Hampton Roads Regional Safety Study

2023 Update





MAY 2024

HAMPTON ROADS TPO

T24-02

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HAMPTON ROADS REGIONAL SAFETY STUDY

2023 UPDATE

PREPARED BY:

HAMPTON ROADS TPO

MAY 2024

T24-02

TITLE:
Hampton Roads Regional Safety Study – 2023 Update

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ABSTRACT

There were a total of 26,170 crashes in Hampton Roads in 2021 – an average of 72 crashes every day throughout the year, or one crash in the region every 20 minutes. These crashes resulted in tens of millions of dollars of damage, over 16,000 injuries, and 179 lives lost. These crashes have a wide range of impacts, not only on the transportation system, but also on families, friends, and society as a whole. Because of these impacts, roadway safety is a priority in the metropolitan transportation planning process.

This report is an update to the previous Hampton Roads Regional Safety Study released by the HRTPO in 2001 and 2014. This report, which is designed to meet the eligibility requirements for a Comprehensive Safety Action Plan in the Safe Streets and Roads for All (SS4A) federal program, includes sections related to regional safety trends, crash characteristics, crash locations, efforts to improve roadway safety, general crash countermeasures, an in-depth analysis of high crash locations, and next steps. The study also includes a vision, mission, and goal for safety in the region.

REPORT DATE:
May 2024

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ACKNOWLEDGMENTS

This document was prepared by the Hampton Roads Transportation Planning Organization (HRTPO) in cooperation with the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Virginia Department of Transportation (VDOT), Virginia Department of Rail and Public Transportation (DRPT), and the local jurisdictions and transit agencies within the Hampton Roads metropolitan planning area. The contents of this report reflect the views of the HRTPO. The HRTPO staff is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, FTA, VDOT or DRPT. This report does not constitute a standard, specification, or regulation. FHWA, FTA, VDOT or DRPT acceptance of this report as evidence of fulfillment of the objectives of this program does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

NON-DISCRIMINATION

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ACKNOWLEDGEMENTS

HRTPO staff would like to thank the following people that supported and enhanced this effort through their participation on the Regional Safety Study Working Group:

- Dorian Allen – City of Norfolk
- Demaris Braswell – City of Newport News
- Mitzi Crystal – Virginia Department of Transportation
- Karen Davis – Williamsburg Area Transit Authority
- Keith Darrow – City of Norfolk
- Matthew Davenport – Virginia Department of Transportation
- Troy Eisenberger – City of Chesapeake
- Valerie Henchel – City of Virginia Beach
- Carl Jackson – City of Portsmouth
- Dwight Jenkins – Virginia Department of Motor Vehicles
- Ric Lowman – City of Virginia Beach
- Tracy Jones-Schoenfeld – City of Chesapeake
- Jim McElligott – City of Virginia Beach Police (retired)
- Nathan Milaszewski – Virginia Department of Transportation
- Carol Rizzio – Gloucester County
- Lisa Simpson – City of Newport News
- Jason Souders – City of Suffolk
- Eric Stringfield – Virginia Department of Transportation
- Robert Weber – City of Suffolk

INTRODUCTION

There were a total of 26,170 crashes in Hampton Roads in 2021 – an average of 72 crashes every day throughout the year, or one crash in the region every 20 minutes. These crashes resulted in tens of millions of dollars of damage, over 16,000 injuries, and 179 lives lost. These crashes have a wide range of impacts, not only on the transportation system, but also on families, friends, and society as a whole.

Because of these impacts, roadway safety has been a priority in the state and metropolitan transportation planning processes. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) aimed for a transportation system that provides safe and efficient mobility and accessibility. In 1998, the Transportation Equity Act for the 21st Century (TEA-21) required that Metropolitan Planning Organizations (MPOs) incorporate safety and security as a priority factor in their metropolitan planning process. Safety planning also continued as a priority under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which established the Highway Safety Improvement Program (HSIP) as a core Federal-aid program in 2005.

In 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) made safety the U.S. Department of Transportation's number one priority throughout all transportation planning efforts. In 2015, the Fixing America's Surface Transportation (FAST) Act was enacted that increased funding for highway safety until the program and extensions expired in 2021.

In November 2021, President Biden signed the Infrastructure Investment and Jobs Act (IIJA) into law, which is making historic investments in various transportation sectors, including roadway safety. In addition to providing additional funding for the existing Highway Safety Improvement Program (HSIP), the IIJA established a new federal discretionary safety program called the Safe Streets and Roads for All (SS4A) program. The SS4A program provides an additional $5 billion to fund projects and activities through grants submitted by MPOs, cities and counties, transit agencies, or tribal governments.

FIGURE 1 - HRTPO SAFETY PLANNING EFFORTS

The Hampton Roads Transportation Planning Organization (HRTPO) initiated its regional roadway safety planning efforts with the *Hampton Roads Regional Safety Study* in 2001. This comprehensive three-part report examined general crash data and trends on a regional and jurisdictional level, the locations of crashes on Interstates and at arterial intersections throughout the region, and crash countermeasures for high crash locations.

Based on the work completed in the *Hampton Roads Regional Safety Study*, HRTPO staff expanded its safety planning efforts to the rural areas of the region. The 2006 *Hampton Roads Rural Safety Study* comprehensively examined roadway safety in those Hampton Roads communities outside of the metropolitan planning area, including Franklin, Gloucester County, Southampton County, and Surry County.

The *Hampton Roads Regional Safety Study – 2013/2014 Update* provided the first full update to the original Hampton Roads Regional Safety Study. This study was released in two parts. Part I of the study introduced previous HRTPO safety planning efforts, reported the recent trends in roadway safety in Hampton Roads, detailed the characteristics of crashes in Hampton Roads, and specified the number and rate of crashes for each mile of freeway and approximately 600 of the busiest intersections throughout the region. Part II of the study built upon the results of Part I by investigating ways to improve roadway safety. This included efforts to improve roadway safety, described the new Potential for Safety Improvement metric, highlighted general crash countermeasures, and investigated countermeasures for high crash locations.

This *Hampton Roads Regional Safety Study – 2023 Update* provides another full update to the Hampton Roads Regional Safety Study, and is designed to meet the eligibility requirements for a Comprehensive Safety Action Plan in the SS4A program. Most of the topics included in this update are similar to those included in the Regional Safety Study – 2013/2014 Update, while incorporating new information and methodologies. This Regional Safety Study update includes the following sections:

- **Introduction**
- **Vision, Mission, and Goal –** A successful comprehensive safety action plan includes a Vision, Mission, and Goal(s). The Vision, Mission, and Goal of the Hampton Roads Regional Safety Study Update are discussed in this section.
- **Regional Safety Trends** – This section highlights trends in traffic crashes in Hampton Roads and includes information related to injuries and fatalities resulting from traffic crashes. Crash data for each Hampton Roads jurisdiction is included, and comparisons with other metropolitan areas in Virginia are also examined.
- **Crash Characteristics** – This section looks at the characteristics of crashes, injuries and fatalities in Hampton Roads. Examples include crash types, driver actions, alcohol usage, speeding, and distracted driving.
- **Crash Locations** – This section examines the locations of crashes, injuries, and fatalities on the Hampton Roads roadway system. Details are provided on how the crash data was collected and analyzed. The number of crashes for each location is shown, as is the rate based on the severity of crashes and the exposure to crashes.
- **Efforts to Improve Roadway Safety –** There are a number of national, statewide, and local efforts to improve roadway safety. This section describes categories for improving roadway safety and provides examples of ongoing initiatives including the Highway Safety Improvement Program (HSIP), the Virginia Strategic Highway Safety Plan (SHSP), the VDOT Pedestrian Safety Action Plan (PSAP), and other safety programs and educational efforts.

- **Equity Analysis –** Equity is the fair inclusion into a society in which all can participate, prosper, and reach their full potential. In recent years, planning with an equity lens has been put to the forefront at the federal level, and one of the essential activities under the SS4A Grant Program is the inclusion of equity considerations.
- **General Crash Countermeasures** – A wide range of countermeasures exist to address both general and specific roadway safety problems. A description of these various crash countermeasures is included, as are other general strategies to improve roadway safety. Crash modification factors are also described and included.
- **High Crash Locations –** Based on the analysis of crash locations, a number of locations throughout Hampton Roads are identified for further study. This section provides a detailed safety analysis for the top intersections in each Hampton Roads locality. Collision diagrams, summaries of crash characteristics at each location, site observations and possible causes, and expected benefits are included.
- **Safety Survey –** As part of the study, a public survey was conducted regarding regional roadway safety that included nearly 1,500 responses. This section highlights the findings from that survey.
- **Summary and Next Steps –** This section summarizes the study and details how the information included in this report will be used in upcoming transportation planning efforts.
- **Appendices** – The appendices include detailed crash data and maps for each Hampton Roads jurisdiction.

As part of this study, a task force was formed to assist with the development and implantation of the plan. Members of the Regional Safety Study Working Group include engineers and planners from cities and counties throughout the region, VDOT staff, Virginia Department of Motor Vehicles (DMV) staff, and local police.

This study is designed to meet the eligibility requirements for a Comprehensive Safety Action Plan in the SS4A program. Those requirements include:

- Leadership commitment and goal setting
- Planning structure for oversight of plan development, implementation, and monitoring
- A safety analysis of existing conditions and historical trends, particularly for fatalities and serious injuries.
- Engagement and collaboration with the public and relevant stakeholders
- Equity considerations
- Policy and process changes that assess current policies, plans, guidelines, and standards
- Identifying projects and strategies to address safety problems
- Measuring progress after the plan is developed

More information on these eligibility requirements is included in the Safety Funding - SS4A section of this report.

VISION, MISSION, AND GOAL

A successful comprehensive safety action plan includes a Vision, Mission, and Goal(s).

The Vision, Mission, and Goal of the Hampton Roads Regional Safety Study Update are shown in the box to the right. The Vision, Mission, and Goal were agreed to by the working group formed for this study as described earlier in this report.

The Vision and Mission of the Hampton Roads Regional Safety Study are similar to the Vision established in the Virginia Strategic Highway Safety Plan (SHSP), which is described further in this report. However, the Regional Safety Study Working Group recommended that "motor vehicle crashes" in the Vision be changed to "crashes" in order to clarify that this represents all crashes and not just those only involving motor vehicles.

The Goal of the Hampton Roads Regional Safety Study matches the target that has been established by the HRTPO for Federal Performance Targets. More information on this target is described on HRTPO's Regional Performance Measures and Targets page at https://www.hrtpo.org/554/Regional-Performance-Measures-Targets.

HAMPTON ROADS REGIONAL SAFETY STUDY VISION, MISSION, AND GOAL

VISION

"TOWARDS ZERO DEATHS AND SERIOUS INJURIES FROM CRASHES SO THAT ALL ROADS USERS ARRIVE SAFELY AT THEIR DESTINATION."

MISSION

"TO FULFILL THE VISION THROUGH A COLLABORATIVE, DATA-DRIVEN, MULTIMODAL AND SAFE SYSTEM APPROACH THAT INCORPORATES ACTIONS FROM THE FOUR ES OF ROAD SAFETY—ENFORCEMENT, EDUCATION, ENGINEERING, AND EMERGENCY RESPONSE AND MEDICAL SERVICES TO ACHIEVE SAFE TRAVEL FOR EVERYONE."

GOAL

"TO REDUCE FATALITIES AND SERIOUS INJURIES TO ZERO BY 2050, THE HORIZON OF THE UPCOMING HAMPTON ROADS LONG-RANGE TRANSPORTATION PLAN."

Regional Safety Trends

This section examines the number and rate of crashes, injuries, and fatalities in Hampton Roads, and how they compare to recent trends and the levels seen in other urban areas in Virginia.

Crashes

There were 26,170 reportable crashes[1] in Hampton Roads in 2021 according to data obtained from the Virginia Department of Motor Vehicles (DMV) – an average of 72 crashes every day throughout the year, or one crash throughout the region every 20 minutes.

The number of crashes in Hampton Roads had been increasing in the second half of last decade, as shown in **Figure 2**. However, the number of crashes in the region dropped by 11% in 2020 due to the impacts of the pandemic. The 2021 crash levels, however, were nearly equal to the number experienced in the region prior to the pandemic in 2019.

The regional crash rate, in terms of the number of crashes that occurred compared to the amount of roadway travel, increased over the last decade. In 2021, there were 1.87 crashes for every million vehicle-miles of travel (VMT) in Hampton Roads. This crash rate is up 7.7% from the 1.74 crashes per million VMT that occurred in the region in 2012 (**Figure 3**).

The crash rate in Hampton Roads is higher than the crash rates experienced in other metropolitan areas throughout the state. As shown in **Figure 4** on page 6, the Hampton Roads 2021 crash rate of 1.87 crashes per million VMT is higher than the crash rate in the

[1] Crashes are defined by the Virginia Department of Motor Vehicles as being reportable if the crash involves a fatality, injury, or estimated property damage of at least $1,500.

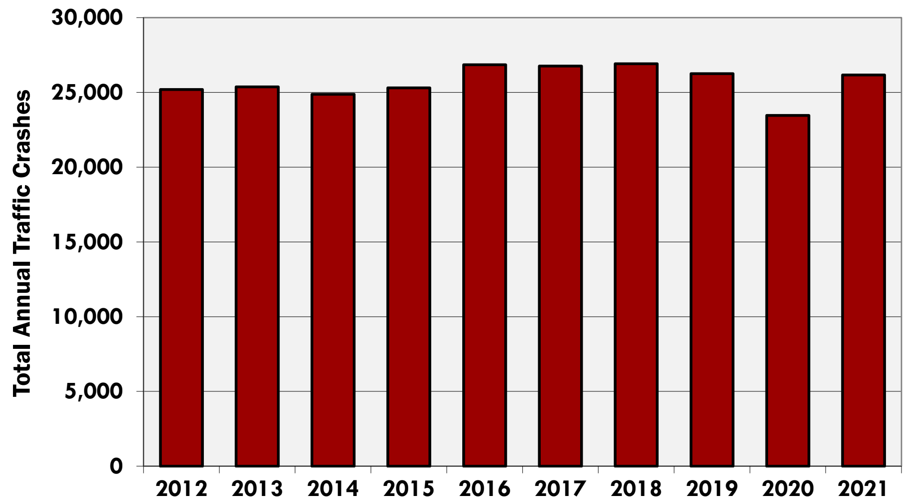


Figure 2 - Hampton Roads Annual Traffic Crashes, 2012-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.
A reported traffic crash includes all crashes on public roadways that involve a fatality, injury, or estimated property damage of at least $1,500 according to the DMV.

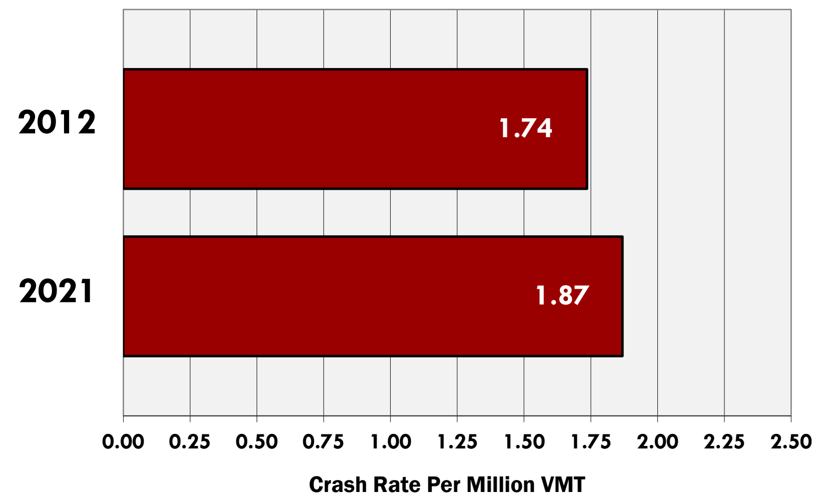


Figure 3 – Hampton Roads Traffic Crash Rates, 2012 and 2021

Source: HRTPO analysis of Virginia DMV and VDOT data.

Northern Virginia area (1.41 crashes per million VMT), the Richmond area (1.63), and the Roanoke area (1.70).

Figure 5 shows the number of crashes and the crash rates for each jurisdiction in Hampton Roads in 2021. Virginia Beach had the most crashes in Hampton Roads in 2021 (5,805), followed by Norfolk (4,399), Hampton (3,518), and Newport News (3,393).

In terms of crash rates, Hampton (2.86 crashes per million vehicle-miles of travel) was the locality that had the highest crash rate in the region in 2021. The localities with the next highest crash rates in the region were Portsmouth (2.72), Poquoson (2.44), Norfolk (2.34) and Virginia Beach (2.25).

The lowest crash rates in the region were generally found in more rural areas. The lowest rate in the region was in Southampton County, at 0.54 crashes per million vehicle-miles of travel in 2021. The next lowest crash rates in the region were in Gloucester County (0.98), Chesapeake (1.02), James City County (1.21) and York County (1.26).

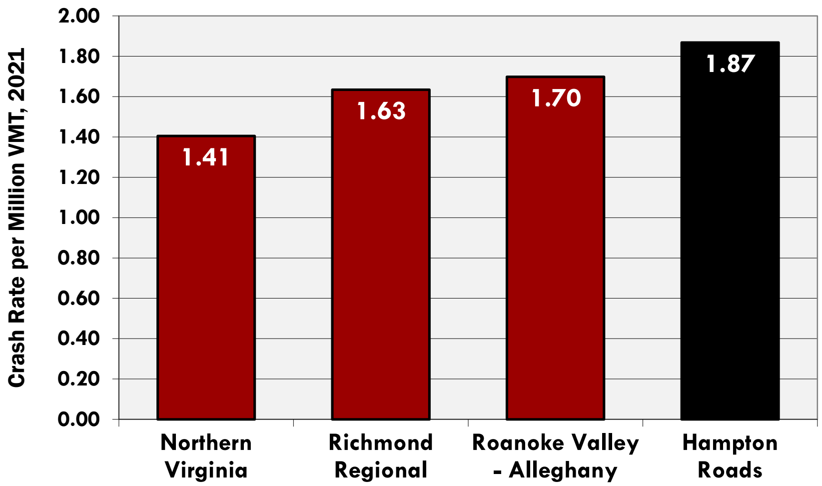


FIGURE 4 – CRASH RATES IN VIRGINIA METROPOLITAN AREAS, 2021

Source: HRTPO analysis of Virginia DMV and VDOT data.

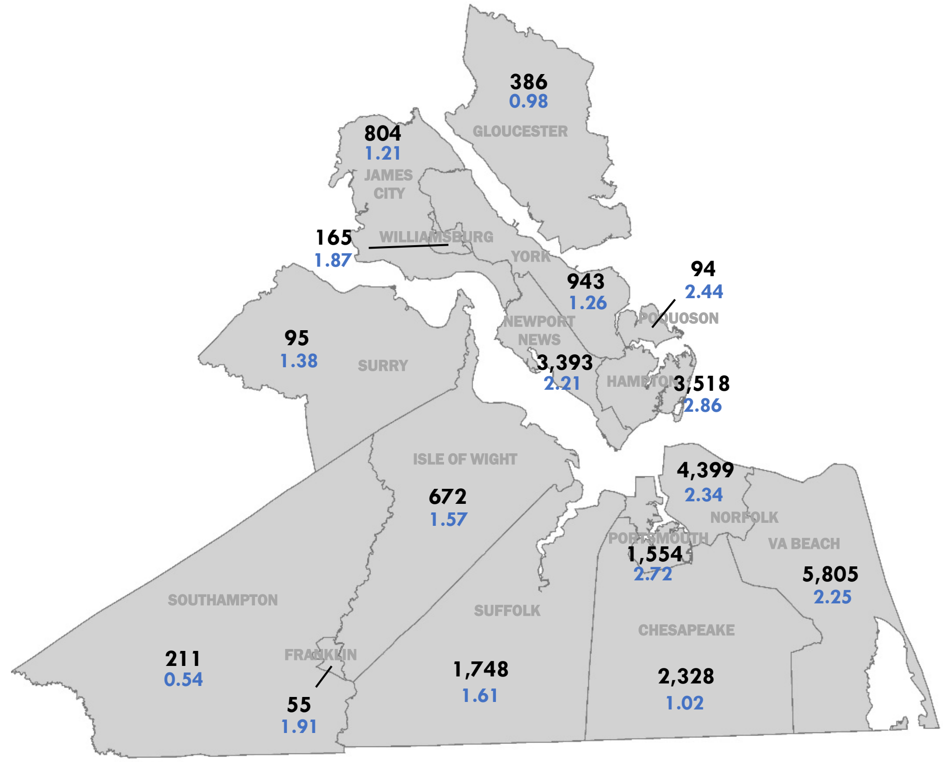


FIGURE 5 – TRAFFIC CRASHES AND RATES BY JURISDICTION, 2021

Source: HRTPO analysis of Virginia DMV and VDOT data. Rates are per one million VMT.

Figure 6 shows the change in the number of crashes in each jurisdiction over the last decade. Eight localities in Hampton Roads experienced a decrease in crashes from 2012 to 2021, and eight experienced an increase.

The locality that experienced the largest decrease in crashes from 2012 to 2021 was Franklin, at -37%. This is followed by Poquoson (-14%), Surry County (-11%), and Virginia Beach (-10%).

Isle of Wight County experienced the largest increase in crashes from 2012 to 2021 at +51%, followed by Hampton (+23%), Suffolk (+20%) and Newport News (+11%).

Appendix A includes annual crash data for each Hampton Roads jurisdiction dating back to 2000.

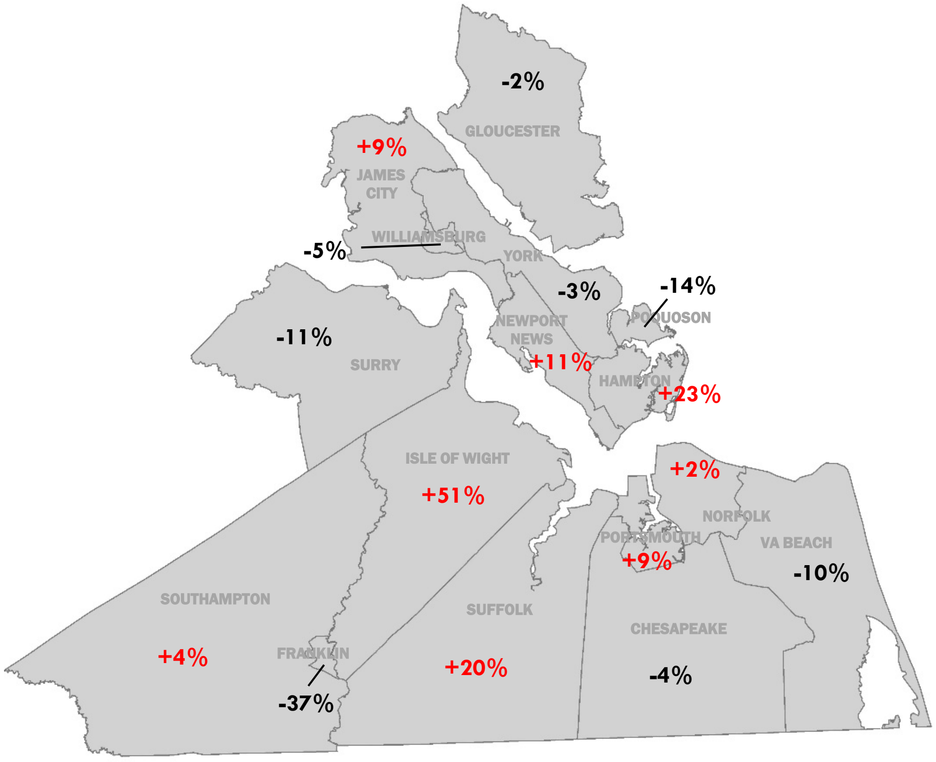


FIGURE 6 – CHANGE IN THE NUMBER OF CRASHES BY JURISDICTION, 2012 TO 2021

Source: HRTPO analysis of Virginia DMV data.

INJURIES

There were 16,531 injuries[2] that resulted from traffic crashes in Hampton Roads in 2021 – an average of 45 injuries throughout the region every day, or one injury every 32 minutes.

The number of injuries resulting from crashes in Hampton Roads had been increasing in the second half of last decade, as shown in **Figure 7**. However, similar to the trend in crashes, the number of injuries in the region decreased during the pandemic but nearly returned to pre-pandemic levels in 2021.

The regional crash injury rate, in terms of the number of injuries that resulted from traffic crashes compared to the amount of roadway travel, also increased over the last decade. In 2021, there were 1.18 traffic crash injuries for every million vehicle-miles of travel (VMT) in Hampton Roads. This injury rate increased 14% from 1.04 injuries per million VMT in the region in 2012 (**Figure 8**).

The traffic crash injury rate in Hampton Roads is higher than the rates experienced in other metropolitan areas throughout the state. As shown in **Figure 9** on page 9, Hampton Roads 2021 traffic crash injury rate of 1.18 injuries per million VMT was significantly higher than the rates experienced in the Northern Virginia (0.65), Roanoke (0.66), and Richmond areas (0.72).

The severity of crashes are classified based on the KABCO scale. The KABCO scale represents the following based on the most severe injury experienced in the crash:

- **K** – At least one fatality occurred in the crash

[2] Injuries in traffic crashes that result in no fatalities within 30 days of the crash according to DMV.

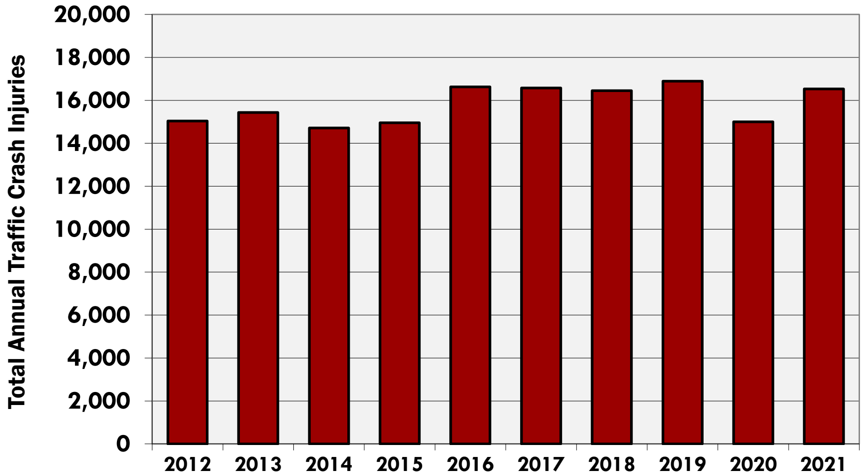


FIGURE 7 – HAMPTON ROADS ANNUAL TRAFFIC CRASH INJURIES, 2012-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.
Data includes all injuries in traffic crashes that result in no fatalities within 30 days of the crash according to the DMV.

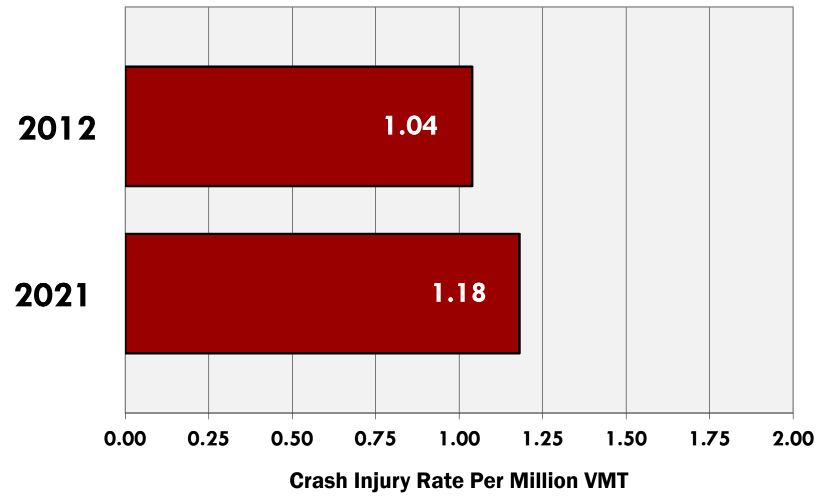


FIGURE 8 – HAMPTON ROADS TRAFFIC CRASH INJURY RATES, 2012 AND 2021

Source: HRTPO analysis of Virginia DMV and VDOT data.

- **A** – At least one person in the crash suffered an incapacitating injury
- **B** – At least one person in the crash experienced a non-incapacitating injury
- **C** – At least one person with a possible injury
- **O** – Crashes that involve property damage only

Figure 10 shows the breakdown of injuries by severity for Hampton Roads for the year 2021, excluding those crashes that involved fatalities. Of the 16,531 injuries that were suffered in the region in 2021, 1,835 injuries (11%) are classified as A - Incapacitating injuries. Another 6,925 injuries (42%) are classified as B - Non-incapacitating injuries, and the remaining 7,771 injuries (47%) are classified as C - Possible injuries.

By comparison, back in 2012 the regional injuries by severity were 17% were classified as A - Incapacitating injuries, 41% were B - Non-incapacitating injuries, and the remaining 42% were C - Possible injuries.

