PVD GREAT STREETS

Appendix A:
Vulnerable Road User Safety Action Plan

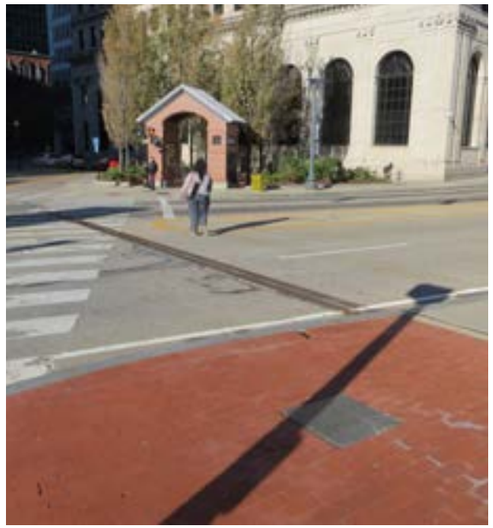
Completed in 2017, Providence's Vulnerable Road User Safety Action Plan conducted an analysis of existing conditions and historical trends to baseline the level of crashes involving fatalities and serious injuries across the city. It identified the locations where there are crashes, the severity, as well as contributing factors and crash types. It performed an analysis of systemic and specific safety needs (e.g., high risk road features, specific safety needs of relevantroad users. The geospatial identification of higher risk locations informed recommendations for locations to prioritize for safety improvements.

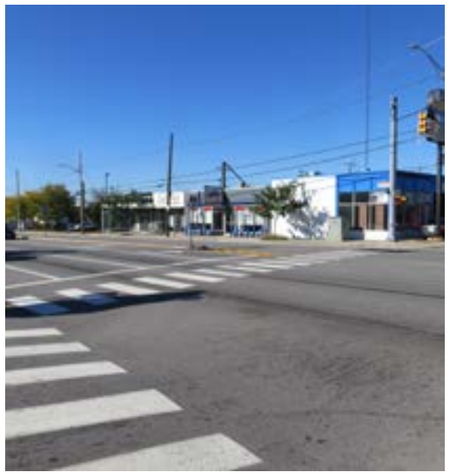
MAYOR JORGE O. ELORZA
CITY OF PROVIDENCE

https://www.providenceri.gov/planning/great-streets/

Vulnerable Road User Safety Action Plan

PROVIDENCE, RHODE ISLAND





JANUARY 2017

U.S. Department of Transportation
Federal Highway Administration

HSIP

Crashes on city streets in the past **five** years

14+
Fatalities

319+
Serious Injuries



Introduction

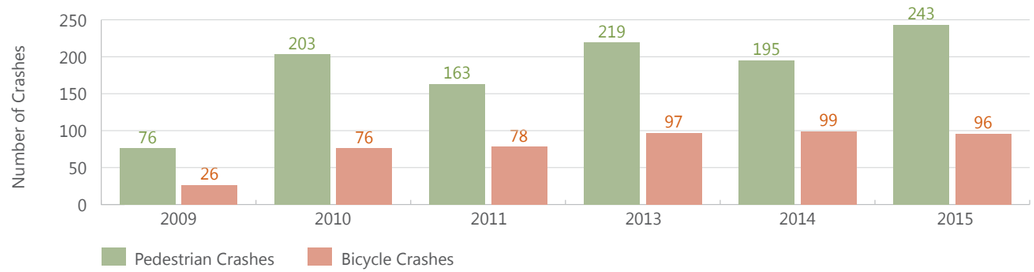
Vulnerable road user safety affects everyone irrespective of gender, age, or socioeconomic status. Vulnerable Road Users are defined in a variety of ways, including, but not limited to, pedestrians, persons using wheelchairs, and bicyclists.

Between 2009 through 2015, 1,099 pedestrian and 472 bicycle crashes occurred in the City of Providence with 14 pedestrian crashes resulting in fatality. With vulnerable road user crashes steadily increasing since 2009, the City of Providence launched an initiative to formalize a citywide Vulnerable Road User Safety Action Plan (VRUSAP).

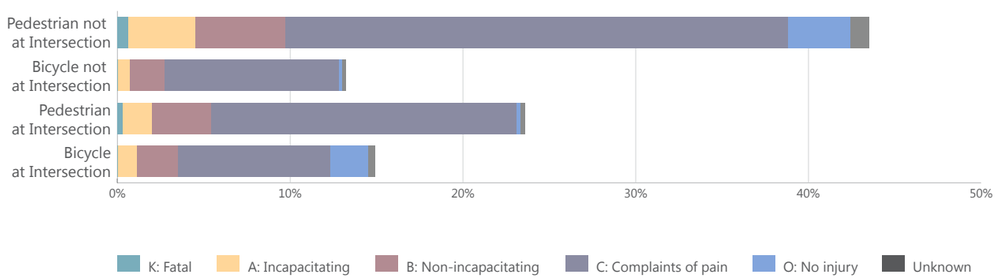
While the City of Providence has a relatively good record on traffic safety compared to other capital cities throughout the country, a plan to reduce the number of fatalities and serious injury crashes in Providence must be created in order to address the rise in vulnerable road user crashes.

The City of Providence is committed to reducing fatal and serious traffic crashes in the City.

Bicycle and Pedestrian Crashes Per Year



Crash Severity at Intersection Versus not an Intersection

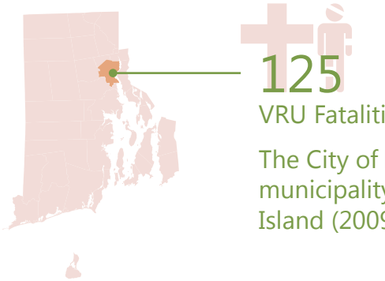


2009 2015

User crashes over a five year period have **tripled**

131

Fatalities and Serious injuries
Per year, in the City of Providence



125

VRU Fatalities and Serious Injuries

The City of Providence is the top municipality in the State of Rhode Island (2009-2013)

Purpose and Objectives

The overall purpose of this Vulnerable Road User Safety Action Plan (VRUSAP) is to identify and utilize available data to evaluate bicyclist and pedestrian crash patterns and develop a citywide approach that improves safety and compliments on-going initiatives in the City of Providence. By effectively using data to identify the problem areas and risk factors, funding can be focused on the areas and approaches with the greatest potential to reduce fatal and serious injuries to vulnerable roadway users.

Vulnerable Road User crashes have steadily increased over the five-year analysis period of 2009-2015 to triple as many crashes in 2015 as 2009. Although this upward trend is alarming, serious injury crashes have consistently accounted for approximately 8% of all crashes. While 8% may seem relatively low, this percentage translates to an average of 131 people per year losing their life or incurring life altering injuries in the City of Providence.

Serious injury crashes, defined as fatal or incapacitating injury crashes, have a severe impact in the City of Providence as their effects ripple through the community and often include the loss of human life. Therefore, the goal of this plan is to reduce vulnerable road user crashes resulting in fatalities and serious injury in Providence in half by 2030, with the ultimate goal of striving “Toward Zero Deaths (TZD)”. TZD is a national effort to improve roadway safety.

In addition to the increase in vulnerable road user crashes in the City of Providence, a review of historical trends state-wide show vulnerable road user crashes have also steadily increased.

Adopted in 2007 and revised in 2012, the Rhode Island Strategic Highway Safety Plan (SHSP) provides the overall direction for the implementation of the Rhode Island Department of Transportation’s (RIDOT) safety programs, including the Highway Safety Improvement Program (HSIP) and the Highway Safety Plan (HSP). The SHSP also assists in coordinating efforts between driver behavior programs and engineering solutions through a comprehensive, inclusive, data-driven approach that combines the 4 E’s of highway safety (engineering, education, enforcement, and emergency response). The RIDOT has three programs they use in the planning, implementation, and evaluation components of the HSIP process: the HSIP Design Study Program that identifies critical safety locations statewide; the Strategically Targeted Affordable Roadway Solutions program that delivers low-cost/ high-benefit solutions to address critical safety and congestion locations, and the Pedestrian Safety in RI program that focuses on pedestrian safety at high pedestrian fatal injury crash locations.

Based on data collected through the HSIP process, between 2009 and 2013, there were over 400 fatalities and serious injuries in Providence. This translates to over 20 percent of fatalities and serious injuries in the state. The City of Providence experienced the highest number of pedestrian and bicyclist fatalities and serious injuries out of any municipality in the state of Rhode Island during this period. The Rhode Island Strategic Highway Safety Plan (SHSP) also has an Emphasis Area 6, regarding Vulnerable Road Users. From the SHSP data (2006-2012) crashes involving pedestrians numbered 84 fatalities and 438 serious injuries with bicycle crashes resulting in seven fatalities and 161 serious injuries.

Through this VRUSAP, the City of Providence strives to change this upward trend and decrease serious injury crashes in half by 2030. Addressing vulnerable road user safety requires a comprehensive approach and will be achieved through unified collaboration of all partners involved—private, non-profit, local, state, and federal. Therefore, the VRUSAP outlines a coordinated application of countermeasures consisting of the 4 E's of safety (engineering, enforcement, education, and emergency response). The 4th "E" - emergency response plays a critical role in reducing death and disability in the post-crash phase, however is not incorporated in this document as an objective.

Specific objectives of the plan include the following:

- Reduce pedestrian exposure to vehicular traffic
- Reduce vulnerable road user crashes at intersections
- Reduce vulnerable road user crashes along the roadway
- Reduce vulnerable road user crashes at mid-block crossings
- Improve sight distance between vulnerable road user and vehicles
- Reduce vehicle speeds

In addition to these objectives, the VRUSAP identifies emphasis areas where vulnerable road user safety concerns need to be addressed.

Improve Young User Safety

Improve Older User Safety

Infrastructure

Compliancy

Data Analysis

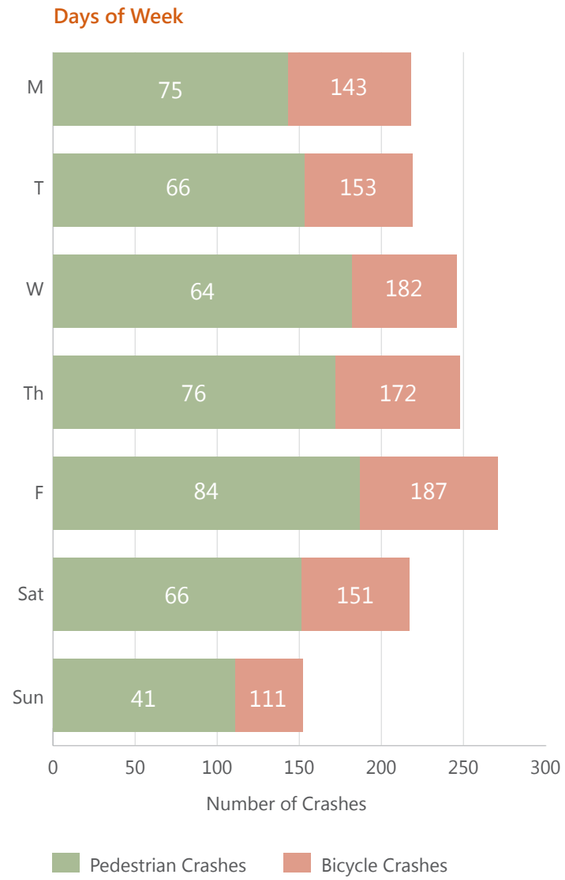
Addressing vulnerable road user safety is an ongoing priority for the City of Providence. Safety is being addressed through a variety City and RIDOT projects, including the Woonasquatucket Greenway Extension, City Walk (an effort to improve infrastructure for vulnerable road users to better connect eight Providence neighborhoods to Downtown, Roger Williams Park, and India Point Park), and the Rhode Island Strategic Highway Safety Plan (SHSP). The City took a data driven approach to identifying and prioritizing the trends for the Vulnerable Road User Safety Action Plan (VRUSAP). To help highlight trends, a detailed crash evaluation, based on police crash data involving vulnerable road users, was conducted for the City of Providence for the years 2009 through 2015. This analysis examined overall, fatal, and serious injury crash trends for vulnerable road users, while taking into account existing evidence, the impacted person's age, surrounding land use, and environmental data.

