Walk Bike plan BTV

SAFETY ACTION PLAN

Adopted on June 16, 2025

ACKNOWLEDGMENTS

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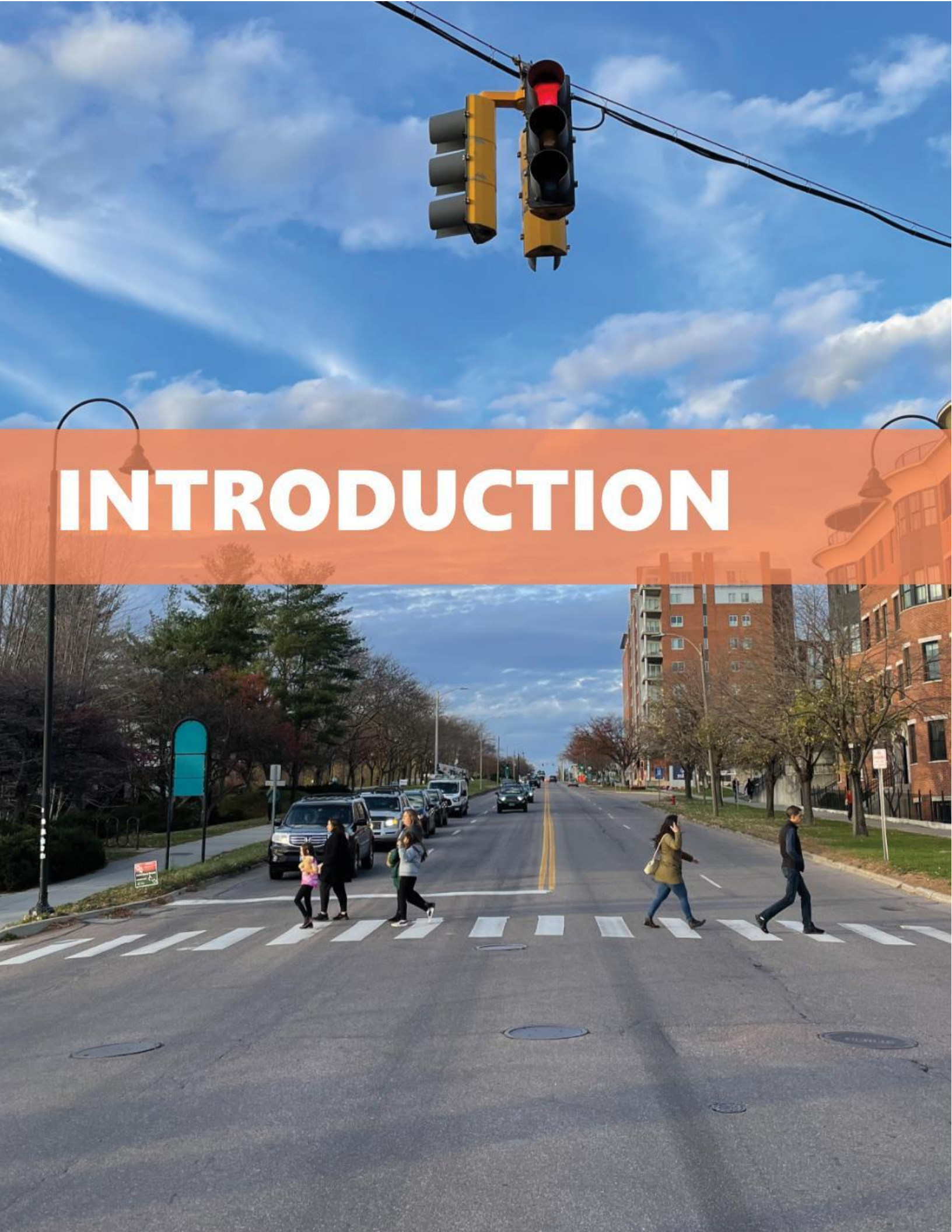
Acronyms

AARP	American Association of Retired Persons
AASHTO	American Association of State Highway Transportation Officials
ACS	American Community Survey
ADA	Americans with Disabilities Act
BIL	Bipartisan Infrastructure Law
BTV	Burlington, Vermont
CCRPC	Chittenden County Regional Planning Commission
DTC	Downtown Transit Center
ECOS	Environment; Community; Opportunity; Sustainability
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
GMT	Green Mountain Transit
HIN	High Injury Network
HSP	Highway Safety Plan
HSIP	Highway Safety Improvement Program
KABCO	Injury Scale
	K Fatality
	A Suspected Serious Injury/A-Injury
	B Non-Incapacitating Injury
	C Possible Injury
	O Property Damage Only
KA	Fatal and Serious Injury
NHTSA	National Highway Traffic Safety Administration
NPA	Neighborhood Planning Assembly
PSC	Proven Safety Countermeasure (As identified by FHWA)
RSA	Road Safety Audit
SHSO	State Highway Safety Office
SHSP	Strategic Highway Safety Plan
SS4A	Safe Streets and Roads for All
UVM	University of Vermont
UVMMC	University of Vermont Medical Center
USDOT	United States Department of Transportation
VRU	Vulnerable Roadway Users
VTrans	Vermont Agency of Transportation



INTRODUCTION

Background

The City of Burlington is committed to addressing its roadway safety challenges. Development of this Safety Action Plan revealed that there were 6 fatal crashes and 85 serious injury crashes on the City's roadway network between 2014 and 2023. Over 40% of the most severe crashes on the system involved pedestrians or bicyclists. This represents a significantly higher proportion of severe crashes involving pedestrians or bicyclists as compared to statewide rates of 11%. It also speaks to the vulnerability and heightened risk for non-motorized, vulnerable roadway users in the state's largest city. Burlington was identified as one of ten high risk communities in the Vermont Vulnerable Roadway Users Assessment. This can be attributed to Burlington having both a higher propensity for crashes involving pedestrians and bicyclists, as well as demographics and built environment characteristics that contribute to a higher propensity for travel as vulnerable roadway users, both out of necessity and by choice.

Designation as a high-risk community for vulnerable roadway users and circumstances of the serious crashes that have occurred within Burlington warrants a comprehensive assessment of Burlington's safety performance. The aim of the City's commitment to an evolving Safety Action Plan is to identify strategies, countermeasures, and actions that align with the state's "Toward Zero Deaths" ethos, particularly for pedestrians and bicyclists.

Burlington is not starting from scratch on transportation safety. Previous planning efforts have generated pathways for progress in making the transportation system in the city safer for all users. Notably, the 2011 Transportation Plan spurred the Complete Streets approach that transformed two key corridors and set a citywide speed limit of 25 mph. The 2017 planBTV Walk Bike Plan similarly set into motion the goal of creating safer streets for everyone by eliminating traffic-related fatalities and serious injuries. The recommendation of a Vision Zero policy and progress on implementation of over 200 recommended projects are notable. The project implementation progress has entailed

five completed intersection projects, nine interim intersection improvement projects, 17.6 miles of bikeway projects, and pedestrian improvement projects including three to four miles of reconstructed sidewalk per year.

This Safety Action Plan reinvigorates the commitment to safer streets by pledging action in a Safe Systems Approach and Vision Zero philosophy in the march towards eliminating transportation related deaths and serious injuries. A Safe System Approach to walking, biking, and rolling in Burlington represents a shift in how we think about and address roadway safety problems. It requires shifting our thinking upstream to prevent problems before they happen. This entails moving beyond focusing on changing individual behavior and instead accepting shared responsibility for putting a safe system in place for all road users.

About Burlington

Burlington is located in northwest Vermont, and is positioned on the eastern shore of Lake Champlain. The City has an estimated population of 44,528 as of 2023. As the most populous City in the state and home to many institutions and businesses, Burlington serves as a hub and economic center for the state of Vermont. The City is home to the state's only Level 1 Trauma Center at the University of Vermont Medical Center (UVMMC), as well as two of the state's largest employers, UVMMC and the University of Vermont (UVM). The greater Burlington area and surrounding Chittenden County represents Vermont's only Metropolitan Planning Organization – the Chittenden County Regional Planning Commission.

As a hub to the region and the state, Burlington's roadways serve residents, commuters, the regional community, and visitors to the state. Further, critical connections to medical care and emergency medicine are made via city routes. Improving safety and accessibility for all road users, especially pedestrians and bicyclists, is vital to Burlington's goal of reducing fatalities and serious injuries on the transportation system while supporting safe and low-cost transportation options to residents and visitors alike.

Safe Systems Approach

The Safe System Approach is a comprehensive, US DOT adopted approach to address roadway safety by incorporating the objectives and principles outlined below. The Safe System Approach is built on five pillars or overarching objectives to a safe transportation system, including:

- Safer People / Road Users
- Safer Roads
- Safer Vehicles
- Safer Speeds
- Post-Crash Care

The Safe System Approach incorporated into this Safety Action Plan acknowledges several key principles:

- Death and Serious Injuries are Unacceptable
- Humans Make Mistakes
- Humans Are Vulnerable
- Responsibility is Shared
- Safety is Proactive
- Redundancy is Crucial

The Safe System Approach leverages key fundamental principles from Vision Zero planning practices. The five fundamental principles or concepts that underlie this work include:

- Traffic deaths and severe injuries are acknowledged to be preventable.
- Human life and health are prioritized within all aspects of transportation systems.
- Transportation systems must account for human error.
- Safety work should begin with systems-level changes and follow with influencing individual behavior.
- Speed is recognized and prioritized as a fundamental factor in crash severity.

In developing a Safe System Approach, the following processes and practices are prioritized:

- Build and sustain leadership, collaboration, and accountability to advance safety.
- Collect, analyze, and use data to identify safety concerns and opportunities for improvement.
- Prioritize actions to provide a safe and equitable transportation system for all users.
- Lead with roadway design that prioritizes safety.
- Reduce target design speeds and impact speeds.
- Maximize technology advances, without overlooking low-tech solutions.

Although the targeted safety outcomes of this Safety Action Plan are focused primarily on vulnerable roadway users, the entire roadway system and all roadway users were assessed in the safety analysis. This safety analysis formed the underpinnings of the Safety Action Plan's projects and strategies, which align with the Safe System Approach. Key components of the Safety Action Plan include:

- Data Driven Approach: Comprehensive assessment of crash data resulting in fatalities and serious injuries on the network to identify emphasis areas and connect strategies and countermeasures to address safety deficiencies in a systemic approach.
- Stakeholder Engagement: Public engagement across different media to capture experience and perception of safety on the system while promoting a culture of safety.
- Strategies & Actions: An action table details proven countermeasures and projects along focal corridors that represent a high-injury network for the City.
- Policy Review & Recommendations: Policies and processes were reviewed to identify additional recommendations to support a culture of transportation safety in Burlington.

This Safety Action Plan details Burlington's data driven implementation approach to achieve the goal of a safer system for all users, specifically focused on pedestrians and bicyclists of all ages and abilities.

Aligned Plans & Policies

SAFE STREETS FOR ALL

POLICY & PROCESS CHANGES

The planBTV Walk Bike Safety Action plan builds on the foundation of planBTV Walk Bike, a comprehensive active transportation master plan adopted in 2017. With a specific focus on improving safety outcomes by committing to a Safe Systems Approach, the update to the Plan builds on the foundation of previous planning and aligns with a host of efforts across the city, region, and state. Relevant plan documents and aligned safety work are summarized below:

Table 1 Relevant Plans, Programs, and Policies

Name	Date	Summary
planBTV Walk Bike	2017	planBTV Walk Bike was a comprehensive master plan for active transportation in the City. The plan set targets to create a safer system for users with the aim of reducing fatalities and serious injuries while increasing the share of people walking and biking. Over 200 projects were identified as well as actions to improve evaluation, education, encouragement, enforcement, and equity for walking and biking across the City.
planBTV: Comprehensive Plan	2019	planBTV: Comprehensive Plan is Burlington's evolving comprehensive plan, outlining the goals and objectives for the future of the City. The plan documents the plan for action around the themes of a distinctive, dynamic, inclusive, and connected city. The plan also details future land use and development framework to support planning activities to conserve, sustain, and grow within the City.
Great Streets Design Standards	2018	Set design and construction standards for Burlington's downtown streets to support a transformative street environment that is walkable, bikeable, sustainable, vibrant, and functional. The document provides guidance to achieve a cohesive, unified aesthetic to downtown streets that achieve the Great Streets ethos, carrying a project through the development phases of design considerations, street typology, roadway and pedestrian options, siting considerations, street and intersection assemblies, and street ecology.

Name	Date	Summary
Quick Build Design & Materials Standards	2017	Set standards for design and application of materials within the roadway environment to take near-term action on street redesign projects. This document provides guidance to implement safety improvements and placemaking projects with low-cost and flexible elements with the intent of remaining in place for up to five years. This enables opportunities for the community to interact with design elements to identify adjustments to designs and support decision making toward more permanent investments to achieve intended outcomes.
Chittenden County ECOS Plan	2018	The ECOS Plan is a long-range regional planning effort at the county level. The update adopted in 2018 focused primarily on the Metropolitan Transportation Plan, Comprehensive Economic Development Strategy, and Regional Enhanced Energy Plan components. The plan sets the vision for the region and goals for natural systems, social community, economic infrastructure, and built environment. Aligning with this work, key actions identified in the plan include addressing roadway safety issues and supporting areas planned for growth with multimodal infrastructure investments.
CCRPC Safety Action Plan	Ongoing	The CCRPC Safety Action Plan development process is underway. This Safety Action Plan looks to serious crashes and safety outcomes at the county level to assess targets and identify actions for reducing fatalities and serious injuries. It is anticipated that this plan will both reinforce the local objectives and identify other safety actions that will complement Burlington's planBTV Walk Bike Safety Action Plan.
Vermont Vulnerable Roadway Users Safety Assessment	2023	The Vulnerable Roadway Users Safety Assessment was appended to the Vermont Strategic Highway Safety Plan to focus directly on the emphasis areas. The effort entailed additional safety data analysis, outreach to high-risk populations, and identification of challenges facing VRUs on the transportation system. Strategies were identified for implementation including increasing visibility of VRUs, separating VRUs in space, managing speeds, establishing VRU safety culture, increasing transit options, and conducting VRU planning activities.
Vermont Strategic Highway Safety Plan	2022-2026	This plan details statewide strategies to address traffic related fatalities and serious injuries. The plan sets crash reduction targets for emphasis areas identified through safety data analysis and tracks progress towards the plan objectives.

In alignment with the 2017 planBTV Walk Bike Plan and other citywide goals, there are a number of related plans or efforts that aim to increase mode share for walking and biking. Among others, these plans include Burlington's Net Zero Energy Plan and Citywide Transportation Options Study. This is noteworthy as it is anticipated that the share of pedestrians and bicyclists on the City's roadways will continue to increase as Burlington moves to pursue these related goals.