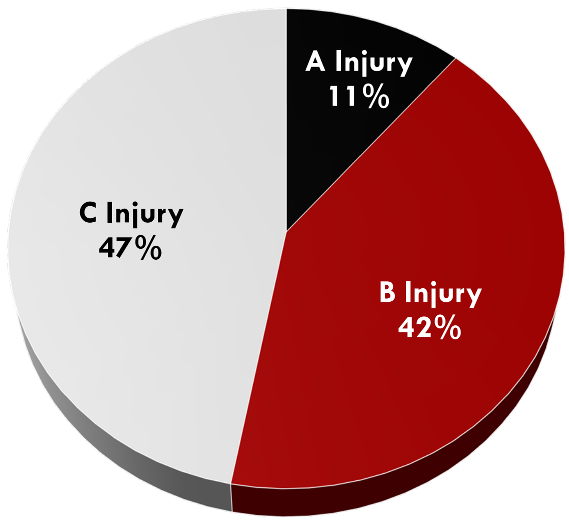


FIGURE 10 – INJURIES IN HAMPTON ROADS BY SEVERITY, 2021

Source: HRTPO analysis of Virginia DMV data.

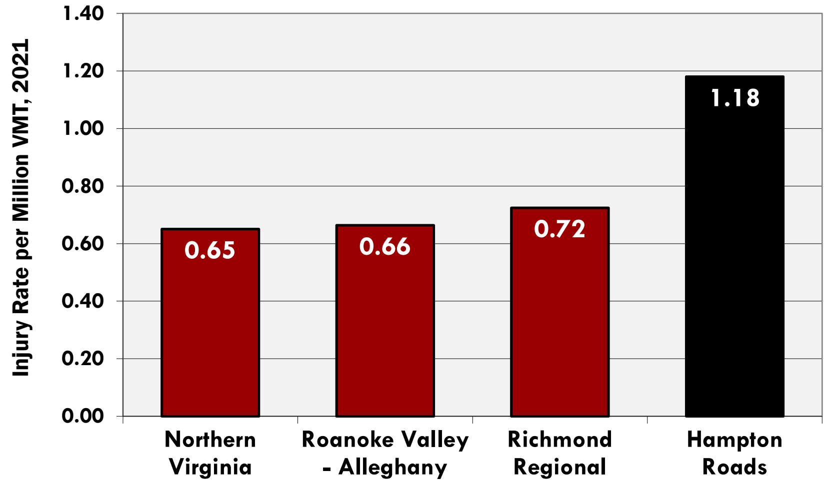


FIGURE 9 – INJURY RATES IN VIRGINIA METROPOLITAN AREAS, 2021

Source: HRTPO analysis of Virginia DMV and VDOT data.

Figure 11 shows the number of injuries resulting from traffic crashes and the crash injury rates in 2021 for each jurisdiction in Hampton Roads. Hampton had the most injuries (3,676) in Hampton Roads in 2021, followed by Virginia Beach (2,906), Norfolk (2,253), Newport News (1,928), and Chesapeake (1,484).

The City of Poquoson had the highest rate of injuries in the region in 2021, at 3.06 injuries per million vehicle-miles of travel. This is followed by the City of Hampton (2.99 injuries per million vehicle-miles of travel), Portsmouth (1.94), Franklin (1.42), and Newport News (1.25). The lowest crash injury rates occurred in Southampton County (0.42), Isle of Wight County (0.54), York County (0.54), Gloucester County (0.60) and Chesapeake (0.65).

Appendix A includes annual traffic crash injury data for each Hampton Roads jurisdiction dating back to 2000.

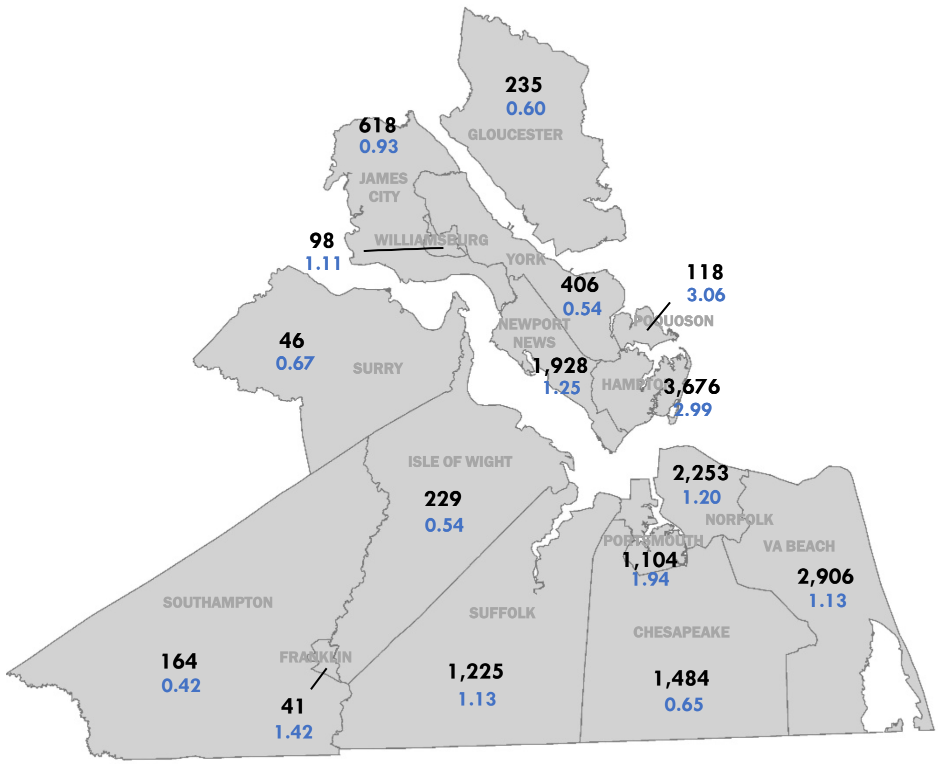


FIGURE 11 – CRASH INJURIES AND RATES BY JURISDICTION, 2021

Source: HRTPO analysis of Virginia DMV and VDOT data. Rates are per one million VMT.

FATALITIES

There were 179 fatalities[3] that resulted from traffic crashes in Hampton Roads in 2021 – an average of one fatality every other day throughout the region.

The number of fatalities in Hampton Roads has, unfortunately, risen over the last decade. As shown in **Figure 12**, there were more fatalities in Hampton Roads in 2021 than in any other year since at least 1994, and there were 80 more fatalities in the region in 2021 than in 2012. Unlike the number of crashes and injuries, the number of fatalities in the region did not decrease during the pandemic in 2020.

Because of the variability in the number of fatalities that occur in any given year, most analyses of fatalities include a longer period of time than one year. The fatality data included in this section is shown in three-year intervals.

The total number of fatalities increased 37% in Hampton Roads between the 2010-2012 period and the 2019-2021 period. The regional crash fatality rate increased as well. In 2019-2021, there were 1.11 fatalities for every 100 million vehicle-miles of travel (VMT) in Hampton Roads. This represents a 38% increase from 0.81 fatalities per 100 million VMT in the region in 2010-2012 (**Figure 13**).

As shown in **Figure 14** on page 12, Hampton Roads crash fatality rate of 1.11 fatalities per 100 million VMT in 2019-2021 is higher than the fatality rate in the Richmond area (1.02) and lower than the fatality rate in the Roanoke area (1.23). However, the crash fatality

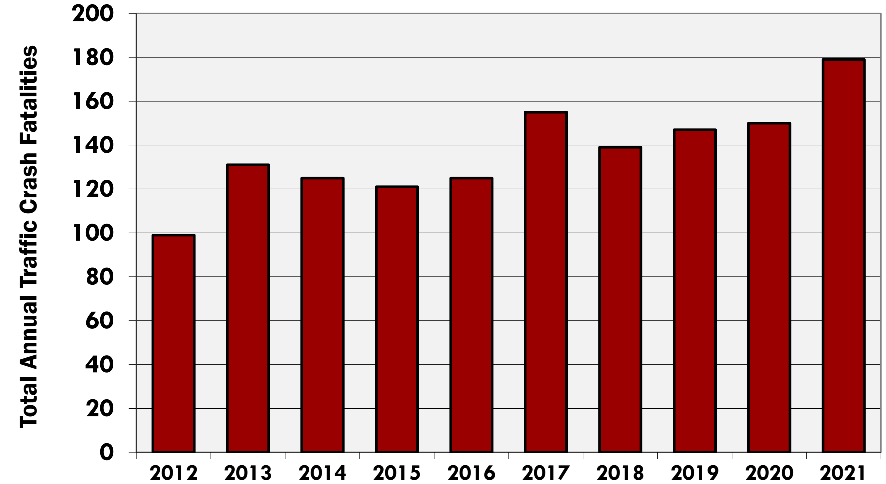


FIGURE 12 – HAMPTON ROADS ANNUAL TRAFFIC CRASH FATALITIES, 2012-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.
Data includes all fatalities in traffic crashes that occur within 30 days of the crash according to the DMV.

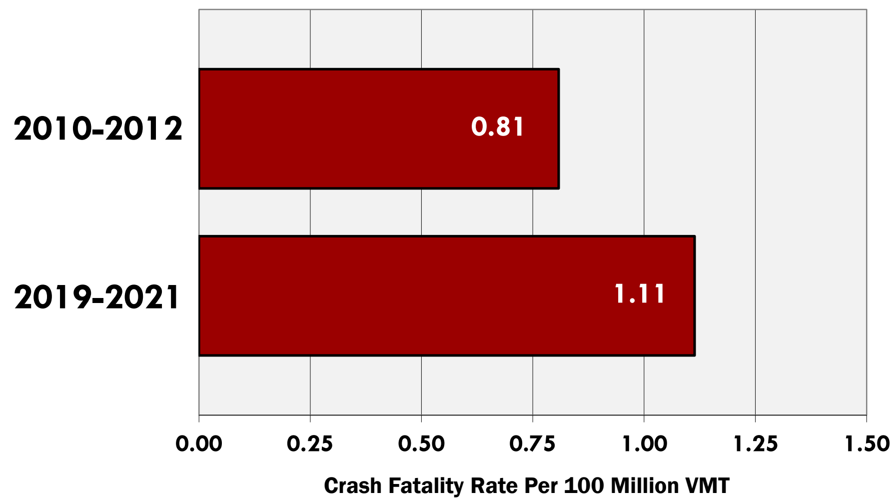


FIGURE 13 – HAMPTON ROADS TRAFFIC CRASH FATALITY RATES, 2010-2012 AND 2019-2021

Source: HRTPO analysis of Virginia DMV and VDOT data.

[3] Fatalities resulting from traffic crashes within 30 days of the crash according to the DMV.

rate in Northern Virginia (0.52) is less than half the fatality rate seen in Hampton Roads.

Figure 15 shows the average number of annual fatalities and the average crash fatality rate for each jurisdiction during the 2019-2021 time period. Virginia Beach had the most fatalities in Hampton Roads (an average of 27.3 fatalities each year), followed by Norfolk (25.7), Newport News (18.3), Chesapeake (17.7), and Hampton (14.7).

In terms of crash fatality rates, rural areas generally have a higher rate than the more urbanized areas of the region. Surry County (3.45 fatalities per 100 million vehicle-miles of travel) had the highest crash fatality rate in the region in 2019-2021, followed by Isle of Wight County (2.21), Southampton County (1.87), Poquoson (1.66) and Norfolk (1.34). Rural areas tend to have higher speeds, narrower roads and shoulder areas, and lower safety belt usage than urban areas, leading to higher fatality rates.

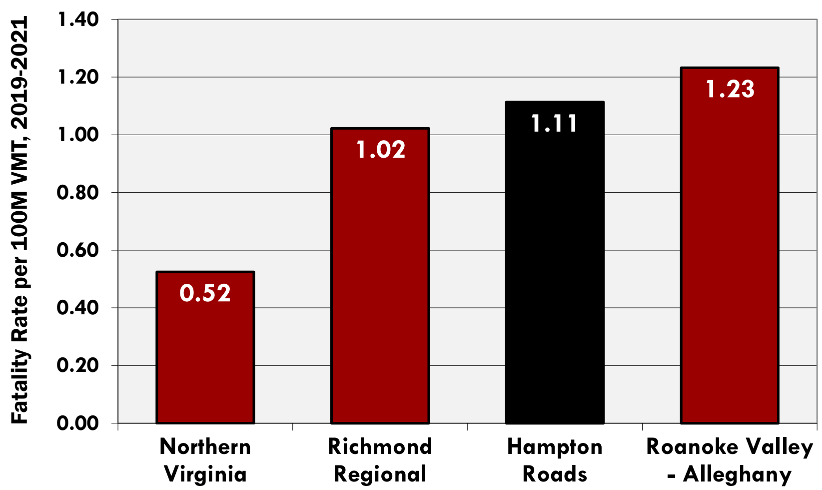


FIGURE 14 – CRASH FATALITY RATES IN VIRGINIA METROPOLITAN AREAS, 2019-2021

Source: HRTPO analysis of Virginia DMV and VDOT data.

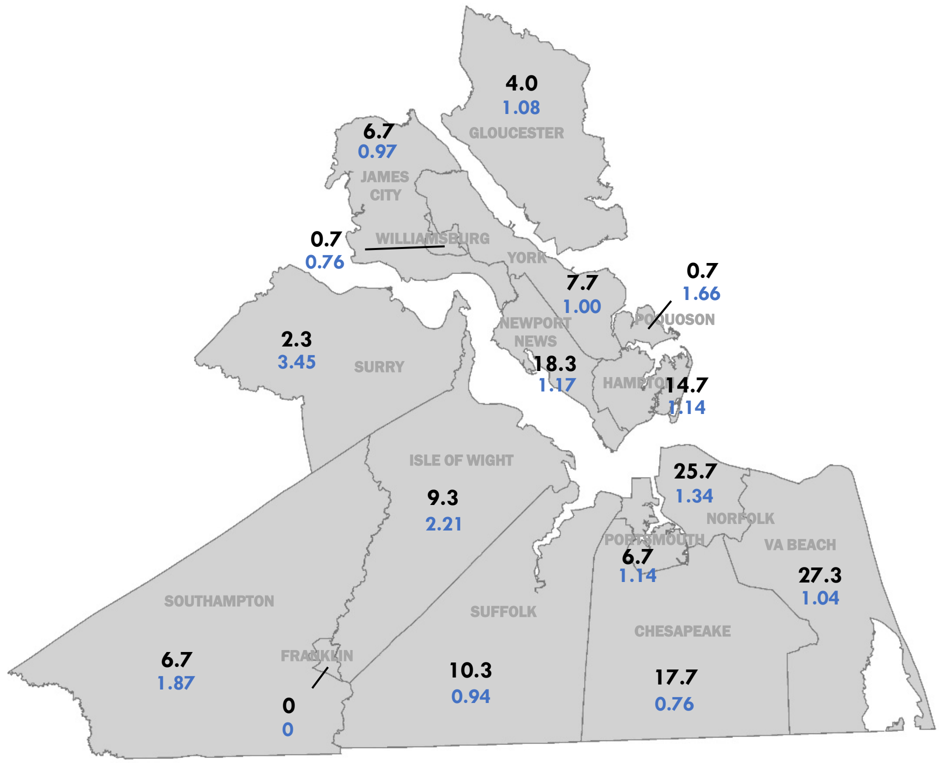


FIGURE 15 – AVERAGE ANNUAL FATALITIES AND FATALITY RATES BY JURISDICTION, 2019-2021

Source: HRTPO analysis of Virginia DMV and VDOT data. Rates are per 100 million VMT.

At the other end of the spectrum, the localities with the lowest crash fatality rates in the region in the 2019-2021 period were Franklin (no fatalities), Chesapeake (0.76 fatalities per 100 million vehicle-miles of travel), Williamsburg (0.76), Suffolk (0.94), and James City County (0.97).

Figure 16 shows the change in the number of fatalities in each locality from the 2010-2012 period to the 2019-2021 period. Only four localities in Hampton Roads experienced a decrease (or no change) in fatalities resulting from crashes during these time periods, while the remaining 12 localities experienced an increase.

The locality that experienced the largest decrease in crashes from the 2010-2012 period to the 2019-2021 period was Franklin, due to having no fatalities during the 2019-2021 period. This is followed by Gloucester (-57%) and Suffolk (-18%), while Williamsburg experienced no change in fatalities between the two time periods.

Poquoson had no fatal crashes in the 2010-2012 period and therefore had the largest increase in fatalities resulting from crashes from the 2010-2012 period to the 2019-2021 period. The localities with the next largest increases were Surry County (+133%), James City County (+122%) and Isle of Wight County (+115%).

Appendix A includes annual crash fatality data for each Hampton Roads jurisdiction dating back to 2000.

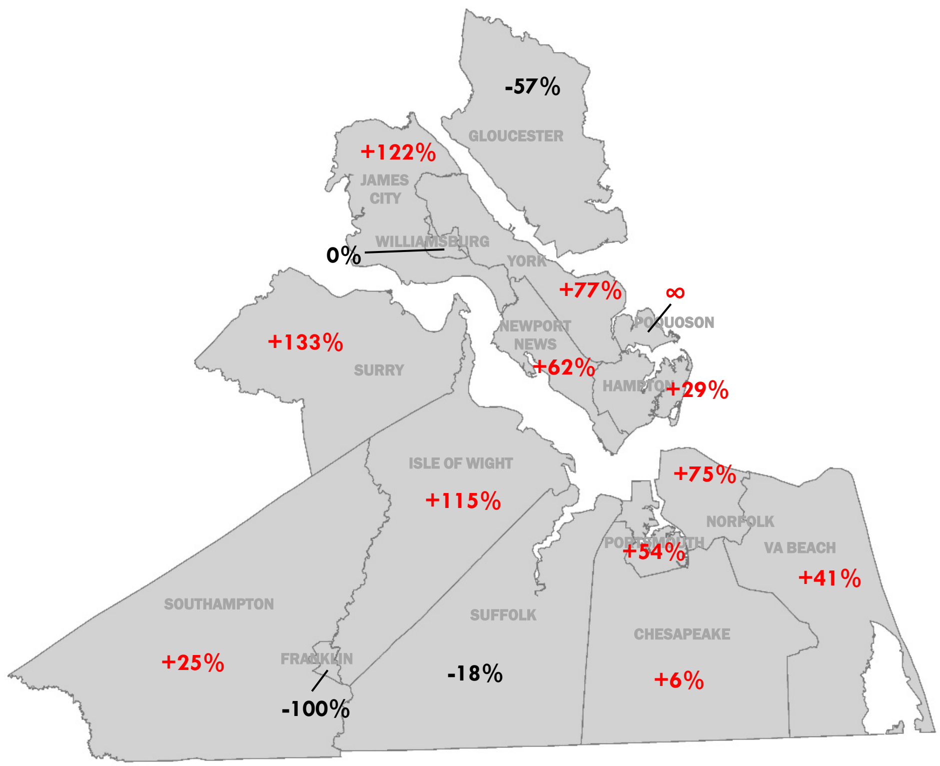


FIGURE 16 – CHANGE IN THE NUMBER OF FATALITIES BY JURISDICTION, 2010-2012 TO 2019-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.
Data includes all fatalities in traffic crashes that occur within 30 days of the crash according to the DMV.

Crash Characteristics

Crashes are caused by a number of factors. Many of these factors are human in nature, such as driver inattention, driving under the influence of alcohol, or speeding. In other cases, factors such as bad weather or defective equipment may also be a primary cause.

This section looks at the characteristics of crashes and fatalities in Hampton Roads. These characteristics include:

- **Crash Types** – The primary types of crashes and fatal crashes in Hampton Roads.
- **Weather** – Those crashes in Hampton Roads where the weather likely played a factor.
- **Number of vehicles** – Compares the number of single vehicle and multi-vehicle crashes in the region.
- **Driver Actions** – The primary actions that led to crashes and fatal crashes in the region.
- **Alcohol Usage** – Those crashes and fatal crashes that resulted from drivers being under the influence of alcohol at the time of the crash.
- **Speeding** – Those crashes and fatal crashes where at least one of the drivers was traveling over the speed limit or exceeded the safe travel speed.
- **Safety Belt Usage** – Those fatal crashes where the person killed in the crash was not wearing a safety belt.
- **Distracted Driver** – Those crashes and fatal crashes that resulted from drivers not paying attention to the driving task.
- **The Big 4 Behavioral Crash Patterns** – Those fatalities involving alcohol use, distracted driving, speeding, and not wearing a seat belt.
- **Motorcyclists**
- **Trucks** – Those crashes and fatal crashes that involved commercial trucks.

For each of the characteristics detailed in this section, data for the entire Hampton Roads region for the years 2017 through 2021 is analyzed.

Crash Types

The primary crash types in Hampton Roads for the years 2017-2021 (**Figure 17**) were rear end crashes (35.2%), angle crashes (28.3%), and fixed objects off the roadway surface crashes (14.4%). Nearly four out of every five crashes in Hampton Roads during this period were one of these three crash types.

Despite only causing 14.4% of all crashes, fixed object off the roadway surface crashes were the most common fatal crash type in Hampton Roads between 2017 and 2021. During this time, 30.4% of all fatal crashes were fixed object off the roadway surface crashes.

Bicyclist/pedestrian and head on crashes are also highly represented in fatal crash types in Hampton Roads. Bicyclist/pedestrians only comprised 1.3% of all crashes but 16.6% of all fatal crashes in Hampton Roads, and head on crashes comprised 2.4% of all crashes but 6.9% of all fatal crashes.

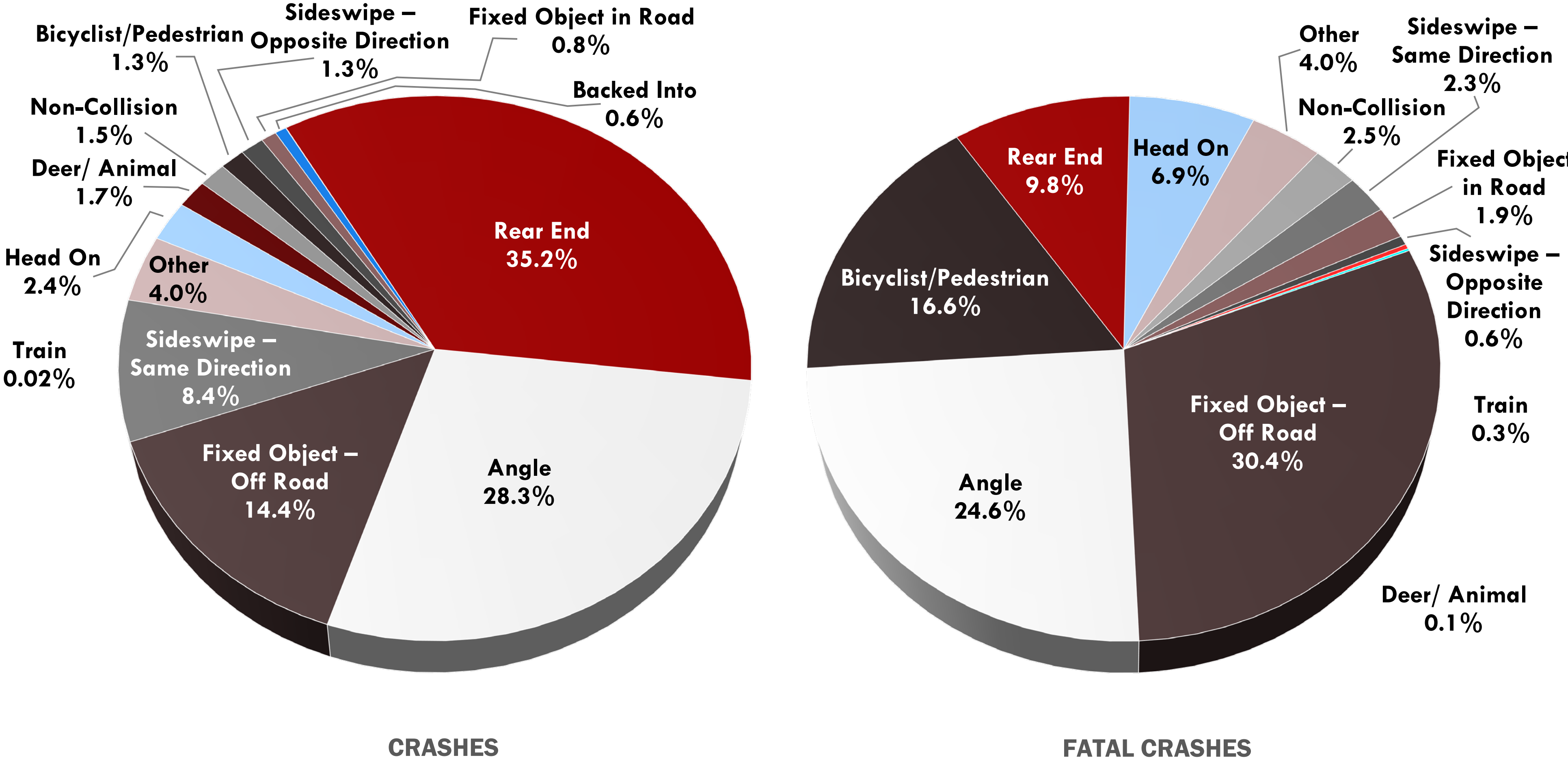


FIGURE 17 – HAMPTON ROADS CRASHES AND FATAL CRASHES BY CRASH TYPE, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Weather

Although the Hampton Roads climate is temperate compared to many areas of the country, weather does impact traffic safety in the region. Safety is impacted by a number of factors including poor visibility, slick or flooded pavement, and increased congestion in bad weather.

According to the Federal Highway Administration (FHWA), an estimated 21% of all crashes nationwide occur in rain, snow, or foggy conditions. Adverse weather conditions had slightly less of an impact in Hampton Roads. Approximately 17% of all crashes in Hampton Roads between 2017 and 2021 occurred in bad weather such as rain, snow, and fog (**Figure 18**).

Weather conditions contribute less of an impact to fatal crashes than to total crashes. About 11% of all fatal crashes in Hampton Roads between 2017 and 2021 occurred in bad weather conditions.

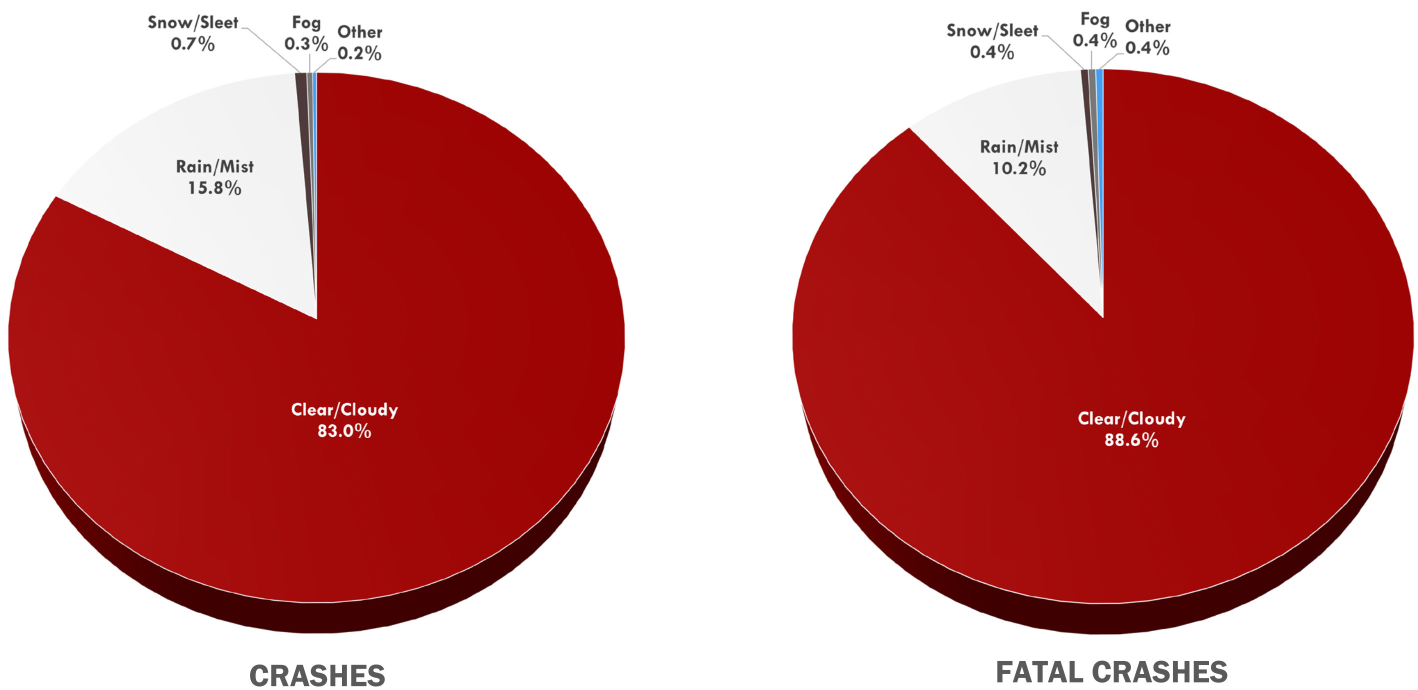


Figure 18 – Hampton Roads Crashes and Fatal Crashes by Weather, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Number of Vehicles

Crashes in Hampton Roads typically involve two vehicles. Between 2017 and 2021, two out of every three crashes in the region involved two vehicles (**Figure 19**). Single vehicle crashes constituted 21% of all crashes in the region, while 13% of all crashes involved three or more vehicles.