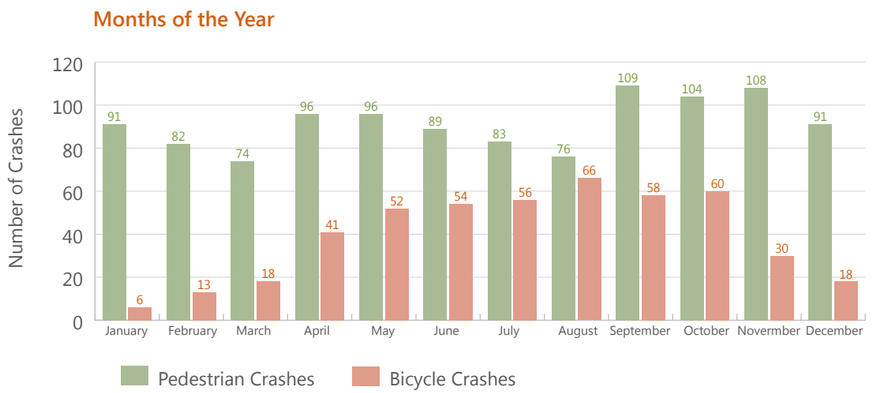
As a result of this data evaluation, the existing data trends were reviewed and prioritized into areas of greatest concern and three of the most critical trends requiring focused attention were selected.

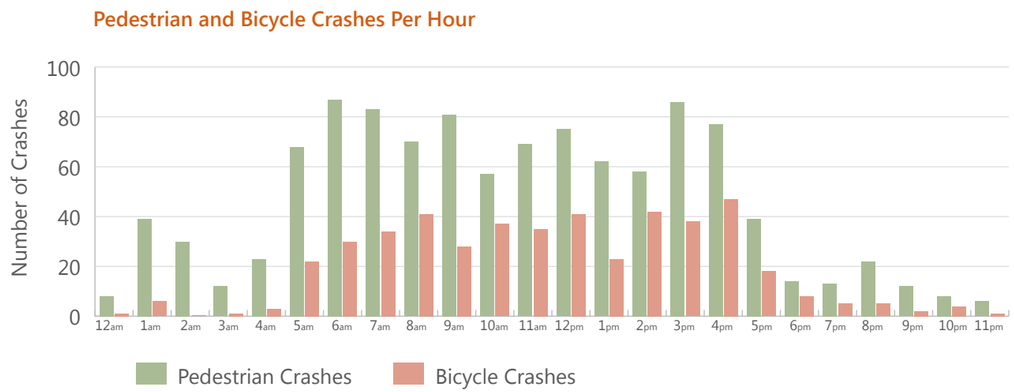
The following trends were identified for inclusion in the VRUSAP:

- Improve Young User Safety
- Improve Older User Safety
- Improve Infrastructure
- Increase Compliancy

The following sections provide an overview of each emphasis area, along with its specific goal and strategies for accomplishing the goal.







22%
▾18
years old

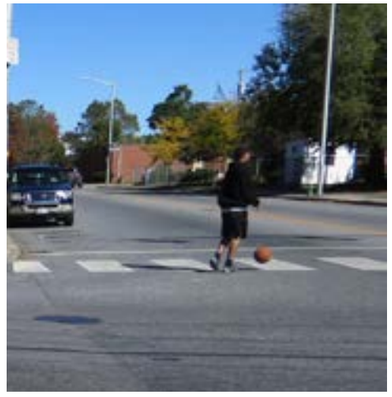
+

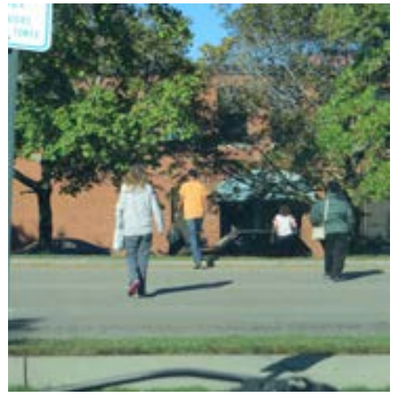
20%
19-29
years old

City of Providence vulnerable road user crash statistics

46%
21-25
years old

Fatal pedestrian crashes during **1-3 a.m.**





Age Appropriate Solutions

Improve Young User Safety

Young vulnerable road users are defined as individuals under 29 years of age. According to the 2010 United States Census, approximately 52.6% of Providence residents are under the age of 29 years. This means that approximately 94,000 relatively new and young vulnerable road users are using the City's roadways on a daily basis for recreation, transportation to and from school, and other activities. During the five year period studied, approximately 42% of all vulnerable road user crashes in the City of Providence involved individuals under the age of 29 years old and an additional 20% of all crashes involved individuals between 19-29 years old as the driver or vulnerable road user hit.

There were 14 fatal pedestrian crashes during the five years of data collection (2009-2015 excluding 2012 data), with a disproportionately high number of pedestrian crashes during the early morning hours of 1am to 3am. Approximately 46% of all fatal pedestrian crashes were male, aged 21-25, and during the hours of 1am to 3am. Almost 75% of all fatal pedestrian crashes involved young vulnerable users under the age of 10 years old or between the ages of 20-29 (9% and 64% respectively).

Young drivers between the ages of 16-19 years old accounted for 8% of all pedestrian and bicycle crashes in the City of Providence during the same data collection period. Approximately 30% of bicycle and 29% of pedestrian crashes involved young vulnerable road users under the age of 19 years old. Young drivers between the ages of 20-29 years old accounted for approximately 22% and 23% of bicycle and pedestrian crashes in the City of Providence, respectively. An additional 34% of bicycle and 27% of pedestrian crashes involved vulnerable road users between the ages of 20-29. This means that approximately 64% of all bicycle crashes and 56% percent of all pedestrian crashes in the City of Providence involve young roadway users.

Drivers between the ages of 20-29 years old account for the most vulnerable road user crashes.

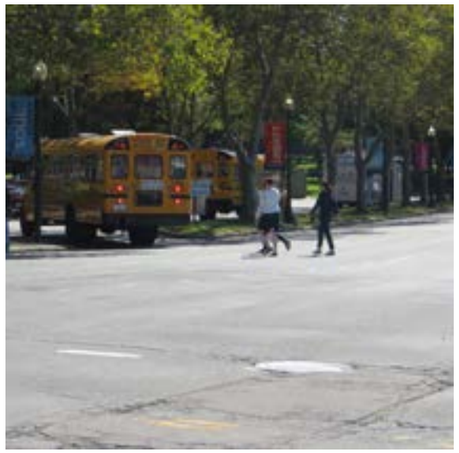
They account for the highest number of crashes involving vulnerable road users for bicycle driver age, pedestrian driver age, bicyclist age, and pedestrian age. Due to the projected increase in young vulnerable road drivers and users, addressing potential safety countermeasures and being proactive is essential for this growing population.

Strategies

1. Improve young road user safety and driver preparation through education and training.
2. Strengthen enforcement, especially during periods and locations where trends of fatal and serious injury crashes occur frequently.
3. Increase public outreach and education on the basics of roadway safety aimed at vulnerable road users and drivers age 16-29.
4. Implement appropriate infrastructure that improves safety for young vulnerable road users and drivers.

20-29
years old

Account for most vulnerable road user crashes



Action Plan

STRATEGY 1

Improve young road user safety and driver preparation through education and training.

Action Steps

- Review information in current school curriculum, preschools, and daycares, then recommend incorporating traffic safety materials where appropriate.
- Provide resources and training opportunities, using social media, public communication messages, and printed material to parents, young children, and young drivers.
- Consider discouraging dangerous or unlawful pedestrian behavior (texting, emailing, relying on drivers to obey crosswalk laws, etc.)
- Develop brochures targeted to drivers that explain how to share the road safely with vulnerable road users and distribute to AAA, insurance companies, DMV locations, driving schools, and other appropriate locations.
- Increase public outreach and education on the basics of roadway safety aimed at road users under 16 years old and drivers aged 16-29 years old.
- Develop flyers to distribute at schools, community centers, and recreation centers, such as a parent's guide to safe roadways and safe driving.
- Strengthen the RI graduated licensing law (GDL) for young drivers.
- Continue to research statistics, trends, and legislation for young vulnerable road users and young drivers.

STRATEGY 2

Strengthen enforcement, especially during periods and locations where trends of fatal and serious injury crashes occur frequently.

Action Steps

- Increase enforcement of the RI graduated licensing law (GDL) and educate the public on GDL's provisions.
- Install signage and striping to clearly indicate that vehicles are not permitted to "block the box" at key intersections, must stop at bus stop locations, and may not park in bike lanes.
- Conduct enforcement at locations where there are a high number of pedestrian crashes, and at other key locations including those where drivers typically fail to stop for pedestrians in crosswalks, where vehicles drive or park in bicycle lanes or at bus stop locations, and where vehicles "block the box" at important intersections.
- Publicize initiatives being conducted by enforcement in the City and State.
- Educate and train all officers on the importance of targeting this age group through meetings, presentations, etc.
- Explore opportunities to ensure home and business owners remove snow/debris from their sidewalks, for example local ordinances or fines.
- Educate the judiciary on young driver enforcement programs.
- Explore opportunities to encourage pedestrians to use proper crossing techniques and educate them on how motorized and non-motorized users can safely share the road.



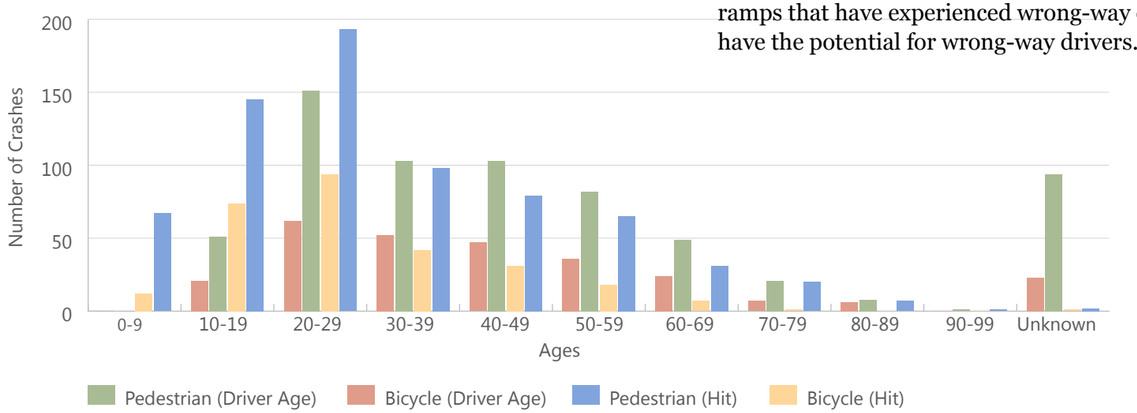

STRATEGY 3

Increase public outreach on the basics of roadway safety aimed at all young vulnerable road users and drivers age 16-29.