Assessment of progress towards the targets of the previous planBTV Walk Bike Plan was key to the development of this Safety Action Plan. The focus of safety in the previous plan identified actions to address serious crashes on the system related to walking, biking, and rolling. Projects, programs, and policies were reviewed from the plan to understand progress to date and identify potential carry forward projects that align with the updated safety analysis and emphasis areas for this Safety Action Plan update.

Progress has been made on implementing the approximately 200 projects identified in the original planBTV Walk Bike Plan. The status of the projects from the original plan are depicted in the map below and as of winter 2025 have included:

- Intersection Priority Projects
  - 20 identified in the plan and 2 added since
  - 5 intersection projects completed
  - 9 intersection projects with interim improvements
  - 6 intersection projects planned
- Bikeway Projects
  - 28 miles targeted
  - 17.6 miles completed
- Sidewalk Projects
  - 3.4 miles of new sidewalk targeted
  - 0.16 miles of new sidewalk completed
  - 3-4 miles of sidewalk reconstructed each year

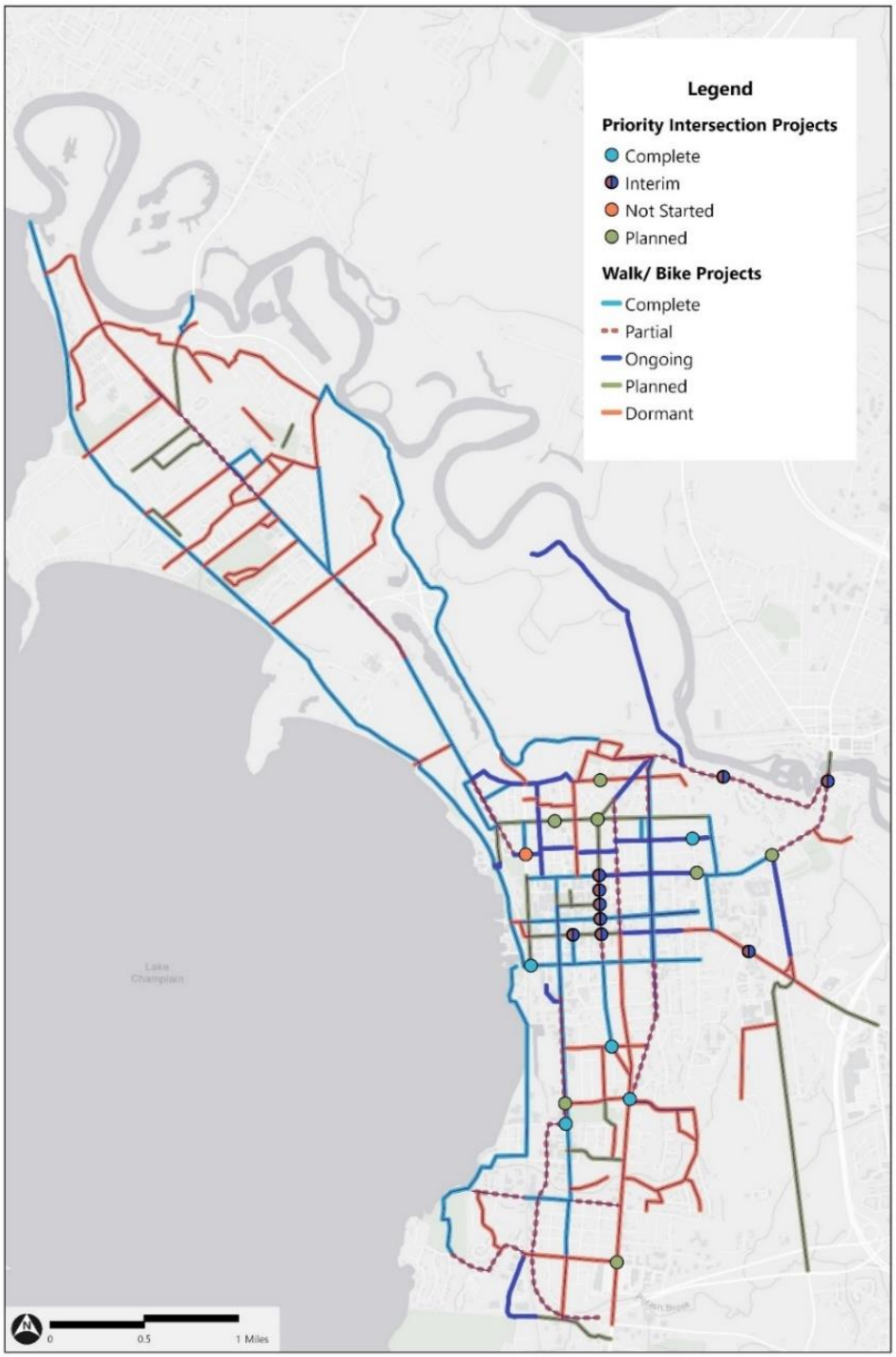


Figure 1. planBTV Walk Bike Plan Project Progress

Additionally, other engineering actions and policy and protocol changes have been pursued since the plan adoption in 2017, including:

- Expanded use of pilot and demonstration projects with Quick Build Design and Materials Standards (e.g., Main Street between Union Street and Winooski Avenue or North Avenue at Institute Road)
- Established Downtown Slow Zone with implementation of 20 mph speed limit
- Improved pavement markings at bus stop conflicts (e.g., Pearl Street between Winooski Avenue and Orchard Terrace)
- Formalized winter bikeway maintenance plan
- Launched bike skills training initiatives (e.g., school-based programs like Edmunds' bike safety elective, Sustainability Academy's physical education led program, and CP Smith's use of learn to ride programming, some in partnership with Local Motion, Lowe's, or Old Spokes Home[1])
- Expanded Safe Routes to School programs (five of the Burlington School District's schools are engaged in the Safe Routes to School programming)

There are a number of programs and processes that further the targeted goal of reducing severe injuries and fatalities on the City's roadways and highlight the commitment of the City to improving transportation safety, particularly for the system's most vulnerable users. Not only do the Great Streets Design Standards and Quick Build Design and Materials Standards provide the framework and guidance for improvements to the system, but they also enable the City to be nimble and responsive to infrastructure needs. These documents serve to further the goal of safety improvements and will support the implementation of actions identified in this plan.

Additionally, the City has a number of programs that serve to continually improve upon the safety of vulnerable roadway users using data-driven processes. Of note are those programs highlighted in Table 2 below.

[1] Burlington School District Travel Plan, 2022, https://studiesandreports.ccrpcvt.org/wp-content/uploads/2022/06/BSD_TravelPlan_FinalDraft_20220616.pdf

Table 2. Highlighted Burlington Programs

Program	Summary
Sidewalk Program	The City of Burlington prioritizes sidewalk improvements based on various factors. A city-wide data collection and analysis was completed in 2019. Examples of data collected include but are not limited to running slope, cross slope, and roughness. These data points are combined to create a barrier score with a higher score indicating more serious barriers. These barriers refer to areas that no longer comply with Americans with Disabilities Act standards and public right-of-way accessibility guidelines. An activity score was also created based off the level and type of pedestrian traffic. Areas closer to schools, senior centers, neighborhood activity centers, city parks, and the downtown district will generate a higher activity score. The activity score also includes demographic metrics. Together the barrier and activity score prioritize which sidewalks need improvements based on the severity of the barrier, the number of people who might be affected by these barriers, and distribution of projects across the City. In addition to the city-wide data collection and analysis, staff reviews resident requests, conducts site visits, and coordinates sidewalk repair based on other current or future work happening throughout the City of Burlington.

Program	Summary
Traffic Calming Program	The City of Burlington Traffic Calming Program is a data-driven initiative designed to enhance neighborhood safety and comfort by addressing speeding and other safety related concerns. The process begins with community requests, followed by an evaluation using traffic data such as speed studies, traffic volumes, and crash history. Projects are prioritized based on demonstrated need, ensuring resources are directed where they are most impactful. Traffic calming projects are qualified and then prioritized based on the following criteria: • 85th percentile speed exceeds the posted speed limit • Severity of crash type exceeds 10 property damage only crashes, 2 injury crashes or 1 fatality • The number of bicycle/pedestrian crashes exceeds 1 injury or fatality • Heavy trucks exceed 4% of traffic Because the number of requests and qualified exceeds the amount of funding that is available for traffic calming work, DPW has implemented a dual approach to address traffic calming needs. This strategy includes: • **Implementing quick-build solutions** for more rapid response to requests, as detailed in our Strategic Traffic Calming Initiatives. • **Continuing to utilize traditional construction methods** for more permanent traffic calming projects. This combined strategy aims to balance the need for immediate interventions with long-term solutions to address safety needs throughout our roadway network.

The policies, aligned plans, guidance, programs, and processes were reviewed and, in combination with the safety analysis, were used to inform strategic policy and process changes, focused on systemic treatments to address safety needs. These actions are further detailed in the Action Plan chapter.

Public Transportation

It is critical to recognize the inherent connection of transit users to walking and biking, as every transit user is a pedestrian or bicyclist during some part of their transit-based trip.

Burlington's transit network is primarily served by fixed bus route service via Green Mountain Transit (GMT).

GMT is a local and regional bus transit provider serving downtown Burlington, the greater Chittenden County, and locations beyond the County's boundary. As the bus transit provider for the region, GMT offers fixed routes, local commuter routes, LINK Express (regional commuter) routes, and ADA paratransit services.

Much of GMT's service converges at the Downtown Transit Center (DTC), located in the northern part of the downtown core of Burlington on St. Paul Street between Cherry and Pearl Streets. The DTC serve as the hub for all the local routes and many of the commuter and regional LINK routes.

These routes operate with varying schedules to accommodate weekday and weekend travelers, helping to connect residents to key locations across the City. GMT also provides Shopping Specials from senior housing complexes to grocery stores Tuesday through Thursday. Monday through Friday during the school year, GMT offers Neighborhood Specials to select neighborhoods that serve students and are open to all riders. There are additional buses to the Burlington International Airport on Saturdays and Sundays. Regional transit routes connect Burlington to destinations like St. Albans, Montpelier, Milton, Essex Junction, and Williston.

Walking and biking safety improvements can help to stretch the service area of the fixed route transit system by enabling more passengers to walk or bike comfortably to and from transit stops. Faced with recent transit service reductions, it will be imperative to expand safe and comfortable walking and biking connections as a means of extending access to transit.

Action Plan Intention

SAFE STREETS FOR ALL

GOAL SETTING

The Safety Action Plan builds on the previous comprehensive planning in Burlington. This plan is not meant to replace the 2017 planBTV Walk Bike Plan but rather provide an update and refinement to safety strategies and actions through a data-driven planning process. As such, this Plan adapts the Vision set forth in previous planning, updates the Goals specific to creating safer streets for everyone, and identifies Objectives specific to this planning process to align with the safety focus of this update and adoption of a Safe Systems Approach. Adaptation of the previous plan to inform goal setting for the Safety Action Plan was done collaboratively with stakeholders during the plan development process.

Vision

Adapted from the original planBTV Walk Bike Plan, the aligned Vision for this Safety Action Plan is as follows:

Imagine a future where…

- …Burlington's streets are safe enough that kids want to walk, bike, or roll to school, to the park, or to a friend's house without worry; and that older adults comfortably walk, bike, or roll from their home to community destinations such as the grocery store, pharmacy, or community center.
- …walking, rolling, biking, and taking the bus are the preferred choice for children and adults living, working, or visiting in Burlington, regardless of age or ability all year round.
- …Burlington's transportation network continuously improves in support of our local economy and quality of life, leading people to stay in Burlington and invest in our community.

Goals

Adapted from the original planBTV Walk Bike Plan, the safety related goals for this Safety Action Plan are as follows:

Creating safer streets for everyone:

- We will significantly reduce traffic-related fatalities and serious injuries by 2035, prioritizing the safety and accessibility of our streets for users of all ages and abilities.
- The safety of people walking, rolling, and biking will be at the forefront of planning and programming, fostering a culture of transportation safety and protecting our most vulnerable road users.

Objectives

The Safety Action Plan development process sets out specific Objectives, with the overarching aim to:

- Develop a culture of transportation safety in the City through an engagement process.
- Identify actions to improve safety and mobility outcomes through a data-driven process.
- Prioritize actions that address safety and mobility outcomes for the City.
- Leverage the action planning process to make projects eligible for future funds.

The Objectives of the development process are to yield a Safety Action Plan that is:

- **Data-Driven:** Utilize existing data sets, from crash data to pedestrian and bicyclist infrastructure inventories, to develop a comprehensive, data-driven Safety Action Plan for improving transportation safety.
- **Community-Guided**: Engage with the community, stakeholders, and targeted individuals to shape the Plan and its Objectives. This includes holding public meetings to solicit feedback and conducting focus groups or targeted engagement to connect with underserved communities.
- **Safety-Focused**: Prioritize the improvement of safety outcomes by identifying and addressing hot-spot and systemic safety issues, which includes areas with a high occurrence of crashes or safety issues.
- **Encouraging Active Transportation Modes**: Encourage more use of active transportation modes like walking/rolling and biking by creating a safer and more accessible environment for these users.
- **Inclusive**: Center engagement and outreach with underserved and/or disadvantaged populations, and ensure the plan is responsive to their needs and concerns.

- **Prioritizing Projects**: Develop a prioritization matrix for active transportation projects based on safety data analysis and community feedback.
- **Clearly Communicated**: Generate clear, concise communication of analysis outcomes through public meetings, fact sheets, interactive tools, and an easily comprehensible final plan.
- **Future Ready**: Build a dynamic Plan that evolves as projects are implemented, conditions shift, and new data inputs become available. This includes setting monitoring metrics to track and adjust the plan over time.
- **Collaborative**: Create a Safety Action Plan that guides the transportation components of aligned planning processes conducted in partnership with allied City departments.
- **Measurable:** Define metrics that measure progress towards goals that can be continually tracked with transparent reporting and community involvement.

