues and gather input, ensuring that all voices within the region are heard.

   a. **Public Involvement**

5. **Equity Considerations**: Ensuring that safety measures are equitable and do not disproportionately impact disadvantaged or vulnerable populations.

   a. **Public Involvement**

6. **Policy and Process Changes**: Evaluating existing safety policies, programs, and infrastructure to identify strengths and areas needing improvement on both local and regional levels.

   a. **Plan and Policy Review**

7. **Strategy and Project Selections**: Developing specific safety interventions and engineering solutions tailored to local and regional safety issues, using evidence-based strategies and the SSA. Projects and strategies are prioritized and include timelines.

   a. **Crash Reduction**

8. **Progress and Transparency**: Establishing processes to regularly monitor and assess the effectiveness of implemented measures, and to provide publicly available and transparent updates on progress.

   a. **Implementation and Monitoring**

Glossary

- **Safe System Approach** Framework that expects the road system to be planned, designed, and operated to be forgiving of inevitable human mistakes, so that serious injuries are unlikely to occur.
- **Systemic Analysis** Uses crash and roadway data in combination to identify high-risk roadway features that correlate with particular crash types.
- **Emphasis Area** A focus crash type. These are typically the most serious transportation problems, defined by summary crash types including over-represented crash types or trends.
- **Countermeasure:** A proposed improvement that can be provided along a roadway or at an intersection that may address a current safety concern. A countermeasure usually has research that supports its use for a specific type of roadway segment or intersection.
- **Proven Safety Countermeasures (PSCi)** FHWA's Proven Safety Countermeasures initiative (PSCi) is a collection of 28 countermeasures and strategies effective in reducing roadway fatalities and serious injuries on our Nation's highways.
- **Serious Injury:** An injury other than a fatality that results in one or more of the following:
  - Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood.
  - Broken or distorted extremity (arm or leg).
  - Crush injuries.
  - Suspected skull, chest, or abdominal injury other than bruises or minor lacerations.
  - Significant burns (second and third degree burns over 10 percent or more of the body).

  - Unconsciousness when taken from the crash scene.
  - Paralysis.

- **Fatality:** Deaths resulting from injuries sustained in a specific road vehicle crash (Fatality Accident Reporting System [FARS] reporting – within 30 days after the crash, NC reporting – within 12 months after the crash).
- **Serious Injury Crashes:** Crashes resulting in one or more serious injury
- **Fatal Crashes:** Crashes resulting in one or more fatality
- **Vulnerable Road User (VRU):** Anyone who is not protected by being inside a vehicle – including pedestrians, cyclists, people using wheelchairs or scooters, and people walking to and from transit.
- **Speed-Related Crashes:** Contributing circumstances related to the driver are recorded as exceeding the posted speed limit or driving too fast for conditions.
- **Alcohol-Related Crashes:** The drivers are confirmed or suspected of being under the influence of alcohol.
- **Drug-Related Crashes:** The drivers are confirmed or suspected of being under the influence of a drug other than alcohol.
- **Distracted Driver Crashes:** Contributing circumstances related to the driver are recorded as inattention or distraction (by devices or other factors).
- **Animal Involved Crashes**: Crash/Collision type are recorded as an "Animal"
- **Older Driver Crashes:** Involve a driver over the age of 64.
- **Teen Driver Crashes:** Involve a driver between 15 and 19 years old.
- **Intersection-Related Crashes:** The roadway feature at the crash location is an at-grade intersection.
- **Unbelted Crashes:** Driver or occupant recorded as not using a restraint (i.e., seat belt or car seat).
- **Motorcycle-Involved Crashes:** The vehicle type involved in the crash is recorded as a motorcycle.
- **Heavy Truck-Involved Crashes:** The vehicle type involved in the crash are recorded as Truck/Trailor, Truck/Tractor, Tractor/Semi-Trailor, Tractor/Doubles, or Unknown Heavy Truck.
- **Pedestrian-Involved Crashes:** Crash/Collision type, "vehicle" type, or person type recorded as a pedestrian.
- **Bicyclist-Involved Crashes:** Crash/Collision type, "vehicle" type, or person type recorded as a bicycle.
- **Lane Departure Crashes:** Crash/Collision type recorded as running off the road, rollover/overturn, striking fixed object, sideswipe in opposite directions, or head on.

Public Involvement

Public involvement played critical role in shaping the WPTSP. GHMPO committed to ensuring that the planning process and the final plan reflected the voice of the community. The transportation network and needs across the region varies greatly across the four counties, from rapidly growing urban areas to expansive rural agriculture to mountainous foothills. The WPTSP public involvement process deployed four key elements:

- Technical Safety Subcommittee
- Local Events
- Online Survey
- Public Review Period

Technical Safety Subcommittee

A Technical Safety Subcommittee was created to provide oversight of the development of the WPTSP. The subcommittee is charged with overseeing the implementation and monitoring of the WPTSP, after adoption, and will continue to meet regularly. The subcommittee includes representatives from MPO member agencies, law enforcement, NCDOT, Public Schools, Emergency Services, Transit, , Emergency Services Youth and Elder Advocates, and Bicycle and Pedestrian Advocates.

The subcommittee met twice over the course of the development of the plan. The first meeting, the subcommittee provided feedback on safety concerns, reviewed crash data, shared ideas on public engagement, and helped inform the WPTSP goals. The second meeting, the subcommittee reviewed the application of safety data to inform project location recommendations, planning alignment, policy gaps, and strategy development.

Insights from these meetings refined the WPTSP safety strategies, establishing a holistic, consistent approach to reducing fatal and serious injury crashes across the region.

Local Events

The WPTSP project team gathered public input at four local events, one in each of the four member counties. At these events, the project team shared updates on the plan and gathered input on local safety concerns and priorities.

Morganton Festival | September 10, 2024

Primary concerns from the Burke County event include:

- Population growth impact to safety
- Narrow roads and poor visibility
- Unsafe or lack of pedestrian

- Lack of sidewalks in rural areas
  - Distracted drivers

Primary opportunities and priorities include:

- Roundabouts
- Pedestrian and bicycle facilities to community services.
- Behavioral and educational investments for driver behavior and safety infrastructure
- Enforcement of Distracted Driving
- Services for older roadway users

Hickory Oktoberfest | October 12, 2024

Primary concerns from the Catawba County event include:

- Speeding
- Bicycling and walking safety in urban and rural areas
- Narrow roads
- Intersection geometry
- Distracted driving
- Red light running

Primary opportunities and priorities include:

- Improved intersection safety
- Pedestrian and bicycle facilities on rural roads

Lenoir Wood, Fire, and Smoke Festival | October 19, 2024

Primary concerns from the Caldwell County event include:

- Narrow roads
- Speeding, high-speed passing
- Intersection safety
- Bicycle and pedestrian safety
- Unpaved roads / pavement condition
- Parking on rural roads

Primary opportunities and priorities include:

- Roundabouts
- Behavioral and education investments
- Increased enforcement
- Pedestrian and bicycle facilities on rural roads

Taylorsville Apple Festival | October 19, 2024

Primary concerns from the Caldwell County event include:

- Narrow roads
- Visibility
- Pavement condition

Driver behavior

Primary opportunities and priorities include:

- Behavioral and education
- Rumble strips

Online Survey

To increase public involvement and provide participation opportunities beyond in-person events, the WPTSP launched an online survey, made available from September 2024 to December 2024. The survey addressed transportation safety culture, identifying safety concern locations, and priority safety strategies. The survey had 68 total responses and highlighted the three most concerning safety issues in the region: **busy intersections, speeding, lighting**. Respondents identified **intersections, high speed roads,** and **driver behavior** as priority safety improvement strategies.

Public Review Period

The fourth stage of public involvement was the public review period. The WPTSP is published as a draft, available for public comment for 30-days, during which the public will be asked for feedback on all elements of the plan. This section will be updated with insights from the Public Review Period that inform or impact the safety strategies.

Plan and Policy Review

The WPTSP project team assessed local and regional plans and policies using a Safe System-Based scoring framework. The following plans were reviewed:

Name of Plan	County	Jurisdiction	Year Published
MTP 2050 Safety Chapter	Alexander, Burke, Caldwell, Catawba	MPO	2020
Sawmills Bicycle and Pedestrian Plan	Caldwell	Municipality	2021
Hudson Bicycle and Pedestrian Plan	Caldwell	Municipality	2019
Western Piedmont Bicycle Plan	Alexander, Burke, Caldwell, Catawba	MPO	2019
Walk RCV Plan	Burke	Municipality	2015
Overmountain Victory Trail	Burke, Caldwell	Municipality, interjurisdictional	2021
Hickory Pedestrian and Bicycle Plan	Catawba	Municipality	2020
Alexander County Comprehensive Plan: Transportation Section	Alexander	County	2024
Caldwell County Comprehensive Plan: Transportation Section	Caldwell	County	2020
Catawba County Comprehensive Plan: Transportation Section	Catawba	County	2024

The review process assessed the extent to which each plan or study addresses the different elements and principles of Safe System Approaches. Each plan received a score between 0 and 3 on how effectively it addresses the following questions:

Safer People

1. To what extent does the plan address the safety of multimodal road users (e.g., pedestrians, bicyclists, transit users, micromobility users, or users of mobility assistance devices)?
2. To what extent does the plan address road user behavior?

Safer Vehicles

3. To what extent does the plan address the safety effects of vehicle design?
4. To what extent does the plan address heavy vehicles?

Safer Speeds

5. To what extent does the plan address the safety effects of vehicle operating speed?

6. To what extent does the plan address the safety effects of roadway design and speeds?

Safer Roads

7. To what extent does the plan address strategies for separating different road users?
8. To what extent does the plan address intersection design?
9. To what extent does the plan address how land use context affects roadway design?

Post-Crash Care

10. To what extent does the plan address post-crash care or emergency response?
11. To what extent does the plan focus on crash severity?

An Overall SSA

12. To what extent does the plan promote proactive safety solutions (e.g., risk-based or systemic approaches as opposed to reactive or crash hot-spot approaches)?

Successes, Gaps, and Opportunities

Safer People

Mode specific plans (bicycle and pedestrian plans, trail plains) most successfully identified safety outcomes for safer people. Many plans included education and behavior-based recommendations, though these were primarily focused on bicycle and pedestrian safety.

Future plans or plan updates should include specific identification of safety risks and how the plan addresses those risks for various road users. Plans should include all modes permitted on all roads. Traffic safety culture should be addressed for all road users, including drivers, to emphasize the shared responsibility of safety culture

Safer Vehicles

Few plans addressed vehicle design or heavy vehicles. Future plans or plan updates should consider transit-related safety and the role of freight and fleet management in safety outcomes.

Safer Speeds

The safety effect or operating speed and design speed is not included in many plans. Future plans or plan updates should consider specific safety outcomes related to operating speeds and implementing design speed decisions that are tailored to roadway and corridor context.

Safer Roads

Many plans addressed the role of separating users in time and space, while few addressed intersections or land use context. Future plans or plan updates should consider integrating crash risk into project scopes and design, establishing guidance for road user separation, and creating context-sensitive designs.

Post-Crash Care

Very few plans addressed emergency response or crash severity. Future plans or plan updates should include representatives of post-crash care (EMTs, LEOs) in plan development, incorporate

the role of post-crash storytelling, and embed crash severity and crash reporting standards into decision-making.

Overall SSA

Overall, future plans and plan updates should prioritize diving into specific safety outcomes related to SSA when creating analysis processes and developing recommendations to improve the correlation between regional plans and regional safety outcomes.

Safety Analysis

The WPTSP followed a data-driven safety analysis process, summarized by five main components:

- Identify crash trends: a categorical method of comparing historical fatal (K) and serious injury (A) crashes against all-severity crashes.
- Identify crash focus types: analyze crash types that have higher crash severity outcomes than all-injury outcomes to identify focus crash types. Crash types are grouped into Emphasis Areas, in alignment with the NCDOT Strategic Highway Safety Plan (SHSP), in order to create efficiencies between state and regional transportation safety plans.
- Assess the demographic impacts of crash outcomes: determine if any population groups or geographic areas are adversely impacted by crash safety outcomes.
- Create High Injury Networks (HINs): Use historical crash data to map roadways and intersections that have high-injury outcomes. This approach identifies locations for the region to reactively address safety concerns.
- Create High Risk Networks (HRNs): Use crash data, roadway data, and probibalistic analysis to map roadways and intersections that have high risk conditions for focus crash types. This approach identifies locations for the region to proactively address safety concerns.

This method presents a holistic approach to addressing where crashes have happened and where crashes are likely to happen in the future, focusing on crash types that have the highest severity outcomes. The Crash Reduction section identifies how these analysis components build a framework for eliminating K and A crashes on the region's transportation network.

