KITTELSON & ASSOCIATES
272 North Front Street, Suite 410
Wilmington, NC 28401
P 910.475.1789

# TECHNICAL MEMORANDUM

October 24, 2025 Project# 30423

To: Beth King, Assoc. Transportation Planner
Wilmington Urban Area Metropolitan Planning Organization
525 N 4th St
Wilmington, NC 28401

From: Cat Suria; Andrew Ooms, PE, PTOE, RSP; and Zach Bugg, PhD, PE - Kittelson & Associates, Inc.
Jordan Powell, AICP - VHB, Inc.

CC: Carolyn Caggia, Greer Templer, and Abby Lorenzo

RE: WMPO SS4A Safety Action Plan - Existing Conditions and Plan/Policy Review Memorandum

## Introduction

The Wilmington Urban Area Metropolitan Planning Organization (WMPO) is preparing a Safe Streets and Roads for All (SS4A) Safety Action Plan (SAP) to improve roadway safety for all roadway users in the region. The SS4A program is a federal initiative launched by the U.S. Department of Transportation to support efforts to enhance transportation network safety and to eliminate serious injuries and fatalities for all road users, including people walking, using a mobility device, biking, and taking transit. The goal of the WMPO SS4A SAP is to develop a holistic, well-defined multimodal strategy to prevent roadway fatalities and serious injuries in the WMPO region.

The purpose of the WMPO SS4A SAP Existing Conditions Memorandum is to provide context on the current community, transportation infrastructure, safety challenges and opportunities. The following section outlines the seven core components of the WMPO SS4A SAP, of which this document focuses on two: policy review and crash and safety analysis. The sections of this document are organized accordingly:

- What is an SS4A Safety Action Plan?
- WMPO SS4A Safety Action Plan
- Safe Streets for All in North Carolina
- Transportation Plan and Policy Review
- Crash Analysis Findings
- Risk Assessment Findings
- Next Steps

## WHAT IS A SS4A SAFETY ACTION PLAN?

A SS4A SAP is a comprehensive strategy that identifies safety issues and outlines actions to improve roadway safety for all users, including pedestrians, bicyclists, and drivers. It is a data-driven, community-informed plan that identifies where the most severe crashes are happening, why they are happening, and

what can be done to prevent them. The SS4A SAP typically includes crash data analysis to identify trends and high-risk locations, community engagement to understand local concerns, identification of proven safety countermeasures, and a prioritized list of projects or strategies to eliminate serious crashes and fatalities on our transportation network.

The SAP is structured around seven foundational components[1]:

1. **Leadership & Vision:** Local and regional leaders must formally commit to a goal of zero traffic deaths. This is often backed by a resolution or policy and includes a defined timeline or measurable reduction targets.
2. **Organizational Structure:** A designated group, such as a task force or committee, must be established to guide the development and future implementation of the plan.
3. **Public & Stakeholder Engagement:** In this component, meaningful input is gathered from residents, local agencies, and community groups to inform the plan. Outreach spans all jurisdictions and aligns with related planning efforts.
4. **Policy Review:** Existing policies, standards, and design practices are reviewed to identify ways to better prioritize safety, with opportunities for future updates or reforms.
5. **Crash & Safety Analysis:** The plan must be grounded in a review of crash trends and contributing factors, identifying locations and patterns of fatal and serious injury crashes across all travel modes. A High-Injury Network (HIN) map is developed as part of this analysis.
6. **Strategy & Project Identification:** Evidence-based strategies and potential projects are outlined, with priorities and timeframes for implementation. These solutions incorporate Safe System principles and reflect stakeholder input.
7. **Monitoring & Transparency:** The plan includes a process for tracking progress using performance measures along with regular public reporting to ensure accountability and transparency over time. At minimum, annual public and accessible reporting on progress must be provided, in addition to posting the plan online.

Together, these components form the foundation of a proactive and accountable safety framework, one that moves beyond identifying problem locations to fostering a shared commitment to safer streets. By combining data analysis, policy review, and meaningful community input, the SAP establishes the groundwork for a more systematic approach to preventing severe crashes. The next section, **Building with the Safe System Approach (SSA)**, expands on this foundation by introducing the guiding philosophy that underpins the plan and its strategies for achieving zero deaths and serious injuries.

## Building with the Safe System Approach (SSA)

The SAP supports local and regional efforts to adopt the SSA, a nationally recognized framework adopted by the U.S. Department of Transportation to eliminate roadway fatalities and serious injuries. This is a holistic, proactive way of thinking about traffic safety. Instead of blaming individual road users for crashes, it focuses on designing a transportation system that protects everyone, even when people make mistakes.

[1] U.S. Department of Transportation. "Comprehensive Safety Action Plans." https://www.transportation.gov/grants/SS4A/comprehensive-safety-action-plans

The core principles guiding this approach are:

- Safety is non-negotiable: Fatal and serious injuries on the road are unacceptable.
- Human error is expected: The system must accommodate and forgive mistakes.
- People are physically vulnerable: Roadway designs must consider limits to injury tolerance.
- Responsibility is shared: Everyone has a role in improving safety.
- Prevention is key: Risks should be addressed before crashes occur.
- Redundancy matters: If one safety layer fails, others must protect users.

To implement these principles, the approach focuses on five key elements:

1. Safer People – Promoting responsible road use and safe behaviors.
2. Safer Roads – Designing roads that reduce crash likelihood and severity.
3. Safer Vehicles – Advancing technologies that help avoid or withstand crashes.
4. Safer Speeds – Ensuring speed limits and road design match safety goals.
5. Post-Crash Care – Supporting rapid emergency response and crash survivability[2].

This framework shapes both the data analysis and strategies of the WMPO SS4A SAP, aiming toward the goal of zero roadway deaths and serious injuries in the WMPO region.

# WMPO SS4A SAFETY ACTION PLAN

Federal law requires Metropolitan Planning Organizations (MPOs) in all urbanized areas with populations over 50,000 to serve as the primary forum for local governments to work together on transportation priorities and funding decisions. In Wilmington, the WMPO is the federally designated MPO responsible for coordinating regional transportation planning in a continuing, cooperative, and comprehensive manner as prescribed by the federal government. As the eligible applicant, the WMPO was awarded funding through the U.S. Department of Transportation's SS4A Grant Program to develop a SAP. While the WMPO leads the effort, various regional stakeholders will be involved in the planning process.

The WMPO's planning area covers approximately 494 square miles, encompassing all of New Hanover County and portions of Brunswick and Pender counties. Member jurisdictions include New Hanover, Brunswick, and Pender counties; the City of Wilmington; and the Towns of Wrightsville Beach, Carolina Beach, Kure Beach, Belville, Leland, and Navassa. The WMPO Board is composed of representatives from each member jurisdiction, as well as from the Cape Fear Public Transportation Authority (Wave Transit) and the North Carolina Board of Transportation.

## Vision and Goals

A clear vision and a set of supporting goals establish the foundation for any SAP. The vision represents the community's long-term aspiration for safety, it defines where we want to be and provides a unifying direction for all future actions. The goals translate that vision into what we need to accomplish to make it a reality, outlining specific focus areas that guide strategies, investments, and performance tracking.

[2] U.S. Department of Transportation. "What Is a Safe System Approach?" https://www.transportation.gov/NRSS/SafeSystem

The Vision and Goals for the WMPO SAP were developed collaboratively through an interactive exercise at the first Steering Committee meeting. Committee members, representing WMPO staff, local jurisdictions, law enforcement, schools, and regional organizations, were asked to identify key values, priorities, and desired outcomes for the region's safety future. Participants developed a draft vision statement and discussed potential goal areas such as awareness, collaboration, infrastructure design, innovation, and policy support. Their feedback was consolidated and refined by the project team into the final Vision and Goals that guide this SAP, seen in Figure 1 and Figure 2 respectively.

> ***"Our region will eliminate fatal and serious injury crashes by 2050 through a collaborative, comprehensive, and evidence-based approach to ensure all people, regardless of mode or ability, can move freely and safely."***

**Figure 1. WMPO SS4A Safety Action Plan Vision**

A foundational element of the SAP process is leadership commitment, which is a shared pledge from local and regional leaders to prioritize roadway safety and pursue a long-term goal of eliminating fatal and serious injury crashes. The WMPO SS4A Steering Committee has demonstrated this commitment by guiding the development of the plan's vision, goals, and strategies. Composed of representatives from member jurisdictions and partner agencies, the committee provides the leadership and coordination necessary to advance a unified regional approach to safety. This commitment ensures accountability and reinforces the community's collective effort to move toward a transportation system where all users can travel safely.


**Figure 2: WMPO SS4A Safety Action Plan Goals**

# SAFE STREETS FOR ALL IN NORTH CAROLINA

The SSA has proven successful in improving roadway safety across the globe, with countries like Sweden and the Netherlands leading the way in reducing traffic fatalities through system-wide changes. In the United States, this methodology has gained significant traction in recent years, with cities such as New York City and San Francisco demonstrating early success by implementing data-driven strategies that prioritize human safety. Building on this momentum, communities across North Carolina are increasingly adopting Safe System principles as part of their roadway safety effort, embedding them into strategic plans, infrastructure investments, and community-based programs. Below are a few cases of these ongoing efforts throughout the state:

Local Examples:

- Durham: Adopted Vision Zero in 2024, aiming for a 50% crash reduction by 2035. Strategies emphasize safer street design and speed management[3].
- Greensboro: Developed a Vision Zero Action Plan in 2019; has since secured three SS4A grants to advance safety infrastructure[4].
- Belmont: Passed a Vision Zero resolution in 2023 and finalized an action plan in 2024. Currently implementing treatments on high-injury corridors[5].
- Other cities including Chapel Hill, Brevard, Boiling Springs, and Apex have either passed resolutions or begun planning efforts[6].
- Town of Cary: Deployed smart traffic systems that improve emergency response and pedestrian safety, representing Safe System-aligned innovation[7].
- NC Friendly Driver Program: Promotes safer behaviors around pedestrians and cyclists, aligning with the "Safer People" principle of the SSA[8].
- Vision Zero Community Collaborative: Coordinated by the Governor's Highway Safety Program, this collaborative supports over 25 localities in launching or strengthening Vision Zero efforts. This collaborative provides training, data tools, and peer exchange platforms aligned with Safe System principles[9].

As the SSA continues to increasingly become the standard methodology for safety improvements, many communities throughout North Carolina join various states and cities in making a commitment to reducing fatalities and serious injuries to zero. This "Vision Zero" represents a profound shift in safety culture, declaring that even one death or serious injury is unacceptable. Figure 3 shows the communities

[3] City of Durham, NC. "Vision Zero | Durham, NC." https://www.durhamnc.gov/4347/Vision-Zero

[4] City of Greensboro, NC. "Greensboro Receives Grant to Expand Vision Zero Program." https://www.greensboro-nc.gov/Home/Components/News/News/17811

[5] Town of Belmont, NC. Vision Zero Traffic Safety Action Plan, October 2024. https://belmontnc.gov/DocumentCenter/View/2851/Vision-Zero-Belmont-Traffic-Safety-Action-Plan_October-2024_w-Resolution

[6] NC Vision Zero. "Vision Zero Communities." https://ncvisionzero.org/visionzero-communities

[7] Town of Cary. "Cary Begins North Carolina's First Town-Wide Connected Vehicle Deployment." https://www.townofcary.org/Home/Components/News/News/16026

[8] U.S. Department of Transportation. "Safe System in Action: North Carolina's Approach." https://www.transportation.gov/NRSS/SafeSystem/North-Carolina

[9] Governors Highway Safety Association. "Recorded Webinar - Lifting Up a Safe System Approach in State Highway Safety Offices: North Carolina's Vision Zero Community Collaborative." https://www.ghsa.org/events/2022/NC-VZ-Webinar

currently committed to reducing roadway fatalities to zero across North Carolina, visualizing the spread of the adoption of the SSA[10].

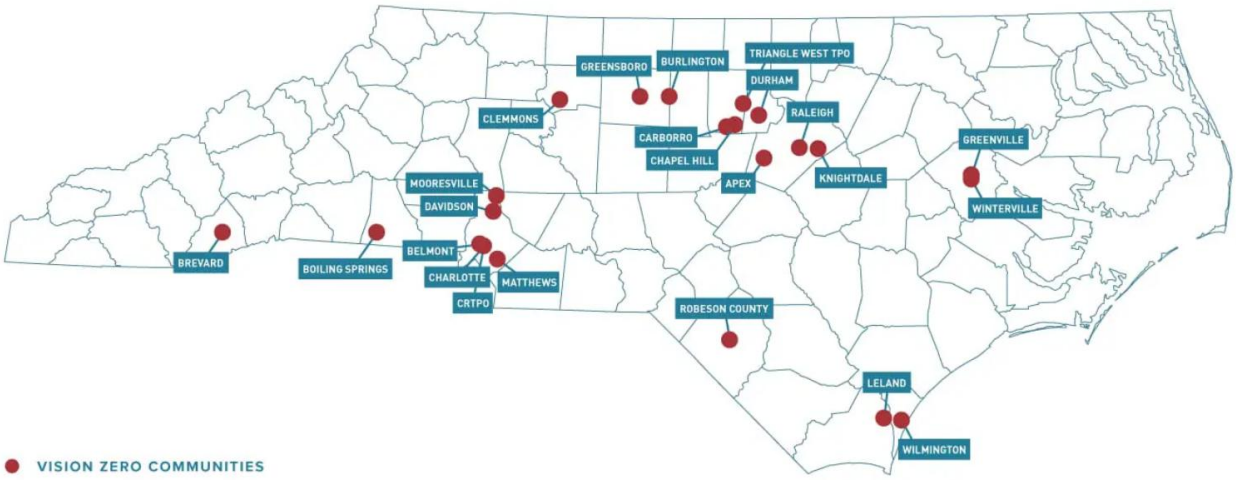



**Figure 3: 2025 Vision Zero Communities in North Carolina**

Together, these statewide Vision Zero efforts and SS4A grants illustrate the framework and momentum driving roadway safety efforts in North Carolina. With that context established, the following section reviews how existing regional and local transportation plans align with, and advance, this safety agenda through policies, infrastructure, and data-driven strategies.

[10] NC Vision Zero Initiative. "About Us: Communities." NC Vision Zero, https://ncvisionzero.org/about-us/communities/#:~:text=In%20September%202017%2C%20Durham%20joined%2C%20sidewalks%2C%20and%20bicycle%20facilities.

# Transportation Plans and Policy Review

The project team conducted a comprehensive review of existing transportation plans across the WMPO region to understand the policies, strategies, and projects already guiding local and regional decision-making. This review ensures that the SAP builds upon, rather than duplicates, ongoing planning efforts and aligns with established transportation, land use, and safety priorities. By identifying common themes, safety objectives, and gaps among existing plans, the project team can integrate relevant strategies and coordinate recommendations to support a unified regional approach to improving roadway safety. Several of the plans reviewed as part of this Policy Review were developed with input from the public through surveys, workshops, or stakeholder meetings. Where applicable, this section highlights how community feedback informed the development of plan goals and recommendations.

## CAPE FEAR NAVIGATING CHANGE 2050

*Adoption Year: 2025*

Cape Fear Navigating Change 2050 is the WMPO's forthcoming Metropolitan Transportation Plan (MTP), intended to succeed the current plan expiring in November 2025. MTPs are federally required plans that direct how local, state, and federal transportation funds are spent in the region. This MTP establishes a 25-year strategy, guiding transportation priorities and investments in the greater Wilmington area. Public outreach included an open comment period from May 28 to June 27, 2025, and various engagement events to collect regional input on the draft plan's vision and investment priorities, before entering the finalization stage[11]. The draft outlines a vision, as well as lists goals under five themes:

- Safe
- Fair
- Connected
- Resilient
- Proactive

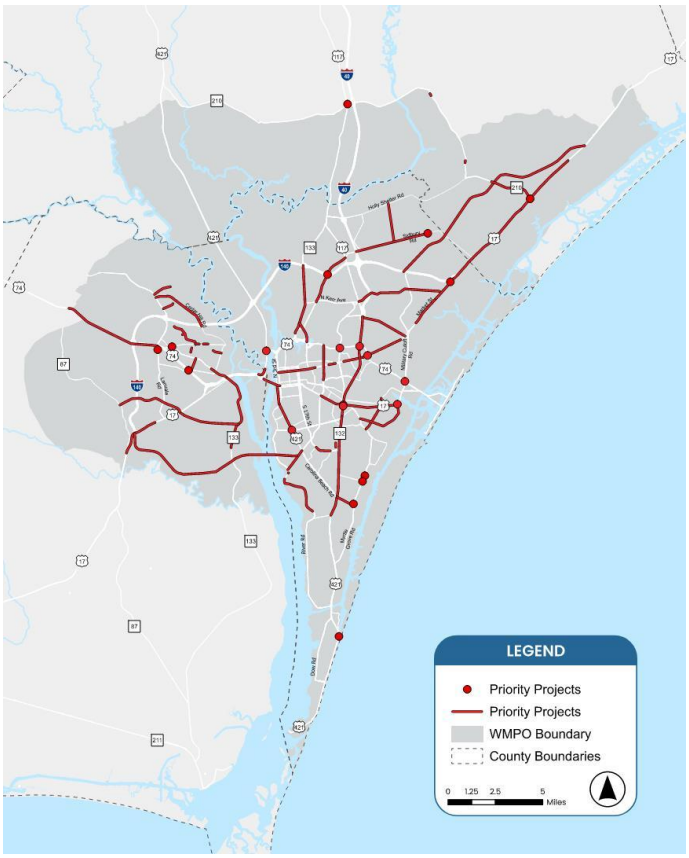



**Figure 4: Roadway Projects, Cape Fear Navigating Change 2050**

Specific objectives are provided for different transportation modes, including aviation; active transportation such as walking, bicycling, using e-scooters, or traveling by wheelchair; public

[11] Wilmington Urban Area Metropolitan Planning Organization. "Cape Fear Navigating Change 2050." Wilmington MPO, May–June 2025, https://www.wmpo.org/2050mtp-public-comment/

transportation; ferry and water transportation; rail; and roadway. The draft also identifies objectives related to Transportation Demand Management (TDM). Together, these objectives establish a comprehensive multimodal framework that supports the WMPO SAP. The MTP's vision and goals directly inform regional safety priorities and guide the development of targeted countermeasures and recommendations within the SAP. Priority projects identified through the MTP process complement the existing conditions analysis and help shape future safety investments across the WMPO region. Figure 4 shows the roadway projects identified during MTP development and the public comment period[12].

## GO COAST TRANSPORTATION DEMAND MANAGEMENT IMPLEMENTATION PLAN

*Adoption Year: 2025*

The Go Coast program is the WMPO's regional TDM initiative, designed to reduce single-occupancy vehicle trips by promoting alternative travel options such as carpooling, public transit, biking, walking, and telecommuting. The Go Coast 2026–2030 Implementation Plan, included in the appendices of the MTP, outlines specific TDM action items organized under the five themes established in the MTP. These actions aim to support more efficient use of the existing transportation network while reducing congestion and emissions. Specific goals, objectives, and performance measures are detailed under each theme. The goals provided in the Go Coast Plan include the following:

- Safe
  - Bolster education and outreach for safe bicycling and walking to all road users.
  - Develop tools for education and awareness surrounding safety for motorized forms of alternative transportation, i.e. carpooling, vanpooling, and public transportation.
- Fair
  - Conduct employer outreach in all areas to a broad range of employer sizes and industries.
- Connected
  - Pursue opportunities to increase carpooling and facilitate carpool ride-matching.
  - Coordinate with Wave Transit on outreach to increase familiarity with public transportation.
  - Investigate opportunities for Park and Ride lots within WMPO boundaries.
- Resilient
  - Foster a regional culture where alternative transportation usage is legitimized and embraced.
- Proactive
  - Increase marketing and outreach to improve awareness and understanding of alternative transportation options to audiences including area employers, neighborhoods, schools, and others.
  - Identify opportunities to facilitate commuter incentives at the employer level.

The update process began in summer 2024 with a developed public participation plan and initial employer/commuter outreach to inform the plan's goals and implementation strategies. An

[12] Wilmington Urban Area MPO, Cape Fear Moving Forward 2050 (Metropolitan Transportation Plan – Chapter 5), May 2025, https://www.wmpo.org/wp-content/uploads/2025/05/Chapter-5.pdf

implementation timeline for each goal and objective is also provided[13]. With the goal of promoting mode shift and improving access to safe, sustainable travel options, the Go Coast Plan directly supports the SAP's goals of reducing crash risk, enhancing multimodal connectivity, and fostering a culture of safety throughout the region.

## CAROLINA BEACH BICYCLE AND PEDESTRIAN PLAN

*Adoption Year: 2025*

The Carolina Beach Bicycle and Pedestrian Plan aims to enhance the town's livability by creating a walkable and bikeable environment for residents and visitors. It emphasizes safety, accessibility, and active living, while prioritizing public involvement to identify barriers and opportunities for connecting community destinations. A recommendation map from the document is in Figure 5[14].