Action Steps

- Develop a media campaign targeted at the appropriate age population that enforces safe vulnerable road user practices, for example focusing on safety belts, driving bicycles the proper direction, speed, wearing reflective colorful clothing, and distracted drivers/pedestrians.
- Develop partnerships with organizations aimed at younger roadway users to identify and recommend effective programs aimed at changing vulnerable user and young drivers' behaviors and attitudes toward safe roadway usages, such as crossing at inappropriate locations, installing flashers on bicycles, wearing reflective clothing and wearing a helmet.
- Conduct an outreach program to employers, unions and trade schools and request their assistance in educating their employees/members/students age 16-29 on traffic safety issues.
- Encourage healthcare providers to discuss with their patients, especially under the age of 29, about traffic safety issues and the dangers of unsafe roadway usage.
- Work with bars and liquor stores to provide education to address impaired vulnerable road users, especially in the age group of 21-29 during bar closures.
- Encourage adequate funding levels for effective younger vulnerable road user safety programs and initiatives.

Age of People Involved



STRATEGY 4

Implement appropriate infrastructure that improve safety for young, vulnerable road users and drivers.

Action Steps

- Examine and adjust accordingly pedestrian crossing times to accommodate vulnerable road users.
- Implement bicycle lanes and other separated bicycle infrastructure on high volume and/or high speed roads.
- Study high crash corridors and intersections for other improvements such as road diets, traffic calming, pavement marking improvements, and additional lighting to improve safety and visibility.
- Install wrong-way driver dynamic alert systems at off ramps that have experienced wrong-way drivers or that have the potential for wrong-way drivers.

7%
▲65
years old

Vulnerable road user crashes in City of Providence

▲65
years old

13%

12%

Persons 65+ are most likely to be involved in bicycle or pedestrian crashes

25%

40%

Vulnerable road users involved in crashes during poorly lit conditions **(dark/dusk timeframe)**

Improve Older User Safety

An older vulnerable road user is defined as an individual who is 65 years of age or older. According to the 2010 United States Census, approximately 8.7% of Providence residents are 65 years and over. This means that approximately 15,500 older vulnerable road users are using Providence roads on a daily basis for recreation and transportation to and from destination locations. As this population ages, there will be an increase in the number of older vulnerable users and potentially an increase in crashes. Approximately 7% of all vulnerable road user crashes in the City of Providence involved individuals 65 years old or older.

The SHSP has an Emphasis Area 7: Aging Road Users, that reiterates the above information and states that the key to ensuring the safety of the older vulnerable road user population is to develop programs that allow mobility as long as possible while reinforcing safety.

In general, only about 3% of all bicycle and 9% of all pedestrian vulnerable user crashes involve a vulnerable user aged 65 years or older. In regards to crashes were the drivers age is 65 years or older, 13% of all bicycle and 12% of all pedestrian crashes involved older drivers.

It is important to be proactive in addressing potential safety countermeasures for older drivers and road users, as there is a projected increase in this age group in coming years.

Strategies

1. Identify opportunities to organize outreach and increase education aimed at individuals over 65 years old to stay safe and mobile.
2. Implement appropriate infrastructure that improve safety for older vulnerable road users and drivers.
3. Increase enforcement and education for locations with the most severe safety needs, including pedestrian crosswalks and school zones.

Action Plan

STRATEGY 1

Identify opportunities to organize outreach and increase education aimed at individuals over 65 years to stay safe and mobile.

Action Steps

- Review and strengthen the RI driver's license renewal requirements.
- Develop a media campaign targeted at the over 65 age population that enforces safe practices, for example focusing on the dangers of distracted drivers.
- Develop partnerships with organizations aimed at older roadway users, such as AAA, AARP or other Council of Aging locations, to develop and distribute an Older Driver guidebook.
- Encourage healthcare providers to discuss with their patients about traffic safety issues and dangers, such as prescription drug use for both walkers and driver and incentives to stop driving.
- Continue to research statistics, trends, and legislation for older individuals.

STRATEGY 2

Implement appropriate infrastructure that improves safety for older vulnerable road users and drivers.

Action Steps

- Implement engineering countermeasures designed to benefit older than 65 roadway users, including but not limited to lighting and improved signing and striping, based on the FHWA Highway Design Handbook for Older Drivers and Pedestrians.
- Examine and adjust pedestrian crossing times accordingly to accommodate older vulnerable road users
- Study high crash corridors for other improvements such as road diets and traffic calming that might improve safety.
- Install wrong-way driver dynamic alert systems at off-ramps that have experienced or could experience wrong-way drivers.

STRATEGY 3

Increase enforcement and education for locations with the most severe safety needs, for example pedestrian crosswalks, school zones and educational campaigns.

Action Steps

- Educate pedestrians about proper crossing techniques and how motorized and non-motorized users can safely share the road.
- Encourage adequate funding levels for effective older vulnerable road user safety programs and initiatives.
- Conduct enforcement "stings" at high pedestrian crash locations to target motorist who fail to yield or stop for pedestrians in crosswalk.

95%

Do not have pedestrian warning signs

93%

Do not have bicycle facility markings or warning signage

Improve Infrastructure

Infrastructure is the basic framework for vulnerable road users and is generally defined as the equipment and structures (such as roads and sidewalks) that are needed for an area to function properly. Improving the basic framework should address specific infrastructure and behavioral safety concerns identified through an analysis of data, information obtained through field assessments, and stakeholder input. Locations with seniors, children, and people with disabilities should be prioritized for safety improvements, while still acknowledging the diversity of neighborhoods and utilizing their community support groups.

Crash samples were selected from the top 25 vulnerable road user crash corridors and at random from the remaining crashes for the five years of crash data for the City of Providence. The crash samples were evaluated for current infrastructure such as signing, striping and signal equipment with a 100-foot radius used as the threshold for data collection. Trends for the top 25 corridors were:

- 69% of all crosswalks are continental style
- 95% do not have pedestrian warning signs
- 93% do not have bicycle facility markings or warning signage
- 58% do not have pedestrian signals
- 87% do not have median refuges
- 98% have street lighting
- 55% of all crashes occur on two-lane roadways
- 66% have crossing distances greater than 40 feet
- 88% have crosswalks within an acceptable distance
- 61% do not have a transit stop within 100 feet

Trends in the 100 random serious injury sample crashes were selected taking the traffic control percentages from overall City of Providence trends and distributing the crash sampling accordingly. Trends for the random sample crashes were:

- 51% of all crosswalks are continental style
- 96% do not have pedestrian warning signs
- 93% do not have bicycle facility markings or warning signage
- 82% do not have pedestrian signals
- 89% do not have median refuges
- 95% have street lightening
- 78% of all crashes occur on two-lane roadways
- 36% have crossing distances greater than 40 feet
- 91% have crosswalks within an acceptable distance
- 76% do not have a transit stop within 100 feet

The trends from both the random sampling and the top 25 corridors are comparable and provide an indication of some low-cost improvements that can be incorporated systemically and along the top crash corridors.

Many crashes involving vulnerable users occurred outside of a crosswalk, despite crosswalks being available within a 100-foot radius. Fatalities involving vulnerable road users not at an intersection were twice as high as fatalities at intersections. This trend continued through all the crash severities, stressing the importance of utilizing the 4 E's of engineering by encouraging enforcement and education not just building infrastructure.

The strategies and action plan for improving infrastructure are important for vulnerable road users but cannot thrive without support from enforcement and education to the local communities and wards.

While, vulnerable road users were involved in crashes in a variety of lighting conditions, approximately 25% of bicycle and 40% of pedestrian crashes occurred during the dark/dusk timeframe. In general, most of the corridors have street lighting.

Strategies

1. Select locations, especially with seniors, children and people with disabilities, and implement countermeasures with the greatest potential for safety improvement.
2. Continue implemention and inter-department policy/plan review with Providence Bicycle and Pedestrian Advisory Commission.
3. Mitigate high crash locations by providing data, countermeasure alternatives, and resources to implement improvements.

Action Plan

STRATEGY 1

Select locations, especially with seniors, children and people with disabilities, and implement countermeasures with the greatest potential for safety improvement.

Action Steps

- Promote and development regulations complete streets within City of Providence.
- Review access management policies for vulnerable roadway users and promote improved connectivity and safety.
- Proposed countermeasures should acknowledge the diversity of each neighborhood and utilize their community support groups, while considering roadway conditions.
- Update the City of Providence's standards and ordinances to align with national and state standards included in the Manual of Uniform Traffic Control Devices (MUTCD) and best practices as included in others guidelines such as the National Association of City Transportation Officials (NACTO) Urban Street Design Guide and.
- Improve crossings (e.g. install continental crosswalk pavement markings, additional lighting, flashing beacons, etc.) and pedestrian facilities (e.g. pedestrian signage and signals, detection to extend crossing times, etc.), standards and ordinances, to align with the national guidelines of the Manual of Uniform Traffic Control Devices (MUTCD).
- Improve bicycle facilities (e.g. warning signage, facility markings, etc.) by updating all intersections to the City of Providence standards and ordinances, along with the national guidelines of the Manual of Uniform Traffic Control Devices (MUTCD).
- Improve roadway lighting at vulnerable road user crossings.
- Consider crossing enhancements to improve quality and functionality.
- Prohibit vehicle parking in advance of pedestrian crossings, especially mid-block crossings, to increase pedestrian visibility.
- Consider a traffic signal retiming program to accommodate slower walking speeds in areas with a high number of seniors, children and people with disabilities.
- Conduct road safety audits along the top 25 vulnerable user crash corridors and to systemically develop corridor-specific improvements for intersections and high crash locations.

STRATEGY 2

Continue implemention and inter-department policy/plan review with Providence Bicycle and Pedestrian Advisory Commission.

Action Plan

- Coordinate with new projects within the City to encourage Vulnerable Road User facilities and incorporate Complete Streets concepts.
- Educate the community about making bicycling and walking a safter attractive transportation option.

STRATEGY 3

Mitigate high crash locations by providing data, countermeasure alternatives, and resources to implement improvements.