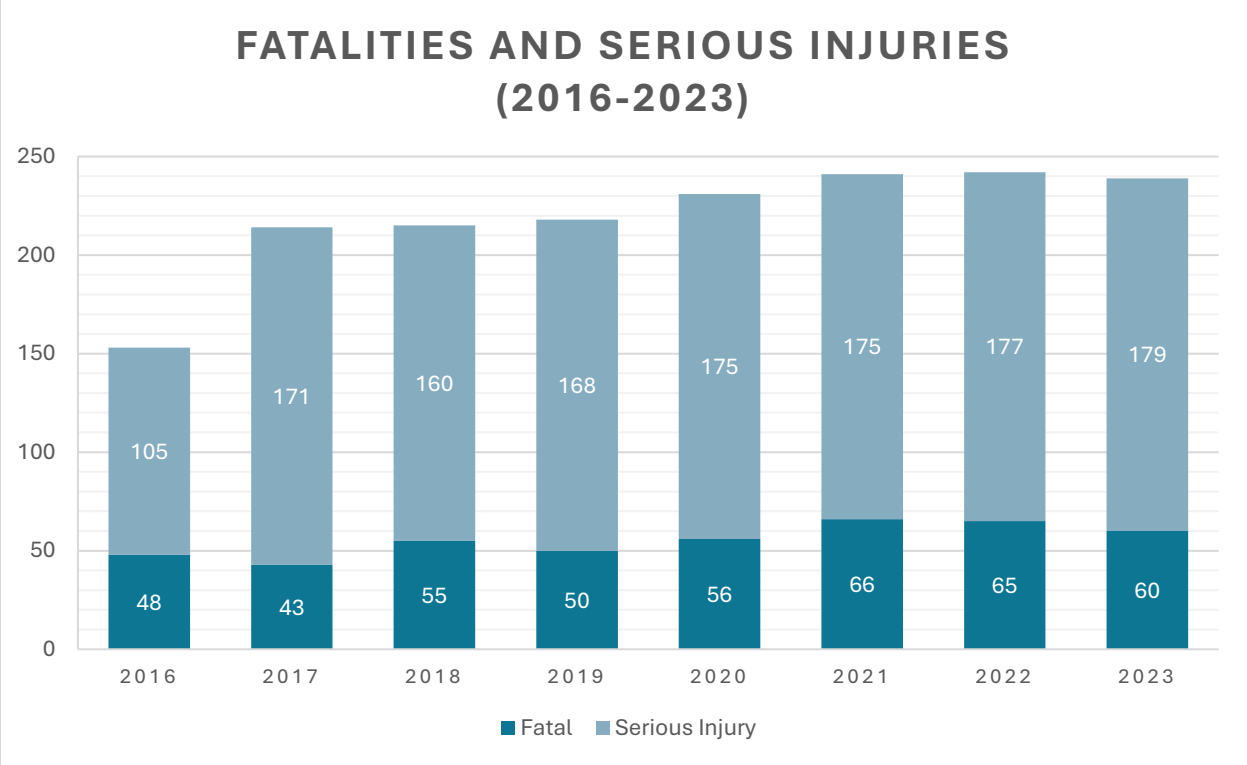
Data Sources

The WPTSP used the following data sources to conduct safety analysis:

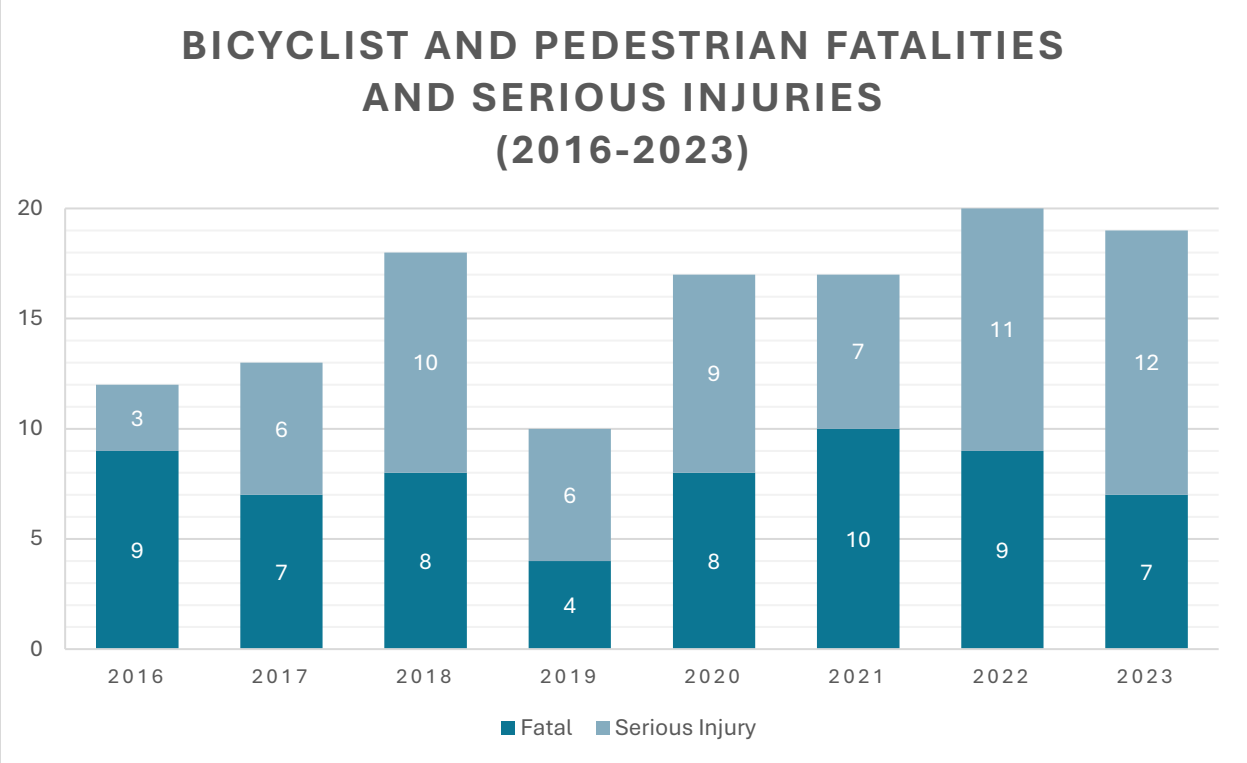
- Crash Data: Sourced from NCDOT crash data, including years 2016 - 2023 and all severities, modes, and types of crashes.
- Roadway Characteristics: Sourced from NCDOT, including physical and operational roadway attributes.

Crash Trends

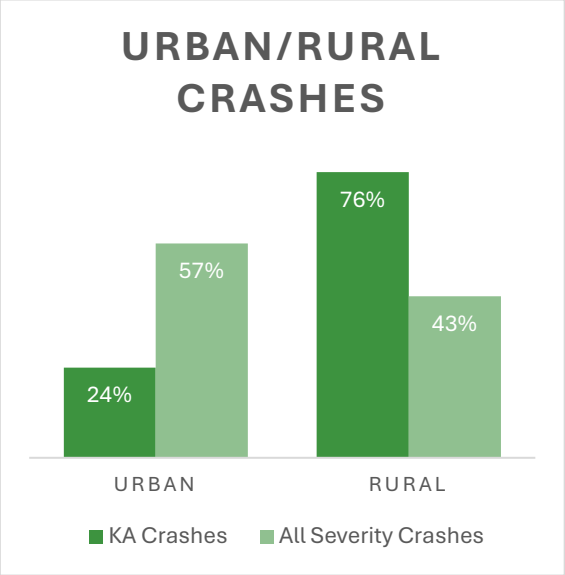
The WPTSP Safety Analysis produced detailed Crash Summaries for the four-county region and each county, which are published on the MPO Web site. From 2016 to 2023, there were 83,610 total crashes on the region's transportation network. There were 1,483 fatal and serious injury crashes during this period, resulting in 443 fatalities and 1,310 serious injuries.

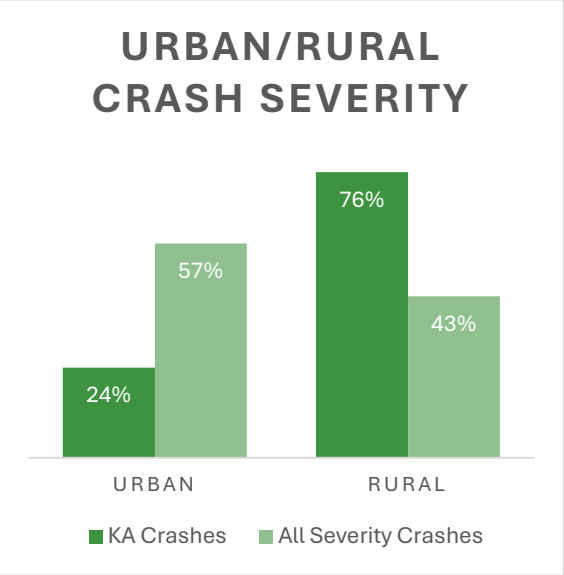


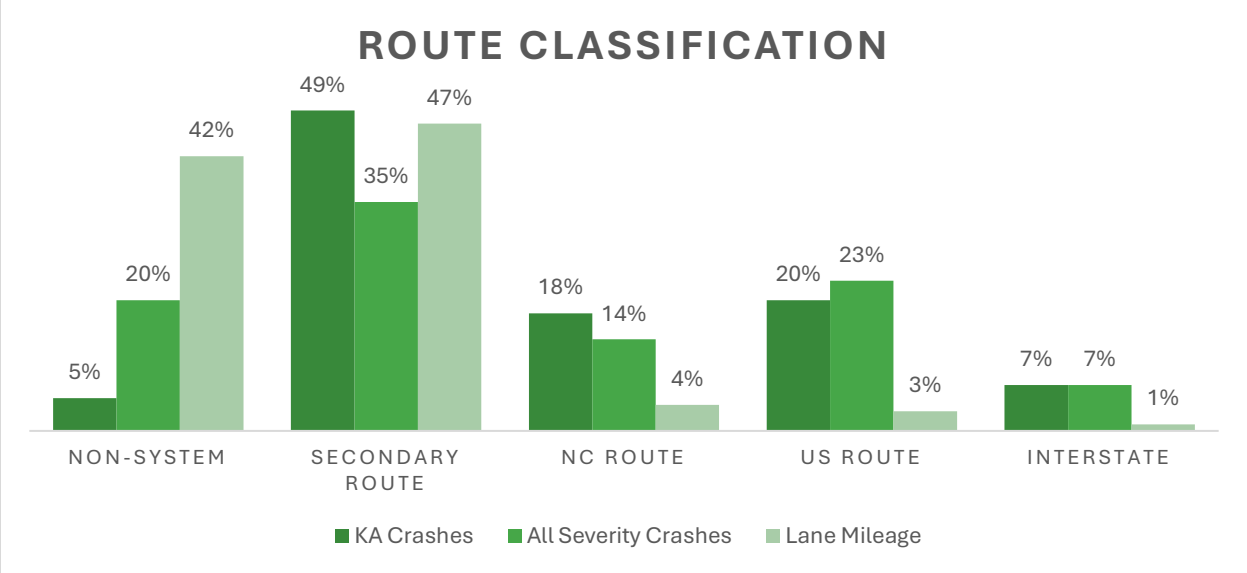
During this same period, there were 576 total crashes involving bicyclists or pedestrians. These crashes resulted in 62 fatalities and 64 serious injuries.

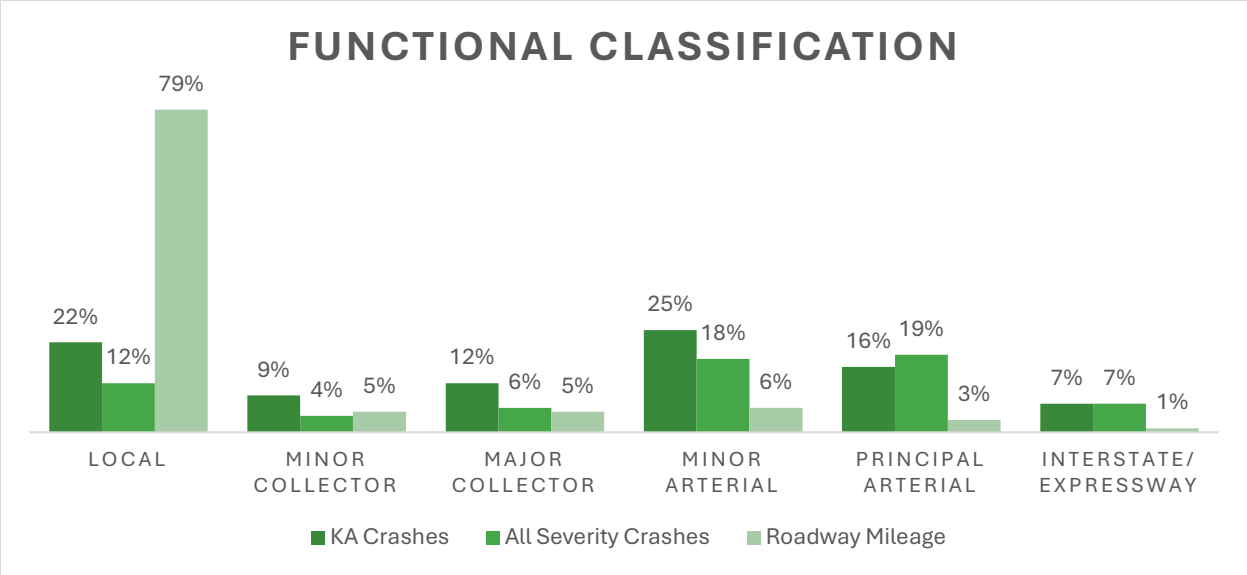


Roadway characteristics like Urban/Rural, Route Class, and Functional Class describe crash trends for the region. Comparing the percentage of total crashes and KA crashes by Route Class and Functional Class to the total proportion of the region's transportation network mileage within these categories is a critical tool to inform decision-making based on crash severity.