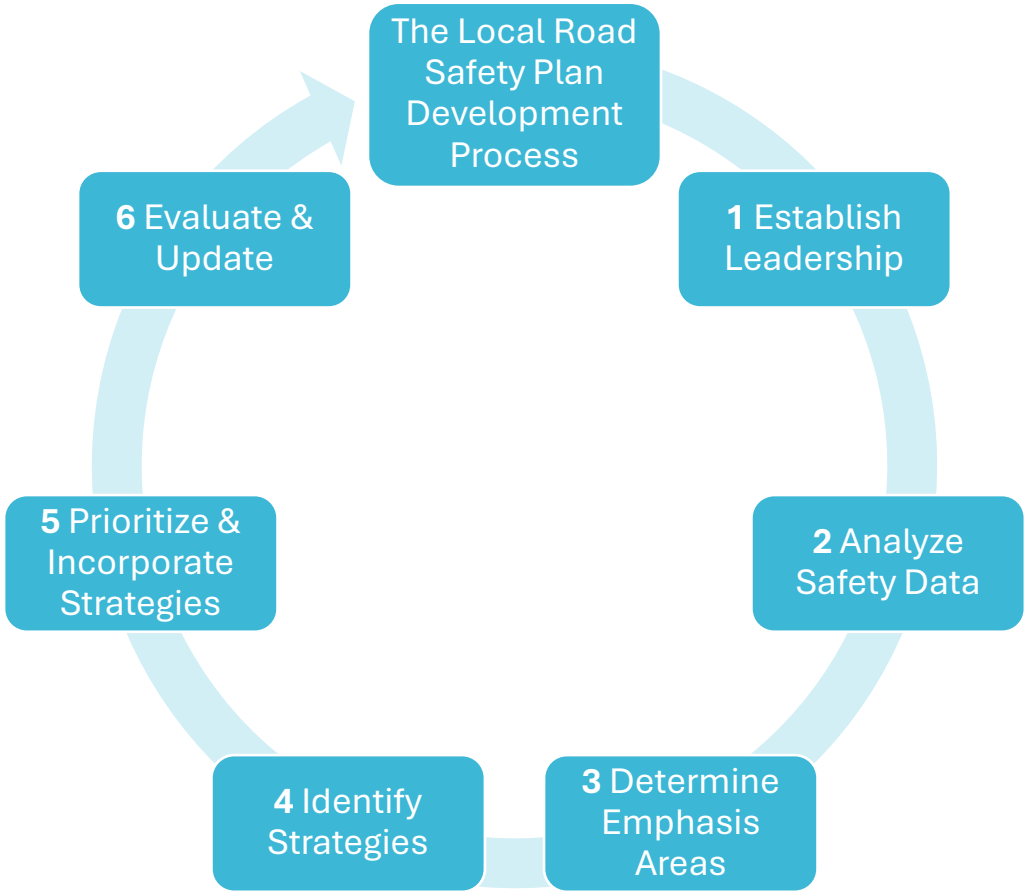
METHODOLOGY

Development Process

The planBTV Walk Bike Safety Action Plan builds upon past and ongoing planning efforts and safety activities. The planBTV Walk Bike Safety Action Plan aligns with the VTrans Strategic Highway Safety Plan and appended Vulnerable Roadway User (VRU) Safety Assessment at the state level, contributing to the "Toward Zero Deaths" philosophy of the Agency as outlined in the message from the Secretary of Transportation that accompanies the VRU Safety Assessment. Additionally, the planBTV Walk Bike Safety Action Plan aligns with the ongoing effort by the CCRPC to establish a Safety Action Plan for Chittenden County, with active transportation making up approximately a quarter of the targeted priorities of the county level action plan. At the citywide level, the planBTV Walk Bike Safety Action Plan builds on previous comprehensive active transportation planning and many other activities aimed at promoting safety for all transportation users.

This Safety Action Plan update identifies the goals and strategies specifically aimed at eliminating traffic fatalities and serious injuries by adopting the principles and elements of the Safe System Approach. Implementation is imperative and has been at the forefront during the Safety Action Plan development process.

Safety Action Plans are developed using a collaborative six-step process as outlined below. This chapter describes the development process and how each step relates to key foundational elements of the Safe Systems Approach. The development process relates directly to the components of a Safety Action Plan to meet the criteria for the Safe Streets for All (SS4A) Program. Program criteria include Leadership Commitment, Goal Setting, Planning Structure, Safety Analysis, Engagement and Collaboration, Policy and Process Changes, Strategy and Project Selections, and Progress and Transparency. Sections of the plan development process that detail specific components of a Safety Action Plan are highlighted with a Safe Streets for All callout.



Source: FHWA.

Figure 2 Safety Action Plan development process.

1 | Establish Leadership

SAFE STREETS FOR ALL

PLANNING STRUCTURE

An Advisory Committee with membership from City leaders, City staff, CCRPC, Green Mountain Transit, Burlington Walk Bike Council, AARP Vermont, and Local Motion was established at the outset of this effort. Along with the consultant team and other City staff, they have shepherded the plan from goal setting to developing strategies and actions. This team was pivotal in development and review of the plan elements, as well as the development, implementation, and adoption of safety projects, programs, and policies for the City. As such, this team will continue to play key partnership

roles to the City staff and City leadership in executing the Safety Action Plan. City staff and City leadership commit to continued collaboration in the execution and monitoring of the planBTV Walk Bike Safety Action Plan, recognizing the essential role of this foundational partnership in reaching the targeted outcomes of the Safety Action Plan.

The planBTV Walk Bike Safety Action Plan team consisted of committed safety leaders across multiple entities, including:

Phillip Peterson | Burlington Public Works
Julia Ursaki | Burlington Public Works
Eleni Churchill | CCRPC
Sai Sarepalli | CCRPC
Eliana Fox | CCRPC
Marek Broderick | Burlington City Council
Becca Brown McKnight | Burlington City Council
Chris Damiani | Green Mountain Transit & DPW Commission
Jak Tiano | Burlington Walk Bike Council
Kelly Stoddard-Poor | AARP Vermont
Jonathon Weber | Local Motion
Christian Berry | Burlington Office of Racial Equity, Inclusion & Belonging
Charles Dillard | Burlington Office of City Planning
Evan Haugh | VHB Transportation Safety Engineer
Elisabeth Sundberg | VHB Transportation Planner
Karen Sentoff | VHB Project Manager
Jenn Conley | VHB Technical Advisor

SAFE STREETS FOR ALL

LEADERSHIP COMMITMENT

This Plan was brought forth to the Burlington City Council for adoption on June 16, 2025. With the adoption of the plan, City Council and the Office of the Mayor have committed to execution of the Safety Action Plan. As the governing body and City executive, this commitment establishes City leadership in pursuit of the goals of the Safety Action Plan and required implementation. This leadership is supported

directly by Burlington Public Works, as the responsible department for plan action. Additional leadership beyond the organizations listed above will include Burlington's Public Works Commission, Planning Commission, Parks and Recreation Commission, and Transportation, Energy and Utilities Committee.

Additional Stakeholders include:

- Vermont Agency of Transportation (VTrans)
- Federal Highway Administration (FHWA) Vermont Division
- Burlington Parks, Recreation, and Waterfront
- Burlington's Neighborhood Planning Assemblies
- Burlington Police Department
- Burlington Fire Department
- University of Vermont Police Services
- University of Vermont Rescue
- UVM Medical Center Critical Care Transport
- Vermont State Police
- South Burlington Police Department
- South Burlington Fire Department

SAFE STREETS FOR ALL

ENGAGEMENT & COLLABORATION

Promoting a culture of safety in transportation is an additional component to establishing leadership and aligns with the Safe Systems Approach. Through the engagement process for this Safety Action Plan and building on the safety elements from the 2017 planBTV Walk Bike Plan, engagement with the public to build a culture of safety was key to the process. This took different forms during the development process. The project team visited each Neighborhood Planning Assembly to share the process and hear feedback from each community within the City. Connection with the Burlington Walk Bike Council, who have served as volunteer arbiters

of the 2017 planBTV Walk Bike Plan, were engaged for feedback throughout the process. A project website and map-based survey input tool were shared widely to enable information sharing and solicit feedback on experience and perception of safety. Further, in person and virtual public meetings were held to engage directly with residents on the safety analysis findings and plan development process. These touchpoints helped to build a foundation of responsibility and sense of ownership in a collective transportation safety ethos.

2 | Analyze Safety Data

SAFE STREETS FOR ALL

SAFETY ANALYSIS

Development of a data-driven Safety Action Plan relies on the analysis of safety outcomes. Understanding the specific and systemic factors and risks involved in transportation related fatalities and serious injuries unlocks the ability to address these crash outcomes through a Safe Systems Approach, employing proven countermeasures and strategies to prevent and mitigate severe outcomes. As such, the development of the Safety Action Plan used an analysis of safety data to identify crash trends, contributing factors, high-risk characteristics, and system locations with a propensity for serious crashes resulting in fatalities (K crashes on KABCO scale) or serious injuries (A crashes on KABCO scale).

Data were acquired from Vermont Web Crash, which houses the electronic records for crash data for all Vermont reporting agencies, including Vermont State Police and Burlington Police Department. Vermont also maintains a Vermont Public Crash Data Query Tool, which maintains a public facing version of the data. The analysis focused on severe crashes (crashes resulting in fatalities or incapacitating injuries) in Burlington. Serious crashes (K and A crashes) from the past ten calendar years of 2014 through 2023 were examined. To support the specific planning goals of the planBTV Walk Bike Safety Action

Plan, an additional assessment of pedestrian and bike crashes, regardless of severity, was completed. For lower severity pedestrian and bike crashes, five years of data from 2019 through 2023 were examined.

Crash analysis identified crash types, factors, and underlying characteristics contributing to the crash outcomes. Given the stochasticity of crash data, this approach helped to illuminate systemic issues and identify locations where risk of crashes exists even if crashes have not occurred in these specific locations.

The safety data analysis was complemented by additional data driven approaches. Contextual considerations such as neighborhood demographics and destination access across the City were evaluated. Input gathered from public engagement and survey responses were assessed. Additionally, previous plans, current policies, and existing procedures were reviewed. Each of these complementary resources were used to help expand, weigh, and refine the potential systemic and geographic actions that were identified through the safety data analysis.

3 | Determine Emphasis Areas

A combination of crash data analysis and public input served to identify the emphasis areas for the Safety Action Plan. Based on the data driven approach, this analysis reviewed contributing factors, trends, outcomes, and locations of crashes. Several prominent patterns emerged as key issues to consider in the plan and its implementation.

Leading Factors for Serious Vehicular Crashes

- Object Strikes
- Angle Crashes / Turning Conflicts
- Motorcyclist Behavior

Leading Factors for Walking, Biking, and Rolling Crashes

- Informal Midblock Crossings
- Pedestrian Visibility
- Pedestrian Behavior (e.g., unexpected or erratic movements)
- Bicyclist Behavior (e.g., unexpected actions)
- Signalized Intersection / Turning Conflicts

Top Safety Issues based on Survey Respondents and Public Engagement

- Driver Behavior and Speed Management
- Missing or Poor Condition Bike Lane or Separated Bike Facility
- Missing or Poor Condition Sidewalks or Shared Path
- Crossing Conflicts (at Intersections and Midblock)

The Vermont Strategic Highway Safety Plan (SHSP) 2022-2026 identified critical emphasis areas and associated serious crash reduction objectives for each emphasis area. Some of these overlap with emphasis areas identified through the data-driven process for this Safety Action Plan. The areas where the Safety Action Plan aligns with statewide critical emphasis areas are shown in the table below. Some statewide emphasis areas, such as impaired driving, were not factors in Burlington's bicycle or pedestrian crashes and therefore do not have a corresponding action in this plan. Some local emphasis areas, revealed through the data analysis, relate to modes outside of walking, rolling, and biking and are included to reflect the comprehensive analysis approach.

The geographic analysis found that bicycle and pedestrian crashes occur predominantly on Burlington's main arterials, representing 83% of all bicycle and pedestrian crashes and 73% of the serious bicycle and pedestrian crashes. The arterial network represents the high injury network when it comes to vulnerable roadway users. As such, the ten most prominent corridors in the crash data were each designated as focal corridors. The emphasis areas and focal corridors were the foundation for identifying strategies that address serious crashes in Burlington.

Table 3. Statewide and Local Emphasis Area Comparison

SHSP Critical Emphasis Areas		planBTV Emphasis Areas
Infrastructure	Lane Departure	Object Strikes
	Intersections	Angle Crashes Turning Conflicts
	Speed and Aggressive Driving	Speed Management
Behavioral	Occupant Protection	
	Impaired Driving	
	Distracted Driving and Alertness	Driver Behavior
Vulnerable Users & Roadway Users	Pedestrians	Pedestrian Behavior Midblock Crossings Pedestrian Visibility Signalized Intersection Conflicts Missing/Poor Sidewalks Crossing Conflicts
	Bicyclists	Bicyclist Behavior Signalized Intersection Conflicts Missing/Poor Bike Lanes
	Motorcyclists	Motorcyclists
	Younger Drivers	
	Older Drivers	
Data & Emerging Topics	Data Analysis and Integration	

4 | Identify Strategies

SAFE STREETS FOR ALL

STRATEGY & PROJECT SELECTIONS

The planBTV Walk Bike Safety Action Plan identifies strategies and actions in an implementation framework with the aim of addressing safety issues related to the emphasis areas to reduce crashes, specifically serious crashes resulting in fatalities or serious injuries. Although the update to the planBTV Walk Bike Safety Action Plan specifically focused on reinvigorating the commitment to safety for active modes of transportation, the plan took into consideration all types of road users and transportation modes.

There were four primary approaches to identify strategies and actions for the Safety Action Plan. Review of previous plan recommended projects and actions, review of policies and processes, analysis of the safety data in Burlington, and consideration of the emphasis areas and focal corridors were combined to identify strategies, actions, and countermeasures to be applied with the aim of reducing crashes and improving safety. The evaluation specifically identified:

- a series of priority actions that are systemic or policy driven and expected to reduce serious crashes in Burlington;
- specific countermeasures proven to reduce crashes for the emphasis areas identified; and,
- arterial focal corridors where both countermeasures and carry forward projects are expected to address safety issues and reduce crashes.

The strategy and project selections are further detailed in the Action Plan chapter.

5 | Prioritize & Incorporate Strategies

The priority actions consisted of primarily systemic and policy actions derived from the safety data analysis and review of policies and processes. Prioritization of the actions was

predicated on the crash reduction potential and implementation feasibility. Where applicable, each strategy was assigned an affiliated countermeasure, appropriate crash modification factor, targeted crash count, calculated 10-year crash reduction potential, timeframe for implementation (i.e., short: less than 2 years, medium: 3-5 years, long: 5-10 years), and priority status (i.e., high, medium, low).

For the focal corridors, actions largely entailed carry forward projects from the previous plan, applicable countermeasures, and new projects based on safety analysis and emphasis areas. A prioritization scheme to rank the focal corridors entailed development of weighted criteria related to safety, network, context, engagement, and cost considerations. The criteria and associated metrics are included in the table below.