Action Plan

- Coordinate with community groups and leaders within individual neighborhoods and City Council wards to share data, potential alternatives, and discuss resources for improving infrastructure and roadway safety.
- Conduct workshops to teach community groups and leaders within individual neighborhoods and City Council wards about proven countermeasures, low-cost safety improvements, etc.
- Provide education aimed at proper crossing techniques and how motorized and non-motorized users can safely share the road.
- Conduct a before-and-after study to evaluate the effectiveness of the infrastructure improvements on vulnerable road users and roadway safety.
- Continue to research statistics, trends, and legislation for vulnerable road users.
-

Crashes involving **bicycles** in the City of Providence

Compliancy

Drivers of motor vehicles and vulnerable road users need to share the road with one another and follow traffic laws and regulations. For those crashes involving bicycles in the City of Providence, 13% were bicyclist non-compliance and approximately 4% were wrong-way bicyclists, traveling against the flow of traffic. In regards to pedestrians, 62% of all pedestrian crashes occurred at locations other than intersection where a vast majority of the pedestrians involved were found to have been jaywalking.

Strategies

1. Increase compliance with traffic laws and regulations related to vulnerable roadway users through education and enforcement.
2. Implement appropriate infrastructure to improve compliancy by vulnerable road users.

Action Plan

STRATEGY 1

Increase compliance with traffic laws and regulations related to vulnerable roadway users through education and enforcement.

Action Steps

- Increase awareness and understanding of safety issues related to vulnerable road users through education at appropriate locations (e.g. grade schools, driver's education, council for the aging, etc.).
- Increase educational efforts aimed at proper bicycle riding techniques (e.g. driving with the flow of traffic), especially targeted at high risk age groups.
- Increase educational efforts aimed to increase bicycle helmet compliance for children under the age of 18 years old.
- Identify locations and behaviors prone to vulnerable road users within each jurisdiction and implement multidisciplinary countermeasures.
- Encourage adequate funding levels for effective vulnerable road user safety programs and initiatives.
- Create an environment that supports and encourages safe bicycling and walking.
- Support national, state, and local legislative initiatives and policies that will increase bicycle and pedestrian safety.
- Encourage pedestrians of positive behavior at crosswalks.

STRATEGY 2

Implement appropriate infrastructure to improve compliancy by vulnerable road users.

Action Steps

- Provide guidance on the direction of travel and lane positioning for cyclists through pavement markings and signage within bike lanes.

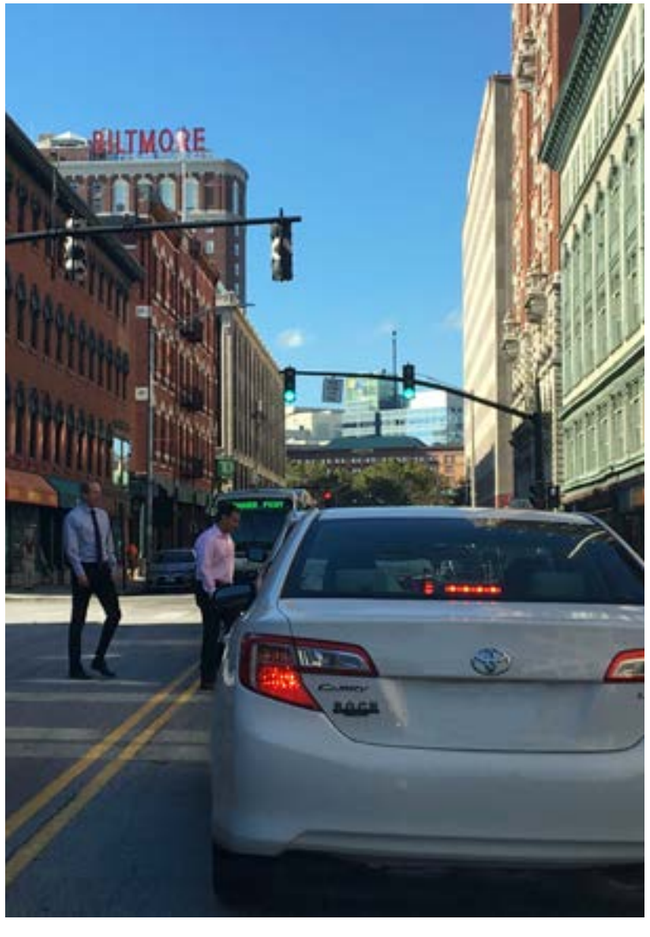
Crash Corridors

In addition to the three systemic trends, more specific areas have been identified as top vulnerable road user crash corridors in the City of Providence. While these areas aren't viewed as any less important than the systemic trends, they account for approximately half of all the fatal and serious injury crashes for vulnerable road users in the City of Providence. As these corridors account for a large percentage of serious injury crashes in Providence it has been recommended that they be monitored and tracked closely to identify corridor specific emerging trends.

The top 20 vulnerable road user roadways are as follows:

1 Broad
2 Chalkstone
3 North Main Street
4 Westminster
5 Smith
6 Washington
7 Cranston
8 Francis
9 Hope
10 Angell
11 Branch
12 Elmwood
13 Manton
14 Allens
15 Pine
16 Steeple/Memorial
17 Douglas
18 Hartford
19 Admiral
20 Dorrance

An example of a Road Safety Assessment was completed on Broad Street and along I-95 service roads adjacent to Downtown on June 16, 2016 and August 16, 2016. The accompanying report with findings and recommendations for Broad Street and the I-95 service roads is located in Appendix A.



Short-Term Countermeasures

Install Continental Crosswalk Striping

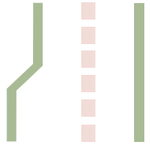
Crosswalks are pavement markings that delineate a portion of the roadway that is designated for pedestrian or bicycle crossing. Continental crosswalk striping is a high visibility crosswalk striping style, used at intersection and midblock pedestrian crossings. Install continental crosswalk striping at all marked crossings and at all future warranted crosswalks. Refer to Section 3B.18 of the MUTCD for guidance. Continental crosswalk striping should be used in place of stamped concrete crossings, brick crossings, diagonal lines, and transverse lines.

$ | 5 YEARS | CMF - 40%

Coordinate Transit Stop Placement

Transit stops should be highly visible locations that pedestrians can reach easily by means of accessible travel routes. Access to the bus stop via sidewalk connections from an adjacent intersection, sidewalk, or nearest land use should be as direct as possible. Transit stops should also be strategically placed to not block crosswalks or sight lines of vulnerable road users and adequate crossing opportunities should be provided in the area surrounding the transit stop. This countermeasure should be considered on corridors serviced by transit.

$ - $$$ | 2 YEARS | CMF - 45%



Lane Narrowing

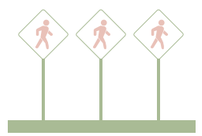
The narrowing of travel lanes—either visually (by using pavement markings) or physically (with measures such as curb extensions, curb relocations, or pedestrian refuge islands). Lane narrowing may provide space for bike lanes, sidewalks, or medians. Refer to MUTCD Chapter 3I for guidance.

$ - $$ | 2 YEARS | CMF - varies by width

Enhance Signage

Regulatory and warning signs inform motorists of the presence of pedestrians and bicyclists and of the need to share the roadway with bicycles and pedestrians, direct motorists to yield or stop at the lines used in advance of marked pedestrian crosswalks, and direct pedestrians and bicyclists how to share the road with motorists. Signs include but are not limited to R10-5a,-b,-c, W11-2, W13-1p, W16-7p, etc. Refer to Sections 2B.52, 2B.53, 2C.50 of the MUTCD for guidance. Priority for sign installation should be given to locations where vulnerable users are unexpected due to limited visibility or high vulnerable road user volume. Regulatory signs are used to inform road users of selected traffic laws. Warning signs can be used to alert road users to unexpected entries into the roadway by bicyclists and pedestrians and where other crossing activities might cause conflicts. Refer to Sections 2B.04 to 2B.12, 2C. 50, 9B.18 and 9B.19 for Standards, Guidance and Options for installation of appropriate signage.

$ | 5 YEARS | CMF - 5% - 15%



Sign Clutter

Signage should be inventoried and reviewed to ensure that all signs are visible and clear to drivers and that consistent signage is used at all locations to reduce possible confusion. Unnecessary signs or those that are non-compliant with the MUTCD Part 2 should be removed and/or replaced, as needed.

$ | 5 YEARS | CMF - 5% - 15%

Install Traffic Signal Retro-Reflective Backplates

The installation of Traffic Signal Retro-Reflective backplates provides added visibility for motorists when approaching a signalized intersection. The backplates encase the traffic signal head and have a retro-reflective border. The use of retro-reflective backplates should be considered at locations with a history of red light running, crashes related to red light running, or where there are unexpected signalized intersections.

$$ | 5 YEARS | CMF - 15%

Implement No Parking within 25 Feet of Crosswalk

The removal of on-street parking near intersections increases pedestrian visibility and reduces conflicts between pedestrians and turning vehicles. Parking restrictions include appropriate No Parking signs and hatched pedestrian markings where parking is not permitted. This countermeasure should be implemented near intersections with high numbers of turning vehicle-pedestrian crashes.

$ | 1 YEARS | CMF - 40% - 45%

Restriping

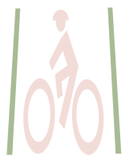
All pavement markings should be highly visible for all roadway users in order to clearly delineate space for various road users. Pavement markings should be consistent in width, color, and style. Striping should be considered on all roadways where pavement markings are lacking or have faded overtime.

$ - $$ | 2 YEARS | CMF - 18% - 24%

Crosswalk Consolidation/Addition

All crosswalks should be highly visible for all roadway users and placed strategically in order to best service pedestrians. All crosswalks should be reviewed to ensure proper placement. Crosswalks should be relocated, and installed to accommodate pedestrians and provide ample sight visibility to and from the crosswalk.

$ | 1 YEARS | CMF - 40%



Bicycle Lanes

Bicycle lanes should be considered on existing roadways by reallocating curb to curb road space to better accommodate vulnerable users. Reallocating curb to curb road space to include bicycle lanes might include: narrowing vehicle travel lane widths, removal of on-street parking, or by reducing the number of vehicle travel lanes (Road Diet). Lane width narrowing and roadway reconfiguration can be implemented without negatively impacting vehicular operation, however, a traffic study and data collection should be conducted to confirm prior to redesigning the roadway.

FHWA has encouraged flexibility in the application of design criteria particularly travel lane widths, bicycle lane widths, and offset from on-street parking. Refer to the FHWA publication Incorporating On-Road Bicycle Networks into Resurfacing Projects, March 2016 for factors to consider when using combinations of minimum travel and bicycle lane widths.

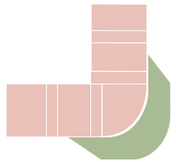
$ | 2 YEARS | CMF - 59%

Long-Term Countermeasures

ADA Pedestrian Compliancy

Ensure that streets include appropriate sidewalk widths, cross slopes, running slopes, and wheelchair ramps that meet slope requirements, have detectable warning panels, and are placed in order to direct the pedestrian in the correct direction. Install audible and vibro-tactile push buttons at all signalized intersections.