**Figure 5: Project Recommendations Map from Carolina Beach Bicycle and Pedestrian Plan**

The plan explicitly connects to safety by recommending infrastructure improvements such as adding Rectangular Rapid Flashing Beacons (RRFBs) at high traffic locations, enhancing markings and signage at

[13] Go Coast Transportation Demand Management (TDM) Implementation Plan (2026–2030). Wilmington MPO, 2024–2025, https://www.gocoastnc.org/go-coast-fy25-quarter-1-report/

[14] Carolina Beach, Carolina Beach Bicycle and Pedestrian Plan, April 2025, https://www.wmpo.org/wp-content/uploads/2025/04/Carolina-Beach-Bicycle-Pedestrian-Plan_April2025_Final_Plan_with_Appendix-1.pdf

priority crossings, and installing crosswalks on all intersection legs in downtown areas. These measures are intended to strengthen pedestrian connectivity and safety and serve as practical benchmarks for building a stronger culture of safety across the WMPO region. Development of the plan was informed by community input collected through an online survey and interactive comment map, which identified key safety concerns and opportunities for multimodal improvements. In addition to infrastructure recommendations, the plan highlights education and enforcement strategies to promote safer cycling and walking behaviors, though these strategies are discussed less comprehensively. Collectively, these actions support the strategic objectives of the WMPO SAP by advancing pedestrian and bicyclist safety throughout the region.

## LELAND INTEGRATED MOBILITY PLAN

*Adoption Year: 2025*

The Leland Integrated Mobility Plan (IMP) establishes the prioritization process for local transportation conditions analysis but also provide guideposts for roadway and multimodal safety improvements. The project team identified 150 different projects of High and Medium Priority in the Town of Leland, just west of Wilmington, using a scoring method based on 13 unique criteria under 6 categories:

- Safety
- Fairness
- Multimodal Comfort
- Connectivity
- Roadway and Congestion Improvement
- Environmental Resiliency

Project types include crosswalks, intersections sidewalks, multi-use paths, and roadway improvements. The IMP also provides additional recommendations for mobility in Leland. For instance, the project team proposes that the functional street design of Leland's horizontal cross sections is enhanced to improve safety and comfort.

This plan prioritizes projects that enhance roadway safety and improve connectivity and access for multimodal users, aligning with the Safe Roads principle of the SSA. The plan was developed through a collaborative process that included public outreach, such as open houses held in October 2024 to gather resident feedback on transportation priorities, safety needs, and desired multimodal connections[15]. This community input helped shape the project scoring and prioritization process, ensuring that the resulting recommendations reflect local values and needs. Collectively, these priorities provide valuable input to the SAP by identifying local projects that can advance regional safety goals and guide future investment decisions across the WMPO area.

[15] Town of Leland, Leland Integrated Mobility Plan, 2025, https://www.townofleland.com/sites/default/files/uploads/Planning%20and%20Inspections/IMP/leland-integrated-mobility-plan-with-appendices-2025.pdf

# LELAND SAFE STREETS FOR ALL SAFETY ACTION PLAN

*Adoption Year: 2025*

The Leland SS4A SAP identifies a pedestrian, bicyclist, and vehicular HIN and recommends safety countermeasures. The SS4A-compliant SAP establishes a vision, several safety goals for the town and identifies actionable steps to meet these markers, outlining priority projects and funding options for implementation. Public outreach for this plan included an online survey, interactive comment map and a workshop open house that took place on July 15 to collect resident feedback on perceived unsafe locations and preferred safety improvements[16].

This SAP uses the SSA as a framework for recommending safety measures in the Town of Leland. It addresses four SSA elements through recommendations and project priorities. Examples of recommendations under each Safe System element include:

- *Safe People*: Efforts to promote safer behavior include launching education campaigns for all road users and fostering a stronger public sense of responsibility when it comes to roadway safety.
- *Safe Roads*: To create safer infrastructure, the plan calls for updated roadway cross-sections and improved project development practices that incorporate safety considerations from the start.
- *Safe Speeds:* Multiple strategies aim to manage and reduce vehicle speeds, such as lowering posted speed limits, applying targeted enforcement, and encouraging speed management training. Additionally, a traffic calming toolbox will be developed and promoted to support local implementation.
- *Post-Crash Care:* The plan emphasizes coordination with emergency medical services (EMS), particularly for speed-related projects, to improve outcomes following serious crashes.

The Town of Leland is within the WMPO region, and its SAP will be critical to the development of regional safety initiatives. Using Leland as a guide for transportation safety work in the region, the project team can draft recommendations that align with local goals and priorities. Furthermore, the priority projects outlined in the Leland SS4A SAP will be important to consider when evaluating current and future conditions in the region.

# NCDOT STATE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

*Adoption Year: 2025*

The STIP, managed by NCDOT, is a 10-year State and Federally mandated transportation plan that identifies construction funding and project timelines for transportation projects across the state. NCDOT updates the STIP approximately every two years to ensure that projects remain aligned with available funding and evolving statewide priorities. The Strategic Prioritization Process, overseen by NCDOT's Strategic Prioritization Office of Transportation (SPOT), provides a data-driven framework for evaluating

[16] Town of Leland. Leland Safe Streets and Roads for All Safety Action Plan, June 26 2024. https://www.townofleland.com/news/town-leland-launches-safe-streets-and-roads-all-action-plan-public-engagement-opportunities

and ranking transportation projects. This process, commonly referred to as Prioritization X.0, scores projects based on safety, congestion reduction, benefit-cost ratio, and consistency with local and regional priorities. The current cycle to update the STIP for the years 2028–2037 is known as Prioritization 8.0, P8.0. It began in summer 2025, when NCDOT divisions and local planning organizations gathered public input on proposed projects for evaluation and scoring. The final STIP was adopted by the NCDOT Board of Transportation in July 2025, with subsequent adoption by the WMPO in August 2025.[17].

Table 1 lists 2026-2035 STIP projects under construction within the WMPO jurisdiction. These projects demonstrate the range and scope of STIP projects. The project team will consider these existing and planned projects while studying the existing roadway and safety conditions in the WMPO. Many of the projects in the STIP directly address road safety issues and contribute to the state's adoption of SSA principles.

**Table 1. 2026-2035 Adopted STIP projects under construction in WMPO jurisdiction.**

| PROJECT ID | ROUTE/CITY | LOCATION DESCRIPTION | *DESCRIPTION OF WORK* |
|---|---|---|---|
| AV-5801 | ILM | Wilmington International Airport | *Expand air carrier apron.* |
| EB-6026 | Belville Elementary Multi-Use Path | Along NC 133 connecting north and south entrances of Hawkeswater development to Belville Elementary School in Belville | Completed: *Construct multi-use path.* |
| EB-6025 | Rice Hope Multi-Use Path | Along NC 133 from Morecamble Boulevard to Rice Hope Run in Belville | Completed: *Construct multi-use path.* |
| EB-6028 | US 17 Business (Market Street) | 21st Street in Wilmington | Completed: *Construct signalized pedestrian crossing.* |
| I-6036 | I-140 | US 17 to north of US 74. | *Rehabilitate pavement.* |
| U-5914 | NC 133 | US 17 / US 74 / US 76 to SR 1554 (Old River Road). | Completed: *Modernize roadway.* |
| U-5534C | Greenville Avenue | SR 1411 (Wrightsville Avenue) to Hinton Avenue in Wilmington | *Realign intersection and construct bike lanes and sidewalk along Greenville Ave.* |
| U-5534H | Hinton Avenue | Park Avenue to Greenville Avenue in Wilmington. | *Construct a 10-foot multi-use path.* |
| U-5534G | Hooker Road | SR 1411 (Wrightsville Avenue) to Mallard Drive / Rose Avenue intersection in Wilmington. | *Construct a 10-foot multi-use path.* |
| HS-2003AP | SR 1302 (23rd Street) | SR 1301 (Princess Place Drive) intersection in Wilmington. | *Upgrade traffic signals and install pedestrian signals.* |
| HS-2003U | SR 2048 (Gordon Road) | West of I-40. | *Install pavement markings.* |
| HS-2003K | US 74 | SR 1627 (3rd Street / Martin Luther King, Jr. Boulevard) westbound on-ramp in Wilmington. | *Revise traffic signal.* |
| W-5803A | US 74 (Eastwood Road) | US 17 (Military Cutoff Road) and Cavalier Drive intersections in Wilmington. | *Upgrade pedestrian signals.* |

[17] North Carolina Department of Transportation. State Transportation Improvement Program (STIP) Development, July 21 2025. https://www.ncdot.gov/initiatives-policies/Transportation/stip/development/Pages/public-input.aspx

| PROJECT ID | ROUTE/CITY | LOCATION DESCRIPTION | *DESCRIPTION OF WORK* |
|---|---|---|---|
| U-4751A | Lendire Road | West of US 17 Business (Market Street) to US 17 Business (Market Street) / SR 1403 (Middle Sound Loop Road). | *Realign roadway.* |
| U-5710A | New Location | SR 1409 (Military Cutoff Road) at Drysdale Drive to US 74 (Eastwood Road). | *Construct roadway in a new location.* |
| U-4751 | SR 1409 (Military Cutoff Road Extension) | SR 1409 (Military Cutoff Road) to US 17 (Market Street) in Wilmington. | *Construct roadway in a new location.* |
| U-6202 | SR 2048 (Gordon Road) | US 17 Business (Market Street) to I-40. | *Widen to four lanes.* |
| U-4902D | US 17 Business (Market Street) | SR 1403 (Middle Sound Loop Road) to SR 2290 (Mendenhall Drive) / SR 2734 (Marsh Oaks Drive). | *Construct access management improvements.* |
| I-6039 | I-40 | End I-40 (mile marker 420) to NC 210 (mile marker 408). | *Rehabilitate pavement.* |
| HS-2403D | SR 1336 (Sidbury Road) | SR 1318 (Blue Clay Road) to US 17 North of Wilmington | *Install centerline and shoulder sinusoidal rumble stripes with bicycle pattern.* |
| R-3300B | US 17 | NC 210 to US 17 north of Hampstead. | *Construct freeway on new location.* |
| P-5740A | CSX SE Line | Wilmington. | *Rehabilitate ties and curves, realign curve, upgrade bridges.* |

# WILMINGTON DOWNTOWN TRAIL PHASES 2 AND 3 FEASIBILITY STUDY

*Adoption Year: 2025*

In partnership with the NCDOT Integrated Mobility Division (IMD), the WMPO conducted and adopted a feasibility study for the second and third phases of its downtown trail project. The study intends to identify a preferred trail alignment and alternative design for these phases. The Wilmington Downtown Trail would connect the Northside neighborhood with Forest Hills through downtown Wilmington via a separate, multi-use path. The feasibility study highlights the physical, economic, and social constraints and opportunities of the project.

By separating vulnerable road users (VRUs), such as pedestrians, wheelchair users and other non-motorized travelers, from traffic and providing safe routes throughout the downtown Wilmington area, the Downtown Trail fulfills the Safe Roads pillar of the SSA. The project can also build a culture of active transportation and promote safe walking and bicycling.

This project is an important factor of the WMPO SAP, especially for pedestrian and bicyclist safety. While the trail would enhance connectivity and access for a variety of modes, it also presents unique safety challenges. The project team identified several potential safety concerns such as a railroad bridge crossing and several road crossings including a key downtown boulevard, Market Street. Public engagement conducted as part of the feasibility study also provided valuable insight into community priorities,

including trail usage, crossing comfort, safety, and accessibility. This feedback helped inform the project's design considerations and supports the SAP's goal of creating safer, more connected multimodal corridors across the region[18].

## WILMINGTON GREATER DOWNTOWN PLAN

*Expected Adoption Year: 2026*

The Wilmington Greater Downtown Plan will be a Small Area Plan focused on providing recommendations and strategies to address concerns specific to the downtown-centered study area. The plan will complement the existing Create Wilmington Comprehensive Plan and identify actionable steps to address growth and resident priorities. Public engagement for the plan occurred in two phases and included pop-up events, open houses, focus groups, and online surveys, gathering input from more than 5,100 residents on topics such as mobility, local character, the economy, and small business. With both phases of public engagement complete, the plan is nearing finalization. Four strategy themes have been identified: Local Character, Economy, Small Business, and Mobility. A draft of the plan with action items and strategies is expected to be shared for City Council approval in 2026[19].

The plan supports the Safe Roads and Safe People components of the SSA by recommending strategies that improve roadway safety and encourage safe behavior among all road users. These recommendations include intersection redesigns, Complete Streets improvements, and pedestrian-oriented infrastructure that enhance connectivity and comfort across downtown Wilmington. Through these actions, the plan reinforces Safe System principles by addressing both roadway design and user behavior to reduce crash risk in high-activity areas.

## GULLAH GEECHEE HERITAGE TRAIL FEASIBILITY STUDY

*Adoption Year: 2024*

The WMPO partnered with NCDOT IMD to conduct a feasibility study for the Gullah Geechee Heritage Trail in Brunswick County. The Gullah Geechee Heritage Corridor is a nationally designated heritage area dedicated to preserving Gullah Geechee history and culture along the East Coast from Jacksonville, NC to Jacksonville, FL. The local study identified a recommended trail alignment through Wilmington, NC by exploring existing social, environmental, and transportation safety conditions. Public engagement for the study included two rounds of outreach in Fall 2023 and Spring 2024, featuring open houses, pop-up events, and online surveys to gather feedback from residents, particularly those in Navassa, Leland, Belville, and unincorporated Brunswick County, on preferred trail routes and amenities. The proposed trail alignment, an example of which is shown in Figure 6, would connect Brunswick Nature Park south of

[18] Wilmington Urban Area Metropolitan Planning Organization. Wilmington Downtown Trail Phases 2 and 3 Feasibility Study., 2024, https://www.wmpo.org/wilmington-downtown-trail-phases-2-and-3-feasibility-study

[19] City of Wilmington. Greater Downtown Plan. 2024–2025, https://www.wilmingtonnc.gov/Development-Business/Plans-and-Initiatives/Greater-Downtown-Plan

Belville to Phoenix Park north of Navassa via separate, multi-use facilities. The project is proposed to be completed in several phases, beginning with highly feasible and popular segments[20].

The Gullah Geechee Heritage Trail Feasibility Study addresses the Safe Roads pillar of the SSA by recommending separated mobility options for active transportation and proactively addressing roadway safety issues. This project would significantly contribute to mobility and recreation in the WMPO region while also presenting critical transportation safety challenges. The study identifies safety concerns throughout the proposed trail corridor, including rail and bridge crossings, freeway interchanges, and high-volume roadways. The proposed trail alignment and identified safety concerns will inform existing conditions analysis and recommendations for pedestrian and bicyclist safety in WMPO SAP.

**Figure 6: Proposed Pedestrian and Bicyclist Bridge over Sturgeon Creek**

# ISLAND GREENWAY (NC) PAVED TRAIL FEASIBILITY STUDY

*Completed: 2024*

The Island Greenway Feasibility Study was conducted by the NCDOT IMD to explore the implementation of a multi-use trail that would connect the existing greenway in Carolina Beach to the Fort Fisher-Southport Ferry Terminal. The Island Greenway is a portion of the East Coast Greenway, a continuous multi-use trail along the eastern seaboard of the United States from Maine to Florida. Several alternatives at different locations throughout Kure Beach were discussed in this plan, one seen in Figure 7[21]. The feasibility study conducted public outreach via an online survey (open until April 20, 2024) and a September 2023 public meeting to collect input on preferred alignment alternatives, amenities, and trail-user priorities[22].

[20] Wilmington Urban Area MPO, Gullah-Geechee Heritage Trail Feasibility Study, June 2023, https://www.wmpo.org/wp-content/uploads/2023/06/Gullah-Geechee-Heritage-Trail-Feasibility-Study.pdf

[21] Town of Kure Beach, Island Greenway (NC) Trail Feasibility Study (30 Percent Draft Plan), 2024, https://www.townofkurebeach.org/sites/default/files/uploads/public_meeting_alta_kure_beach_nc_trail_feasibility_study_30percent_draft_plan_21424.pdf

[22] Wilmington Urban Area MPO. Island Greenway Paved Trail Feasibility Study. 2024. https://www.wmpo.org/wp-content/uploads/2024/09/Alta_Kure-Beach-NC_Trail_Feasibility_Final-Study_Compressed.pdf

This project would be critical to pedestrian and bicycle safety in the coastal community of Kure Beach and provide safe, separated facilities for vulnerable road users. While the plan only directly addresses the Safe Roads priority of the SSA, the project could also encourage safe behavior for people walking and bicycling with easy access and connectivity along the proposed multi-use path. Such an installation would not only provide safe mobility and recreational opportunities for Kure Beach residents, but also for the broader WMPO community and visitors to the region. The opportunity for pedestrian and bicycle connectivity through this coastal community is important in developing safe and accessible transportation networks for all. The recommendations provided in this study will inform existing conditions analysis for the WMPO SAP by highlighting significant opportunities and challenges for safety in the region. Moreover, the project team can work to ensure that regional priorities align with the vision and goals of its member jurisdictions.

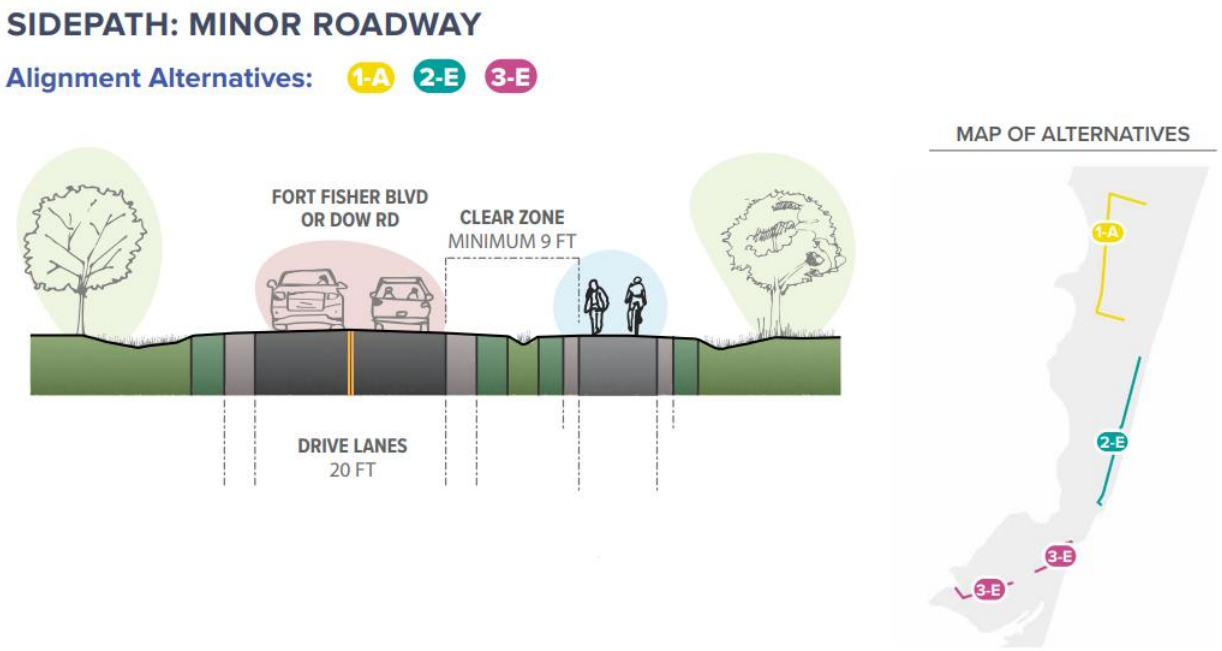



**Figure 7: Facility Type Alternative – Side Path: Minor Roadway**

# NORTH CAROLINA STRATEGIC HIGHWAY SAFETY PLAN (SHSP)

*Adoption Year: 2024*

The NC SHSP, updated in 2024, outlines the state's goal of reducing traffic-related fatalities and serious injuries by 50% by 2035 and striving for zero by 2050. The SHSP applies an SSA, emphasizing shared responsibility, safer infrastructure, and proactive safety strategies to prevent severe crashes and mitigate their consequences. The plan included stakeholder-driven input from over 75 safety-partner organizations

and the February 16, 2024, executive update documents show a "working groups" process with agency engagement in the development of emphasis-area action plans[23].

The plan targets several Emphasis Areas (EAs) that closely align with WMPO SAP's risk analysis, including lane departure, intersection safety, pedestrian and bicyclist safety, impaired driving, speeding, and older and younger drivers. Recommended countermeasures include infrastructure enhancements (e.g., all-way stops, separated bike lanes), public education, inclusive project development, and expanded data collection. The SHSP also encourages quick-build safety projects, automated enforcement, and behavioral interventions like motorcycle training and seat belt outreach.

By addressing these focus areas with both engineering and behavioral strategies, the SHSP provides a strong statewide framework that complements and supports the WMPO SAP's goals and EAs.

## UNIVERSITY OF NORTH CAROLINA WILMINGTON (UNCW) CAMPUS MASTER PLAN

*Adoption Year: 2024*

As a major regional stakeholder, UNCW plays an important role in shaping travel demand and pedestrian activity, and its campus initiatives closely align with Safe System principles and broader WMPO transportation safety goals. The 2024 Campus Master Plan provides a vision for growth and development at UNCW over the coming decades. It covers a broad range of campus needs, including academic buildings, housing, and open spaces, and includes a substantial focus on mobility and multimodal transportation, an example seen in Figure 8 below. The plan was developed through an 18-month collaborative process that included open forums, online surveys, and stakeholder input from more than 1,700 students, faculty, staff, alumni, and Wilmington community members[24].

