Bar Harbor Safety Action Plan: Data Analysis Memo

Data Analysis Memo summarizing and interpreting the transportation safety landscape in Bar Harbor. This memo will include a baseline review of existing state and local plans and policies, contain an overview of the data collection program, and document the data analysis used to establish the High Injury Network in Bar Harbor.

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Town of Bar Harbor

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Town of Bar Harbor Safety Action Plan

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Table of Contents

List of Figures

List of Tables

1 Baseline Review of Existing State and Local Plans and Policies

In order to gain a deeper understanding of how existing conditions and proposed changes in the town may impact the safety of Bar Harbor's transportation network, the following local and state policies and plans were reviewed:

- **Town of Bar Harbor**
  - Comprehensive Plan Update, June 2007
  - Bar Harbor 2035, Draft
  - Climate Action Plan, November 2021
  - Bar Harbor Land Use Ordinance, Chapter 194: Vehicles and Traffic
- **Acadia National Park**
  - Acadia National Park Final Transportation Plan / Environmental Impact Statement, March 2019
- **College of the Atlantic**
  - StoryMap: Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, May 2022
  - StoryMap: Multi-use Paths on Mount Desert Island, November 2022
- **Bar Harbor Hospitality Group**
  - Your Guide to Biking Acadia National Park & Bar Harbor
- **State of Maine**
  - Maine's 2022 Strategic Highway Safety Plan, December 2022
  - Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017
  - StoryMap: MaineDOT 2024 Safety Initiatives
  - Maine Vulnerable Road User Safety Assessment, November, 2023
  - Maine State Active Transportation Plan, March 2023

1.1 Summary of Plans and Policies

1.1.1 Town of Bar Harbor

Comprehensive Plan Update, June 2007

This plan provides the legal basis for Land Use Ordinances and guides capital improvements' decisions as well as operations. It is an encompassing document, affecting all Town Departments in service delivery and setting priorities. The vision set forth for the year 2020 states that the downtown will continue to be to core of the community, proving services, shops, and restaurants. Route 3 and Route 102 will continue to be the principal corridors, but with improvements to slow traffic and increase safety for walkers and bikers.

Bar Harbor 2035, 2025 (Draft)

This plan is currently in draft form but was still reviewed in addition to the adopted plan from 2007. This plan represents a "big picture" of the community, allowing officials and citizens to explore their community's major opportunities and challenges and clarify their ideas on the kind of community they would like to live in. Bar Harbor's vision for 2035 is: "Bar Harbor's vibrancy stems from the mix of people and the dramatic natural and cultural beauty of our place. Together, we build upon our diverse economic strengths, and through partnerships, we create solutions that meet year-round and seasonal needs. Our resilient and sustainable community includes sufficient equitable housing, robust infrastructure, and efficient transportation. We work through our differences to strengthen our collective sense of community. We take care of each other, and we take care of our place."

Climate Action Plan, November 2021

This plan outlines a comprehensive strategy to achieve net-zero emissions in Bar Harbor by 2030. It addresses the climate emergency through five key strategies: transitioning to 100% renewable energy, electrifying and improving energy efficiency in buildings, promoting sustainable transportation, engaging and educating the public, and integrating sustainability into governance. The plan includes specific actions such as developing community solar farms, replacing municipal fleets with electric vehicles, conducting energy audits, and hiring a Sustainability Coordinator. It emphasizes local action to mitigate climate change impacts and aims to create a sustainable, resilient community.

Bar Harbor Land Use Ordinance, Chapter 194: Vehicles and Traffic

This chapter of the Town's Land Use Ordinance outlines regulations to ensure the orderly flow of pedestrian and vehicular traffic, enhance public safety, and manage parking. The document addresses the operation of vehicles, including bicycles, and sets out pedestrian rights and duties. Enforcement measures, such as penalties for violations and the authority to remove obstructive vehicles, are detailed in this chapter of the ordinance.

1.1.2 Acadia National Park

Acadia National Park Final Transportation Plan / Environmental Impact Statement, March 2019

This plan outlines a comprehensive approach to providing safe and efficient transportation to visitors to Acadia National Park while ensuring that park resources are protected, and visitors can enjoy their experience. The plan examines current and potential visitor transportation and access opportunities and develops long-term strategies for providing access, connecting visitors to key destinations, and managing visitor use. Many of the park's previous planning and management documents do not reflect the current magnitude of visitors to the park, so this plan provides updated guidance for addressing current and future transportation strategies, management techniques, and resource protection concerns.

1.1.3 College of the Atlantic

StoryMap: Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, May 2022

This StoryMap was created by College of the Atlantic students in 2022. It outlines Bar Harbor's efforts to promote active transportation as part of its climate action plan. It highlights the town's commitment to reducing greenhouse gas emissions by 2030 through infrastructure improvements that support walking, cycling, and other non-motorized transportation. Key recommendations include creating pedestrian-only areas, implementing complete streets, extending shared-use paths, and enhancing safety at key intersections. The plan emphasizes the economic, health, and community benefits of active transportation, aiming to make Bar Harbor a safer, sustainable, and enjoyable place for both residents and visitors.

StoryMap: Multi-use Paths on Mount Desert Island, November 2022

This StoryMap was completed by a senior at College of the Atlantic in 2022. It focuses on identifying locations for additional multi-use paths on Mount Desert Island (MDI). It includes recommendations for connecting Bar Harbor, Northeast Harbor, and Southwest Harbor with separated multi-use paths, improving safety at key intersections, and utilizing powerline right-of-ways for new trails. The project emphasizes the importance of active transportation for reducing greenhouse gas emissions, enhancing public health, and providing economic benefits. It also highlights the challenges of constructing new multi-use paths, including funding, community engagement, and maintaining historical and environmental integrity.

1.1.4 Bar Harbor Hospitality Group

Your Guide to Biking Acadia National Park & Bar Harbor

This online guide provides a comprehensive overview of biking in Acadia National Park and Bar Harbor, highlighting the area's scenic beauty and diverse trails suitable for cyclists of all skill levels. It offers practical advice on bike rentals, including options for hybrid, mountain, and e-bikes, and emphasizes the importance of safety gear and preparation. The guide also details various biking routes, such as the Acadia carriage roads and road cycling paths and provides tips for transporting and storing bikes.

1.1.5 State of Maine

Maine's 2022 Strategic Highway Safety Plan, December 2022

Maine's 2022 Strategic Highway Safety Plan aims to reduce fatalities and serious injuries on Maine's highways through a comprehensive, data-driven approach. The plan focuses on improving travel safety for all transportation system users by addressing enforcement, engineering, education, and emergency services. Key goals include coordinating safety improvement efforts among various agencies, guiding investment decisions towards effective strategies, and enhancing data-sharing among stakeholders. The plan identifies several focus areas, such as lane departure, illegal/unsafe speed, occupant protection, younger drivers, impaired driving, distracted driving, mature drivers, motorcycles, winter crashes, intersection crashes, commercial trucks and buses, pedestrians and bicyclists, large animals, work zones,

and emergency medical services. The plan emphasizes collaboration with Metropolitan Planning Organizations, Regional Planning Organizations, and Tribal Communities to address local safety concerns and integrate safety into transportation planning efforts.

Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017

This plan aims to enhance pedestrian safety at uncontrolled intersections. Developed as part of the Federal Highway Administration's (FHWA) Safe Transportation for Every Pedestrian (STEP) initiative, the plan recommends five specific countermeasures: enhancing crosswalks, raised crosswalks, median refuge islands, pedestrian hybrid beacons, and road diets. The plan emphasizes the creation of a countermeasure toolbox, the importance of cost-benefit analysis, and the expansion of pedestrian and bicyclist count programs. It also highlights the need for better cost-benefit information and collaboration with local governments to implement these measures effectively.

StoryMap: MaineDOT 2024 Safety Initiatives

The 2024 Safety Initiatives StoryMap by MaineDOT aims to enhance the safety and reliability of Maine's transportation network. The plan introduces a new Roadway Context Classification System, which categorizes roads based on their surrounding environment to guide speed limit settings and Complete Streets policies. The updated speed limit methodology aligns with the Safe System Approach, focusing on achieving safer speeds through contextually appropriate measures. The Complete Streets Policy has been revised to ensure the safety and mobility of all transportation system users, incorporating the new context classifications. Additionally, the Local Cost Share Policy has been updated to facilitate fair cost-sharing for transportation projects, supporting the implementation of safety initiatives. The plan also includes a demographic overview to improve outreach and engagement with Maine residents.

Maine Vulnerable Road User Safety Assessment, November 2023

The Maine Vulnerable Road User Safety Assessment aims to improve the safety of pedestrians and bicyclists across the state. The plan analyzes data from 2018-2022 to identify high-risk areas and outlines strategies to enhance safety, including infrastructure improvements, speed management, and targeted enforcement. It emphasizes the importance of collaboration with local communities and stakeholders and integrates elements from Maine's Strategic Highway Safety Plan and Active Transportation Plan. The assessment also considers demographic factors and aims to address the needs of disadvantaged communities to ensure equitable safety improvements. This assessment identifies Bar Harbor as one of the towns with disadvantaged census tracts that experienced at least three pedestrian or bicyclist fatalities or serious injuries during the 2018-2022 evaluation period. Specifically, Bar Harbor had four pedestrian fatalities or serious injuries and is listed as a high-risk area for vulnerable road users.

Maine State Active Transportation Plan, March 2023

The Maine State Active Transportation Plan aims to enhance pedestrian and bicyclist safety, expand mobility, support economic development, reduce greenhouse gas emissions, and improve the quality of life for Maine residents and visitors. The plan includes an assessment of current practices, infrastructure, and safety trends, and outlines goals and strategies to improve on-road and off-road active transportation networks. Key goals include making cost-effective improvements, expanding trail networks, enhancing multimodal connections, improving education and outreach, and identifying new funding opportunities.

The plan emphasizes collaboration with stakeholders and regular progress reviews to ensure successful implementation.

1.2 Key Safety Goals

The safety goals outlined in the reviewed plans and policies for Bar Harbor and Maine aim to create a safer, more connected, and equitable transportation network. Key objectives include adopting Vision Zero and Complete Streets policies to eliminate traffic fatalities and ensure safe access for all users. Enhancing public health and community wellbeing, supporting active and public transportation, and improving infrastructure and connectivity are also prioritized. The goals emphasize education and outreach, collaboration among stakeholders, and strategic planning to guide investment decisions and resource sharing. Specific pedestrian safety enhancements, such as improved crosswalk visibility and raised crosswalks, are also highlighted.

The following key safety goals were identified in the policies and plans reviewed:

Vision Zero and Complete Streets

- Work toward a Vision Zero-type strategy and additional wayfinding to decrease traffic fatalities and severe injuries, while providing safe, healthy, equitable mobility for all. (Bar Harbor 2035, Draft)
- Adopt a Complete Streets Policy that is consistent with Maine Department of Transportation's Policy. (Bar Harbor 2035, Draft)
- Implement a substantive update of MaineDOT's Complete Streets Policy, provide training, and integrate Complete Streets principles into the project development process. (Maine Vulnerable Road User Safety Assessment, 2023)

Active Transportation

- Make prioritized, cost-effective improvements to the on-road Active Transportation network. (Maine State Active Transportation Plan, 2023)
- Make prioritized expansions to the off-road active transportation network. (Maine State Active Transportation Plan, 2023)
- Improve travel safety for ALL transportation system users. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Support the development of electric, active, and public transportation systems across Mount Desert Island. (Climate Action Plan, 2021)
- Improve Walkability, Bikeability and the Community-Feel in the downtown core (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Enhance multimodal connections for all Maine people. (Maine State Active Transportation Plan, 2023)
- Make prioritized, cost-effective improvements to the active transportation network, including promoting the Village Partnership Initiative and improving active transportation on rural state highways. (Maine Vulnerable Road User Safety Assessment, 2023)

- Establish separated multi-use paths to link Bar Harbor, Northeast Harbor, and Southwest Harbor, enhancing connectivity and safety for cyclists and pedestrians. (Multi-use Paths on Mount Desert Island, 2022)

Pedestrian Safety Enhancements

- Continue and increase investment in streetscape and pedestrian improvements in both residential and business districts. (Comprehensive Plan, 2017)
- Increase the visibility of mid-block pedestrian crossings through high visibility signage and the installation of Rectangular Rapid Flashing Beacons (RRFBs). (Maine Vulnerable Road User Safety Assessment, 2023)
- Improve the visibility of crosswalks through high visibility markings, advanced stop bars, and warning signs. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)
- Use raised crosswalks to slow down traffic and provide a safer crossing for pedestrians. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)
- Create safe waiting areas in the middle of the road for pedestrians to cross one direction of traffic at a time. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)
- Deploy Pedestrian Hybrid Beacons (PHBs): Use PHBs to increase driver awareness and compliance at pedestrian crossings. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)
- Reconfigure roadways to reduce the number of travel lanes and create safer crossing environments for pedestrians. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)

Speed Management and Enforcement

- Assess existing speed limit setting and identify opportunities to change roadway features that influence driver behavior, focusing on the context of roadway segments and mode share. (Maine Vulnerable Road User Safety Assessment, 2023)
- Seek NHTSA Grant Funding for focused enforcement in high pedestrian crash locations to reduce the number of pedestrian crashes and fatalities. (Maine Vulnerable Road User Safety Assessment, 2023)

Policy and Collaboration

- Continue bicycle and pedestrian safety education and outreach efforts directed at all transportation system users, including vulnerable populations. (Maine Vulnerable Road User Safety Assessment, 2023)
- Continue to work with the twenty-one communities identified in the HEADS UP! Pedestrian Safety Initiative and reach out to new high-risk areas identified in the assessment. (Maine Vulnerable Road User Safety Assessment, 2023)
- Continue to coordinate and partner with municipalities, planners, and advocates on policies, processes, and funding opportunities to improve vulnerable road user safety. (Maine Vulnerable Road User Safety Assessment, 2023)
- Coordinate the safety improvement efforts of various agencies and stakeholders. (Maine’s 2022 Strategic Highway Safety Plan, 2022)
- Guide investment decisions towards strategies and countermeasures with the most potential to reduce fatalities and serious injuries. (Maine’s 2022 Strategic Highway Safety Plan, 2022)

- Provide an avenue for partners to have ongoing communications/network. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Resource sharing among safety stakeholders and partners. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Document that communicates to all that Maine does have a coordinated plan that guides the development of other plans such as our Highway Safety Plan, Highway Safety Improvement Program, and Commercial Vehicle Safety Plan. (Maine's 2022 Strategic Highway Safety Plan, 2022)

1.3 Key Safety Challenges

The safety challenges in Bar Harbor include a range of infrastructure, traffic, seasonal, and demographic issues. Infrastructure challenges include outdated public safety facilities, narrow roadways, and insufficient pedestrian and bicycle infrastructure. Traffic congestion, particularly in downtown areas and during peak tourist seasons, exacerbate safety concerns. High crash locations, dangerous intersections, and speeding vehicles also pose significant risks to vehicular occupants, pedestrians, and cyclists.

The following key safety challenges, both infrastructure and programmatic, were identified in the policies and plans reviewed:

Infrastructure Challenges

- Narrow roadways and poor sight lines in the Downtown impact pedestrian and bicycle safety. (Bar Harbor 2035, Draft)
- Lack of pedestrian and bicycle infrastructure town-wide limit connectivity. (Bar Harbor 2035, Draft)
- Despite parking improvements in recent years, issues still persist due to rising demand. (Bar Harbor 2035, Draft)
- Local roadways not designed to handle larger volumes are seeing increased traffic volumes at peak times. (Bar Harbor 2035, Draft)
- The Police Department has outgrown its present location, and the Fire Station requires renovation. A new Public Safety Facility in Bar Harbor village, addressing both departments' needs, may be necessary over the upcoming ten-year planning period. (Comprehensive Plan, 2017)
- The abrupt end of the Route 3 shared-use path at West Street forces cyclists onto the street, creating safety risks. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022) (Multi-use Paths on Mount Desert Island, 2022)
- Insufficient signage and poorly marked crosswalks reduce the visibility of pedestrians and cyclists, increasing the risk of accidents. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022) (Multi-use Paths on Mount Desert Island, 2022)
- Pedestrians are especially vulnerable at non-intersection locations where a significant percentage of pedestrian fatalities occur. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)

- Many uncontrolled pedestrian crossing locations lack sufficient safety measures, leading to higher crash rates. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)
- Poor visibility of crosswalks and pedestrians, especially at night, contributes to pedestrian crashes. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)
- Ensuring that drivers yield to pedestrians at uncontrolled crossings remains a challenge. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)

Traffic, Speed and Congestion Challenges

- Increased visitation to Acadia National Park and Bar Harbor resulting in traffic congestion. (Bar Harbor 2035, Draft)
- The head of the island and the entry points to the downtown had the greatest volume of traffic in both 1996 and 2003. Some of the largest percentage increase in volume between 1996 and 2003 occurred on some of the interior rural roads such as Norway Drive and Knox Road. Volumes also increased significantly in the downtown. (Comprehensive Plan, 2017)
- Downtown traffic and congestion, particularly during the summer, has been recorded as a significant problem. (Comprehensive Plan, 2017)
- High volumes of vehicle traffic in the downtown core create unsafe conditions for pedestrians and cyclists, who must navigate narrow sidewalks and busy streets. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022) (Multi-use Paths on Mount Desert Island, 2022)
- Key intersections, such as the Route 3/West Street and Eden-Mt Desert Street intersections, are identified as hazardous due to high traffic volumes and complex traffic patterns. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022) (Multi-use Paths on Mount Desert Island, 2022)
- High vehicle speeds in certain areas, such as Cottage Street and Main Street, pose a significant danger to non-motorized road users. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022) (Multi-use Paths on Mount Desert Island, 2022)
- While a significant portion of crashes occur in urban areas, rural areas also experience a high number of fatalities, often due to higher speeds on rural roads. (Maine State Active Transportation Plan, 2023)
- Managing vehicle speeds, especially in areas with high pedestrian and bicyclist activity, remains a challenge. Speeding is a significant factor in the severity of crashes involving vulnerable road users. (Maine State Active Transportation Plan, 2023)

Programmatic Challenges

- All segments of the historic motor road system on Mount Desert Island and the Schoodic Peninsula are identified in the general management plan as the “Park Loop Road” and are considered a key historic property. (Acadia National Park Final Transportation Plan / Environmental Impact Statement, March 2019)
- Implementing cost-effective and prioritized improvements to the active transportation network, including enhancing mid-block crossings and creating safer road designs, is an ongoing challenge. (Maine State Active Transportation Plan, 2023)
- Implementing cost-effective and prioritized improvements to the pedestrian network, such as raised crosswalks and pedestrian refuge islands, is an ongoing challenge. (Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations, 2017)

- Pedestrian and bicyclist crash data vary widely year-to-year, making it difficult to identify consistent trends and target interventions effectively. (Maine State Active Transportation Plan, 2023)
- Seasonal variations, such as increased pedestrian crashes in winter due to lack of sidewalk maintenance, and higher bicyclist crashes in warmer months, present unique challenges. (Maine State Active Transportation Plan, 2023)
- Addressing the needs of disadvantaged communities, which may have higher rates of pedestrian and bicyclist injuries, requires targeted outreach and tailored interventions. (Maine State Active Transportation Plan, 2023)

1.4 Key Safety Recommendations

The recommendations in state and local plans focus on enhancing safety and accessibility for all road users through a combination of infrastructure improvements, traffic rules enforcement, and public awareness campaigns. Key measures include installing bicycle lanes, signage, and implementing traffic-calming features and speed limit adjustments. The plans also emphasize the importance of community engagement and "Tactical Urbanism" strategies. Additionally, there are specific initiatives to address distracted and impaired driving, improve crosswalk visibility, and support vulnerable road users.