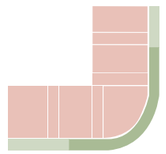
$$ | YEARS 5 | CMF - unknown



Curb Extensions

Also known as bulb-outs, neckdowns, and chokers, curb extensions are portions of the roadway where the curb extends out into the parking lane or shoulder. This both visually and physically narrows the roadway to reduce vehicle speeds, improves visibility between pedestrians and motorists, and provides a shorter distance for pedestrian crossings. This countermeasure should be considered on sections of roadway where on-street parking is provided, there are high vehicle speeds, and pedestrian crossings are common.

$$ | 5 | CMF - 37%



Curb Radius Reduction

At intersections, large curb radii typically result in high-speed turning movements by motorists. Smaller radii improve pedestrian safety by requiring motorists to reduce vehicle speeds when turning, shortening crossing distances for pedestrians (which also improves signal timings), improving sight distances, and allowing for greater flexibility in curb ramp placement.

$$ | YEARS 5 | CMF - unknown

Flashing Beacons (RRFBs & HAWKS)

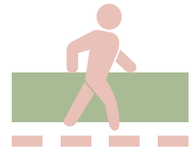
A flashing beacon provides a warning to motorists about the presence of a crosswalk. A Rapid Rectangular Flashing Beacon (RRFB) is yellow, rectangular, and has a rapid “wig-wag” flash similar to police lights. The High Intensity Activated Crosswalk (HAWK) is one of the FHWA Proven Safety Countermeasures and is used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street at a marked crosswalk; a warrant analysis and study must be performed prior installation (refer to MUTCD Chapter 4F). The device consists of three signal sections with a yellow signal head centered below two horizontally aligned red signal heads. Both the RRFB and HAWK should operate only when a pedestrian is present through either push button or passive detection. This countermeasure is for use at midblock crossings and intersections that do not warrant a signal.

$$-$$$ | YEARS 3 | CMF - RRFBs; HAWKS 69%

Radar Speed Display Signal/Portable Speed Trailer

A changeable message sign that displays the speed of approaching vehicles. A radar speed display signal should be considered where motorized vehicle speed is a concern.

$-$$ | YEARS 2 | CMF - 46%



Pedestrian Barrier

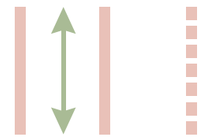
A pedestrian barrier is a concrete or landscape barrier that provides an area for pedestrians to walk, while also restricting their path from areas that may be harmful to cross. Pedestrian barriers should be considered at locations with a history of crashes due to pedestrians walking illegally in an area that may be considered restricted, such as an on-ramp or off-ramp to a limited access highway.

$$-$$$ | YEARS 2 | CMF - unknown

Parking Improvements Due to Visibility

The removal of roadside objects or parking near mid-block crosswalks and intersections to increase visibility and reduce conflicts between vehicles and vulnerable road users. Consider implementing near intersections and crosswalks with high turning vehicle-pedestrian crashes or at locations where the pedestrians lack conspicuity.

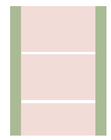
$$-$$$ | YEARS 2 | CMF - 47%



Road Diet

A road diet is a redistribution of space in the roadway leading to a reduction in the width or number of travel lanes for motor vehicles on a roadway. The road diet is one of the FHWA Proven Safety Countermeasures and may provide space for bike lanes, sidewalks, or medians, and can help reduce motor vehicle speed. A traffic analysis is required to determine the feasibility of a road diet. Consider a road diet on segments with pedestrian crossings, multiple lanes of traffic, and high vehicle speeds.

$ | YEARS 2 | CMF - 47% - 71%



Sidewalk Repair/Replacement

Sidewalks are usually paved and separated from the street by curbing and should be of appropriate width and slope for all vulnerable road users. Areas where there are tripping hazards, deteriorated conditions, or discontinuous sidewalks should be repaired or replaced.

$ | YEARS 5 | CMF - varies

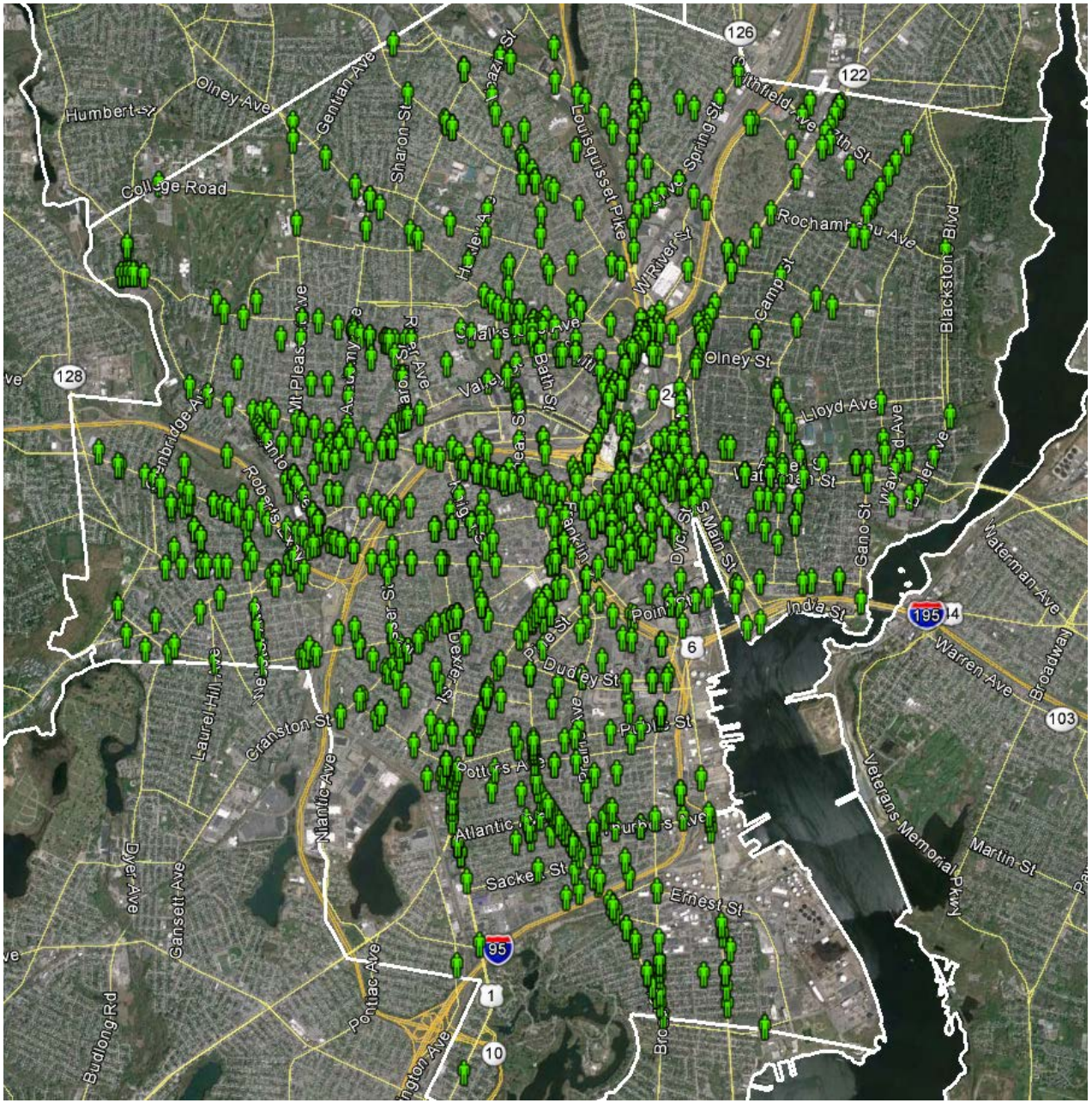
Roadway Safety Lighting

Lighting directed to illuminate the roadway, specifically in the vicinity of intersections and marked pedestrian crossings. Consider this countermeasure on sections of roadway with high volumes of nighttime non-motorized activity.

$$ | YEARS 5 | CMF - 27% - 69%

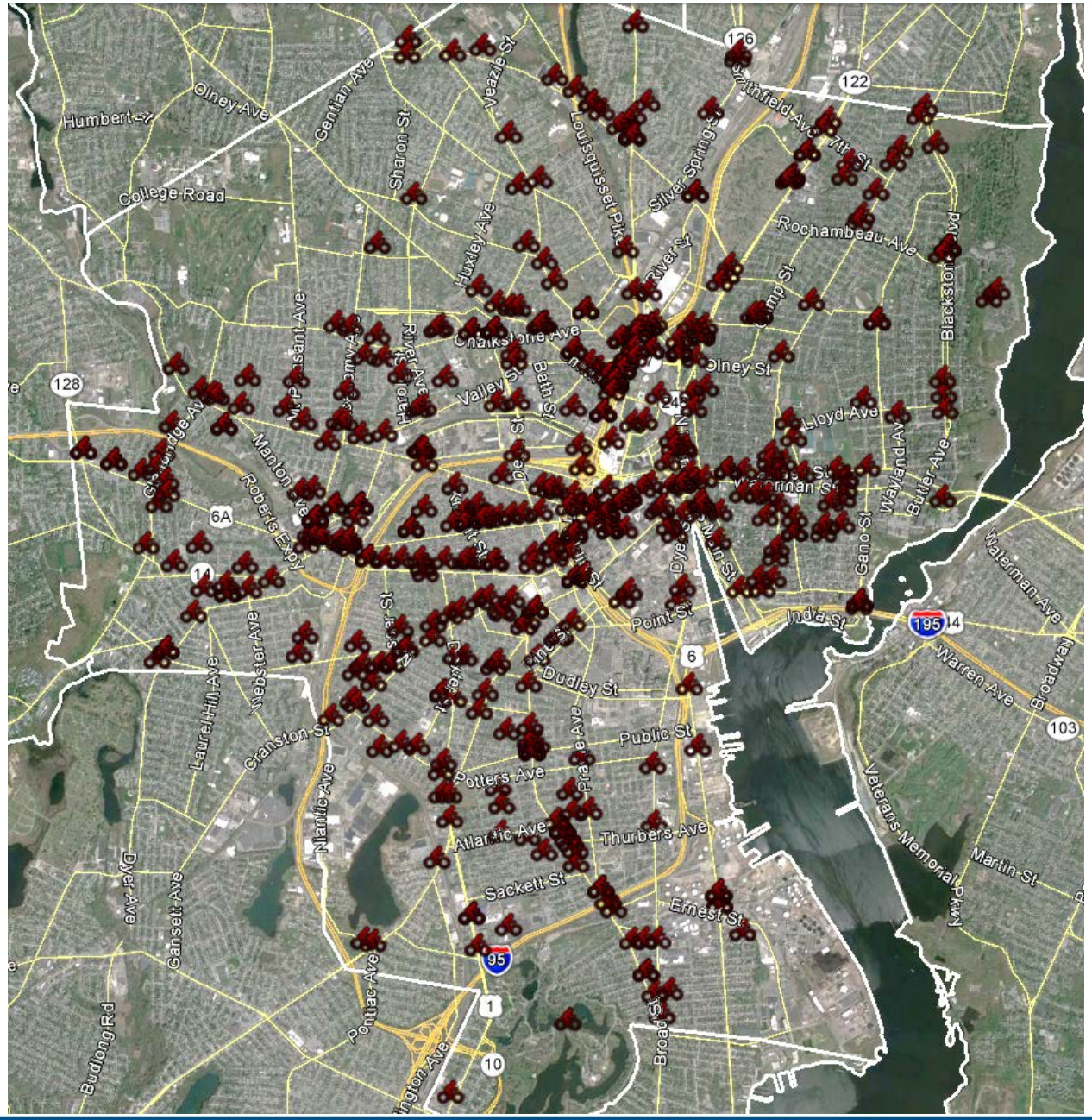
TOTAL Pedestrian Crashes (2009-2015)