The plan highlights strategies to improve bicycle and pedestrian connectivity, manage vehicular circulation, and enhance transit access throughout campus. Major recommendations include expanding shared-use paths, improving wayfinding for all users, and prioritizing safety and accessibility at major campus crossings like College Rd and Randall Dr. While not a transportation plan in the traditional sense, it provides valuable guidance for improving multimodal safety and connectivity.

[23] North Carolina Department of Transportation. North Carolina Strategic Highway Safety Plan (SHSP) 2024 Update. February 2024. https://connect.ncdot.gov/groups/echs/Documents/2024%20NC%20SHSP%20Update%20(2-16-24).pdf

[24] University of North Carolina Wilmington. Campus Master Plan. Wilmington, NC: UNCW, 2024. https://www.uncw.edu/media/pdf/facilities/campus-master-plan.pdf

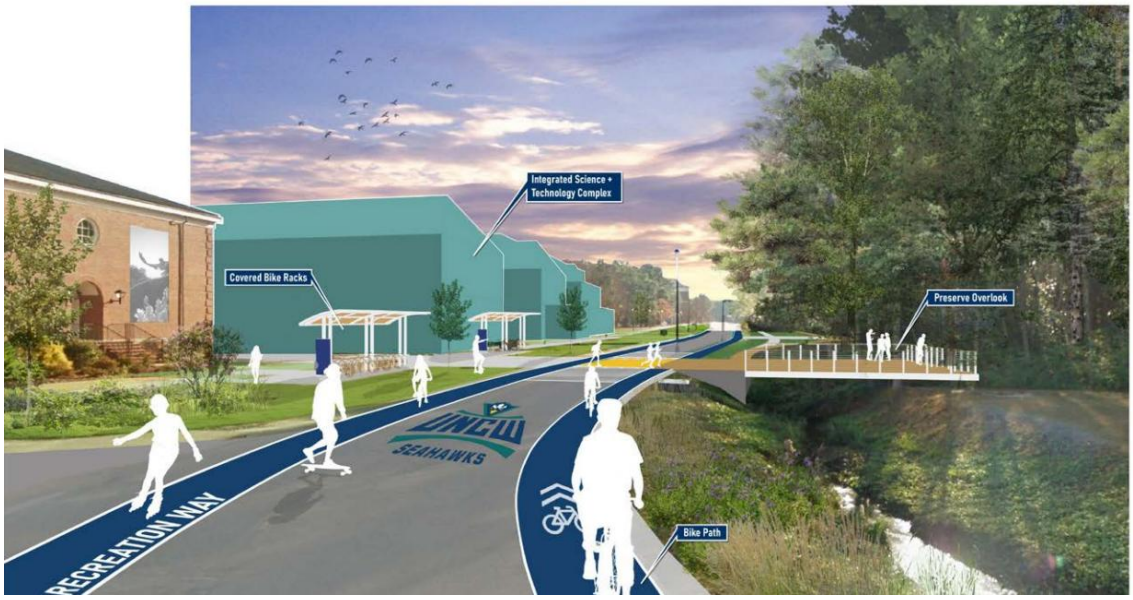



**Figure 8: Conceptual Collage of Price Dr "Recreation Way"**

# WRIGHTSVILLE BEACH BICYCLE AND PEDESTRIAN PLAN

*Adoption Year: 2024*

The Wrightsville Beach Bicycle and Pedestrian Plan is a community-driven initiative directed at enhancing biking and walking within the town. It outlines a vision to guide future investments and decisions regarding bicycle and pedestrian facilities and programs, with strategies focused on making the town safer, more accessible, and better connected. Safety is a key component of the plan, emphasizing the promotion of safe travel conditions for people of all ages and abilities. This plan was guided by community engagement efforts including two public workshops and an online survey that gathered input on walking and bicycling needs, challenges, and priorities in the town[25].

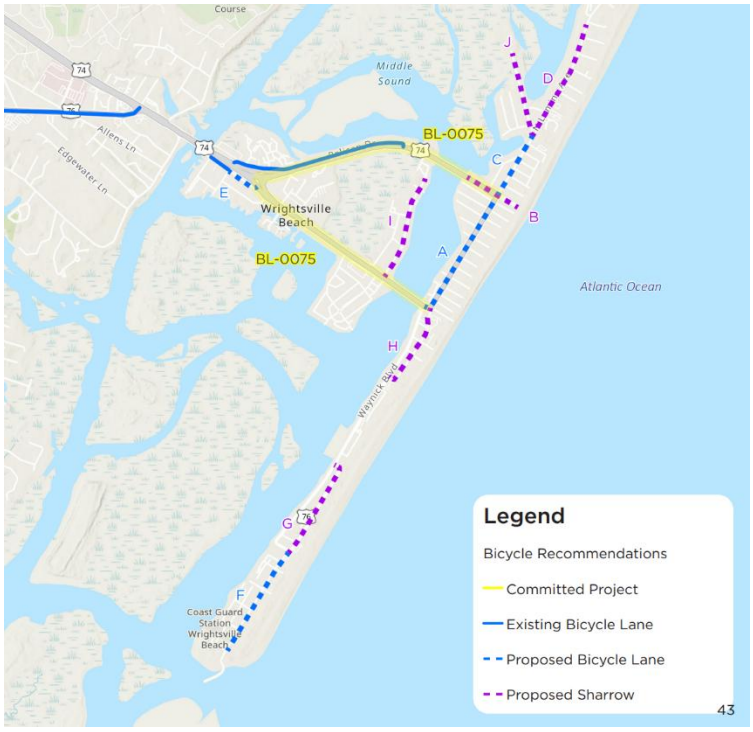



**Figure 9: Proposed Bicycle Facilities**

Several connections to safety are evident throughout the document,

[25] Town of Wrightsville Beach, Wrightsville Beach Bicycle and Pedestrian Plan, adopted June 13, 2024, https://www.wmpo.org/wp-content/uploads/2024/07/Wrightsville-Beach-Bicycle-and-Pedestrian-Plan-Adopted-6.13.24.pdf

primarily through proposed enhancements to bicycle and pedestrian infrastructure, seen in Figure 9; however, it does not clearly articulate how these enhancements are expected to translate into specific safety benefits. Recommendations include reducing the town-wide speed limit to 25 miles per hour and implementing intersection improvements such as signals and bike boxes. Additionally, the plan prioritizes safety by analyzing crash data and focusing on projects along more dangerous corridors. However, it lacks comprehensive discussion on the safety effects of these strategies. The recommended infrastructure improvements and safety enhancements identified in this plan will align with and contribute to the strategic objectives of the WMPO SAP, particularly in advancing pedestrian and cyclist safety measures.

## WALK WILMINGTON PEDESTRIAN PLAN UPDATE

*Adoption Year: 2023*

The Walk Wilmington Pedestrian Plan Update seeks to enhance pedestrian safety, connectivity, and accessibility throughout Wilmington. The plan outlines strategies for improving pedestrian infrastructure, promoting adherence to traffic laws, and enhancing the overall pedestrian experience to support health, environmental, and economic benefits. Like many of the previous plans discussed in this review so far, the update included a public-engagement phase, held May 2022–February 2023, with online surveys and an open house that solicited feedback on walking needs, safety concerns, and priority sidewalk and crossing locations[26].


**Figure 10: Watch for Me NC Educational Poster**

This document explicitly connects to safety by focusing on pedestrian infrastructure and traffic calming measures, aiming to improve pedestrian systems holistically through various strategies. It includes recommendations for local encouragement, education, and enforcement programs such as Watch for Me NC (Figure 10) and Be a Looker, a homegrown WMPO initiative, both focused on improving road user behavior[27]. Additionally, the plan discusses conducting a safe speed study to determine appropriate speeds for the area, acknowledging the safety effects of vehicle operating speed. Specific safety strategies related to roadway design are also included, such as crossing improvements and visibility enhancements.

## WILMINGTON PEDESTRIAN SAFETY ACTION PLAN (PSAP)

*Adoption Year: 2024*

The Wilmington PSAP is a comprehensive framework designed to enhance pedestrian safety across Wilmington. It employs a data-driven approach to prioritize locations for safety improvements, leveraging crash data, risk factors, and coordination among local and state partners. The plan was developed

[26] City of Wilmington, North Carolina. Walk Wilmington Pedestrian Plan Update. 2023. https://www.whqr.org/local/2023-02-02/wilmington-unveils-its-new-pedestrian-plan-seeks-feedback

[27] Wilmington Urban Area MPO, Walk Wilmington Pedestrian Plan, 2023 (Final), https://www.wmpo.org/wp-content/uploads/2025/04/2021-227-Wilmington-Pedestrian-Plan_Final_reduced-compressed.pdf

collaboratively by NCDOT's Traffic Safety Unit, Division 3, the City of Wilmington, the WMPO, and Wave Transit, with stakeholder input used to validate priority areas and refine project recommendations. The document outlines a structured five-year implementation strategy, including systemic safety treatments, Road Safety Assessments, and coordination with ongoing local and state transportation programs. The prioritized locations for safety improvements identified within this plan establish strong safety baselines, particularly for pedestrian safety, that align with and contribute to the strategic objectives of the WMPO SAP[28].

# PENDER COUNTY BICYCLE AND PEDESTRIAN PLAN

*Adoption Year: 2023*

The Pender County Bicycle and Pedestrian Plan's purpose is to enhance the infrastructure for cyclists and pedestrians within the urbanized areas of Pender County, as identified by the WMPO. The plan outlines recommendations for facilities and policies to improve safety and connectivity, emphasizing the importance of integrating these modes of transportation into the broader transportation network. Public outreach included a survey available online from November 2022 to March 2023, pop-up events in February 2023, and a StoryMap for community input[29].


**Figure 11: Crosswalk with RRFB *(Above)***

**Figure 12: Curb Extension *(Above)***

The plan explicitly connects to safety by focusing on bicycle and pedestrian road users, aiming to enhance their safety through improved infrastructure. Specific recommendations include strategies for intersection

[28] North Carolina Department of Transportation Traffic Safety Unit and Wilmington Urban Area MPO. Wilmington Pedestrian Safety Action Plan. 2024

[29] Pender County, North Carolina. Pender County Bicycle & Pedestrian Plan. 2023. https://www.wmpo.org/wp-content/uploads/2023/06/Pender-Co-Bike-Ped-Plan-Summary-of-Survey-Results.pdf

design, such as improved bicycle and pedestrian signalization, High Intensity Activated Crosswalk (HAWK) signals, Rectangular Rapid Flashing Beacons (RRFB), and curb extensions, as shown in Figures 11 and 12, respectively. Additionally, the plan emphasizes the separation of road users in space, advocating for greenways, shared-use paths, side paths, and separated bike lanes. However, it lacks comprehensive strategies for vehicular user types and does not address road user behavior, vehicle design, or heavy vehicles, important components of the Safe Road Users and Safe Vehicles elements of the SSA.

The recommended infrastructure improvements and safety enhancements identified in this plan will align with and contribute to the strategic objectives of the WMPO SAP, particularly in advancing pedestrian and bicyclist safety measures.

## WMPO CONGESTION MANAGEMENT PROCESS (CMP)

*Adoption Year: 2023*

The WMPO CMP provides a systematic, data-driven framework to identify, monitor, and manage congestion within the metropolitan area. Adopted in 2023, the CMP supports regional decision-making by linking congestion analysis with project prioritization in the MTP and STIP. The process evaluates travel time reliability, corridor performance, and multimodal mobility to improve the efficiency of the transportation network[30].

Public and stakeholder outreach was conducted throughout the CMP development to gather input on priority corridors and strategies for congestion relief. While the process primarily focuses on improving travel efficiency and reducing delay, it also supports the Safe System Approach by contributing to the Safe Roads and Safe Speeds elements, recognizing that managing congestion and speed can reduce crash risk and severity. Strengthening the connection between congestion management and multimodal safety will further advance the strategic goals of the WMPO SAP.

## KURE BEACH BICYCLE AND PEDESTRIAN PLAN

*Adoption Year: 2022*

The Kure Beach Bicycle and Pedestrian Plan focuses on enhancing the town's infrastructure to support walking and biking, improving accessibility and safety for residents and visitors. The plan includes recommendations for new sidewalks, bike lanes, and greenway extensions, with a focus on improving connectivity and safety, particularly at key intersections like Fort

**Figure 13: Kure Beach, K Avenue**

[30] Wilmington Urban Area Metropolitan Planning Organization. CMP Biennial Data Report. Adopted March 29, 2023. https://www.wmpo.org/wp-content/uploads/2023/05/2022-CMP-Biennial-Data-Report_Final.pdf

Fisher Boulevard (Figure 13)[31] and K Avenue (Figure 14)[32]. Over 400 residents participated in the planning process, which included two public open houses in late 2021 and an online survey in January 2022; attendees and survey respondents provided feedback on walking and biking conditions, prioritized projects, and suggested improvements such as crosswalks and side paths. The document goes further by outlining steps for seeking funding and partnerships to implement these projects, having the goal of achieving recognition as a Bicycle-Friendly and Walk-Friendly Community by 2026[33].


**Figure 14: Kure Beach, Fort Fisher Boulevard**

This plan is focused on the safety of bicycle and pedestrian road users, but specific mentions of safety are mostly implied and focused on those two modes, rather than the broader system. It does include data on speed limits and the survival rates of pedestrians hit by vehicles traveling at these speeds but recommends few strategies to slow cars.

The recommended infrastructure improvements and safety enhancements identified in this plan will align with and contribute to the strategic objectives of the WMPO SAP, particularly in advancing pedestrian and cyclist safety measures.

## TOWN OF NAVASSA COMPREHENSIVE BICYCLE AND PEDESTRIAN PLAN

*Adoption Year: 2022*

Navassa's Comprehensive Bicycle and Pedestrian Plan sets out to establish a master plan for improving bicycle and pedestrian infrastructure in the town, addressing the lack of existing facilities and preparing for future development. Development included steering committee meetings, an in-person public workshop, and an online comment map to solicit feedback on trail, sidewalk, and bicycling needs and connectivity priorities. The plan establishes goals to guide multimodal transportation within new developments, connect facilities with parks and trails, enhance economic benefits, and promote public health and safety through active transportation. It includes specific project recommendations, public

[31] Howard Hanna Real Estate. "829 Fort Fisher Boulevard S, Kure Beach, NC 28449." https://www.howardhanna.com/Property/Detail/829-Fort-Fisher-Boulevard-S-Kure-Beach-NC-28449/BrunswickCountyNC/100525836

[32] Long & Foster Real Estate. "613 K Avenue, Kure Beach, NC 28449." https://www.longandfoster.com/homes-for-sale/613-K-Avenue-Kure-Beach-NC-28449-362404431

[33] Town of Kure Beach. Kure Beach Bicycle & Pedestrian Plan. May 2022. https://www.wmpo.org/wp-content/uploads/2022/05/Kure-Beach-Bike-Ped-Plan_May-2022-FINAL-DRAFT.pdf

engagement strategies, and a prioritization and implementation plan to secure funding and advance the proposed projects[34].

The plan makes several explicit connections to safety, particularly focusing on the safety of pedestrians and bicyclists. It includes specific strategies for separating different road users in space, such as buffered bike lanes and shared-use paths, which are designed to enhance safety. An example is seen in Figure 15. The recommended infrastructure improvements and safety enhancements identified in this plan will align with and contribute to the strategic objectives of the WMPO SAP, particularly in advancing pedestrian and cyclist safety measures.

**Figure 15: Broadway Street Trail Crossing Preferred Alternative**

# WILMINGTON RAIL TRAIL MASTER PLAN

*Adoption Year: 2020*

The Wilmington Rail Trail Master Plan aims to promote multimodal travel in Wilmington by creating a vibrant community space that connects the Northside Community, Cape Fear Community College, and downtown destinations. This project reimagines an abandoned rail corridor as a bicycle/walk/transit corridor, promoting mode shift and safety. A public survey and a 14-day public comment period were conducted for this plan, guided by a steering committee comprising of the WMPO, City of Wilmington staff, NCDOT representatives, the Arts Council of Wilmington, and citizen advocates. Outlined is a phased implementation approach, starting with land preparation and trail construction, followed by the addition of protective fencing, public art, and amenities, and culminating in the establishment of passenger rail service[35].

[34] Town of Navassa. Town of Navassa Comprehensive Bicycle & Pedestrian Plan. 2023. https://www.wmpo.org/wp-content/uploads/2023/03/Navassa-Bike-Ped-Plan_revised-NCDOT_CLEAN.pdf

[35] Wilmington Urban Area MPO / City of Wilmington / NCDOT. Wilmington Rail Trail Master Plan. October 2020. https://www.wmpo.org/wp-content/uploads/2020/10/Wilmington-Rail-Trail-Master-Plan_October-2020-DRAFT_Spreads.pdf

The plan briefly mentions safety precautions related to the construction of the new rail trail, such as potential amenity options like lighting and railings, but lacks detailed implementation strategies. While it acknowledges the relationship between land use context and rail trail design, it does not comprehensively address the safety of multimodal road users or proactive safety solutions. Overall, the plan's connection to safety is minimal, with limited explicit recommendations, indicating a need for more focused strategies to enhance safety for all road users. The project identified in this plan supports multimodal travel and connectivity, while also providing a foundation for protective measures and infrastructure improvements, which support the safety focus of the WMPO SAP.

## US 17 BUSINESS (MARKET ST) CORRIDOR STUDY

*Adoption Year: 2016*

The US 17 Business Corridor Study (2016 Update) evaluated the feasibility of implementing a road diet along Market Street in Wilmington by reducing the roadway from four lanes to two, adding medians, bike lanes, and sidewalks to create a "Complete Street" that better accommodates all transportation modes. Guided by a steering committee composed of representatives from the City of Wilmington, NCDOT, the WMPO, and the Chamber of Commerce, the study included four committee meetings and robust public engagement. Although the report recognized a road diet as a potential method to improve safety for all users, it ultimately determined that the concept was not feasible for the proposed limits due to adverse impacts on traffic operations and increased vehicle queueing, particularly between 16th Street and Covil Avenue. Importantly, the analysis identified corridor bottlenecks caused by closely spaced driveways and signalized intersections, which contribute to congestion and create conflict points for pedestrians and cyclists—insights that inform the WMPO SAP's approach to managing multimodal safety and operational efficiency[36].

## WILMINGTON-NEW HANOVER COUNTY COMPREHENSIVE GREENWAY PLAN

*Adoption Year: 2013*

The Wilmington-New Hanover County Comprehensive Greenway Plan lays the groundwork for a network of greenways to enhance transportation options, promote health and wellness, and boost economic activity in the region. Public workshops and a StoryMap campaign provided stakeholders and residents with an opportunity to comment on a proposed network of greenways linking Wilmington and New Hanover County, helping to build the foundation for the county and city-wide trail strategy. The plan includes developing new trails, creating safe connections for walking and bicycling, and establishing non-motorized water trail access points, connecting to multimodal safety by enhancing connectivity and infrastructure. Although safety is mentioned, it is often implied rather than explicitly stated. Specific recommendations include strategies for separating road users in space, such as constructing trails, and

[36] Wilmington Urban Area MPO / City of Wilmington / NCDOT. US 17 Business (Market Street) Corridor Study. 2016. https://www.wmpo.org/wp-content/uploads/2016/05/2007-04_US17CorridorMarketSt_Final.pdf

acknowledging the safety effects of intersection design, where well-designed crossings can mitigate conflicts between path users and motorists[37].

The proposed greenway corridors focus on connecting existing assets such as the River-to-Sea Bikeway and Cross-City Trail, while also identifying new opportunities for regional greenway development. Though dated, many of the plan's key corridors remain priorities in subsequent efforts and are referenced in recent studies and project lists. This plan could significantly enhance mobility and recreation in the WMPO region. However, it also raises some safety concerns regarding specific areas of the proposed trail system, which may inform conditions during the creation of the WMPO SAP.

## US 17/NC 210 CORRIDOR STUDY

*Adoption Year: 2012*

The US 17/NC 210 Corridor Study aims to address safety and mobility deficiencies in Hampstead by implementing strategies that align with the community's vision for improved access management and reduced traffic-related injuries. The corridor study included a dedicated public involvement process; two public workshops and a local official's meeting in May 2004, with the purpose of gathering input on mobility issues, land use concerns, and roadway design along US 17/NC 210. It includes features such as a landscaped median, pedestrian and bicycle facilities, and shared driveways to enhance the area's identity and functionality. The study also identifies accessibility barriers, such as deteriorated or missing curb ramps shown in Figure 16 and recommends improvements to achieve compliance with the Americans with Disabilities Act (ADA), supporting safe and continuous pedestrian travel for all users. Additionally, the study anticipates growth-induced congestion and proposes solutions like the Hampstead Bypass to manage traffic effectively[38].