Key Takeaways

- **Secondary Route KA Rate:** While the proportion of KA crashes (49%) on secondary routes is consistent with the road mileage (47%), there is a substantial overrepresentation of KA crashes compared to all crashes (35%) on secondary roads.
- **Interstate/US Route/NC Route:** While none of these route classes experience the KA vs. All Crash overrepresentation that secondary routes experiences, these route classes experience between 4 and 7 times higher KA crash rates compared to their mileage proportion (e.g. US Routes make up 3% of the mileage, but 19% of KA crashes, or 6.3x the rate)
- **Non-System:** Non-system roads make up 42% of the network but just 3% of KA crashes.
- **Local Roads:** Although they account for 79% of road mileage, they are involved in only 22% of KA crashes, a considerable underrepresentation.
- **Arterials:** When considering all arterial classifications, these roads make up 9% of road mileage and account for 41% of KA crashes.
- **Interstate:** With 1% of the mileage contributing to 6% of KA crashes, interstates are also notably overrepresented. However, these facilities carry far more traffic per mile than other facilities in the region. On a per vehicle basis, these facilities are likely not substantially overrepresented.

Emphasis Areas

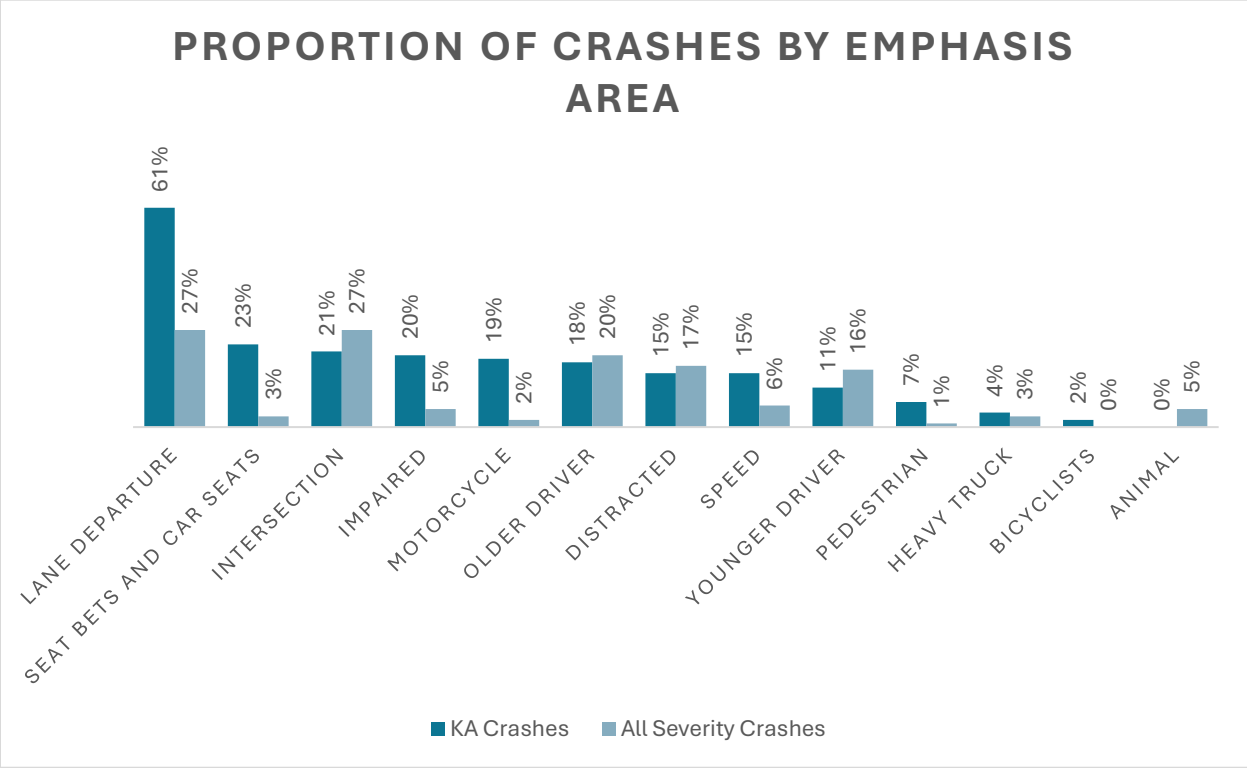
The next step of the Safety Analysis identified emphasis area, or focus crash types. The NCDOT SHSP (2024) identified 10 priority emphasis areas for road safety:

- Lane departure
- Intersections

- Pedestrian safety
- Child car seats
- Seat belts
- Substance impaired driving
- Safer speeds
- Older drivers
- Younger drivers
- Motorcyclists

The SHSP is a connection between local and federal planning, as safety plans like the WPTSP align efforts with the goals, vision, safety priorities, and solutions outlined in the SHSP. As NCDOT is a key partner for implementation of safety improvements and strategies along roadways across the state, the WPTSP groups crash types into similar emphasis areas to identify which are priorities for the GHMPO region.

If the region's proportion of KA crashes exceeded the proportion of All Crashes by more than 1%, it was identified as a focus crash type.



Lane Departure, Seat Belts and Car Seats, Impaired Driving, Motorcycle, Speed, Pedestrian, and Bicyclist emphasis areas are overrepresented in KA crashes compared to all crashes. For instance, Lane Departure crashes constitute 61% of KA crashes but only 27% of all crashes. This trend indicates that crashes in these emphasis areas make up a larger proportion of the region's fatalities and serious injury crashes than they do all injury crashes. While Intersection is not overrepresented, it is identified as a focus crash type because this EA represents a relatively large share (21%) of KA crashes. This step identifies eight (8) focus crash types

- **Lane Departure**: Crash/Collision type recorded as running off the road, rollover/overturn, striking fixed object, sideswipe in opposite directions, or head on.
- **Speed-Related**: Contributing circumstances related to the driver are recorded as exceeding the posted speed limit or driving too fast for conditions.
- **Bike**: Crash/Collision type, "vehicle" type, or person type recorded as a bicycle.
- **Pedestrian**: Crash/Collision type, "vehicle" type, or person type recorded as a pedestrian.
- **Motorcycle**: Vehicle type involved in crash is recorded as a motorcycle.
- **Intersection-Related:** Roadway feature at the crash location is an at-grade intersection.
  - All crash modes
  - Bicycle/Pedestrian crashes

Impaired Driving and Seat Belts and Car Seats are crash types related to occupant behavior and traffic safety culture, and are addressed in the Safety Strategies, but are not included in the following Risk Analyses.

Demographic Analysis

HIN

A High Injury Network (HIN) focuses on roadway segments and intersections where the highest number of fatal and serious injury crashes have occurred over a set timeframe. This provides an important tool to identify locations with the highest concentration of the highest severity crashes and can be used to prioritize locations where safety improvements with reactively address conditions that contributed to historical crashes. The WPTSP created four HIN maps: All Mode HIN, All Mode High Injury Intersections (HII), Bike Ped HIN, and Bike Ped HII. Combined, the HINs account for 72% of All Mode KA Crashes and 66% of Bike Ped KA Crashes

	Network Coverage	KA Crash Coverage
All Mode HINs	13%	72%
Bike Ped HINs	5%	66%

HIN MAPS

HRN

While a HIN analysis identified high frequency crash locations, a High-Risk Network analysis identifies locations where crashes might not have occurred with high frequency, but where underlying conditions create a reasonable expectation for a future crash that results in death or serious injury. The HRN analysis identifies common conditions for focus crash types (e.g. land use context, observed speed, number of lanes), identifies where those conditions exist across the network, and applies a probabilistic analysis to determine the likelihood of future high severity crash outcomes.

The HRN analysis has three main pillars:

- **Exposure**: Areas where there is an expectation of higher exposure risk for all road users based on potential for conflict between road user and the number of vehicles
- **Severity**: Areas where there is an expectation of higher severity based on traffic speed
- **Likelihood**: Areas where there is an expectation of increased likelihood of focus crash types, based on shared location characteristics.

The HRN provides an important tool for the MPO to incorporate risk into project scoping and location identification, to implement systemic improvements across the network, and to avoid characteristics that will create new risk or exacerbate existing risks in future growth and project planning. Used alongside the HIN, the HRN establishes a proactive approach to transportation safety planning.

HRN MAPS

Applying the Safety Analysis

All components of the WPTSP Safety Analysis are important indicators of safety problems, with application for developing projects and priorities that improve safety outcomes. The following list identifies key applications of the various components of the Safety Analysis

Crash Analysis

- Specific factors and road types to address
- Potential packages of countermeasures and project types
- Behavior, policy and education

High Injury Network

The HIN helps to identify where to prioritize near-term safety strategies including:

- Road Safety Assessments (RSAs) or field review
- Targeted enforcement
- Site specific interventions

High Risk Network

The HRN, including consideration for Exposure, Speed and Likelihood, helps to identify where to prioritize mid and longer-term safety strategies including:

- Systemic inventory and analysis
- Project review and scoping
- Project prioritization
- Corridor studies
- Speed management strategies
- Site specific countermeasures or packages of countermeasures
- Behavior, education, and policy

Crash Reduction

Framework

The WPTSP Crash Reduction Framework is organized by Goals, Strategies, and Actions.

Goals are informed by Safety Analysis, Public Involvement and regional leadership. Each goal includes sets of safety strategies that address priority safety concerns and are anticipated to have the highest impact on reducing crashes Strategies are divided into actions, which are measurable, time-based, and tied to performance measures.

Goal	Category	Strategy
GHMPO and its members will use policies, guidances, and funding mechanisms to embed Safe Systems into the regional decision-making.	Policy	Land Development practices and procedures
	Policy	Roadway safety resources and guidance
	Policy	Funding resources, guidance, and support
GHMPO and its members will address urban safety concerns through all pillars of the Safe System Approach	Urban	Multimodal safety in urban areas
	Urban	Multimodal safety on multilane arterials
	Urban	Traffic calming on local streets
GHMPO and its members will address rural safety concerns through all pillars of the Safe System Approach.	Rural	Walking, biking, motorcycle on rural roads
	Rural	Rural high-speed / curvature roads
GHMPO and its members will adopt a Safe System Approach and commit to addressing traffic safety culture through shared responsibility of Safer Road Users	Culture	Behavior /Distraction
GHMPO and its members will commit to systemic safety improvements that improve safety outcomes across the network and create a consistent safety experience across the region.	Systemic	Intersections
	Systemic	Pedestrians at night
GHMPO and its members will make data-informed decisions and commit to maintaining high quality safety data to inform transportation decisions.	Data	Data collection, tools, and guidance

Strategy Action Plans

Each WPTSP Crash Reduction Safety Strategy has a develop action plan. Action Plans include:

- Partners: A non-exhaustive list of partners that may support implementation
- WPTSP Tools: Tools developed for the WPTSP that help implementation
- Timeline: Near (1y), Mid (1-5y), Long (5-10y) estimated for expected implementation timeframe
- Cost: An anticipated low ($) or high ($$) cost range associated with implementation
- Performance Measures: Performance metrics for tracking implementation

These strategy implementation plans are designed as living plans. As priorities shift, outcomes change, actions are completed, or new actions are identified, these implementation plans should be updated accordingly. To increase accessibility, and ease implementation tracking, the **WPTSP Safety Strategies Implementation Plan** is linked in a separate document.