The following key safety recommendations, both infrastructure and programmatic, were identified in the plans reviewed:

Infrastructure Recommendations

- Develop multi-modal design standards to guide the design and construction of transportation related infrastructure. (Bar Harbor 2035, Draft)
- Invest in Complete Street infrastructure within the Downtown and Village Growth areas, and along the transportation corridors. This might include sidewalks, bicycle lanes, crosswalks, and shared use paths along with supporting infrastructure such as street trees, bus shelters, and bicycle racks. (Bar Harbor 2035, Draft)
- Plan and design to build and modify streets that will enable safe access for all users, including pedestrians, bicyclists, motorists, etc. There should be a focus on connectivity and consideration given to all modes of transportation. Especially the transportation needs of children and those without access to a vehicle. (Bar Harbor 2035, Draft)
- Consider prioritizing investments that improve pedestrian, bicycle, and vehicle safety and the functional area of intersections. This should include but not be limited to the intersections of Mt Desert and Main Street, West Street and Route 3, and others. (Bar Harbor 2035, Draft)
- Incorporate placemaking practices into the transportation infrastructure design process. This will allow the town to test design solutions and engage the community in the process before designs are finalized and construction begins. (Bar Harbor 2035, Draft)
- Identify key locations in the community for signage and bicycle racks, considering the location of parks, scenic byways, community facilities and events, and the Downtown Master Plan. Install and maintain appropriate signs and racks. (Comprehensive Plan, 2017)
- Identify existing parking and traffic congestion issues in the downtown and other locations, and work to address these transportation challenges with infrastructure improvements and policy changes. This should include the development and updating of a prioritized improvement,

maintenance, and repair plan for the community's transportation network. (Bar Harbor 2035, Draft)

- Address line of site issues along existing roadways this should include in town locations and outlying areas where the geometry, tree growth, utility poles and signage are incompatible with traffic speed. (Bar Harbor 2035, Draft)
- Evaluate the potential benefits and impacts of pedestrian only access to some areas of the community (existing streets, the Pier, etc.) at certain times. This could be trialed as a pilot "Open Streets" project. (Bar Harbor 2035, Draft)
- Include bicycle lanes in any major road project, when rights-of-way are available or pursue easements. (Comprehensive Plan, 2017)
- Continue and increase investment in streetscape and pedestrian improvements in both residential and business districts. (Comprehensive Plan, 2017)
- Extend Shared Use Path as Uninterrupted route along Route 3 from West Street to Mt Desert Street (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Pave the on-street parking spots with pavement or bricks that visually contrast with the gray pavement to make the street look narrower (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Install signage that clearly tells car drivers to expect bikes in the center of the lane (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- West-Street Extension: Construct a safer route for cyclists by adding a small section of trail to avoid the dangerous intersection at Rt3 and West-Street. (Multi-use Paths on Mount Desert Island, 2022)
- Bloomfield Access: create a 700-foot shortcut on an old roadbed in Acadia National Park to keep children off hazardous roads. (Multi-use Paths on Mount Desert Island, 2022)
- MDI High School Connection: Connect the high school to the carriage roads to provide a safe, separated path for students to bike to school. (Multi-use Paths on Mount Desert Island, 2022)
- Northeast Harbor Path Extension: Widen the sidewalk and extending the multi-use path to the carriage road gatehouse to ensure safe access for residents and tourists. (Multi-use Paths on Mount Desert Island, 2022)
- Jackson Lab Connection: Extend the multi-use path from Compass Harbor across the Jackson Lab campus to the Gardens of Acadia to add more safe locations to the network. (Multi-use Paths on Mount Desert Island, 2022)
- Improve active transportation on rural roads by paving shoulders along High-Priority Active Transportation corridors. (Maine State Active Transportation Plan, 2023)
- Develop a list of High-Priority Active Transportation trails and begin building out the network. (Maine State Active Transportation Plan, 2023)
- Install median cable guardrails and rumble strips. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Conduct road safety audits and corridor analysis. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Improve clear zones and use high friction surface treatments. (Maine's 2022 Strategic Highway Safety Plan, 2022)

- Use high visibility crosswalk markings, advanced stop bars, and warning signs to improve the visibility of crosswalks. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Implement raised crosswalks: Install raised crosswalks to slow down traffic and provide a safer crossing for pedestrians. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Install pedestrian refuge islands: Create safe waiting areas in the middle of the road for pedestrians to cross one direction of traffic at a time. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Deploy pedestrian hybrid beacons (PHBs): Use PHBs to increase driver awareness and compliance at pedestrian crossings. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Conduct road diets: Reconfigure roadways to reduce the number of travel lanes and create safer crossing environments for pedestrians. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Expand pedestrian and bicyclist count programs: Increase data collection to measure the effectiveness of implemented countermeasures and improve future planning. (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Implement traffic-calming features in road design. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Install centerline rumble strips as a safety countermeasure. (Maine's 2022 Strategic Highway Safety Plan, 2022)

Programmatic recommendations

Public Outreach and Awareness

- Implement a Bicycle/Pedestrian Advisory Committee (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Use "Tactical Urbanism" strategies to gain public support (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Participate in and support organizations that coordinate bicycle awareness campaigns and promote non-vehicular ways of commuting such as Bicycle Month (May) and Commute Another Way Day. Update emergency operation plans (Comprehensive Plan, 2017)
- Participate in "Click It or Ticket" campaigns. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Conduct child passenger safety training and awareness programs. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Use changeable message signs to promote seat belt use. (Maine's 2022 Strategic Highway Safety Plan, 2022)z
- Increase parental involvement in teen driver education. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Develop interactive teen driver awareness programs. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Support driver education with community events. (Maine's 2022 Strategic Highway Safety Plan, 2022)

- Increase public awareness of the dangers of distracted driving. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Continue public awareness campaigns like "Drive Sober or Get Pulled Over." (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Use changeable message signs to promote seat belt use. (Maine's 2022 Strategic Highway Safety Plan, 2022)

Speed and Enforcement Efforts

- Enforce traffic rules for bicyclists as well rules to increase the safety of bicyclists. Promote and enforce traffic rules for motorists to respect bicyclists. Provide public information on these rules to both residents and visitors. (Comprehensive Plan, 2017)
- Assess speed limits and identify opportunities to adjust road design. (Maine State Active Transportation Plan, 2023)
- Conduct high visibility enforcement and sobriety checkpoints. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Provide specialized law enforcement training for detecting impaired drivers. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Conduct high visibility distracted driving enforcement. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Enhance speed enforcement and public awareness campaigns. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Decrease downtown speed limit to 15mph (Active Transportation Pedestrian and Bicycle Solutions in Bar Harbor, 2022)
- Utilize portable dynamic speed feedback signs. (Maine's 2022 Strategic Highway Safety Plan, 2022)
- Conduct child passenger safety training and awareness programs. (Maine's 2022 Strategic Highway Safety Plan, 2022)

2 Data Collection

To get a comprehensive understanding of existing conditions in Bar Harbor, the team looked at various data sets over the course of the study. These data sets include crash data from MaineDOT, local data from the Town of Bar Harbor and data collected by Stantec to fill in the data gaps/needs for the project. Below sections describe in-depth all the different datasets.

2.1 MaineDOT Data

MaineDOT provides two relevant public maps, the Maine Public Crash Query Tool and MaineDOT Public Map Viewer, using Geographic Information Systems (GIS) to identify, and make available, crash data throughout the State of Maine for download, including attributes and information, to be used to establish trends and geographic locations for assessing priority locations. Pertinent to the intent of the Bar Harbor Safety Plan, it is important to identify locations for property damage only (PDO), injury, and fatal crashes along with the physical and driver attributes contributing to the crashes. Establishing the crash history along all the roadway networks in the Town of Bar Harbor is critical to establishing a base in identifying areas needing safety-based improvements.

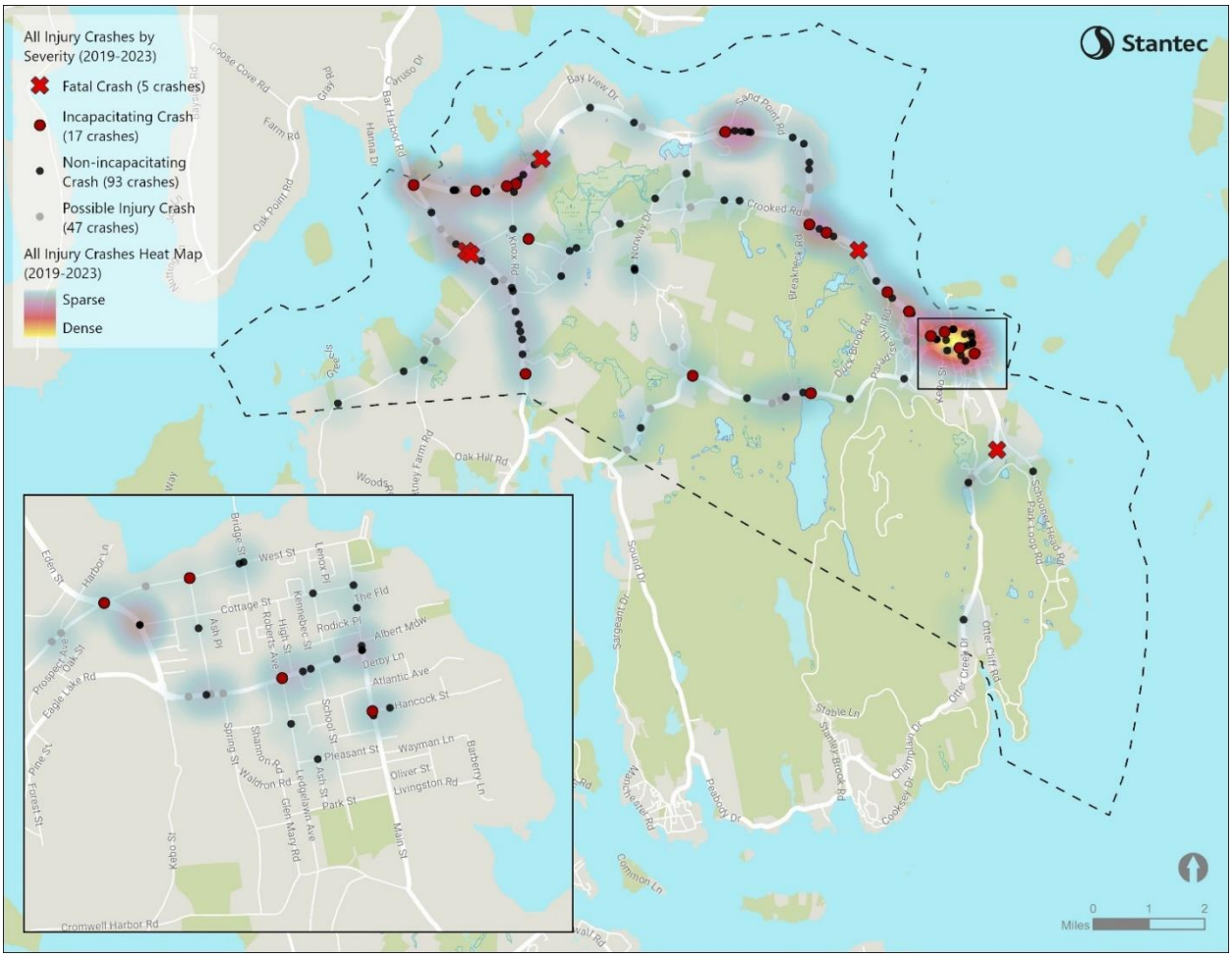


Figure 1 – Injury Crashes in Bar Harbor (2019-2023)

2.1.1 High Crash Locations (HCLs)

The Maine Public Crash Query Tool and MaineDOT Public Map Viewer includes identifying High Crash Locations (HCLs), both intersections (nodes) and roadways (segments) as indicated from the State of Maine's Office of Safety and Mobility through calculations of recent crash histories, average daily traffic, and comparison to similar intersection of roadway attributes. HCL identification is critical to establishing a layer of prioritizing locations for improvements, however HCLs do not establish priority locations based on high injury or fatality metrics, but by total crashes within the context of the environments that are most important to the Town of Bar Harbor.

Additional metrics reviewed, especially for HCLs, are Crash Rates, Critical Crash Rates, and Crash Rate Factors (CRFs). Crash Rates for intersections are a calculation of number of crashes per million entering vehicles (MEV) and crash rates for roadway segments are a calculation of number of crashes per million vehicle miles traveled (MVMT). Critical Crash Rates are crash rates that are statistically adjusted based

on other roads with similar characteristics to provide another layer of commonality between different types of roadways and intersections.

As referenced by the Androscoggin Transportation Resource Center, High Crash Locations (HCLs) are locations that have eight or more traffic crashes and a CRF greater than 1.00 in a three-year period. A highway location with a CRF greater than 1.00 has a frequency of crashes that is greater than the statewide average for similar locations. A CRF is a statistical measure to determine the "expected crash rate" as compared to similar intersections in the State of Maine.

While HCLs are determined using a mix of roadway attributes with total crash frequency, they do not weigh the prevalence of fatal or high injury crashes that are pertinent to developing the Town's Safety Plan through this Safe Streets 4 All project. However, it is important to assess these High Crash Locations to provide a layer of reviewing trends and analysis towards improving the safety of the Town's roadways.

For the years of 2020 through 2023, the following locations were identified as HCLs in the Town of Bar Harbor:

- Eden Street (Maine Route 3) at Cottage Street (Intersection)
- West Street from Holland Avenue to Bridge Street (Segment)
- Main Street from Hancock Street to Newton Way and Atlantic Avenue (Segment)
- Maine Route 3 at the "Head of the Island" (Segment / Intersection Hybrid)
- Between the signalized intersection of Triangle Road (Maine Route 102 / ME Route 198) and the town line with Trenton, at the Maine Route 3 crossings of Thompson Island.
- Cottage Street from Eden Street to Maple Avenue (Segment)
- Maine Route 3 at Crooked Road (Intersection)

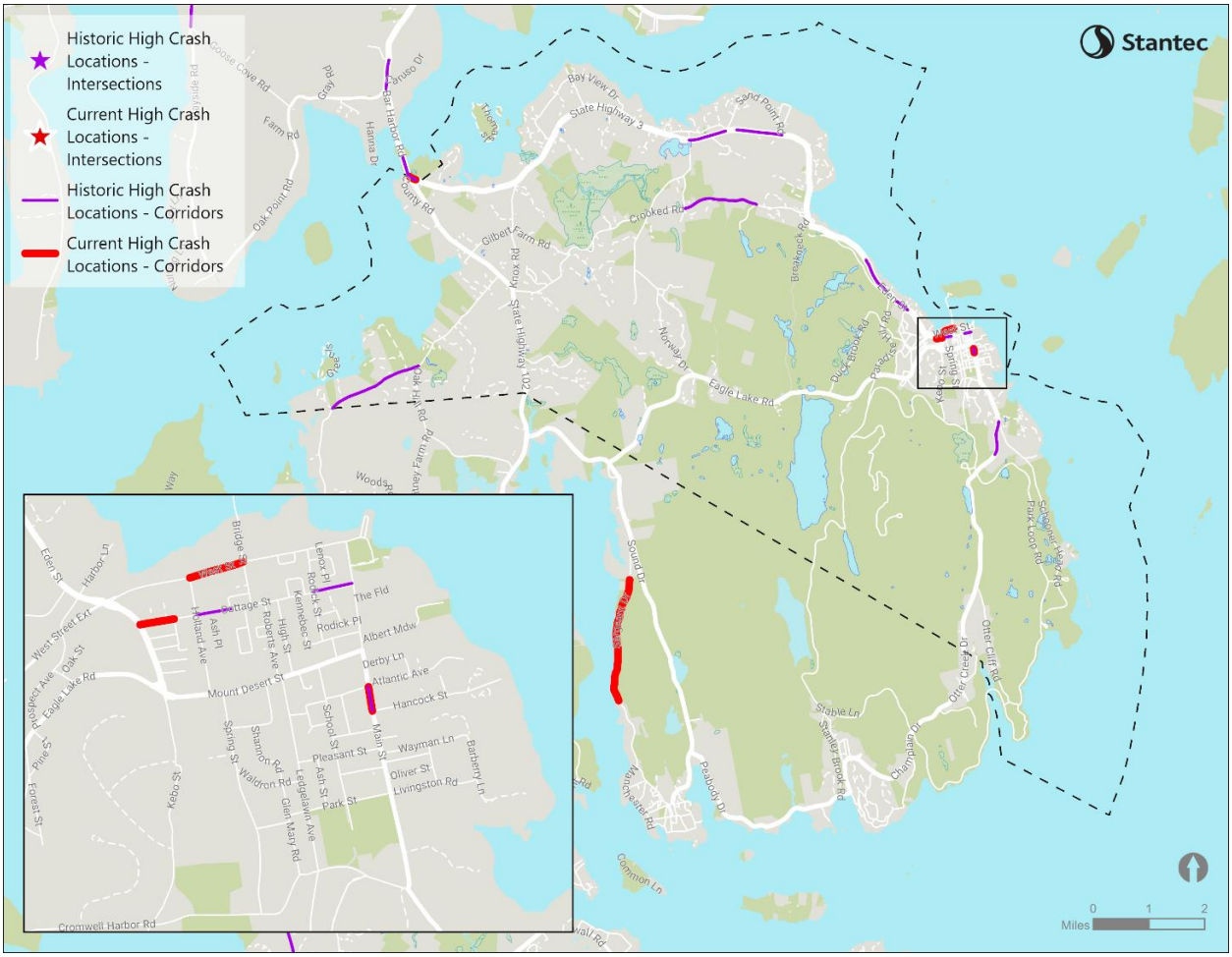


Figure 2 – Current and Historical High Crash Locations in Bar Harbor

2.1.1.1 Eden Street (Maine Route 3) at Cottage Street

The most current crash diagram and crash data summary shows this intersection had nine crashes in the period of 2021 through 2023 and a Critical Rate Factor (CRF) of 2.67. Of the nine crashes, four of the crashes (44 percent) were injury crashes, which three of those were indicated as Class B injuries (non-incapacitating) at their highest levels.