**Figure 16: Broken Wheelchair Ramp along E side of US 17**

This plan makes vehicle, bicycle, and pedestrian safety a goal. However, plan recommendations rarely explicitly address safety, though some recommendations do reference safety, such as constructing medians that are "reported to produce safety." Insights and recommendations from this plan could support the WMPO SAP by providing targeted infrastructure solutions, like improved pedestrian crossings and congestion management strategies.

[37] Wilmington Urban Area MPO / New Hanover County / City of Wilmington. Wilmington/New Hanover County Comprehensive Greenway Plan. 2013. https://www.wmpo.org/wp-content/uploads/2016/05/2013_wilmingtongreenwayplan_mainchapters_optimized.pdf

[38] Wilmington Urban Area MPO and NCDOT, US 17/NC 210 Corridor Study, March 2012, https://www.wmpo.org/wp-content/uploads/2016/05/2012-03_US17-NC210.pdf

## DOW ROAD CORRIDOR STUDY

*Adoption Year: 2009*

The Dow Road Corridor Study addresses the NCDOT project R-4708, a plan to widen and extend Dow Road to improve north-south access between Carolina Beach and Kure Beach, while alleviating traffic congestion on US 421 and enhancing pedestrian and bicycle facilities. Public involvement for the study included stakeholder workshops and an open house to evaluate future alignments and extensions of the corridor from US 421 (Lake Park Boulevard) toward K Avenue and the Fort Fisher area. Initiated in 2008, it identified significant environmental and stakeholder challenges for the proposed extension, which led to the project scope being narrowed to focus on future traffic forecasts and multimodal transportation facilities that enhance safety and address anticipated traffic volumes along Dow Road (between US 421 and K Avenue) and along K Avenue (Figure 13). The study details environmental analyses, stakeholder engagements, and projections for both "No Build" and "Build" scenarios up to 2030[39].

The study makes several explicit connections to safety, particularly through recommendations for roadway design and user separation strategies. It includes specific strategies for separating road users in space, such as constructing wide Multi-Use Paths (MUPs) for pedestrians and bike lanes to separate bicyclists. Additionally, the study provides recommendations for roadway improvements, including left turn lanes, wayfinding signs, and curve lengthening/super-elevation, aimed at enhancing safety in the vicinity of proposed developments. However, the study does not comprehensively address safety across all aspects, such as intersection design or proactive safety solutions. The recommendations from this study provide insights into safety challenges along an important corridor in Carolina Beach and Kure Beach and can inform the strategic goals of the WMPO SAP.

## CAPE FEAR HISTORIC BYWAY CORRIDOR MANAGEMENT PLAN

*Adoption Year: 2009*

The Cape Fear Historic Byway is a unique urban Scenic Byway located in downtown Wilmington. It's Corridor Management Plan engaged local stakeholders and included community workshops, field tours, and coordination with local historic and transportation groups to build consensus around preserving scenic, cultural, and multimodal transportation features of the byway. It aims to preserve the byway's historical integrity, enhance visitor experience across various modes of transportation, and raise awareness of its intrinsic qualities and historical significance[40].

[39] Wilmington Urban Area MPO / Town of Carolina Beach. Dow Road Corridor Study. October 2009. https://www.wmpo.org/wp-content/uploads/2016/05/2009-10_DRCS_PlanFINAL.pdf

[40] Wilmington Urban Area MPO / City of Wilmington / Historic Wilmington Foundation. Cape Fear Historic Byway Corridor Management Plan. 2008. https://www.wmpo.org/wp-content/uploads/2016/04/2008-04_CFHBP_FullPlan.pdf

Safety is a goal of this plan, but explicit mentions of safety are limited. Some mentions of safety include Goal 11, "Increase pedestrian and biking safety along the byway corridor," separating modes of transportation on the Wilmington Waterfront, and "add a safety/decorative barrier to separate pedestrian and vehicle traffic on Front Street Bridge." This effort offers insights into the development of the WMPO SAP on balancing safety considerations with diverse land uses and cultural contexts across the city and region. The Wilmington Waterfront Promenade and extension was a recommendation that came to life from this plan, among others (Figure 17).


**Figure 17: Recommendations from Wilmington Vision 2020 - A Waterfront Downtown**

# DAWSON & WOOSTER CORRIDOR PLAN

*Adoption Year: 2008*

The US 76 corridor in South Wilmington, encompassing Dawson and Wooster Streets, is a critical east-west connection in the region. This effort focuses on improving safety and establishing a long-term vision for the corridor, with particular attention to intersections identified by NCDOT as high-risk. A public design workshop was conducted to gather community input, highlighting concerns about traffic safety, equitable involvement, aesthetic improvements, and the impact on local businesses and transit. The project team, alongside the WMPO and NCDOT, worked to address these issues and propose comprehensive safety and connectivity improvements[41].

The Dawson Wooster Corridor Plan connects to safety primarily through its focus on intersection improvements, which are aimed at enhancing pedestrian and vehicular safety. Specific recommendations include the implementation of high visibility crosswalks, bulb-outs, lane markers, skip lines, and medians

[41] Wilmington Urban Area MPO / City of Wilmington. Dawson & Wooster Corridor Plan. 2007. https://www.wmpo.org/wp-content/uploads/2016/05/2007-10_DawsonWooster_FinalReport.pdf

to improve safety along the corridor. This plan's focus on safety can be used to inform safety recommendations and strategic objectives of the WMPO SAP along the US 76 corridor.

## CAPE FEAR MEMORIAL BRIDGE REPLACEMENT FEASIBILITY STUDY

*Adoption Year: 2020*

The Cape Fear Memorial Bridge Replacement is one of the region's most significant infrastructure priorities. The replacement study includes a public comment portal designed to collect input and questions from residents, allowing anyone to review alternatives and document their views on bridge options and multimodal access. Although the bridge spans across multiple jurisdictions, it is essential for connecting residents, commuters, freight, and emergency services. Feasibility studies led by NCDOT are exploring a range of alternatives, including high fixed-span and movable bridge options, with consideration of vertical clearances and navigational impacts. These scenarios are under active evaluation through technical and environmental processes[42].

While full construction funding has yet to be secured, a major milestone was reached in 2024 when the project was awarded a $242 million federal grant to advance planning and engineering. Project design and outreach activities remain ongoing, including the evaluation of potential tolling considerations[43,44].

From an SSA standpoint, the bridge corridor is a critical component of the transportation network. As a high-speed, high-volume facility that accommodates a wide mix of users (passenger vehicles, freight, VRUs), its replacement offers an opportunity to incorporate modern safety design principles, such as separation of modes, improved access management, clear sight distances, and safe transitions at both ends of the bridge. Multimodal connectivity and redundancy across the Cape Fear River are also key to ensuring safe and equitable access throughout the region.

## SAFE SYSTEMS REVIEW

As part of the planning review analysis, each transportation-related plan, policy, and study was evaluated for how effectively it supports the principles of the SSA. This framework emphasizes five key elements essential to eliminating roadway fatalities and serious injuries: Safer People, Safer Roads, Safer Vehicles, Safer Speeds, and Post-Crash Care.

Overall, the reviewed plans demonstrate a range of alignment with Safe System principles, with particular strength in the Safer People and Safer Roads categories. The Wrightsville Beach Bicycle and Pedestrian Plan stands out for its clear focus on reducing conflicts through multimodal improvements and public outreach, earning high marks for both people- and infrastructure-focused safety strategies. Similarly, the

[42] North Carolina Department of Transportation. Cape Fear Memorial Bridge Replacement Study (HB-0039). 2024. https://publicinput.com/capefearmemorialbridge

[43] North Carolina Department of Transportation. Cape Fear Memorial Bridge Replacement Feasibility Study. Accessed September 22, 2025. https://www.ncdot.gov/projects/cape-fear-memorial-bridge-replacement/Pages/default.aspx

[44] Wilmington Urban Area Metropolitan Planning Organization. Cape Fear Memorial Bridge Updates. Accessed September 22, 2025. https://www.wmpo.org/projects/planned-projects/cape-fear-memorial-bridge/

Cape Fear Navigating Change 2050 Plan incorporates fairness and accessibility goals, but its strongest emphasis is on Safer Speeds and roadway design, with less attention to behavioral change or post-crash systems. Safer Vehicles and Post-Crash Care are generally not addressed in these plans and represent opportunities for improvement in future planning efforts. This analysis underscores the potential for the WMPO SAP to fill these gaps by integrating data, strategic goals, and safety outcomes more explicitly into regional efforts.

# Crash and Risk Analysis Overview

The following sections provide an overview of safety performance and regional risk conditions. Using historical crash data and network screening results, the analysis identifies existing safety challenges, recurring crash types, and locations with elevated risk for severe outcomes. Together, the crash analysis and risk assessment findings inform the development of targeted countermeasures and strategic recommendations for the WMPO SAP.

## CRASH ANALYSIS FINDINGS

A critical step in developing the WMPO SS4A SAP is evaluating regional crash data trends. This technical memo summarizes an analysis that includes a geospatial identification of higher-risk locations, in the form of a High Injury Network (HIN). Crashes within the WMPO boundary, including New Hanover County and portions of Brunswick and Pender Counties, were examined for the study period of January 1, 2017 through December 31, 2024. The dataset includes all reported crashes, with specific attention to those resulting in fatalities or serious injuries, classified using the KABCO severity scale, a national standard where[45]:

*K = Fatal injury, A = Serious injury, B = Minor injury, C = Possible injury, and O = Property damage only*

Between 2017 and 2024, there were over 63,000 reported crashes within the WMPO region, including 823 Fatal or Serious Injury, or KA, crashes. It is important to note that a KA crash may include multiple fatalities or seriously-injured people if there is more than one vehicle involved in the crash or more than one occupant per vehicle; thus, these 823 KA crashes resulted in nearly 1,000 people killed or seriously injured. Overall crash numbers have been slowly increasing, with a noticeable dip in 2020 during the COVID-19 pandemic, followed by a peak in 2024. KA crashes have consistently made up about 1–1.5% of all crashes, but the consequences are significant.

The following trends were observed in the reported crash data from the WMPO:

- Overall Trends: Total crashes show a slight upward pattern. KA crashes are also increasing modestly, with KA crashes consistently accounting for 1–1.5% of all crashes. Crashes involving bicyclists and pedestrians with fatal or serious injuries spiked notably in 2024.
- Priority Areas: Certain crash types, such as those involving pedestrians, motorcycles, bicycles, seat belt and car seat use, and impaired driving, are disproportionately severe compared with the share of total crashes.
- Urban vs. Rural Patterns: In New Hanover County, the most urbanized and densely populated county in the WMPO region, intersection crashes, impaired driving incidents, and pedestrian/bicycle crashes occur at higher rates. In contrast, the portions of Brunswick and Pender Counties within the WMPO boundary see more crashes related to lane departures, speeding, and seat belt or car seat issues.
- Vulnerable Road Users: The share of pedestrian and bicyclist KA crashes is particularly high across the region, surpassing both the statewide averages and those of other MPOs in North Carolina.

[45] Federal Highway Administration. KABCO Injury Classification Scale and Definitions. Office of Safety. https://highways.dot.gov/media/20141

- North Carolina Routes: On NC Routes, KA crashes make up 10% of incidents, a higher proportion than their share of all crashes (6%) or of roadway mileage (5%).
- Minor Arterials: Minor Arterials experience 21% of KA crashes, compared to 16% of overall crashes and only 6% of roadway mileage.

Table 2 summarizes crashes during the study period, including crash-level data and person-level fatality and injury data. There were 63,252 reported crashes and 823 KA crashes (1.3%), resulting in 962 fatalities or serious injuries. Crash totals in the table include all reported crash types within the WMPO boundary (single-vehicle, multi-vehicle, and non-motorized user crashes), not just crashes between two vehicles.

**Table 2: Crashes Summarized (2017 – 2024)**

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| Total Crashes | 7,941 | 8,021 | 8,260 | 6,966 | 7,802 | 7,772 | 8,177 | 8,313 | 63,252 |
| Total KA Crashes | 93 | 88 | 117 | 91 | 120 | 106 | 95 | 113 | 823 |
| Fatalities | 31 | 24 | 44 | 27 | 40 | 34 | 31 | 41 | 272 |
| Serious Injuries | 84 | 75 | 88 | 85 | 98 | 94 | 79 | 87 | 690 |
| Fatalities (Bike Ped) | 10 | 8 | 13 | 2 | 10 | 5 | 5 | 11 | 64 |
| Serious Injuries (Bike Ped) | 12 | 8 | 14 | 10 | 11 | 12 | 12 | 22 | 101 |

## Crash Overview

Figure 18 provides a detailed breakdown of crash severity for the entire study period. Figure 19 highlights the trends for fatal (K) and serious injury (A) crashes during the study period from 2017 to 2024. Figure 20 illustrates all crashes recorded during the study period, including an eight-year trendline for total crashes plotted alongside population growth on a secondary axis. Crash totals increased between 2017 and 2019, declined in 2020 in alignment with nationwide patterns related to the COVID-19 pandemic, and then climbed to their highest level in 2024.

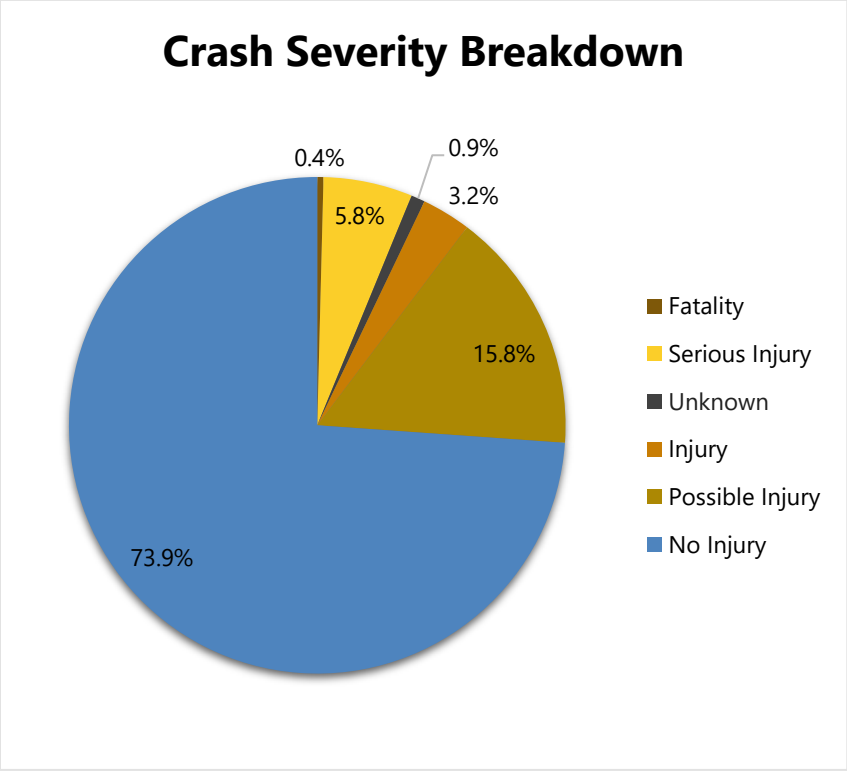



**Figure 18: Crash Severity Breakdown (2017 – 2024)**

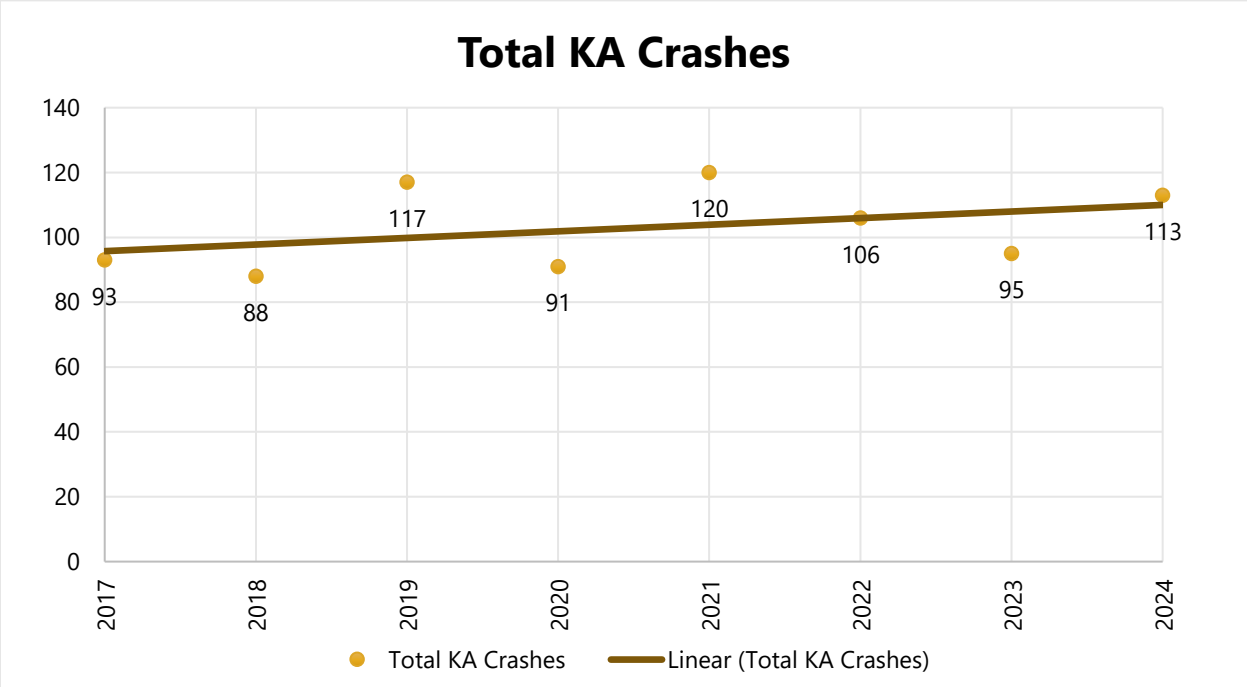



**Figure 19: KA Crashes (2017 – 2024)**

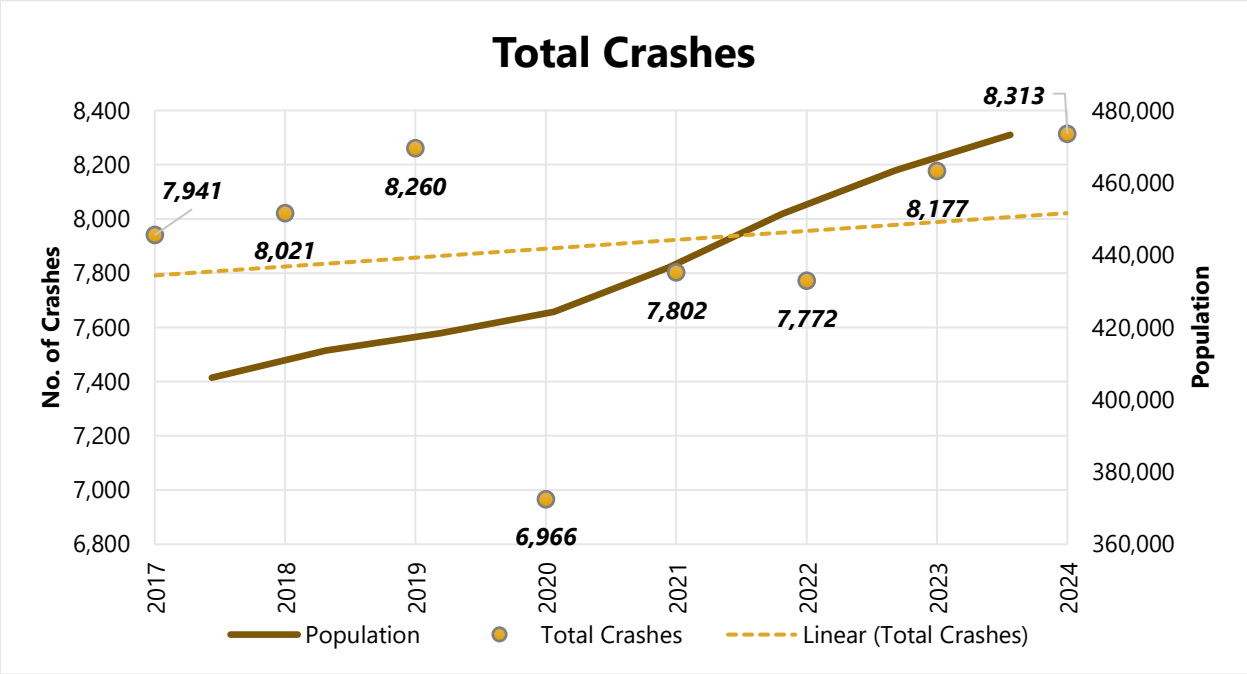



**Figure 20: Total Crashes VS Population Growth (2017 – 2024)**

## Fatalities and Serious Injuries

Although this analysis primarily examines crashes at the crash level, it is critical to recognize the human impacts reflected in fatalities and serious injuries. Figure 21 below presents person-level data for vehicle and pedestrian/bicycle crashes, which differs from crash-level data. For example, a single crash that results

in multiple fatalities would be counted once at the crash level, but the number of fatalities would reflect the total individuals involved.