Location Prioritization

The WPTSP location prioritization process was developed to identify priority project locations based on the Safety Analysis conducted for the plan and the Safe System Approach. This process scored locations to highlight corridors and intersections that have high KA crash history and/or high KA crash risk. The scoring process accounts for:

- High Injury Networks (All Mode, Bike Ped, Intersections)
- Severity Risk
- Likelihood Risk (for focus crash types)
- Exposure Risk

This process scored every road segment and intersection in the region. A sample of the highest scoring regional corridors and intersections are listed below. The **Location Priority Matrix** can be used to identify a priority score for any segment or intersection, ensuring that projects across the region are focusing on reducing the risk of future KA crashes consistent with the Crash Reduction Framework.

Corridors	County	Agenc(ies)
Independence Blvd	Burke	Morganton
Blowing Rock Blvd	Caldwell	
S NC 16	Catawba	Newton
E Union St	Burke	Morganton
Conover Blvd	Catawba	Conover
N Center St	Catawba	Hickory
Enola Rd	Burke	Morganton
Hickory Blvd	Caldwell	Lenoir
Wilkesboro Blvd	Caldwell	Lenoir, Cedar Rock
Startown Rd	Catawba	Maiden
Morganton Blvd	Caldwell	Gamewell
Church Rd	Alexander	
Intersections	**County**	**Agenc(ies)**
N Center St / 25th Ave NW	Catawba	Hickory
US 321 / US 64	Caldwell	Lenoir
S Center St / US 70 E	Catawba	Hickory
NC 126 / NC 181	Burke	Morganton
US 321 / NC 268	Caldwell	
NC 181 / Sanford Dr	Burke	Morganton
NC 16 / Providence Mill Rd	Catawba	
NC 150 / Slanting Bridge Rd	Catawba	
S Center St / NC 127	Catawba	Hickory
US 70 / 1st St E	Catawba	Conover

NC 16 / Alspaugh Dam Rd	Alexander	
NC 16 / Friendship Church Rd	Alexander	

Project Scoping and Countermeasures

This section provides tools for identifying countermeasures, specific project location screening for each MPO member, and general project location screening for safety improvements.

Countermeasure Guidance Tool

Once project locations are identified, the following set of countermeasures should assessed for applicability and feasibility. These countermeasures are grouped by the WPTSP Focus Crash Types. This is a non-exhaustive list of countermeasures. Additional countermeasures should be assessed based on the FHWA's Proven Safety Countermeasures (PSCi). Expected Crash Reduction and additional countermeasure information should be evaluated based on the NCDOT Safety Countermeasure Glossary.

Critical assessment questions should include:

1. Is the location rural or urban?
2. What is the context of the roadway and the current and future land use?
3. Are there safety risks for multiple transportation modes?
4. Are there overlapping safety risks?
5. Can multiple countermeasures be applied?
6. Can a countermeasure address multiple safety risks?
7. Which countermeasure addresses the highest severity crash risks, with the highest expected crash reduction?

Lane Departure Countermeasures:

- Rumble Strips/Stripes
- Safety Edge
- Shoulder Widening
- Horizontal Curvature Improvements
- Guardrail/Median Barrier
- Signs and Pavement Markings

Speed Countermeasures

- Gateway Treatments
- Variable Speed Limit
- Mini Roundabout
- Dynamic Speed Feedback Signs
- Signal Timing Improvements

Intersection Countermeasures

- New Signal
- Advanced Warning Flashers
- Flashing Yellow Arrow
- All Way STOP Control
- Roundabout
- Reduced Conflict Intersection (RCI)
- Dedicated Turn Lanes / Signal Phasing Improvements

Motorcycle Countermeasures

- Motorcycle Rub Rail
- Paved Shoulder
- Roadway Condition /Maintenance Improvements

Pedestrian Countermeasures

- Sidewalk
- Grade separation
- Raised Median
- Signal Improvements: Countdown Signal Heads, Leading Pedestrian Interval, Right Turn on Red Restrictions (RTORR)
- Crossing Improvements: Crosswalk, Curb Extension, Raised Median/Refuge Island, Pedestrian Hybrid Beacon (PHB), Rectangular Rapid Flashing Beacon (RRFB)

Bicycle Countermeasures

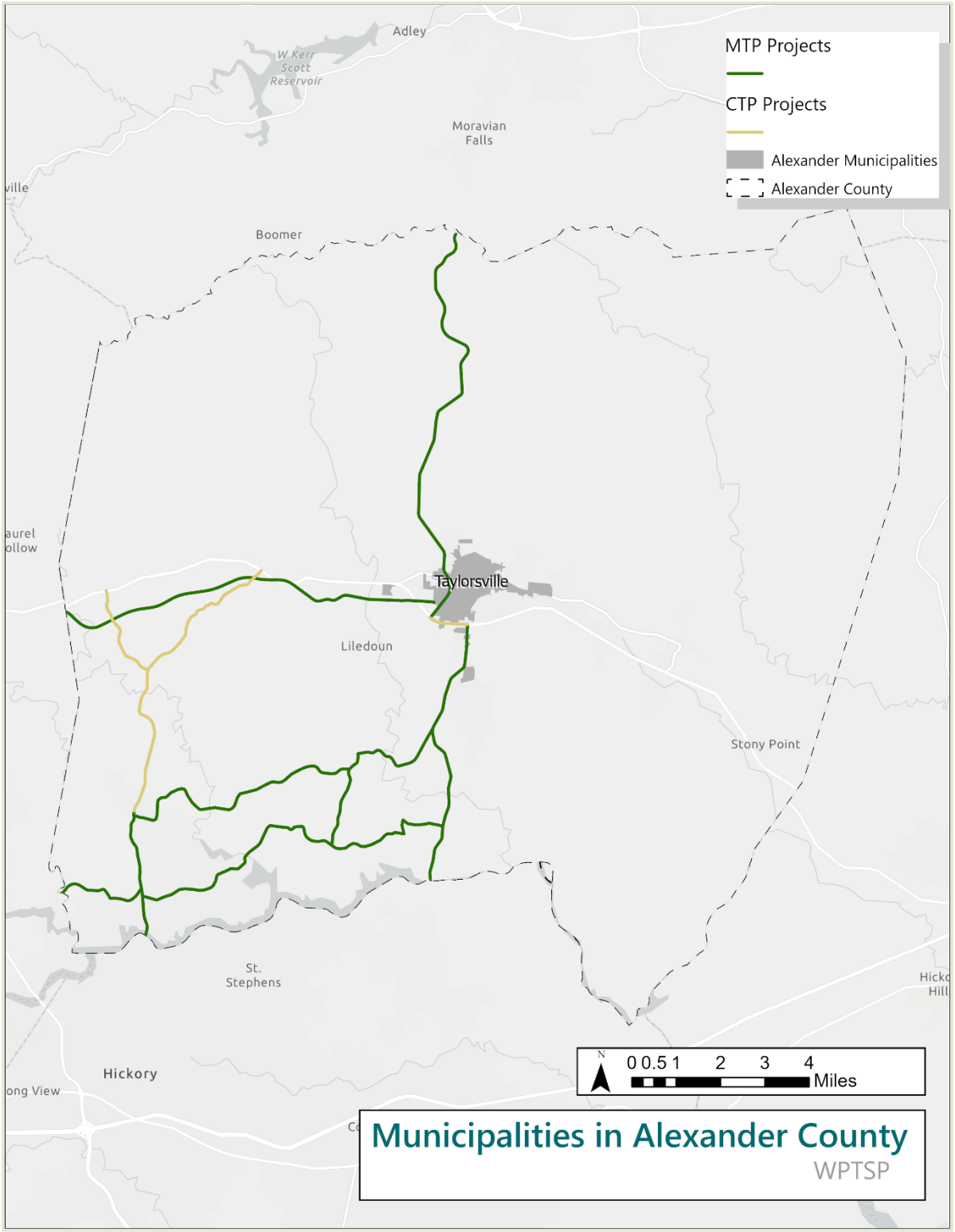
- Bike Lane: buffered, separated, green color pavement
- Bike Box
- Signal Improvements: Detection, Timing
- Protected Intersection
- Median Improvements

Systemic Countermeasures

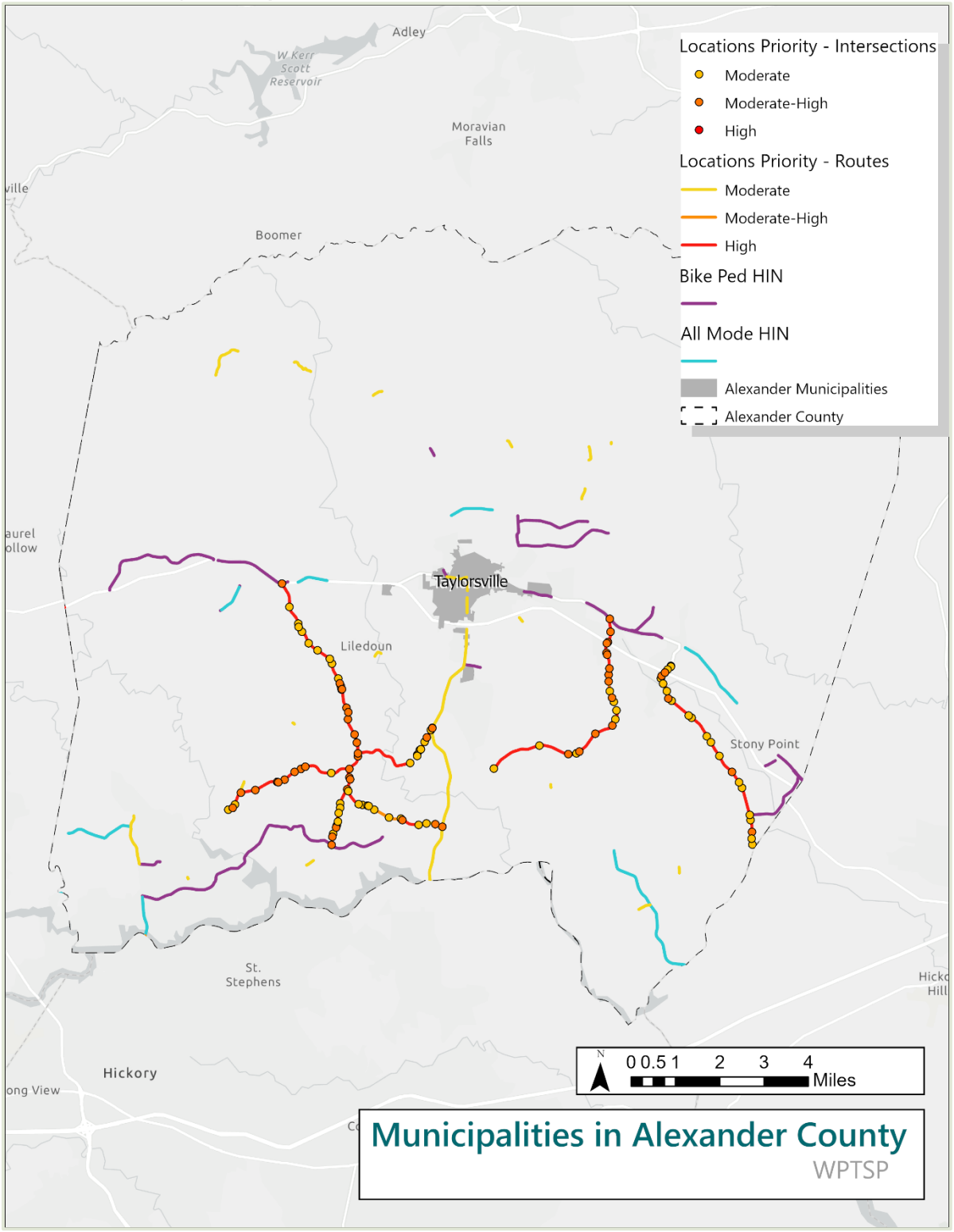
- Shorten distance between crossing locations and crossing distance
- LPI
- RTORR
- Signal Timing and Phasing
- Raised Median/Refuge Islands
- Road Diets