Nearly one half of all fatal crashes in Hampton Roads from 2017 to 2021 involved one vehicle. About 40% of all fatal crashes involved two vehicles, and about 12% of all fatal crashes involved three or more vehicles.

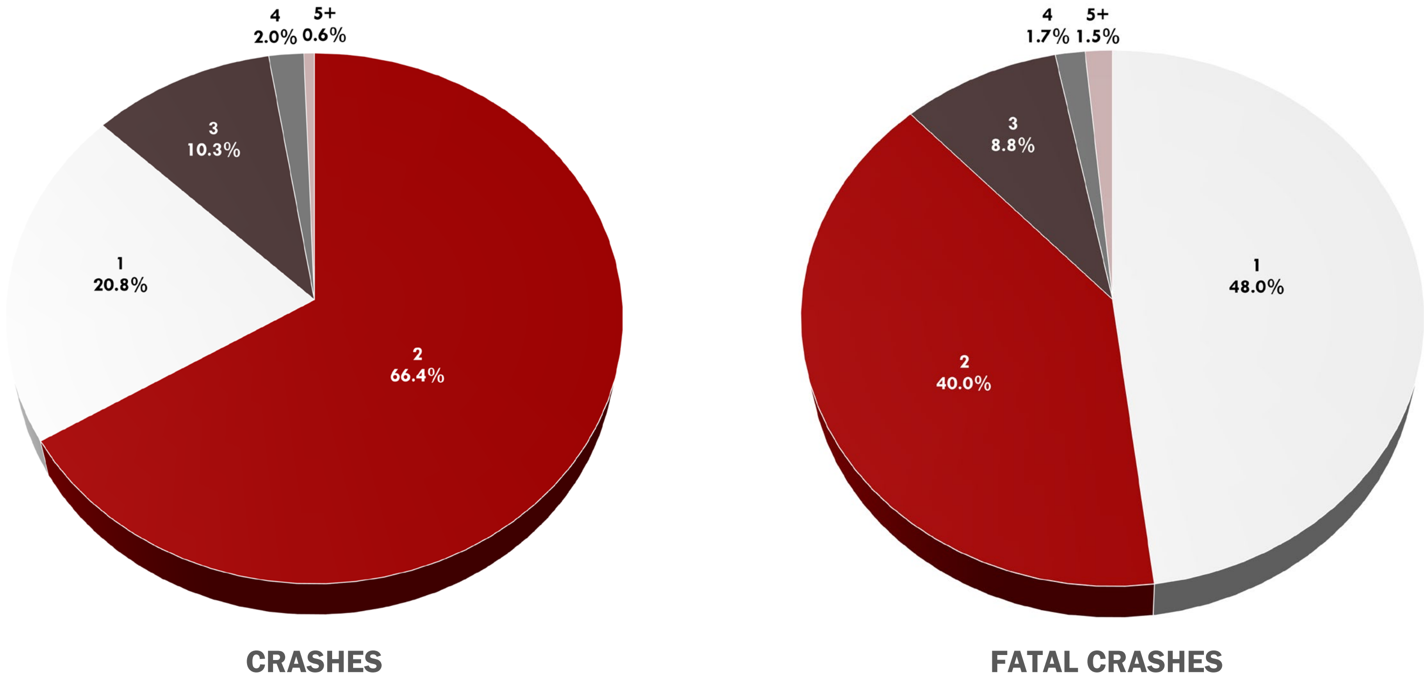


Figure 19 – Hampton Roads Crashes and Fatal Crashes by Number of Vehicles, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Driver Actions

FHWA estimates that driver error is involved in 90% of all motor vehicle crashes. Understanding the driver actions that precede traffic crashes is critical to improving safety on a localized and regional level.

The most prevalent primary actions by drivers leading to crashes in Hampton Roads between 2017 and 2021 (**Figure 20**) were following too closely (30.6%), failing to yield the right-of-way (15.2%), and failing to maintain control of the vehicle (11.5%). Nearly three out of every five crashes in Hampton Roads during this time were caused by one of these three driver actions.

These actions leading to crashes, however, are different from the most prevalent driver actions leading to fatal crashes. The most prevalent driver action leading to fatal crashes in Hampton Roads for the years 2017-2021 was failure to maintain control of the vehicle. Failure to maintain control of the vehicle led to 11.5% of all crashes in Hampton Roads; however, it led to 30.3% of all fatal crashes.

The second and third most prevalent driver actions leading to fatal crashes were failing to yield the right-of-way and speeding. Failing to yield the right-of-way led to slightly fewer fatal crashes (12.2%) when compared to all crashes (15.2%) in Hampton Roads between 2017 and 2021. Speeding led to 1.9% of all crashes in Hampton Roads but 12.2% of all fatal crashes between 2017 and 2021.

Following too closely, which is the most prevalent crash type in Hampton Roads at 30.6% of all crashes, only led to 4.0% of the fatal crashes in the region.

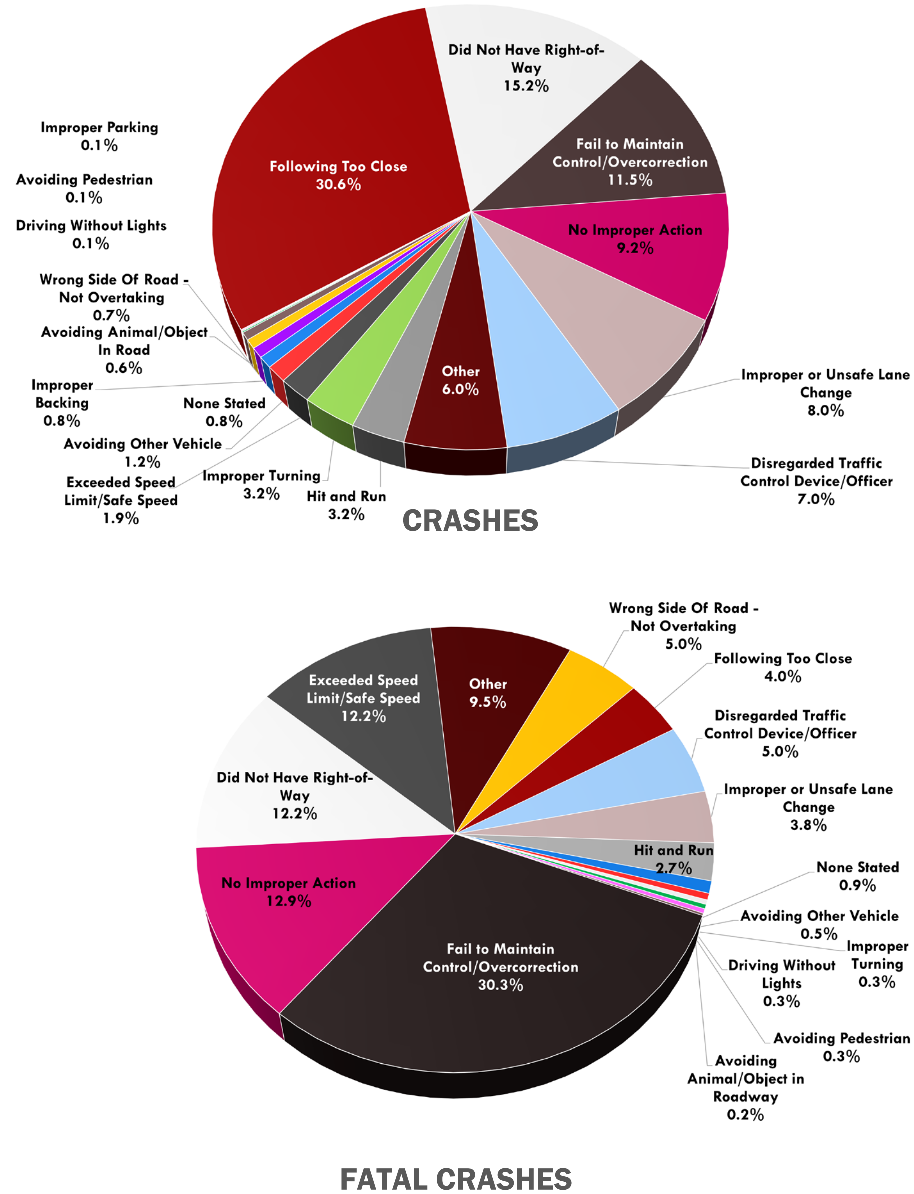


Figure 20 – Hampton Roads Crashes and Fatal Crashes by Driver Action, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Distracted Driver

According to the Department of Motor Vehicles, there are three types of distracting driving: manual, visual, and cognitive. Manual distraction accounts for times when a driver's hand is off the steering wheel such as eating or handling an object. Visual distraction occurs anytime when a driver's eyes are off the road such as looking at scenery or looking at the dashboard. Cognitive distraction occurs when the driver performs two cognitive tasks, such as talking on the phone and driving simultaneously. In this instance, the driver's mind is more focused on the conversation than on driving.

Crashes involving a distracted driver accounted for 19.1% of all crashes in Hampton Roads between 2017 and 2021 (**Figure 21**). During this same period, distracted driver-related crashes made up 19.7% of all crashes with injuries and 17.1% of all fatal crashes in Hampton Roads.

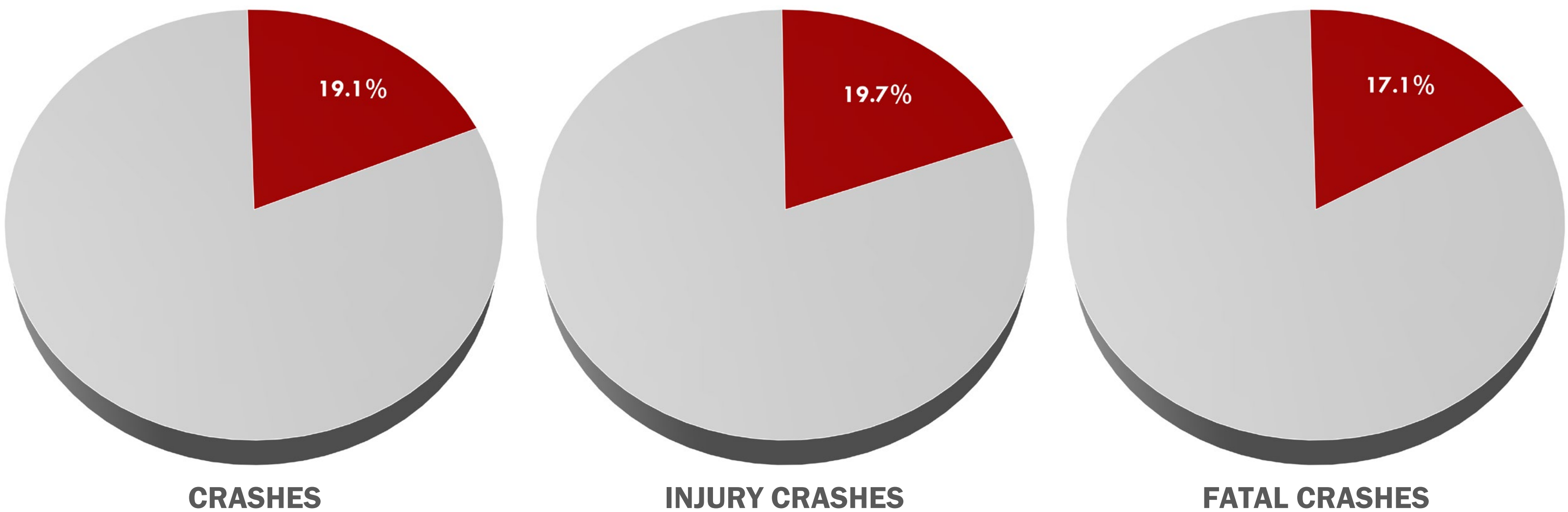


Figure 21 – Hampton Roads Distracted Driver-Related Crashes, Injuries, and Fatalities, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Alcohol Usage

The Department of Motor Vehicles defines an alcohol-related crash as a crash where any amount of alcohol is present at the time of the crash as determined by a police officer. Drunk driving – having a Blood Alcohol Concentration (BAC) of at least 0.08% – can result in catastrophic outcomes; however, consuming even a small amount of alcohol can compromise a safe driving environment. According to the National Highway Traffic Safety Administration (NHTSA), drivers with a 0.02% BAC have a decline in visual function, are unable to multi-task and lose some judgement capabilities. At a 0.05% BAC, motor skills are reduced and tracking moving objects and steering become taxing. Additionally, drivers experience a reduced response to emergency situations.

Driving under the influence of alcohol is one of the main causes of fatal crashes in Hampton Roads. Although only 5.9% of all traffic crashes in Hampton Roads between 2017 and 2021 (**Figure 22**) involved alcohol, the percentage of fatal crashes that involved alcohol was 35.9%.

Between 2017 and 2021, a total of 273 people were killed in Hampton Roads from crashes involving alcohol use.

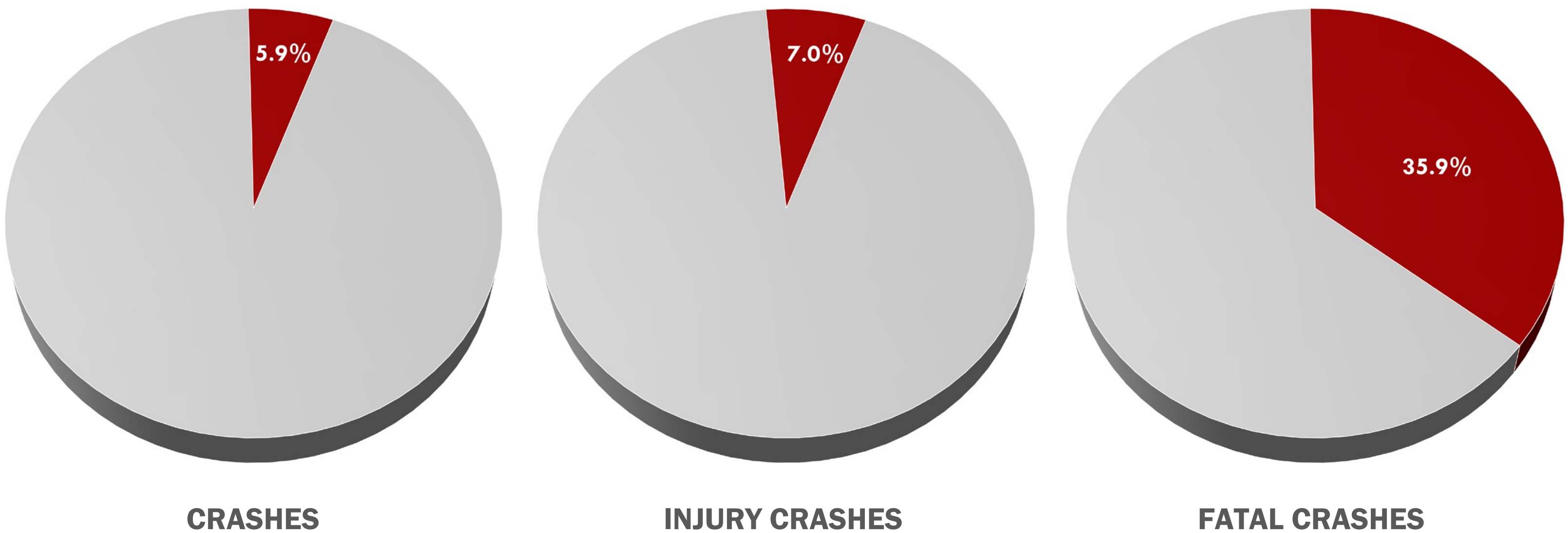


Figure 22 – Hampton Roads Crashes, Injuries, and Fatalities Where At Least One Driver Had Been Drinking, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Speeding

Another main cause of fatal crashes in Hampton Roads is speeding. According to DMV statistics, a total of 18.2% of all traffic crashes in Hampton Roads between 2017 and 2021 included at least one driver exceeding the speed limit or the safe travel speed (**Figure 23**), regardless of other driver actions that resulted in the crash. Note that this differs from the percentage listed in the Driver Actions data on the previous page, which covers only the *primary* driver actions. In terms of speed-related fatal crashes, however, this percentage more than doubles, at 44.2% of all fatal crashes in the region.

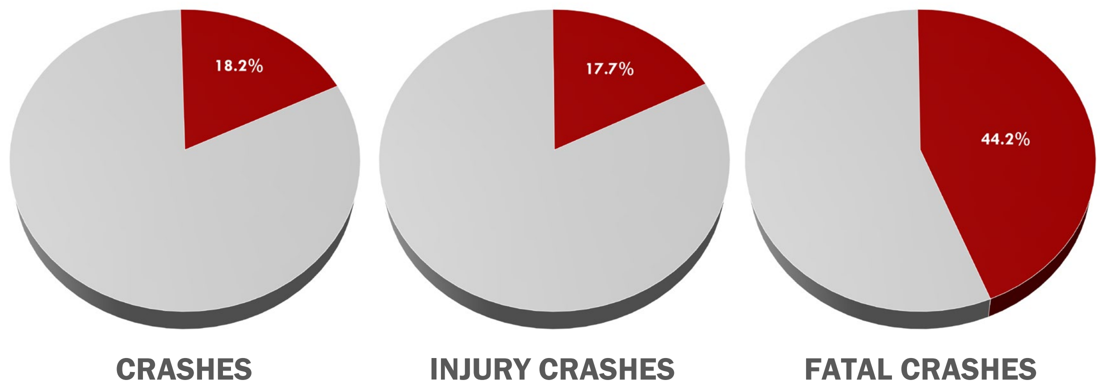


Figure 23 – Hampton Roads Speeding-Related Crashes, Injuries, and Fatalities, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Safety Belt Usage

Along with alcohol usage and speeding, not using a safety belt is a primary characteristic of fatal crashes in Hampton Roads. Looking at Hampton Roads data for the years 2017 to 2021, among the fatal crashes that involved people that were killed as drivers or passengers in motor vehicles (in other words excluding bicyclists, pedestrians, and motorcyclists), safety belts were not used at the time of the crash for 56.0% of these fatal crashes.

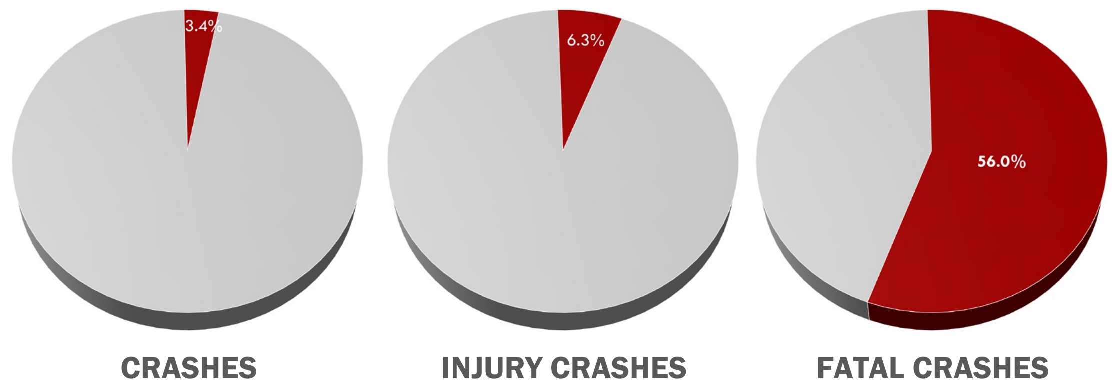


Figure 24 – Hampton Roads Crashes, Injuries, and Fatalities Involving No Safety Belt Use, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

THE BIG 4 BEHAVIORAL CRASH PATTERNS

A driver's behavior behind the wheel can lead to catastrophic results. Impairment due to alcohol use, driver distraction, speeding, and not using a safety belt – referred to as the Big 4 Behavioral Crash Patterns in this report – were linked to 537 fatalities (approximately 69.7% of all fatalities) in Hampton Roads between 2017 and 2021. The impact of the Big 4 Behavioral Crash Patterns is shown in **Figure 25**.

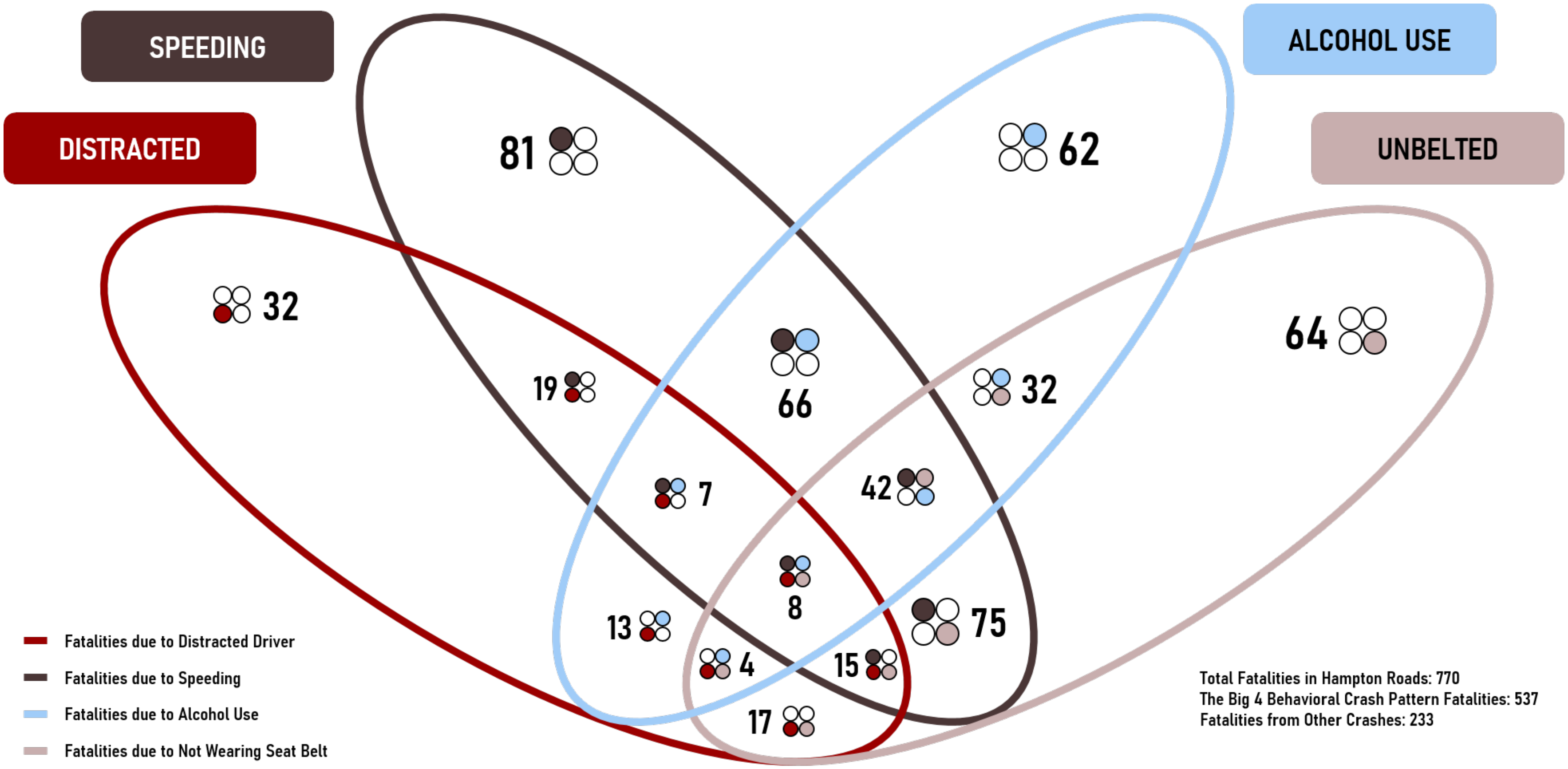


FIGURE 25 – THE BIG 4 BEHAVIORAL CRASH PATTERN FATALITIES IN HAMPTON ROADS, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Motorcyclists

Many of the fatal crashes in Hampton Roads involved motorcyclists. Although only 2.1% of all crashes in Hampton Roads between 2017 and 2021 involved motorcyclists (**Figure 26**), 124 of the 727 fatal crashes (17.1%) that occurred in Hampton Roads during this time involved motorcyclists.

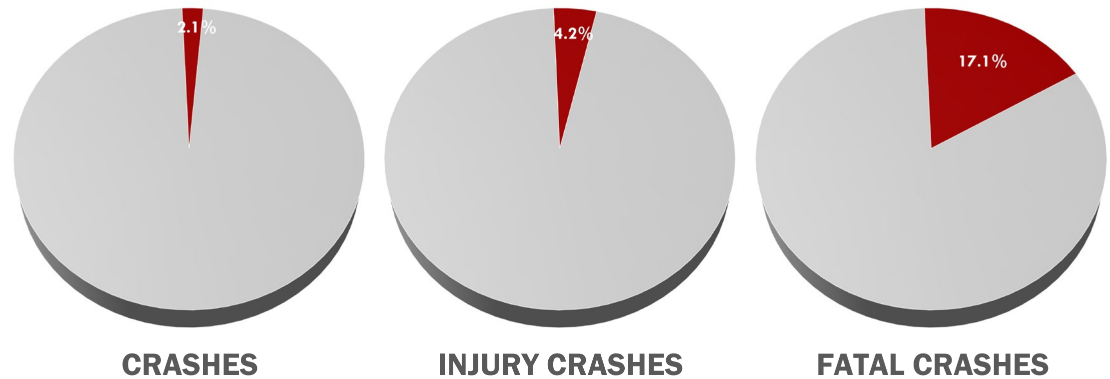


Figure 26 – Hampton Roads Crashes, Injuries, and Fatalities Involving Motorcyclists, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Trucks

The movement of goods is one of the main economic drivers in the Hampton Roads region. Between 2017 and 2021, 6.3% of all crashes in Hampton roads involved trucks (**Figure 27**). Approximately 9.6% of all fatal crashes in Hampton Roads involved trucks in the same 5-year period.

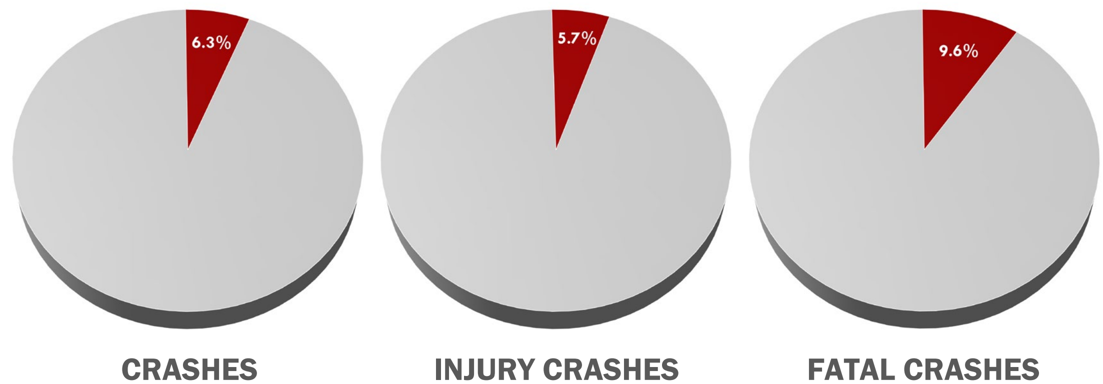


Figure 27 – Hampton Roads Crashes, Injuries, and Fatalities Involving Trucks, 2017-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Crash Characteristics Summary

Crashes are caused by a variety of factors, most of which are the result of driver error such as following too close and failing to yield the right of way. Most fatal crashes in Hampton Roads, however, are primarily caused by a small number of factors, including drivers traveling under the influence of alcohol, driving while distracted, speeding, or not using safety belts. Many fatal crashes involve more than one of these factors, such as drivers traveling at a high rate of speed under the influence of alcohol and not wearing a safety belt. The number of fatal crashes involving motorcycle users, bicyclists, and pedestrians is also highly overrepresented compared to their amount of travel.

Crash Locations

This section provides an analysis of the location of crashes throughout Hampton Roads, and highlights locations with either a high number and rate of crashes. This section includes:

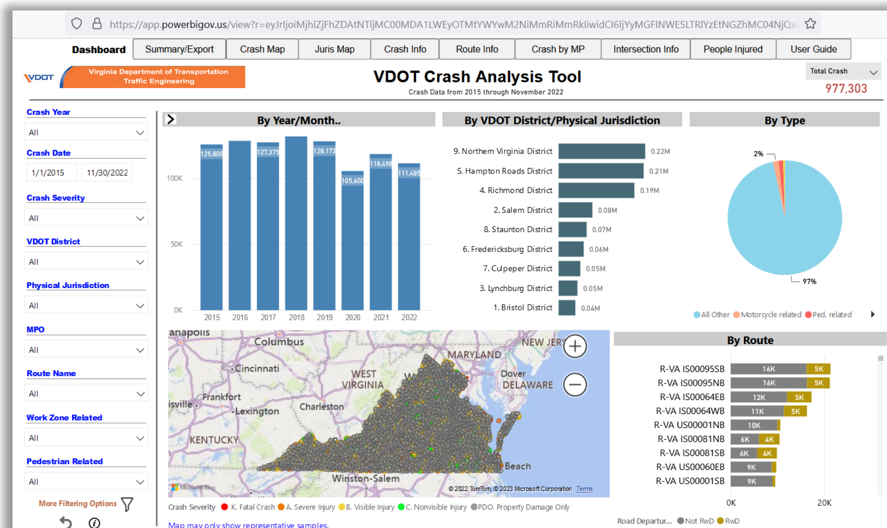
- **Data Collection** – Details on the crash data that was used in this study.
- **Data Analysis** – Details how the crash data was analyzed, terms and equations used in the analysis, methodologies, etc.
- **Crash Analysis by Location** – Details the locations of crashes throughout the region. This section also highlights locations with a high number and rate of crashes.
- **Active Transportation Crashes** – Details the locations of crashes involving bicyclists and pedestrians throughout the region.