From the crash data summary, all crashes occurred in the daylight (light condition) and daytime (time of day) and related to intersection movements. Most notably, all three of the Class B injury crashes involved bicyclists at the intersection, with two of these crashes involving bicycles traveling southbound in Cottage Street crosswalk and vehicles turning right towards Eden Street northbound after making a stop. The third involved an Eden Street northbound bicycle striking a Eden Street southbound left-turning vehicle. All other crashes involved rear end crashes and angle crashes based on failure to stop or yield and inattention

The Crash Rate for this intersection is 0.87 crashes per MEV and a critical crash rate of 0.33 critical crashes per MEV, where the statewide crash rate is 0.11. This represents that this intersection sees three times more crashes than a typical intersection of this type in Maine and nearly eight times higher overall crash rate than the statewide average.

2.1.1.2 West Street from Holland Avenue to Bridge Street

The most current crash diagram and crash data summary shows this intersection had nine crashes in the period of 2021 through 2023 and a Critical Rate Factor (CRF) of 2.42. Of the nine crashes, four of the crashes (44 percent) were injury crashes, which three of those were indicated as Class B injuries (non-incapacitating) at their highest levels.

2.1.1.3 Main Street from Hancock Street to Newton Way and Atlantic Avenue

Within the HCL, the 0.06-mile segment includes sidewalks and parallel street parking available along both sides of the roadway with marked crosswalks available across Main Street at both terminus intersections and no mid-block crossings. Lighting is available along the segment, but with overhead “cobra-head” luminaires on utility poles and no pedestrian-level lighting.

The most current crash diagram and crash data summary shows this intersection had ten crashes in the period of 2021 through 2023 and a Critical Rate Factor (CRF) of 4.56. Of the ten crashes, all of the reported crashes were property damage only, with no injury crashes. The Critical Crash Rate along this segment is calculated as 647.78 per MVM where the statewide crash rate is 188.12.

From the crash data summary, all crashes, except one, occurred in the daylight (light condition). Nine of the ten crashes were vehicles crashing into parked vehicles and the tenth striking a parking meter as a single vehicle crash with an object where all contributing factors were related to driver behaviors (failure to yield or not using wipers) to potentially geometric contributions (failing to keep lane). No crashes were noted for inclusion of bicycles or pedestrians in this segment.

2.1.1.4 Maine Route 3 at the “Head of the Island”

The most current crash diagram and crash data summary shows this intersection had ten crashes in the period of 2021 through 2023 and a Critical Rate Factor (CRF) of 2.00. Of the ten crashes, four of the crashes (44 percent) were injury crashes, which three of those were indicated as Class B injuries (non-incapacitating) at their highest levels.

2.1.1.5 Cottage Street from Eden Street to Maple Avenue

The most current crash diagram and crash data summary shows this intersection had eight crashes in the period of 2021 through 2023 and a Critical Rate Factor (CRF) of 2.54. Of the eight crashes, four of the crashes (44 percent) were injury crashes, which three of those were indicated as Class B injuries (non-incapacitating) at their highest levels.

2.1.1.6 Historical High Crash Locations

HCLs have been identified throughout the Town of Bar Harbor as early as 2008. Throughout Maine's annual review of HCLs throughout the roadway networks in the State, several intersections and roadway segments have risen into or fallen out of the thresholds of being identified as an HCL.

While some locations may be removed from the HCL list due to active improvements made to the physical roadways and intersections or improving driver behaviors and operations, sometimes these are simply due to the nominal statistics of the intersections or segments evaluated each three-year period and not a thorough indication that safety has improved.

The following table shows historical HCLs in the Town of Bar Harbor along with the most recent year the intersection or segment was included on the list and its CRF from that year, with CRFs greater than 2.00 in **bold**:

Table 1 – Historical High Crash Locations in the Town of Bar Harbor

Roadway/Intersection	Segment or Intersection	Most Recent Year of HCL Inclusion	Critical Rate Factor (CRF)
Bar Harbor Road (Maine Route 3) in Trenton from Thompson Island to Trenton / Bar Harbor Town Line	Segment	2012	1.08
Bar Harbor Road (Maine Route 3) in Bar Harbor	Segment - From Norway Drive to Old Bar Harbor Road	2021	1.46
	Segment – From East of Old Bar Harbor Road to Hutchins Lane and Sand Point Road	2021	1.04
Crooked Road from Old Norway Drive to Lake Wood Pond Road	Segment	2017	1.45
Eden Street (Maine Route 3)	Segment – From "The Bluffs" to the Holiday Inn Bar Harbor – Acadia National Park	2009	1.03
	Segment – From Jack Russell's Steak House To Highbrook Road	2012	1.69
Indian Point Road from Oak Hill Road to Bar Harbor / Mount Desert Town Line	Segment	2019	1.30
Cottage Street	**Segment – From Holland Avenue to Summer Street**	**2013**	**3.90**
	Segment – From Rodick Street to Main Street	**2008**	**2.31**
Eden Street and Kebo Street at Mount Desert Street and Eagle Lake Road	**Intersection**	**2017**	**2.13**
Mount Desert Street at Ledgelawn Avenue	**Intersection**	**2019**	**2.55**
Mount Desert Street at Main Street	**Intersection**	**2019**	**2.19**
Main Street from Schooner Head Road to The Jackson Laboratory	Segment	2009	1.20

2.1.2 Historical Traffic Volumes

Stantec reviewed MaineDOT's traffic data, available on its public interactive traffic data map, for TMCs and continuous count sites (CCSs) available. The traffic data reviewed from MaineDOT's public map consisted of peak hour intersection TMCs and CCSs from, at a minimum, the most recent four to five years. Stantec further filtered traffic counts that are likely impacted by COVID pandemic-related policies and practices that would have affected normal traffic volumes and movements in the study area.

2.1.3 Future Traffic Volumes

Stantec coordinated with MaineDOT to inquire about the State's Future Traffic Model to assist in the development of future traffic volumes, beginning with a meeting on September 24, 2024. From this coordination MaineDOT was able to provide Stantec with map-based outputs of historical traffic volumes and projections to estimate future traffic throughout the Town of Bar Harbor to inform Stantec's projections for recommendations and improvements. MaineDOT provided the team two maps showing the MaineDOT count locations used for their statewide model and the historical average growth rate observed, the statewide average annual growth rate for similar roadway types, and the recommended statewide growth rate (five percent). The two maps represent the northwest portion of the Town, including the "Head of the Island" and Town Hill areas, and the eastern portion of the Town, including Downtown Bar Harbor. The model maps will be used to inform the potential regional and local growth evaluated for the analysis related to recommendations and improvements for the Safety Plan.

2.1.3.1 Forecasted Traffic Model

Per MaineDOT's model, the growth rate along the roadways seen within the Town of Bar Harbor range is between -4.57 and 0.27 percent per year, with the recommended average annual growth rate for design considerations at 0.5 percent per year. Between 2024 and 2045, this amounts to a conservative, eleven percent (11%) increase in general traffic volumes.

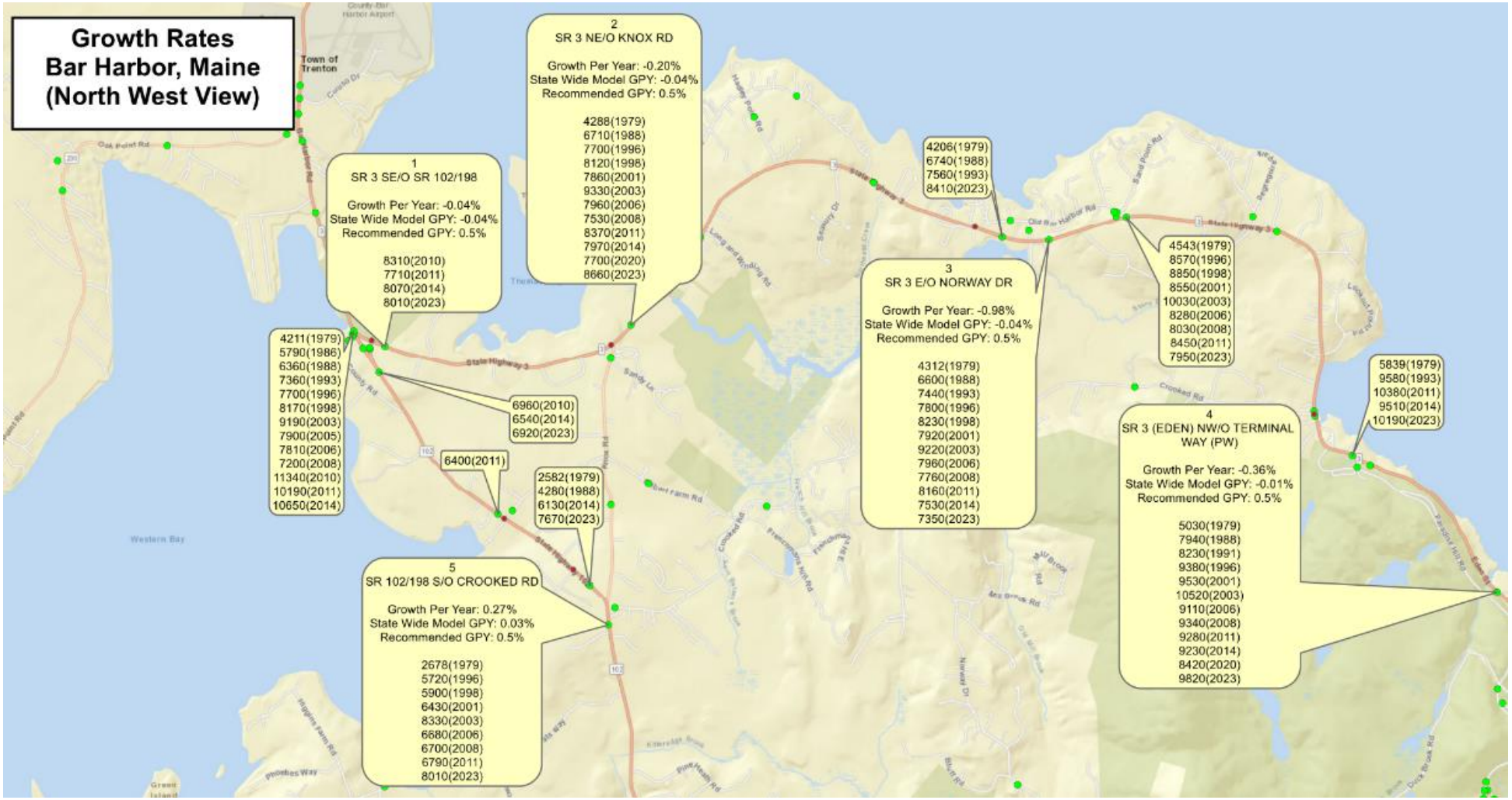


Figure 3 – Bar Harbor Growth Rates from MaineDOT Statewide Model – Northwest Locations

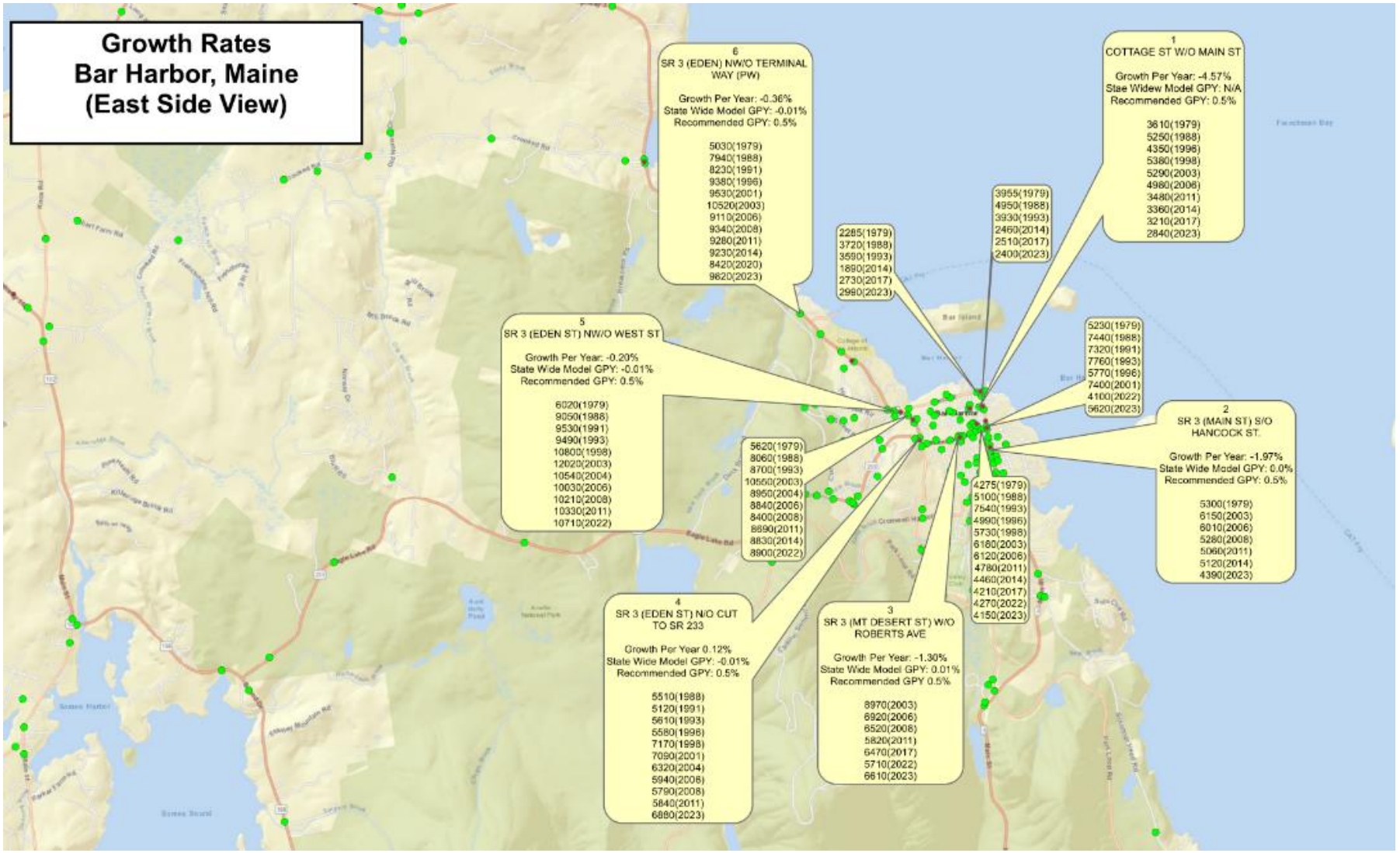


Figure 4 – Bar Harbor Growth Rates from MaineDOT Statewide Model – East Locations

2.2 Local Data

To provide additional layers of roadway, traffic, and safety context to the information identified from MaineDOT sources (**Section 2.1**) and previous plans and studies (**Section 1.1**), Stantec reviewed other resources to assist in identifying the visual conditions and operations of the existing infrastructure and the existing behaviors by users of the system.

2.2.1 Field Reviews

From August 27th through August 29th, Stantec conducted field reviews of the physical infrastructure and operations of critical intersections and roadway segments to add context to data and information from the Town and MaineDOT data.

On August 27th, Stantec reviewed the existing traffic signal timing data for the intersection of Maine Route 3 at Maine Route 102 ("Head of the Island"), as well as the evening commuter operations and geometries at this intersection, and the critical intersections along Maine Route 102 (Gilbert Farm Road and Indian Point Road).

Figure 5 – Evening Commuter Congestion at the Head of the Island Signal

On August 28th, Stantec reviewed street throughout Downtown Bar Harbor, including the typical operations and geometries at intersections, general assessment of sidewalk and crosswalk accessibility, and the midday peak interactions between vehicles (both traveling and parking), bicycles, pedestrians, transit (Island Explorer), and the influx of cruise ship related traffic to and from the Town's Wharf.

Figure 6 – Intersection of Main Street at Newport Drive

Figure 7 – Typical Midday Downtown Bar Harbor Operations

On August 29th, Stantec reviewed the critical intersections along Eden Street in Downtown Bar Harbor to assess operations related to the start of school (Conners Emerson School and Emerson Middle School on Eagle Lake Road). In addition, Stantec review the length of Maine Route 3 from Downtown Bar Harbor, where it is part of the urban environment, to the "Head of the Island" where the roadway increases in speeds and context along the way.