Alexander County Location Screening

Alexander County Municipalities + MTP/CTP Projects



Alexander County Municipalities + WPTSP Analysis



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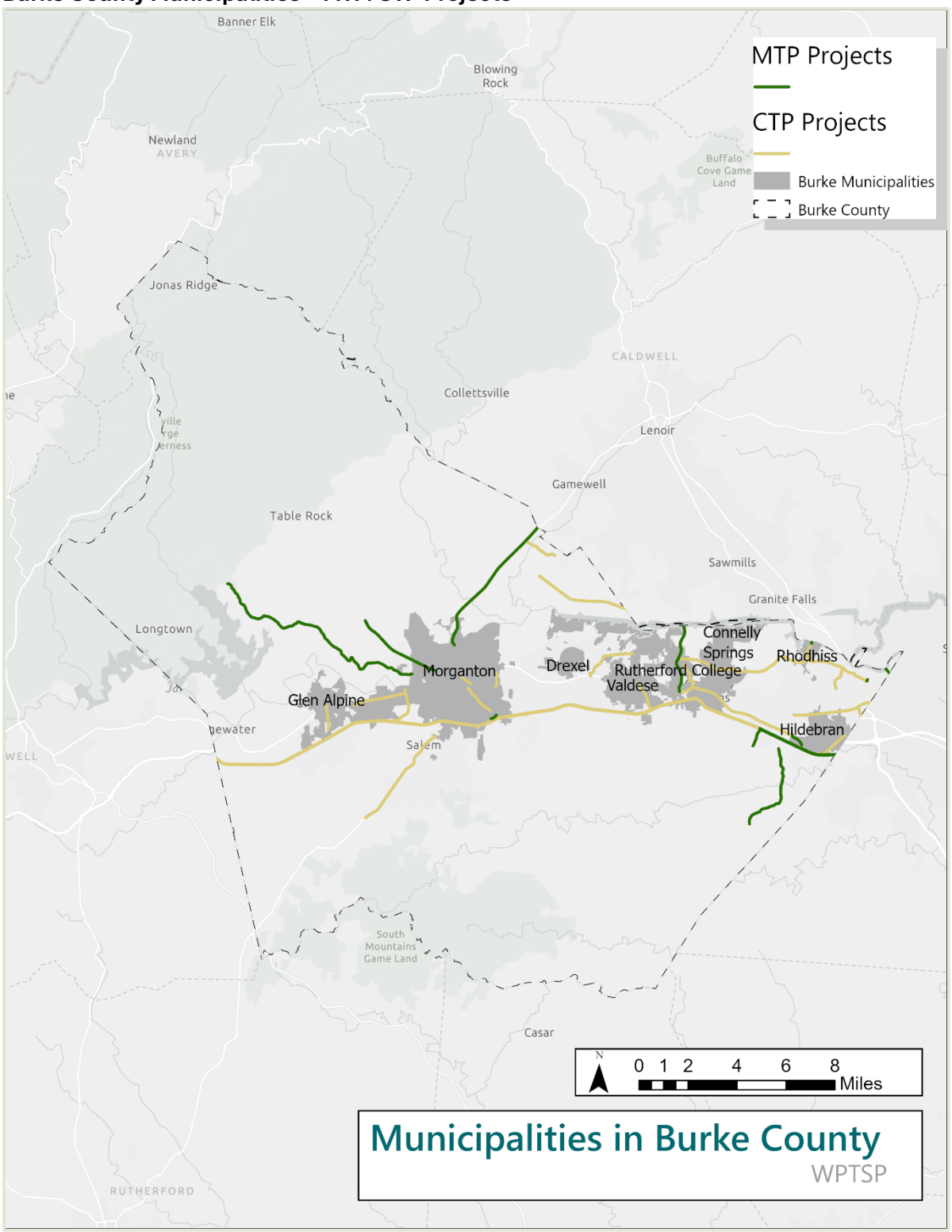
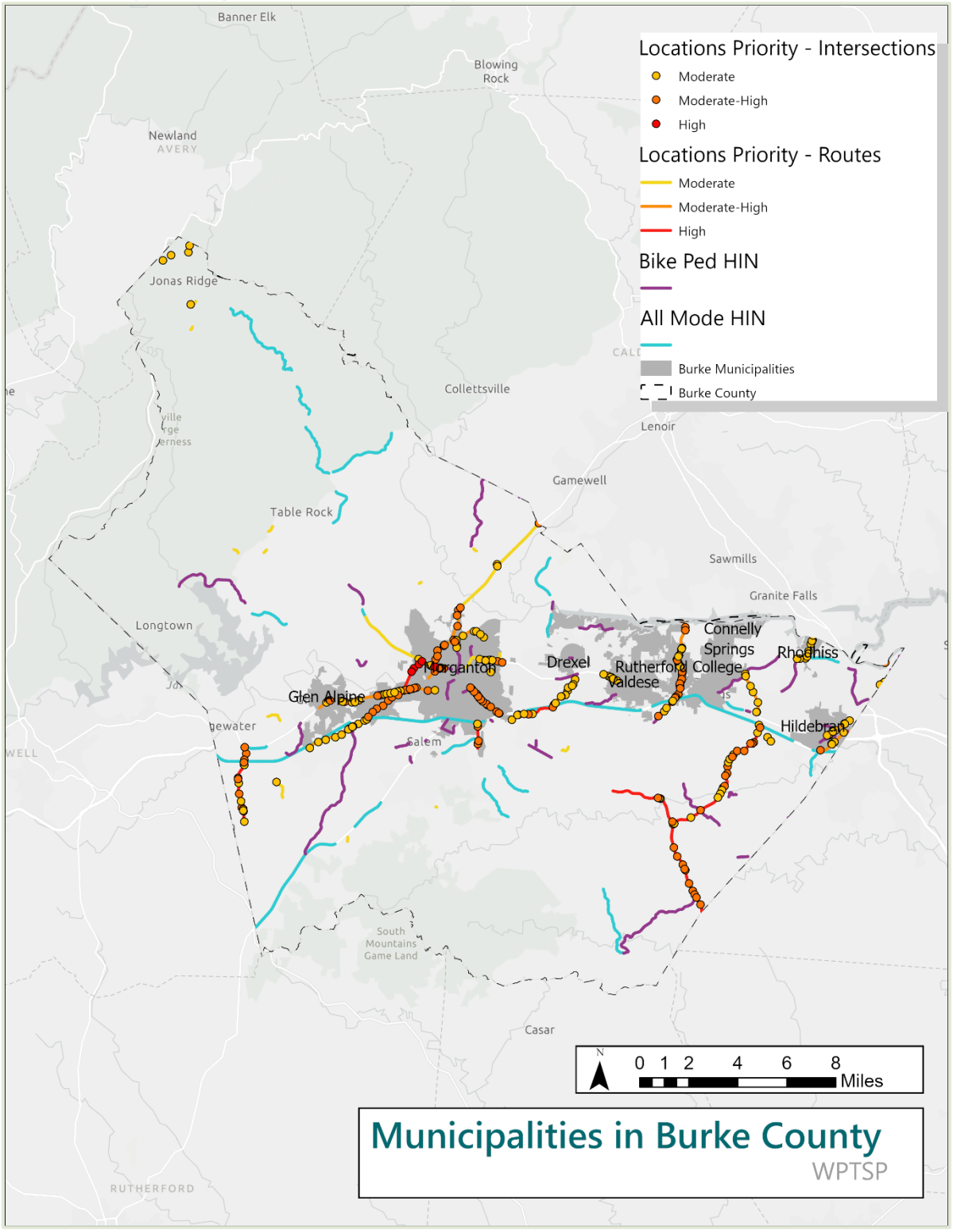
Taylorsville	Description	Opportunity
Locations Priority - Intersections	-	
Locations Priority - Routes	W Main Avenue (NC 16) NC 16 (1st Ave SW to Commercial Park Ave)	RSA Speed Study
MTP Projects	NC 16/Liledoun Rd (US 64 to Wilkes County)	Incorporate Bike Ped Safety into modernization scoping for downtown
CTP Projects		
Bike Ped HIN	NC 16 E Main Ave	RSA Modernization
All Mode HIN	-	
Additional Risks	NC16/W Main: All Mode Intersection E Main/1st St & Center St: Bike Ped Intersection	RSA Systemic Intersection Improvements
Unincorporated Alexander County	**Description**	**Opportunity**
Locations Priority - Intersections	NC 16 S: Multiple Intersections	RSA Systemic Intersection Improvements
Locations Priority - Routes	NC 16 S Teague Town Rd Millersville Rd	RSA Speed Study Curvature Analysis
MTP Projects	Teague Town Rd NC 16 S NC 127/N Center St	RSA Incorporate Lane Departure, Motorcycle, Speed, and Pedestrian Risk into scope
CTP Projects	NC 127	Incorporate Lane Departure and Motorcycle Risk into scope
Bike Ped HIN	Rink Dam Rd Church Rd	RSA Modernization
All Mode HIN	NC 16 S Paul Payne Store Rd	RSA Incorporate Lane Departure, Motorcycle, Speed, and Pedestrian Risk into scope
Additional Risks	Hwy 64: Multiple Safety Risks	RSA Corridor Study

Burke County Location Screening

Burke County Municipalities + MTP/CTP Projects



Burke County Municipalities + WPTSP Analysis



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Connelly Springs	**Description**	**Opportunity**
Locations Priority - Intersections	-	
Locations Priority - Routes	-	
MTP Projects	-	
CTP Projects	US 70 Northeast Burke Corridor	Incorporate Multimodal Safety Risk into scope
Bike Ped HIN	Rhodiss Rd	
All Mode HIN	US 70	
Additional Risks	Rhodiss Rd: Overlapping Risks Shady Grove Rd: Speed and Lane Departure Risks	RSA Speed Study Multimodal Safety Improvements
Drexel	**Description**	**Opportunity**
Locations Priority - Intersections	-	
Locations Priority - Routes	-	
MTP Projects	-	
CTP Projects	-	
Bike Ped HIN	Church St	Multimodal Safety Improvements
All Mode HIN	-	
Additional Risks	Main St: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Glen Alpine	**Description**	**Opportunity**
Locations Priority - Intersections	E Main St/London St W Main St/S Bridge St	RSA Systemic Intersection Improvements
Locations Priority - Routes	W Main St	RSA Multimodal Safety Improvements
MTP Projects	-	Incorporate Multimodal Safety Risk and Intersection Improvements into scope

CTP Projects	Glen Alpine Connector	Incorporate Multimodal Safety Risk and Intersection Improvements into scope
Bike Ped HIN	-	
All Mode HIN	-	
Additional Risks	Turkey Tail Ln/Linville St: All Mode Intersection Ridk Linville St: Overlapping Risks Turkey Tail Ln: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Hildebran	**Description**	**Opportunity**
Locations Priority - Intersections	US 70: Multiple Intersections I-40 Access Rd: Multiple Intersections	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Locations Priority - Routes	US 70 I-40 Access Rd	RSA Multimodal Safety Improvements
MTP Projects	Tex's Fish Camp Rd	Incorporate Safety Risk into scope
CTP Projects	I-40 Access Rd	Incorporate Safety Risk into scope Multimodal Safety & Intersection Improvements
Bike Ped HIN	Main Ave E I-40 Access Rd Cline Park Dr	RSA Multimodal Safety Improvements
All Mode HIN	I-40 Access Rd	RSA Speed Study Interchange Safety Improvements
Additional Risks	Center St: Overlapping Risks	RSA Speed Study Multimodal Safety Improvements
Morganton	**Description**	**Opportunity**
Locations Priority - Intersections	NC 126/NC 181 NC 181/Sanford Dr NC 126/Independence Blvd	RSA Systemic Intersection Improvements Geometric Configuration Multimodal Safety Improvements
Locations Priority - Routes	NC 126 E Union St E Meeting St	RSA Speed Study Road Diet Multimodal Safety Improvements
MTP Projects	NC 181 Lenoir Rd	RSA Access Management Incorporate Safety Risk into scope