Data Collection

Crash data used in this report was obtained by HRTPO from the Virginia Department of Motor Vehicles (DMV) and the Virginia Department of Transportation (VDOT). DMV and VDOT each maintain a database containing a record of every reportable[1] crash that occurred on public roadways throughout the Commonwealth. Each record contains a wide variety of information regarding the crash, such as the date, time of day, number and severity of injuries and fatalities, collision type, weather, driver action, etc. VDOT's database also provides the exact location of each crash, in terms of latitude and longitude coordinates.

The number of crashes at any particular location fluctuates from year to year, so crash data is typically evaluated for multi-year periods in order to reduce this variation and make the data more reliable. For this study, the five most recent years of crash data that were available at the start of the analysis – 2017 to 2021 – were used.

The crash data that was used in this study is publicly available and can be accessed at https://www.virginiaroads.org/. In addition, VDOT has created a Crash Analysis Tool using the Power BI platform where users can run queries of all crashes statewide. The VDOT Crash Analysis Tool (shown below) is available at https://bit.ly/VDOTCrashTool_Public.



1 A reportable traffic crash involves either a fatality, injury, or an estimated property damage of at least $1,500.

Data Analysis

The crash data HRTPO staff collected for this study was analyzed using ArcGIS, a geographic information software package with which users can spatially analyze crash locations and produce data-oriented maps. An example of using ArcGIS to show the location of crashes is shown in **Figure 28**.

Crash data in this study was analyzed separately for the freeway system and the non-freeway arterial roadway network. This is due to the operational differences between freeways – which have fewer safety conflicts due to limits to access and no at-grade intersections – and other roadways.

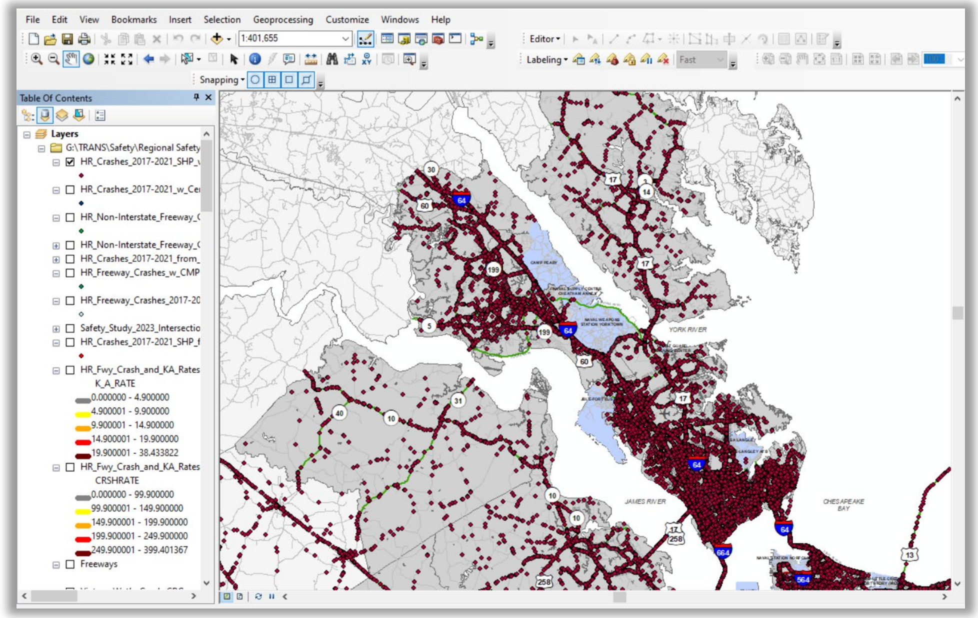


Figure 28 – Crash Locations in ArcGIS

Source: HRTPO.

Freeways

Crashes were analyzed for the entire regional freeway system as part of this study. The regional freeway network includes every mile of the Interstate system (I-64, I-264, I-464, I-564, and I-664) in the region. In addition, the analysis includes non-Interstate freeways such as the Chesapeake Expressway, MLK Freeway, Southwest Suffolk Bypass, Suffolk Bypass, Western Freeway, and the limited-access portion of Route 199.

The freeway system analyzed in this report includes 220 total segments, broken down as shown in **Figure 29**.

FACILITY	TOTAL SEGMENTS	CENTERLINE-MILES
I-64	78	75.4
I-264	42	25.3
I-464	10	5.6
I-564	4	2.8
I-664	26	21.4
CHESAPEAKE EXPWY	16	14.1
M L K FREEWAY	6	1.8
ROUTE 13/58/460	2	6.1
ROUTE 199	10	7.7
SOUTHWEST SUFFOLK BYPASS	2	2.6
SUFFOLK BYPASS	10	8.3
WESTERN FWY	14	7.2

Figure 29 – Analyzed Freeway Segments

Source: HRTPO.

HRTPO staff grouped crashes by freeway segment and direction for this analysis. The total number of crashes was calculated for each freeway segment for each year over the five-year period from 2017 to 2021, and an annual average number of crashes for each segment was also calculated.

Although calculating the total number of crashes that occurred on each freeway segment is necessary for the safety analyses, the number of crashes does not provide an accurate means of comparing safety levels between freeway segments, since freeway segments vary both in length and the volumes they carry.

Instead, the crash rate is used to analyze and compare freeways in this study. The crash rate normalizes each freeway segment by accounting for the total amount of travel of each segment. The crash rate is calculated using the following formula:

$$\text{Freeway Crash Rate} = \frac{100{,}000{,}000 \times \text{Annual Average Crashes}}{365 \times \text{Annual Average Daily Traffic (AADT)} \times \text{Segment Length}}$$

In addition to crash rates, HRTPO staff also specifically analyzed those crashes with fatalities and serious injuries, based on federal guidance that emphasizes these most consequential crashes. Similar to the freeway crash rate, a freeway fatal and serious injury crash rate is also calculated for each freeway segment. The fatal and serious injury crash rate is calculated using the following formula:

$$\text{Freeway Fatal and Serious Injury Crash Rate} = \frac{100{,}000{,}000 \times \text{Annual Average Fatal \& Serious Injury Crashes}}{365 \times \text{Annual Average Daily Traffic (AADT)} \times \text{Segment Length}}$$

Finally, the Potential for Safety Improvement (PSI) was also listed for each freeway segment. PSI is a method of measuring safety based on examining the difference between the number of crashes that occur at a location and comparing it to the number of crashes that would be predicted to occur. This prediction is based on the location's traffic volumes, area type, segment length, intersection control type, etc. This difference between observed and predicted crashes is referred to as the PSI.

VDOT uses PSI as a network screening tool to determine locations for prioritizing highway safety improvements. VDOT prepares a list of the Top 400 PSI segments for each of the VDOT Districts throughout the state. All of the freeway segments included in this analysis are located within the Hampton Roads VDOT District. This analysis of freeway segments includes the District rank if it is included among the Top 400 PSI segments in the Hampton Roads District.

The results of the freeway crash analysis are included in the Crash Analysis by Location section of this report, beginning on page 30.

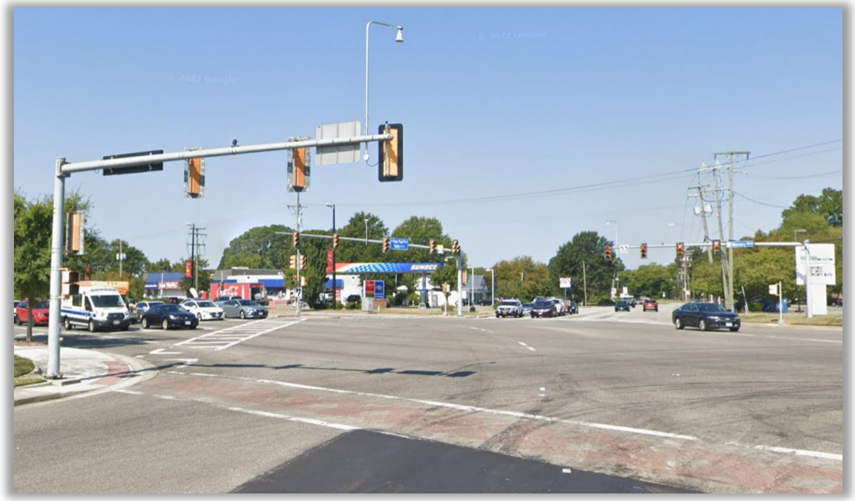
INTERSECTIONS

According to VDOT crash data, just under half (46%) of all crashes in Hampton Roads occur at intersections. In addition, intersections are an emphasis area in the Virginia Strategic Highway Safety Plan, which is described later in of this study. As part of this study, crashes were analyzed for selected at-grade intersections throughout Hampton Roads.

Intersections were selected for this study based on their inclusion in the Hampton Roads Congestion Management Process (CMP) roadway network. The Hampton Roads CMP roadway network is an approximately 1,600-mile network that includes all roadways that are classified as interstates, freeways or other expressways, principal arterials, and minor arterials. The CMP roadway network also includes several roadways classified as collectors based on network connectivity, access to major activity centers, and input from jurisdictions. More information on the Hampton Roads CMP roadway network is available in HRTPO's Congestion Management Process report, which is available on HRTPO's website at https://www.hrtpo.org/390/Congestion-Management.

Intersections were selected for inclusion in this analysis if they comprise an at-grade crossing of at least one CMP roadway network segment with a roadway classified as a major collector or above. This produces a list of 1,013 locations throughout Hampton Roads that were included in this intersection safety analysis.

The crashes that occurred at each of the 1,013 intersections was identified using ArcGIS. All crashes that occurred within 250 feet (or 0.05 miles) of the intersection during the years 2017-2021 were



MERCURY BOULEVARD AT POWER PLANT PARKWAY
Photo Source: Google.

included in the crash totals for that intersection. For those intersections that were within 250 feet of one another, crashes were split at the midpoint between the two intersections. The total number of crashes at each intersection was determined for the five-year period, and an annual average was also calculated.

Calculating the total number of crashes that occurred at each intersection provides one way for determining those locations where safety improvements can have the biggest impact. For example, adding a turn bay at an intersection with high traffic volumes and a high number of angle crashes will likely result in a higher reduction in crashes than adding a similar turn bay at an intersection with lower traffic volumes and a lower number of crashes.

However, the total number of crashes alone does not provide the only means of comparing the safety levels between various intersections, since the number of vehicles served by each intersection varies greatly. For example, the intersection of Jefferson Avenue and Oyster Point Road in Newport News (where an average of nearly 90,000 vehicles enter the intersection each day) would be expected to have many more crashes than the intersection of Centerville Road and John Tyler Highway in James City County, which serves under 8,000 vehicles each day.

As with freeways, an analysis of intersections was also calculated based on the total crash rate, since the crash rate normalizes each intersection by accounting for the total number of users of each location. For intersections, the crash rate is calculated using the following formula:

$$\text{Intersection Crash Rate} = \frac{100{,}000{,}000 \times \text{Annual Average Crashes}}{365 \times \text{Annual Average Daily Vehicles Entering Intersection}}$$

For this study, the "Annual Average Daily Vehicles Entering Intersection" in this equation is based on VDOT's Annual Average Daily Traffic (AADT) volume estimates where available. The average daily vehicles entering an intersection is equal to half of the sum of the 2-way AADT volumes of each leg of the intersection.

For those legs of the intersection where VDOT AADT volumes are not available (such as local roadways or roadways that provide access to areas such as office parks or shopping centers), HRTPO staff used Streetlight Data to obtain estimates of AADT volumes. Streetlight Data is a transportation data analytics company that uses big data from a number of sources including mobile devices to produce analyses for a number of planning-related uses, including traffic volume estimates.

Similar to freeways, HRTPO staff also analyzed those crashes at intersections with fatalities and serious injuries. Both the number and rate of fatal and serious injury crashes for 2017-2021 was calculated for each intersection. The fatal and serious injury crash rate is calculated using the following formula:

$$\text{Intersection Fatal and Serious Injury Crash Rate} = \frac{100{,}000{,}000 \times \text{Annual Average Fatal \& Serious Injury Crashes}}{365 \times \text{Annual Average Daily Vehicles Entering Intersection}}$$

Also similar to freeways, the Potential for Safety Improvement (PSI) is listed for each intersection. Similar to segments, VDOT also prepares a list of the Top 400 PSI intersections for each of the VDOT Districts throughout the state. Intersections included in this study's analysis are primarily located within the Hampton Roads VDOT District, except for those in Gloucester County which are located within the Fredericksburg District. This analysis of intersections includes the District rank if it is included among the Top 400 PSI segments in the District.

The results of the intersection crash analysis are included in the Crash Analysis by Location section of this report, beginning on page 30.

Crash Analysis by Location

This section of the report details the results of HRTPO's crash analysis for the five-year period from 2017 to 2021. This section lists the location of crashes on freeway segments, followed by the analysis for arterial intersections.

Freeways

The total number of crashes for each of the 218 freeway segments was determined by year and direction. However, since freeway segments vary greatly both in length and the volumes they carry, no summaries or comparisons were made between freeway segments in this study using solely the number of crashes. Instead, this analysis uses the crash rate, the fatal and serious injury crash rate, and the Potential for Safety Improvement (PSI) as described in the previous section.

Crash Rate

The crash rate not only accounts for the number of crashes but also the exposure based on traffic volumes and segment length. The average crash rate per 100 million vehicle-miles of travel (VMT) for the entire Hampton Roads freeway system was 93.0 for the years 2017 to 2021.

Figure 30 on page 32 shows the freeway segments in Hampton Roads with the highest crash rates between 2017 and 2021, and **Figures 31-32** on pages 33-34 include maps showing the crash rates for each freeway segment. Information on the crash rates for each freeway segment is also included in **Appendix B**.

I-64 Eastbound Near I-264

Photo Source: Google.

The freeway segment in Hampton Roads with the highest crash rate per 100 million vehicle-miles of travel is I-64 Eastbound between Northampton Boulevard and I-264. This segment has a crash rate of 399.4 crashes per 100 million VMT for the years 2017-2021.

The freeway segment with the second highest crash rate in Hampton Roads between 2017-2021 is I-264 Westbound between Newtown Road and I-64, at 366.4 crashes per 100 million VMT, followed by I-264 Westbound at the Berkley Bridge at 331.3 crashes per 100 million VMT.

Fatal and Serious Injury Crash Rate

The fatal and serious injury crash rate accounts for both the rate and the severity of crashes. The average fatal and serious injury crash rate per 100 million vehicle-miles of travel (VMT) for the entire Hampton Roads freeway system was 4.7 for the years 2017 to 2021.

Figure 33 on page 35 shows the freeway segments in Hampton Roads with the highest fatal and serious injury crash rates between 2017 and 2021, and **Figures 34-35** on pages 36-37 include a map showing the fatal and serious injury crash rates for each freeway segment. Information for fatal and serious injury crash rates for each segment is also included in **Appendix B**.

The freeway segments in Hampton Roads with the highest fatal and serious injury crash rate per 100 million vehicle-miles of travel is both directions of the Martin Luther King Jr. Freeway between High Street and London Boulevard in the City of Portsmouth. This is a short segment (0.25 miles) with a curve located within it. Each direction of this section of the MLK Freeway has a fatal and serious injury crash rate of 38.4 per 100 million VMT for the years 2017-2021.

The freeway segments in Hampton Roads with the next highest fatal and serious injury crash rates are I-264 Eastbound between Birdneck Road and Parks Avenue (16.9 fatal and serious injury crashes per 100 million VMT) and I-664 Southbound between 23rd Street and Terminal Avenue (16.1).

Potential for Safety Improvement (PSI)

The Potential for Safety Improvement (PSI) describes the difference between the number of crashes that occur at a location compared to the number of crashes that would be predicted to occur based on the facility's roadway and traffic characteristics. This difference between observed and predicted crashes is referred to as the PSI.

Figure 36 on page 38 shows the freeway segments in Hampton Roads with the highest PSI rankings. In addition, **Figures 50-51** on pages 52-53 show the PSI rankings for each segment that is included in the VDOT Hampton Roads District Top 400 segment list. PSI information for each segment is also included in **Appendix B**.

The freeway segment in Hampton Roads with the highest PSI is I-64 Eastbound between Northampton Boulevard and I-264, which is also the segment with the highest crash rate. The freeway segments with next highest PSI are I-64 Eastbound at the Hampton Roads Bridge-Tunnel and I-664 Northbound at the Monitor-Merrimac Memorial Bridge-Tunnel.

JURISDICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR	2017-2021 CRASHES TOTAL CRASHES	2017-2021 CRASHES CRASH RATE
NOR	I-64	NORTHAMPTON BLVD	I-264	EB	1175	399.4
NOR	I-264	I-64	NEWTOWN RD/WCL VA. BEACH	WB	389	366.4
NOR	I-264/BERKLEY BRIDGE	I-464	WATERSIDE/CITY HALL/TIDEWATER	WB	196	331.3
HAM	I-64	SETTLERS LANDING RD	MALLORY ST	EB	123	302.8
NOR	I-264	MILITARY HWY	I-64	WB	105	299.7
PORT/NOR	I-264/DOWNTOWN TUNNEL	EFFINGHAM ST	I-464	EB	214	273.9
NOR	I-464	SOUTH MAIN ST	I-264	NB	74	272.3
NOR	I-264	MILITARY HWY	I-64	EB	127	259.2
CHES	I-64	BATTLEFIELD BLVD	I-464	EB	286	255.3
HAM/NOR	I-64/HRBT	MALLORY ST	OCEAN VIEW AVE	WB	768	252.1
HAM/NOR	I-64/HRBT	MALLORY ST	OCEAN VIEW AVE	EB	764	241.8
NN	I-664	TERMINAL AVE	23RD ST	SB	86	230.6
SUF/NN	I-664/MMMBT	COLLEGE DR	TERMINAL AVE	NB	835	223.4
NOR	I-264/BERKLEY BRIDGE	I-464	WATERSIDE/CITY HALL/TIDEWATER	EB	141	217.1
NOR	I-464	SOUTH MAIN ST	I-264	SB	60	215.5
NOR	I-64	4TH VIEW AVE	BAY AVE	WB	159	211.3
HAM	I-64	ARMISTEAD AVE	SETTLERS LANDING RD	EB	381	202.8
NN	I-64	RTE 143 (NORTH)	YORKTOWN RD	EB	126	197.0
PORT	I-264	DES MOINES AVE	EFFINGHAM ST	EB	79	185.5
YC	RTE 199	MOORETOWN RD	I-64	WB	37	179.2
SUF	I-664	BRIDGE RD	WESTERN FWY	NB	14	176.3
VB	I-264	NEWTOWN RD/ECL NORFOLK	WITCHDUCK RD	EB	410	161.1
NN	I-64	RTE 143 (NORTH)	YORKTOWN RD	WB	96	154.0
VB	I-264	BIRDNECK RD	PARKS AVE	EB	18	152.4
NOR	I-564	INTERNATIONAL TERMINAL BLVD	I-64	SB	59	150.8
PORT/NOR	I-264/DOWNTOWN TUNNEL	EFFINGHAM ST	I-464	WB	110	150.2
CHES	I-64	I-464	GEORGE WASHINGTON HWY	EB	523	147.3
VB	I-264	WITCHDUCK RD	INDEPENDENCE BLVD	EB	306	145.6
NOR	I-564	INTERNATIONAL TERMINAL BLVD	I-64	NB	80	144.0
NOR	I-264	BRAMBLETON AVE	BALLENTINE BLVD	WB	127	141.6
NOR	I-64	OCEAN VIEW AVE	4TH VIEW AVE	WB	205	141.5
YC	I-64	RTE 143	RTE 199 (EAST OF WILLIAMSBURG)	WB	319	138.1
HAM	I-664	POWER PLANT PKWY	I-64	NB	147	137.6
CHES	I-64	GEORGE WASHINGTON HWY	MILITARY HWY	EB	157	137.1
NN	I-664	23RD ST	CHESTNUT AVE	SB	145	135.8
NOR	I-264	I-64	NEWTOWN RD/WCL VA. BEACH	EB	165	134.8
YC	I-64	RTE 199 (EAST OF WILLIAMSBURG)	GROVE CONNECTOR	EB	123	133.1
NN/HAM	I-664	CHESTNUT AVE	ABERDEEN RD	SB	64	132.9
NN	I-664	TERMINAL AVE	23RD ST	NB	72	130.7
CHES	I-464	I-64	MILITARY HWY	SB	71	130.5

Figure 30 – Hampton Roads Freeway Segments with the Highest Crash Rates (per 100 Million VMT), 2017-2021

Source: HRTPO analysis of VDOT crash data.

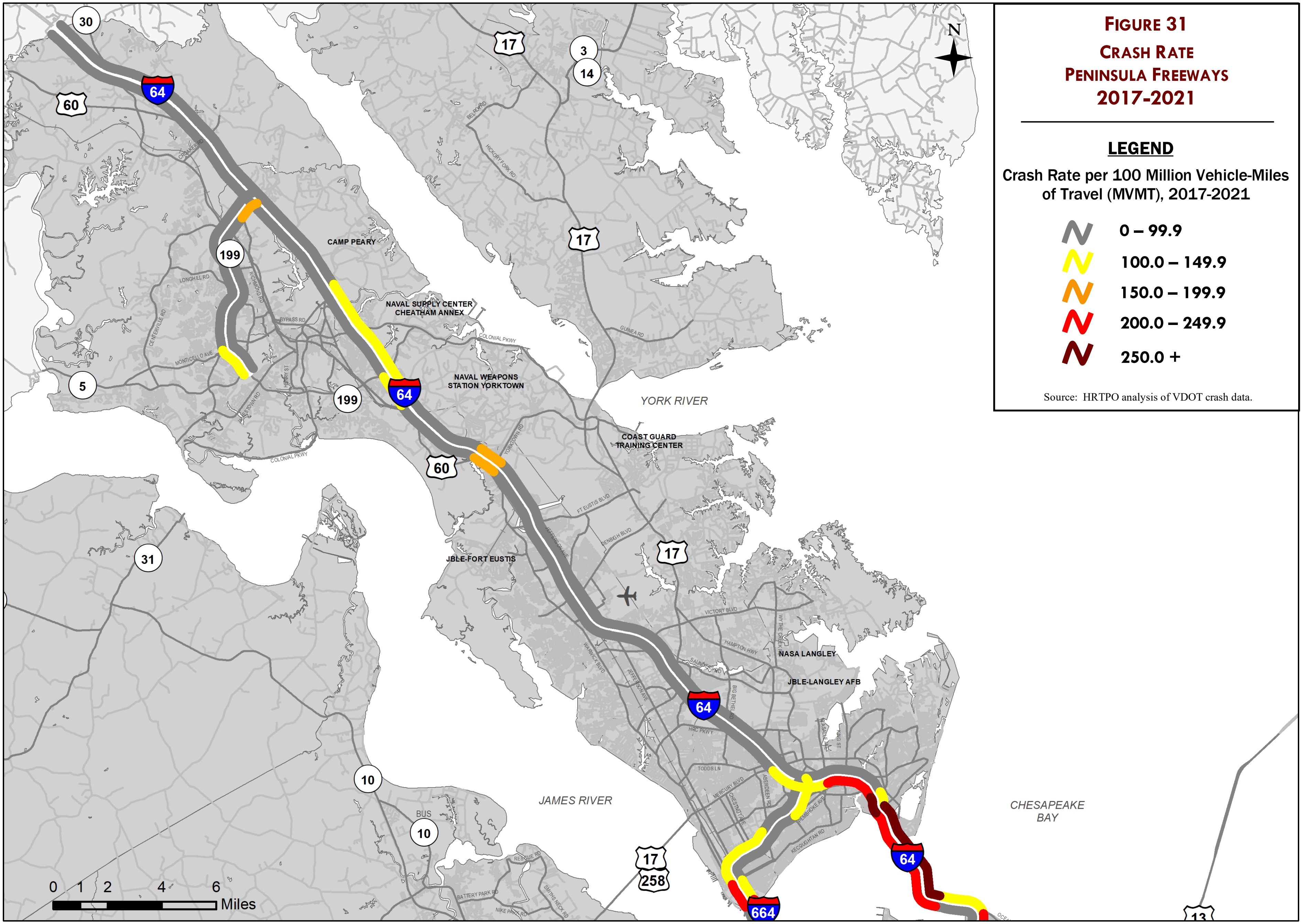


FIGURE 31
CRASH RATE
PENINSULA FREEWAYS
2017-2021
LEGEND
Crash Rate per 100 Million Vehicle-Miles of Travel (MVMT), 2017-2021
0 – 99.9
100.0 – 149.9
150.0 – 199.9
200.0 – 249.9
250.0 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
YORK RIVER
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
JBLE-LANGLEY AFB
JAMES RIVER
CHESAPEAKE BAY
0 1 2 4 6 Miles