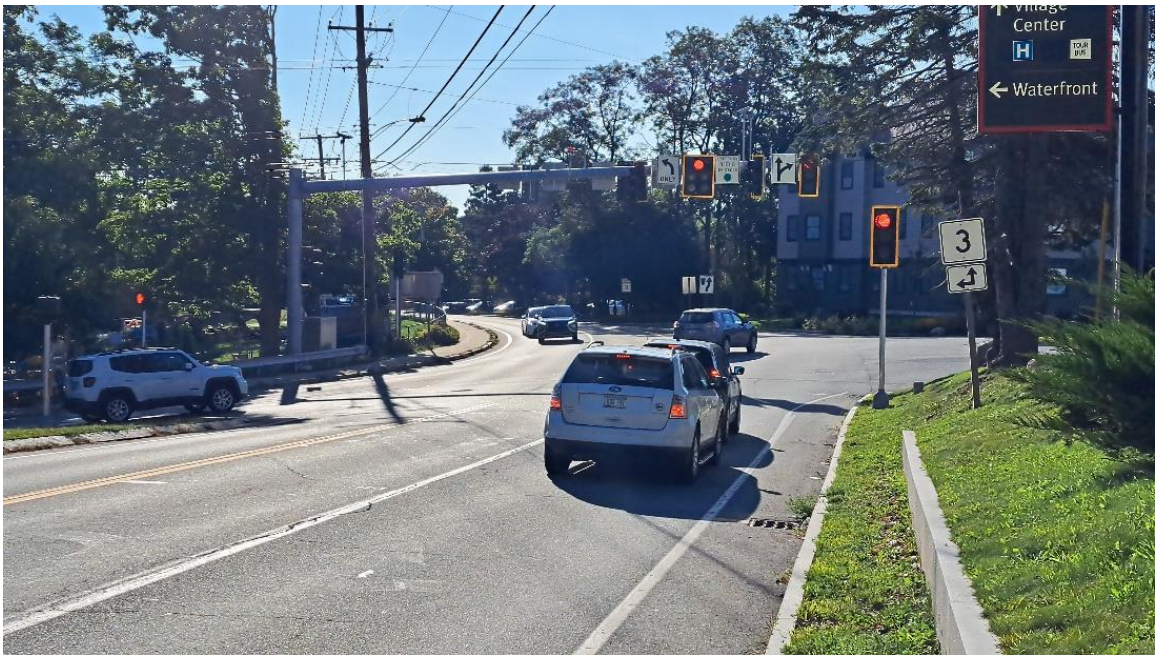


Figure 8 – Intersection of Eden Street, Eagle Lake Road, Kebo Street, and Mt. Desert Street During Morning Commuter and School Opening Traffic

During these reviews, Stantec generally reviewed the following elements to assess their impacts on the safety of Bar Harbor's transportation system:

- Roadway geometries
- Intersection sight distances
- Conditions of pavement markings and signing
- Pedestrian crosswalks and sidewalks
- Parking spaces and other roadside amenities
- Drainage facilities
- General lighting for both roadway and pedestrian-scale.
- Utilities
- Traffic signal equipment and infrastructure

The real world observation and assessment of live operations and interactions between drivers, pedestrians, bicycles, shuttles, buses, delivery trucks, and all other users of the roadway add layers of contextual insight which provides context to the numerical and analyzed data from others sources, giving additional dimensions and nuances to the factors that cause safety issues today and helping to inform the scale of future improvements.

2.2.2 Recreation

With the prominence of Acadia National Park and the draw of tourism and recreation of all kinds, Bar Harbor is the gateway from the built environment to the more natural environment of the Park. With rental bikes (and e-bikes) available to Bar Harbor and Acadia National Park visitors at multiple outdoor outfitters and bicycle shops on Mount Desert Island, most are located in Downtown Bar Harbor.

Per some published guidebooks, including *A Pocket Guide to Biking on Mount Desert Island*, and Strava data, many routes, especially for beginner and intermediate cyclists, begin in Downtown Bar Harbor and climb west towards Acadia National Park either via West Street Extension (through the intersection with Eden Street / Maine Route 3) towards Paradise Hill or Duck Brook Road, or via Eagle Lake Road towards the Park Loop Road, Cadillac Mountain Entrance, and Eagle Lake.

Figure 9 – Strava Global Heat Map of All Sports in Bar Harbor

While these opportunities are important for the enjoyment of what the Town and Acadia National Park are able to offer visitors, there are limited facilities available to accommodate the waves of novice riders traveling east-west on these roadways. Without bicycle, pedestrian, or multi-use facilities to connect origins and destinations, there are increased risks to vulnerable roadway users until steps are taken to provide these improvements.

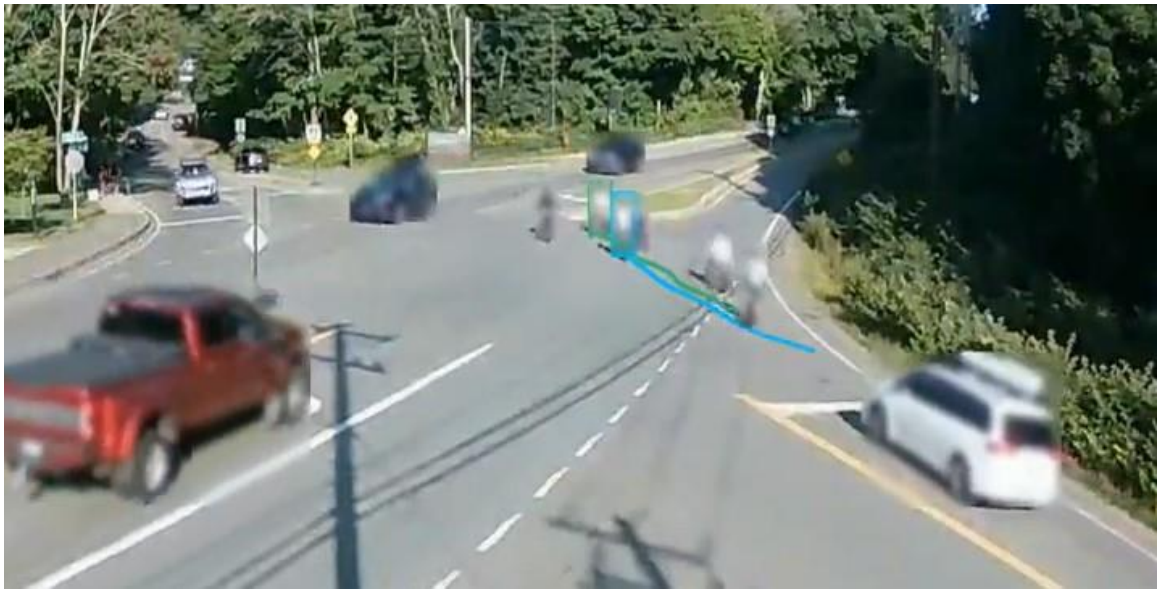


Figure 10 – Cyclists Crossing Eden Street at West Street from Near Miss Analysis Videos

2.2.3 Transit

The Island Explorer is a fare-free bus service on Mount Desert Island linking hotels, inns, and campgrounds with destinations in Acadia National Park and neighboring village centers. The service is available from May to September and provides Mount Desert Island visitors and residents free transportation to hiking trails, carriage roads, island beaches, and in-town shops and restaurants.

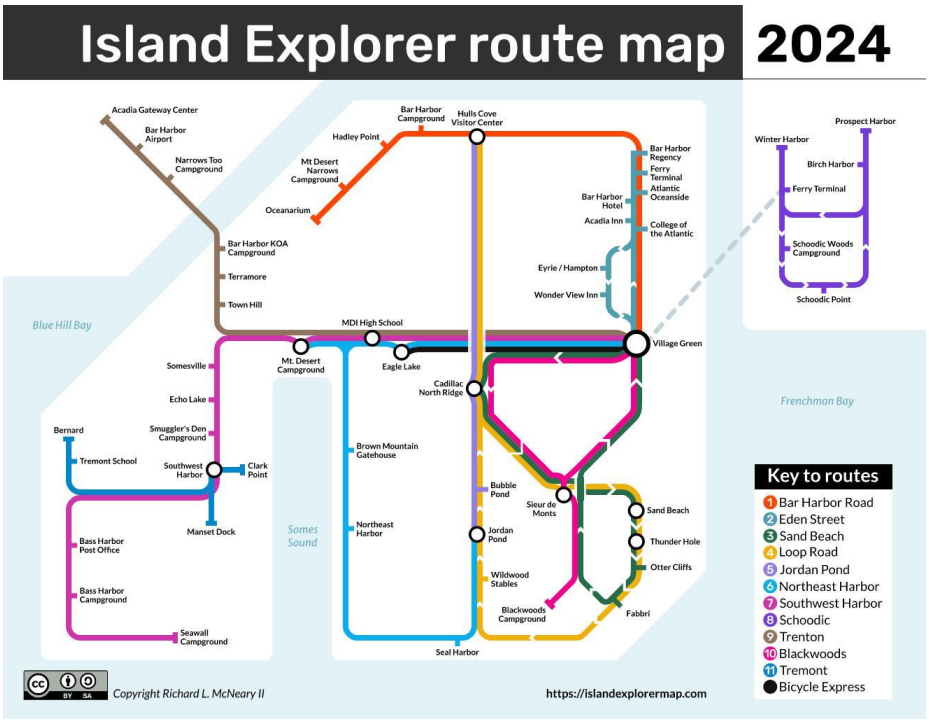


Figure 11 – 2024 Island Explorer Route Map

Island Explorer provided ridership data by route in the table below:

Table 2 – Island Explorer Ridership

Route Number	Route Name	Annual Ridership (2024)
1	BAR HARBOR ROAD	76,415
2	EDEN STREET	104,332
3	SAND BEACH	46,679
4	LOOP ROAD	141,034
5	JORDAN POND	48,144
6	NORTHEAST HARBOR	14,582
7	SOUTHWEST HARBOR	13,285
8	SCHOODIC	7,594
9	TRENTON	13,608
10	BLACKWOODS	11,615
11	TREMONT	1265
	BICYCLE EXPRESS	8,960

2.3 Stantec Data Collection

Stantec teamed with National Data & Surveying, Inc. (“NDS”) to assess existing traffic operations at critical intersections throughout the Town of Bar Harbor and provide analytical support for improvement recommendations that may impact operations and capacity of the Town’s roadway network. NDS assisted Stantec and the Town of Brewer by leading the video-based turning movement count (TMC) data collection, as well as providing the video required for their vendor, Advanced Mobility Analytics Group Pty Ltd (“AMAG”) to deliver near-miss and other safety-based analytics at these intersections throughout the Town.

2.3.1 Traffic Volume Data

NDS collected video-based TMCs at the following priority intersections within the Town:

- Main Street at West Street
- Main Street at Cottage Street
- Main Street at Firefly Lane
- Main Street at Mt Desert Street
- Main Street at Hancock Street
- Kennebec Street at Firefly Lane
- Mt Desert Street at Ledgelawn Avenue / Roberts Avenue
- Eden Street at West Street / West Street Ext
- Eden Street at Cottage Street
- Eden Street / Eagle Lake Road / Kebo Street / Mt. Desert Street
- Route 3 at Highbrook Road (New RRFB Location)
- Route 3 at Crooked Road (Hulls Cove)
- Route 3 at Old Bar Harbor Road
- Route 3 at Knox Road
- Head of the Island Signal
- Route 102 at Gilbert Farm Road
- Route 102 at Indian Point Road

The traffic data was collected using video-based traffic counting equipment and conducted over twelve-hour, mid-week periods to capture the operations of a general workday. The data collection not only included general vehicle counts, but were distributed by vehicle category (motorcycle, bus, truck, etc.). The twelve-hour counts provide enough data for a snapshot of morning and afternoon peak hour operations, whether related to school traffic or commuter traffic, as well as midday operations related to commercial operations, particularly for Downtown Bar Harbor. In addition to vehicles, pedestrian and bicycle traffic data was collected at the intersections.

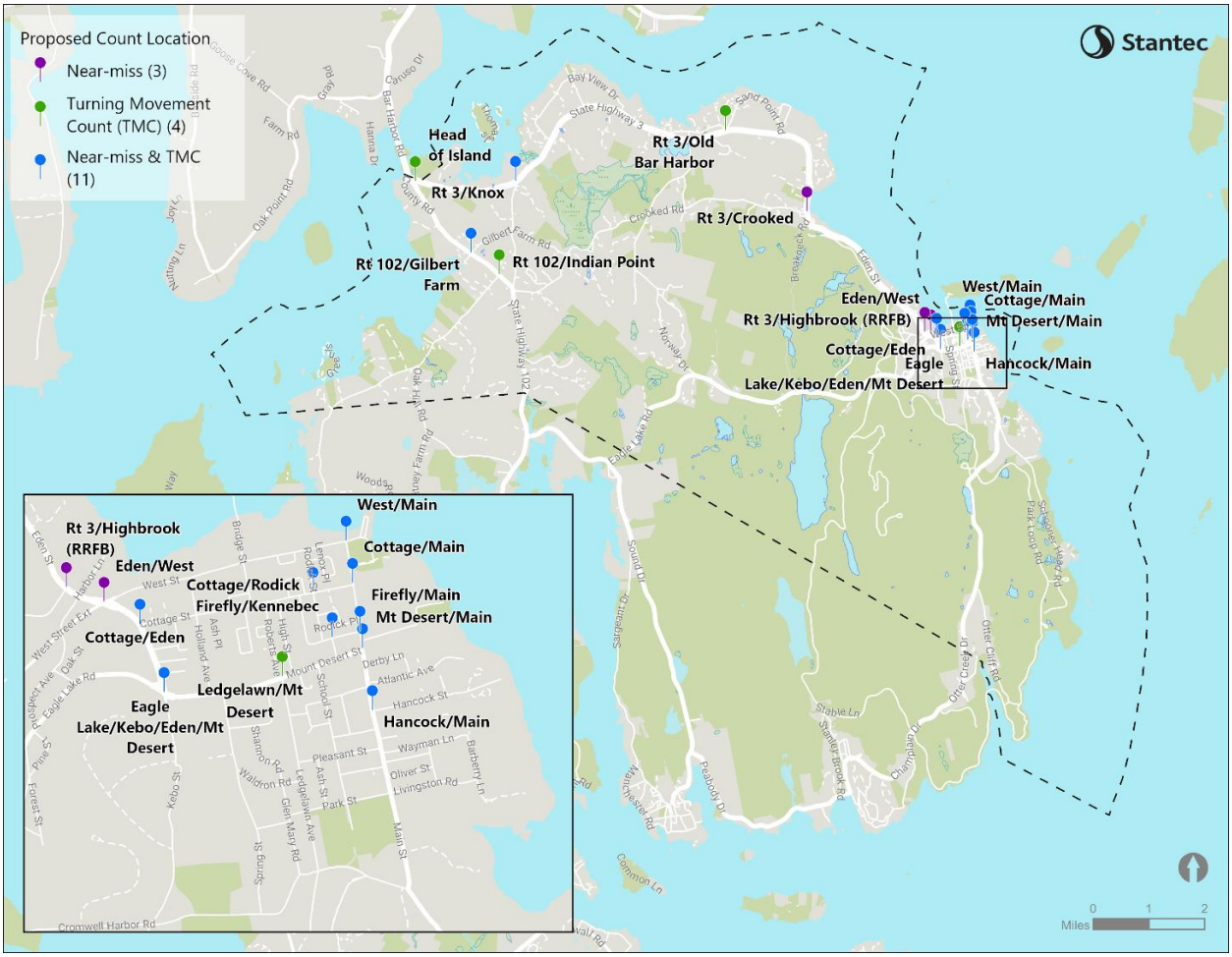


Figure 12 – August 2024 Data Collection Locations

2.3.2 Near Miss Data

Stantec's sub-vendor (AMAG) processed the video collected for traffic counts, using their own algorithms to dissect the video of vehicles, pedestrian, and other roadway users and then provide visualizations and reports on their dashboard, which helps to evaluate risks from "close-call" non-incidents. This assessment of near misses, with evaluation of trajectories and speeds, is intended to supplement historical crash data and strengthen or expand upon the identification of deficiencies in the existing transportation network in the Town.

With the limitations of the length of data collected (12-hour versus a whole week or longer), AMAG noted that any analysis, reporting, and findings that may support the rest of the study's safety analysis process should not to be considered predictive. Through Stantec's efforts in this study, the data and analysis collected should suffice to support the recommendations to be reviewed and analyzed as part of Bar Harbor's Safety Plan, but the Town may find additional insights useful for the most critical intersections if

they wish to revisit this near miss data and review these intersections with longer video time spans in the future.

The results of the 12-hour near miss analysis by AMAG presented near miss recordings when the trajectories of two modes of transportation conflicted within a specific period of time (1.5 seconds was generally used). All locations and types of movements identified that had conflicting trajectories within these brief windows of time during the entire 12-hour span were geolocated and identified as points from which a heatmap could be made for the assessed intersection. These heatmaps of near miss trends supplement the other concurrent data reviews, such as past crash data and traffic volumes, to identify the problem areas within an intersection where safety is a concern. **Figure 13** is an example of a heat map provided by this analysis:

Figure 13 – Near Miss Heatmap: Eden Street at West Street Intersection

The recordings of near misses were flagged and stored on AMAG's dashboard and provide a star rating based on the egregiousness of the near miss, with five stars being the most egregious near miss. The recordings are important to provide visual context for the near misses occurring at Bar Harbor's critical intersections and were compared to historical crash data. They are available for examples of safety concerns in public hearing materials and for identification of methods to improve conditions. **Figure 14** is an example of a near miss recording provided by this analysis:

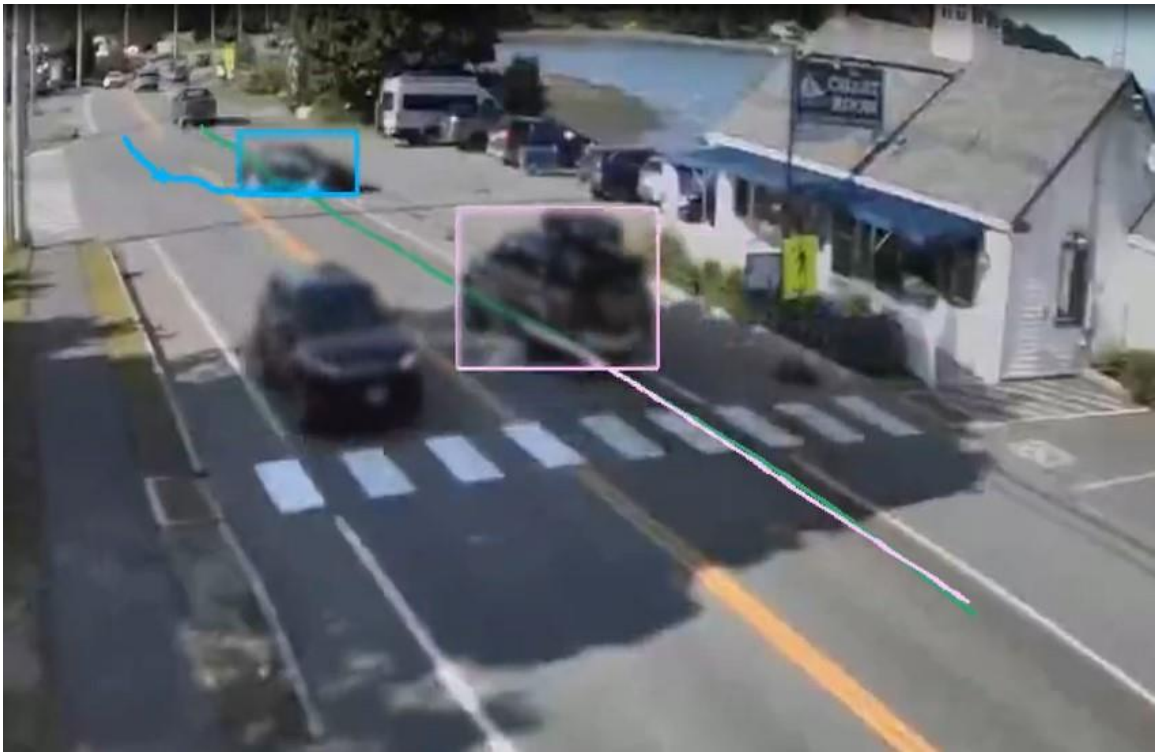


Figure 14 – Near Miss Video: Route 3 at Crooked Road and The Chart Room Intersection

2.3.3 Speed Data

Typical traffic data collection would rely on spot speed counts using a radar gun or automatic traffic recorder (ATR) devices to collect vehicle speeds. Stantec instead chose to use AMAG's dashboard prepared for this project to identify speed violations of greater than five miles per hour (5 MPH) above the speed limit on all approaches to every intersection that was observed for TMCs and Near Miss Analysis. The following table presents the intersections with the most critical violations of approach speeds entering the intersections:

Table 3 – Intersection Approach Speeds

Intersection	Approach	Speed Limit (MPH)	Percentage of Vehicles at/over Speed Limit + 5 MPH
Eden Street at West Street	Eden Street NB	25	23.6%
Eden Street at West Street	Eden Street SB	25	45.8%
Route 3 at Knox Road	Route 3 WB	45	8.5%
Route 102 at Gilbert Farm Road	Route 102 SB	35	10.6%

3 Data Analysis

Vision Zero is an approach and a goal to eliminate fatal and severe injury crashes on our roadways. This approach represents a fundamental change in priority to shift the focus away from the traditional approach to the safe system approach. The traditional approach puts the responsibility on individuals and tries to improve human behavior, prevents crashes reactively based on crash history, and mainly addresses speed. On the other hand, the Safe System Approach acknowledges that people make mistakes, mistakes should not lead to fatal and severe injury crashes, responsibility is shared, humans especially pedestrians and bicyclists are vulnerable, safety is proactive, and redundancy in design is crucial[1]. With this framework in mind, the Safe System Approach offers five holistic strategies: to foster safer people, safer vehicles, safer speeds, safer roads, and post-crash care.