1,100 crashes

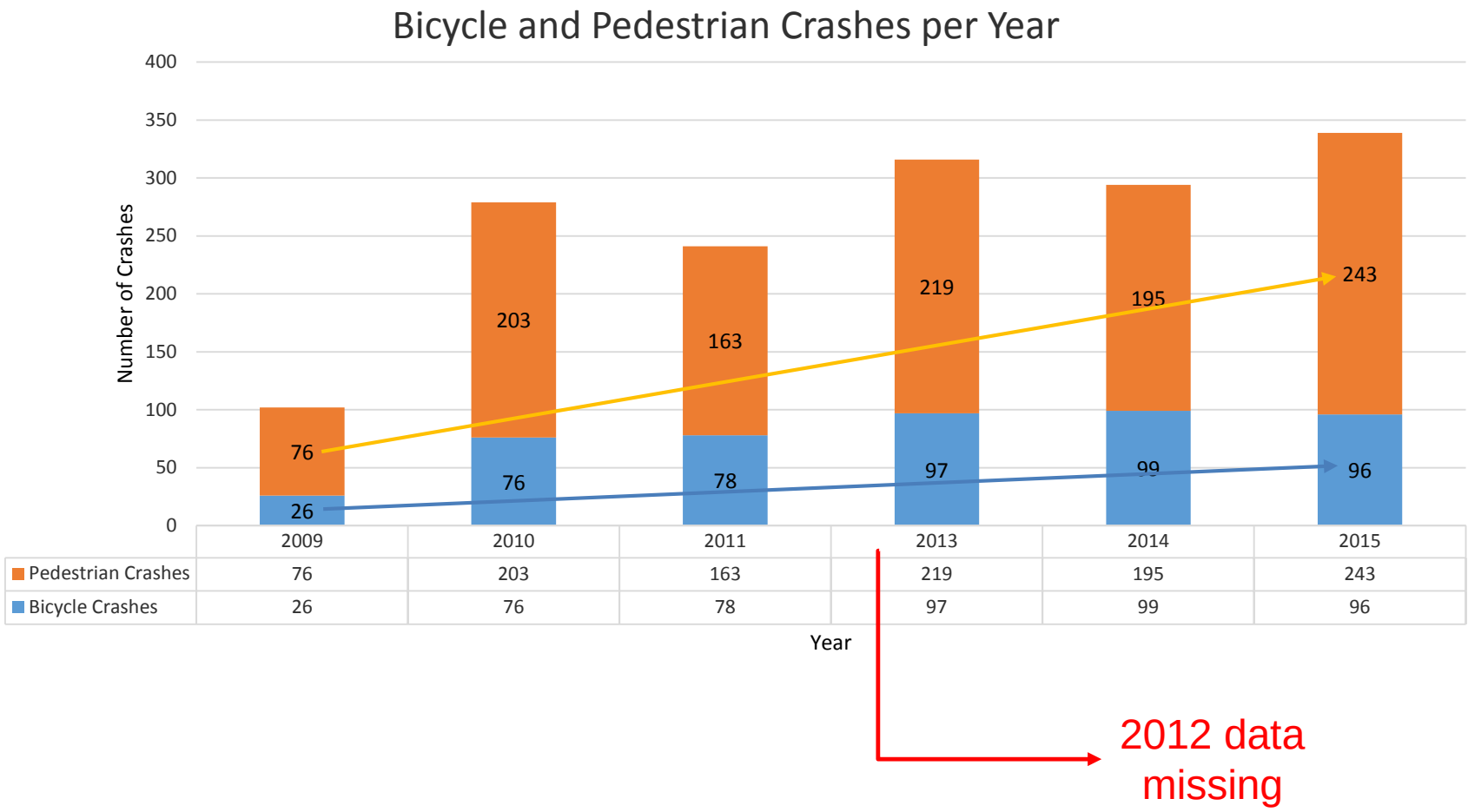


TOTAL Bicycle Crashes (2009-2015)

470 Crashes



Vulnerable Road User Safety Action Plan - Analysis



Vulnerable Road User Safety Action Plan - Prioritization

Top Corridors Ranked by…

Street Name	Serious Injury Crashes			Total Serious Injury Crashes	Serious Injury/Total Crash Percentage	Total Serious Injury Crash Percentage	Total Fatality Crash Percentage	Total Crash Percentage	Miles	Serious Injury Crash Rate (crashes/mile)	Total Crash Rate (crashes/mile)	Stating Point	Ending Point
	Pedestrian	Pedestrian - Fatal	Bicycle										
Broad Street	11		5	16	19.5%	4.8%	0.0%	5.2%	2.80	5.7	29.3	Chestnut Street	Montgomery Avenue
Atwells Avenue	8		3	11	22.4%	3.3%	0.0%	3.1%	1.90	5.8	25.8	Broadway	Manton Avenue
Chalkstone Avenue	6		5	11	26.8%	3.3%	0.0%	2.6%	2.50	4.4	16.4	Douglas Avenue	Manton Avenue
North Main Street	6	1	3	10	30.3%	3.0%	7.1%	2.1%	2.20	4.5	15.0	Chace Avenue	College Street
Westminster Street	6		4	10	19.2%	3.0%	0.0%	3.3%	1.30	7.7	40.0	Franklin Street	Broadway
Smith Street	6	1	2	9	29.0%	2.7%	7.1%	2.0%	2.50	3.6	12.4	North Main Street	Brightwood Avenue
Washington Street	3	1	4	8	19.0%	2.4%	7.1%	2.7%	1.10	7.3	38.2	Memorial Boulevard	Knight Street
Cranston Street	4		3	7	23.3%	2.1%	0.0%	1.9%	1.30	5.4	23.1	Fricker Street	Huntington Avenue
Francis Street	5		1	6	28.6%	1.8%	0.0%	1.3%	0.50	12.0	42.0	Smith Street	Exchange Terrace
Hope Street	2	1	3	6	19.4%	1.8%	7.1%	2.0%	2.80	2.1	11.1	Chace Avenue	Bessie Way
Angell Street	5		0	5	55.6%	1.5%	0.0%	0.6%	1.50	3.3	6.0	River Road	Benefit Street
Branch Avenue	1		4	5	20.8%	1.5%	0.0%	1.5%	2.00	2.5	12.0	North Main Street	Douglas Avenue
Elmwood Avenue	4	1	0	5	14.3%	1.5%	7.1%	2.2%	1.80	2.8	19.4	Broad Street	Roger Williams Avenue
Manton Avenue	1	2	2	5	16.1%	1.5%	14.3%	2.0%	1.80	2.8	17.2	San Souci Drive	Chalkstone Avenue
Allens Avenue	2		2	4	44.4%	1.2%	0.0%	0.6%	1.70	2.4	5.3	Eddy Street	New York Avenue
Pine Street	4		0	4	44.4%	1.2%	0.0%	0.6%	0.70	5.7	12.9	Broad Street	Dyer Street
Steeple Street	2		2	4	80.0%	1.2%	0.0%	0.3%	0.10	40.0	50.0	North Main Street	Memorial Boulevard
Douglas Avenue	4		0	4	18.2%	1.2%	0.0%	1.4%	1.90	2.1	11.6	Hazael Street	Orms Street
Hartford Avenue	2		2	4	16.0%	1.2%	0.0%	1.6%	1.30	3.1	19.2	Plainfield Street	Killingly Street
Admiral Street	3		0	3	33.3%	0.9%	0.0%	0.6%	1.90	1.6	4.7	Charles Street	Gentian Avenue
Burnett Street	3		0	3	100.0%	0.9%	0.0%	0.2%	0.30	10.0	10.0	Public Street	Dexter Street
Fountain Street	3		0	3	42.9%	0.9%	0.0%	0.4%	0.30	10.0	23.3	Dorrance Street	Greene Street
Memorial Boulevard	3		0	3	25.0%	0.9%	0.0%	0.8%	0.60	5.0	20.0	Dyer Street	Huntington Expressway
Plainfield Street	3		0	3	15.8%	0.9%	0.0%	1.2%	1.00	3.0	19.0	Hartford Avenue	Duxbury Street
Dorrance Street	3		0	3	17.6%	0.9%	0.0%	1.1%	0.40	7.5	42.5	Dyer Street	Fountain Street
Total	100	7	45	152		45.6%	50.0%	41.2%					

Half of all crashes

Nearly half of all serious injury crashes

Appendix A

1 Broad Street

Where

LIMITS	Chestnut St. to Montgomery Ave.
ROADWAY TYPE	• 2 lanes undivided • TWLTL between Public St. and Montgomery Ave.
TRAFFIC CONTROL	23 signalized intersections
LAND USE	Mixed use (Commercial/ Residential)
WIDTH	46-54 feet (varies)
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	Sharrows between Service Rd. and Elmwood Ave.
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing and traveling illegally at intersections and throughout limits

When

Afternoon, late evening, and late night

Why

- Connectivity between South Providence and Downtown
- RIPTA bus routes along corridor
- Schools within the vicinity

16 Total Fatal or Serious Injury Crashes

11 Pedestrian Fatal or Serious Injury Crashes

19.5% Serious Injury Crashes

5.7 Serious Injury Crash Rate (crashes per mile)

82 Total Pedestrian/Bike Crashes

5 Bicycle Serious Injuries

2.8 Miles

29.3 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Install Continental Crosswalk Striping
- Implement No Parking within 25 Feet of Crosswalks
- Sign Clutter
- Coordinate Transit Stop Placement
- Crosswalk Consolidation/ Addition
- Bicycle Lanes (Requires Traffic Analysis)

Long-term

- ADA Pedestrian Compliancy
- Curb Radius Reduction
- Sidewalk Repair/ Replacement
- Roadway Safety Lighting
- Parking Improvements Due to Sight Visibility
- Road Diets (Requires Traffic Analysis)

Chalkstone Avenue

2

Where

LIMITS	Douglas Ave. to Manton Ave.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	8 signalized intersections
LAND USE	Residential
WIDTH	34 feet
PARKING	None
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and Stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing and traveling illegally at intersections

When

Morning commute and lunch time

Why

- Connectivity to Downtown
- VA Hospital
- RIPTA bus routes along corridor
- Institutional campus and various schools within the vicinity

11 Total Fatal or Serious Injury Crashes

6 Pedestrian Fatal or Serious Injury Crashes

26.8% Serious Injury Crashes

4.4 Serious Injury Crash Rate (crashes per mile)

41 Total Pedestrian/Bike Crashes

5 Bicycle Serious Injuries

2.5 Miles

16.4 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Sign Clutter
- Install Continental Crosswalk Striping
- Coordinate Transit Stop Placement
- Restriping

Long-term

- Sidewalk Repair/ Replacement
- ADA Pedestrian Compliancy
- Curb Radius Reduction
- Curb Extensions

North Main Street

3

Where

LIMITS	Chace Ave. to College St.
ROADWAY TYPE	• 2 lanes (one-way northbound) between College St. and Smith St. • 4 lanes divided between Smith St. to Chace Ave.
TRAFFIC CONTROL	13 signalized intersections
LAND USE	Mixed use (Commercial/Retail/ Institutional)
WIDTH	43-92 feet (varies)
PARKING	On-street parallel parking, both sides, between Olney St. and Chace Ave.
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing and traveling illegally at intersections