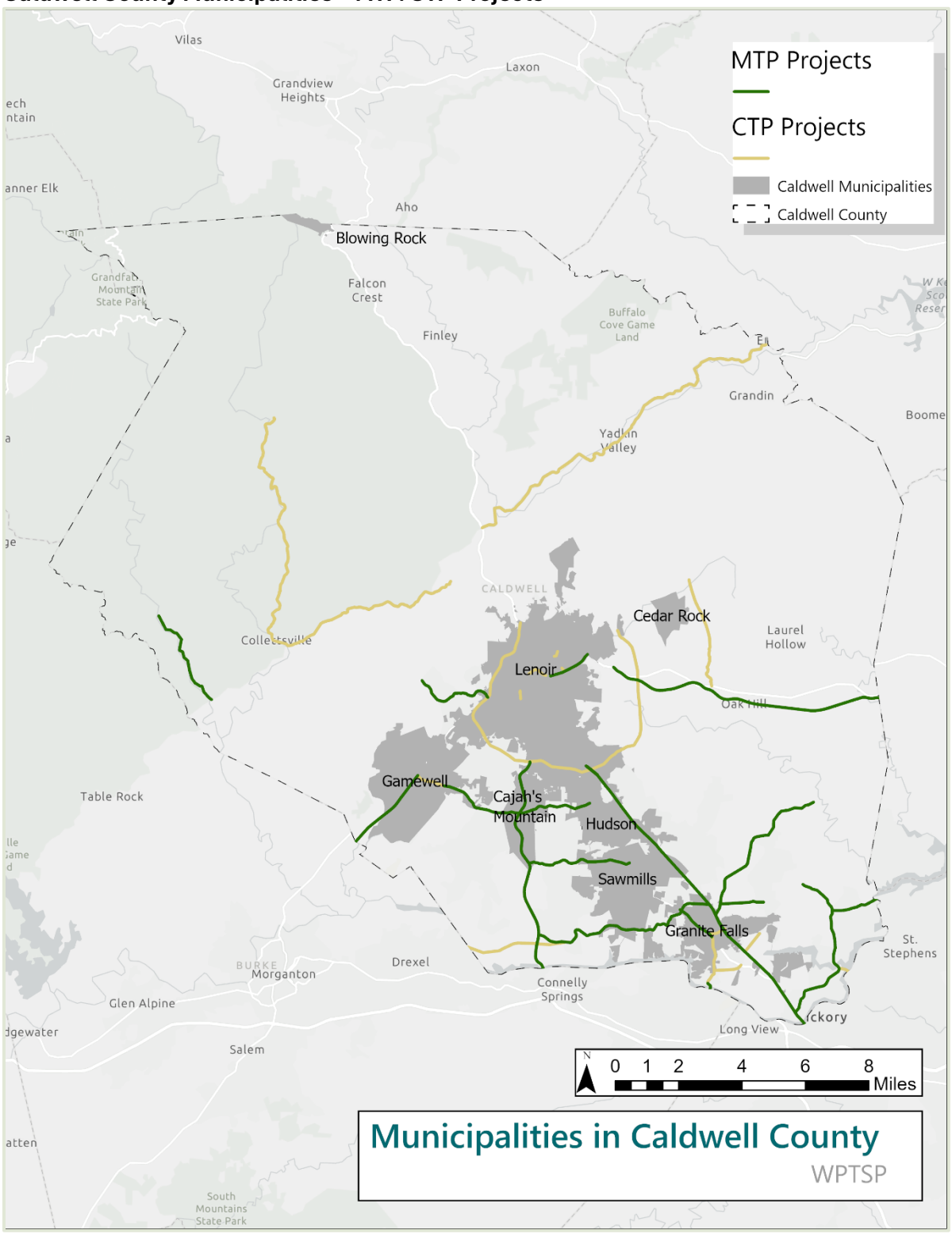
CTP Projects	NC 18 Morganton West Connector US 70	RSA Corridor Study Incorporate Safety Risk and Intersection Improvements into scope
Bike Ped HIN	NC 64/Lenoir Rd NC 64/Burkemont Ave NC 181	RSA Multimodal Safety and Intersection Improvements
All Mode HIN	-	
Additional Risks	NC 64: Bicycle Risk NC 181: Overlapping Risks NC 64/NC 181: All Mode and Bike Ped Intersection Risk	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Rhodiss	**Description**	**Opportunity**
Locations Priority - Intersections	Burke St: Multiple Intersections	RSA Systemic Intersection Improvements
Locations Priority - Routes	Burke St	RSA Speed Management Multimodal Safety Improvements
MTP Projects	-	
CTP Projects	Northeast Burke Corridor Duke St Improvements	Incorporate Multimodal Safety & Intersection Improvements into scope
Bike Ped HIN	-	
All Mode HIN	Airport Rhodiss Rd Burke St	RSA Multimodal Safety Improvements
Additional Risks	Burke St/Carolina Ave: All Mode and Bike Ped Intersection Risk Cape Hickory Rd: Overlapping Risks	RSA Multimodal Safety Improvements
Rutherford College	**Description**	**Opportunity**
Locations Priority - Intersections	Malcolm Blvd: Multiple Intersections	RSA Speed Management Systemic Intersection Improvements Interchange Safety Improvements
Locations Priority - Routes	Malcolm Blvd	RSA Access Management Multimodal Safety Improvements
MTP Projects	Malcolm Blvd	Incorporate Multimodal Safety & Intersection Improvements in scope
CTP Projects	US 70 Majority Town St	Incorporate Multimodal Safety & Intersection Improvements in scope

Bike Ped HIN	Malcolm Blvd	RSA Modernization Multimodal Safety Improvements
All Mode HIN	-US 321	RSA Multimodal Safety Improvements
Additional Risks	US 70: Overlapping Risks Bravard St: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Valdese	**Description**	**Opportunity**
Locations Priority - Intersections	US 70: Multiple Intersections	RSA Speed Management Access Management Systemic Intersection Improvements
Locations Priority - Routes	US 70/Main St W	RSA Speed Management Access Management Multimodal Safety Improvements
MTP Projects	-	
CTP Projects	Eldred St Meytre Ave NE	RSA Incorporate Multimodal Safety & Intersection Improvements into scope
Bike Ped HIN	Seltz Rd Milton Ave SW US 70/Main St W	RSA Modernization Multimodal Safety Improvements
All Mode HIN	-	
Additional Risks	Church St NW/Falls Rd NW: Overlapping Risks Eldred St SE: Overlapping Risks US 70: Multiple Intersection Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Burke County	**Description**	**Opportunity**
Locations Priority - Intersections	Millers Bridge Rd/Nobby Lail Rd Dyartsville Rd: Multiple Intersections NC 18: Multiple Intersections	RSA Multimodal Intersection Improvements Interchange Safety Improvements
Locations Priority - Routes	Dyartsville Rd Miller Bridge Rd NC 18	RSA Speed Study Curvature Analysis Modernization Multimodal Safety Improvements

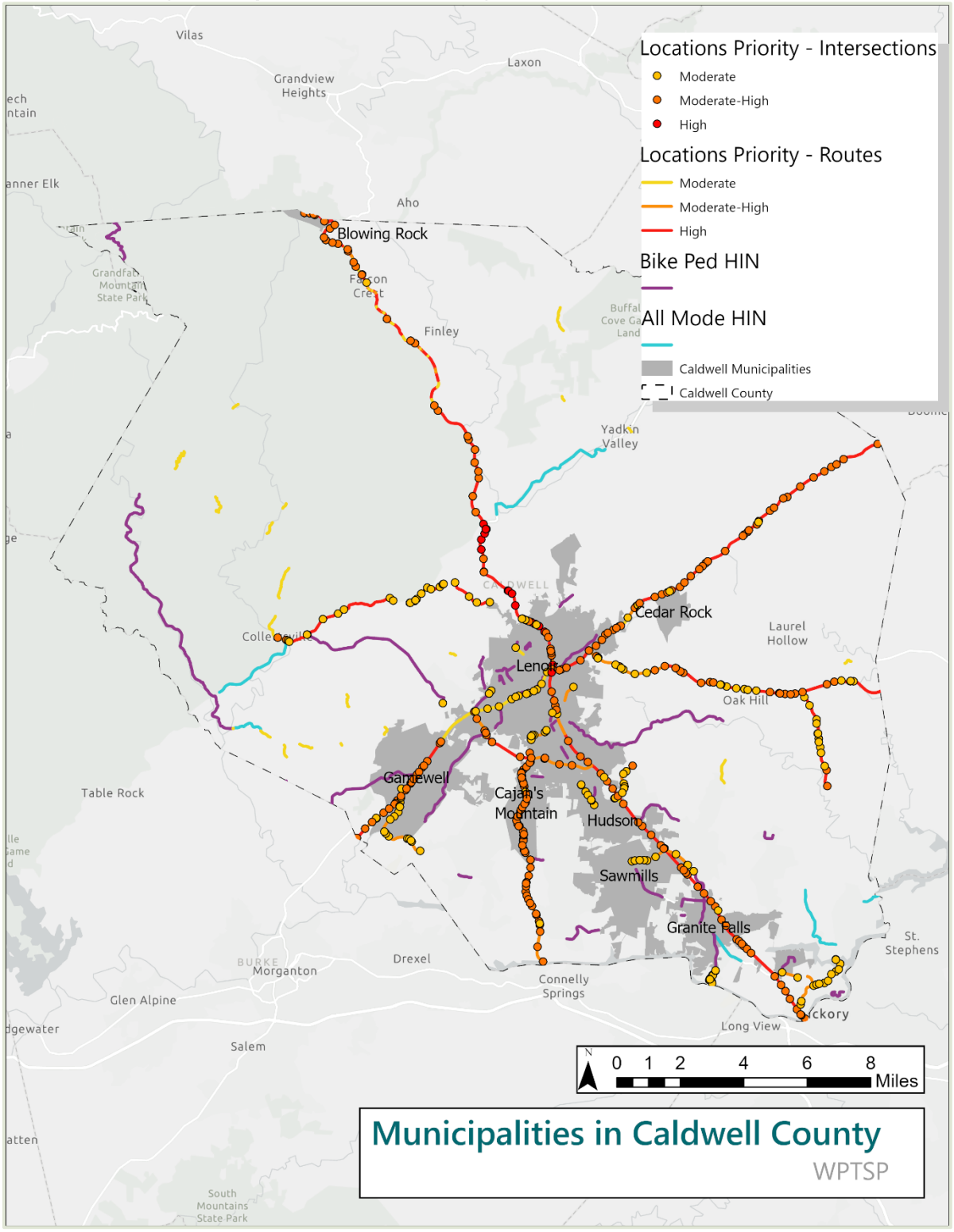
MTP Projects	NC 126 NC 181 Johnson Bridge Rd Rd	Incorporate Multimodal Safety Risk into scope
CTP Projects	US 64 US 321 US 64/NC 18 Connector	Incorporate Multimodal Safety Risk into scope
Bike Ped HIN	Icard Rhodiss Rd NC 126 Conley Rd	RSA Modernization Multimodal Safety Improvements
All Mode HIN	NC 181 Brown Mountain Beach Rd US 64	RSA Speed Study Curvature Analysis Multimodal Safety Improvements
Additional Risks	Old NC 18: Overlapping Risks NC 181: Overlapping Risks NC 126: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements

Caldwell County Location Screening

Caldwell County Municipalities + MTP/CTP Projects



Caldwell County Municipalities + WPTSP Analysis



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Cajah's Mountain	**Description**	**Opportunity**
Locations Priority - Intersections	Connelly Springs Rd: Multiple Intersections	RSA Systemic Intersection Improvements Access Management Multimodal Safety Improvements
Locations Priority - Routes	Connelly Springs Rd	RSA Speed Study Multimodal Safety Improvements
MTP Projects	Connelly Springs Rd Pleasant Hill Rd Orchard Dr	RSA Corridor Study Incorporate Multimodal Safety Risk into scope
CTP Projects	-	
Bike Ped HIN	Connelly Springs Rd	RSA
All Mode HIN	Connelly Springs Rd	RSA
Additional Risks	Connelly Springs Rd/Orchard Dr: All Mode Intersection Risk Pleasant Hill Rd: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Gamewell	**Description**	**Opportunity**
Locations Priority - Intersections	US 64: Multiple Intersections Calico Rd: Multiple Intersections	RSA Access Management Systemic Intersection Improvements
Locations Priority - Routes	US 64 Calico Rd	RSA Speed Study
MTP Projects	US 64/Morganton Rd Crump Rd	RSA Incorporate Multimodal Safety Risk into scope
CTP Projects	Rocky Rd	RSA Incorporate Multimodal Safety Risk into scope
Bike Ped HIN	Craig Mountain Rd Hartland Rd	RSA Speed Study
All Mode HIN	Calico Rd	RSA