Table 4. Prioritization Criteria for Focal Corridors

Criteria	Metrics for Scoring
Bike and Pedestrian Crashes	Number of Bike / Ped Crashes (any severity KABCO)
Serious Crashes	Number of Serious Crashes (KA including non-bike/ped)
Network Connectivity	Addresses Gap in Planned Walk Bike Network
Demographic Context	High, Medium, Low Need
Destination Access Index	High, Medium, Low Need
Community Identified Need	Number of comments expressing need from public engagement or Public Input Tool
Ease of Implementation	Engineering Challenges, Political Will, Fundraising Opps, Resource Capacity, Community Support
Relative Cost	Project Type, Scale

The prioritization summarized above is further detailed in the Action Plan chapter.

6 | Evaluate and Update

SAFE STREETS FOR ALL

PROGRESS & TRANSPARENCY

Implementation, monitoring, evaluation, and updating will be crucial to achieving the goals set forth in the Safety Action Plan.

Although the Plan sets guideposts for implementing strategies and actions to help reduce traffic related fatalities and serious injuries, the Safety Action Plan is expected to be an evolving document that will require consistent commitment and dedicated oversight. The plan should be revisited annually to document progress, identify necessary adjustments, enhance approach based on lessons learned, and course correct as required.

A crucial component of the Safety Action Plan development is cultivating a shared responsibility to take collective action to prevent and mitigate serious crashes on the system. Commitment from Burlington's leadership, City staff, and stakeholders to continue to foster a culture of safety will be key to executing the Plan.

A primary aim of the plan is to bolster the progress towards implementation of a safe transportation environment for all users of the system in Burlington. Synergies with allied City departments and local plans that have overlapping and aligned goals should be leveraged in the execution phase of the Safety Action Plan, opening possibilities in collaborative funding and implementation.

Commitment at the local level is bolstered by aligned and complementary regional and statewide efforts like the CCRPC's Safety Action Plan and Vermont's Strategic Highway Safety Plan, respectively. Leadership at the local level, combined with partnership at the regional and state level, to identify and secure resources to support implementation will be imperative. Coordination with stakeholders at the state level may be particularly beneficial, as the aligned statewide plans are positioned to leverage existing funding sources that could aid in the implementation of Burlington's plan.

This Safety Action Plan is not meant to replace the 2017 planBTV Walk Bike Plan but rather enhance the safety elements to enable eligibility to access a broader set of resources to support plan execution. The Safe Street for All (SS4A) Grant Program could potentially support plan implementation. Adoption of the Safety Action Plan demonstrates the criteria required for the program's competitive implementation grants.

The planBTV Safety Action Plan will evolve in the intervening years and must be revisited regularly for updates. Progress on implementation should be tracked and shared with stakeholders and the public. The City maintains a website for this Plan that can be leveraged to generate transparency by sharing strategy and project status. As strategies and actions are implemented, progress towards the plan goals should be monitored. Tracking reductions in crashes and observing shifts in user behavior as different countermeasures and treatments are applied may provide insights on the efficacy of certain safety improvements. This tracking can inform adjustments or augmentations to the Plan's actions at the time of updates.

Transparency and communication are fundamental to action implementation and evaluation. Keeping the community engaged in the dialogue of transportation safety and demonstrating the commitment of leadership to achieving the plan's goals are imperative. The City has developed a dashboard for tracking crashes, which is available on the existing Plan website and depicted below. Users can interact with the safety data, toggling on different years, vehicle types, and crash severities to display a map and charts that describe the data. This will be accompanied by an inventory and map depicting progress on the projects and strategies that are implemented across the City.

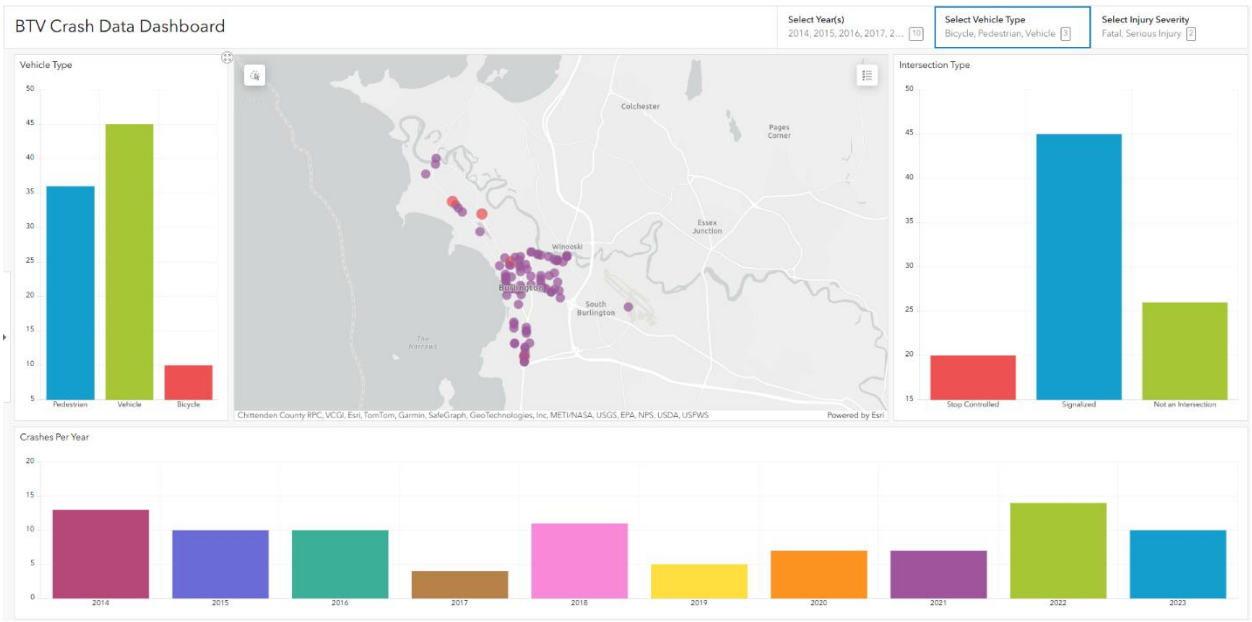


Figure 3. Burlington's Crash Data Dashboard

DATA DRIVEN

Safety Data

SAFE STREETS FOR ALL

SAFETY ANALYSIS

The key underpinning of the Safety Action Plan development is analysis of safety outcomes. The methods and findings of the crash data analysis performed for the planBTV Walk Bike Safety Action Plan are detailed in this section. Consistent with guidelines for the Safe Streets for All program, this analysis focused on *serious crashes* occurring on Burlington's roadways, defined as crashes resulting in fatalities (K type crashes) or incapacitating injuries (A type crashes). Serious crashes from the past ten calendar years (2014 to 2023) were examined. To support the specific goals of the planBTV Walk Bike Safety Action Plan, a deeper analysis of pedestrian and bicyclist-involved crashes was conducted. To this end, an additional assessment of pedestrian and bicyclist crashes, regardless of severity, was completed. For lower severity bike and pedestrian crashes, five years of data spanning 2019 through 2023 were examined. The methods and findings of these reviews are discussed in the following sections.

Data Validation

Several data validation steps were taken to be able to present findings with confidence. As a result of these steps, which improve accuracy, statistics presented in this evaluation are not expected to match the Vermont Public Crash Query Tool. The errors this process corrected are detailed below.

Inaccurate Locations

Crash records include multiple location fields including a street address and GPS coordinates. These fields are sometimes in conflict or wrong altogether. For example, a segment crash may be tagged to a nearby intersection or the automated conversion of coordinates to the nearest street may choose the wrong block. To address these errors,

location was carefully determined from crash reports and diagrams and corrected as needed.

Off-Street Crashes

The scope of both planBTV and SS4A is limited to public roadways. Crashes that occurred off-road (most often parking lot crashes) were excluded from the analysis.

Misclassified Injuries

The Vermont Crash Reporting Instructions provide a detailed definition for each level of injury[2]. In the source data, some injuries were incorrectly marked as serious/incapacitating. To be conservative, these were only downgraded by our review in cases where the person declined medical care entirely.

Misclassified Persons

For this analysis, classifications of electric scooter riders as pedestrians or bicyclists were left unaltered. However, vehicle occupants classified as pedestrians – such as a driver struck by his own vehicle after exiting without engaging the parking brake – were corrected.

Data Analysis

Once data validation procedures were conducted on the crash data sets, analysis of the data drew understanding of crash types, contributing factors, crash trends, high risk characteristics, and system locations with a propensity for serious crashes. Data were evaluated for vehicle-only serious crashes, pedestrian and bicycle serious crashes, and

[2] Serious/incapacitating injury is defined as injuries involving one or more of:

- Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood
- Broken or distorted extremity (arm or leg)
- Crush injuries
- Suspected skull, chest or abdominal injury other than bruises or minor lacerations
- Significant burns (second and third degree burns over 10% or more of the body)
- Unconsciousness when taken from the crash scene
- Paralysis

pedestrian and bicycle minor crashes. Key takeaways, trends, and contributing factors were summarized in the infographic below and detailed further in the following sections.

Serious Crashes

A serious crash results in death or serious injury.

In most of the serious crashes, vehicles were not traveling faster than **25 mph**. In a majority of the bicycle and pedestrian crashes, speed was **10 mph** or less.

Last 5 Years : 2019 - 2023

22 | 13 | 3 | 2 — **40** Total

Serious Injury

1 Total Death

Drivers | Pedestrians | Bicyclist | Passengers

Last 10 Years: 2014 - 2023

39 | 26 | 11 | 9 — **85** Total

Serious Injury

4 | 6 Total Death

8% At Unsignalized Intersections

8% At Driveways

9% of serious crashes involved impairment, which is lower than the statewide rate of 19%.

40% On a Segment

30% of serious crashes involved motorcyclists.

Where?

43% Conflicting movements at signals

How?

Angle crashes or fixed object crashes are the most common serious crash collision types.

42.5% Angle Crashes: Turning and Thru Vehicles at Signals

42.5% Object Strikes: Signs, Trees, Poles

15% Other

Bicycle Crashes

Bicycle injuries occur at signals (6), non-intersections (4), and unsignalized intersections (1).

2/3 Cyclist failed to yield

1/3 Driver failed to yield

25% of pedestrians are struck at signals

50% of pedestrian injuries occur at informal midblock crossings (“jaywalking”)

Pedestrian Crashes

Injuries are evenly split between pedestrian (12) and driver (12) failures to yield (3 share responsibility).

- Drivers typically fail to yield when turning from a major road.
- Pedestrians generally fail to yield by crossing midblock without observing or yielding to approaching traffic.

Vehicle-Only Serious Crashes

There were 40 serious crashes that did not involve a bike or pedestrian in Burlington from 2014 through 2023. Twenty of these were in the last five years, reflecting similar rates in each half of the decade. Of these serious crashes, 43% were single-vehicle fixed-object crashes, usually involving signs, trees, and poles. Another 43% were angle crashes, usually involving a turning vehicle and a vehicle going straight through an intersection, with serious crashes resulting from drivers running red lights being much less common. The remaining 16% were head on or rear end crashes (three each).

The most common location type was signalized intersections, where 43% of serious crashes occurred, with another 40% occurring on segments. Unsignalized intersections and driveways accounted for another 8% each.

Speeds were generally low in the serious crashes involving vehicles only. 42% of serious vehicle-only crashes had maximum speeds of 25 mph or less, with only 20% involving speeds over 35 mph. Driver impairment was a factor in 18% of serious crashes, which is lower than the statewide rate of 54%.

Motorcycles were overrepresented in serious crashes, with 30% of serious crashes involving motorcyclists compared to less than 1% of overall crashes. Of the 12 serious crashes involving motorcycles, five resulted from turning vehicles not seeing oncoming motorcycles, three from a motorcyclist running a red light, and three from a motorcyclist losing control and hitting a fixed object.

Bicycle and Pedestrian Crashes

Serious Crashes

Within the 10-year period examined from 2014 through 2023, one pedestrian died as a result of a motor vehicle crash in Burlington. No bicyclists have died. In that period, 26 pedestrians and 11 cyclists were seriously injured.

When considering only the past five years from 2019 through 2023, there were 13 pedestrian serious injuries, three cyclist serious injuries, and no pedestrian or bicyclist

involved deaths. This is a substantial reduction in cyclist injuries when compared to the five years prior, while pedestrian injuries remained consistent.

Vehicle speeds tend to be low in Burlington, and speed was not a significant factor in pedestrian or bicycle injuries. In nearly 60% of pedestrian or bicyclist involved injury crashes, the maximum vehicle speed was 10 mph or less.

Serious pedestrian crashes were evenly split between driver and pedestrian failures to yield (12 each, with three crashes having shared responsibility). Drivers typically failed to yield when turning from a major road, and pedestrians typically failed to yield by crossing outside established crossings without yielding to approaching traffic. These informal mid-block crossings were the locations with the highest overall share of pedestrian crashes (13, or nearly 50%), followed by signalized intersections (seven) and formal mid-block crossings (four), with unsignalized intersections having the fewest (three).

More than half of the serious bicycle crashes occurred at signalized intersections (six), with only one occurring at an unsignalized intersection and four occurring on segments. In seven of these crashes, or 64%, the cyclist failed to yield, while drivers failed to yield in the other four (36%). Bicyclist failures to yield were generally cases of the bicyclist proceeding inappropriately at intersections.

Minor Crashes

Minor crashes involving a pedestrian or bicyclist were also reviewed for the last five years. There were 57 and 91 minor pedestrian and bicycle crashes, respectively. One major difference from severe crashes is in the failure to yield. Drivers failed to yield in 79% of minor pedestrian crashes and 57% of minor bicycle crashes, which are much higher rates than in serious crashes.

The majority of minor bicycle crashes were at intersections, with more at signals (41%) than unsignalized intersections (26%). Some were at driveways (18%) and a smaller number were segment crashes (12%).

Minor pedestrian crashes were also mostly at intersections, with more at signals (33%) than unsignalized intersections (30%). Fewer (17%) involved informal midblock crossing than serious crashes and the smallest share were at driveways (12%).

Notably, no pedestrian crashes and only one bicycle crash involved a driver disobeying a traffic signal. Reckless or aggressive driving also did not appear in these histories. Negligence, inattention, and poor visibility (night or heavy rain) were most often cited in these crashes. Relatively few minor crashes (2 pedestrian and 8 bicycle) were related to conflicts entering or exiting on-street parking.

Focal Corridors

Serious injury crashes are not clustered in any one place. They have happened in all neighborhoods of the city, but almost exclusively on arterial streets. Shelburne Street and Riverside Avenue have had the highest number of serious injury crashes of any streets in the city, at 11 and 10 respectively. Other arterials with notable numbers of serious crashes (6+ over 10 years) are Main Street, Pine Street, Winooski Avenue, and North Avenue. The only intersection to have reached 3 serious crashes in ten years is Shelburne Street and Home Avenue. The majority of serious crashes at intersections (27 of 38) have been the only serious crash at the intersection in the last decade.