When

Late night

Why

- Connectivity between East Side and Downtown
- RIPTA bus routes along corridor
- Institutional campuses and various schools within the vicinity

10 Total Fatal or Serious Injury Crashes

7 Pedestrian Fatal or Serious Injury Crashes

30.3% Serious Injury Crashes

4.5 Serious Injury Crash Rate (crashes per mile)

33 Total Pedestrian/Bike Crashes

3 Bicycle Serious Injuries

2.2 Miles

15.0 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Crosswalk Consolidation/ Addition
- Enhanced Signage
- Coordinate Transit Stop Placement
- Install Continental Crosswalk Striping
- Lane Narrowing
- Implement No Parking within 25 Feet of Crosswalks
- Bicycle Lanes (Requires Traffic Analysis)

Long-term

- Sidewalk Repair/ Replacement
- Curb Extensions
- Curb Radius Reduction
- Road Diets (Requires Traffic Analysis)
- Roadway Safety Lighting

Westminster Street

4

Where

LIMITS	Franklin St. to Broadway
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	10 signalized intersections
LAND USE	Mixed use (Commercial/Retail)
WIDTH	40 Feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing and traveling illegally at intersections

When

Morning commute and lunch time

Why

- Connectivity between Olneyville Square and Downtown

10 Total Fatal or Serious Injury Crashes

6 Pedestrian Fatal or Serious Injury Crashes

19.2% Serious Injury Crashes

7.7 Serious Injury Crash Rate (crashes per mile)

52 Total Pedestrian/Bike Crashes

4 Bicycle Serious Injuries

1.3 Miles

40.0 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Restriping
- Install Continental Crosswalk Striping
- Coordinate Transit Stop Placement
- Implement No Parking within 25 Feet of Crosswalks

Long-term

- Sidewalk Repair/ Replacement
- Road Diets (Requires Traffic Analysis)
- Curb Radius Reduction
- Curb Extensions
- ADA Pedestrian Compliancy
- Parking Improvements Due to Sight Visibility

Smith Street

5

Where

LIMITS	North Main St. to Brightwood Ave.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	12 signalized intersections
LAND USE	Mixed use (Commercial/Retail/ Residential)
WIDTH	40 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road user crashes due to vehicles making left and right turns

When

Morning commute and late night

Why

- Connectivity between North Providence and Downtown
- State offices
- Institutional campuses and various schools within the vicinity

9 Total Fatal or Serious Injury Crashes

7 Pedestrian Fatal or Serious Injury Crashes

29% Serious Injury Crashes

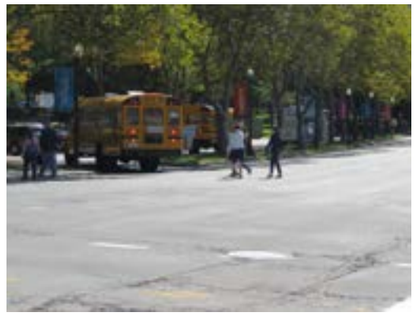
3.6 Serious Injury Crash Rate (crashes per mile)

31 Total Pedestrian/Bike Crashes

2 Bicycle Serious Injuries

2.5 Miles

12.4 Total Crash Rate (crashes per mile)



Countermeasure Solutions

Short-term

- Enhanced Signage
- Crosswalk Consolidation/ Addition
- Install Continental Crosswalk Striping
- Implement No Parking within 25 Feet of Crosswalks
- Bicycle Lanes (Requires Traffic Analysis)
- Coordinate Transit Stop Placement

Long-term

- Sidewalk Repair/ Replacement
- Curb Extensions
- Curb Radius Reduction
- Roadway Safety Lighting
- ADA Pedestrian Compliancy
- Parking Improvements Due to Sight Visibility

6 Washington Street

Where

LIMITS	Memorial Blvd. to Knight St.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	8 signalized intersections
LAND USE	Mixed use (Commercial/Retail)
WIDTH	25-40 feet (varies)
PARKING	On-street parallel parking, both sides between Franklin St. and Dorrance St.
BIKE AMENITIES	Sharrows between Knight St. and Dean St.
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road user crashes due to vehicles making left and right turns

When

Lunch time and late evening

Why

- Connectivity to Kennedy Plaza
- Institutional campuses and various schools within the vicinity

8 Total Fatal or Serious Injury Crashes

4 Pedestrian Fatal or Serious Injury Crashes

19% Serious Injury Crashes

7.3 Serious Injury Crash Rate (crashes per mile)

42 Total Pedestrian/Bike Crashes

4 Bicycle Serious Injuries

1.1 Miles

38.2 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Coordinate Transit Stop Placement
- Install Continental Crosswalk Striping
- Restriping
- Implement No Parking within 25 Feet of Crosswalks

Long-term

- Sidewalk Repair/ Replacement
- Roadway Safety Lighting
- Curb Radius Reduction
- Curb Extensions
- Parking Improvements Due to Sight Visibility
- ADA Pedestrian Compliancy

7 Cranston Street

Where

LIMITS	Fricker St. to Huntington Ave.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	5 signalized intersections
LAND USE	Mixed use (Commercial/ Residential)
WIDTH	56 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Lack of sight visibility for vulnerable road users

When

Evening commute and late evening

Why

- Connectivity between West Side and Downtown
- RIPTA bus routes along corridor

7 Total Fatal or Serious Injury Crashes

4 Pedestrian Fatal or Serious Injury Crashes

23.3% Serious Injury Crashes

5.4 Serious Injury Crash Rate (crashes per mile)

30 Total Pedestrian/Bike Crashes

3 Bicycle Serious Injuries

1.3 Miles

23.1 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Lane Narrowing
- Install Continental Crosswalk Striping
- Coordinate Transit Stop Placement
- Implement No Parking within 25 Feet of Crosswalks
- Restriping

Long-term

- Road Diets (Requires Traffic Analysis)
- Roadway Safety Lighting
- Curb Radius Reduction
- Curb Extensions
- Parking Improvements Due to Sight Visibility
- ADA Pedestrian Compliancy

8 Francis Street

Where

LIMITS	Park Row to Gaspee St.
ROADWAY TYPE	4 lanes undivided
TRAFFIC CONTROL	2 signalized intersections
LAND USE	Mixed use (Retail/Park/ Commuter rail)
WIDTH	50 feet
PARKING	None
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing illegally at signalized intersections

When

Commuter hours and lunch time

Why

- Connectivity between Providence Station and Providence Place Mall

6 Total Fatal or Serious Injury Crashes

5 Pedestrian Fatal or Serious Injury Crashes

29% Serious Injury Crashes

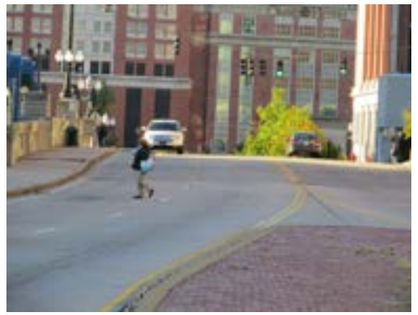
12 Serious Injury Crash Rate (crashes per mile)

21 Total Pedestrian/Bike Crashes

1 Bicycle Serious Injuries

0.5 Miles

42.5 Total Crash Rate (crashes per mile)



Countermeasure Solutions

Short-term

- Enhanced Signage
- Install Continental Crosswalk Striping
- Restriping
- Sign Clutter
- Lane Narrowing
- Coordinate Transit Stop Placement
- Traffic Signal Backplates
- Bicycle Lanes (Requires Traffic Analysis)

Long-term

- Roadway Safety Lighting
- Curb Extensions
- Sidewalk Repair/ Replacement
- Road Diets (Requires Traffic Analysis)
- ADA Pedestrian Compliancy
- Curb Radius Reduction

9 Hope Street

Where

LIMITS	Chace Ave. to Bessie Way
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	12 signalized intersections
LAND USE	Mixed use (Commercial/Retail/ Residential/Institutional)
WIDTH	40 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	Sharrows
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road user crashes due to vehicles making left turns

When

Evening commute

Why

- Connectivity to institutional campuses and various schools within the vicinity

6 Total Fatal or Serious Injury Crashes

3 Pedestrian Fatal or Serious Injury Crashes

19.4% Serious Injury Crashes

2.1 Serious Injury Crash Rate (crashes per mile)

31 Total Pedestrian/Bike Crashes

3 Bicycle Serious Injuries

2.8 Miles

11.1 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Crosswalk Consolidation/ Addition
- Install Continental Crosswalk Striping
- Sign Clutter
- Implement No Parking within 25 Feet of Crosswalks

Long-term

- Flashing Beacons (RRFBS & HAWKS)
- Roadway Safety Lighting
- Curb Radius Reduction
- Curb Extensions
- Parking Improvements Due to Sight Visibility

10

Angell Street

Where

LIMITS	River Rd. to Benefit St.
ROADWAY TYPE	1 lane (one-way westbound)
TRAFFIC CONTROL	8 signalized intersections
LAND USE	Mixed use (Commercial/Retail/ Residential/Institutional)
WIDTH	25 Feet
PARKING	On-street parallel parking, one side
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Limited sight visibility of pedestrians.

When

Late afternoon and evening commute

Why

- Connectivity to institutional campuses and various schools within the vicinity

5 Total Fatal or Serious Injury Crashes

5 Pedestrian Fatal or Serious Injury Crashes

55.6% Serious Injury Crashes

3.3 Serious Injury Crash Rate (crashes per mile)

9 Total Pedestrian/Bike Crashes

0 Bicycle Serious Injuries

1.5 Miles

6.0 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Install Continental Crosswalk Striping
- Implement No Parking within 25 Feet of Crosswalks
- Coordinate Transit Stop Placement
- Lane Narrowing
- Traffic Signal Backplates
- Restriping
- Bicycle Lanes (Requires Traffic Analysis)

Long-term

- Roadway Safety Lighting
- Sidewalk Repair/ Replacement
- Curb Radius Reduction
- Road Diets (Requires Traffic Analysis)
- Flashing Beacons (RRFBS & HAWKS)
- ADA Pedestrian Compliancy
- Parking Improvements Due to Sight Visibility
- Curb Extensions

11

Branch Street

Where

LIMITS	North Main St. to Douglas Ave.
ROADWAY TYPE	• 2 lanes undivided • 4 lanes divided near I-95 ramps
TRAFFIC CONTROL	9 signalized intersections
LAND USE	Mixed use (Commercial/ Residential)
WIDTH	35 feet
PARKING	On-street parallel parking, both sides (not striped)
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road user crossing and traveling illegally at intersections

When

Evening

Why

- Connectivity between residential and commercial businesses

5 Total Fatal or Serious Injury Crashes

1 Pedestrian Fatal or Serious Injury Crashes

20.8% Serious Injury Crashes

2.5 Serious Injury Crash Rate (crashes per mile)

24 Total Pedestrian/Bike Crashes

4 Bicycle Serious Injuries

2.0 Miles

12.0 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Sign Clutter
- Install Continental Crosswalk Striping
- Coordinate Transit Stop Placement
- Implement No Parking within 25 Feet of Crosswalks
- Restriping