The Bar Harbor safety analysis aims to holistically analyze and review safety. The safety analysis is comprised of three main components – Trends-based Network, Risk-based Network, and Community-based Network – that make up the priority network.

- The Trends-based Network reviews the past five years of crash data to understand where injury crashes are occurring based on past crash trends. Crashes are analyzed to identify overall trends, and the crashes are mapped on the roadway to identify the high injury network of roadways with higher densities of crashes.

- The Risk-based Network considers systemic and context factors that are associated with increased risk of crashes, regardless of past crash history. Land use context variables such as proximity to schools and community assets, roadway context variables such as speed limit and presence of crosswalks, and other variables such as insufficiently focusing on certain communities are considered in the risk-based factors. If these variables are associated with a higher risk of crashes, these locations are mapped and used to define priorities.

- The Community-based Network incorporates community experiences and input on where people feel unsafe. Crashes may commonly be underreported and there may be common near-miss locations. This community-based network aims to catch these under-reported and near-miss crash locations and supplement the priority network and locations.

The Priority Network captures and overlays these three networks to identify the top priority locations. The priority network helps guide the decision-making and next steps for safety improvements and strategies.

[1] Vision Zero Network (2025). https://visionzeronetwork.org/fundamentals-of-the-safe-system-approach/

3.1 Crash Trends

Past crash data is the most critical input into the Road Safety analysis. Even one death on Bar Harbor's roadways is too many – in the last five years there were five (5). The crash analysis underpinning this Action Plan is based on the most recent five years of crash data (2019-2023) collated by the Maine Department of Transportation (MaineDOT). This analysis focuses on injury crashes and identifying the highest risks for injuries. Therefore, this analysis excludes property damage only (PDO) crashes. Crashes where the severity was unknown and crashes that were not geolocated by MaineDOT or Stantec or were geolocated outside of Bar Harbor are also excluded throughout.

While the prevalence of vehicular safety devices such as automatic braking and blind spot detection has increased dramatically, overall injury crashes have still kept increasing over the last 5 years. During the pandemic in 2020, when fewer people were outside, people took to speeding on empty roadways. This is when Bar Harbor had the most fatalities. Since then, there has still been one fatality per year. Meanwhile, incapacitating (serious) injury crashes have grown precipitously since 2019, with this crash type increasing 5 times by 2023. Other injury crashes have also been steadily increasing. Overall, there were 40 crashes in 2023 which is high for a community the size of Bar Harbor. (see **Figure 15**).

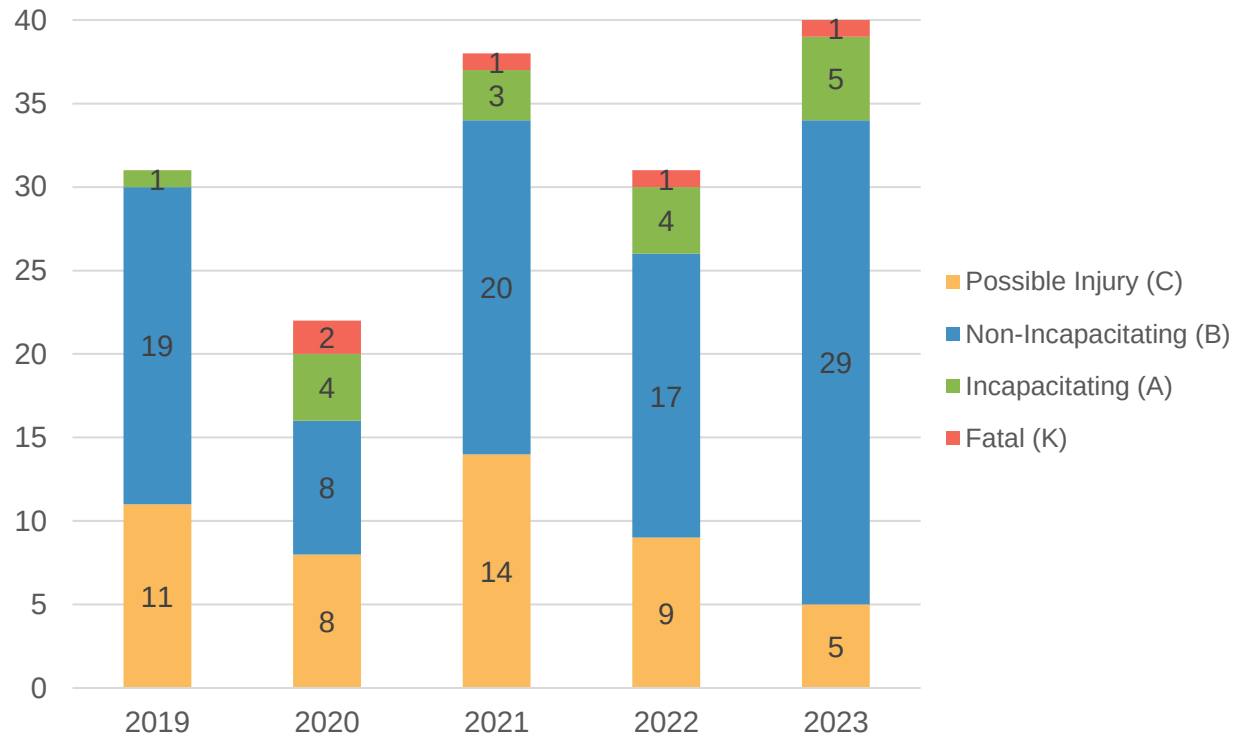


Figure 15 – Crashes per Year in Bar Harbor by Severity

A common way to compare the safety of different communities is by measuring crash fatalities per 100,000 people. While Bar Harbor has fewer people than 100,000, this measure highlights Bar Harbor's unique challenges. Though there is on average one fatality annually, Bar Harbor experiences a high number of crash fatalities per capita for its small population and has a higher rate of crash fatalities than the statewide rate.

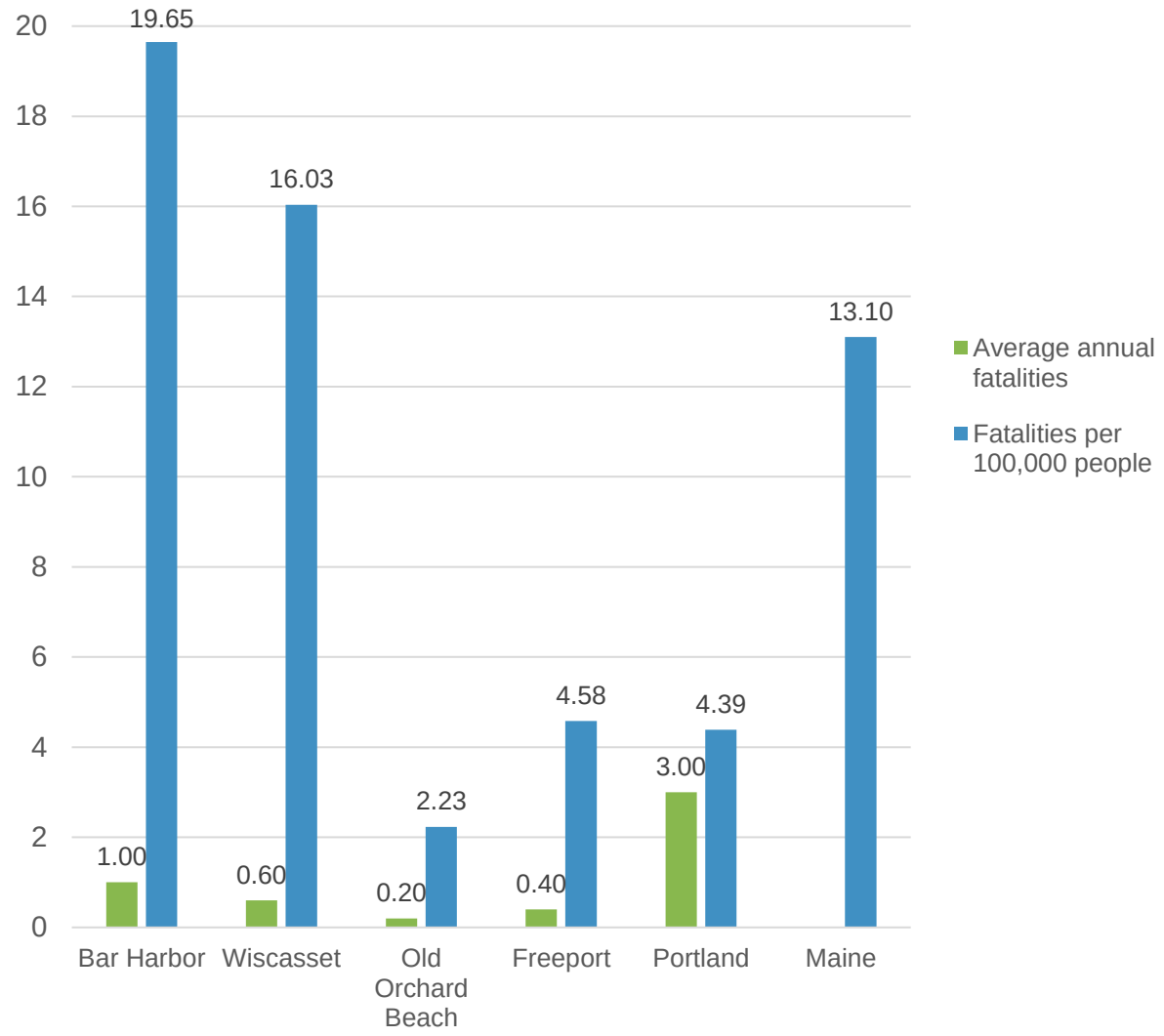


Figure 16 – Average Annual Fatalities per 100,000 People in Maine Communities

The locations of crashes in Bar Harbor were geo-coded and are identified in the map below (**Figure 17**). The heat map shows that majority of crashes occur in few specific areas, that include the Downtown, Bar Harbor Rd, Main St and Eagle Lake Rd.

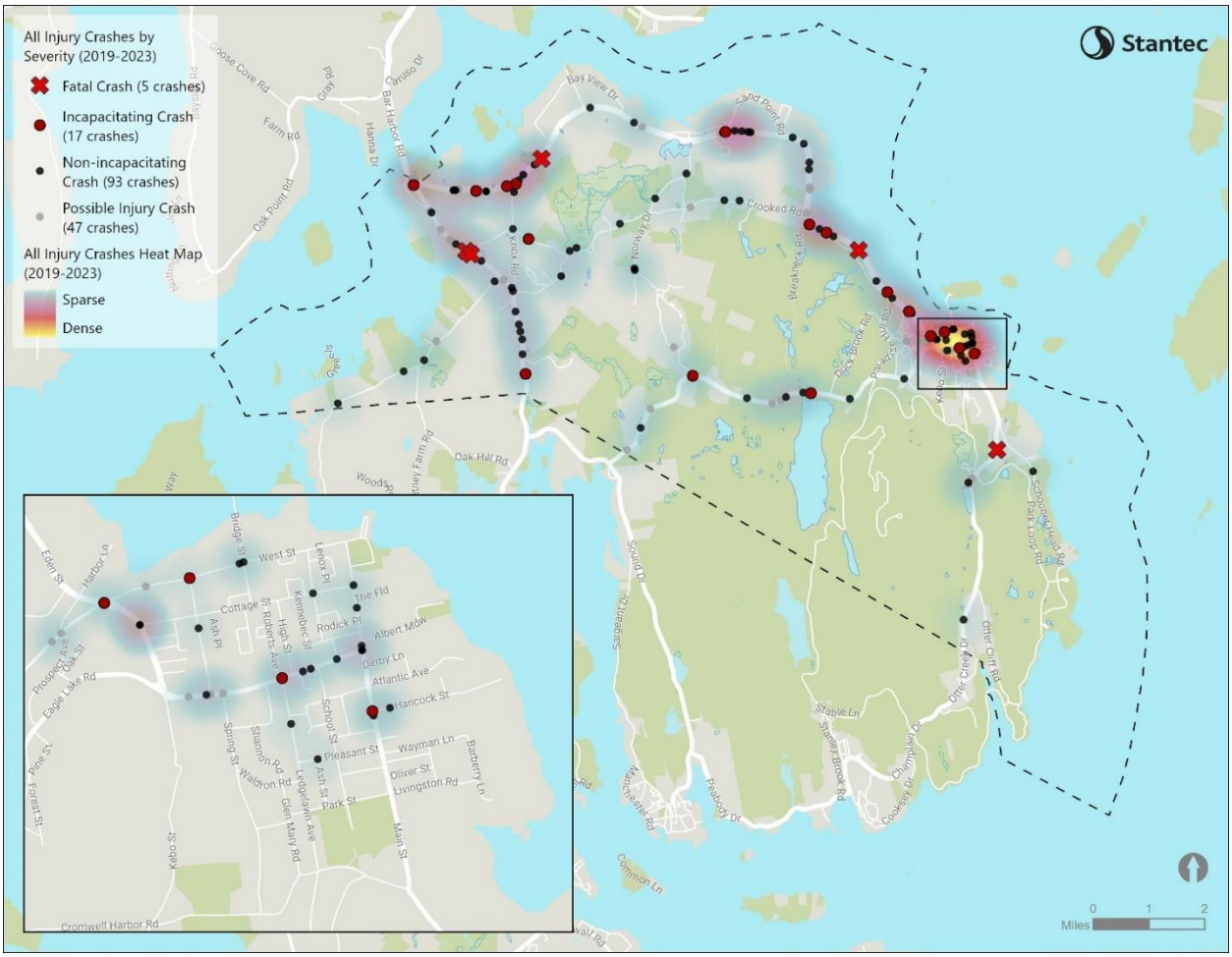


Figure 17 – Injury Crashes by Severity (2019-2023)

In Bar Harbor, a major summer tourist destination, 75% of injury crashes occur between May and October, and a majority of fatal crashes occurred in October.