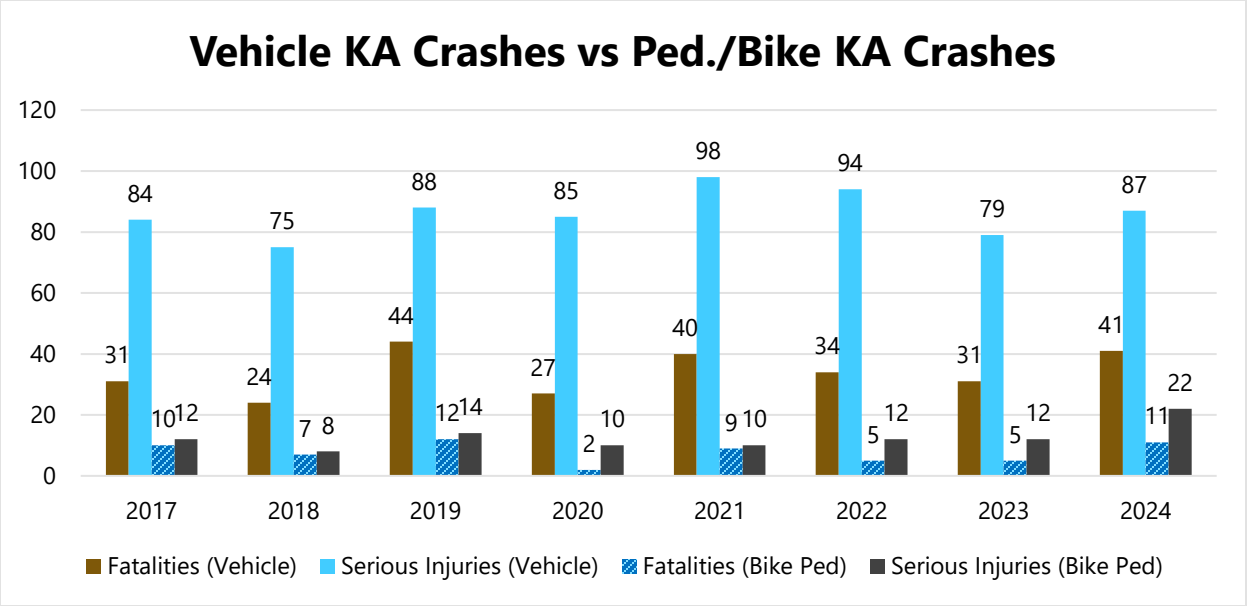



**Figure 21: Fatal and Serious Injuries - Vehicle, Pedestrian & Bicycle – (2017 – 2024)**

An analysis of crash severity by mode also reveals notable trends. Over the study period, there were 571 pedestrian-involved crashes, with 54 fatalities. Bicyclists were involved in 486 crashes, resulting in 8 fatalities. Motorcycles accounted for 760 crashes, with 42 fatalities. Among the 61,435 remaining crashes involving other modes, 153 fatalities occurred*. Vehicles and motorcycles, typically travelling at higher speeds than pedestrians and bicyclists, had the greatest share of KA crashes, shown in Figure 22.

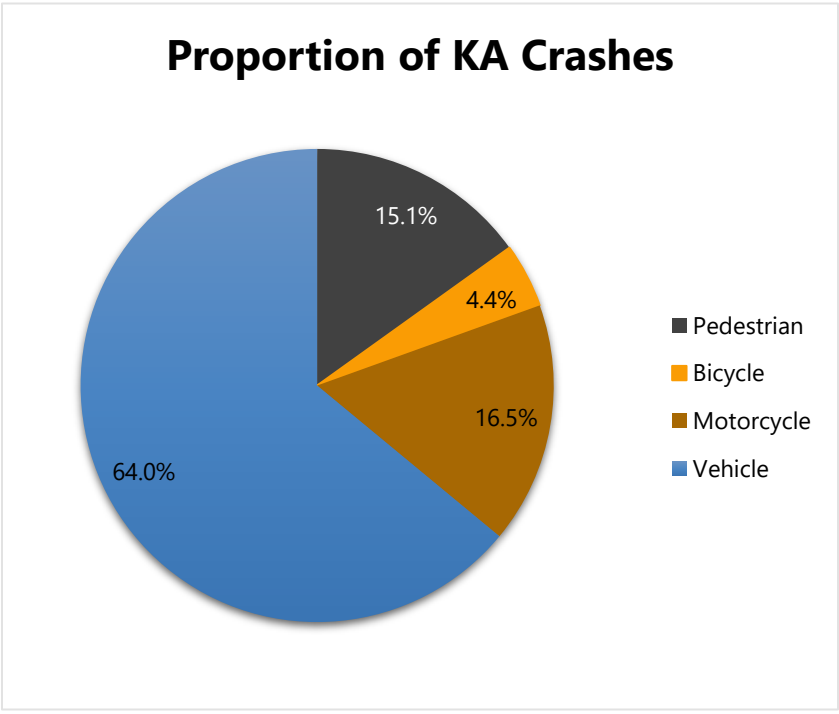



**Figure 22: Proportion of KA Crashes by Mode (2017 – 2024)**

* Due to the inclusion of very recently updated 2024 Pedestrian and Bicyclist Crash Analysis Tool (PBCAT) crash data, there is a difference of 3 KA crashes in Table 2 as compared to the rest of the analysis. This difference is not significant to the remainder of the crash analysis, as it does not impact over-representation, emphasis area analysis, or risk analysis.

## Crash Rates & Overrepresentation

Figure 23 highlights the distribution of all crashes compared to KA crashes across key EAs, which align with those identified in the NC SHSP. EAs represent the primary crash categories or contributing factors, such as lane departure, impaired driving, and intersection-related collisions, that account for a large share of KA crashes. These categories are used at both the state and regional level to focus safety analysis and countermeasure development and will serve as the basis for identifying focus crash types in the Risk Assessment Findings section. The results show that certain EAs are disproportionately represented among severe crashes. Lane departure stands out most significantly, accounting for 14.6% of all crashes but 38.1% of KA crashes. Crashes involving unrestrained occupants (seat belt and car seat-related) and speeding also show substantial disparities, representing 23.8% and 15.5% of KA crashes, respectively, despite comprising much smaller shares of total crashes. Impaired driving and intersection-related crashes are also notably overrepresented, with KA crash shares of 29.1% and 25.1%, respectively.

Of note, all proportions of KA crashes are greater than their EAs overall proportion in the figure except for older driver, younger driver, and animal-related crashes, possibly suggesting a reduced likelihood of severe outcomes for those categories.

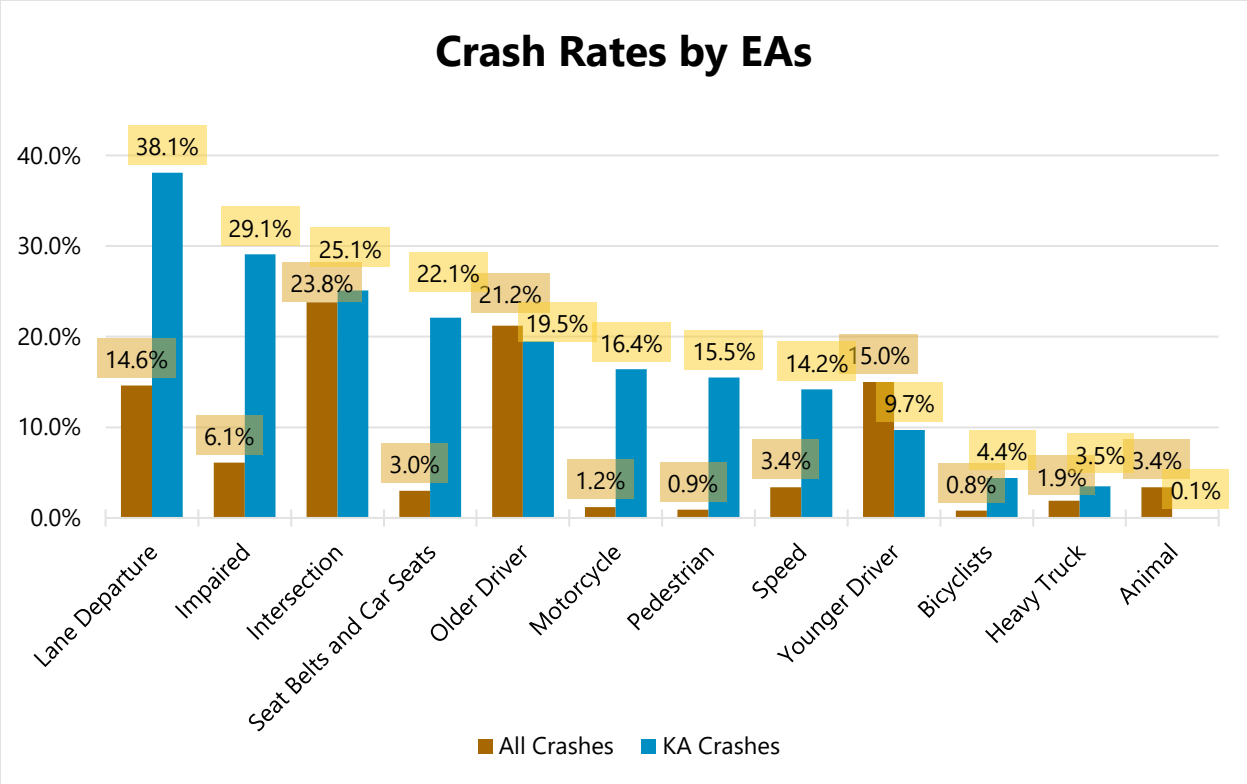



**Figure 23: Crash Rates by EAs (2017 – 2024)**

Figure 24 shows the proportion of specific crash types among all crashes and the share of collisions within that type that resulted in a fatal or serious injury. Rear-end and Angle crashes were the most frequent crash type but tended to have a lower share of fatal or serious injury crashes. Fixed object crashes, on the other hand, had a greater likelihood of resulting in a fatal or serious injury. This suggests that although this crash type may not happen as frequently as others, when it does occur, the consequences are often more serious.

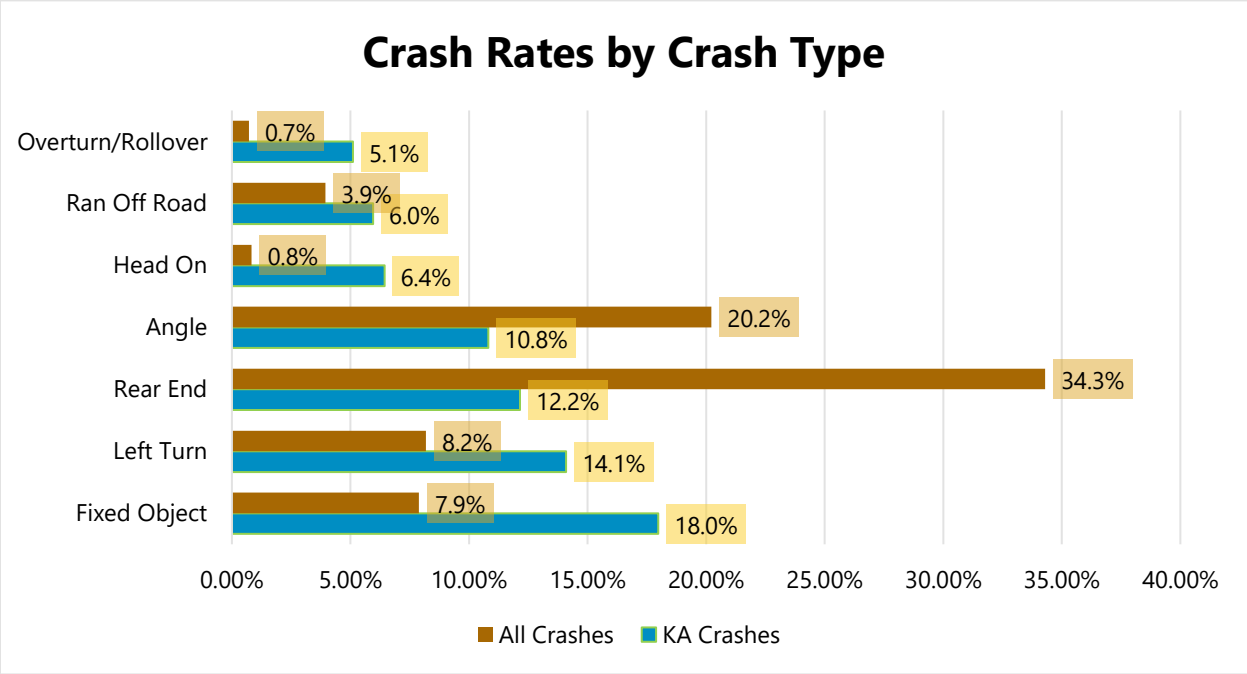



**Figure 24: Crash Rates by Crash Types (2017 – 2024)**

## High Injury Networks (HINs)

A series of HINs were developed to better understand where the most severe crashes are concentrated in the WMPO region. Using the Equivalent Property Damage Only (EPDO) methodology, which standardizes all severity crashes into a common unit, roadway segments and intersections were weighted and mapped to highlight areas with the greatest safety concerns. The WMPO's HINs include all-mode roadway segments, bicycle and pedestrian segments, High Injury Intersections (HII) and bicycle/pedestrian-specific HIIs, along with a focused HIN for the Town of Leland created as a part of the 2025 Leland SAP.

**Pedestrian and Bicyclist HIN (Figure 25)**

Figure 25 highlights where the most severe pedestrian and bicyclist crashes occur within the WMPO region, primarily in urban Wilmington. These areas have higher residential density, key destinations, and a well-developed sidewalk network, which likely contributes to increased walking and biking activity.

**Vehicle HIN (Figure 26)**

Figure 26 shows where the most severe vehicle crashes are concentrated, highlighting US 17, including US 17BUS and Market Street, as a key corridor for all modes. The NC 132/College Rd to Carolina Beach Rd corridor also stands out, reinforcing its importance in addressing multimodal safety across the region. The Wrightsville Beach area exhibits a high concentration of pedestrian and bicycle crashes, likely due to the large number of people accessing the beach on foot. Limited parking availability in the area may also encourage people to walk or bicycle rather than drive, increasing exposure to traffic and elevating the risk of crashes.

**Figure 25: Pedestrian and Bicycle High Injury Network**

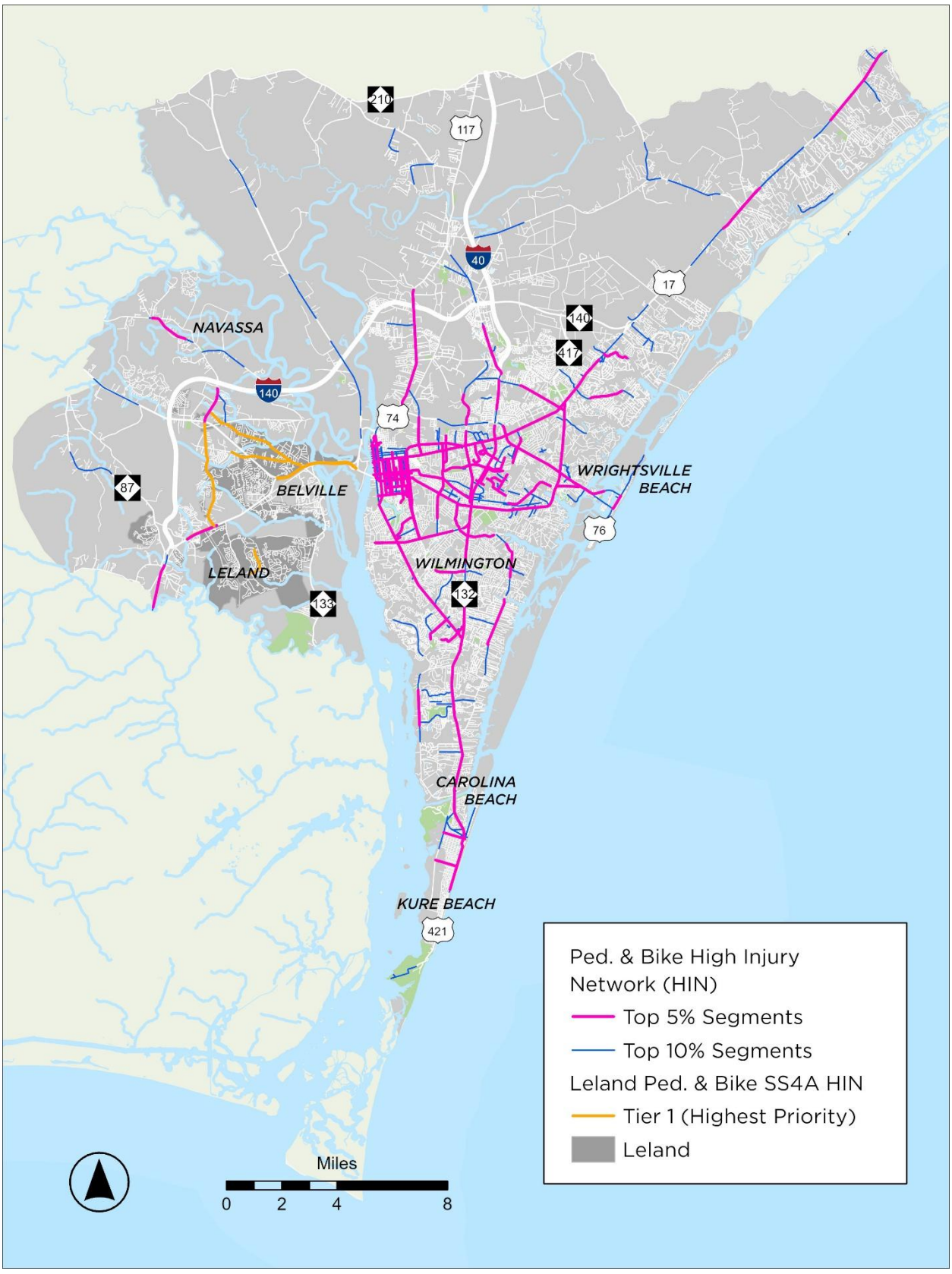
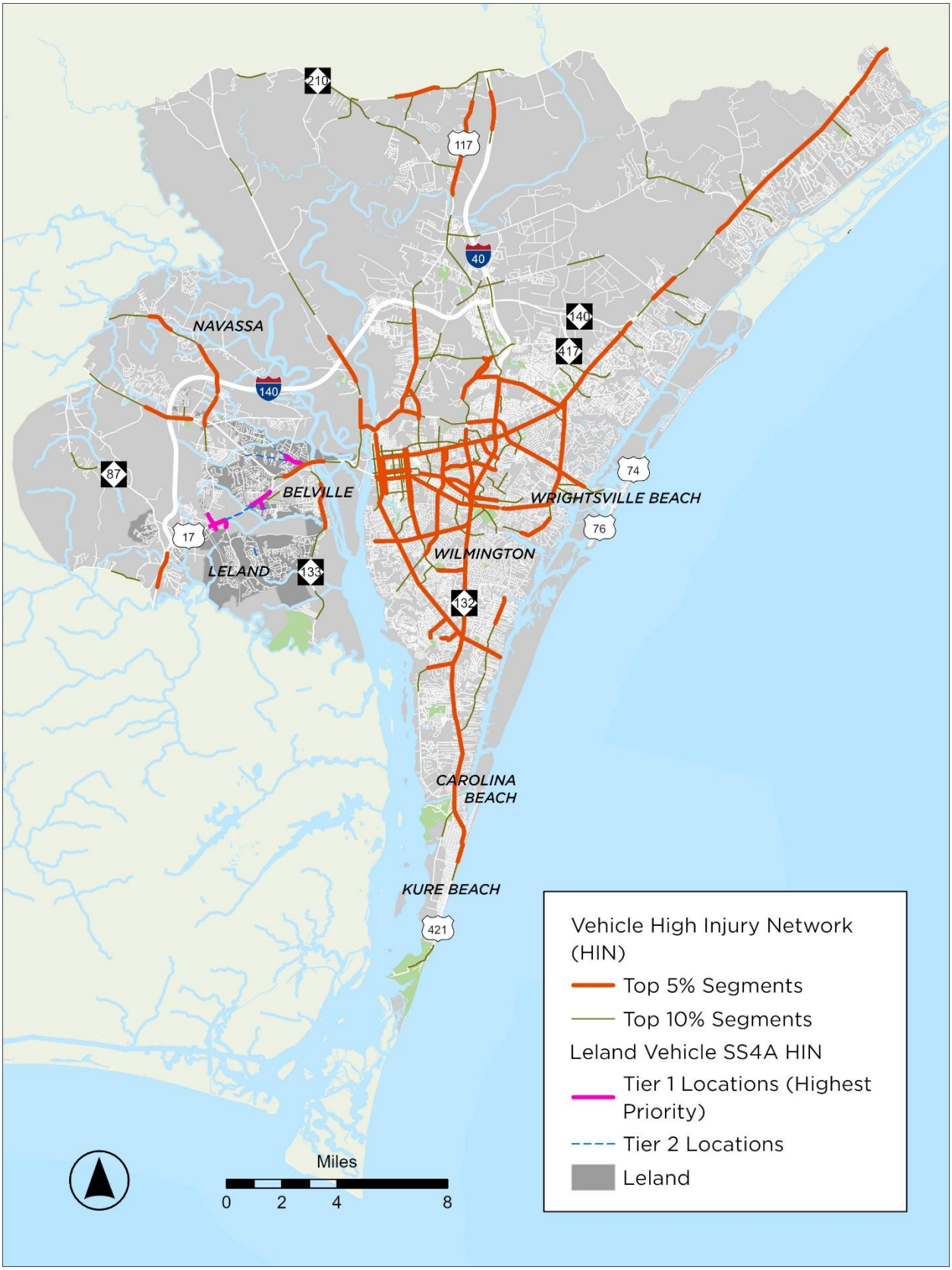


**Figure 26: Vehicle High Injury Network**



## Urban vs Rural

Location types provided additional background to safety issues in the WMPO region. While urban crashes account for the majority of all reported crashes in the MPO area (59%), rural crashes represent a disproportionate share of severe crashes, with 62% of all KA crashes occurring in rural areas. Within these contexts, certain crash types are more pronounced: lane departure crashes make up 43% of rural KA crashes, while pedestrian-involved crashes represent 22% of urban KA crashes. Other crash types remain relatively consistent between urban and rural environments. Figure 27 highlights these trends by showing the proportion of KA crashes by crash emphasis area for both location types. Lane departure and impaired driving are especially significant in rural areas, whereas pedestrian and bicycle crashes are more concentrated in urban areas. The Impaired and Older Driver EAs were the most consistent across location types, occurring at rates within 1% of each other.