When considering bicycle and pedestrian crashes, regardless of severity, a similar pattern is seen. These crashes are spread around the city rather than concentrated on any particular streets or neighborhoods. These are also overwhelmingly on arterial streets. Winooski Avenue, Pine Street, Main Street, Pearl Street, and Colchester Avenue have the highest number of bike and pedestrian crashes.

Given 73% of serious crashes occur on the arterial roadways, a high injury network comprised of focal corridors on the arterial network represents the vast majority of safety challenges to be addressed. The focal corridor network includes those arterial roadways in the city which contribute most to the City's crash history, and in particular severe injury or fatal crashes, as depicted in the map in 4.

Figure 4. Focal Corridor High Injury Network

Although there are no locations that can be described as specific "hot spots" or high-crash locations, the dispersion of crashes around the city is informative. Based on this distribution, a focus on the focal corridor arterial streets, signalized intersections, and (for pedestrians and bicyclists) special emphasis on downtown have emerged as key focal areas.

Safety Analysis Takeaways

One of the most notable conclusions is the minimal occurrences of red light running and excessive speed in Burlington's serious crashes. However, while compliance in those areas is strong, other behavioral factors including impaired driving and informal midblock crossing were more frequent.

Serious crashes without pedestrian or bicyclist involvement are mostly between turning vehicles at signals or fixed object strikes. Fixed object strikes generally involve some type of driver error resulting in loss of control. Motorcyclists are also overrepresented in these crashes.

Most pedestrian or bicyclist crashes do not produce serious injuries, likely due to the low speeds involved – in fact, some have occurred when bicycles overtake vehicles. Serious pedestrian crashes tend to involve a pedestrian misjudging traffic when crossing improperly midblock or a driver not seeing a pedestrian as they complete a turn. Visibility or inattention tend to be causal, while speed through a turn does not. Serious bicycle crashes tend to involve cyclists moving through intersections out of turn.

Finally, with no specific high crash locations found, a more general focus on arterials, signalized intersections, and downtown is advised. Focusing improvements on these areas, with particular attention to providing adequate sight lines to all conflict points, appropriate lighting, and channelizing movements (avoiding informal use of space or irregular crossings), will create a solid foundation for a data-driven safety plan.

Community Context Considerations

Understanding community context is crucial to focusing investments on transportation safety that maximize potential benefits and have the greatest impact on safety outcomes. Additionally, addressing the safety needs of underserved communities is at the forefront of the Safe Streets for All initiative. Burlington is the largest City in Vermont, with a population of over 44,500 people. The majority of the City's population resides in areas of persistent poverty, as all but two of the City's census tracts are persistent poverty census tracts. Of the City's residents, approximately 17,300 people, or 28% of the population, live in historically disadvantaged community census tracts. Compared to the rest of Vermont, Burlington ranks in the 60th percentile for individuals living below 200% of the federal poverty line, 56th percentile for unemployment, 85th percentile for renter-occupied housing, 77th percentile for housing cost burden, and 73rd percentile for limited English proficiency. These metrics highlight social vulnerabilities affecting a substantial portion of the City's population.

Community context is also key to understanding the places where there is higher propensity for vulnerable users on the system and higher risk for roadway users. This context informs prioritization of actions and investments. Metrics that characterize the demographics of the City's various neighborhoods and access to community destinations were developed to identify areas with higher likelihood of walking, biking, and rolling and higher risk for negative safety outcomes. Each metric, or index, scores the level of need and applies it to individual roadway segments based on demographic characteristics within the block group or proximity to community destinations.

The demographic index evaluated population characteristics derived from ACS 5-Year Estimates (2017-2022) as an indicator of areas where residents may have higher likelihood of walking, biking, or rolling out of necessity or predisposition to risk of negative safety outcomes. At the block group level, population characteristics were considered in the

demographic index as follows:

- Percent Living in Poverty
- Percent Youth (<18)
- Percent Elderly (65+)
- Percent Living with Disability
- Percent No Car Available

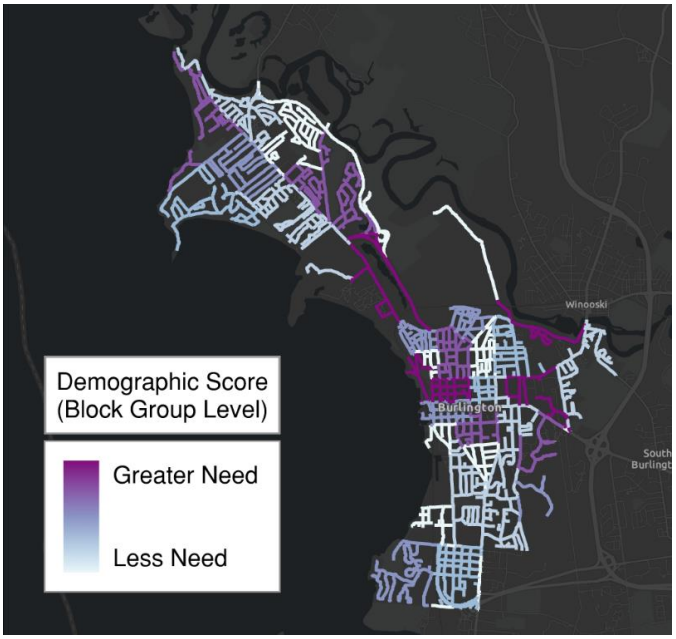


Figure 5. Demographic Index

The destination access index evaluated the locations of destinations and facilities that provide vital resources to the community. The selection of locations represents places within the City that have a higher likelihood of people walking, biking, or rolling to access the resources and services provided. The location selection was based on the E911 database which provides location type information for all buildings, landmarks, and locations in Burlington. Location types were aggregated into categories of destinations and facilities as follows:

- Government and Public Buildings
- Community Centers
- Schools and Daycares
- Parks and Outdoor Spaces
- Shelters and Food Resources
- Affordable Dwelling Units
- Transit Stops and Lines

These indices were applied to the roadway network with two different processes. The demographic index was applied to the street network by spatially joining the census block group to roadway

segments, scoring each road segment according to the census block group it most overlaps with. The community destinations index was attributed to roadway segments by assessing the number of destinations or facilities within a quarter-mile of each segment. Each input to the destination or demographic indices was normalized on a zero to one scale. Normalized values were multiplied by their corresponding weighting, generating scores for each index. The final score for each road segment was calculated by combining the sum of the community destination and demographic data scores.

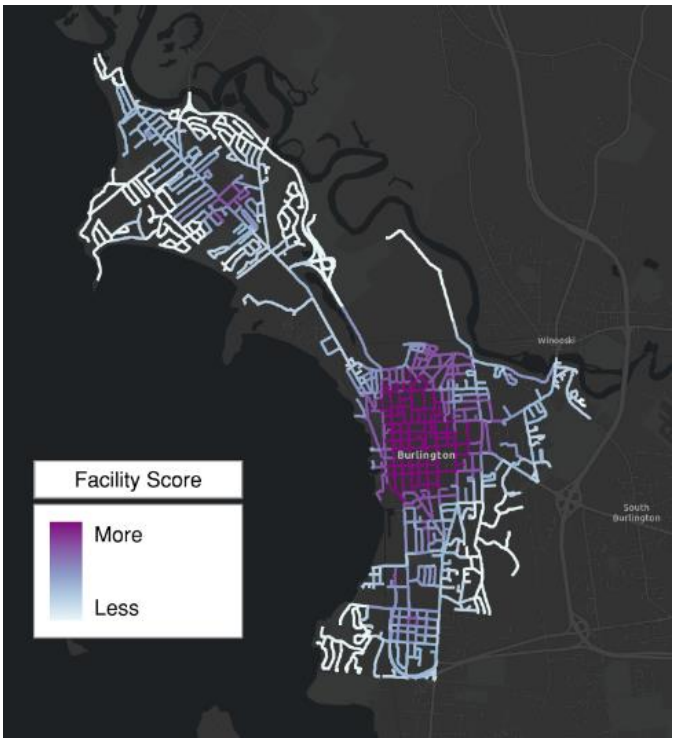


Figure 6. Destination Access Index

The demographic score indicates a demographic need based on population characteristics. The index represents a set of indicators that highlight areas where residents may have a higher likelihood of walking, biking, or rolling or face disproportionate risks of negative outcomes. This index identifies populations in need of more targeted resources based on various demographic factors.

The community destinations score reflects areas with an increased presence of resources requiring community access. This index identifies areas in need of more targeted

resources as the locations requiring community access have higher likelihoods of people walking, biking, or rolling to access the resources and services provided.

A combined score summed the demographic index and community destinations index to provide an overview of areas on the network with both high demographic need and high destination access need. The combined score was helpful in identifying both areas of high need and the potential for impactful intervention, where roadways connect underserved populations to vital community resources.

Survey Results

This plan included a community engagement component both to build a culture of transportation safety and to identify any blind spots in the data-based analysis. To this end, it was important to hear about individuals' experiences on the existing transportation network. One of the key opportunities for the community to engage with the plan development process was through an online survey and public input tool. The survey was shared at public meetings, posted online on the City and CCRPC websites, and sent out on platforms like Front Porch Forum. The survey was opened in July 2024 through March 2025 for community members to participate and share their input.

The survey served as an ongoing touchpoint between the community and the plan development process, garnering over 300 participants representing a range of demographics and socioeconomic backgrounds. Respondents shared their transportation safety experiences in Burlington and provided over 400 comments about locations where they felt unsafe traveling in Burlington. Additionally, there were 50 comments indicating locations where respondents stated they felt safe traveling, which identify locations with safety enhancements or other built environment features that are exemplary in fostering a safe transportation system.

Who We Heard From

The plan development process is a collective effort, designed to reflect the range of voices and experiences within the community. The survey acted as an effective tool to capture the input from a wide range of community members. Below a series of figures compares the demographics of **Survey Respondents** to the overall **City of Burlington**[3].

[3] City of Burlington Population: 2023 American Community Survey (ACS), 5-year estimates.

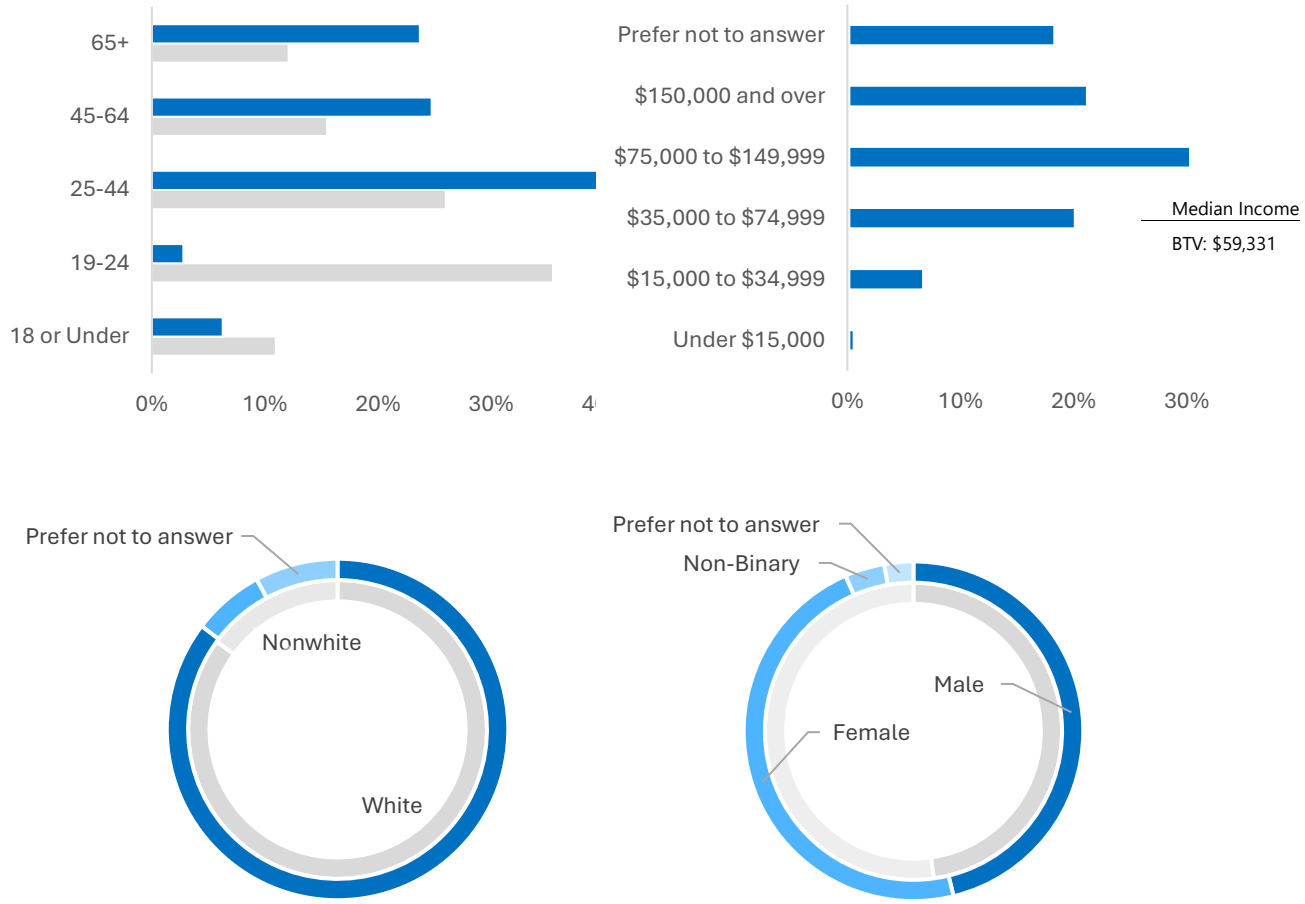


Figure 7. Survey to Census Demographics Comparison

Generally, the survey respondent demographics were consistent with Burlington's population, including for gender and race. Higher incomes than the citywide median household income may have been slightly overrepresented in the respondent pool, however; about one in five respondents declined to share their household income so it was difficult to assess whether more targeted outreach based on socieconomic factors was necessary. The distribution of ages in the respondent pool was also slightly skewed,

with more representation in the respondent pool for ages 25 and over than for younger age brackets. It is important to note that there is a disproportionately high population of 19 to 24 year olds in Burlington as compared to other Vermont communities, as the student populations of the University of Vermont and Champlain College are included in Burlington's population statistics. It is notable that there was a limited response from the 19 to 24 year old age group, and to a lesser degree the 18 and under age group, that could warrant additional targeted outreach. It is important to note that the University of Vermont and Champlain College are consistently engaged in transportation related initiatives with the City and should be targeted as a key stakeholder to represent the interests of the students, which largely account for the demographics underrepresented in the survey response.