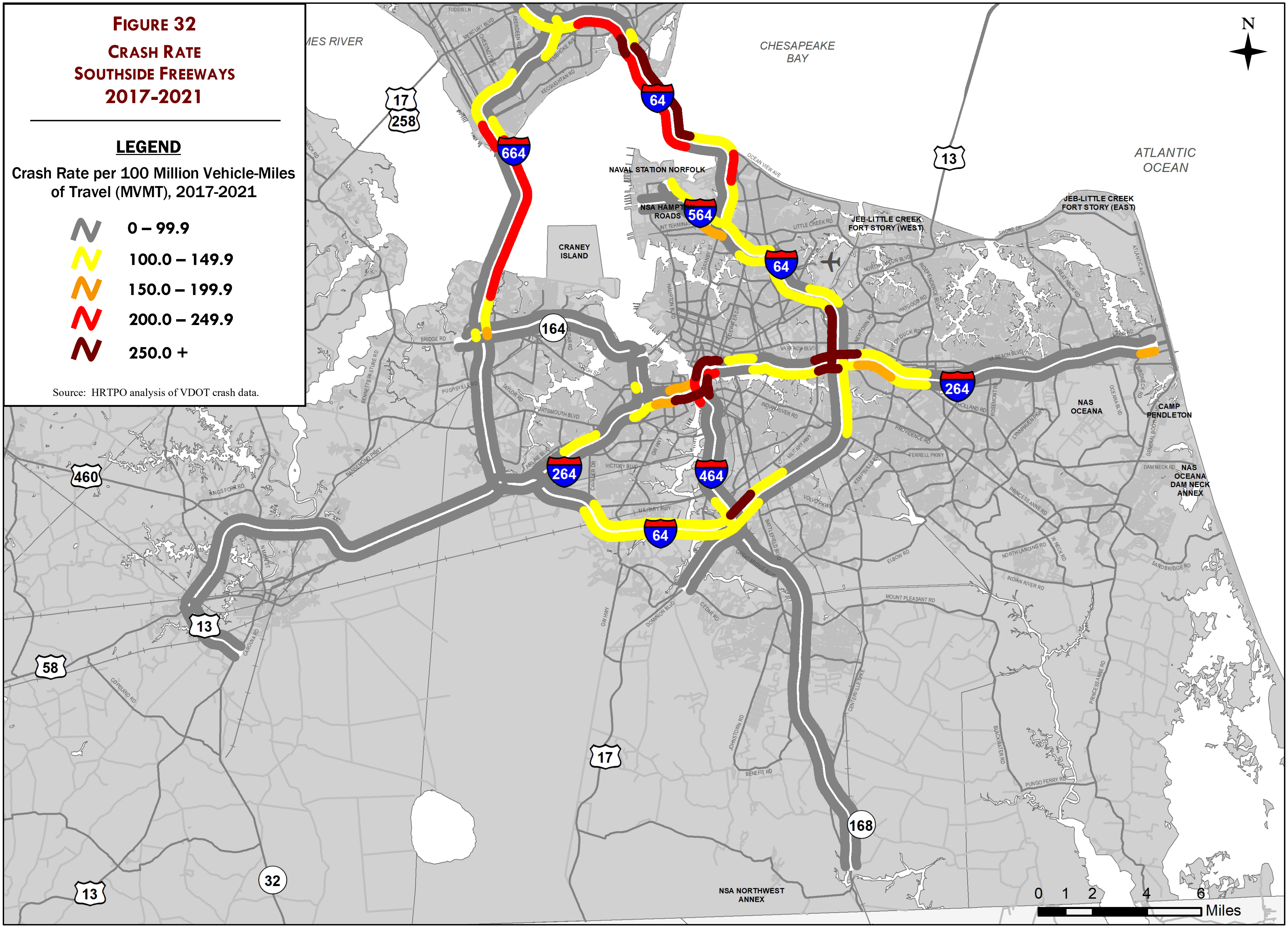


Figure 32
Crash Rate
Southside Freeways
2017-2021

HAMPTON ROADS TPO

JURISDICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR	2017-2021 CRASHES FATAL CRASHES	A INJ CRASHES	K+A CRASH RATE
PORT	M L K FWY	HIGH ST	LONDON BLVD	NB	0	3	38.4
PORT	M L K FWY	HIGH ST	LONDON BLVD	SB	1	2	38.4
VB	I-264	BIRDNECK RD	PARKS AVE	EB	0	2	16.9
NN	I-664	TERMINAL AVE	23RD ST	SB	0	6	16.1
VB	I-264	BIRDNECK RD	PARKS AVE	WB	0	2	15.7
PORT	I-264	FREDERICK BLVD	DES MOINES AVE	EB	0	7	15.4
PORT	WESTERN FWY	WEST NORFOLK RD	MLK FREEWAY/MIDTOWN TUNNEL	EB	1	12	14.6
PORT	WESTERN FWY	WEST NORFOLK RD	MLK FREEWAY/MIDTOWN TUNNEL	WB	1	12	14.6
NOR	I-464	SOUTH MAIN ST	I-264	SB	1	3	14.4
NOR	I-264	MILITARY HWY	I-64	WB	1	4	14.3
NN	I-64	RTE 143 (NORTH)	YORKTOWN RD	EB	0	9	14.1
PORT	I-264	GREENWOOD DR	VICTORY BLVD	WB	2	5	13.8
PORT	M L K FWY	LONDON BLVD	WESTERN FWY/MIDTOWN TUNNEL	NB	0	6	13.0
PORT	M L K FWY	LONDON BLVD	WESTERN FWY/MIDTOWN TUNNEL	SB	0	6	13.0
NOR	I-564	TERMINAL BLVD	I-64	SB	0	5	12.8
SUF	I-664	BRIDGE RD	WESTERN FWY	NB	0	1	12.6
PORT	WESTERN FWY	APM BLVD	WEST NORFOLK RD	EB	0	4	12.4
HAM	I-64	MERCURY BLVD	I-664	WB	4	13	12.3
CHES/PORT	I-264	I-64&664	GREENWOOD DR	WB	1	9	12.3
NOR	I-264	I-64	NEWTOWN RD	WB	0	13	12.2
SUF	WESTERN FWY	BRIDGE RD	I-664	WB	2	0	11.5
SUF/NN	I-664/MMMBT	COLLEGE DR	TERMINAL AVE	NB	4	38	11.2
NN	I-664	TERMINAL AVE	23RD ST	NB	0	6	10.9
PORT	I-264	PORTSMOUTH BLVD	FREDERICK BLVD	WB	1	4	10.8
PORT	I-264	VICTORY BLVD	PORTSMOUTH BLVD	EB	1	3	10.6
PORT/NOR	I-264/DOWNTOWN TUNNEL	EFFINGHAM ST	I-464	EB	0	8	10.2
NOR	I-264/BERKLEY BRIDGE	I-464	WATERSIDE/CITY HALL/TIDEWATER	WB	1	5	10.1
HAM	I-64	ARMISTEAD AVE	SETTLERS LANDING RD	EB	1	18	10.1
SUF/PORT	WESTERN FWY	COLLEGE DR	TOWN POINT RD	EB	1	5	10.1
NOR	I-264	BALLENTINE BLVD	MILITARY HWY	EB	2	21	9.7
HAM	I-64	MERCURY BLVD	I-664	EB	1	12	9.6
PORT	WESTERN FWY	CEDAR LN	APM BLVD	EB	0	5	9.4
PORT	I-264	DES MOINES AVE	EFFINGHAM ST	EB	1	3	9.4
HAM	I-64	I-664	ARMISTEAD AVE	EB	0	8	9.0
HAM	I-64	ARMISTEAD AVE	SETTLERS LANDING RD	WB	0	16	9.0
CHES	I-64	BATTLEFIELD BLVD	I-464	EB	1	9	8.9
CHES	I-664	ROUTES 13/58/460	DOCK LANDING RD	SB	3	5	8.6
CHES	I-464	MILITARY HWY	FREEMAN AVE	NB	1	3	8.6
HAM/NOR	I-64/HRBT	MALLORY ST	OCEAN VIEW AVE	EB	0	27	8.5
CHES/PORT	I-264	I-64/I-664	GREENWOOD DR	EB	2	5	8.5

Figure 33 – Hampton Roads Freeway Segments with the Highest Fatal and Serious Injury (K+A) Crash Rates (per 100 Million VMT), 2017-2021

Source: HRTPO analysis of VDOT crash data.

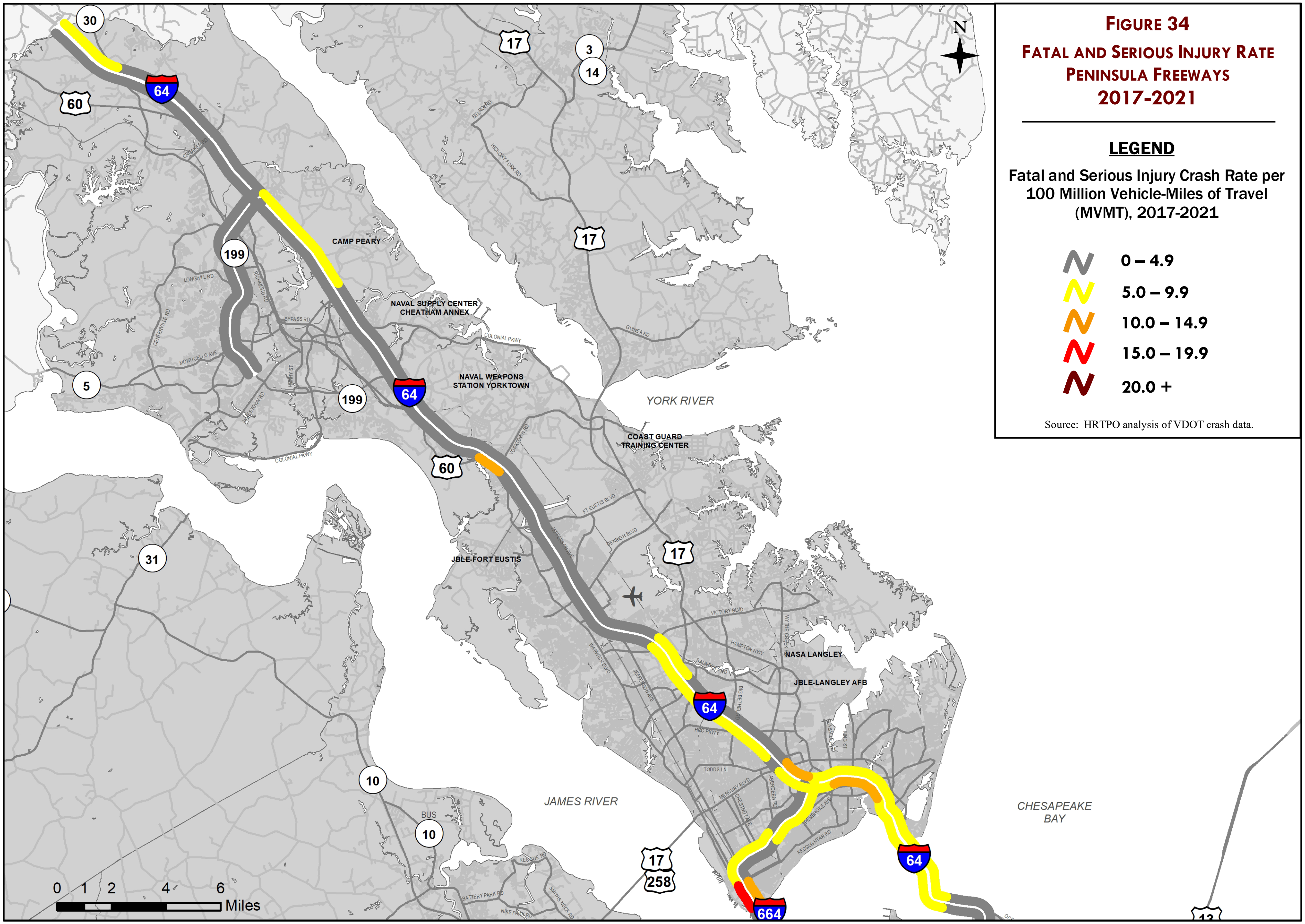


FIGURE 34
FATAL AND SERIOUS INJURY RATE
PENINSULA FREEWAYS
2017-2021
LEGEND
Fatal and Serious Injury Crash Rate per 100 Million Vehicle-Miles of Travel (MVMT), 2017-2021
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
YORK RIVER
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
JBLE-LANGLEY AFB
JAMES RIVER
CHESAPEAKE BAY
0 1 2 4 6 Miles
N

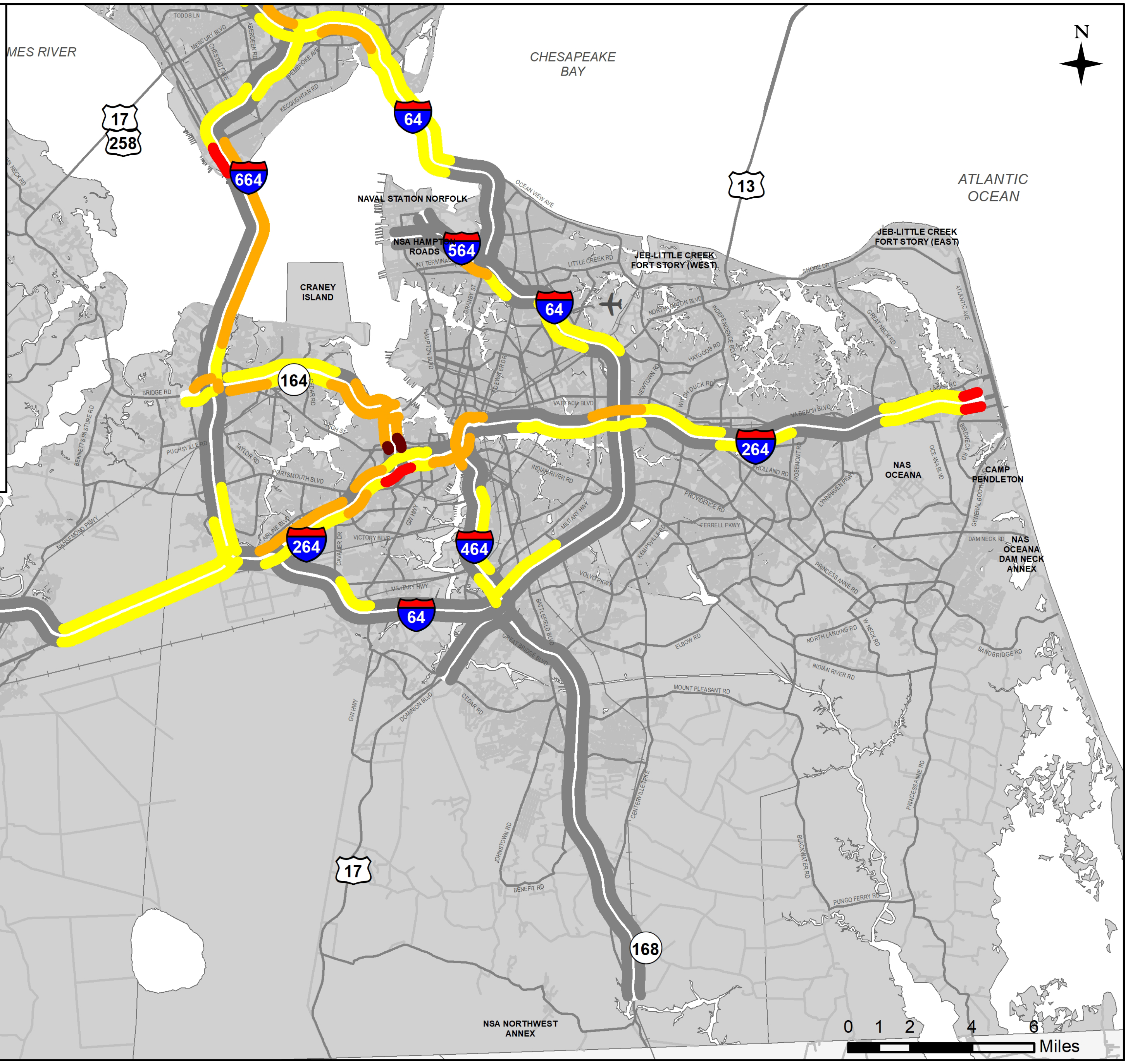
Figure 35
Fatal and Serious Injury Rate Southside Freeways 2017-2021

LEGEND

Fatal and Serious Injury Crash Rate per 100 Million Vehicle-Miles of Travel (MVMT), 2017-2021

- 0 – 4.9
- 5.0 – 9.9
- 10.0 – 14.9
- 15.0 – 19.9
- 20.0 +

Source: HRTPO analysis of VDOT crash data.



DISTRICT PSI FREEWAY RANK	JURISDICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR
1	NOR	I-64	NORTHAMPTON BLVD	I-264	EB
2	HAM/NOR	I-64/HRBT	MALLORY ST	OCEAN VIEW AVE	EB
3	SUF/NN	I-664/MMMBT	COLLEGE DR	TERMINAL AVE	NB
4	NOR	I-64	OCEAN VIEW AVE	4TH VIEW AVE	WB
5	HAM	I-64	ARMISTEAD AVE	SETTLERS LANDING RD	EB
6	NOR	I-264	I-64	NEWTOWN RD/WCL VA. BEACH	WB
7	PORT/NOR	I-264/DOWNTOWN TUNNEL	EFFINGHAM ST	I-464	EB
8	NN	I-64	RTE 143 (NORTH)	YORKTOWN RD	EB
9	NOR	I-264/BERKLEY BRIDGE	I-464	WATERSIDE/CITY HALL/TIDEWATER	WB
10	CHES	I-64	I-464	GEORGE WASHINGTON HWY	EB
11	NN	I-64	RTE 143 (NORTH)	YORKTOWN RD	WB
12	VB	I-264	WITCHDUCK RD	INDEPENDENCE BLVD	EB
13	NOR/VB	I-64	I-264	INDIAN RIVER RD	WB
14	VB	I-264	NEWTOWN RD/ECL NORFOLK	WITCHDUCK RD	EB
15	NOR	I-64	TIDEWATER DR	CHESAPEAKE BLVD	WB
16	SUF/NN	I-664/MMMBT	COLLEGE DR	TERMINAL AVE	SB
17	CHES	I-64	BATTLEFIELD BLVD	I-464	EB
18	NOR/VB	I-64	I-264	INDIAN RIVER RD	EB
19	HAM	I-64	SETTLERS LANDING RD	MALLORY ST	EB
20	NOR	I-264	BALLENTINE BLVD	MILITARY HWY	EB
21	NOR	I-264	BRAMBLETON AVE	BALLENTINE BLVD	WB
22	SUF/CHES	ROUTE 13/58/460	SUFFOLK BYPASS	I-664	EB
23	YC/JCC/NN	I-64	GROVE CONNECTOR	RTE 143 (NORTH)	WB
24	YC	I-64	RTE 143	RTE 199 (EAST OF WILLIAMSBURG)	WB
25	NOR	I-64	4TH VIEW AVE	BAY AVE	WB
26	NOR	I-64	I-564/LITTLE CREEK RD	TIDEWATER DR	WB
27	NN	I-64	YORKTOWN RD	FORT EUSTIS BLVD	WB
28	CHES/PORT	I-264	I-64&664	GREENWOOD DR	WB
29	YC/JCC/NN	I-64	GROVE CONNECTOR	RTE 143 (NORTH)	EB
30	NOR	I-264	I-64	NEWTOWN RD/WCL VA. BEACH	EB
31	YC	I-64	RTE 199 (EAST OF WILLIAMSBURG)	GROVE CONNECTOR	EB
32	YC	I-64	RTE 199/646	RTE 143	WB
33	NOR	I-64	NORVIEW AVE	MILITARY HWY	EB
34	HAM	I-664	POWER PLANT PKWY	I-64	NB
35	VB	I-264	NEWTOWN RD/ECL NORFOLK	WITCHDUCK RD	WB
36	NOR	I-64	I-564/LITTLE CREEK RD	TIDEWATER DR	EB
37	VB	I-264	WITCHDUCK RD	INDEPENDENCE BLVD	WB
38	PORT	I-264	DES MOINES AVE	EFFINGHAM ST	EB
39	NOR	I-464	SOUTH MAIN ST	I-264	NB
40	NN	I-664	23RD ST	CHESTNUT AVE	SB

FIGURE 36 – HAMPTON ROADS FREEWAY SEGMENTS WITH THE HIGHEST POTENTIAL FOR SAFETY IMPROVEMENT (PSI) RANKINGS IN THE HAMPTON ROADS VDOT DISTRICT, 2016-2020

Source: VDOT.

INTERSECTIONS

The total number of crashes was analyzed for each of the 1,013 selected intersections throughout Hampton Roads. In addition, other measures that were analyzed for each of these intersections were the crash rate, the total number of fatalities and serious injuries, and the rate of fatalities and serious injuries. Finally, this section includes VDOT's Potential for Safety Improvement (PSI) analysis for intersections as described in the previous section.

Total Crashes

As described in the Data Analysis section of this report, HRTPO staff used the ArcGIS platform to determine the total number of crashes at each of the 1,013 intersections analyzed in this study.

Figure 37 shows the intersections in Hampton Roads with the highest annual number of crashes between 2017 and 2021, and **Figures 42-43** on pages 44-45 show the number of crashes at each intersection analyzed in this study.

A total of 28 intersections analyzed in this study had at least 100 crashes during the 5-year analysis period. Among these intersections, nine are in Hampton, eight are in Virginia Beach, seven are in Newport News, two are in Norfolk, and one each are in Portsmouth and Suffolk. Intersections in suburban areas tend to have a higher number of crashes than those in urban and rural locations, since suburban intersections typically carry

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES (2017-2021)
HAM	MERCURY BLVD	POWER PLANT PKWY/TODDS LN	267
HAM	MERCURY BLVD	COLISEUM DR	226
NN	JEFFERSON AVE	J CLYDE MORRIS BLVD	195
HAM	MERCURY BLVD	ARMISTEAD AVE	181
VB	INDIAN RIVER RD	KEMPSVILLE RD	179
NN	JEFFERSON AVE	OYSTER POINT RD	178
HAM	MERCURY BLVD	ABERDEEN RD	177
VB	FIRST COLONIAL RD	VA BEACH BLVD	160
VB	INDEPENDENCE BLVD	BONNEY RD/EUCLID RD	150
HAM	MERCURY BLVD	CUNNINGHAM DR	147
HAM	HRC PKWY	BIG BETHEL RD	143
PORT	GEORGE WASHINGTON HWY	VICTORY BLVD	142
NN	JEFFERSON AVE	BLAND BLVD	141
HAM	ARMISTEAD AVE	LASALLE AVE	138
NN	JEFFERSON AVE	BRICK KILN BLVD	137
VB	HOLLAND RD	ROSEMONT RD	130
NN	JEFFERSON AVE	DENBIGH BLVD	128
NN	MERCURY BLVD	JEFFERSON AVE	122
HAM	MERCURY BLVD	FOX HILL RD/CHERRY ACRES DR	121
VB	PRINCESS ANNE RD	LYNNHAVEN PKWY	121
HAM	MERCURY BLVD	BIG BETHEL RD	114
VB	GENERAL BOOTH BLVD	DAM NECK RD	111
NOR	NORTHAMPTON BLVD	WESLEYAN DR	106
SUF	BRIDGE RD	COLLEGE DR	104
NN	WARWICK BLVD	OYSTER POINT RD	103
NOR	TIDEWATER DR	LAFAYETTE BLVD	102
VB	LYNNHAVEN PKWY	ROSEMONT RD	101
VB	NEWTOWN RD	BAKER RD	101
VB	MILITARY HWY	INDIAN RIVER RD	99
VB	ROSEMONT RD	BONNEY RD/I-264 RAMP	99

FIGURE 37 – HAMPTON ROADS INTERSECTIONS WITH THE HIGHEST NUMBER OF CRASHES, 2017-2021

Source: HRTPO analysis of VDOT data. Data includes all crashes that occurred within 250' (or 0.05 miles) of the intersection. Analysis only includes those intersections that are part of the Hampton Roads CMP network as defined in this study.

higher daily traffic volumes which leads to more exposure to possible crashes.

The intersection of Mercury Boulevard and Power Plant Parkway/Todds Lane in the City of Hampton had the highest number of crashes among the 1,013 analyzed intersections in Hampton Roads, at 53 crashes per year between 2017 and 2021. The intersections with the second and third highest number of crashes were both also on the Peninsula: Mercury Boulevard at Coliseum Drive in Hampton (45 crashes per year) and Jefferson Avenue at J Clyde Morris Boulevard in Newport News (39 crashes per year).

Crash data for each of the 1,013 intersections analyzed as part of this study, broken down by each jurisdiction, is shown in **Appendix C**.

Crash Rate

The crash rate not only accounts for the number of crashes but also the exposure based on the number of users of the intersection. The average crash rate per 100 million entering vehicles for the 1,013 intersections throughout Hampton Roads analyzed for this study was 59.6 for the years 2017 to 2021.

Figure 38 shows the intersections in Hampton Roads with the highest crash rates between 2017 and 2021, and **Figures 44-45** on pages 46-47 show the crash rates at each intersection analyzed in this study. Crash rate information for each intersection is also included in **Appendix C**.

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	CRASH RATE PER 100 MILLION ENTERING VEHICLES
NN	ROANOKE AVE	48TH ST	488.91
SUF	COPELAND RD	MANNING RD	400.45
HAM	ARMISTEAD AVE	LASALLE AVE	226.40
HAM	WOODLAND RD	COUNTY ST	212.20
IW	SMITHS NECK RD	ROUTE 665 (REYNOLDS DR)	202.57
NN	JEFFERSON AVE	26TH ST	200.35
HAM	MERCURY BLVD	MALLORY ST	197.01
PORT	GEORGE WASHINGTON HWY	VICTORY BLVD	191.69
HAM	MERCURY BLVD	POWER PLANT PKWY/TODDS LN	188.78
HAM	MERCURY BLVD	COLISEUM DR	187.60
JCC	JOHN TYLER HWY	CENTERVILLE RD	186.47
HAM	MERCURY BLVD	OLD BUCKROE RD	185.95
HAM	SETTLERS LANDING RD	TYLER ST/I-64 RAMP	182.65
HAM	POWER PLANT PKWY	BRIARFIELD RD/QUEEN ST	180.30
NOR	MONTICELLO AVE	26TH ST	171.75
NOR	COLLEY AVE	26TH ST	171.66
HAM	HRC PKWY	BIG BETHEL RD	169.24
POQ	WYTHE CREEK RD	VICTORY BLVD/LITTLE FLORIDA RD	169.22
NOR	26TH ST	COLONIAL AVE	168.77
NN	ROANOKE AVE	39TH ST	165.16
NN	HUNTINGTON AVE	26TH ST	165.01
VB	FIRST COLONIAL RD	VA BEACH BLVD	164.80
HAM	KING ST	RIP RAP RD	164.51
GLO	ROUTE 17	ROUTE 610 (DAVENPORT/WOODS CROSS RD)	164.06
PORT	DEEP CREEK BLVD	LINCOLN ST	162.99
SUF	BRIDGE RD	COLLEGE DR	162.82
HAM	MERCURY BLVD	FOX HILL RD/CHERRY ACRES DR	159.57
NN	26TH ST	ROANOKE AVE	156.56
HAM	MERCURY BLVD	PEMBROKE AVE	154.06
VB	BIRDNECK RD	VA BEACH BLVD	152.40

FIGURE 38 – HAMPTON ROADS INTERSECTIONS WITH THE HIGHEST CRASH RATES, 2017-2021

Source: HRTPO analysis of VDOT data. Data includes all crashes that occurred within 250' (or 0.05 miles) of the intersection. Analysis only includes those intersections that are part of the Hampton Roads CMP network as defined in this study.

The intersection of Roanoke Avenue and 48th Street in the City of Newport News had the highest crash rate among the 1,013 analyzed intersections in Hampton Roads. This intersection experienced 488.9 crashes per 100 million vehicles entering the intersection. The intersections with the second and third highest rate of crashes were Copeland Road at Manning Road in Suffolk (400.4 crashes per 100 million entering vehicles) and Armistead Avenue at LaSalle Avenue in Hampton (226.4).

Fatal and Serious Injury Crashes

In addition to crashes and crash rates, HRTPO staff also separately analyzed those crashes with fatalities and serious injuries, based on federal guidance that emphasizes these most consequential crashes.

Figure 39 shows the intersections in Hampton Roads with the highest number of combined fatal and serious injury crashes between 2017 and 2021, and **Figures 46-47** on pages 48-49 show the number of fatal and serious injury crashes at each intersection analyzed in this study. Fatal and serious injury crash information for each intersection is also included in **Appendix C**.

The intersections with the highest number of fatal and serious injury crashes are located in the City of Hampton. The intersection of Mercury Boulevard and Coliseum Drive and the intersection of Mercury Boulevard at Power Plant Parkway/Todds Lane both had 17 fatal and serious injury crashes over the 5-year period from 2017 to 2021, the highest number of fatal and serious injury crashes among the 1,013

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL FATAL & SERIOUS INJURY CRASHES (2017-2021)
HAM	MERCURY BLVD	COLISEUM DR	17
HAM	MERCURY BLVD	POWER PLANT PKWY/TODDS LN	17
HAM	LASALLE AVE	SETTLERS LANDING RD	16
HAM	MERCURY BLVD	ARMISTEAD AVE	15
PORT	GEORGE WASHINGTON HWY	VICTORY BLVD	15
HAM	HRC PKWY	BIG BETHEL RD	13
HAM	MERCURY BLVD	CUNNINGHAM DR	12
HAM	MERCURY BLVD	ORCUTT AVE	12
HAM	MERCURY BLVD	BIG BETHEL RD	11
PORT	PORTSMOUTH BLVD	RODMAN AVE	11
HAM	WOODLAND RD	MERCURY BLVD	10
GLO	ROUTE 17	ROUTE 610 (DAVENPORT/WOODS CROSS RD)	9
HAM	MERCURY BLVD	ABERDEEN RD	9
HAM	MERCURY BLVD	FOX HILL RD/CHERRY ACRES DR	9
HAM	MERCURY BLVD	OLD BUCKROE RD	9
HAM	PEMBROKE AVE	ABERDEEN RD	9
NN	JEFFERSON AVE	OYSTER POINT RD	9
NOR	LITTLE CREEK RD	CHESAPEAKE BLVD	9
VB	INDIAN RIVER RD	KEMPSVILLE RD	9
HAM	ABERDEEN RD	BRIARFIELD RD	8
HAM	ARMISTEAD AVE	LASALLE AVE	8
HAM	MERCURY BLVD	MALLORY ST	8
HAM	SETTLERS LANDING RD/QUEEN ST	PEMBROKE AVE	8
IW	CARROLLTON BLVD	SMITHS NECK RD	8
NN	JEFFERSON AVE	CITY CENTER BLVD	8
NN	JEFFERSON AVE	THIMBLE SHOALS BLVD	8
PORT	FREDERICK BLVD	TURNPIKE RD	8
CHES	GEORGE WASHINGTON HWY	MILITARY HWY	7
HAM	ABERDEEN RD	ALUMINUM AVE	7
HAM	HRC PKWY	COLISEUM DR	7
HAM	LASALLE AVE	PEMBROKE AVE	7
HAM	NEIL ARMSTRONG PKWY	COMMANDER SHEPPARD BLVD	7
HAM	POWHATAN PKWY	SHELL RD	7
NN	JEFFERSON AVE	DENBIGH BLVD	7
NN	JEFFERSON AVE	HARPERSVILLE RD	7
NOR	CHESAPEAKE BLVD	NORVIEW AVE	7
PORT	GEORGE WASHINGTON HWY	GREENWOOD DR	7
PORT	HIGH ST	PENINSULA AVE	7
PORT	PORTSMOUTH BLVD	CITY PARK AVE	7
VB	MILITARY HWY	INDIAN RIVER RD	7

FIGURE 39 – HAMPTON ROADS INTERSECTIONS WITH THE HIGHEST NUMBER OF FATAL AND SERIOUS INJURY CRASHES, 2017-2021

Source: HRTPO analysis of VDOT data. Data includes all crashes that occurred within 250' (or 0.05 miles) of the intersection. Analysis only includes those intersections that are part of the Hampton Roads CMP network as defined in this study.

analyzed intersections in Hampton Roads. The intersection of LaSalle Avenue at Settlers Landing Road had the third-highest number of fatal and serious injury crashes (16) during this period.

Fatal and Serious Injury Crash Rate

Figure 40 shows the intersections in Hampton Roads with the highest fatal and serious injury crash rates between 2017 and 2021, and **Figures 48-49** on pages 50-51 show the fatal and serious injury crash rates at each intersection analyzed in this study. Fatal and serious injury crash rate information for each intersection is also included in **Appendix C**.