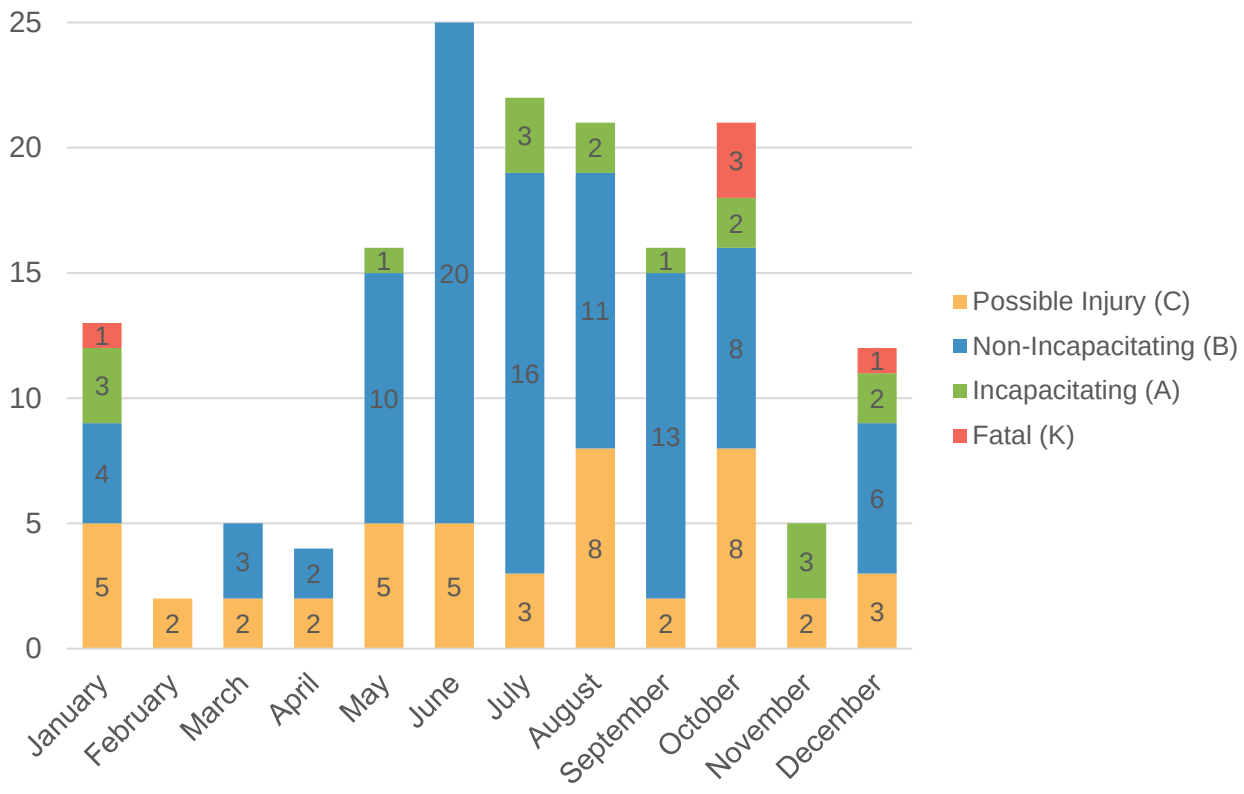
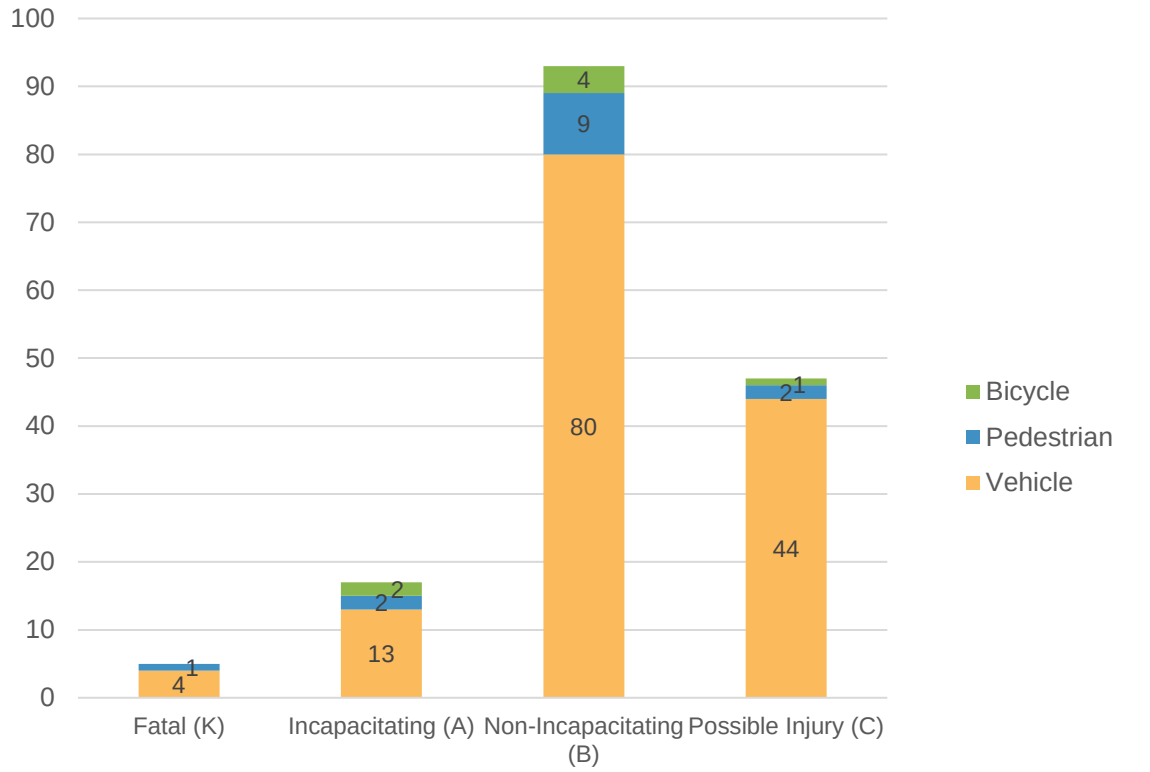


Figure 18 – Injury Crash Trends by Month in Bar Harbor (2019-2023)

3.1.1 Vulnerable Road Users – Bicyclists and Pedestrians

Of the injury-related crashes that occurred in Bar Harbor, those that involved bicyclists and pedestrians are disproportionately much more likely to result in a severe or fatal injury. While pedestrian and bicycle injury crashes make up only 13% of all injury crashes, (9% and 4%, respectively) a higher percentage of pedestrian and bicycle injury crashes are fatal or incapacitating. Fatal or severe pedestrian and bicycle injury crashes make up about 21% and 29%, respectively, of all pedestrian and bicycle injury crashes. In comparison to the percentage of vehicle crashes that are fatal or incapacitating (18% of all vehicle injury crashes), fatal or incapacitating injury crashes make up a notably higher percentage of all pedestrian and bicycle crashes.



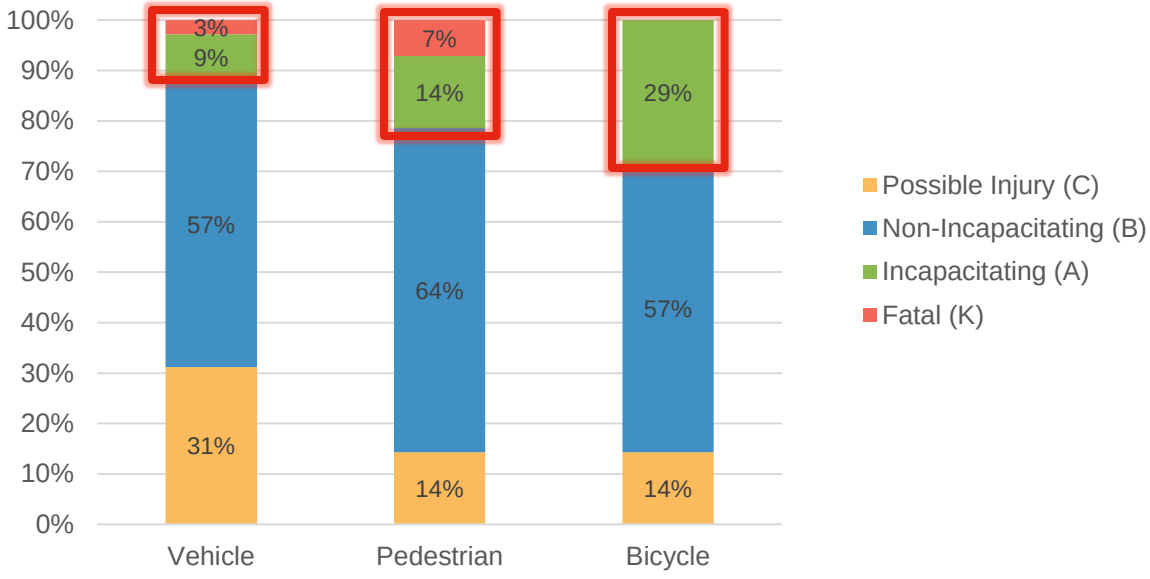


Figure 19 – Injury Crashes in Bar Harbor by Mode and Severity (2019-2023)

Figure 20 below shows the locations of all pedestrian related injury crashes. The majority of the crashes took place in Downtown, especially on Mount Desert Street. Currently the street is a major roadway through town featuring a lot of commercial, retail and restaurant activities. One fatal crash occurred near the Jackson Laboratory along Main Street.

Figure 20 – Pedestrian Related Injury Crashes (2019-2023)

Figure 21 shows the locations of all bicycle related injury crashes. There are fewer crashes compared to the other modes. Most of these occurred in downtown, with most crashes involving minor injuries.

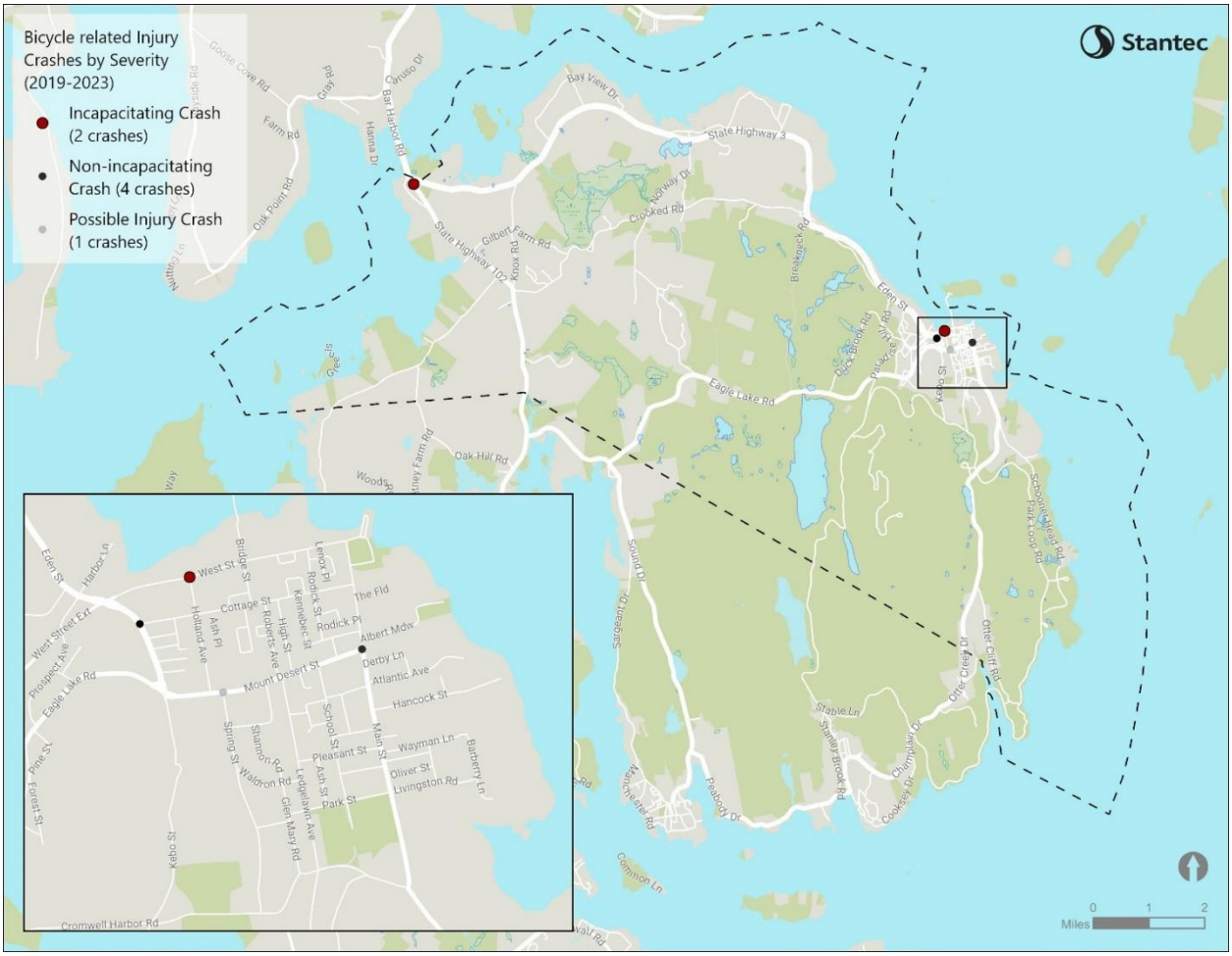


Figure 21 – Bicycle Related Injury Crashes (2019-2023)

Figure 22 shows pedestrian crashes over the last 5 years. The leading cause of pedestrian crashes is when a motorist failed to yield to a pedestrian in the right-of-way. This could be attributed to many factors such as sightlines, road geometry, speed limits and sign postings.

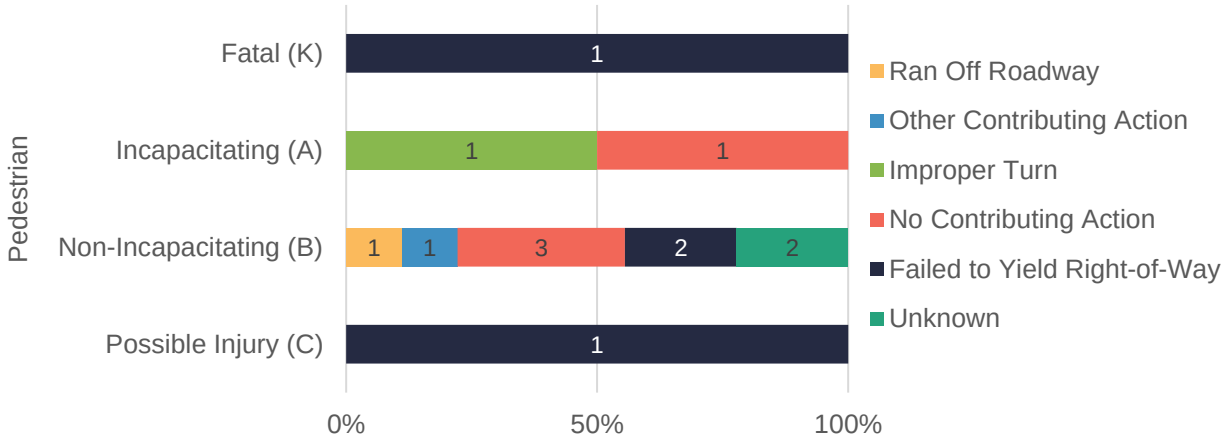


Figure 22 – Driver Action Involving Pedestrian Injury Crashes by Crash Severity (2019-2023)

Figure 23 shows bicycle crashes over the last 5 years. Similar to pedestrian crashes, the leading cause for bicycle crashes is failing to yield to a bicycle in the right-of way.

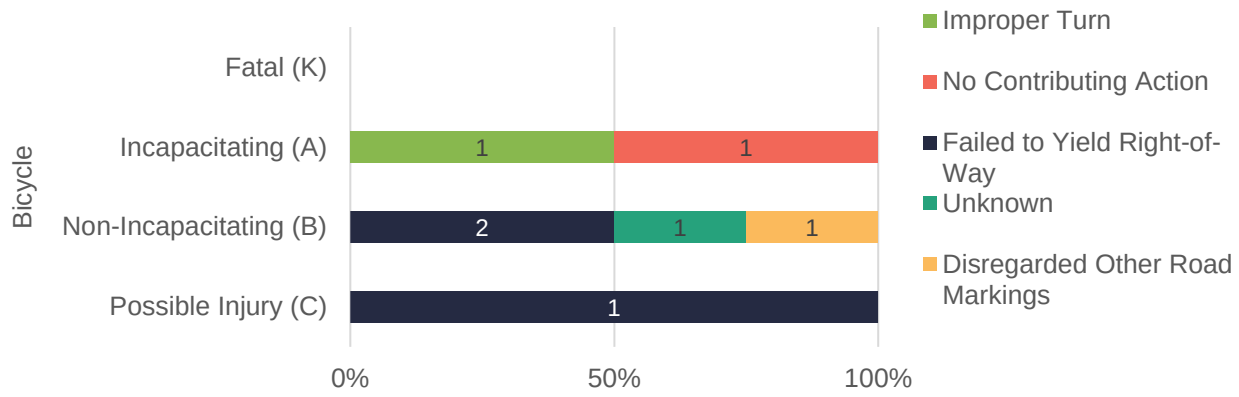


Figure 23 – Driver Action Involving Bicycle Injury Crashes by Crash Severity (2019-2023)

3.2 High Injury Network

The high injury network (HIN) shown in **Figure 24** indicates the roadway segments with higher density of injury crashes. While the HIN covers only 16% of all Bar Harbor roadways, the HIN captures 86% of all fatal and severe injury crashes.

The HIN was drafted by first spatially joining fatal and injury crashes to the most adjacent road segments using a 20 ft buffer. Crashes that happened on intersections were joined to all approaching roadways. Density of injury crashes were visually displayed by road segment. Since Bar Harbor roads in Downtown are shorter in length and roads outside Downtown are longer, injury crashes were displayed by segment per mile to normalize the data and put all road segments on the same playing field. Injury crashes were also weighted to give more weight to fatal and severe injury crashes. Fatal crashes were multiplied by 3, severe injury crashes were multiplied by 2, and minor injury crashes were given a score of 1. Based on the roadway injury crash maps, roadways with higher scores of fatal and injury crashes were included in the HIN. A few shorter segments that had lower scores but were in between HIN segments were included in the HIN to create a more logically-connected network.

Figure 24 – High Injury Network Map

3.3 Risk-Based Network

3.3.1 Risk-Based Variables

The risk-based network shown in **Figure 25** reflects the roadways and areas that are associated with a higher risk of crashes, regardless of past crash trends. The risk-based variables included land use contexts and roadway context. **Table 4** shows all the risk-based variables included in the analysis and their association with injury crashes. The variables with 10% difference in crash representation compared to the roadway representation were shaded in yellow. Yellow shading indicates that these locations are risk-factors because they are overrepresented in the crash data. Overall, the risk-based network covers only 28% of all roadways, but captures 59% of all fatal and severe injury crashes.

All community facilities were combined as one variable and included public schools, colleges, medical facilities, community centers, libraries, food pantries, police stations, fire stations, and port security. Community facilities are areas where pedestrians, bicyclists, children under the age of 18, and people in underserved communities are more likely to visit and populate. Community facilities are along only 6% of all Bar Harbor roadway but this variable captures 50% of all pedestrian-involved injury crashes and 71% of all bicycle-involved injury crashes.

With many tourists visiting Bar Harbor, attractions were identified as a risk variable and included transit hubs, campgrounds, and high-volume pedestrian areas. Foot, bicycle, and vehicle traffic is higher in these areas as is the association with injury crashes. Attractions are along only 8% of all Bar Harbor roadways but capture 23% of fatal and injury crashes, 43% of all pedestrian-involved injury crashes, and 71% of all bicycle-involved injury crashes.

Along with the increase of tourists during the peak season, seasonal workers also come to Bar Harbor to support the industry. Dormitory style housing and subsidized housing were included as a risk variable since seasonal workers are more likely to stay in these housing units and walk to their place of work. Worker housing is along only 3% of all Bar Harbor roadways but captures 50% of all pedestrian-involved injury crashes.

The Island Explorer is one of the main transit systems that serves Bar Harbor visitors and seasonal workers getting to, from, and around Bar Harbor. The top five routes and stops with highest ridership were included as risk variables in the analysis. These Island Explorer stops cover 5% of all Bar Harbor roads but capture 18% of fatal and severe injury crashes.

Low sidewalk capacity indicates areas where the capacity is generally full, and pedestrians have to step outside the sidewalk into the travel lanes. Pedestrians walking along these segments of sidewalk and stepping out into the travel lane are more at risk of being involved in a crash. Low sidewalk capacity covers 5% of all roadways but captures 18% of all fatal and severe injury crashes, 21% of pedestrian-involved injury crashes, and 14% of all bicycle-involved injury crashes.