The survey was advertised through an outreach campaign. Links and QR codes to the survey were distributed both online through project websites and Front Porch Forum posts and offline as the project team promoted the survey at the City's Neighborhood Planning Assembly meetings across each of the neighborhoods within the city. This approach offered targeted outreach to each unique neighborhood in Burlington.

What We Heard

The project team received over 400 comments with locations people have felt unsafe while traveling in Burlington. A map depicts the pinpointed locations on the system where individuals indicated their experiences as safe or unsafe. Much like the findings from the safety analysis, the arterials throughout the city had the greatest propensity of respondents pinpointing locations associated with feeling unsafe. The primary issues driving the indication of unsafe locations throughout Burlington included lack of bike lane or shared path, driver behavior and vehicle speeds, and conflicts at intersections or crossings. These top issues mirror some of the key issues identified in the safety analysis, while providing further insights into locations on the system where safety issues persist beyond the reported crash data.

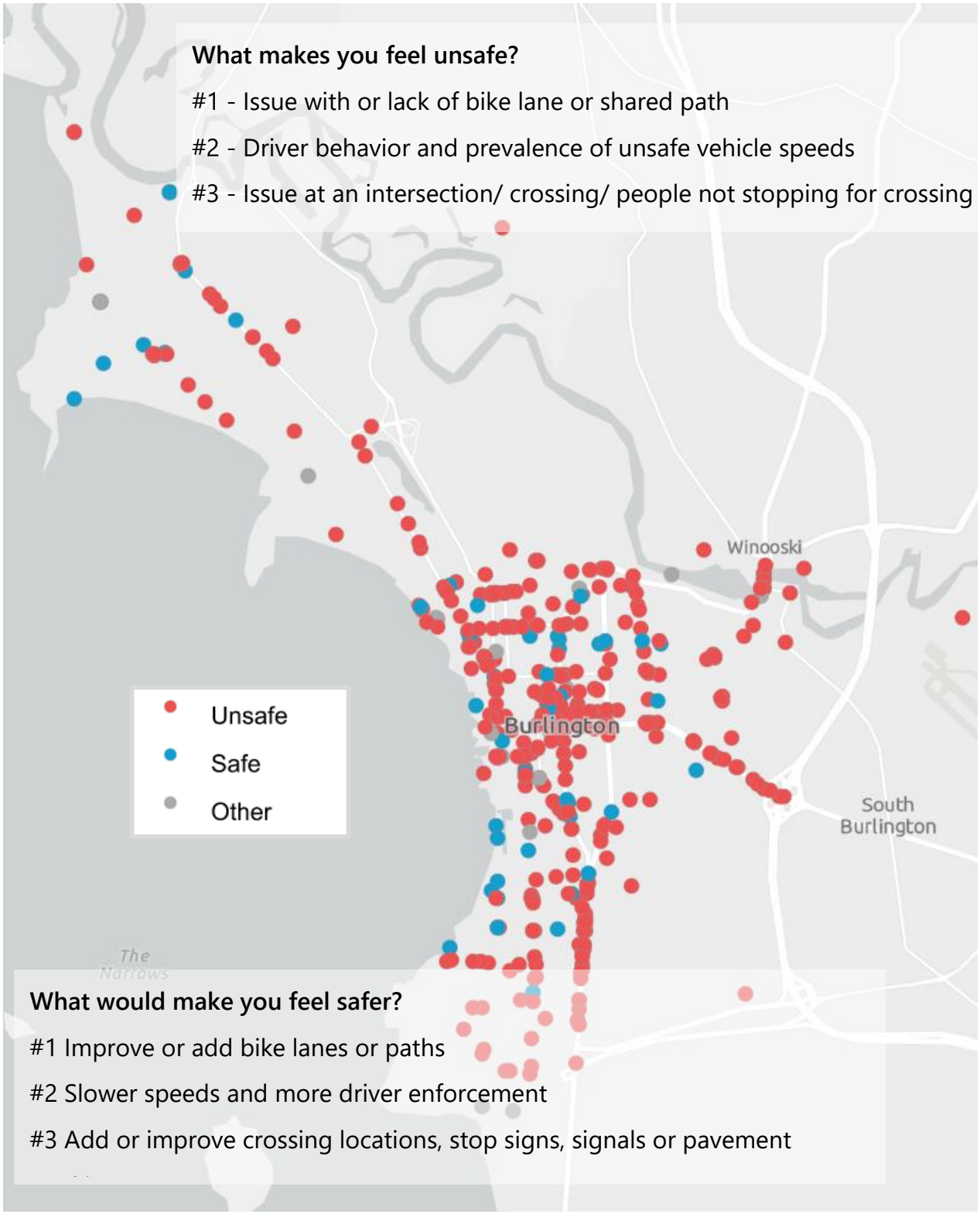


Figure 8. Survey Responses for Locations that Feel Unsafe or Safe

By providing this opportunity to identify locations on the system where individuals feel unsafe, data were expanded to user experience where near misses occur, conflicts arise, or perception of safety issues exist, even if there have yet to be crashes in these particular locations. The opportunity to weigh in on what would improve safety at locations that individuals indicated felt unsafe, the top themes were improved or added bike lanes or paths, slower vehicle speeds with more enforcement, and improved or added crossing locations.

Respondents overwhelmingly indicated locations where they feel unsafe when biking (half of responses) and walking (over a third of responses), which was consistent with the data trends from the safety analysis. A small proportion of respondents indicated where they feel unsafe when in a car (13%) and very few indicated where they feel unsafe while taking the bus (2%), using a mobility device (1%), or some other mode of transportation (1%).

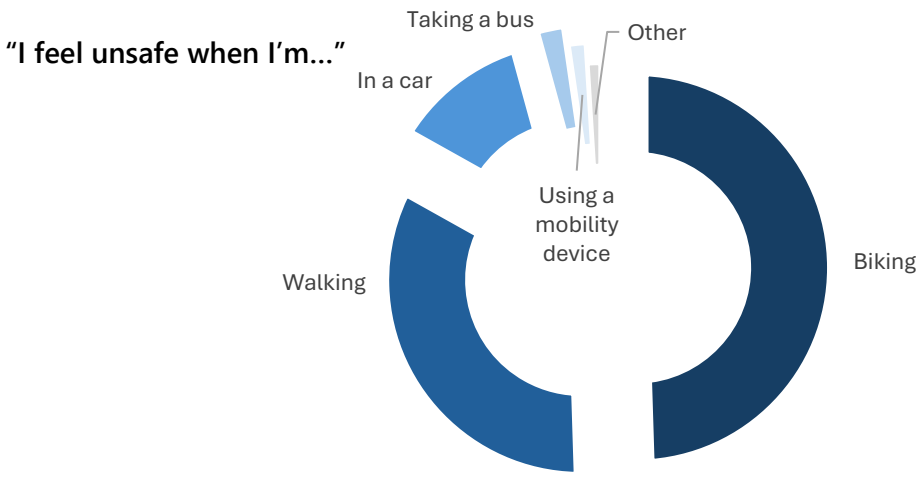


Figure 9. Transportation Mode where User Feels Unsafe

The top safety challenge associated with walking, rolling, and biking was general driver behavior according to survey respondents. Maintenance of facilities, lack of separation or

buffer from vehicles, and completeness of the network (both sidewalk/path and bike lane/shared use path) ranked in the top five safety challenges for walking and biking. For walking and rolling, safety at intersections and crossings were indicated as a top five challenge, consistent with the safety data analysis. For biking, winter snow and ice control was cited as a top five safety challenge.

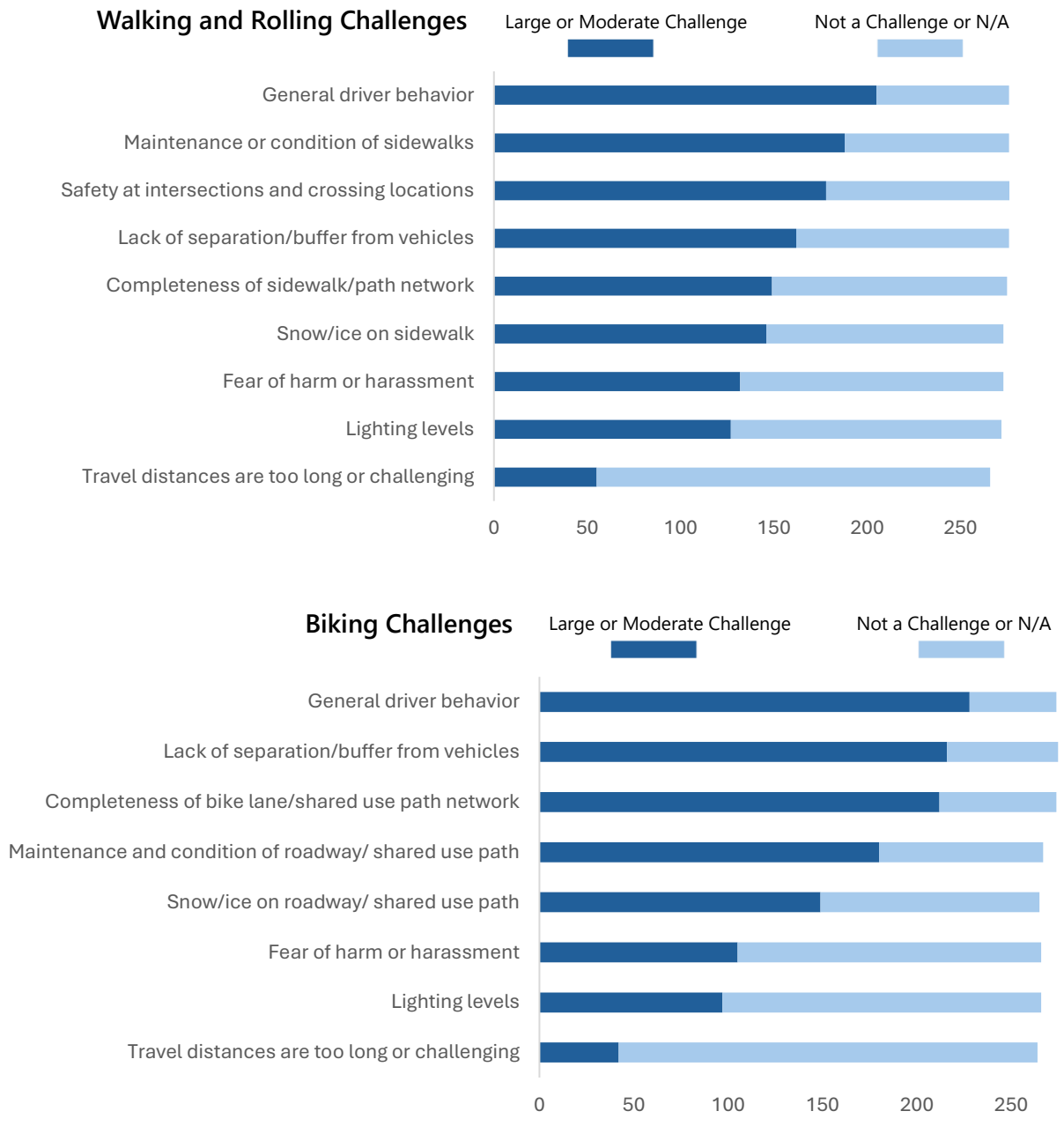


Figure 10. Challenges Identified for Walking, Rolling, Biking

The results from the survey input tool validated many of the findings from the safety data analysis, while helping to fill gaps and illuminate areas that do not necessarily show up in the crash data results. Individuals were able to weigh in on places across the system where they experience safety challenges or issues, some with frequency, and provided insights on where people experience near misses and other conflicts or issues on the system. This input was considered in the development of the Safety Action Plan through enhancement of strategies and countermeasures stemming from the safety data analysis. The input gathered through the survey tool also provided a mechanism to assess community identified needs for the prioritization of focal corridor projects and countermeasures.

ACTION PLAN

Action Plan Development

SAFE STREETS FOR ALL

STRATEGY & PROJECT SELECTIONS

Development of an action plan that will address serious crashes in Burlington relied on a data driven approach to prioritize transportation safety through improved processes and policies, systemic strategies to address key emphasis areas, recommended proven safety countermeasures, and project selections on focal corridors.

A number of emphasis areas emerged from the data driven approach. This action plan focused in on those emphasis areas that contribute potential solutions to the more than 40% of serious crashes on the system involving pedestrians and bicyclists and the overwhelming 73% of serious crashes that occur on the arterial roadways. The emphasis areas that emerged from the safety data analysis trends could be generally organized into the following categories:

- Crossing Safety
- Turning Movement Safety
- Arterial Corridor Treatments

For each strategy or project selected, the emphasis area category was noted. Proven countermeasures were identified that were most applicable to the emphasis areas that emerged from the data-driven approach to the Safety Action Plan development. The efficacy of each potential countermeasure was carried through the action plan tables, with the crash reduction potential indicated for each strategy or project where relevant. The application of relevant proven countermeasures to the Safety Action Plan projects and strategies was detailed in the Proven Countermeasures section below.

Priority actions stemmed from systemic initiatives or proposed changes to policy that were specifically anticipated to address key emerging safety trends from the data analysis. These actions are expected to apply across the system, with recommendations listed for prioritization of implementation citywide. The priority actions are detailed in the Priority Action section below.

Serious pedestrian and bicycle crashes have occurred almost exclusively on the arterial network. As a result, the data analysis stage of this project produced strong direction on where on the system to concentrate improvements. The Safety Action Plan was organized around selected focal corridors on the arterial network. Prioritization of the focal corridors entailed weighted scoring of safety, network priority, community context considerations, community identified needs, relative costs, and ease of implementation. This prioritization is described in the Focal Corridors section below.

For each focal corridor, a brief synopsis of the improvement evolution of the corridor was provided, as well as relevant planning, scoping, or design to be considered in implementation. Individualized recommendations were developed for each of the focal corridors, with many of the recommendations drawn from the long-range planning efforts in the original planBTV plan. Each potential carry forward (i.e., uncompleted) project from that plan was reviewed to assess the safety benefit and applicability to the safety risks that emerged from the most recent crash data analysis. Many of these projects are incorporated as recommendations in the new plan, with updates or additions as needed. The projects for each focal corridor are detailed in the Safety Action Tables section below.

This chapter steps through the relevant safety countermeasures and how they are applied to the Safety Action Plan. It then details the citywide systemic and policy driven priority actions, the prioritization of the focal corridors, and the safety action tables developed for each of the focal corridors. Finally, implementation and evaluation of the action plan and potential funding sources are discussed.