The intersection of Copeland Road and Manning Road in the City of Suffolk had the highest rate of fatal and serious injury crashes among the 1,013 analyzed intersections in Hampton Roads, at 66.74 fatal and serious injury crashes per 100 million entering vehicles between 2017 and 2021. The intersections with the second and third highest rate of fatal and serious injury crashes were Deep Creek Boulevard at Lincoln Street in Portsmouth (46.57 fatal and serious injury crashes per year) and Route 17 at Route 610 – Davenport Road/Woods Cross Road in Gloucester County (44.74). By comparison, the average fatal and serious injury crash rate at the 1,013 intersections analyzed in this study was 3.29 per 100 million entering vehicles.

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	FATAL & SERIOUS INJURY CRASH RATE PER 100 MILLION ENTERING VEHICLES
SUF	COPELAND RD	MANNING RD	66.74
PORT	DEEP CREEK BLVD	LINCOLN ST	46.57
GLO	ROUTE 17	ROUTE 610 (DAVENPORT/WOODS CROSS RD)	44.74
PORT	PORTSMOUTH BLVD	RODMAN AVE	39.24
HAM	MERCURY BLVD	OLD BUCKROE RD	37.19
PORT	HIGH ST	PENINSULA AVE	33.73
HAM	MERCURY BLVD	MALLORY ST	32.84
HAM	LASALLE AVE	SETTLERS LANDING RD	32.51
GLO	ROUTE 198	ROUTE 606 (HARCUM RD)	31.45
HAM	POWHATAN PKWY	SHELL RD	29.97
HAM	PEMBROKE AVE	OLD BUCKROE RD	29.86
HAM	WOODLAND RD	COUNTY ST	28.29
SUF	CAROLINA RD	CYPRESS CHAPEL RD	25.14
FR	FOURTH AVE	HIGH ST	24.46
PORT	PORTSMOUTH BLVD	DES MOINES AVE	24.42
HAM	SETTLERS LANDING RD/QUEEN ST	PEMBROKE AVE	23.80
HAM	KECOUGHTAN RD	LASALLE AVE	22.83
HAM	LASALLE AVE	SHELL RD	22.63
PORT	ELM AVE	COUNTY ST	21.87
JCC	MONTICELLO AVE/JOHN TYLER HWY	JOHN TYLER HWY	21.36
HAM	PEMBROKE AVE	ABERDEEN RD	21.36
HAM	WOODLAND RD	MERCURY BLVD	20.83
NN	25TH ST	CHESTNUT AVE	20.48
GLO	ROUTE 216 (GUINEA RD)	ROUTE 641 (LOW GROUND RD)	20.38
PORT	GEORGE WASHINGTON HWY	VICTORY BLVD	20.25
NN	ROANOKE AVE	39TH ST	19.43
HAM	LASALLE AVE	VICTORIA BLVD	19.28
HAM	PEMBROKE AVE	EATON ST	18.59
NN	ROANOKE AVE	48TH ST	18.45
HAM	ABERDEEN RD	ALUMINUM AVE	18.11

FIGURE 40 – HAMPTON ROADS INTERSECTIONS WITH THE HIGHEST FATAL AND SERIOUS INJURY CRASH RATES, 2017-2021

Source: HRTPO analysis of VDOT data. Data includes all crashes that occurred within 250' (or 0.05 miles) of the intersection. Analysis only includes those intersections that are part of the Hampton Roads CMP network as defined in this study.

Potential for Safety Improvement (PSI)

The Potential for Safety Improvement (PSI) examines the difference between the number of crashes that occur at a location compared to the number of crashes that would be predicted to occur based on the facility's roadway and traffic characteristics. This difference between observed and predicted crashes is referred to as the PSI.

Figure 41 shows the intersections in Hampton Roads with the highest PSI rankings. In addition, **Figures 50-53** on pages 52-55 include maps showing the PSI rankings for each segment and intersection that is included in the VDOT Hampton Roads District Top 400 segment and intersection lists. Potential for Safety Improvement information is also included in **Appendix C**.

The intersection in Hampton Roads with the highest Potential for Safety Improvement is Mercury Boulevard at Power Plant Parkway/Todds Lane in the City of Hampton, followed by the intersection of Mercury Boulevard at Armistead Avenue, also in Hampton. The intersection with the third highest PSI is Jefferson Avenue at Oyster Point Road in the City of Newport News.

DISTRICT PSI INTERSECTION RANK	JURIS-DICTION	MAJOR ROAD	MINOR ROAD
1	HAM	MERCURY BLVD	POWER PLANT PKWY/TODDS LN
2	HAM	MERCURY BLVD	ARMISTEAD AVE
3	NN	JEFFERSON AVE	OYSTER POINT RD
4	VB	FIRST COLONIAL RD	VA BEACH BLVD
5	HAM	MERCURY BLVD	ABERDEEN RD
6	NN	JEFFERSON AVE	J CLYDE MORRIS BLVD
7	HAM	HRC PKWY	BIG BETHEL RD
8	VB	HOLLAND RD	ROSEMONT RD
9	HAM	MERCURY BLVD	CUNNINGHAM DR
10	PORT	GEORGE WASHINGTON HWY	VICTORY BLVD
11	VB	INDIAN RIVER RD	KEMPSVILLE RD
12	VB	INDEPENDENCE BLVD	BONNEY RD/EUCLID RD
13	HAM	ARMISTEAD AVE	LASALLE AVE
14	VB	PRINCESS ANNE RD	LYNNHAVEN PKWY
15	VB	VIRGINIA BEACH BLVD	GREAT NECK RD/LONDON BRIDGE RD
16	HAM	MERCURY BLVD	BIG BETHEL RD
17	HAM	SETTLERS LANDING RD	TYLER ST/I-64 RAMP
18	NN	WARWICK BLVD	OYSTER POINT RD
19	VB	NEWTOWN RD	BAKER RD
20	NN	JEFFERSON AVE	BLAND BLVD
21	VB	GENERAL BOOTH BLVD	DAM NECK RD
22	NN	JEFFERSON AVE	DENBIGH BLVD
23	SUF	BRIDGE RD	COLLEGE DR
24	HAM	POWER PLANT PKWY	BRIARFIELD RD/QUEEN ST
25	VB	INDEPENDENCE BLVD	VIRGINIA BEACH BLVD
26	VB	LYNNHAVEN PKWY	ROSEMONT RD
27	NN	MERCURY BLVD	JEFFERSON AVE
28	VB	LYNNHAVEN PKWY	HOLLAND RD
29	HAM	ARMISTEAD AVE	HRC PKWY/ARMISTEAD POINTE PKWY
30	HAM	WOODLAND RD	MERCURY BLVD

FIGURE 41 – HAMPTON ROADS VDOT DISTRICT INTERSECTIONS WITH THE HIGHEST POTENTIAL FOR SAFETY IMPROVEMENT, 2016-2020

Source: VDOT.

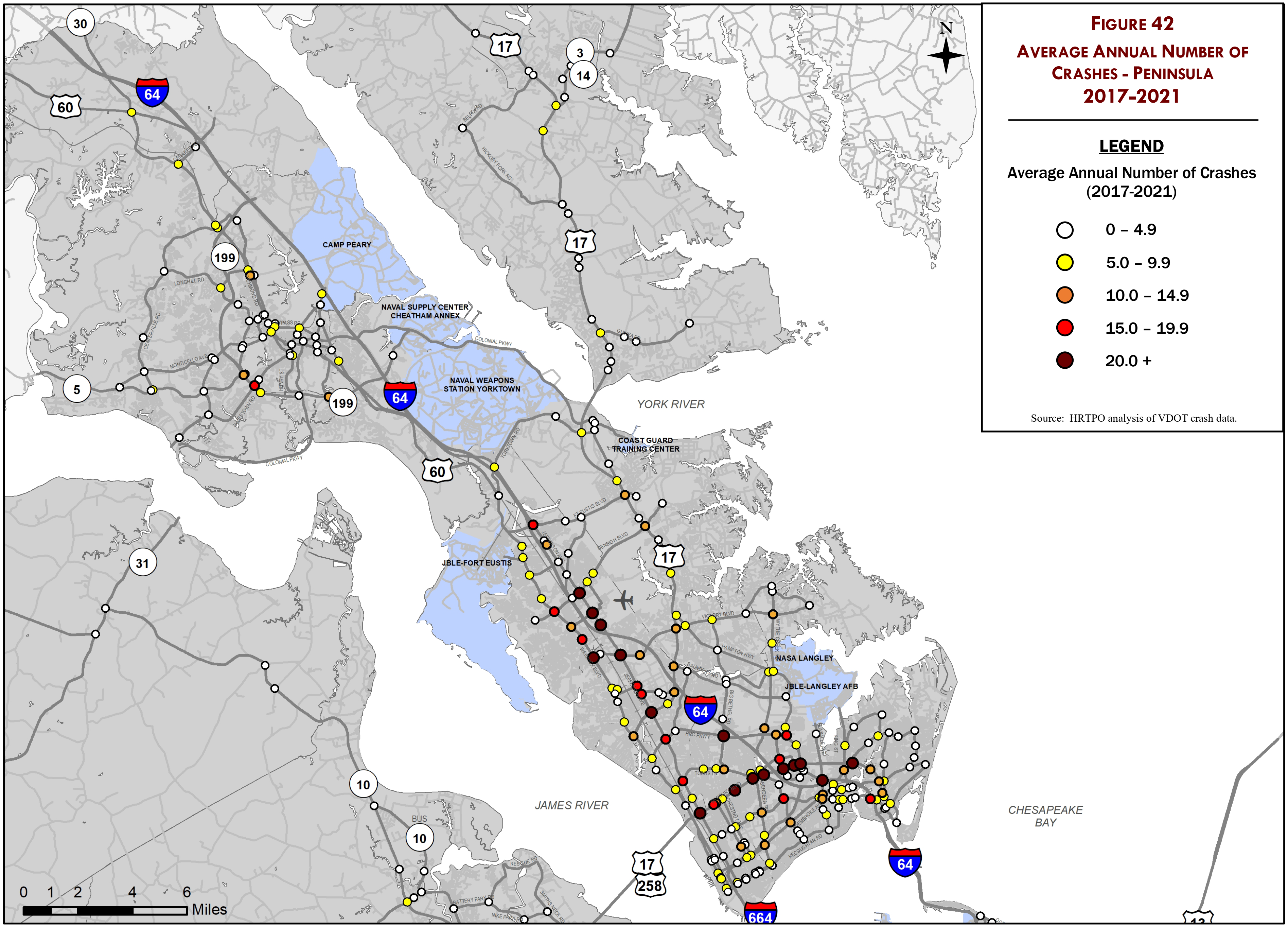


Figure 42
Average Annual Number of Crashes - Peninsula 2017-2021

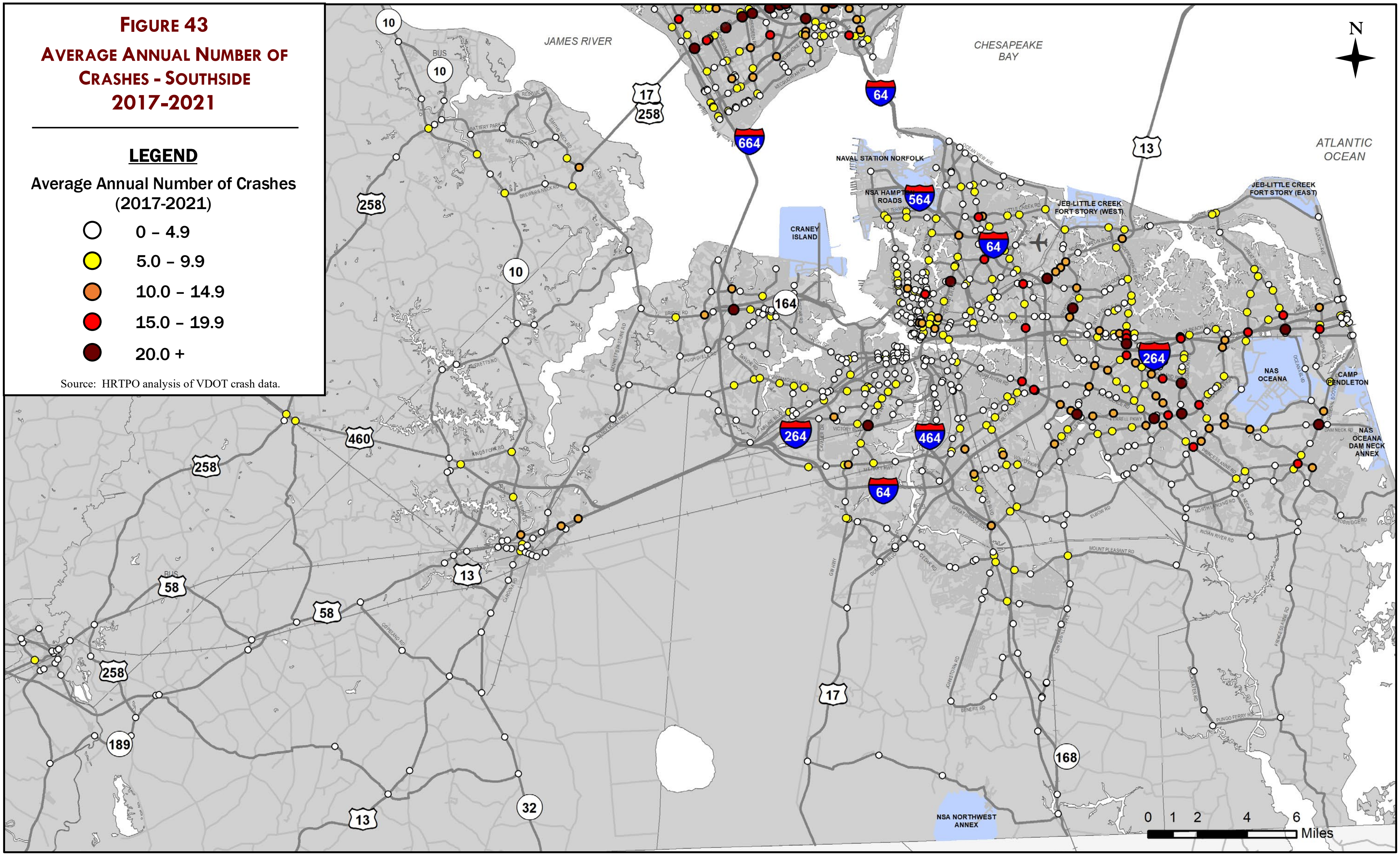


FIGURE 43
AVERAGE ANNUAL NUMBER OF CRASHES - SOUTHSIDE
2017-2021

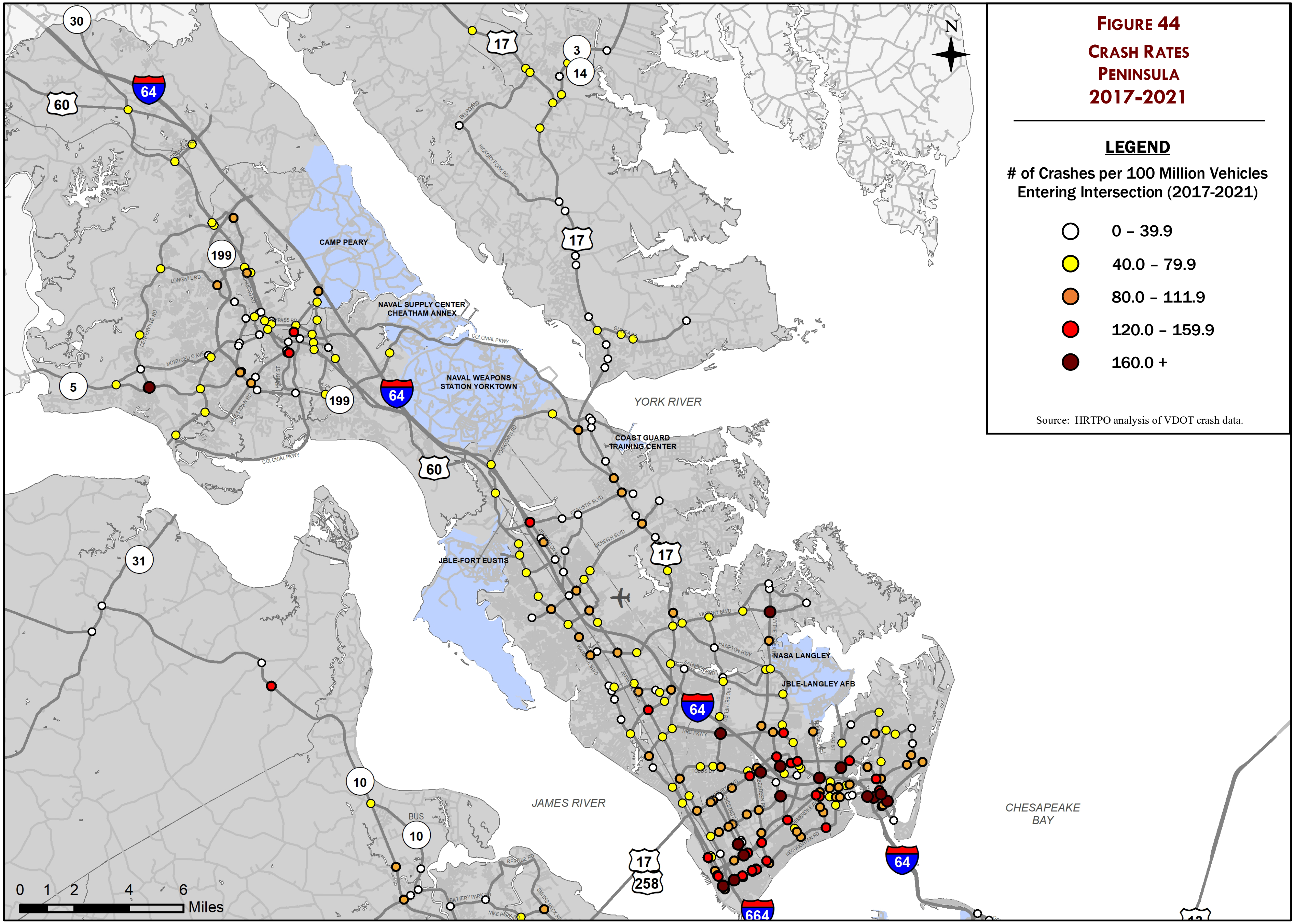
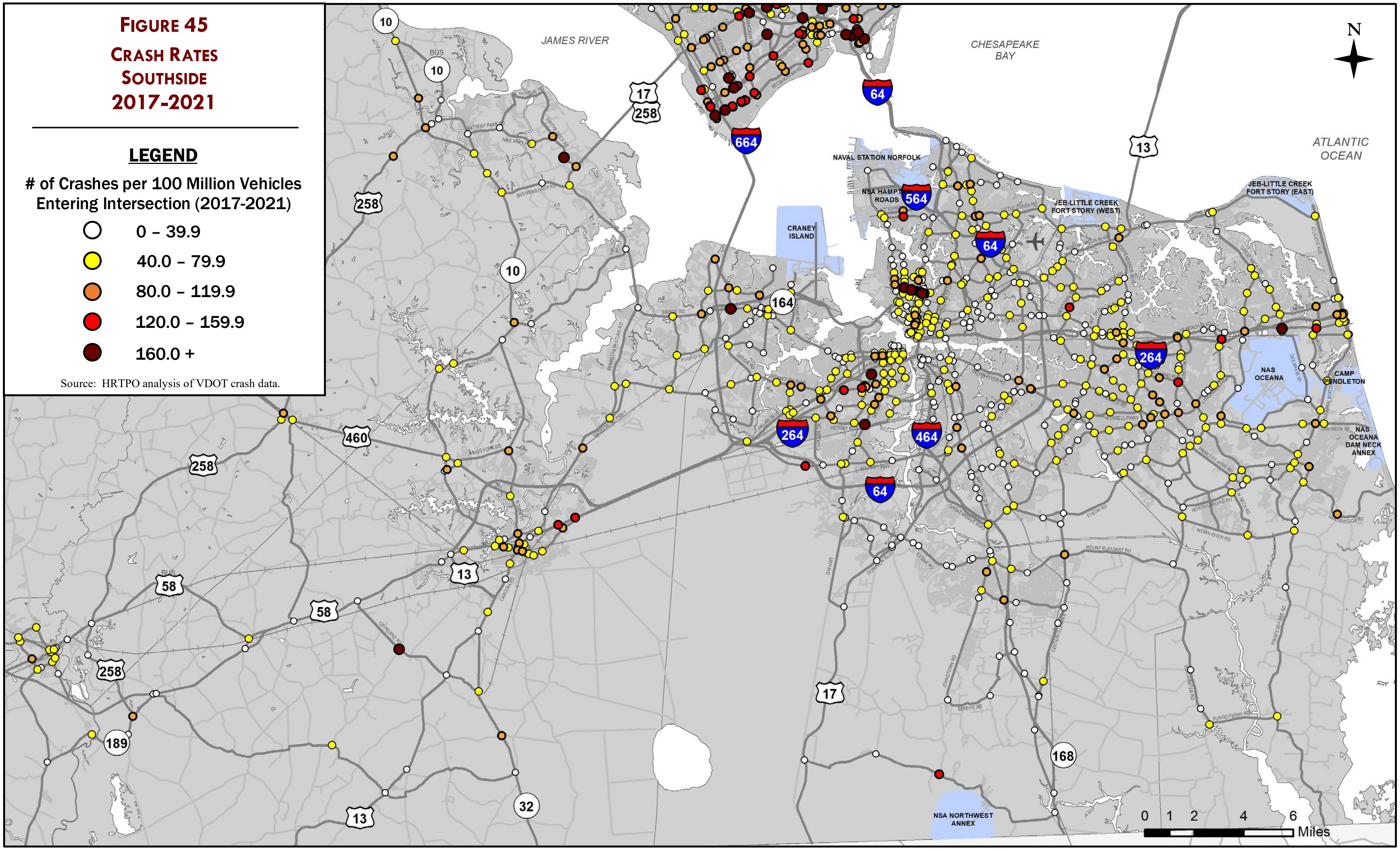


FIGURE 44
CRASH RATES
PENINSULA
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
YORK RIVER
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
JBLE-LANGLEY AFB
JAMES RIVER
CHESAPEAKE BAY
0 1 2 4 6 Miles



HAMPTON ROADS TPO

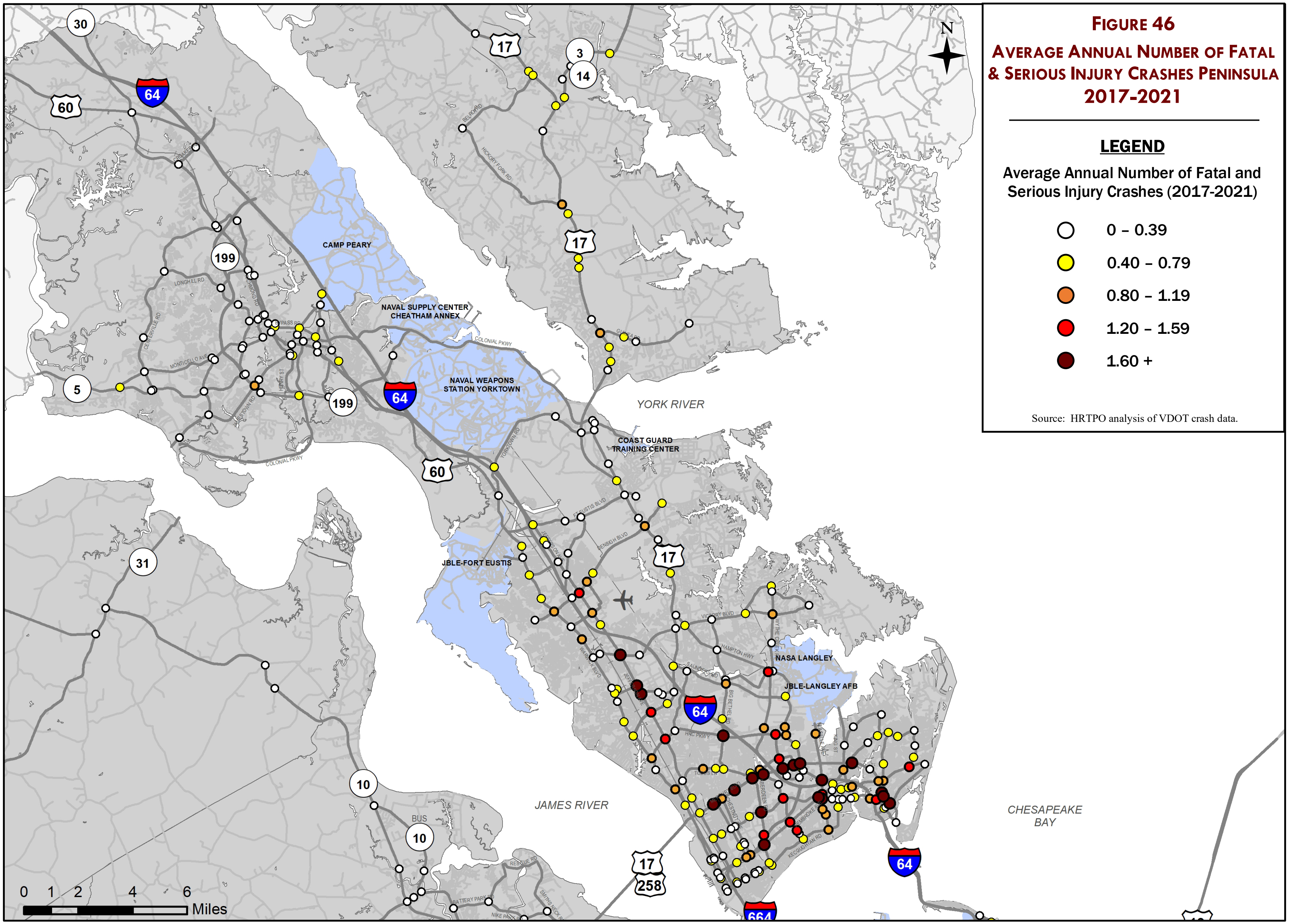


FIGURE 46
AVERAGE ANNUAL NUMBER OF FATAL & SERIOUS INJURY CRASHES PENINSULA 2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
YORK RIVER
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
JBLE-LANGLEY AFB
JAMES RIVER
CHESAPEAKE BAY
0 1 2 4 6 Miles