Long-term

- Roadway Safety Lighting
- ADA Pedestrian Compliancy
- Sidewalk Repair/ Replacement
- Parking Improvements Due to Sight Visibility

12 Elmwood Avenue

Where

LIMITS	Broad St. to Roger Williams Ave.
ROADWAY TYPE	• TWLTL between Broad St. and Congress Ave. • 4 lanes divided south of Congress Ave.
TRAFFIC CONTROL	11 signalized intersections
LAND USE	Mixed use (Commercial/ Residential)
WIDTH	60 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Pedestrians crossing illegally at intersections

When

Late night

Why

- Connectivity between residential and commercial businesses
- RIPTA bus routes along corridor

5 Total Fatal or Serious Injury Crashes

5 Pedestrian Fatal or Serious Injury Crashes

14.3% Serious Injury Crashes

2.8 Serious Injury Crash Rate (crashes per mile)

35 Total Pedestrian/Bike Crashes

0 Bicycle Serious Injuries

1.8 Miles

19.4 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Install Continental Crosswalk Striping
- Implement No Parking within 25 Feet of Crosswalks
- Crosswalk Consolidation/ Addition
- Coordinate Transit Stop Placement
- Lane Narrowing
- Bicycle Lanes (Requires Traffic Analysis)

Long-term

- Roadway Safety Lighting
- Sidewalk Repair/ Replacement
- Parking Improvements Due to Sight Visibility
- Road Diets (Requires Traffic Analysis)
- Curb Extensions
- ADA Pedestrian Compliancy
- Curb Radius Reduction

13 Manton Avenue

Where

LIMITS	San Souci Dr. to Chalkstone Ave.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	3 signalized intersections
LAND USE	Mixed use (Commercial/ Residential/Schools)
WIDTH	37 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing and traveling illegally at intersections

When

Late evening

Why

- Connectivity between residential, schools, and commercial businesses
- Connectivity between residential and Olneyville Square

5 Total Fatal or Serious Injury Crashes

3 Pedestrian Fatal or Serious Injury Crashes

16.1% Serious Injury Crashes

2.8 Serious Injury Crash Rate (crashes per mile)

31 Total Pedestrian/Bike Crashes

2 Bicycle Serious Injuries

1.8 Miles

17.2 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Crosswalk Consolidation/ Addition
- Install Continental Crosswalk Striping
- Coordinate Transit Stop Placement
- Implement No Parking within 25 Feet of Crosswalks
- Restriping

Long-term

- Roadway Safety Lighting
- Curb Extensions
- Curb Radius Reduction
- ADA Pedestrian Compliancy
- Flashing Beacons (RRFBS & HAWKS)
- Sidewalk Repair/ Replacement

14 Allens Avenue

Where

LIMITS	Eddy St. to New York Ave.
ROADWAY TYPE	4 lanes undivided
TRAFFIC CONTROL	8 signalized intersections
LAND USE	Mixed use (Commercial/ Industrial)
WIDTH	60 feet
PARKING	None
BIKE AMENITIES	Bike lane, both directions
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road user crashes due to vehicles making right turns

When

Lunch time

Why

- Connectivity between the City of Cranston and Downtown

4 Total Fatal or Serious Injury Crashes

2 Pedestrian Fatal or Serious Injury Crashes

44.4% Serious Injury Crashes

2.4 Serious Injury Crash Rate (crashes per mile)

9 Total Pedestrian/Bike Crashes

2 Bicycle Serious Injuries

1.7 Miles

5.3 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Install Continental Crosswalk Striping
- Sign Clutter
- Lane Narrowing
- Coordinate Transit Stop Placement
- Crosswalk Consolidation/ Addition
- Restriping

Long-term

- Road Diets (Requires Traffic Analysis)
- Curb Radius Reduction
- Flashing Beacons (RRFBS & HAWKS)
- Curb Extensions
- ADA Pedestrian Compliancy
- Sidewalk Repair/ Replacement

15 Pine Street

Where

LIMITS	Broad St. to Dyer St.
ROADWAY TYPE	1 lane (one-way westbound)
TRAFFIC CONTROL	3 signalized intersections
LAND USE	Mixed use (Commercial/ Industrial)
WIDTH	25 feet
PARKING	On-street parallel parking, one side
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Pedestrians crossing illegally at intersections

When

Late night

Why

- Connectivity between Institutional campuses and various schools within the vicinity
- Parking garages and lots
- Late night bars and night clubs which close at 2 a.m.

4 Total Fatal or Serious Injury Crashes

4 Pedestrian Fatal or Serious Injury Crashes

44.4% Serious Injury Crashes

5.7 Serious Injury Crash Rate (crashes per mile)

9 Total Pedestrian/Bike Crashes

0 Bicycle Serious Injuries

0.7 Miles

12.9 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Restriping
- Install Continental Crosswalk Striping
- Lane Narrowing
- Implement No Parking within 25 Feet of Crosswalks

Long-term

- Roadway Safety Lighting
- Curb Extensions
- Curb Radius Reduction
- ADA Pedestrian Compliancy
- Parking Improvements Due to Sight Visibility
- Hardscape Pedestrian Barrier

Steeple Street & Memorial Boulevard

16

Where

LIMITS	Intersection of Memorial/Steeple
ROADWAY TYPE	• 1 lane (one-way eastbound) • 4 lanes divided
TRAFFIC CONTROL	Signalized
LAND USE	Office
WIDTH	60 feet
PARKING	None
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing and traveling illegally at the signalized intersection

When

Lunch time and late night

Why

- Connectivity between East Providence and Downtown

4
Total Fatal or Serious Injury Crashes

2
Pedestrian Fatal or Serious Injury Crashes

80%
Serious Injury Crashes

5.7
Serious Injury Crash Rate (crashes per mile)

5
Total Pedestrian/Bike Crashes

2
Bicycle Serious Injuries

0.8
Miles

12.9
Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Lane Narrowing
- Install Continental Crosswalk Striping
- Sign Clutter
- Restriping

Long-term

- Hardscape Pedestrian Barrier
- Curb Extensions
- Road Diets (Requires Traffic Analysis)
- Radar Speed Display Sign/ Portable Speed Trailer
- ADA Pedestrian Compliancy

Douglas Avenue

17

Where

LIMITS	Hazael St. to Orms St.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	4 signalized intersections
LAND USE	Residential
WIDTH	50 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Pedestrians crossing illegally at intersections

When

Morning commute and late night

Why

- Connectivity between North Providence and Downtown
- Institutional campuses and various schools within the vicinity

4 Total Fatal or Serious Injury Crashes

4 Pedestrian Fatal or Serious Injury Crashes

18.2% Serious Injury Crashes

2.1 Serious Injury Crash Rate (crashes per mile)

22 Total Pedestrian/Bike Crashes

0 Bicycle Serious Injuries

1.9 Miles

11.6 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Enhanced Signage
- Install Continental Crosswalk Striping
- Sign Clutter
- Coordinate Transit Stop Placement
- Lane Narrowing
- Implement No Parking within 25 Feet of Crosswalks
- Restriping
- Bicycle Lanes (Requires Traffic Analysis)

Long-term

- Sidewalk Repair/ Replacement
- Curb Radius Reduction
- Roadway Safety Lighting
- Curb Extensions
- ADA Pedestrian Compliancy

18 Hartford Avenue

Where

LIMITS	Plainfield St. to Killingly St.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	6 signalized intersections
LAND USE	Mixed use (Commercial/ Residential)
WIDTH	37 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road user crashes due to vehicles making left and right turns

When

Late Afternoon

Why

- Connectivity to Downtown and Olneyville Square from Town of Johnston
- RIPTA bus routes along corridor

4 Total Fatal or Serious Injury Crashes

2 Pedestrian Fatal or Serious Injury Crashes

16% Serious Injury Crashes

3.1 Serious Injury Crash Rate (crashes per mile)

25 Total Pedestrian/Bike Crashes

2 Bicycle Serious Injuries

1.3 Miles

19.2 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Install Continental Crosswalk Striping
- Enhanced Signage
- Coordinate Transit Stop Placement
- Restriping
- Implement No Parking within 25 Feet of Crosswalks

Long-term

- Flashing Beacons (RRFBS & HAWKS)
- Road Diets (Requires Traffic Analysis)
- Curb Extensions
- Sidewalk Repair/ Replacement
- Curb Radius Reduction
- ADA Pedestrian Compliancy
- Parking Improvements Due to Sight Visibility

19 Admiral Street

Where

LIMITS	Charles St. to Gentian St.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	5 signalized intersections
LAND USE	Mixed use (Residential/Retail/ Institutional)
WIDTH	36 feet
PARKING	On-street parallel parking, both sides (not striped)
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Lack of visibility for pedestrians

When

Evening commute and late night

Why

- Connectivity to institutional campuses
- RIPTA bus routes along corridor

3 Total Fatal or Serious Injury Crashes

3 Pedestrian Fatal or Serious Injury Crashes

33.3% Serious Injury Crashes

1.6 Serious Injury Crash Rate (crashes per mile)

9 Total Pedestrian/Bike Crashes

0 Bicycle Serious Injuries

1.9 Miles

4.7 Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Install Continental Crosswalk Striping
- Coordinate Transit Stop Placement
- Sign Clutter
- Enhanced Signage
- Implement No Parking within 25 Feet of Crosswalks

Long-term

- Roadway Safety Lighting
- Sidewalk Repair/ Replacement
- ADA Pedestrian Compliancy
- Flashing Beacons (RRFBS & HAWKS)
- Curb Extensions
- Curb Radius Reduction
- Parking Improvements Due to Sight Visibility

Dorrance Street

20

Where

LIMITS	Washington St. to Clifford St.
ROADWAY TYPE	2 lanes undivided
TRAFFIC CONTROL	7 signalized intersections
LAND USE	Commercial
WIDTH	40 feet
PARKING	On-street parallel parking, both sides
BIKE AMENITIES	None
PEDESTRIAN AMENITIES	• Striped and stamped crosswalks • Signalized crossings with pedestrian countdown heads and push buttons • Sidewalks on both sides • Wheelchair ramps

What

Vulnerable road users crossing and traveling illegally at signalized intersections

When

Early afternoon and evening commute

Why

- Connectivity to Providence City Hall, Kennedy Plaza, and Burnside Park
- Institutional campuses within the vicinity

3	3	17.6%	7.5
Total Fatal or Serious Injury Crashes	Pedestrian Fatal or Serious Injury Crashes	Serious Injury Crashes	Serious Injury Crash Rate (crashes per mile)
17	0	0.4	42.5
Total Pedestrian/Bike Crashes	Bicycle Serious Injuries	Miles	Total Crash Rate (crashes per mile)

Countermeasure Solutions

Short-term

- Traffic Signal Backplates
- Install Continental Crosswalk Striping
- Restriping
- Coordinate Transit Stop Placement
- Sign Clutter
- Enhanced Signage
- Implement No Parking within 25 Feet of Crosswalks

Long-term

- Roadway Safety Lighting
- Sidewalk Repair/ Replacement
- ADA Pedestrian Compliancy
- Curb Extensions
- Curb Radius Reduction
- Parking Improvements Due to Sight Visibility