Proven Countermeasures

Each strategy and project were evaluated based on the crash reduction potential. Proven countermeasures have demonstrated crash reductions that have been quantified through published research studies. The efficacy of the countermeasure in reducing crashes is summarized in a measure called a crash modification factor (CMF). A CMF provides an estimate of the change in the number of crashes that can be anticipated with the

implementation of a countermeasure. For instance, take a segment of roadway that has experienced 20 pedestrian crashes per year and apply a countermeasure that has a CMF of 0.75 for pedestrian crashes. The expected result of the countermeasure application would be 15 pedestrian crashes per year (20 x 0.75 = 15) or a reduction of 5 crashes per year.

The CMF can be applied to future scenarios to understand the crash reduction potential of a type of treatment elsewhere. Crash modification factors for infrastructure-based countermeasures, and their associated research studies, are compiled in the Crash Modification Factors Clearinghouse[4] maintained by FHWA. The CMF Clearinghouse provides a rating to indicate the quality or confidence in the results of the study producing the CMF. These are also ratings leveraged in publications like NHTSA's Countermeasures That Work[5] to provide guidance on efficacy of countermeasures that fall outside of infrastructure-based solutions, such as behavior-oriented strategies in education or enforcement.

For each listed strategy or project, the CMF for the recommended countermeasure is applied to the relevant crash history, calculating an expected crash reduction. In cases where multiple countermeasures are recommended, the countermeasure most applicable was highlighted in bold font and the associated CMF for the countermeasure was used to assess the potential crash reduction for the project or strategy. The table below lists the relevant CMF for the proven countermeasures presented in this plan.

[4] FHWA, Crash Modification Factor Clearinghouse, http://www.cmfclearinghouse.org/

[5] NHTSA, Countermeasures that Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, https://www.nhtsa.gov/book/countermeasures/countermeasures-that-work

CATEGORY	COUNTERMEASURE	CRASH TYPE AND SEVERITY	CRASH MODIFICATION FACTOR
Pedestrian Safety	Crosswalk Visibility Enhancements	Pedestrian Crashes	0.52
Pedestrian Safety	Leading Pedestrian Interval	Pedestrian Crashes	0.413
Pedestrian Safety	Improve Overhead Lighting	Pedestrian Crashes with Injury	0.77
Pedestrian Safety	Walkways	Pedestrian Crashes	0.12
Pedestrian Safety	Pedestrian Hybrid Beacon	Pedestrian Crashes	0.45
Pedestrian Safety	Rectangular Rapid Flashing Beacons	Pedestrian Crashes	0.53
Pedestrian Safety	Pedestrian Refuge Islands	Pedestrian Crashes	0.69
Pedestrian Safety	Shared Path	Pedestrian Crashes	0.75
Bicyclist Safety	Separated Bicycle Lanes	All Crashes	0.552
Bicyclist Safety	Bicycle Lanes	All Crashes	0.734
Pedestrian Safety Bicyclist Safety Roadway and Traffic Management	Roadway Reconfiguration	All Crashes	0.71
Bicyclist Safety Roadway and Traffic Management	Intersection Approach Management	All Crashes	0.79
Pedestrian Safety Bicyclist Safety Roadway and Traffic Management	Corridor Access Management	All Crashes	f(width, density)

Priority Actions

Systemic Policy & Process Actions

SAFE STREETS FOR ALL

POLICY & PROCESS CHANGES

This plan identifies priority actions that are directly responsive to trends in crash data and can be applied at multiple locations across the city. The development of these systemic and policy actions took into account the robust existing framework afforded by the policies, aligned planning, and supported programming that are in place and were reviewed as part of this process. The systemic initiatives and policy changes proposed help to address gaps in the existing processes while addressing trends that emerged in the safety analysis. These are systemic initiatives and policy changes that would broadly improve road safety in Burlington.

Strategy Name	Priority Locations	Action	Emphasis Area	Countermeasure	CMF	Timeframe	Priority	Status	Target Crash Count	10 Year Crash Reduction
Maximum Spacing for Pedestrian Crossings	Shelburne Street (between Prospect Pkwy and Ledge Road) North Avenue (between cemetery and high school) Prioritize Focal Corridors and Other Arterials	Provide pedestrian crossings on arterials at a minimum interval of 1/4 mile Install RRFBs or enhanced crossing treatments as appropriate where major street does not have a stop, yield, or signal	Crossing Safety	Rectangular Rapid Flashing Beacon (RRFB)	0.53	Short Term	High	New	5	2.35
Lighting Analysis	Unsignalized Marked Crosswalks (where major street uncontrolled, including RRFB)	Perform lighting analysis using IES standard Make appropriate adjustments and installations in collaboration with Electric Department	Crossing Safety Turning Movements	Add Overhead Lighting	0.77	Medium Term	Medium	New	20	4.6
Uniform Pedestrian Phasing at Signals	Signalized Intersections Prioritize intersections with equipment needs to support rephasing/retiming (e.g., Willard / College)	Standardize 7-second LPIs at signalized intersections Consider exclusive pedestrian phases only where needed per engineering study	Crossing Safety	Implement Leading Pedestrian Interval (LPI)	0.413	Short Term	Medium	New	3	1.761
Near-Miss Detection	Downtown Intersections Signalized Intersections equipped with MioVision	Implement temporary near-miss detection for vehicle, pedestrian, and bicycle conflicts in the downtown zone to identify intersections with mitigation needs.	Crossing Safety Turning Movements	Improved Data Collection to Target Improvements	--	Medium Term	Medium	New	30	--
Control informal use of lane width at intersections	Pearl / Willard (WB) Pearl / Union (WB) College/ Winooski (WB) Other single lane approaches 14’ or wider Prioritize Focal Corridors and Other Arterials	Formalize control where wide single-lane approaches operate with a de facto bypass lane. Perform an engineering analysis to determine whether a formal turn lane is justified. If not, consider curb extension treatments or restriping.	Turning Movements	Intersection Approach Management Install Left-Turn Lane	0.79	Medium Term	Medium	New	2	0.42
Pedestrian and Bicycle Intersection Awareness	Signalized intersections with non-concurrent pedestrian phases Signalized intersections with bicycle signals	Develop a new sign template with instructions for bicyclists or pedestrians at these intersections.	Crossing Safety		--	Short Term	Low	New	--	--
Pedestrian Waiting Time Countdown System	Pearl / Winooski Pearl / Prospect Main / University Heights Other signalized intersections with exclusive pedestrian phases or long cycle lengths	Consider experimentation of a pedestrian waiting time countdown system.	Crossing Safety		--	Medium Term	Low	New	--	--

Focal Corridors

Focal Corridor Prioritization

The focal corridors were prioritized based on a series of factors including number of pedestrian and bike crashes (any severity), number of serious crashes (including all users), network connectivity needs, demographic context, destination access, community identified needs from the survey input tool, relative costs, and ease of implementation. These values were compiled into a raw score and weighted score to determine priority. It is important to note that these corridors were ranked based on the data analyzed for this study, but improvements on any of the ten focal corridors would have major safety benefits in the City of Burlington, and projects on all of these corridors should be pursued as opportunities arise.

RANK	CORRIDOR	BIKE/PED CRASHES (ANY SEVERITY)	SERIOUS CRASHES (INCLUDING NON-BIKE/PED)	NETWORK CONNECTIVITY NEED	DEMOGRAPHIC CONTEXT	DESTINATION ACCESS CONTEXT	COMMUNITY IDENTIFIED NEED	COST	EASE OF IMPLEMENTATION	RAW SCORE	WEIGHTED SCORE
1	Winooski Avenue	18	4	Medium	3	3	19	$$	Medium	19	39
2	North Avenue	13	6	Medium	3	2	32	$$	Medium	19	39
3	Pine Street	16	4	Medium	2	2	25	$$	Medium	18	37
4	Main Street (West of Willard)	14	3	High	3	3	7	$$$	Low	16	34
5	North Street	11	2	Medium	3	3	21	$$	Medium	17	33
6	Main Street (East of Willard)	3	4	High	3	3	14	$$	Medium	17	33
7	Colchester Avenue	14	4	Medium	3	1	13	$$	Low	15	32
8	Shelburne Street	7	7	High	2	1	34	$$$	Low	15	32
9	Riverside Avenue	7	7	Low	3	2	10	$	High	17	32
10	Battery Street	4	4	High	3	3	14	$$$	Low	15	31

Safety Action Tables

Focal Corridor 1: Winooski Avenue

Prior to this plan, Winooski Avenue has received significant upgrades, including a bikeway between Main and Riverside and 4-to-3 lanes reconfiguration between Main and Pearl. Curb extensions have also been constructed in the downtown area. The main improvements to complete, as listed below, are pedestrian-focused intersection improvements. Recommendations from the Winooski Avenue Transportation Study Report should be considered.

Action #	Strategy Name	Locations	Action	Countermeasure(s)	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
1a	College / South Winooski Pedestrian Improvements	College Street / South Winooski	Turning traffic failing to yield to pedestrians in crosswalk; improve with lighting, reduce crossing distance and/or speeds with curb extensions.	**Crosswalk Visibility Enhancements** Lighting	0.52	Medium	Crossing Safety	Carry Forward	0	--
1b	Pearl / North Winooski Pedestrian Improvements	Pearl Street / North Winooski Avenue	Southbound left turn traffic fails to yield to pedestrians in crosswalk on Pearl. Revisit pedestrian phasing, implement curb extensions to reduce speeds and crossing distance, and enhance visibility.	Crosswalk Visibility Enhancements **Leading Pedestrian Intervals** Lighting	0.413	Medium	Crossing Safety	Carry Forward	3	1.76
1c	North Winooski / North Pedestrian Improvements	North Winooski Avenue / North Street	Turning vehicles from Winooski failing to yield to pedestrians crossing North Street. Revisit pedestrian phasing, implement curb extensions to reduce speeds and crossing distance, and enhance visibility.	Crosswalk Visibility Enhancements **Leading Pedestrian Intervals** Lighting	0.413	Medium	Crossing Safety	Carry Forward	0	--
1d	Bank / South Winooski Pedestrian Improvements	Bank Street / South Winooski	Conflicts at driveway crossings (City Market and Simons gas station); improve with lighting, reduce speeds with lane reassignment, implement land use/urban design/access changes to reduce driveway crossing distances and conflicts.	Corridor Access Management **Crosswalk Visibility Enhancements**	0.52	Medium	Crossing Safety, Turning Movements	Carry Forward	1	0.48
1e	Cherry / South Winooski Pedestrian Improvements	Cherry Street / South Winooski	Turning or side street traffic failing to yield to pedestrians in crosswalk. Improve with curb extensions across Cherry to increase visibility and reduce crossing distance, revisit pedestrian phasing.	**Crosswalk Visibility Enhancements** Lighting	0.52	Medium	Crossing Safety	Carry Forward	0	--
1f	South Winooski / College Pedestrian Improvements	South Winooski Avenue / College Street	Consider high visibility crosswalks, curb extensions with creative materials	**Crosswalk Visibility Enhancements** Lighting	0.52	Medium	Crossing Safety, Turning Movements	Carry Forward	0	--
1g	South Winooski / Howard / St. Paul Pedestrian Improvements	South Winooski / Howard Street / St. Paul Street	Consider signal phasing changes, high visibility crosswalks, curb extensions with creative materials	Crosswalk Visibility Enhancements **Leading Pedestrian Intervals** Lighting	0.413	Medium	Crossing Safety, Turning Movements	Carry Forward	0	--

Focal Corridor 2: North Avenue

North Avenue has been the subject of interim changes, with segments north of the Route 127 Ramp reconfigured from 4-to-3 lanes with addition of bike lanes in 2017. Some crossing enhancements and other improvements have been made along the corridor in the interim timeframe with additional carry forward project recommended as outlined below.

Action #	Strategy Name	Locations	Action	Countermeasure(s)	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
2a	North Avenue Complete Streets Upgrades (North)	North Avenue	Stripe conventional bike lanes on North Avenue, north of Plattsburg Avenue	Bicycle Lanes	0.734	Medium	Arterial Corridors	Carry Forward	1	0.80
2b	North Avenue Intersection Safety	North Avenue	High visibility crosswalks, curb extensions with epoxy/pea gravel, flexposts, or other creative materials (at Shore, Cottage Grove, Poirier, Saratoga, and Institute)	Crosswalk Visibility Enhancements Leading Pedestrian Intervals Pedestrian Refuge Islands Lighting **Rectangular Rapid Flashing Beacons**	0.53	Medium	Arterial Corridors, Crossing Safety	Carry Forward	0	--
2c	North Avenue Complete Streets Upgrades (South)	North Avenue	Add permanent protected bikeway treatments along North Avenue. Add and extend protected/conventional/buffered bike lanes on North Avenue where feasible.	Separated Bicycle Lanes	0.552	Long Term	Arterial Corridors	Carry Forward	19	8.51
2d	North Avenue Crossing	Between Cambrian Way and Institute Road	Consider pedestrian crossing to satisfy spacing recommendations.	**Crosswalk Visibility Enhancements** Rectangular Rapid Flashing Beacon	0.52	Medium	Crossing Safety	New	2	0.96

Focal Corridor 3: Pine Street

Pine Street has had major recent improvements including bike lanes, raised crossings, traffic calming, and a shared use path installed between Kilburn and Lakeside. These improvements are so recent that they are not yet reflected in the crash data, and so a measured approach with a modest number of additional projects is recommended. These are listed below.

Action #	Strategy Name	Locations	Action	Countermeasure(s)	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
3a	Pine Street Complete Streets Upgrades (Lakeside to Flynn)	Pine Street	Protected bicycle lane	Separated Bicycle Lanes	0.552	Long Term	Arterial Corridors	Carry Forward	5	2.24
3b	Pine Street Sidewalk (Lyman to Home)	Pine Street	New sidewalk	Walkways	0.12	Long Term	Arterial Corridors	Carry Forward	0	--
3c	Home / Pine Intersection	Pine Street / Home Avenue	Consider mini-roundabout and shared lane markings	**Crosswalk Visibility Enhancements** Lighting	0.52	Medium	Turning Movements	Carry Forward	0	--

Focal Corridor 4: Main Street (West of Willard)

This segment of Main Street is currently undergoing significant upgrades as part of the Great Streets reconstruction, which will add separated bicycle lanes and shorten pedestrian crossings. While these are expected to be effective, two additional carry forward projects outside the Great Streets limits are proposed.

Action #	Strategy Name	Locations	Action	Countermeasure	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
4a	South Willard / Main Intersection	Main Street / South Willard Street	High visibility crosswalks, curb extensions with creative materials	Crosswalk Visibility Enhancement	0.52	Medium	Crossing Safety	Carry Forward	1	0.48
4b	Main / South Winooski Intersection	Main Street / South Winooski Avenue	Turning traffic failing to yield to pedestrians in crosswalk; long crossing distance and speed also factors. Improve by revisiting pedestrian phasing, reduce crossing distance and/or speeds with curb extensions, implement the Great Streets design.	**Crosswalk Visibility Enhancements** Intersection Approach Management	0.52	Short	Crossing Safety	Carry Forward	1	0.48

Focal Corridor 5: North Street

North Street has seen a number of pedestrian-focused improvements over the last decades. Two additional improvements are recommended.