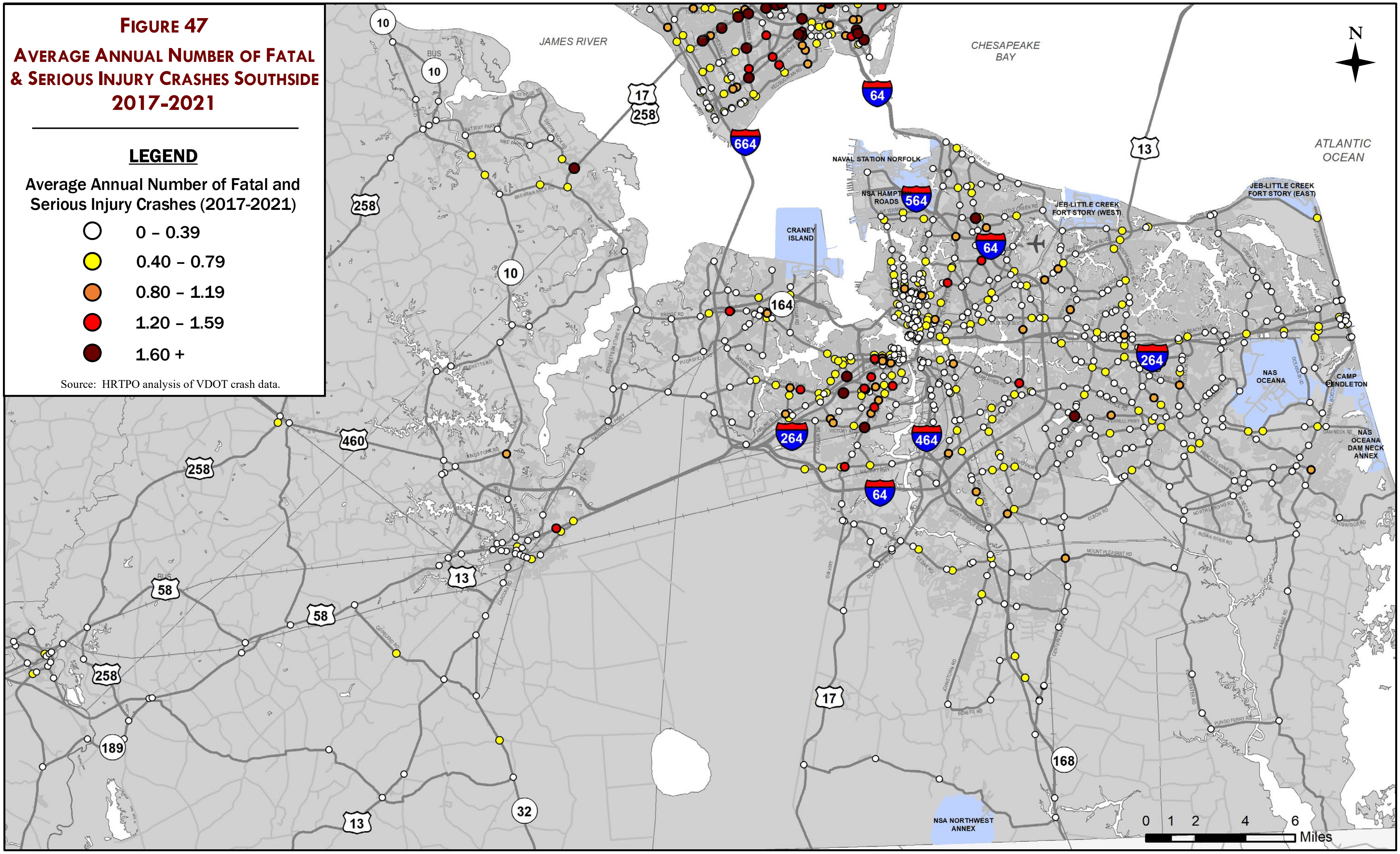


FIGURE 47
AVERAGE ANNUAL NUMBER OF FATAL & SERIOUS INJURY CRASHES SOUTHSIDE 2017-2021

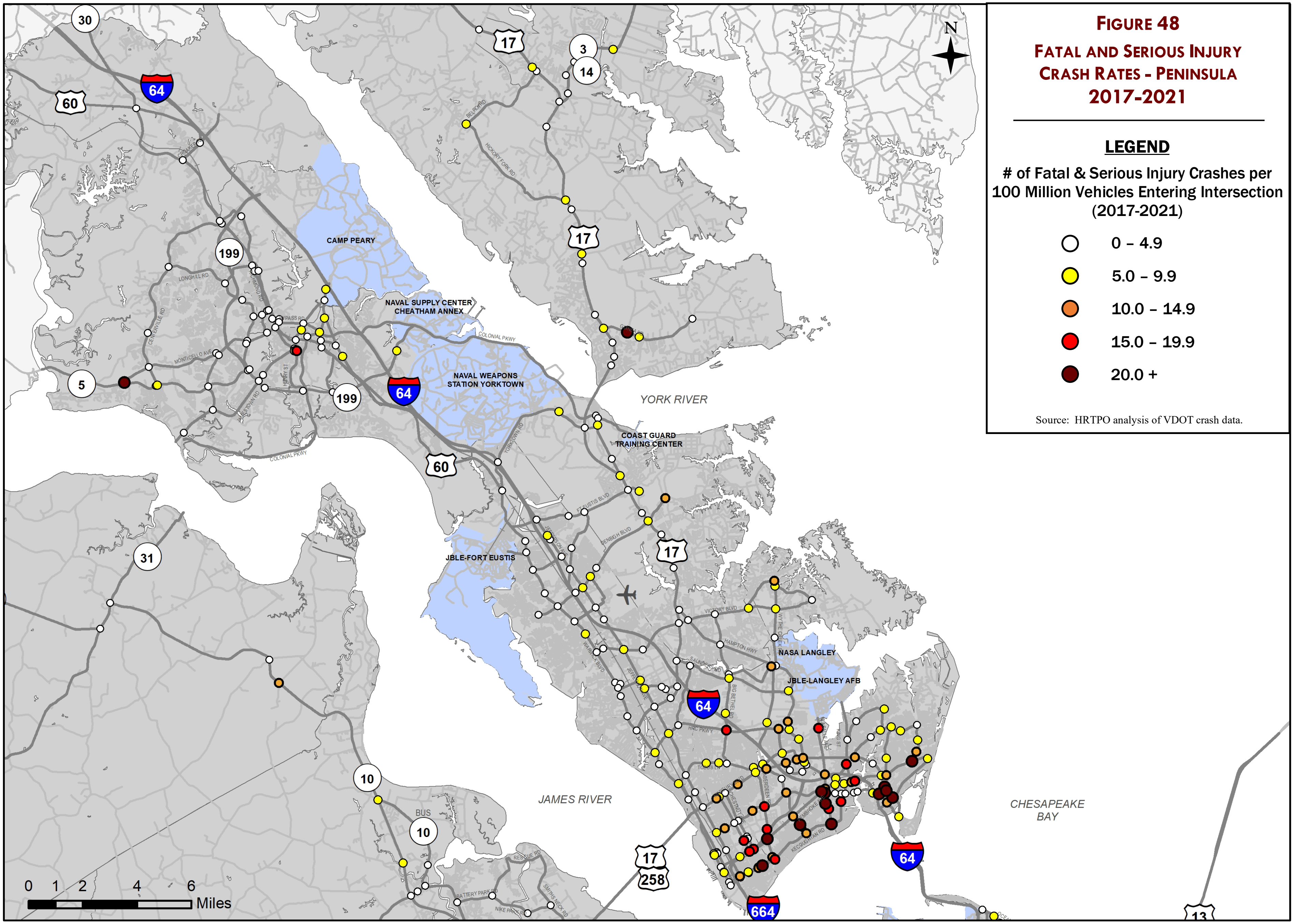


FIGURE 48
FATAL AND SERIOUS INJURY CRASH RATES - PENINSULA 2017-2021

LEGEND

\# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)

- 0 – 4.9
- 5.0 – 9.9
- 10.0 – 14.9
- 15.0 – 19.9
- 20.0 +

Source: HRTPO analysis of VDOT crash data.

HAMPTON ROADS TPO

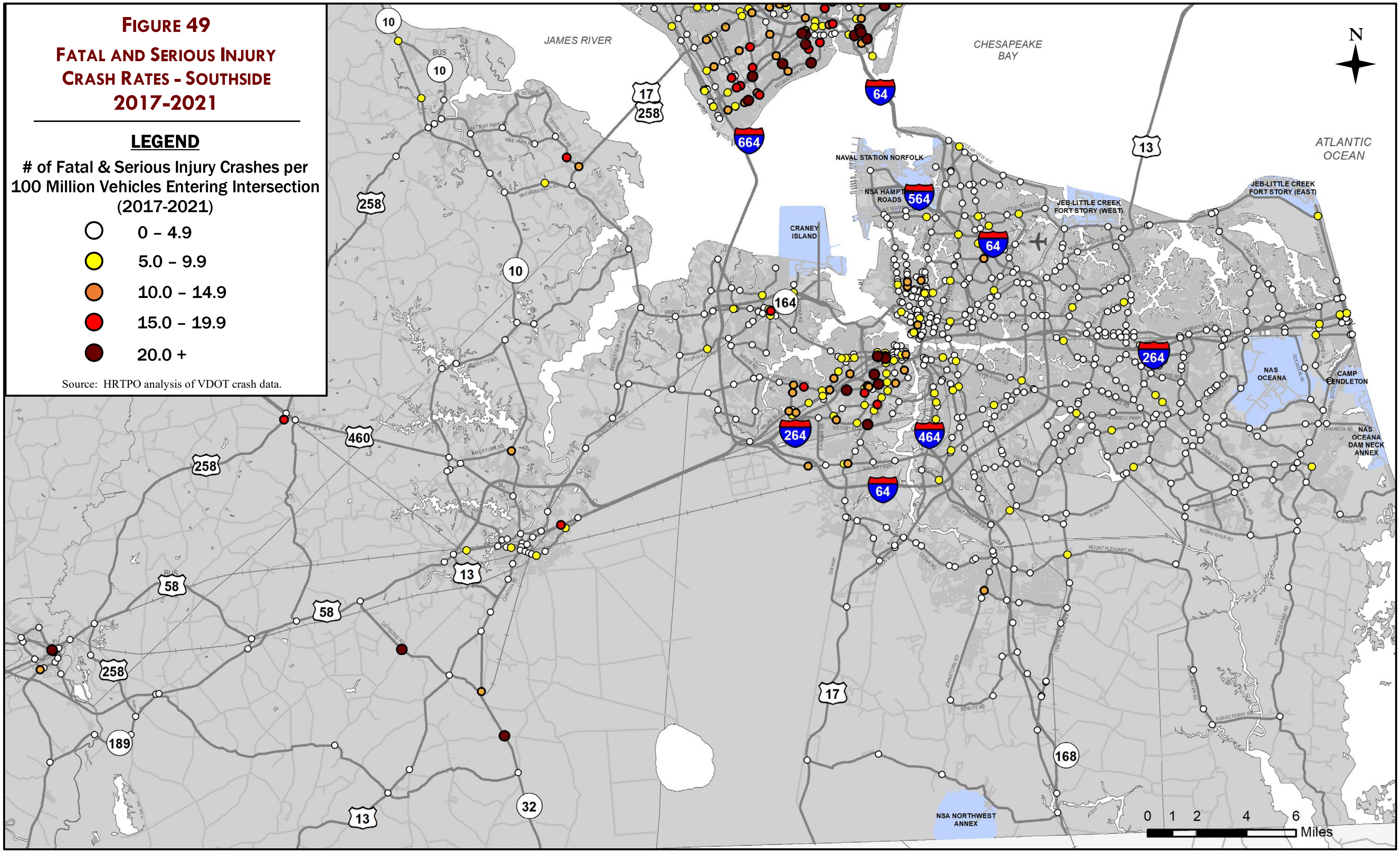
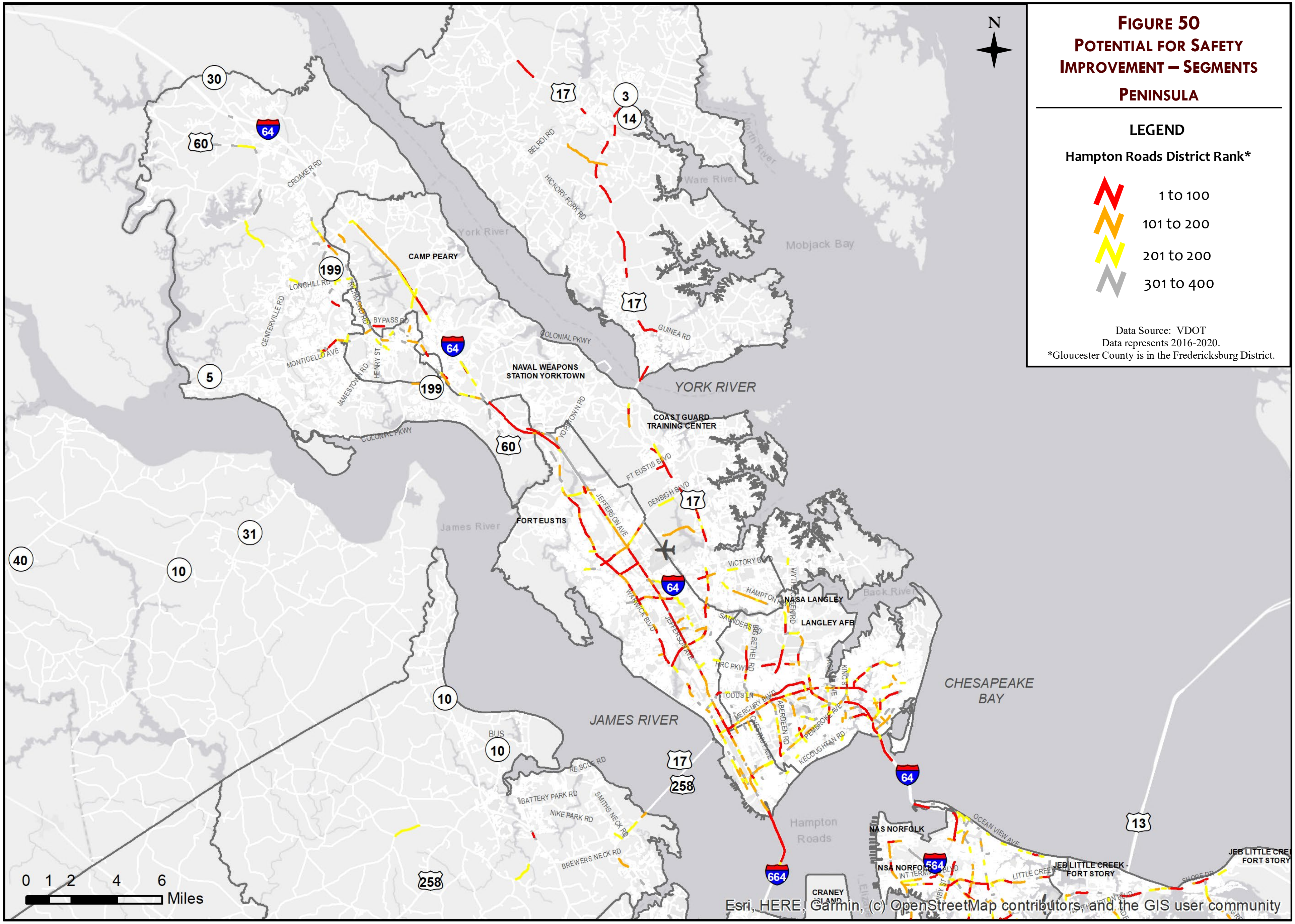


FIGURE 49
FATAL AND SERIOUS INJURY CRASH RATES - SOUTHSIDE
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NAVAL STATION NORFOLK
NSA HAMPTON ROADS
CRANEY ISLAND
JEB-LITTLE CREEK FORT STORY (WEST)
JEB-LITTLE CREEK FORT STORY (EAST)
NAS OCEANA
CAMP PENDLETON
NAS OCEANA DAM NECK ANNEX
NSA NORTHWEST ANNEX
N
0 1 2 4 6
Miles

Figure 50
Potential for Safety Improvement – Segments
Peninsula



HAMPTON ROADS TPO

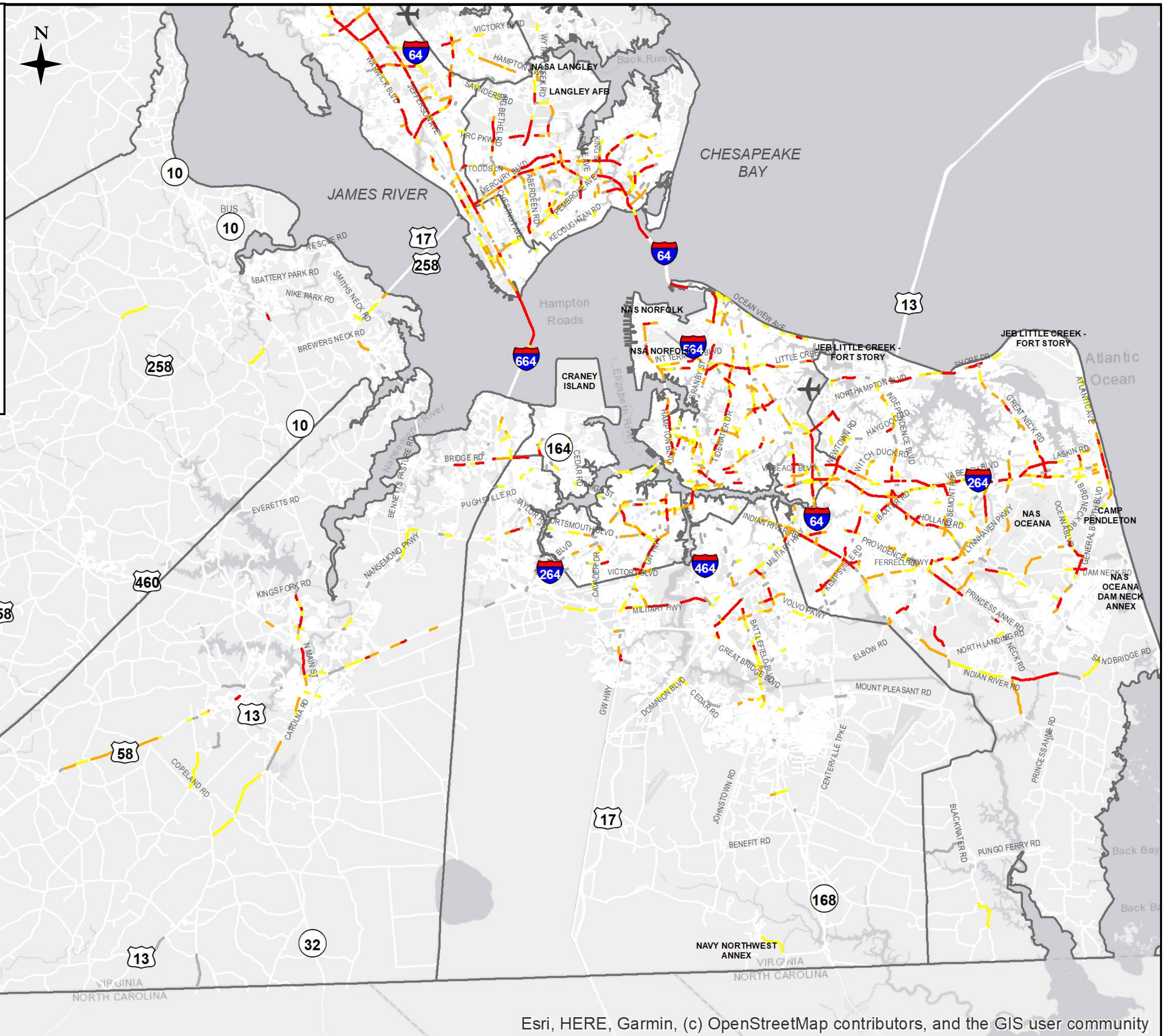
Figure 51
Potential for Safety Improvement – Segments
Southside

LEGEND

Hampton Roads District Rank

1 to 100
101 to 200
201 to 200
301 to 400

Data Source: VDOT
Data represents 2016-2020.



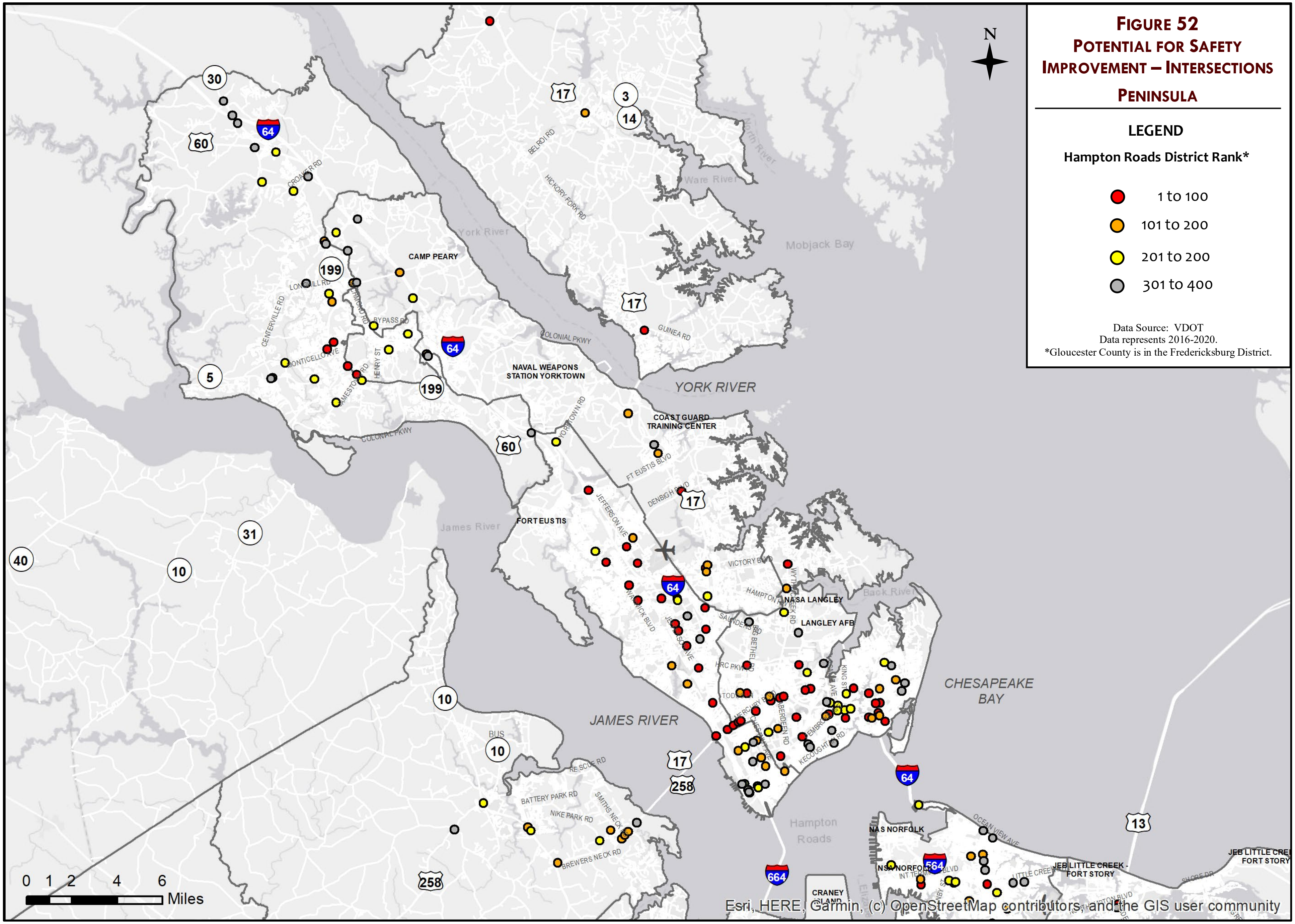


FIGURE 52
POTENTIAL FOR SAFETY IMPROVEMENT – INTERSECTIONS
PENINSULA
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
Data Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
N
CAMP PEARY
NAVAL WEAPONS STATION YORKTOWN
COAST GUARD TRAINING CENTER
FORT EUSTIS
NASA LANGLEY
LANGLEY AFB
NAS NORFOLK
NSA NORFOLK
CRANEY ISLAND
JEB LITTLE CREEK - FORT STORY
YORK RIVER
JAMES RIVER
CHESAPEAKE BAY
York River
James River
Ware River
Mobjack Bay
Back River
Hampton Roads
0 1 2 4 6 Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

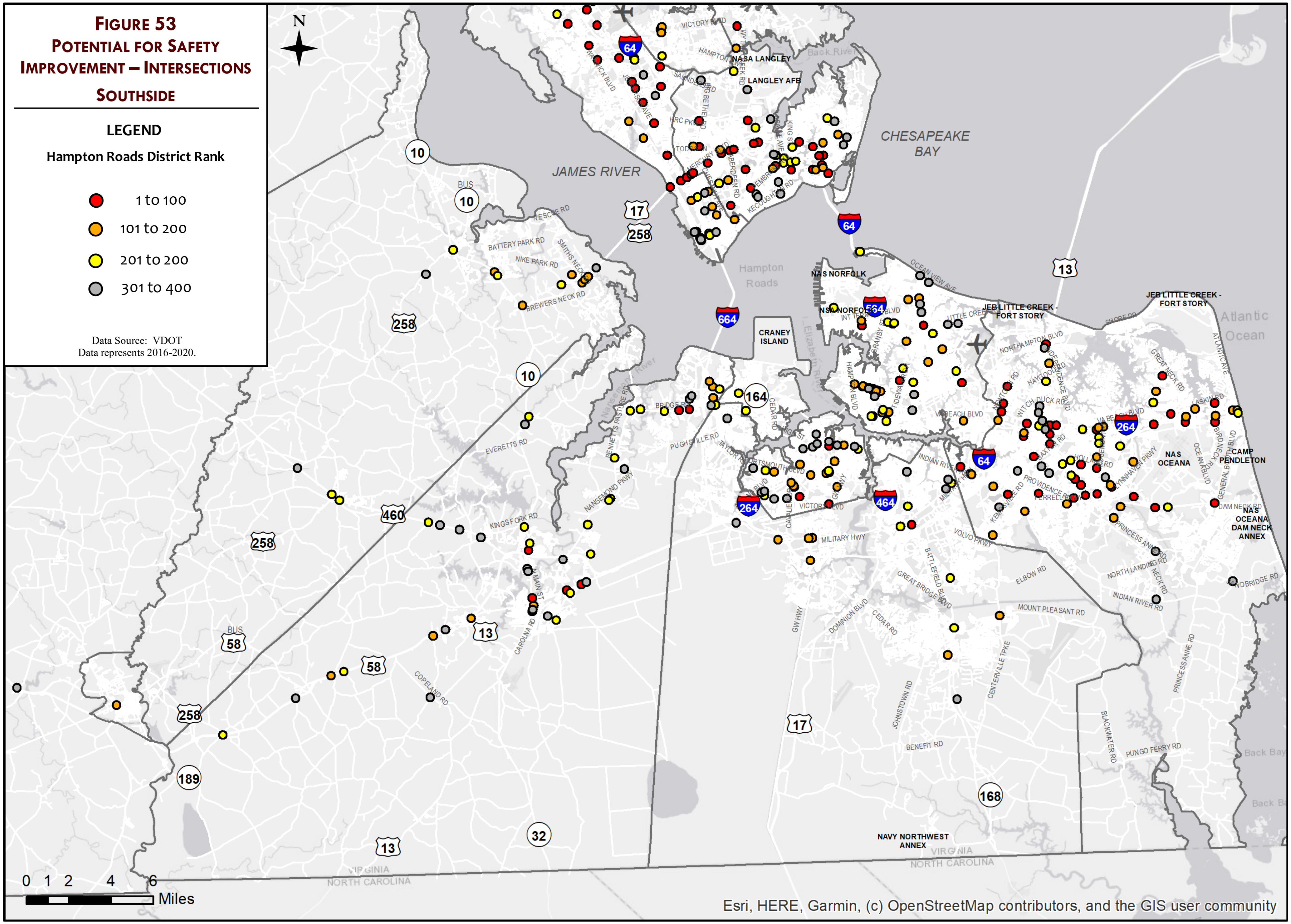


Figure 53
Potential for Safety Improvement – Intersections
Southside
LEGEND
Hampton Roads District Rank
1 to 100
101 to 200
201 to 200
301 to 400
Data Source: VDOT
Data represents 2016-2020.
N
JAMES RIVER
CHESAPEAKE BAY
Hampton Roads
NASA LANGLEY
LANGLEY AFB
NAS NORFOLK
CRANEY ISLAND
JEB LITTLE CREEK - FORT STORY
NAS OCEANA
CAMP PENDLETON
NAS OCEANA DAM NECK ANNEX
NAVY NORTHWEST ANNEX
Atlantic Ocean
VIRGINIA
NORTH CAROLINA
0 1 2 4 6
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Active Transportation Crashes

Bicyclists and pedestrians are some of the most vulnerable users of the transportation network. Although bicyclists and pedestrians only comprised 2% of the total crashes in Hampton Roads over the last decade, they comprised 22% of the fatalities in the region during this period.

The number of crashes involving bicyclists and pedestrians in Hampton Roads has largely decreased over the last decade, but the number of fatalities suffered in these crashes has increased. As shown in **Figure 54**, there were 167 crashes involving bicyclists and 356 crashes involving pedestrians in 2021. These crashes resulted in 6 bicyclist fatalities and 35 pedestrian fatalities (**Figure 55**).

The Hampton Roads locality with the most bicyclist and pedestrian crashes in 2021 was Virginia Beach, with 138 active transportation crashes, followed by Norfolk (112 active transportation crashes) and Newport News (84 crashes). The locality with the most active transportation fatalities in 2021 was Norfolk (10 fatalities), followed by Newport News (9 fatalities) and Virginia Beach (8 fatalities). The number of active transportation crashes and fatalities in each locality is shown in **Figure 56** on page 57.

As part of this study, HRTPO staff also analyzed those crashes in Hampton Roads involving bicyclists and pedestrians for the years 2017-2021. The locations and severity of active transportation crashes are shown in **Figures 58-61** on pages 58-61.

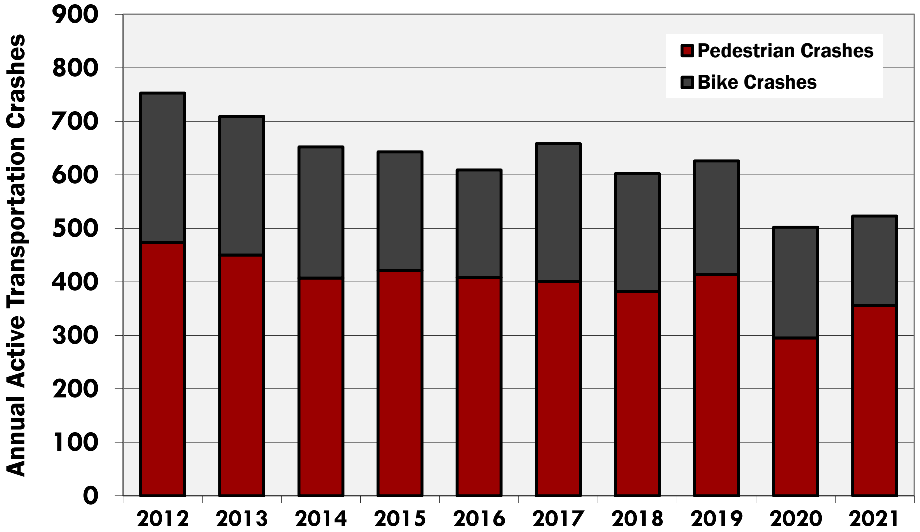


Figure 54 - Crashes Involving Pedestrians or Bicyclists in Hampton Roads, 2012-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

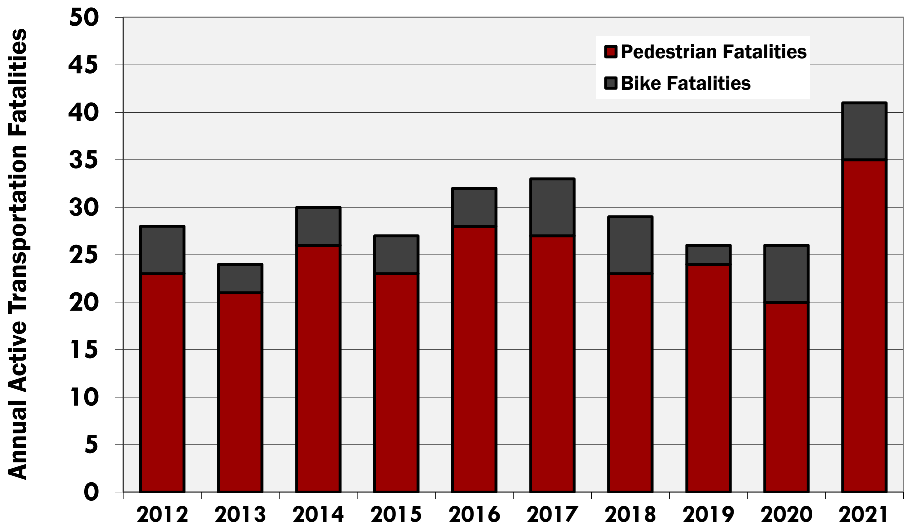


Figure 55 – Pedestrian/Bicyclist Fatalities in Hampton Roads, 2012-2021

Source: HRTPO analysis of Virginia Department of Motor Vehicles (DMV) data.