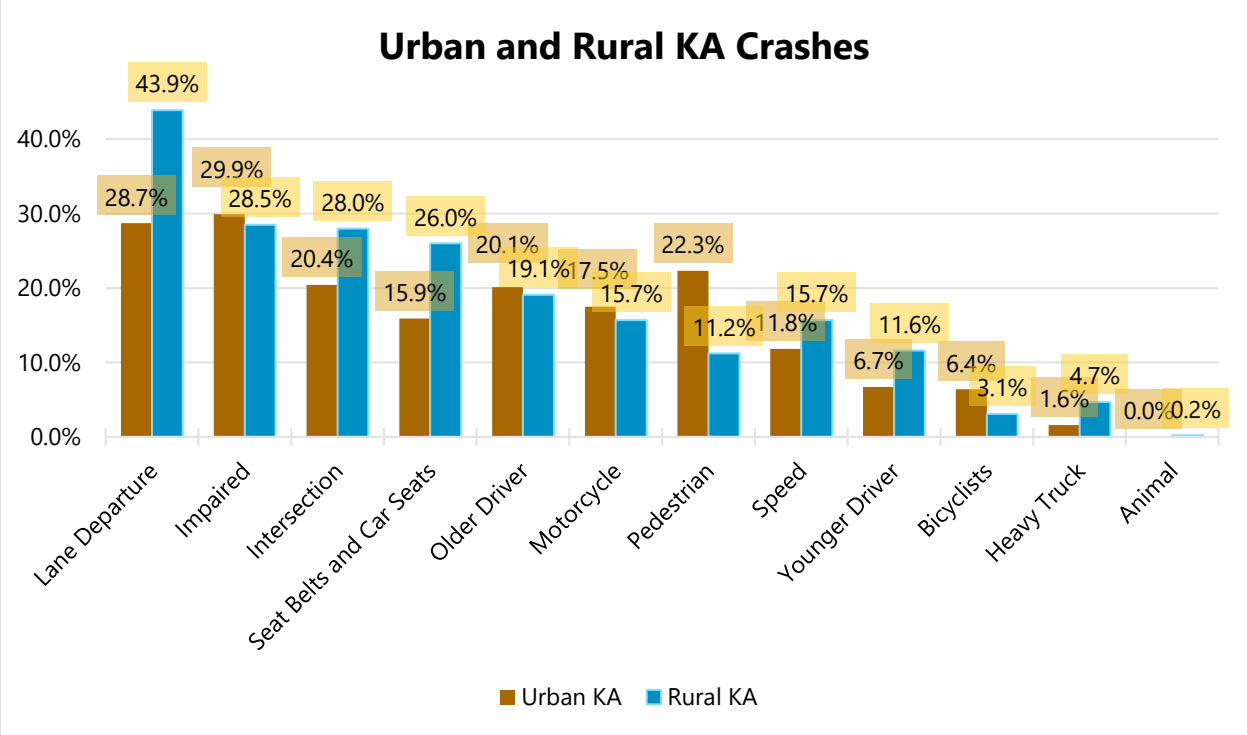



**Figure 27: Urban vs Rural Fatal and Serious Injury Crashes (2017 – 2024)**

## County Level KA Crash EAs

To identify unique safety concerns across the region, each county's share of KA crashes by EA was compared to the MPO-wide average. As Table 3 shows, proportions that exceed the MPO average by at least 1% are highlighted in red to indicate overrepresentation. Brunswick and Pender counties are overrepresented in similar EAs, varying when it comes to Heavy Trucks in Brunswick and Young Drivers in Pender. New Hanover's EAs coincide with a more urban environment with an increased frequency of not just pedestrians and bicycles, but city blocks with restaurants, stores, and bars as well.

This analysis reveals distinct crash emphasis trends across the region:

- Urban vs. Rural Patterns: New Hanover County, the region's most urbanized area, has disproportionately high rates of Intersection-related, Impaired Driver, and Pedestrian and Bicyclist crashes. In contrast, Brunswick and Pender Counties show greater overrepresentation in lane departure and seat belt–related crashes, reflecting safety challenges more frequently observed in rural areas where higher speeds and longer travel distances are common.
- Pedestrian and Bicyclist Safety: Across the MPO region, KA crash rates involving pedestrians and bicyclists are notably high when compared to state and national averages, underscoring the importance of infrastructure and safety improvements for vulnerable road users.

Understanding these localized trends helps the WMPO and its partners prioritize safety strategies that are responsive to each area's specific needs and roadway context.

**Table 3: Proportion of KA Crashes by County Relative to MPO KA Crashes by EA (2017 – 2024)**

| Empasis Area | Brunswick | New Hanover | Pender | MPO-wide |
|---|---|---|---|---|
| Animal | 0.0% | 0.2% | 0.0% | 0.1% |
| Bicyclists | 2.1% | **5.8%** | 1.4% | 4.4% |
| Heavy Truck | **6.8%** | 2.6% | 3.6% | 3.5% |
| Impaired | 21.9% | **31.4%** | 27.5% | 29.1% |
| Intersection | 21.9% | **26.4%** | 23.2% | 25.1% |
| Lane Departure | **45.9%** | 33.8% | **46.4%** | 38.1% |
| Motorcycle | 17.1% | 16.9% | 13.8% | 16.4% |
| Older Driver | 17.8% | 19.7% | 20.3% | 19.5% |
| Pedestrian | 9.6% | **19.3%** | 6.5% | 15.5% |
| Seat Belts and Car Seats | **24.0%** | 20.3% | **27.5%** | 22.1% |
| Speed | **17.8%** | 12.5% | **17.4%** | 14.2% |
| Younger Driver | 8.2% | 8.4% | **16.7%** | 9.7% |

## Crash Distribution by Route Classification

In the WMPO region, route classifications, such as Interstates, US Routes, NC Routes, Secondary Routes, and Non-System roads, correlate with ownership, maintenance, and often, crash characteristics. A comparison of crash proportions relative to their total miles within the WMPO region provides important insights into which routes present elevated safety concerns.

- NC Routes show a notable overrepresentation in serious crashes. While they comprise only 5% of the total road mileage and 6% of all crashes, they account for 10% of KA crashes, indicating that these roads pose disproportionate safety risks.

- US Routes experience the highest intensity of serious crashes when adjusted for mileage. They make up 6% of the network but account for 47% of KA crashes, nearly eight times their mileage share.
- Non-System roads, typically maintained by municipalities or private entities, form the largest share of the roadway network at 56% but represent only 13% of KA crashes, suggesting a lower severity risk relative to their prevalence.

This breakdown can help the WMPO prioritize investments and countermeasures based on where the most severe crashes are occurring, not just where the most crashes are happening overall. Prioritizing US and NC Routes, as well as Secondary Routes, may yield the most substantial improvements in reducing fatal and serious injury crashes. Figure 28 visualizes crashes by Route Class.

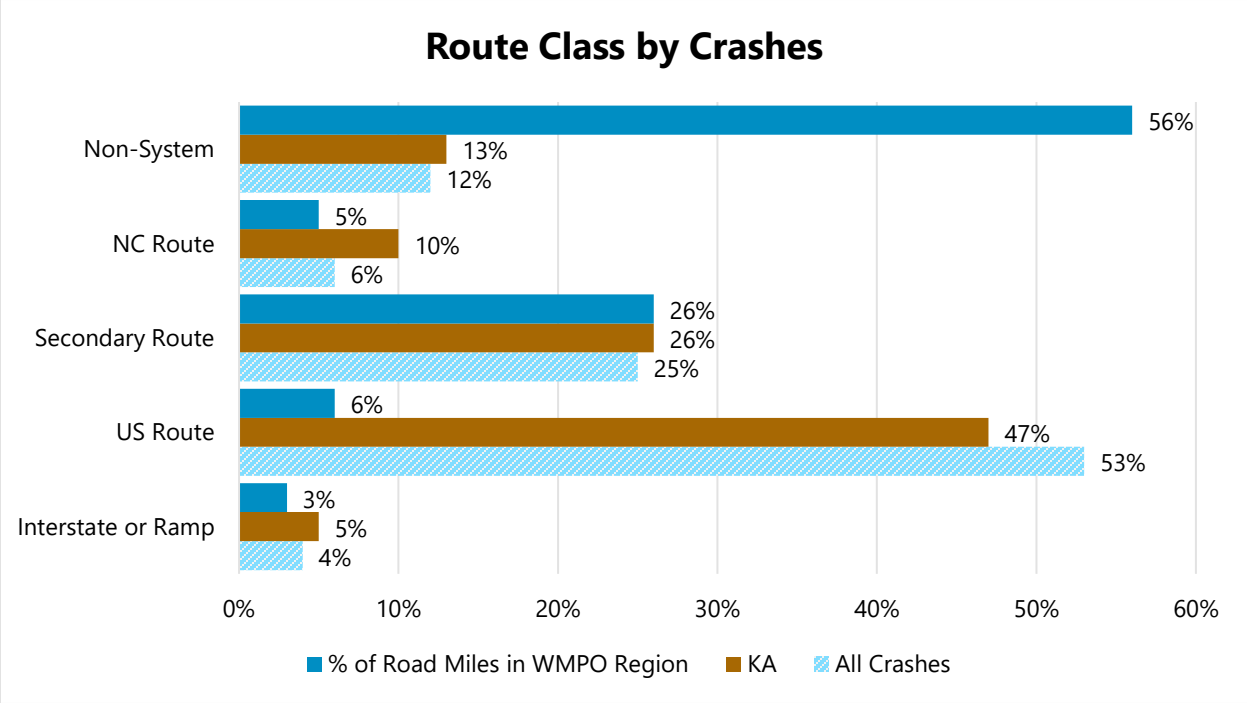



**Figure 28: Crashes by Route Class (2017 – 2024)**

## Crash Patterns by Functional Classification

Public roads in the U.S. are categorized by functional classification, which reflects their role in the transportation network, design standards, and relationship to land use. These classifications range from high-capacity facilities like Interstates and Principal Arterials to local roads and collectors. Although related to route classification, functional class captures more about roadway function than ownership.

In the WMPO region, a review of KA crashes, total crashes, and mileage by functional class reveals notable disparities. Arterial roads, including Principal Arterials, Minor Arterials, and Expressways, make up only 10% of the roadway network but account for nearly 60% of KA crashes. Principal Arterials alone are significantly overrepresented, with crash rates nearly eight times higher than their mileage share.

Minor Arterials also show an imbalance, with a higher share of serious crashes compared to all crash types. Local roads, in contrast, make up over 80% of the network but account for only 17% of KA crashes, suggesting underrepresentation in severe crash data. These trends and more are visualized in Figure 29.

It should be noted that due to geolocation limitations in crash reporting, particularly on local and lower-classified roads, the analysis of crash severity by functional class should be interpreted cautiously. Nonetheless, these findings are useful for shaping regional policy and roadway design guidance.

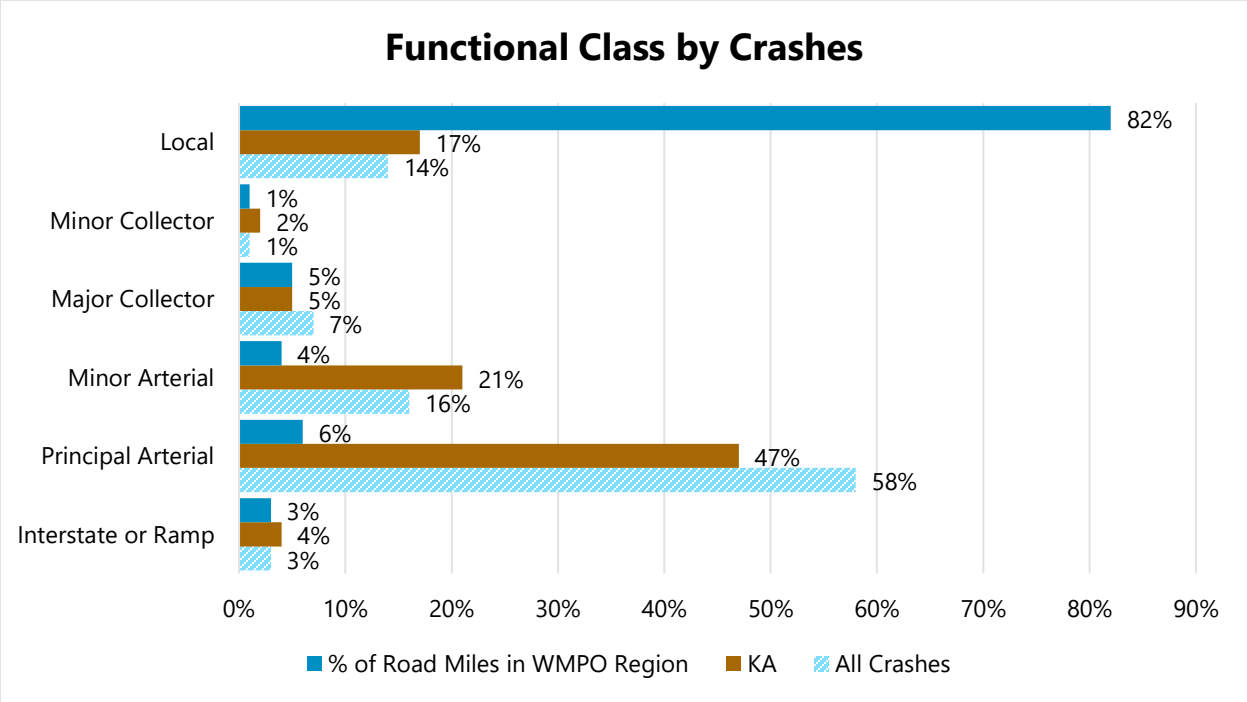



**Figure 29: Functional Class by Overall Proportion of mi. in WMPO Region, Total Crashes, and KA Crashes (2017 – 2024)**

# RISK ASSESSMENT FINDINGS

As part of the WMPO SAP, a risk-based analysis was conducted to better understand where and why the most serious crashes occur in the region. This approach combines crash history with roadway characteristics to proactively identify locations with higher crash risk, even before future crashes occur, so that safety improvements can be targeted where they will make the biggest impact.

## From Emphasis Areas to Focus Crash Types

The analysis began by identifying "focus crash types", categories of crashes that make up a disproportionately large share of the region's KA crashes compared to total crashes. For the WMPO region, the following crash types, based on EAs, were found to be overrepresented and will be the focus of future risk factor analysis:

- Lane Departure Crashes – Crashes in which a vehicle leaves the roadway, often resulting in a collision with a fixed object or overturn. These crashes frequently lead to severe outcomes due to high speeds and loss of control.
- Intersection Crashes – Crashes occurring at or related to intersections, including those involving pedestrians and bicyclists. They are often linked to turning movements, signal violations, and visibility challenges.
- Motorcycle Crashes – Crashes involving motorcycles. These are often severe due to rider exposure and lack of protective vehicle structure.
- Speed-Related Crashes – Crashes where speeding or traveling too fast for conditions was a contributing factor. Higher speeds increase crash severity and reduce driver reaction time.
- Pedestrian Crashes – Crashes involving a vehicle and a pedestrian, typically resulting in a high likelihood of fatal or serious injury due to the pedestrian's vulnerability.
- Bicyclist Crashes – Crashes involving standard bicycles or e-bikes, often occurring in shared-use environments or at intersections.
- Heavy Truck Crashes – Crashes involving large commercial vehicles. These collisions tend to cause greater damage and injury severity due to vehicle size and mass differences.

## Focus Facility Types

The next step examined "focus facility types" or roadway classifications where these high-severity crashes occur more often than expected based on the amount of roadway mileage. The analysis found that US Routes, NC Routes, and Secondary Routes are overrepresented in severe crash data. This overrepresentation likely reflects both the higher traffic volumes and design characteristics typical of these NCDOT-maintained facilities, as well as the fact that state-maintained roads generally have more complete and readily available crash reporting compared to locally maintained streets. For example, while these facilities make up only about 37% of the road mileage in the region, they account for 78% of lane departure fatal or serious injury crashes and 85% of pedestrian fatal or serious injury crashes.

Within these facility types, the memo highlights several patterns:

- US Routes consistently show the highest overrepresentation for most focus crash types, including pedestrian, heavy truck, and bicycle crashes.
- NC Routes are also heavily represented, particularly for bicycle and lane departure crashes.
- Secondary Routes see a significant share of lane departure and intersection-related KA crashes.

To identify and prioritize roadway safety improvements, the risk analysis conducted for the WMPO SAP was structured around three key dimensions: likelihood, exposure, and severity. This approach allows for a proactive understanding of where KA crashes are most likely to occur, where diverse and high-volume road user activity is concentrated, and where the consequences of crashes may be most severe due to speed. As part of this process, the analysis focused on identifying risk factors associated with the defined focus crash types and facilities. Some crash types, such as impaired driving and seat belt–related crashes, were excluded from the likelihood analysis because they are primarily influenced by behavioral or enforcement factors rather than roadway or infrastructure characteristics. These issues are best addressed through education, policy, and enforcement initiatives rather than engineering countermeasures.

## Likelihood

Likelihood refers to the statistical probability of a fatal or serious injury crash occurring on a segment or intersection, based on roadway and contextual characteristics. Logistic regression models were used to determine which combinations of factors, such as facility type, number of lanes, traffic volume, and social vulnerability, correlated most strongly with specific crash types. This analysis is summarized in Tables 5 and 6. For example, segments that were classified as US Routes, located near transit stops or schools, and had higher population and employment densities showed increased likelihood of pedestrian and bicyclist KA crashes. Likewise, intersections in urban cores with higher AADT, signalization, and four legs tended to have elevated crash risks. The tables below summarize the risk factors most correlated with the focus crash types for segments and intersections.

An orange cell indicates a risk factor correlated with a focus EA. In some cases, a risk factor was not applicable to a particular crash type because the variable itself was not relevant to the nature of that crash. For example, "Transit Stop Present" is unrelated to Lane Departure or Motorcycle crashes, as these typically occur outside pedestrian or transit environments. Similarly, some land use or contextual variables may not apply to crash types that occur primarily on higher-speed, limited-access facilities. In these cases, black cells are used to indicate that the risk factor was excluded from the model for that crash type. An empty cell indicates a risk factor that did not present a significant correlation with crash emphasis area.

**Table 4: Key for Table 5 and Table 6**

| Color | | Meaning |
|---|---|---|
| - | **Orange** | Risk factor correlated with a focus EA |
| / | **Black** | Risk factor was excluded from the model |
| – | **Empty/Blank** | Risk factor did not present significant correlation with EA |

**Table 5: Risk Factors for Segments Based on Focus Crash Types**

| Risk Factor | Lane Departure | Motor-cycle | Speed-Related | Pedes-trian | Heavy Truck | Bicycle |
|---|---|---|---|---|---|---|
| School or University Nearby | - | _ | _ | - | / | - |
| Transit Stop Present | / | / | / | _ | / | _ |
| Fewer Travel Lanes | _ | _ | - | _ | / | _ |
| More Travel Lanes | - | _ | _ | _ | / | _ |
| Higher AADT | - | - | - | - | - | - |
| Interstate Route* | / | / | / | / | - | / |
| US Route | - | - | - | - | - | - |
| NC Route | - | _ | - | - | _ | _ |
| SR Route | - | - | - | - | | |
| Rural Context Classification | _ | _ | _ | _ | _ | _ |
| Suburban Context Classification | _ | _ | _ | - | - | - |
| Urban Context Classification | _ | _ | - | - | _ | _ |
| Urban Core Context Classification | _ | _ | - | _ | - | - |
| Higher CDC Social Vulnerability Index | - | _ | - | - | / | - |
| Higher Proportion of Zero Vehicle Households | / | / | / | _ | / | _ |
| Higher Population and Employment Density | - | - | - | - | / | - |

*While Interstate Routes are typically associated with a high risk of several other crash types beyond Heavy Trucks, the limited prevalence of Interstate Routes within the WMPO resulted in a smaller sample size than other risk factors.