Action #	Strategy Name	Locations	Action	Countermeasure	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
5a	North Street near Murray Intersection	North Street near Murray	Conflicts between vehicles and mid-block crossings or people leaving parked cars. Implement a raised-textured intersection to reduce speeds and enhance visibility of pedestrians. Continue to study and pilot projects needed to determine best approach for traffic calming.	Rectangular Rapid Flashing Beacon	0.53	Short	Crossing Safety, Arterial Corridors	Carry Forward	2	0.94
5b	North Street Sidewalk (Prospect to Mansfield Ave - north side)	North Street	New sidewalk	Walkways	0.12	Long Term	Arterial Corridors	Carry Forward	0	--

Focal Corridor 6: Main Street (East of Willard)

This focal corridor has had few crashes but is consistently identified as a high-demand area for pedestrian and bicycle improvements. Two network improvements are recommended. This focal corridor should be revisited as part of the upcoming Main Street Corridor Study.

Action #	Strategy Name	Locations	Action	Countermeasure	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
6a	Main / University Heights Intersection	Main Street / University Heights	Install high visibility pedestrian crossing, other enhancements to increase visibility of signal and crossing, revisit signal timing and phasing, and widen median refuge.	Crosswalk Visibility Enhancement	0.52	Medium	Crossing Safety	Carry Forward	0	--
6b	Main Street Path on UVM Campus	Main Street Path on UVM Campus	Continue UVM Shared Use Path to fill gap from University Heights to the Jughandle	Shared Path	0.75	Medium	Arterial Corridors	Carry Forward	2	0.50

Focal Corridor 7: Colchester Avenue

Colchester Avenue is a low-speed arterial with a cross section that varies between two and three lanes. It is a critical connection between downtown, UVM, the hospital, and Winooski and serves high levels of vehicle and nonmotorized traffic. Over a decade ago, a 4-to-3 lane reconfiguration and introduction of bike lanes was implemented between East Avenue and Prospect. A missing segment of sidewalk between Greenmount Cemetery and Calarco Court was installed. More recently, a shared use path along the south side was widened and extended between East Avenue and Prospect. Additionally, midblock crossings with RRFBs have been added to improve pedestrian crossings and minor improvements have been implemented at the intersections with Prospect / Pearl and Barrett. Continuing bike facilities further east is a key network connectivity goal, as well as intersection improvements. Recommendations from the Colchester Avenue: Bikeways, Parking, and Intersection Safety Study and Pearl Street / Prospect Street / Colchester Avenue Intersection Scoping Study should be considered.

Action #	Strategy Name	Locations	Action	Countermeasure	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
7a	East / Colchester Intersection	East Avenue / Colchester Avenue	Turning traffic failing to yield to pedestrians in crosswalk, address with mid-block, median-protected crossings to the west of this intersection.	Crosswalk Visibility Enhancements **Leading Pedestrian Intervals** Pedestrian Refuge Islands Lighting	0.413	Medium	Crossing Safety	Carry Forward	1	0.59
7b	Colchester Avenue Bikeway	Colchester Avenue Bikeway	Stripe bike lanes on Colchester east of East Avenue, with a more robust treatment long-term.	Bicycle Lanes	0.734	Medium	Arterial Corridors	Carry Forward	0	--
7c	Colchester / UVMMC Intersection	Colchester Avenue / UVMMC Entrance	Install high visibility pedestrian crossing.	Crosswalk Visibility Enhancements	0.52	Medium	Crossing Safety	Carry Forward	1	0.48
7d	Colchester Avenue Complete Streets Upgrades (Prospect to Riverside)	Colchester Avenue	Protected bicycle lanes.	Separated Bicycle Lanes	0.552	Long Term	Arterial Corridors	Carry Forward	16	7.17
7e	Colchester / Prospect / Pearl Intersection	Colchester Avenue / Prospect Street / Pearl Street	Install long-term multimodal and safety improvements based on prior scoping study.	Intersection Approach Management **Crosswalk Visibility Enhancements**	0.52	Medium	Arterial Corridors	Carry Forward	1	0.48
7f	Colchester Avenue Bikeway Winooski River Crossing	Colchester Avenue	Construct a shared use path on both sides of the Burlington-Winooski bridge consistent with RAIZ(2).	Shared Use Path	0.75	Long Term	Arterial Corridors	New	0	--
7g	Barrett / Colchester Intersection	Barrett Street / Colchester Avenue	Turning traffic failing to yield to pedestrians in crosswalk – address with exclusive or advance pedestrian phase, curb extensions to reduce speeds and crossing distance, and enhance visibility with lighting or other devices. Consistent with RAIZ(2) and STP 5000(29).	**Crosswalk Visibility Enhancements** Lighting	0.52	Medium	Crossing Safety	Carry Forward	0	--
7h	Colchester / Riverside Realignment	Colchester / Riverside / Chase / Barrett	Implement design as proposed in STP 5000(29). Realignment to allow all bicycle movements and pedestrian crossings on 4 legs.	**Crosswalk Visibility Enhancements** Bicycle Lanes	0.52	Long Term	Arterial Corridors	New	0	--

Focal Corridor 8: Shelburne Street

Shelburne Street is one of the least accommodating roadways in the City for nonmotorized traffic. Although there are alternate routes – particularly for bicycles with parallel north-south connections on Pine Street – pedestrian crossings and lack of bikeways remain a concern. With the opening of the Champlain Parkway, vehicle volumes are expected to decrease on Shelburne Street and make capacity reductions, such as a 4-to-3 reconfiguration, potentially more feasible. In the longer term, this is recommended to improve crossing opportunities and provide space for bicycle lanes. Scoping should be pursued once the Champlain Parkway is fully operational. The Home Avenue and Shelburne Street Scoping Study should be referenced for recommendations.

Action #	Strategy Name	Locations	Action	Countermeasure	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
8a	Shelburne / Home Intersection	Shelburne and Home	Consider recommendations of 2024 scoping study and install mid-term recommendations.	Crosswalk Visibility Enhancements	0.52	Medium	Crossing Safety, Turning Movements	Carry Forward	1	0.48
8b	Shelburne Street 4-to-3 Conversion	Shelburne St (Flynn Ave to roundabout)	Scoping to evaluate implementation of a two-way left turn lane, reduced through lanes, and addition of bike lanes. Shorten pedestrian crossings and increase their conspicuity. Implement recommendations of scoping.	**Roadway Reconfiguration** Bicycle Lanes	0.71	Long Term	Arterial Corridors, Crossing Safety	New	7	2.03
8c	Shelburne Street Pedestrian Crossing	Between Prospect Parkway and roundabout	Consider pedestrian crossing to satisfy spacing recommendations.	**Crosswalk Visibility Enhancements** Rectangular Rapid Flashing Beacon Pedestrian Hybrid Beacon	0.52	Medium	Crossing Safety	New	2	0.96

Focal Corridor 9: Riverside Avenue

Riverside Avenue currently has a shared-use path on the north side of the road, on-road bicycle lanes, and sidewalk on the south side between Barrett Street and Intervale Road / North Prospect Street. The sidewalk and bike lanes terminate at the Intervale Avenue intersection, stopping short for those headed downtown or to connections in the Old North End. The shared use path continues to the intersection with North Winooski Avenue at which point sidewalks flank the Riverside Avenue corridor on both sides to the intersection with Intervale Avenue and Oak Street. Focus on connected and cohesive facilities and improvements at conflict points are recommended.

Action #	Strategy Name	Locations	Action	Countermeasure	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
9a	Riverside: Intervale to Hillside Intersection	Riverside: Intervale to Hillside	Conflict points in parking lots and at driveway crossings create unsafe conditions for people walking or biking. Address by enhancing visibility of pedestrians, reduce speeds to reduce conflicts, land use/urban design/access changes to reduce driveway crossing distances and conflicts, added pavement markings at conflict points, and pilot more robust urban design changes as needed.	Corridor Access Management	--	Medium	Arterial Corridors	Carry Forward	7	--
9b	Riverside / North Prospect Intersection	Riverside Avenue / North Prospect Street	High visibility crosswalks, curb extensions with epoxy/pea gravel, flexposts or other creative materials, revisit pedestrian phasing.	Intersection Approach Management Crosswalk Visibility Enhancements **Leading Pedestrian Interval**	0.413	Medium	Crossing Safety	Carry Forward	0	--
9c	Riverside Path Extension	Riverside between North Winooski and Intervale Avenue	Shared use path on north side of street.	Shared Use Path	0.75	Long Term	Arterial Corridors	Carry Forward	1	0.25

Focal Corridor 10: Battery Street

Battery Street was investigated in depth as part of a recent scoping study, which looked at ways to improve pedestrian and bicycle facilities. This plan recommends implementing the scoping study's recommendations.

Action #	Strategy Name	Locations	Action	Countermeasure	CMF	Timeframe	Emphasis Area	Status	Target Crash Count	10 Year Crash Reduction
10a	Battery Street Complete Streets Upgrades (Maple to Park / Sherman)	Battery Street	Lane reassignment and bike lanes (phase 1), Pearl/Battery intersection improvements and protected bike lanes (phase 2), other recommendations from active scoping study.	Roadway Reconfiguration Separated Bike Lanes	0.71	Long Term	Arterial Corridors	Carry Forward	6	1.74

Implementation & Evaluation

SAFE STREETS FOR ALL

PROGRESS & TRANSPARENCY

The action plan contains strategies that can be implemented independently in the short-term and longer-term projects that require coordination with other work. The City is committed to continuously leveraging opportunities to advance this plan, including pursuing outside funding and incorporating safety treatments into routine roadway projects. A key part of this is keeping recommendations ready as other infrastructure projects are planned, and, as resources and funding allow, chipping away at the short- and medium-term projects.

Reporting

The SS4A program requires that plans designate a reporting process and responsible party. City staff will be responsible for tracking the status of actions in this plan and periodically updating to show completed and in-progress actions.

Data Collection and Evaluation

Another requirement of SS4A is ongoing evaluation of the plan. Both process and outcomes must be evaluated. Process evaluation involves reviewing each action in the plan and determining if progress has been made. Outcome evaluation looks at the impact of activities. For most projects, safety impact is determined with a before-and-after evaluation of crash statistics in the study area. For others, new metrics such as a reduction in the number of near-misses, improved compliance with traffic control devices and laws, or other behavioral changes may be more appropriate measures of effectiveness. In addition to project-level evaluations, City staff will review total crash fatalities, serious injuries, and number of non-motorist crashes on an annual basis. The City's crash data dashboard, already linked on their website[6], will provide monitoring metrics and transparency on safety outcomes.

[6] BTV Crash Data Dashboard: https://www.arcgis.com/apps/dashboards/0d344de88f014a99b05b41a6fb2e109a

The City has set a goal of significantly reducing traffic-related fatalities and serious injuries by 2035. As part of the annual crash data review, City staff will assess whether Burlington is making progress towards that goal and any issues needing focused attention. Crash data will be requested from VTrans and this brief assessment will be published in writing.

Public Reporting

Burlington DPW provided leadership in the development of the Safety Action Plan and will continue to monitor implementation of the plan. This includes reviewing crash statistics and implementation status of actions, recommending re-prioritization of safety priorities, and identifying additional potential funding opportunities that support implementation of strategies and actions. The core team will also coordinate with VTrans where there are opportunities to harmonize state and city safety activities. Staff will prepare an annual progress report.

Integration with the Plan

The City recognizes that many strategies depend on other work taking place first, receiving certain funding, or coordination with future work. The PlanBTV Walk Bike Safety Action Plan is a living document that will be reviewed and updated on an ongoing basis in between full-scale updates. These updates will ensure new projects with opportunities to incorporate safety treatments are reflected in the plan and that it is integrated with other long-term planning documents.

Funding Sources

Funding to implement this Safety Action Plan must be sourced from a mix of federal, state, and local sources. Potential funding sources may include recurring funding programs, existing grants, or grants for new initiatives. These may include the following:

Local Agency Funding

Burlington engages in a coordinated effort across departments to generate a 5-year Capital Plan, known as BTV Thrives. This process identifies a program of capital investments including infrastructure projects for transportation, water, wastewater, stormwater, and other physical assets for the City. Consideration of the Safety Action Plan strategies during future funding planning and allocation should be pursued, especially for maintenance activities or other roadway improvement projects that can support safety project implementation.

Impact fees are assessed to new development with the intent of offsetting the cost of additional demand and new development on City infrastructure. As infill development across the City takes shape, transportation or traffic impact fees may be used to support pedestrian and bicyclist infrastructure safety improvements.

Tax increment financing has also been leveraged in two different districts within the City to support infrastructure investments. This mechanism has been demonstrated to support infrastructure improvements and may be a source to consider for opportunities to support the Safety Action Plan.

Regional Funding Opportunities

The CCRPC is responsible for long range transportation planning for the region. The CCRPC updates the Metropolitan Transportation Plan on a five-year recurring basis. Adoption of projects into the MTP makes them eligible for federal funding. Additionally, the CCRPC develops a Unified Planning Work Program annually to support member cities and towns in their planning activities. These mechanisms should be considered for opportunities to plan for and fund safety strategies identified in the planBTV Walk Bike Safety Action Plan.

State Funding Opportunities

State funding opportunities like the Transportation Alternatives Program or Bicycle and Pedestrian Program grants enable planning, design, and construction for projects through

support from VTrans. Applications to these programs should be considered to support components of the plan.

Highway Safety Improvement Program (HSIP)

VTrans manages the Highway Safety Improvement Program (HSIP) programs for the state. This core Federal-aid highway program funds projects and strategies that are data-driven, align with Vermont's Strategic Highway Safety Plan (SHSP), and through implementation, help reduce traffic-related fatalities and serious injuries on all public roadways including local roads. The HSIP can advance the implementation of the Safe System Approach and this Safety Action Plan. HSIP has spending targets for local road projects, historically achieved through both grants and site-specific projects.

Safe Streets and Roads for All

The Bipartisan Infrastructure Law (BIL) established the Safe Streets and Roads for All (SS4A) discretionary program that will provide $5-6 billion in grants over the 5-year period. The City should consider applying for demonstration and/or implementation grants which are competitively awarded on an annual basis. SS4A grants require a 20% local match.

NHTSA Behavioral Safety Grants

The State Highway Safety Office (SHSO) awards millions of dollars per year to support enforcement, education, and emergency response activities to improve driver behavior and reduce deaths and injuries from motor vehicle-related crashes. Grants are made on an annual basis with applications due in May. The City should consider partnering with existing grantees to deliver programs in Burlington or applying for its own education and enforcement initiatives.