Crosswalks that are non-compliant with the ADA impact the safety of pedestrians and bicyclists crossing a street. ADA non-compliant crosswalks cover only 0.3% of all Bar Harbor roadways but capture 11% of all bicycle-involved injury crashes.

Posted Speed Limits set an enforceable limit to how fast a vehicle is allowed to travel. The higher the actual vehicle speed is when involved in a pedestrian crash, the more likely that the pedestrian injury will be severe or fatal, so higher limits are considered a risk variable. Posted Speed Limits greater than 35 mph cover 20% of Bar Harbor roadways but capture 59% of all fatal and severe injury crashes.

The last risk-variable evaluated was traffic signals, which are sparce in Bar Harbor. Only two are placed in the whole town. Traffic signals did not have a significant association with injury crashes.

Table 4 – Association of Risk-Based Variables with Injury Crashes

Risk-based variables	Radius	% of All Bar Harbor Roads (Mileage)	% of All Injury Crashes	% of Fatal and Severe Injury Crashes	% Pedestrian Involved Injury Crashes	% Bicycle Involved Injury Crashes
Community Facilities	500 ft In Town 1000 ft Out of Town	5.75%	17%	18%	50%	71%
Attraction Sites	500 ft In Town 1000 ft Out of Town	8.2%	27%	23%	43%	71%
Housing	500 ft In Town 1000 ft Out of Town	3.4%	9%	5%	50%	14%
Island Explorer	200 ft In Town 400 ft Out of Town	4.75 %	11%	18%	7%	0%
Sidewalk Capacity	100 ft In Town 200 ft Out of Town	4.86%	12%	18%	21%	14%
ADA Non-compliant Crosswalk	25 ft In Town 50 ft Out of Town	0.27 %	3%	5%	7%	14%
Traffic Signal	100 ft In Town 200 ft Out of Town	0.28%	2%	0%	0%	0%
Posted Speed Limit >35 mph	50 ft In Town 100 ft Out of Town	19.89%	51%	59%	7%	14%
All Risk-based Factors	Merging all buffers	28%	89%	95%	100%	92%

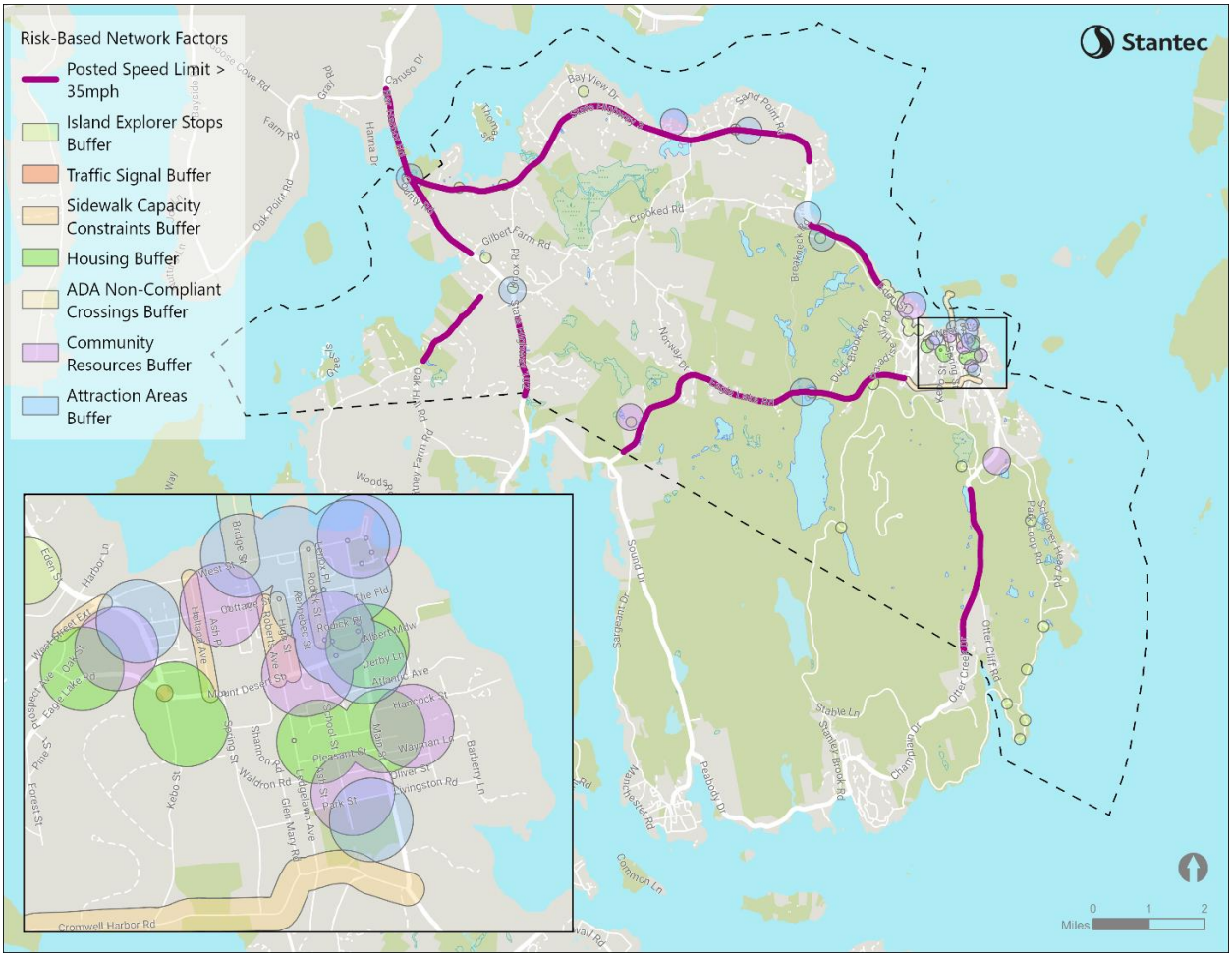


Figure 25 – All Risk-based Variables Overlapped and Displayed as the Risk-Based Network

3.3.2 Other Systemic Factors

As previously mentioned, there is not a higher overall injury crash risk associated with signalized intersections. However, when looking at crashes by mode of travel, a different relationship is clear. Figure 20 shows the intersection type and the mode of travel comparison. Most vehicle crashes occur away from an intersection, which holds true given community feedback and the terrain of Bar Harbor itself. Meanwhile, compared to vehicle crashes, pedestrians and bicyclists are more likely to get into a crash at an intersection.

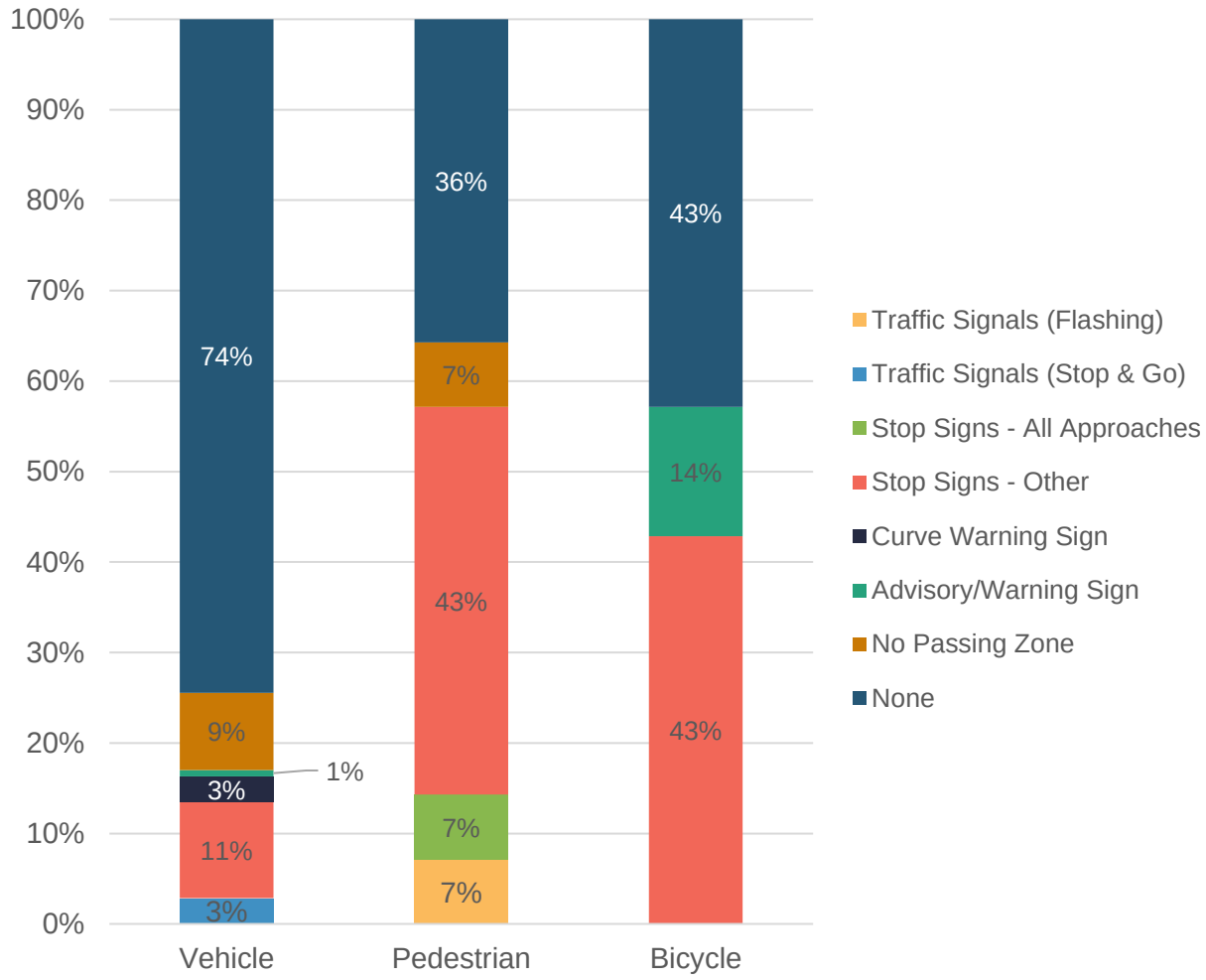


Figure 26 – Traffic Signal Intersection Type by Travel Mode

Based on the chart below, crashes on curved roads are more likely to be fatal. In the last five years, more than half of all fatal crashes took place on curved roads, including pedestrian fatalities. All bicycle-involved injury crashes took place mostly at three-legged intersections i.e., where bike trails meet the road.

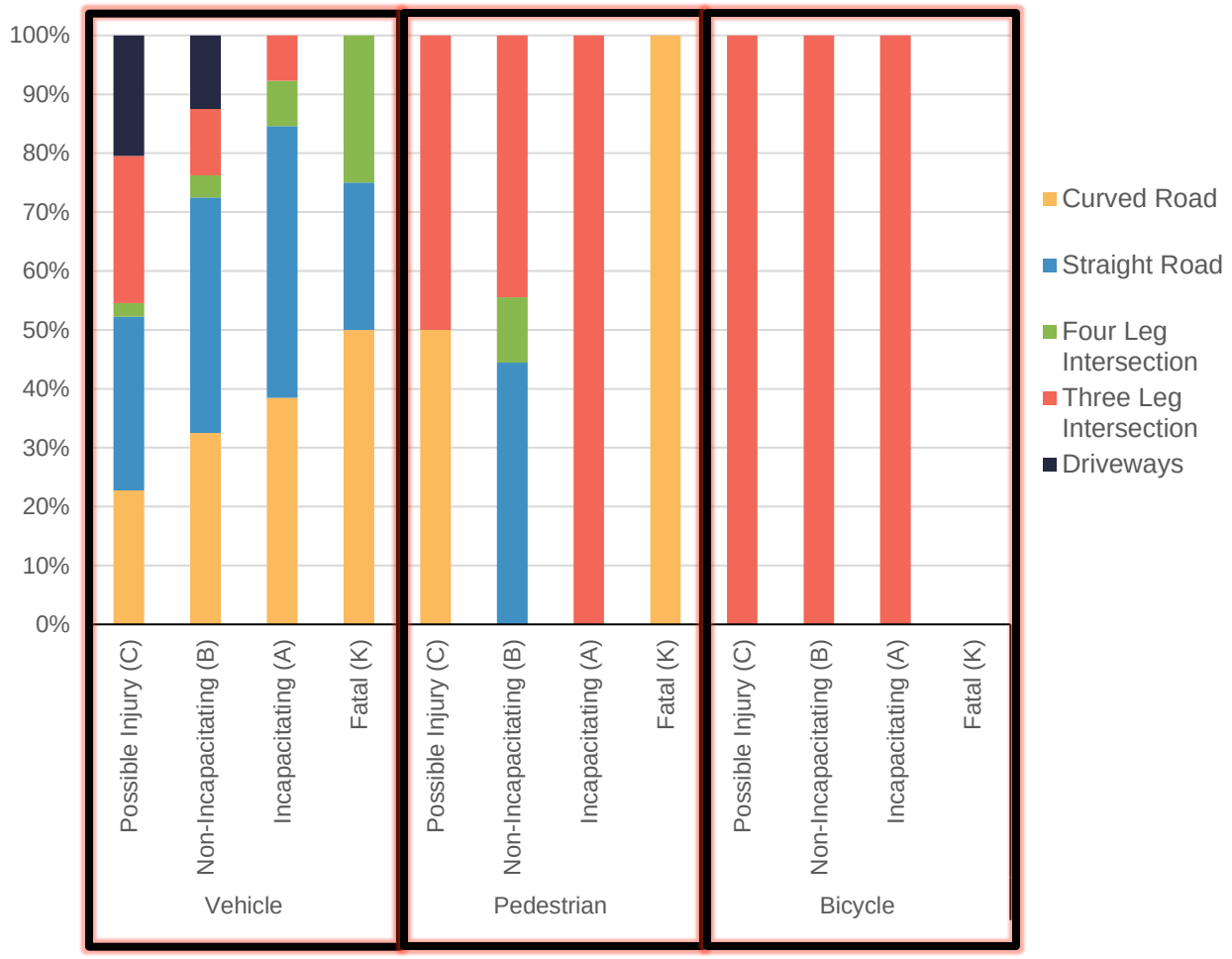


Figure 27 – Road Location Type by Travel Model and Injury Severity

3.4 Community-Based Network

As part of the project, the team conducted extensive public outreach. The team held pop-up events during the week of September 23rd 2024 at Open Table MDI, the Village Green, and Agamont Park. There was a public meeting held on September 25th. Overall, about 20 people attended. Team members also met with representatives from the hotel industry, including many seasonal workers at The Bayview Hotel on September 26th. Approximately 35 people attended this event. Following the meeting, there was also an online survey that could be completed for people who were not able to attend the public meeting. The survey was open from September 4,2024 to October 18, 2024. Around 480 responses to the survey were received from the Bar Harbor community.

As part of the survey, respondents had an option to use an interactive map to place geo-coded comments regarding the safety of travel by different modes of transportation. This resulted in a more accurate representation of people's concerns on the roadway network. **Figure 28** shows these comment locations.

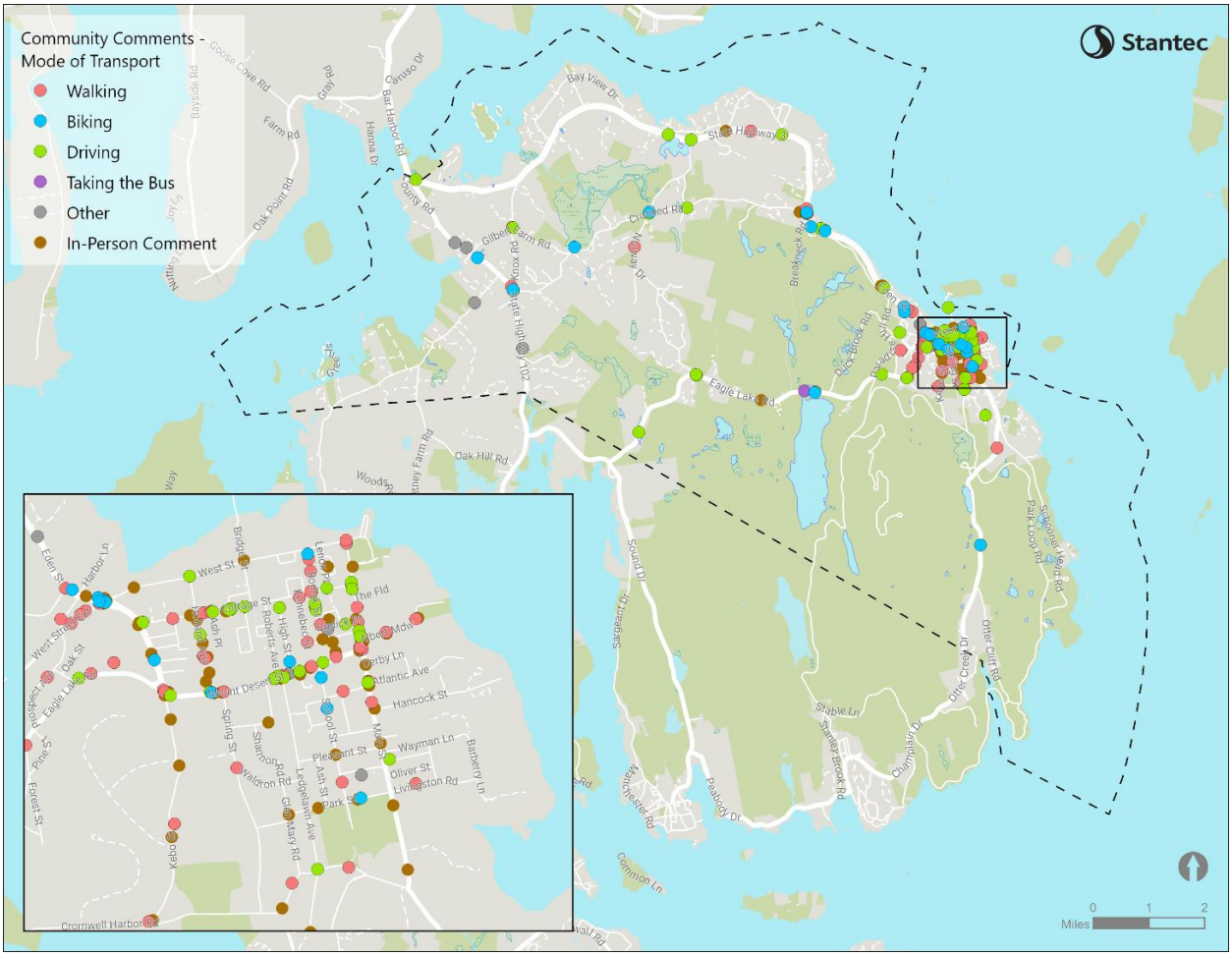


Figure 28 – Locations Where the Community Provided Input

Feedback received from the community was very valuable and will form a basis of evaluating alternatives and selecting key locations around the town for improvements. Some of the areas of high concern include Mount Desert Street, Route 3, and Main Street, with an emphasis on safety for pedestrians and bicyclists.