**Table 6: Risk Factors for Intersections Based on Focus Crash Types**

| Risk Factor | Total Intersection | Bicycle/Pedestrian Intersection |
|---|---|---|
| School or University Nearby | _ | - |
| Transit Stop Present | - | _ |
| Higher AADT | - | - |
| Urban Core Context Classification | - | _ |
| Higher CDC Social Vulnerability Index | - | - |
| Higher Proportion of Zero Vehicle Households | / | - |
| Higher Population and Employment Density | _ | - |
| Four Legs | - | - |
| Signalized | - | - |

## Crash Risk Mapping and Spatial Trends

To further illustrate the outcomes of the likelihood analysis, a series of maps was developed to visualize the spatial distribution of crash risk across the WMPO region. These maps (Figures 30–36) display the probability of KA crashes for each focus crash type, based on the risk factors identified in the logistic regression analysis. By highlighting where roadway and contextual characteristics overlap to create elevated risk, the maps provide a spatial perspective that supports data-driven decision-making and prioritization of safety improvements. The following subsections summarize key spatial patterns observed across the WMPO region for each focus crash type and for intersection-related crash risk.

**Pedestrian Crash Probability (Figure 30)**

Figure 30 shows the probability of a pedestrian crash occurring in the region. Much of the central region has moderate risk of pedestrian crash occurring, with some of the worst areas located in the downtown portion of Wilmington. US 421, US 74, Sidbury Road and Holly Shelter Road are other roads that also stand out as higher risk roadways. The neighborhoods of Greenfield Lake Estates and Glen Meade as well as other neighborhoods south and east of Greenfield Lake stand out as risky areas for pedestrians to travel in.

**Bicyclist Crash Probability (Figure 31)**

For bicyclists, the moderate risk of a crash is more widespread in New Hanover County. In addition to the more urban areas of Wilmington, sections of Kure Beach and Carolina Beach were also identified as high risk for bicyclists. Several residential areas off of Carolina Beach Road and College Road in the unincorporated areas south of Wilmington were identified as high risk in the analysis.

**Motorcycle Crash Probability (Figure 32)**

The risk assessment for Motorcycle Crashes is a stark contrast to the bicyclist and pedestrian risk assessment. Much of the region is at high risk for motorcycle crashes. US and NC routes were largely very high risk for motorcycle crashes. Although parts of the WMPO region can be rural, others tend to have higher population and employment density. Additionally, many of the regions roads are SR Routes, which were found to be correlated with motorcycle crashes.

**Speed-Related Crash Probability (Figure 33)**

The probability of this focus crash type is typically greater on higher-speed roads. However, some roadways in the Wrightsville Beach area, although generally a lower speed region (35 mph or less) were found to have a very high probability of seeing a speed-related crash. Waynick Blvd is a 4-lane roadway that was flagged, in addition to N Lumina Avenue, a 2-lane roadway with street parking at times available on either side of the road.

**Lane Departure Crash Probability (Figure 34)**

Lane Departure crashes were typically predicted on higher order, higher volume roads. Nonetheless, the analysis flagged notable local roadways as having a high probability for crashes in this emphasis area. The Pender County region near Topsail, as highlighted in the inset of Figure 34, shows residential areas with winding roadways where lane departure crashes were predicted as very highly or highly likely to occur.

**Intersection Crash Probability (Figure 35 & Figure 36)**

To support data-driven safety planning, a regional intersection crash probability model was developed to estimate the likelihood of future KA crashes at intersections across the WMPO region. The model incorporated factors such as traffic volumes, roadway geometry, intersection control type, surrounding land use, and social vulnerability. Two maps were created to visualize this output: one focused on the City of Wilmington (Figure 35) and the other covering the full WMPO region (Figure 36).

Across both maps, several key corridors emerged with concentrations of high- and very high-risk intersections. Notably, high crash probability segments are clustered along Market Street (US 17 Business), Oleander Drive (US 76), and College Road (NC 132), especially at signalized intersections and major commercial nodes. Additional risk clusters are visible along Carolina Beach Road (US 421) and Gordon Road, highlighting suburban corridors that combine moderate-to-high traffic volumes with growing development pressure. The broader regional view also shows elevated risk along NC 210, US 17 near Hampstead, and Carolina Beach Road extending south toward Kure Beach. These corridor-level patterns align with regional development and traffic trends and can help guide targeted safety improvements, particularly at signalized intersections, locations with four or more legs, and areas with overlapping equity concerns or multimodal needs.