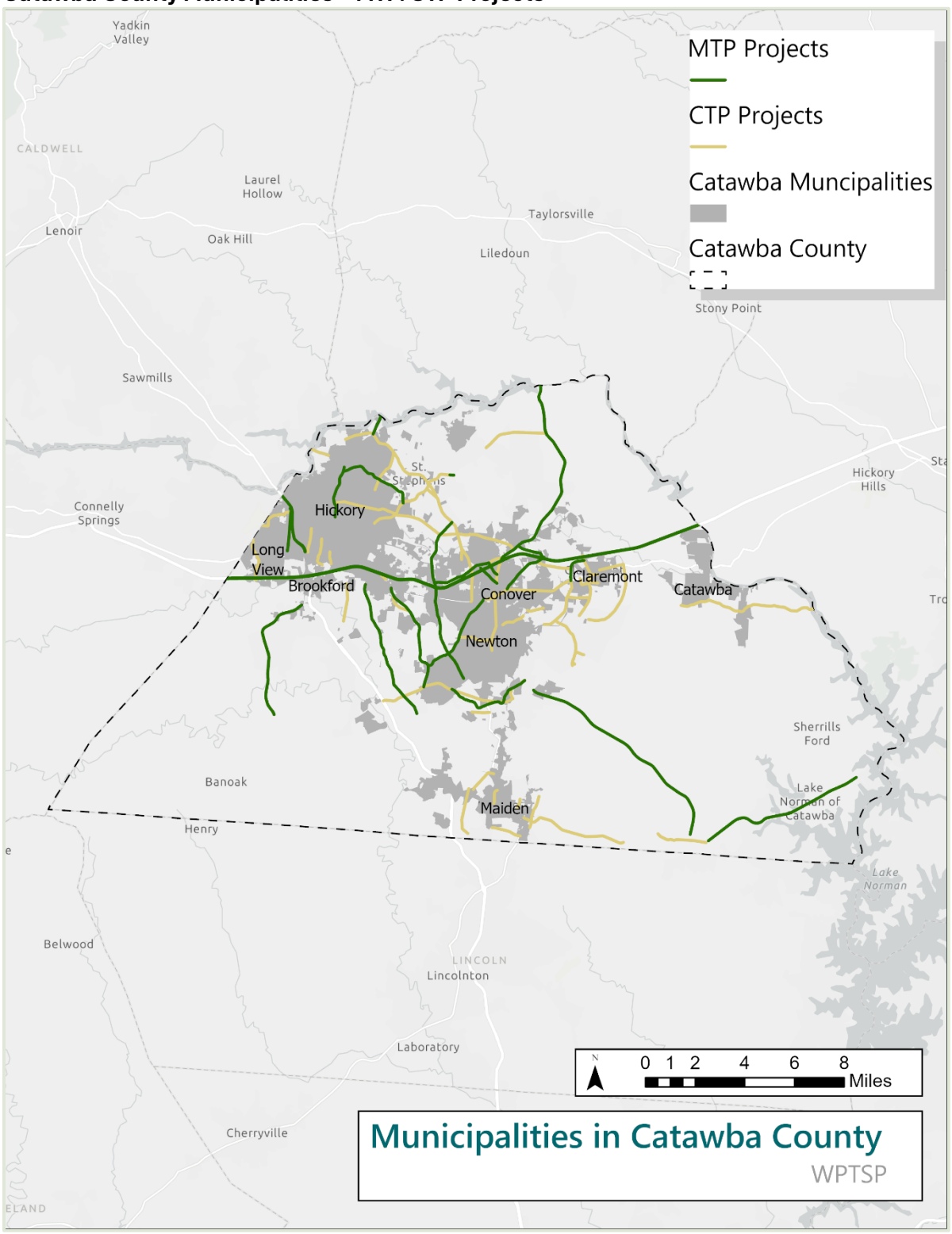
Additional Risks	US 64: Overlapping Risk Craig Mountain Rd/Miller Hill Rd: Overlapping Risk	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Granite Falls	**Description**	**Opportunity**
Locations Priority - Intersections	US 321/Hickory Blvd: Multiple Intersections	RSA Systemic Intersection Improvements
Locations Priority - Routes	US 321/Hickory Blvd S	RSA Speed Study Incorporate Safety Risk into scope
MTP Projects	US 321 S US 321-A/Main St	RSA Incorporate Multimodal Safety Risk and Intersection Improvements into scope
CTP Projects	Falls Avenue Duke St	Incorporate Multimodal Safety Risk and Intersection Improvements into scope
Bike Ped HIN	N Highland Ave Pinewood Rd Duke St	RSA Multimodal Safety and Intersection Improvements
All Mode HIN	US 321-A	RSA Multimodal Safety and Intersection Improvements
Additional Risks	Dry Ponds Rd: Lane Departure Risk Duke St: Lane Departure Risk US 321-A: Multiple Intersection Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements Rail Crossing Safety Improvements
Hudson	**Description**	**Opportunity**
Locations Priority - Intersections	US 321/Hickory Blvd: Multiple Intersections US 321-A/Main St: Multiple Intersections	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Locations Priority - Routes	US 321/Hickory Blvd US 321-A/Main St	RSA Multimodal Safety Improvements
MTP Projects	US 321 S Pleasant Hill Rd	RSA Incorporate Safety Risk into scope
CTP Projects	Pine Mtn Rd	Incorporate Safety Risk into scope Multimodal Safety & Intersection Improvements
Bike Ped HIN	US 321/Hickory Blvd Pine Mtn Rd	RSA Multimodal Safety Improvements
All Mode HIN	-	

Additional Risks	Hudson Cajah Mountain Rd: Pedestrian, Bicycle, Motorcycle, Speed, Lane Departure Risk Cedar Valley Rd: Bicycle, Motorcycle, Speed, Lane Departure Risk Main St/Mt Herman: All Mode Intersection Risk	RSA Speed Study Systemic Intersection Improvements Multimodal Safety Improvements
Sawmills	**Description**	**Opportunity**
Locations Priority - Intersections	US 321/Hickory Blvd: Multiple Intersections Mission Rd: Multiple Intersections	RSA Systemic Intersection Improvements Access Management Multimodal Safety Improvements
Locations Priority - Routes	US 321/Hickory Blvd S Mission Rd Lower Cedar Valley Rd	RSA Speed Study Incorporate Safety Risk into scope
MTP Projects	US 321 S	RSA Incorporate Safety Risk into scope
CTP Projects	NC 127	Incorporate Lane Departure and Motorcycle Risk into scope
Bike Ped HIN	US 321-A	RSA Multimodal Safety and Intersection Improvements
All Mode HIN	US 321 S	RSA
Additional Risks	321-A/Mission Rd: All Mode and Bike Ped Intersection Risk Sawmills School Rd: Overlapping Crash Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Lenoir	**Description**	**Opportunity**
Locations Priority - Intersections	US 321/Wilkesboro Blvd US 321/Pennton Ave NW	Speed Management Multimodal Intersection Improvements Access Management RSA
Locations Priority - Routes	US 321/Hickory Blvd US 64/Wilkesboro Blvd	RSA Speed Management Access Management Multimodal Safety Improvements
MTP Projects	US 64/Wilkesboro Blvd	Access Management Modernization
CTP Projects	Harper Ave Spruce St Hibriten Dr	Access Management Incorporate Multimodal Safety & Intersection Improvements

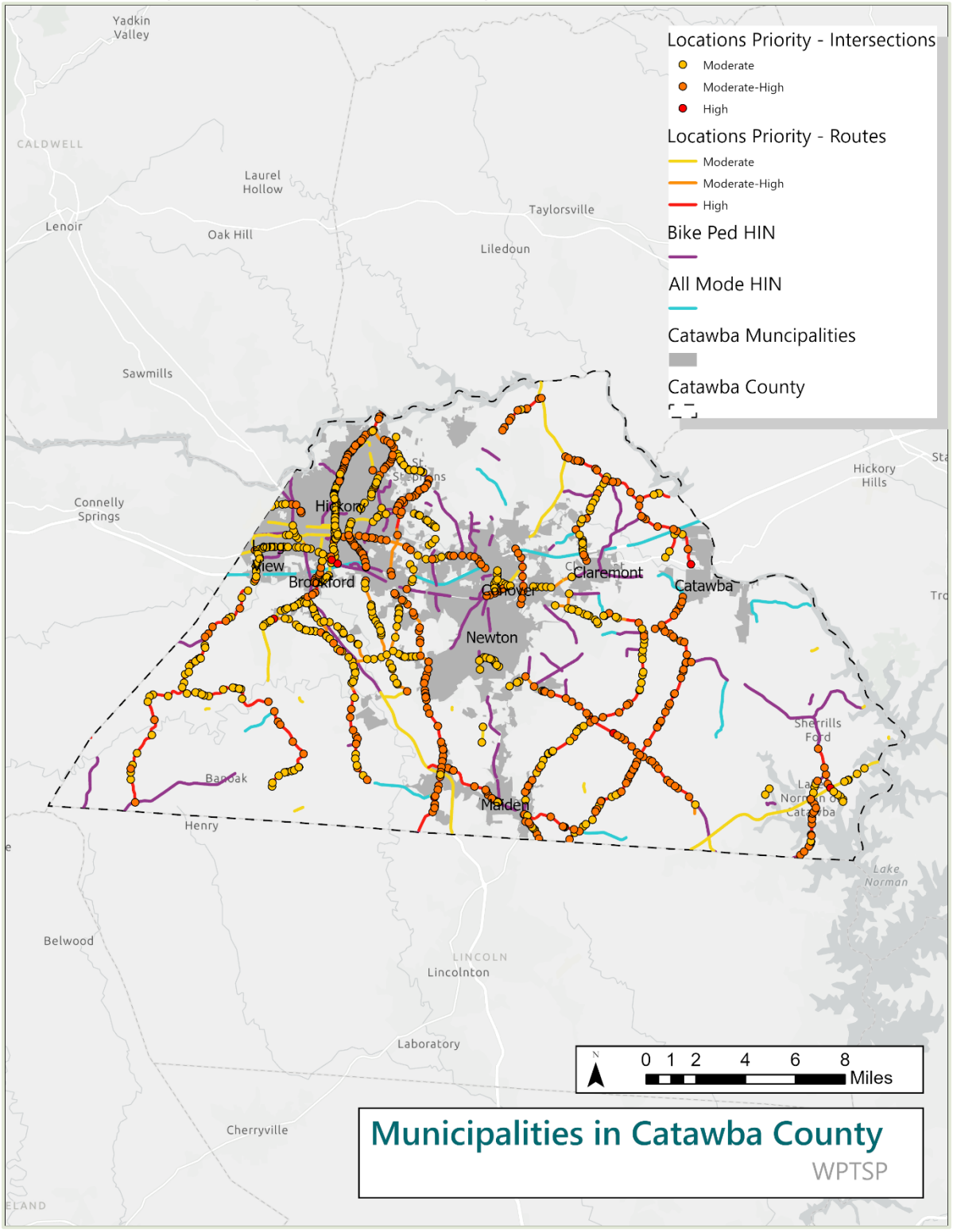
Bike Ped HIN	US 64/Wilkesboro Blvd US 321/Blowing Rock Blvd Broadway St NW	RSA Modernization Multimodal Safety Improvements
All Mode HIN	-	
Additional Risks	Harper Ave NW: Pedestrian, Bicycle, Motorcycle, Speed, Lane Departure Risk Main St NW/Harper Ave, West Ave, Ashe Ave: Bike Ped and All Mode Intersection Risk	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Caldwell County	**Description**	**Opportunity**
Locations Priority - Intersections	US 321: Multiple Intersections Grace Chapel Rd: Multiple Intersections Southwest Blvd: Multiple Intersections	RSA Systemic Intersection Improvements Access Management Multimodal Intersection Improvements
Locations Priority - Routes	US 321 NC 90 Morris Creek Rd	RSA Speed Study Curvature Analysis Modernization Multimodal Safety Improvements
MTP Projects	US 64/NC 90 Dudley Shoals Rd Brown Mountain Beach Rd	RSA Incorporate Multimodal Safety Risk into scope
CTP Projects	NC 268 NC 90 US 321/US 64/NC 18 Connector	Incorporate Multimodal Safety Risk into scope
Bike Ped HIN	Playmore Beach Rd Abington Rd	RSA Modernization
All Mode HIN	Abington Rd NC 268 Brown Mountain Beach Rd	RSA Speed Study Curvature Analysis
Additional Risks	NC 90/Edgemont Rd: Overlapping Risk Zacks Fork Rd: Overlapping Risk Bown Mountain Beach Rd: Overlapping Risk	RSA Systemic Intersection Improvements Multimodal Safety Improvements

Catawba County Location Screening

Catawba County Municipalities + MTP/CTP Projects



Catawba County Municipalities + WPTSP Analysis



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Brookford	**Description**	**Opportunity**
Locations Priority - Intersections	Brookford Blvd/Center St	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Locations Priority - Routes	NC 127/Brookford Blvd Center St	RSA Speed Study Multimodal Safety Improvements
MTP Projects	-	
CTP Projects	-	
Bike Ped HIN	-	
All Mode HIN	-	
Additional Risks	Catawba Valley Blvd: Bicycle Risk	RSA Multimodal Safety Improvements
Catawba	**Description**	**Opportunity**
Locations Priority - Intersections	US 70/NC 10	RSA Multimodal Safety & Intersection Improvements
Locations Priority - Routes	NC 10	RSA Speed Study Multimodal Safety Improvements
MTP Projects	-	
CTP Projects	Hudson Chapel Rd	RSA Incorporate Multimodal Safety Risk into scope
Bike Ped HIN	-	
All Mode HIN	Old Catawba Rd	RSA
Additional Risks	Rosenwald School Dr: Overlapping Risk NC 10/Central Ave: All Mode and Bike Ped Intersection Risk	RSA Systemic Intersection Improvements Multimodal Safety Improvements