The community-based network shown in **Figure 29** indicates the roadway segments with higher density of community inputs. The community-based network covers 9% of all Bar Harbor roadways and captures 59% of all comments.

The community-based network was drafted by first spatially joining community input points to nearby road segments using a proximity analysis. Density of community input was visually displayed by road segments. Since Bar Harbor roads in Downtown are shorter in length and roads outside Downtown are longer, community input points were displayed by segment per mile to normalize the data and put all road segments on the same playing field. Based on the community inputs map, roadways with higher scores of community input points were included as the community-based network. A few segments that had lower

scores but were near intersections were included in the community-based network to account for the approaching streets that make up an intersection.

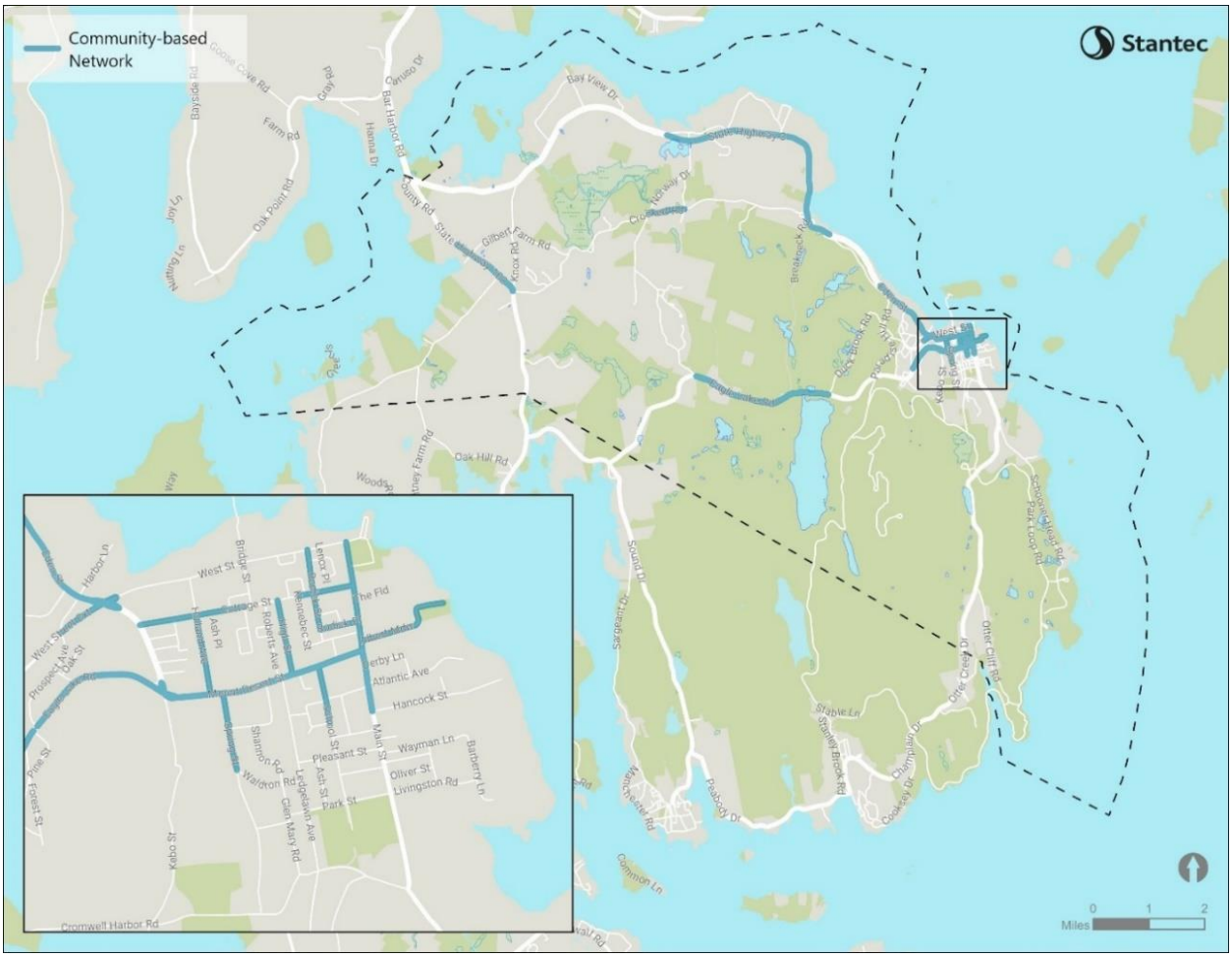


Figure 29 – Community-Based Network Map

3.5 Priority Network

The priority network overlays all three networks – the high-injury (HIN), risk-based, and community-based networks – and gives scores for each road segment based on each network and an overall weighting scheme. See **Figure 30** for the overlaid networks and **Table 5** for the weighting scheme. The HIN was given the most weight of 65% as it indicates the locations where past crashes occurred. Risk-based factors made up a total weight of 25% as it notes the risk areas that are associated with increased risk of injury crashes but not necessarily actual crashes. Each risk-based variable was given different weights based on the percentage of injury crashes associated with these variables. Finally, the community-based network was given a weight of 10% for its valuable additional anecdotal insight. The scored priority network was then further narrowed down using a threshold score of greater than 50 to make a manageable list of priority locations as shown in **Figure 23**. While the top priority network only covers

17% of all Bar Harbor roadways, it captures 77% of all fatal and severe injury crashes. Based on the top priority network, the Town will be selecting up to 20 locations to advance safety and reduce crashes.

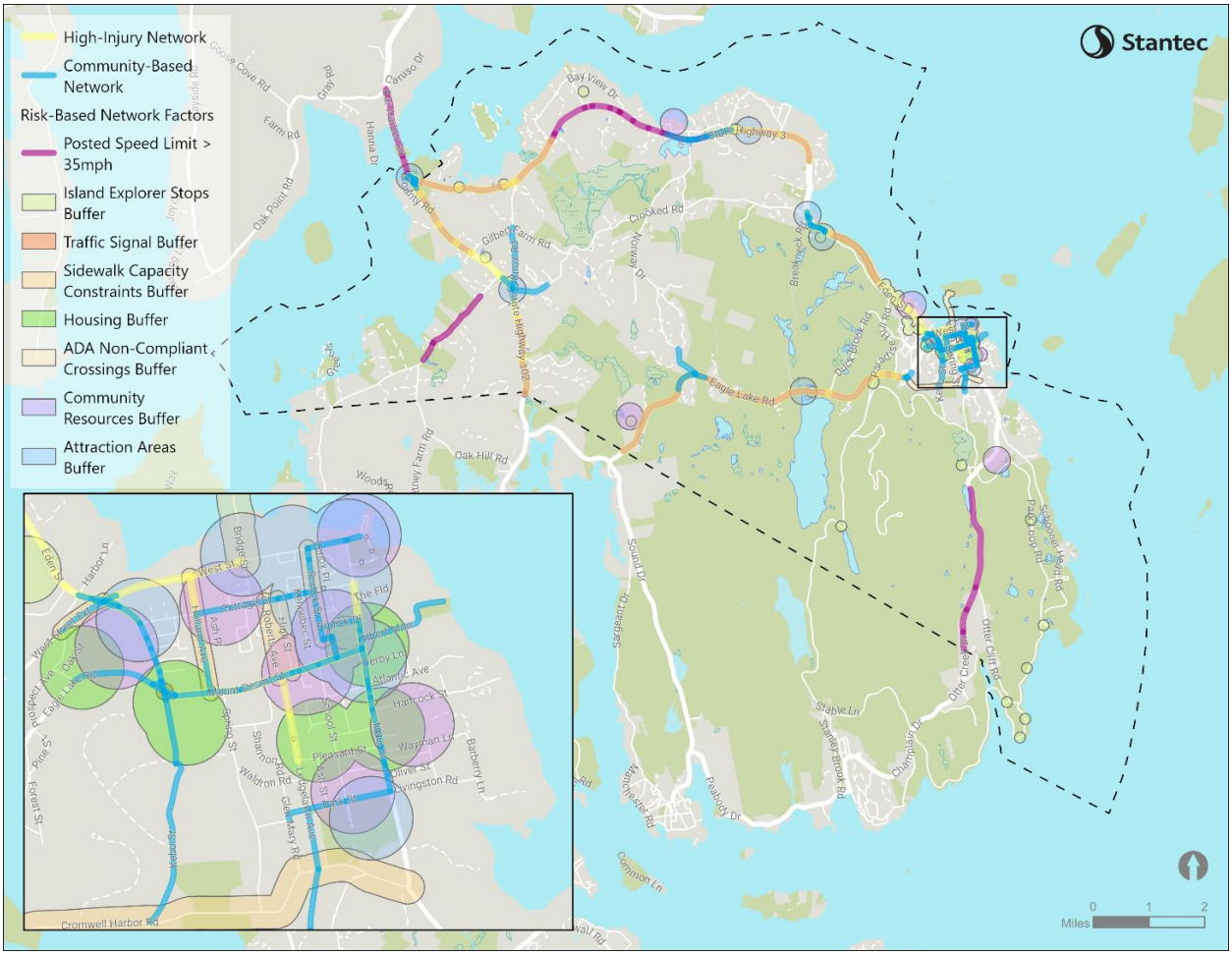


Figure 30 – All Networks Overlaid

Table 5 – Weighting Scheme and Rationale for the Priority Network

Factor	Weight	Rationale
High Injury Network (HIN)	65%	86% of all severe and fatal injury crashes
Community-based network	10%	59% of comments on community-based network
Risk-based Network	25%	95% of all severe and fatal injury crashes
Posted speed limit > 35 mph	*5%*	*59% of all severe and fatal injury crashes*
Roadway Infrastructure	*5%*	*21% of all pedestrian involved injury crashes &* *33% of all bicycle involved injury crashes*
Community facilities	*5%*	*50% of all pedestrian involved injury crashes &* *67% of all bicycle involved injury crashes*
Attraction Areas	*5%*	*43% of all pedestrian involved injury crashes &* *56% of all bicycle involved injury crashes*
Housing	*2.5%*	*50% of all pedestrian involved injury crashes &* *11% of all bicycle involved injury crashes*
Island Explorer	*2.5%*	*18% of all severe and fatal injury crashes*

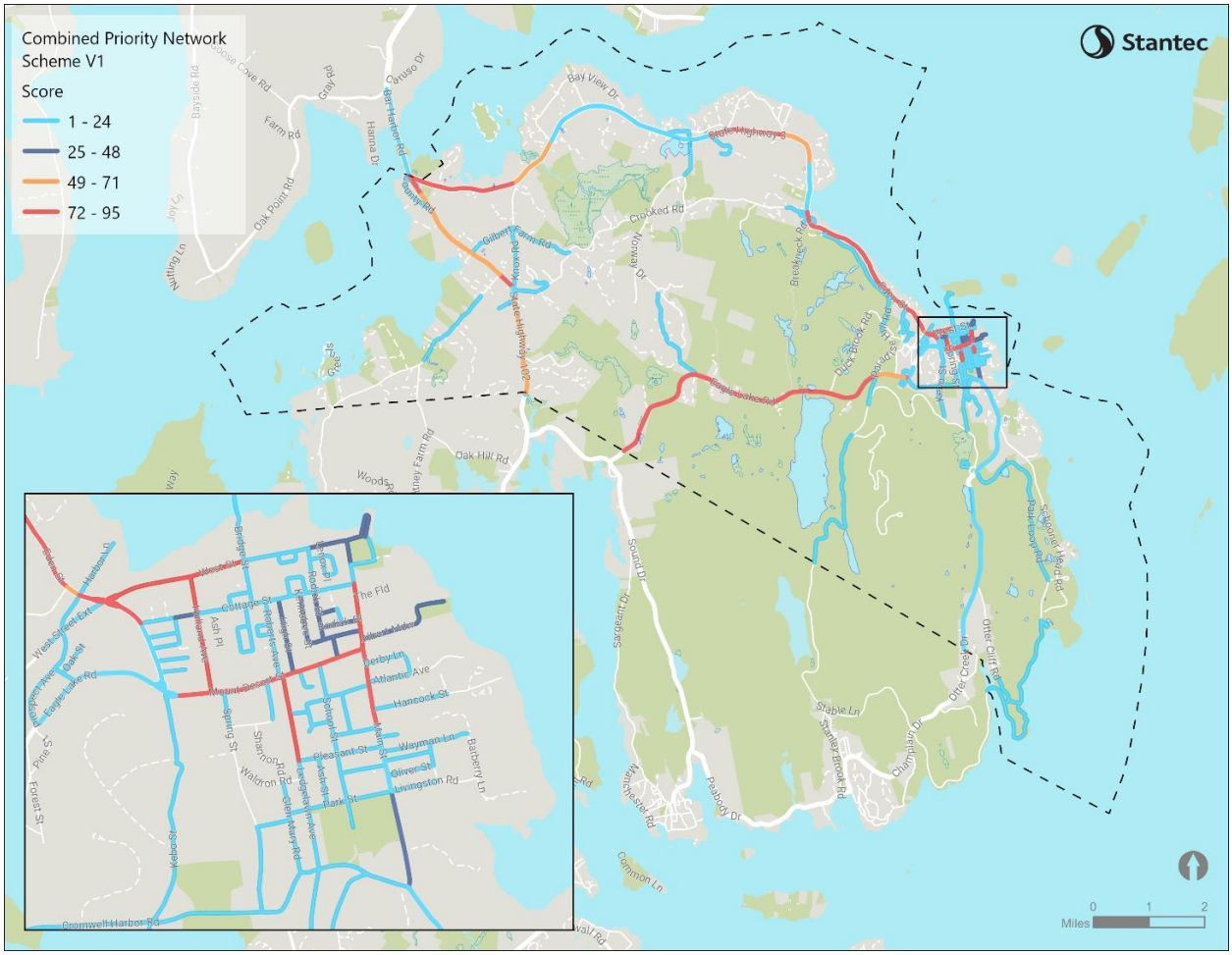


Figure 31 – Priority Network Scores

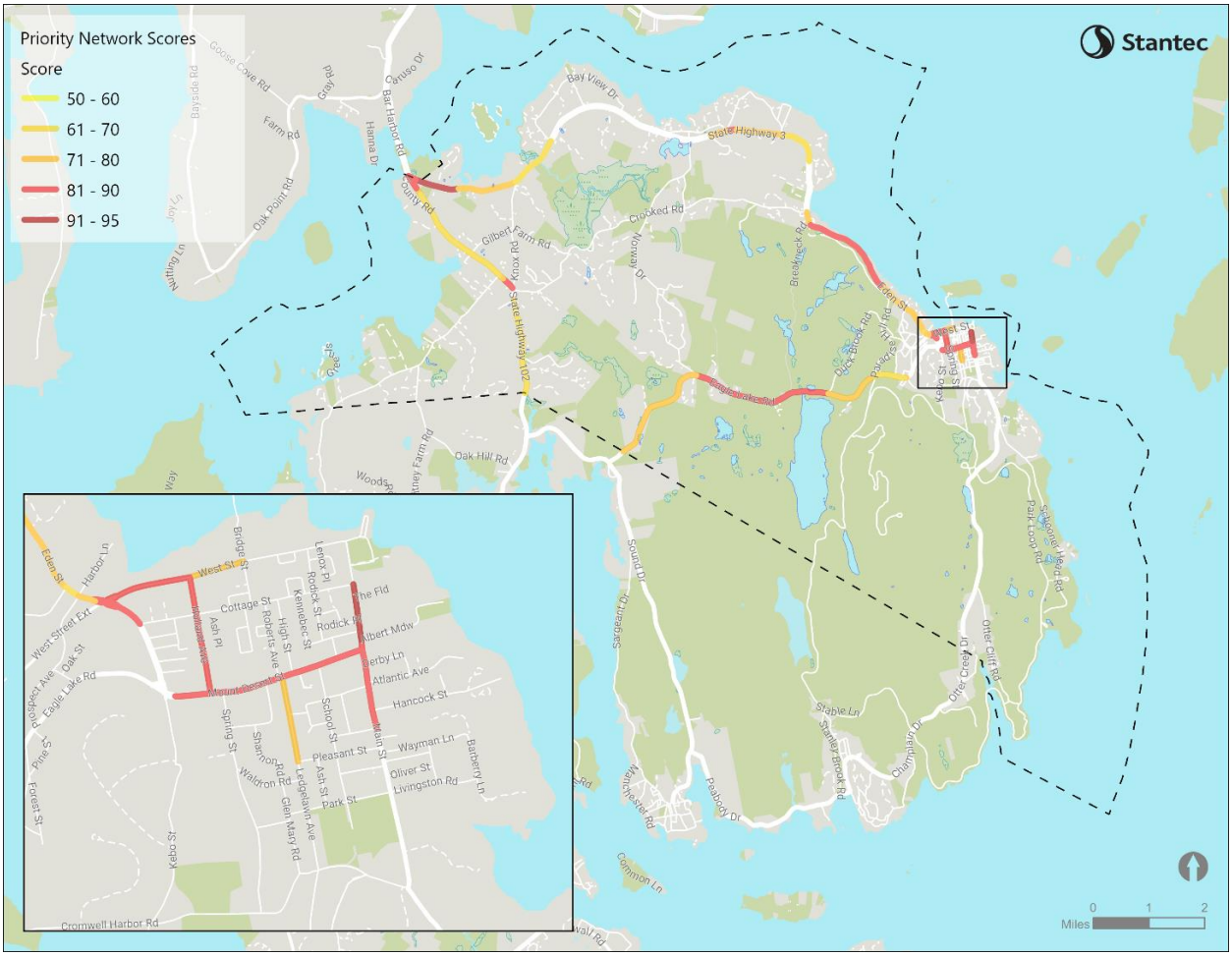


Figure 32 – Top Priority Network

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