**Figure 30: Pedestrian Crash Probability - Segments**

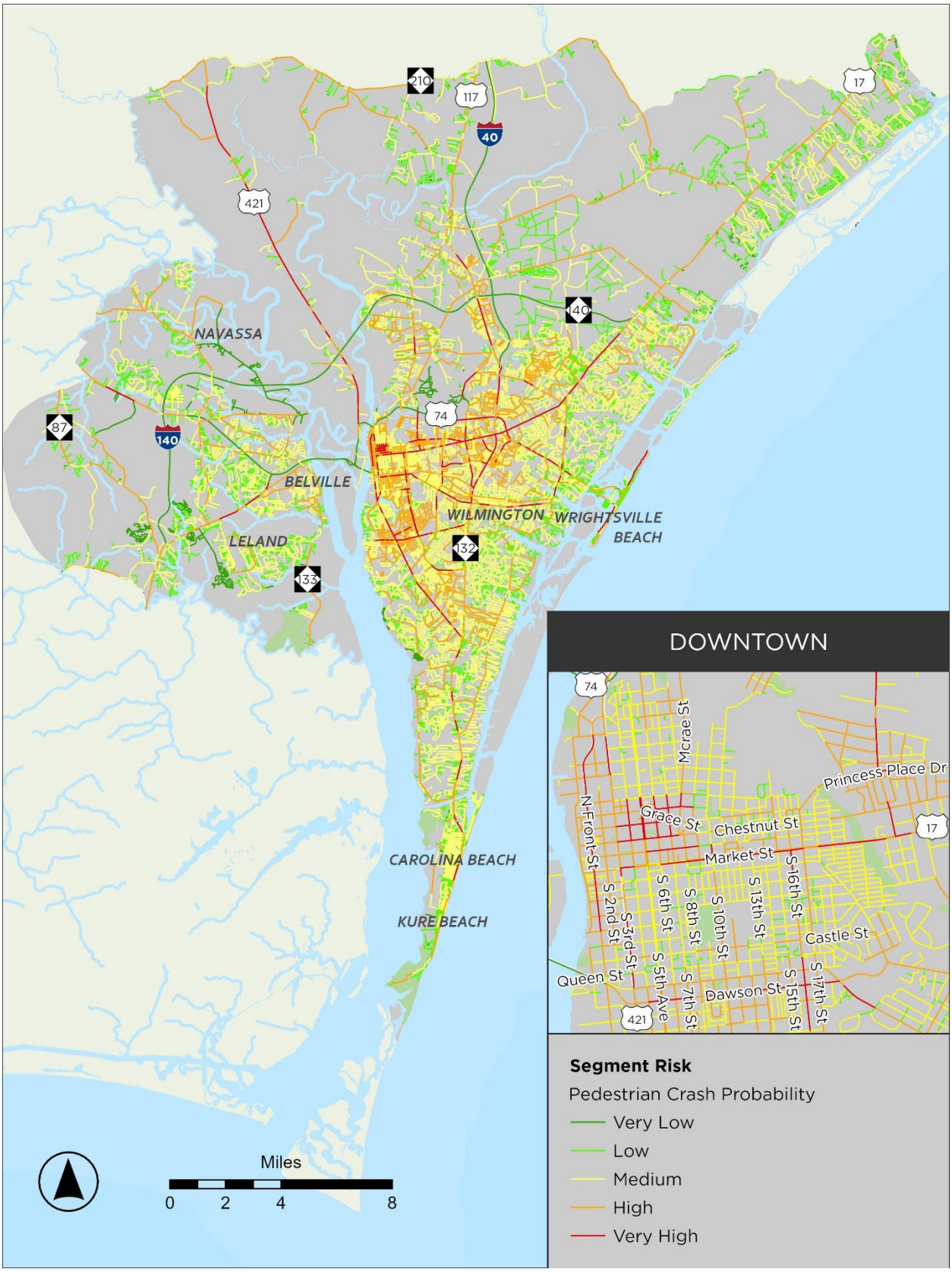


**Figure 31: Bicycle Crash Probability – Segments**

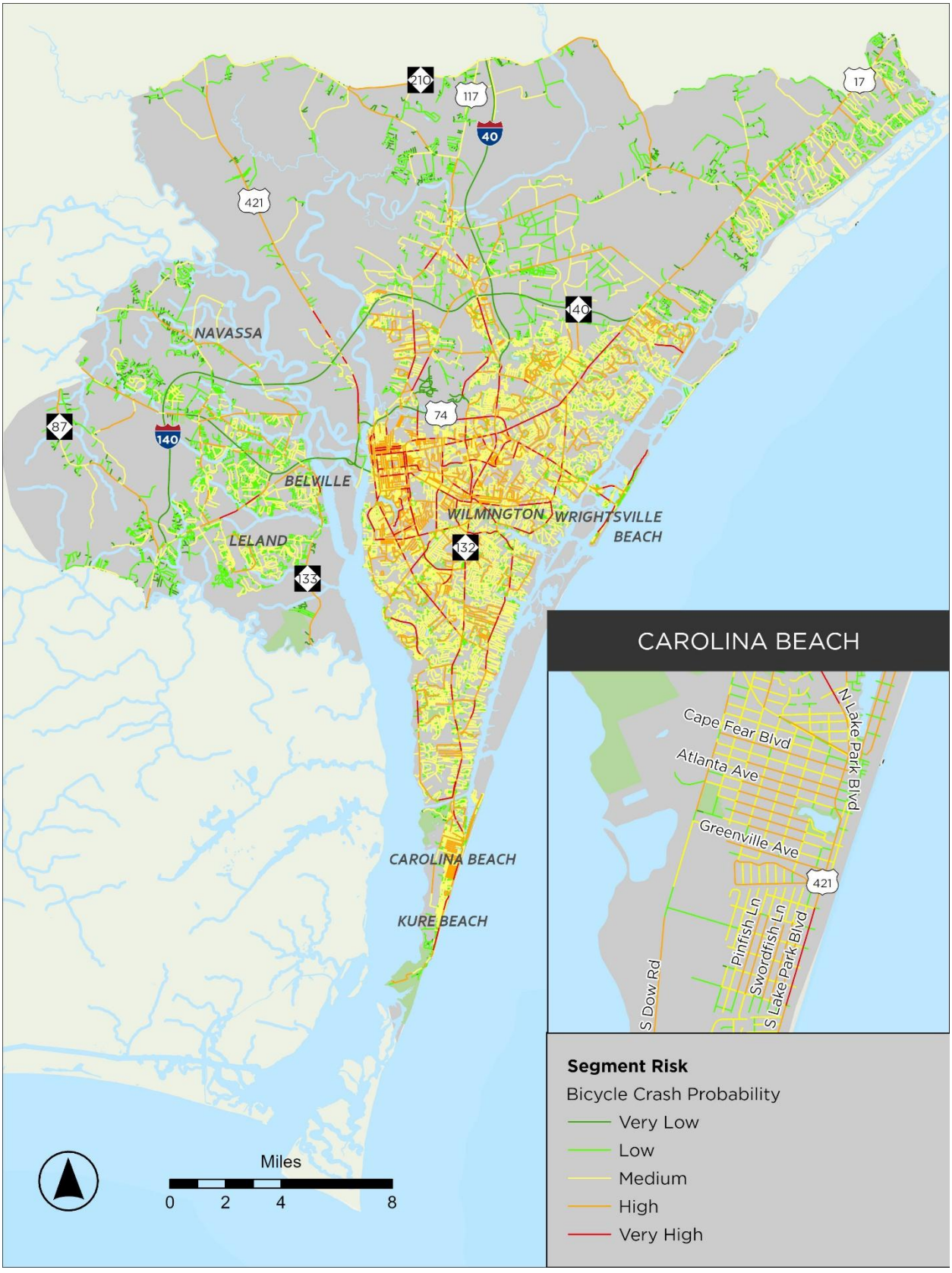


**Figure 32: Motorcycle Crash Probability – Segments**

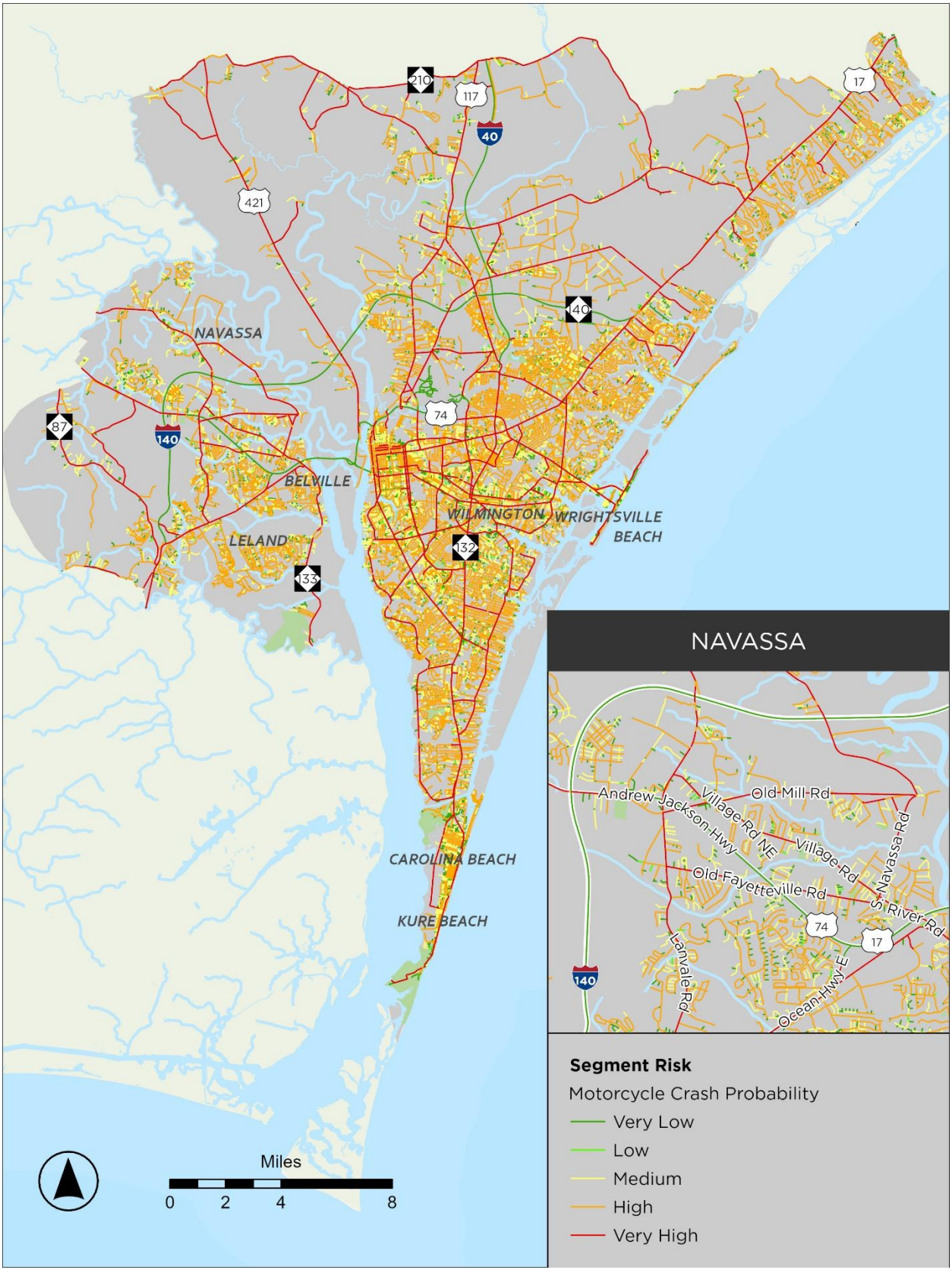


**Figure 33: Speed-Related Crash Probability – Segments**

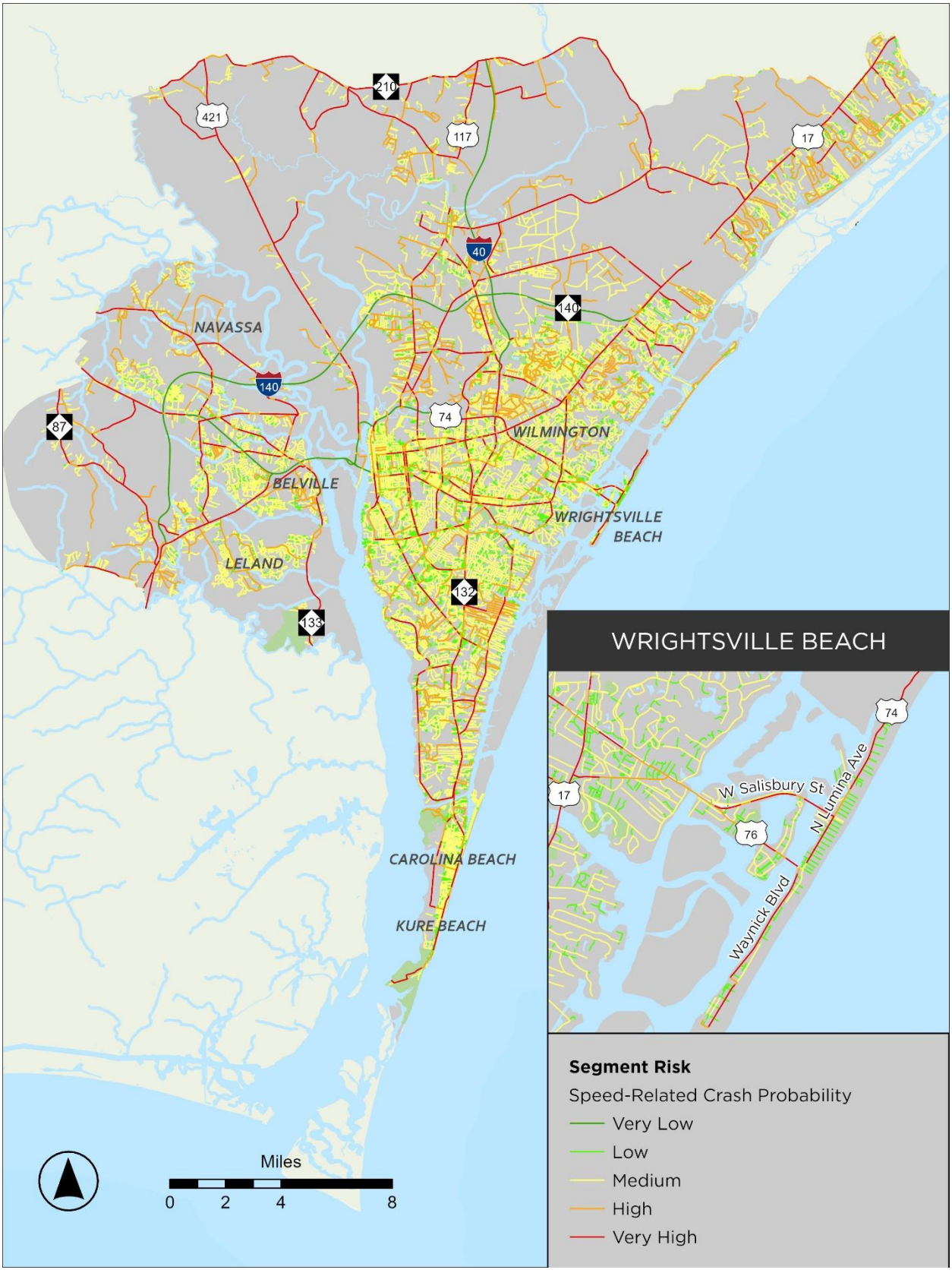


**Figure 34: Lane Departure Crash Probability – Segments**

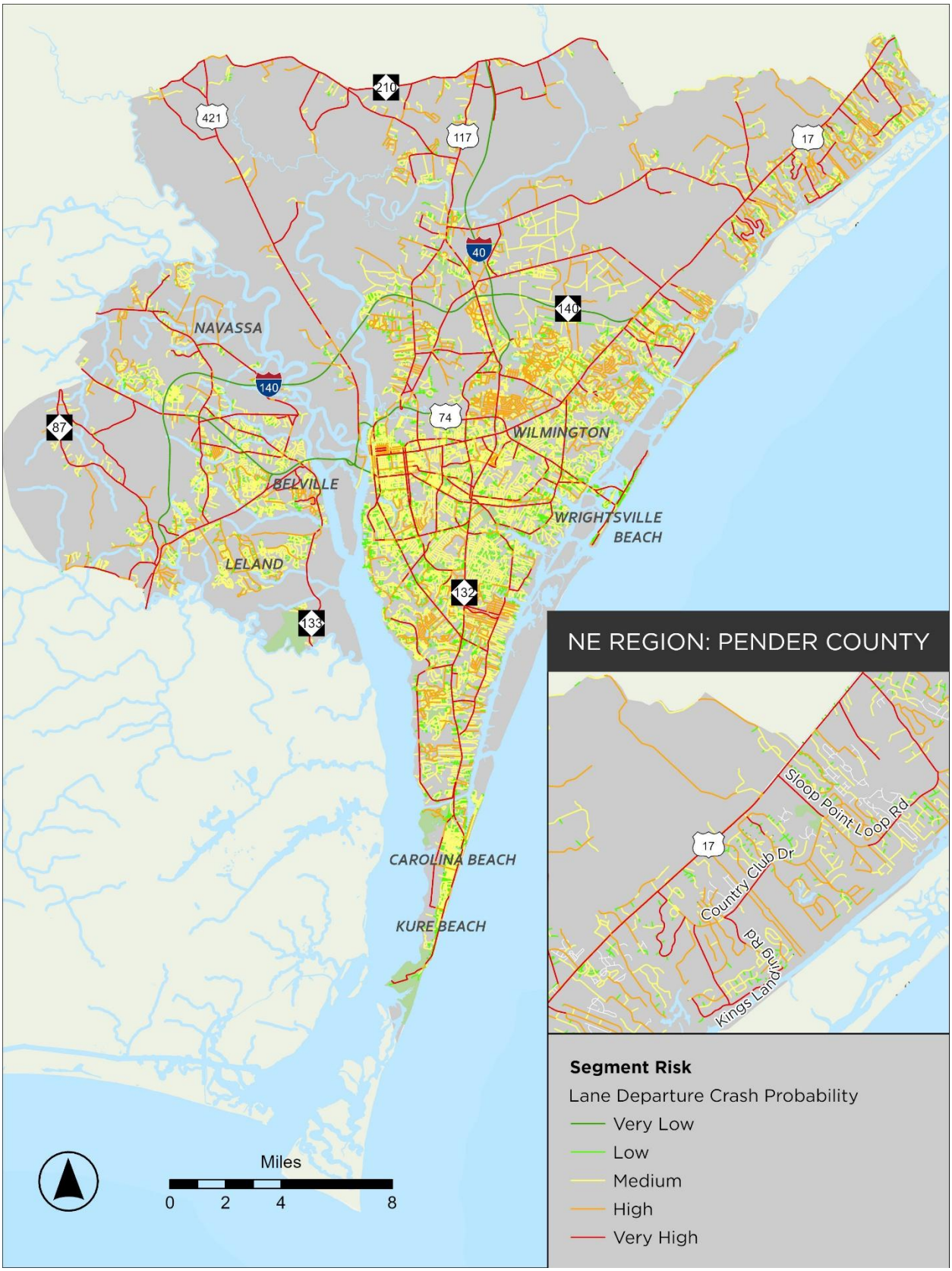


**Figure 35: KA Crash Probability – Wilmington Intersections**

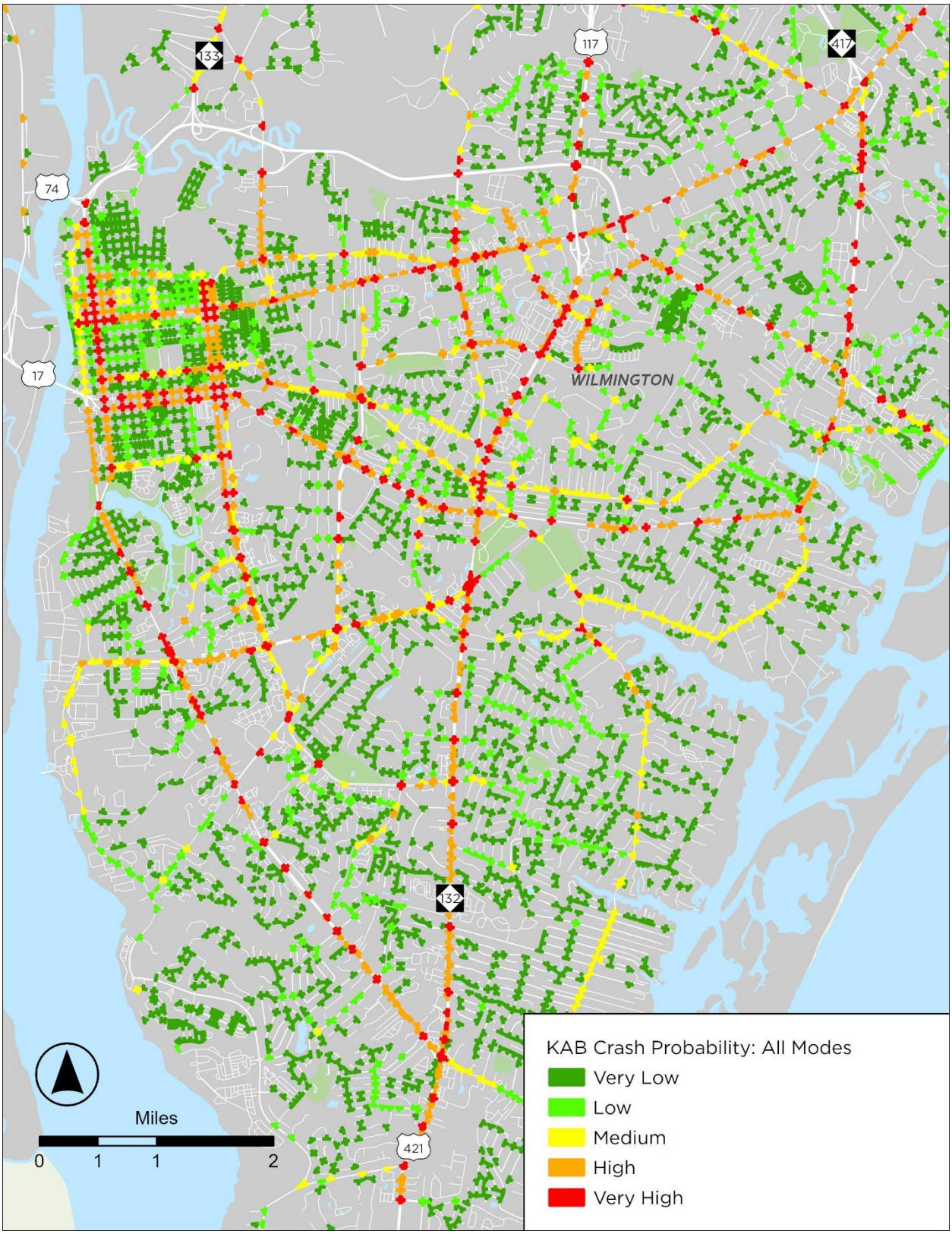
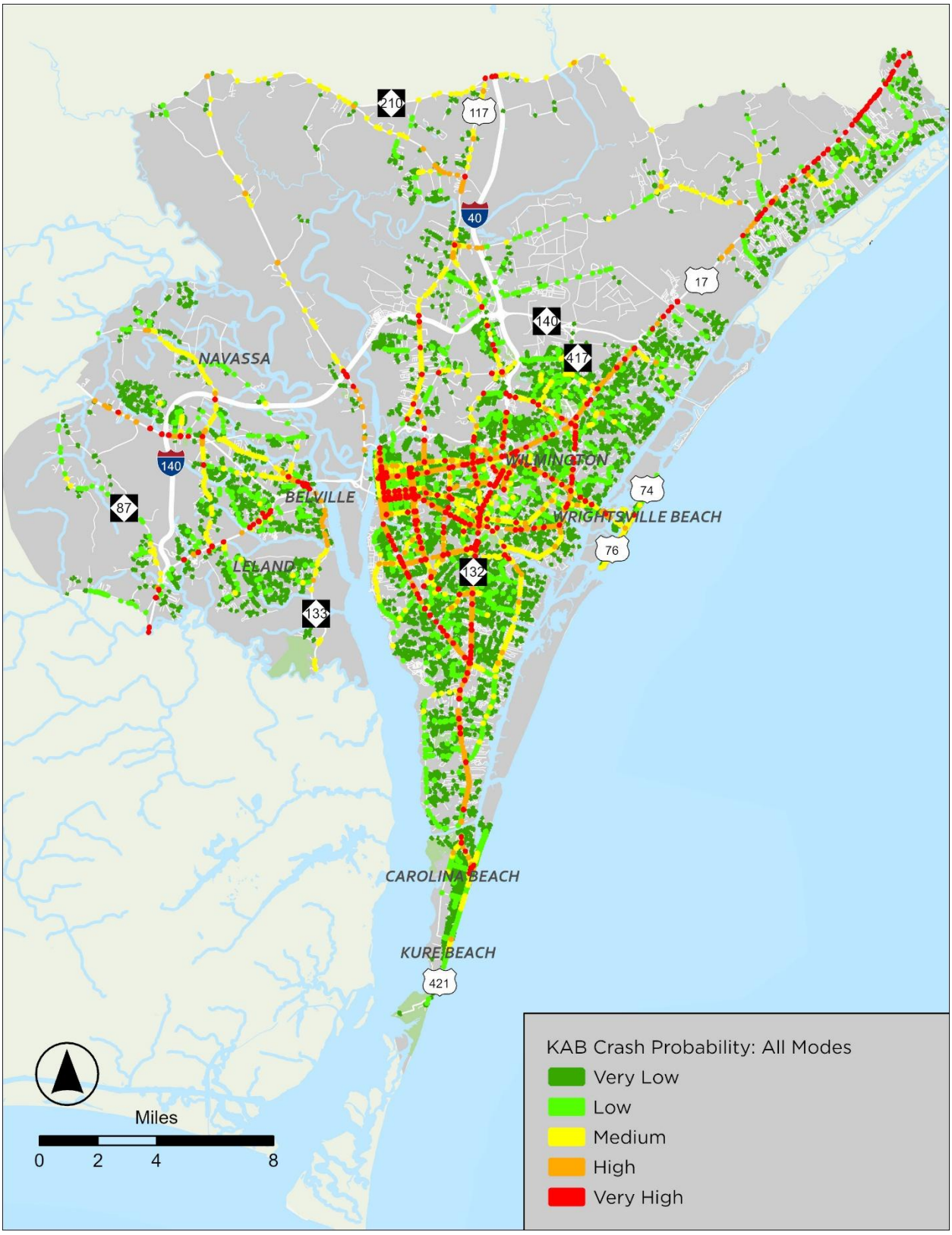


**Figure 36: Intersection Crash Probability - WMPO Region**



## Exposure

To better understand the conditions contributing to serious crashes across the WMPO region, an exposure assessment was conducted focusing on two key factors: traffic volume and contextual land use. Together, these elements help explain not only where crashes may be more likely to occur, but also why certain corridors pose a higher risk.

The first component examined Annual Average Daily Traffic (AADT) to identify roadways with elevated vehicle volumes. Corridors such as US 17 in Hampstead, US 421 south of Wilmington, College Road (NC 132), and Market Street (US 17/US 74/US 76) emerged as high-exposure segments due to consistently high traffic volumes. These high-risk corridors often align with segments of the previously identified High Injury Network and are characterized by frequent access points, higher speeds, and limited multimodal accommodations, factors that elevate both the probability and severity of crashes.

The second component assessed land use context, identifying urban core areas like Downtown Wilmington, Castle Street, and parts of Carolina Beach Road as especially complex due to higher intersection density, multimodal activity, and mixed land use patterns. These areas present unique risks even at lower traffic volumes, as the interaction between vehicles, pedestrians, and bicyclists increases the chance of conflict. Similarly, urban and suburban nodes in Leland and around Monkey Junction also exhibited elevated contextual risk due to growing development and connectivity pressures.

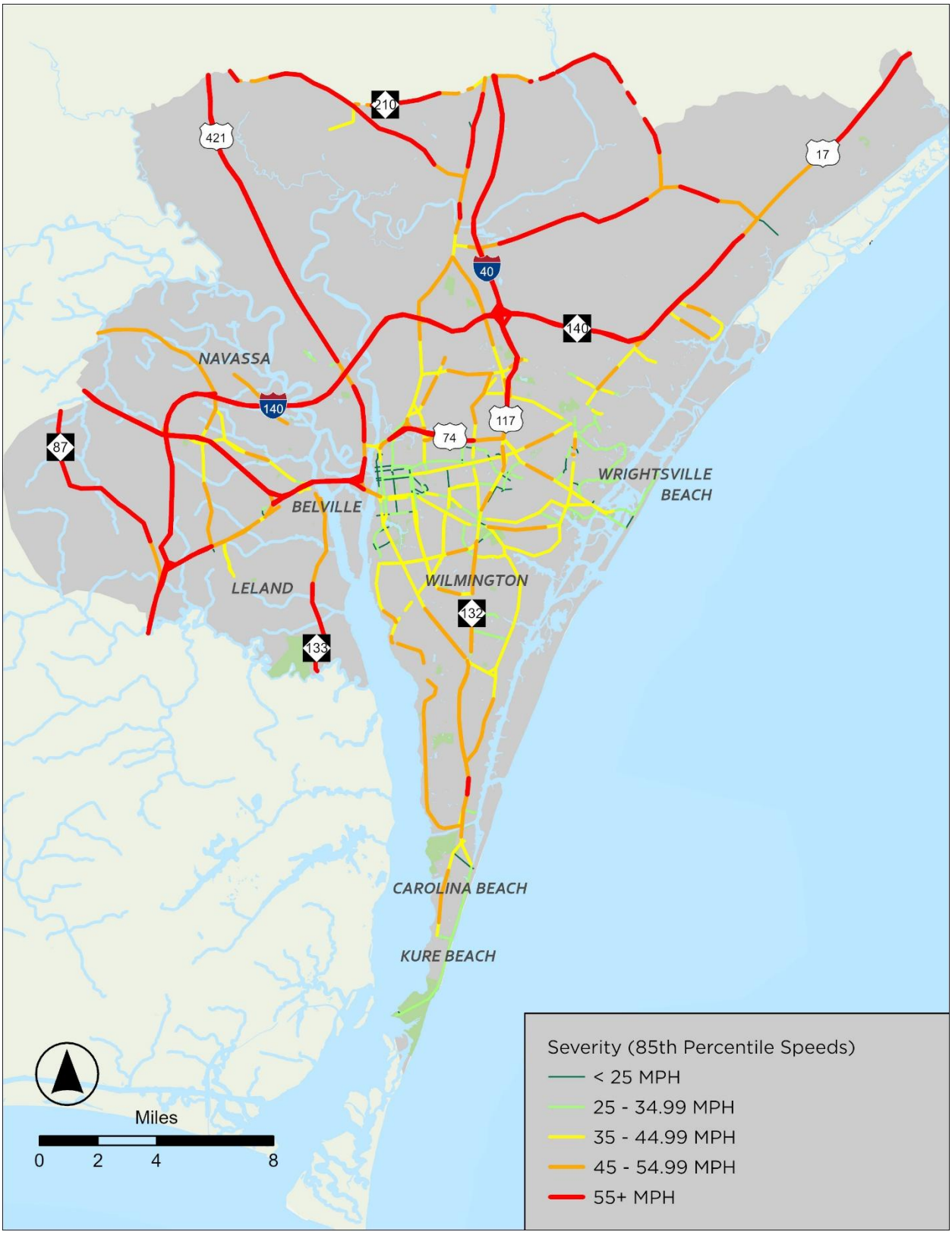
Taken together, these two dimensions of exposure reveal that both volume-driven corridors and dense urban areas demand special attention. High-volume routes like Oleander Drive (US 76/US 17) and College Road (NC 132) may benefit from speed management or access control, while urban core areas may require enhanced pedestrian crossings, visibility improvements, and design elements that reduce driver aggressiveness and increase user awareness.

## Severity

Severity examines corridors and intersections with the highest observed travel speeds, particularly using 85th percentile weekday speeds. These areas carry the greatest risk of kinetic energy transfer in a crash, elevating the chance that a crash will result in severe injury or death. Overlaying this with crash likelihood and exposure helps refine which locations should be prioritized for speed mitigation measures. Figure 37 shows where speeds are the highest in the region, and where these more severe crashes are likely to occur. As the map shows, roadways such as I-140, I-40, as well as US routes throughout the region, are the most likely places for high severity crashes based on the speed that most of the population travels at on any given weekday. Although severity tends to increase on high-speed roads, it is important to note that high severity crashes may still happen at lower speed roads, particularly where there are various vulnerable road users also sharing the roadway.

Together, these three components, likelihood, exposure, and severity, offer a comprehensive risk framework to identify high-risk locations across the WMPO region. This framework is foundational for later stages of the SAP, ensuring countermeasures are strategically targeted and resources are efficiently allocated to areas where lives are most at risk.

**Figure 37: Severity - 85th Percentile Speeds on a Weekday**



## Summary of High-Risk Network Findings

The High-Risk Network (HRN) analysis identifies specific corridors and intersections within the WMPO region where severe crashes are disproportionately concentrated. By focusing on locations that fall within the top proportion of crash risk for each crash type, the analysis helps prioritize where safety interventions are most urgently needed and what types of treatments may be most effective.

**Intersection Crashes**

A small set of crash types, namely head-on, angle, fixed object, left-turn (same roadway), and rear-end crashes, make up more than half of all KA crashes at intersections. These crash types are especially prevalent at the region's highest-risk intersections, with the top 5% of intersections accounting for nearly half of all KA crashes and an even greater share of certain types, such as 70% of angle crashes and 56% of left-turn crashes. This pattern suggests that safety improvements at a limited number of key intersections could significantly reduce overall crash severity in the region.

**Roadway Segment Crashes**

A similar concentration of severe crash types is observed along roadway segments. The same five crash types account for over half of all KA crashes on non-intersection segments. The most critical segments, such as those falling within the top 5% for lane departure, speeding, pedestrian or bicycle crashes, capture a disproportionate share of severe outcomes. For example, top lane departure segments account for 66% of all KA crashes, including 84% of head-on and 60% of fixed-object crashes. Segments flagged for speed-related risk account for the majority of angle, left-turn, and rear-end crashes. High-risk segments for pedestrians and bicyclists similarly account for more than half of their respective KA crashes.

The risk assessment revealed that a small number of crash types and roadway conditions account for a disproportionate share of fatal and serious injury crashes in the WMPO region. Lane departure, intersection-related, and vulnerable road user crashes, especially those involving pedestrians and bicyclists, emerged as top priorities. These severe crashes are strongly concentrated on US, NC, and Secondary Routes, particularly in segments or intersections with recurring patterns such as high speeds, complex turning movements, or poor visibility. The findings confirm that a targeted approach that focuses on key crash types, high-risk facility types, and top contributing factors, will be essential to making meaningful safety improvements. These insights will directly inform the identification of risk factors and potential countermeasures in the next phase of the WMPO SAP.

# Next Steps

The completion of the existing conditions analysis provides a strong foundation for advancing the WMPO SAP. Building on the first phase of public engagement conducted earlier in the project, the next phase will focus on gathering feedback on draft countermeasures and strategies through a series of open houses, pop-up events, and stakeholder meetings. These activities are designed to ensure that the voices of community members, especially those from traditionally underserved areas, continue to inform the plan's recommendations and implementation priorities.

Following this second round of engagement, the project team will synthesize community feedback and existing safety data to identify key risk factors, develop a vision and goals for roadway safety, and propose a list of actionable strategies and countermeasures. These will include both policy-level recommendations and project-specific improvements, such as infrastructure changes or programmatic initiatives, tailored to the needs of the region. Equity, feasibility, and impact will guide project prioritization.

Ultimately, these components will be combined into a comprehensive SAP that positions WMPO and its member jurisdictions to pursue implementation funding and realize measurable reductions in transportation-related fatalities and serious injuries.

# Attachment A

Acronyms and other abbreviations used in this memorandum

| Acronym | Full Description |
|---|---|
| AADT | Annual Average Daily Traffic |
| ADA | Americans with Disabilities Act |
| CMP | Congestion Management Process |
| CTP | Comprehensive Transportation Plan |
| EAs | Emphasis Areas |
| EPDO | Equivalent Property Damage Only |
| HAWK | High Intensity Activated Crosswalk |
| HII | High-Injury Intersections |
| HIN | High-Injury Network |
| HRN | High-Risk Network |
| IMD | Integrated Mobility Division |
| IMP | Integrated Mobility Plan |
| KABCO | K=Fatality, A=Serious Injury, B=Minor Injury, C=Possible Injury, O=Property Damage Only |
| MPO | Metropolitan Planning Organization |
| MTP | Metropolitan Transportation Plan |
| MUP | Multi-Use Path |
| PBCAT | Pedestrian and Bicyclist Crash Analysis Tool |
| PSAP | Pedestrian Safety Action Plan |
| RRFB | Rectangular Rapid Flashing Beacons |
| SAP | Safety Action Plan |
| SHSP | Strategic Highway Safety Plan |
| SPOT | Strategic Prioritization Office of Transportation |
| SS4A | Safe Streets for All |
| SSA | Safe System Approach |
| STIP | State Transportation Improvement Program |
| TDM | Transportation Demand Management |
| UNCW | University of North Carolina Wilmington |
| VRU | Vulnerable Road User |
| WMPO | Wilmington Urban Area Metropolitan Planning Organization |