Claremont	Description	Opportunity
Locations Priority - Intersections	N Oxford St: Multiple Intersections	RSA Systemic Intersection Improvements
Locations Priority - Routes	N Oxford St	RSA Multimodal Safety Improvements
MTP Projects	Centennial Western Claremont L	Incorporate Multimodal Safety Risk and Intersection Improvements into scope
CTP Projects	N Oxford St US 70	Incorporate Multimodal Safety Risk and Intersection Improvements into scope
Bike Ped HIN	US 70 Catawba St N Lookout St	RSA Multimodal Safety and Intersection Improvements Multimodal Safety Improvements
All Mode HIN	-	
Additional Risks	Centennial Blvd: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Conover	**Description**	**Opportunity**
Locations Priority - Intersections	US 70/Conover Blvd: Multiple Intersections 1st Ave S: Multiple Intersections US 70A: Multiple Intersections	RSA Systemic Intersection Improvements Multimodal Safety Improvements Rail Crossing Safety Improvements
Locations Priority - Routes	US 70/Conover Blvd US70A NC 16	RSA Multimodal Safety Improvements
MTP Projects	1st St W NC 16	RSA Incorporate Safety Risk into scope
CTP Projects	NC 16 US 70 Section House Rd	Incorporate Safety Risk into scope Multimodal Safety & Intersection Improvements
Bike Ped HIN	Section House Rd Herman Sipe Rd NW 8th Ave SW	RSA Multimodal Safety Improvements
All Mode HIN	-	
Additional Risks	17th Street Pl SW: Overlapping Risks Thornburg Dr NE: Overlapping Risks	RSA Speed Study Systemic Intersection Improvements Multimodal Safety Improvements

Hickory	Description	Opportunity
Locations Priority - Intersections	US 70/S Center St N Center St/23rd Ave NE & 25th Ave NW 8th St NE/Highland Ave NE & 13th Ave NE	RSA Systemic Intersection Improvements Geometric Configuration Multimodal Safety Improvements
Locations Priority - Routes	N Center St Springs Rd NE McDonald Pkwy	RSA Speed Study Road Diet Multimodal Safety Improvements
MTP Projects	US 321 S NC 127/Center St 17th St NW	RSA Access Management Incorporate Safety Risk into scope
CTP Projects	Springs Rd NE Center St NC 127/Center St	RSA Corridor Study Incorporate Safety Risk and Intersection Improvements into scope
Bike Ped HIN	16th St NE US 70 Lenoir Rhyne Blvd SE	RSA Multimodal Safety and Intersection Improvements
All Mode HIN	-	
Additional Risks	Tate Blvd SE: Overlapping Risks NC 127/2nd St NE: Multiple Intersection Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Long View	**Description**	**Opportunity**
Locations Priority - Intersections	US 70: Multiple Intersections 33rd St SW: Multiple Intersections Old Shelby Rd: Multiple Intersections	RSA Multimodal Intersection Improvements Access Management Interchange Safety Improvements
Locations Priority - Routes	33rd St SW US 70 1st Ave SW	RSA Speed Management Access Management Multimodal Safety Improvements
MTP Projects	-	
CTP Projects	33rd St SW	Incorporate Multimodal Safety & Intersection Improvements into scope
Bike Ped HIN	US 70 Main Ave NW 13th Ave SW/19th Ave SW	RSA Modernization Multimodal Safety Improvements
All Mode HIN	-	

Additional Risks	1st Ave SW: Overlapping Risks 2nd Ave NW: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Maiden	**Description**	**Opportunity**
Locations Priority - Intersections	Main St: Multiple Intersections Startown Rd/W Maiden Rs & US 321 Island Ford Rd/Bost Nursery Rd & E Main St	RSA Speed Management Systemic Intersection Improvements Interchange Safety Improvements
Locations Priority - Routes	Startown Rd W Main St Providence Mill Rd	RSA Access Management Multimodal Safety Improvements
MTP Projects	-	
CTP Projects	E Maiden Rd S C Ave Western Loop	Incorporate Multimodal Safety & Intersection Improvements in scope
Bike Ped HIN	Providence Mill Rd E Main St/US 321-BUS	RSA Modernization Multimodal Safety Improvements
All Mode HIN	-US 321	RSA Multimodal Safety Improvements
Additional Risks	US 321: Overlapping Risks Main St/Main Ave All Mode Intersection Risk W Main St/W Waiden Rd: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Newton	**Description**	**Opportunity**
Locations Priority - Intersections	US 70: Multiple Intersections D St: Multiple Intersections	RSA Speed Management Access Management Systemic Intersection Improvements
Locations Priority - Routes	Startown Rd NC 10/D St E.P. St Extension	RSA Speed Management Access Management Multimodal Safety Improvements
MTP Projects	Startown Rd Newton Conover Loop Conover Startown Rd Extension	Access Management Speed Management Incorporate Multimodal Safety & Intersection Improvements into scope
CTP Projects	NC 16-BUS 20th St NC 10 and South Bypass	RSA Incorporate Multimodal Safety & Intersection Improvements into scope

Bike Ped HIN	US 321 Old Conover Startown Rd N Ashe Ave	RSA Modernization Multimodal Safety Improvements
All Mode HIN	-	
Additional Risks	S Caldwell Ave/NC 10: All Mode and Bike Ped Intersection Risk US 321: Overlapping Risks US 70: Overlapping Risks	RSA Systemic Intersection Improvements Multimodal Safety Improvements
Catawba County	**Description**	**Opportunity**
Locations Priority - Intersections	NC 16/Balls Creek Rd Sherrills Ford Rd/NC 150 NC 127/Bethel Church Rd	RSA Multimodal Intersection Improvements
Locations Priority - Routes	NC 16 S Old Shelby Rd Buffalo Shoals Rd	RSA Speed Study Curvature Analysis Modernization Multimodal Safety Improvements
MTP Projects	NC 16 S NC 127 S Robinson Rd	RSA Incorporate Multimodal Safety Risk into scope
CTP Projects	Section House Rd Upper Springs Rd Cloninger Mill Rd	Incorporate Multimodal Safety Risk into scope
Bike Ped HIN	NC 16 S Robinson Rd Sherrills Ford Rd	RSA Modernization Multimodal Safety Improvements
All Mode HIN	NC 16 S Robinson Rd Greedy Hwy	RSA Speed Study Curvature Analysis
Additional Risks	NC 10: Overlapping Risk Old Shelby Rd: Lane Departure Risk Oxford School Rd: Overlapping Risk	RSA Systemic Intersection Improvements Multimodal Safety Improvements

Consult the WPTSP Safety Strategies, the WPTSP Countermeasure Guidance Tool, the NCDOT Safety Countermeasures Glossary, and the NCDOT Multimodal Guidance Tool for more information about specific countermeasures and guidance about application and implementation to identify countermeasures and strategies that best fit the safety problem(s) for the identified location.

Project Scoping Guidance Tool

IDENTIFY A LOCATION

This tool should be used to enhance the safety components of any project. Project locations can be identified in many ways. Locations can be intersections (one or multiple), segments (<1 mi), or corridors (>1 mi). Examples of location identification include:

- The Location Priority Matrix in the WPTSP
- Locations along the High Injury Networks (HINs) or High Risk Networks (HRNs) in the WPTSP
- Locations identified in other plans or through other planning processes
- Roadway maintenance programs
- Local priorities (ideally informed by documented goals)

NCDOT identifies safety projects through a variety of screening methods and warrants, and primarily focuses on NCDOT system roads and rural locations. If selecting a location on these routes, coordination with NCDOT TSU is important. Locally owned or maintained roads and roads in cities and developed areas are good priority candidates, as feasible.

When screening for locations, first answer the following:

1. Is the location on a High Injury Network?
    1.1. All Mode HIN: Y/N
    1.2. All Mode High Injury Intersections (HII): Y/N
    1.3. Bike Ped HIN: Y/N
    1.4. Bike Ped HII: Y/N
2. Has the location been reviewed by NCDOT Highway Safety Improvement Program (HSIP) within the past 5 years?
    2.1. If yes, coordinate with NCDOT TSU on implementation strategies
    2.2. NC HSIP Locations Map
3. Does the location have a specific crash history or pattern?
    3.1. Describe patterns/history, if known
    3.2. Describe recent crash history (2023+) not included in the WPTSP

DEFINE THE SAFETY PROBLEM

Use the data and tools produced by the WPTSP to describe a specific safety problem or crash risk at the selected location. When screening for safety problems or crash risk, use the following:

- Crash Type “Likelihood Risk”: Risk of a focus crash type occurring
- Crash “Severity Risk”: Increased crash severity risk, based on speed
- Crash “Exposure Risk: Context”: Risk of increased conflicts between users, based on land use proxy data

When screening for safety problems, answer the following:

4. Is the location identified as high or moderate risk in any of the focus crash types?
   - 4.1. Lane Departure: Y/N
   - 4.2. Speeds: Y/N
   - 4.3. Motorcycle: Y/N
   - 4.4. Pedestrian: Y/N
   - 4.5. Bicycle: Y/N
   - 4.6. All Mode Intersection: Y/N
   - 4.7. Bike Ped Intersection: Y/N
5. Does the location have documented speed data that indicates potential increased crash severity risk?
   - 5.1. If no, but speeds are observed as a safety concern, consider a speed study to increase data-backing
   - 5.2. If yes, are the documented speeds context-sensitive, based on the surrounding land use and development patterns?

SCREEN FOR POTENTIAL COUNTERMEASURES

Countermeasures should be responsive to the types and severity of crashes identified previously. When screening for potential countermeasures, consider the following:

1. Start with as extensive a list as feasible – different countermeasures may address multiple crash types to varying levels.
2. Conduct field review to confirm and describe specific safety problems and identify opportunities or constraints for specific countermeasures
3. Countermeasures may require additional analysis to evaluate impacts to traffic operations, pedestrian or bicycle mobility, feasibility, and costs

Document the following criteria to inform countermeasure screening:

Location Characteristics	Year
HIN Location Type(s)	
HRN Location Type(s)	
Lane or Intersection Configuration	
Traffic Volumes	
Posted Speed	
Speed (85th Percentile)	
Speed (50th Percentile)	
Functional Class	
Pedestrian Facilities	
Bicycle Facilities	

Transit Facilities	
Land Use Context	
Access Management	

Site-Specific Interventions

All project scoping should consult the WPTSP Safety Strategies, the WPTSP Countermeasure Guidance Tool, the NCDOT Safety Countermeasures Glossary, and the NCDOT Multimodal Guidance Tool for more information about specific countermeasures and guidance about application and implementation to identify countermeasures and strategies that best fit the safety problem(s) for the identified location.

Implementation and Monitoring

Safety Targets

Each year, the GHMPO adopts annual safety performance targets, informed by five year rolling averages. In alignment with the WPTSP, the MPO adopted the following targets in 2025.

Performance Measure	2019-2023 5-Year Average	2021-2025 Target 5-Year Average	+/- %
Total Fatalities	1,585.2	1,103.3	-30.40%
Fatality Rate (Per 100 million VMT)	1.353	0.925	-31.63%
Total Serious Injuries	5,236.8	3,204.8	-38.80%
Serious Injury Rate (Per 100 million VMT)	4.467	2.675	-40.12%
Non-Motorized Fatalities and Serious Injuries	712.6	434.6	-39.01%

Performance Measures

The GHMPO has incorporated performance measures in the WPTSP Safety Strategy Action Plan. GHMPO will monitor and track progress on these performance measures, and the crash trends in the region, to create accountability and transparency. To track progress on safety outcomes, GHMPO will monitor the Performance Measures identified above. In future years, GHMPO may consider setting more aggressive performance measures, or adopting additional performance measures. These may include:

- KA Crashes on rural and urban roads
- KA Crashes by route classification
- KA Crashes by roadway ownership
- Non-VMT ways of assessing KA Crash Rates

Annual Report

In addition to tracking performance measures, GHMPO will produce an annual report that details the progress on implementing the WPTSP. This report should include progress on near- and long-term goals. This report can also be a place to celebrate the successes that the region has achieved in delivering new projects, incorporating safety standards, adopting new guidelines. The Technical Safety Subcommittee should guide the development of this report, including identifying the metrics to report annually. Some metrics that might be included in the report include:

- Crash Data
- Events and Outreach

- Public Education Campaigns
- Funding Secured
- Funding Invested
- Completed, Ongoing, or Upcoming Projects
- Before and After project crash outcomes
- Proven Safety Countermeasures implemented
- New or updated plans, guidelines, and resources

Leadership Commitment

By adopting this WPTSP and the Safety Targets identified above, the GHMPO is committed to reducing fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Collaboration and Partnerships

Successful implementation of the WPTSP, and ultimate reduction of crashes on the region's transportation network is a shared responsibility. The Safety Strategy Action Plans identify key partners throughout, but GHMPO, MPO member agencies, NCDOT, and the residents and visitors in the region all have important roles in establishing a culture of transportation safety in the Western Piedmont.

GHMPO: Develop resources, lead and track plan implementation, establish project scoping guidelines for safety, identify and secure project funding, provide technical support to members.

Member Agencies: incorporate safety into local decision-making, review and update local policies with s focus on safety, prioritize safety projects and programs, actively participate in the WPTSP Technical Safety Subcommittee.

NCDOT: Provide funding resources, establish and promote safety project guidance, facilitate the development of safety projects, ensure all project development centers safety, actively participate in the WPTSP Technical Safety Subcommittee.

Residents and Visitors: Embrace a safety culture, practice safe transportation behaviors, support safety projects, collaborate on education efforts.