Based on the locations of bicyclist and pedestrian crashes, VDOT has identified top-priority crash clusters as part of their Pedestrian Safety Action Plan (PSAP), which is described later in this report. These clusters are "hot spots" where a higher number of pedestrian crashes have occurred in close proximity to one another over short roadway segments or intersections.

The locations of these crash clusters in Hampton Roads from PSAP Version 3.0 are described in **Figure 57** and are shown in **Figures 59 and 61** on pages 59 and 61.

JURIS-DICTION	LOCATION
HAM	PEMBROKE AVE NEAR SHELTON RD
NN	DENBIGH BLVD EAST OF WARWICK BLVD
NN	JEFFERSON AVE NORTH OF MERCURY BLVD
NN	WARWICK BLVD NEAR HIDEN BLVD
NN	WASHINGTON AVE NEAR 45TH ST
NOR	21ST ST EAST OF COLLEY AVE
NOR	AZALEA GARDEN RD NEAR PRINCESS ANNE RD
NOR	HAMPTON BLVD NEAR 27TH ST
NOR	LITTLE CREEK RD NEAR NEWPORT AVE
NOR	MILITARY HWY NEAR POPLAR HALL DR
NOR	TIDEWATER DR NEAR GUY AVE
PORT	HIGH ST NEAR CONSTITUTION AVE
PORT	LONDON BLVD NEAR HATTON ST
VB	BIRDNECK RD NEAR MARABOU LN
VB	NEWTOWN RD NEAR BAKER RD
VB	PACIFIC AVE NEAR 10TH ST
VB	PACIFIC AVE NEAR 24TH ST
VB	PACIFIC AVE NEAR 34TH ST
VB	VIRGINIA BEACH BLVD EAST OF BIRDNECK RD
VB	VIRGINIA BEACH BLVD NEAR WITCHDUCK RD

Figure 57 – Hampton Roads Pedestrian Crash Clusters Based on the VDOT Pedestrian Safety Action Plan

Source: VDOT.

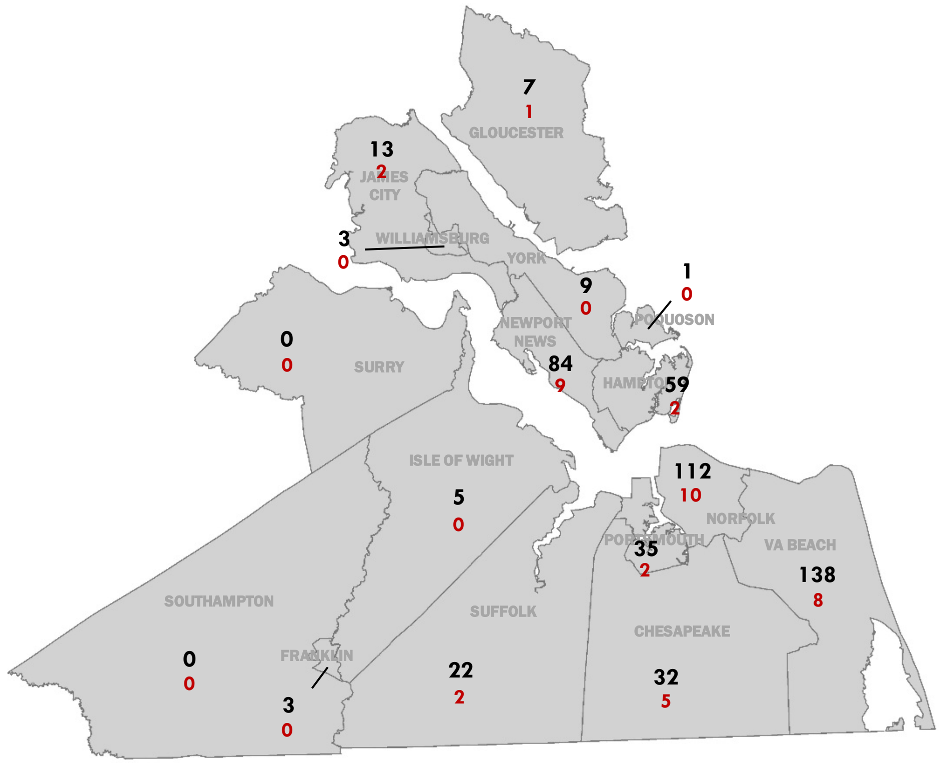


Figure 56 – Active Transportation Crashes and Fatalities by Jurisdiction, 2021

Source: HRTPO analysis of Virginia DMV data.

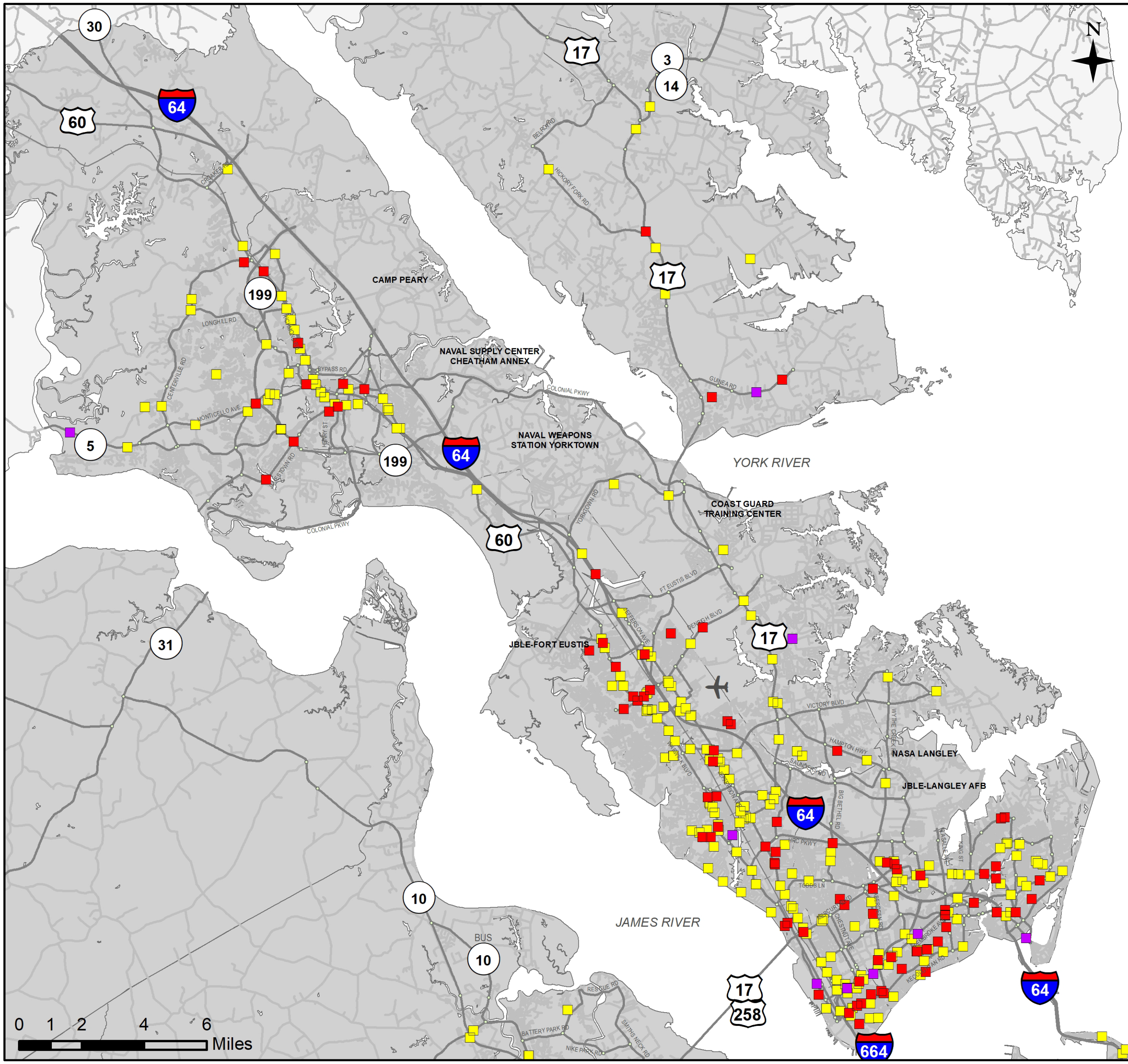


FIGURE 58
CRASHES INVOLVING BICYCLISTS
PENINSULA
2017-2021

LEGEND

Crash Severity

- Fatal
- Serious Injury
- Other/No Injury

Source: HRTPO analysis of VDOT crash data.

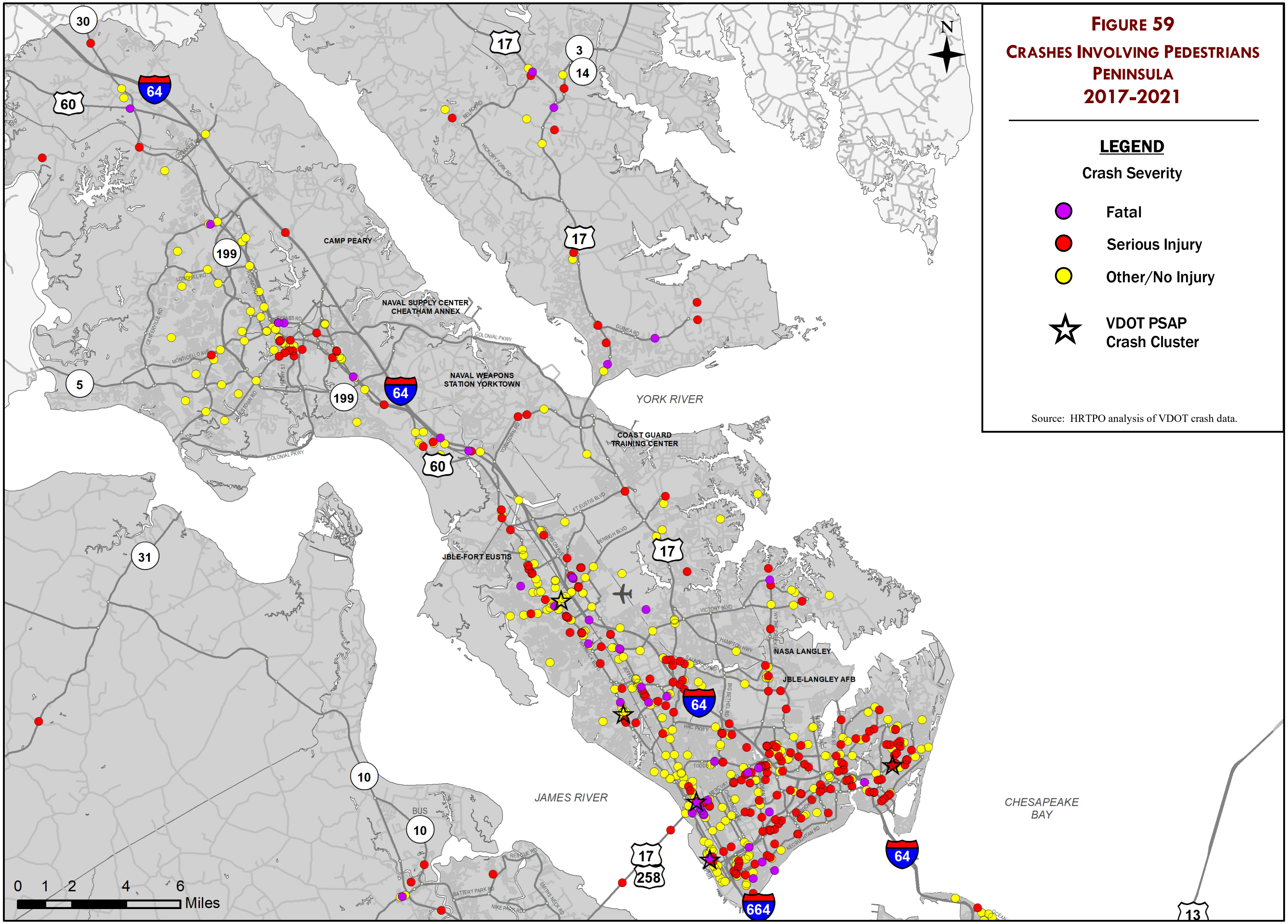


FIGURE 59
CRASHES INVOLVING PEDESTRIANS
PENINSULA
2017-2021
LEGEND
Crash Severity
Fatal
Serious Injury
Other/No Injury
VDOT PSAP
Crash Cluster
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER
CHEATHAM ANNEX
NAVAL WEAPONS
STATION YORKTOWN
YORK RIVER
COAST GUARD
TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
JBLE-LANGLEY AFB
JAMES RIVER
CHESAPEAKE
BAY
0 1 2 4 6
Miles

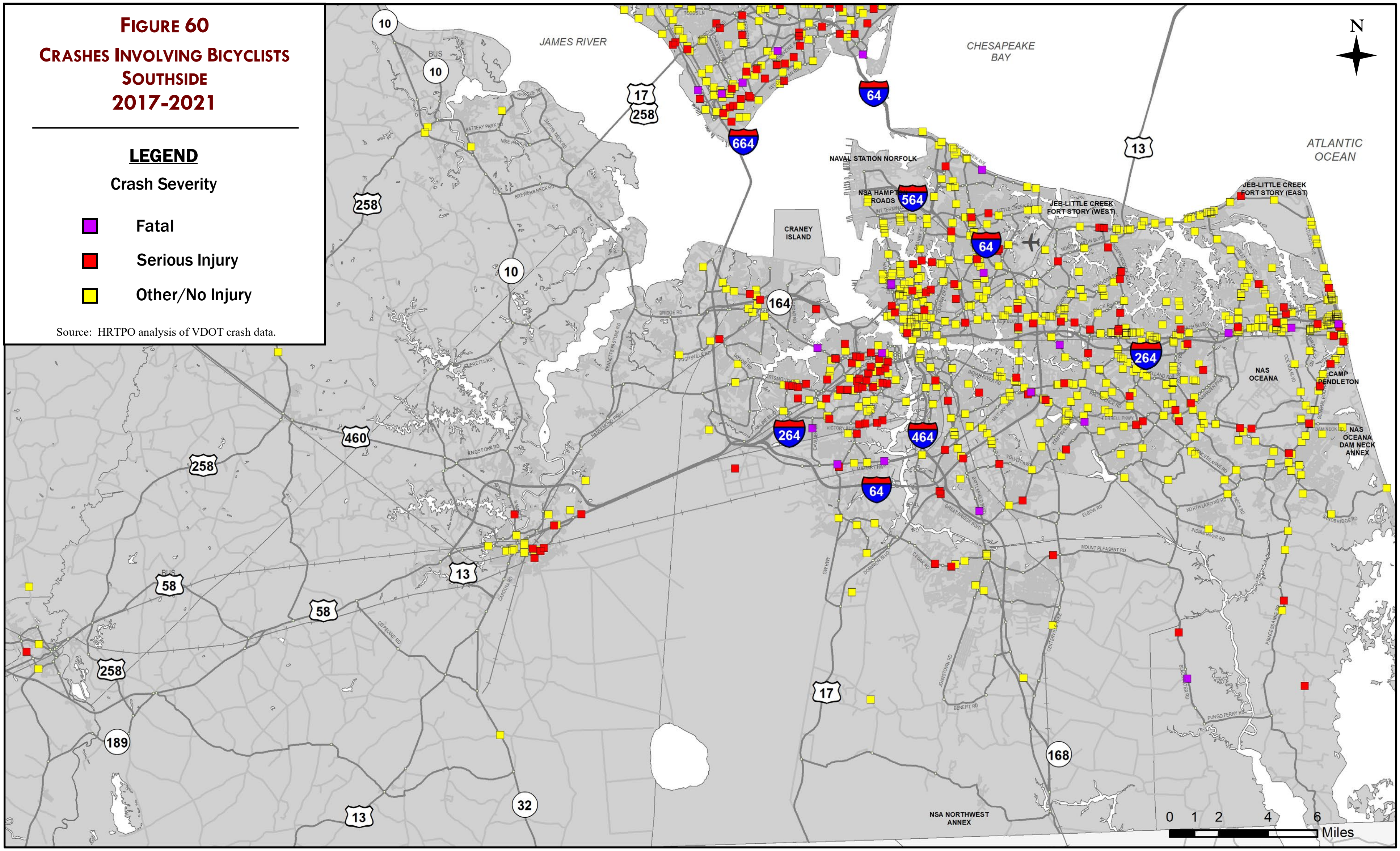
Figure 60
Crashes Involving Bicyclists Southside
2017-2021

LEGEND

Crash Severity

- Fatal
- Serious Injury
- Other/No Injury

Source: HRTPO analysis of VDOT crash data.



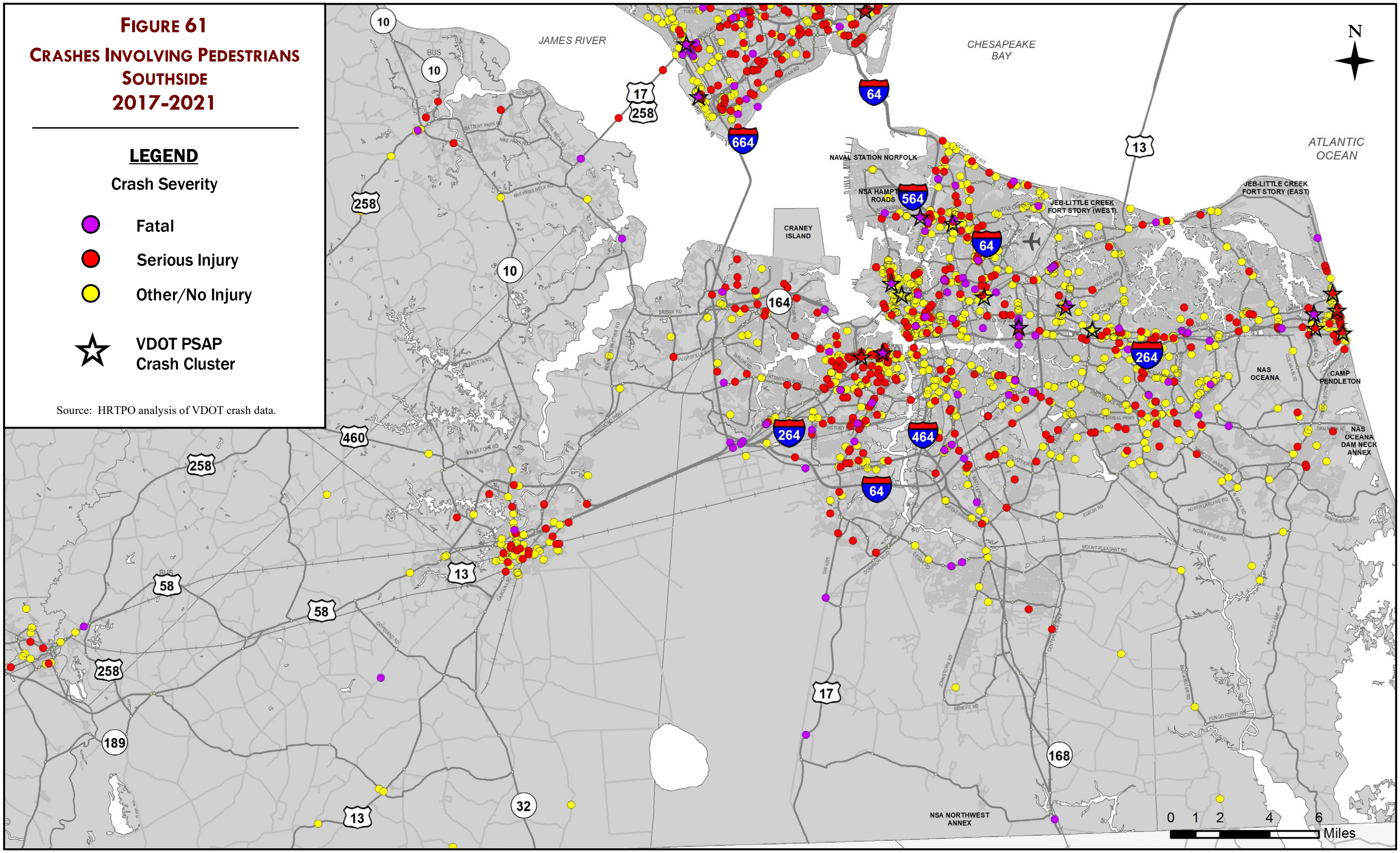


FIGURE 61
CRASHES INVOLVING PEDESTRIANS
SOUTHSIDE
2017-2021
LEGEND
Crash Severity
Fatal
Serious Injury
Other/No Injury
VDOT PSAP
Crash Cluster
Source: HRTPO analysis of VDOT crash data.
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NAVAL STATION NORFOLK
NSA HAMPTON ROADS
CRANEY ISLAND
JEB-LITTLE CREEK FORT STORY (WEST)
JEB-LITTLE CREEK FORT STORY (EAST)
NAS OCEANA
CAMP PENDLETON
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Efforts to Improve Roadway Safety

There are a wide range of efforts currently underway to continue improving roadway safety. This section starts by explaining the major "E" categories for improving roadway safety. The remainder of this section provides a detailed description of several ongoing efforts to improve roadway safety on a national, statewide, and local level, including:

- **Safe System Approach** – The Safe System Approach assumes that humans make mistakes and that human bodies have a limited ability to tolerate crash impacts. The Safe System approach involves anticipating these mistakes by designing road infrastructure to keep the risk of a mistake low, but when the mistake does lead to a crash, the impact does not result in a fatality or serious injury.

- **A Future with Zero –** Under Vision Zero and other similar programs, no amount of traffic related deaths and serious injuries is acceptable. The long-term goal is to have zero deaths and serious injuries occurring from traffic collisions.

- **Federal Safety Planning Efforts –** The US Department of Transportation recently released the National Roadway Safety Strategy, which is the federal blueprint that outlines a comprehensive approach to significantly reduce serious injuries and deaths on the nation's roadways.

- **Virginia Safety Planning Efforts** – Strategic Highway Safety Plans (SHSP) and Highway Safety Plans (HSPs) are federally-required documents that provide a comprehensive framework for improving statewide roadway safety. In addition, Virginia has produced plans to improve safety for pedestrians and bicyclists.

- **Highway Safety Manual** – The American Association of State Highway Transportation Officials (AASHTO) released the first edition of the Highway Safety Manual, which assists with determining the impact of transportation planning decisions on roadway safety, selecting safety countermeasures, comparing alternatives, and prioritizing safety projects.

- **Road Safety Audits** – A Road Safety Audit (RSA) is a formal and independent safety performance review of an existing or future road or intersection by an experienced team of safety specialists, addressing the safety of all road users.

- **Safety Laws** – Examples of these laws include mandatory safety belt usage, prohibiting driving under the influence of drugs or alcohol, and prohibiting texting while driving.

- **Safety Funding Programs** – The Highway Safety Improvement Program (HSIP) is the primary funding mechanism for roadway safety improvements. In addition, recent federal legislation created the Safe Streets and Roads for All (SS4A) program to fund safety improvements. Funding is also available through DMV safety grants and other sources.

- **Hampton Roads Traffic Incident Management working group** – The Hampton Roads Regional Concept of Transportation Operations – Traffic Incident Management (RCTO-TIM) working group meets on a regular basis to develop and implement strategies to improve emergency response in the region.

- **Safety Programs and Educational Efforts** – There are a number of regional, statewide, and national organizations and programs that have been created to improve various roadway safety aspects.

- **Safety Projects in Hampton Roads** – This section details the safety benefits of a number of projects that have been completed throughout the region in recent years.

The Es of Safety

"The Es of Safety" is a term used by safety professionals that refers to the primary categories for addressing roadway safety: education, enforcement, engineering, and emergency response and medical services. In addition, safety officials also refer to two other Es – encouragement and evaluation. These are also discussed in this section.

Education

Educational campaigns and outreach solutions are often tailored to specific causes. Data obtained from crash databases help formulate public educational campaigns towards specific safety issues, such as the National Highway Traffic Safety Administration's "Drive Sober or Get Pulled Over" campaign to discourage drunk driving and the "Click It or Ticket" campaign to increase seat belt usage. The National Highway Traffic Safety Administration (NHTSA) and other traffic safety organizations allocate education resources on specific issues that are expected to improve safety in terms of reduced crashes, fatalities and injuries.

Continuing to educate motorists – particularly elderly citizens and young inexperienced drivers – through driver education classes and schools are important measures to improve safety. Community educational seminars provide the opportunity to promote safety and distribute material highlighting driving and safety tips. By educating motorists about changes in traffic safety laws, they can remain in compliance and create a safe travel environment. The long-term goal of educational efforts is to teach and promote safe driving techniques and measures in an effort to improve driving habits and overall safety.

Other education strategies include teaching walking and biking skills to children and adults. Educating motorists to be more aware of walkers and bikers is also important, particularly in areas of high activity such as downtown or beach areas.

There are also a number of campaigns related to the dangers of driving under the influence of drugs or alcohol. Organizations, such as Mothers Against Drunk Driving (MADD), provide outreach to raise awareness of the dangers of drinking and driving. MADD's mission is to stop drunk driving, support the victims of this crime and prevent underage drinking.

Enforcement

Law enforcement plays an important role in preventing and lessening the impact of crashes by enforcing traffic safety laws related to seat belt use, speeding, child passenger protection, impaired driving, expired licensing/registration, and distracted driving. Penalties, like fines or license suspension, should be significant enough to make people hesitant before breaking the rules. The goal is to catch violators in order to protect the general traveling public. Reductions to the number of law enforcement officers due to budget cuts put a major strain on the effectiveness of this safety measure. For this measure to be effective, both traffic regulatory laws and enforcement of those laws are essential.

Adding educational campaigns to enforcement can improve safety by changing driver habits and behavior. One example that has been successful is “Click it or Ticket”.

Technology can also play a role for enforcement agencies. Laptops installed in police cars can provide greater detail, such as the latitude and longitude of the crash, which is important information for analyzing safety. Data storage and analysis systems can help traffic law enforcers perform their jobs more efficiently and allow them to track repeat offenders and follow through with penalties. Installing cameras at high crash signalized intersections can also help enforce specific violations, such as red-light running. Localities have also implemented automated speed cameras in school zones with fines to deter speeding and improve safety in school areas.

Law enforcement officers are typically the first responder to arrive at the crash scene and are responsible for capturing important data including:

- Driver information, including license status and conviction history
- Violation committed
- Date and time of crash
- Weather and pavement conditions at the time of the crash
- Fatality and injury information
- Description of vehicles involved, including commercial vehicle data (e.g. driver, load)
- Property damage
- Other crash scene details, such as the reason for the crash

This data is typically stored in a statewide crash database and made available to localities and other planning agencies. This information is used to report state specific crash information to the federal government, which allocates resources to address safety issues and prioritizes traffic safety programs. Through detailed analysis of this crash data, state DOTs, public safety agencies, localities, and planning agencies, such as the HRTPO, can assist in making proactive funding decisions and prioritize safety recommendations based on countermeasures that yield the greatest return on investment.

Engineering

Roadway Improvements

Traffic engineers analyze data from police crash reports and site visits in order to recommend roadway-based engineering crash countermeasures. Some countermeasures include removing vegetation obstructions, improving lighting, improving signage,

adjusting curves, adding/extending turn lanes, installing rumble strips, adding a protective left-turn phase, and using traffic calming techniques like roundabouts and speed humps. Engineers use crash data to identify high-risk problem areas like short interstate ramps, busy intersections, or steep roadway grades to develop a list of potential roadway-based engineering safety improvements to reduce crash rates. These types of roadway-based engineering countermeasures are described further in the General Crash Countermeasures section of this report.

Safety systems are being developed to allow roadside devices to communicate with traveling vehicles. Some technologies that can improve the roadway environment include pavement sensors, lighting changes based on weather or time of day, advanced headlamps, and signaling warning systems.

Further research is underway to assist drivers in degraded roadway conditions, such as snow, ice, and fog. Some technologies include infrared reflective lane-edge markings that will enable drivers to stay in their lane during hazardous conditions and avoid roadway departures.

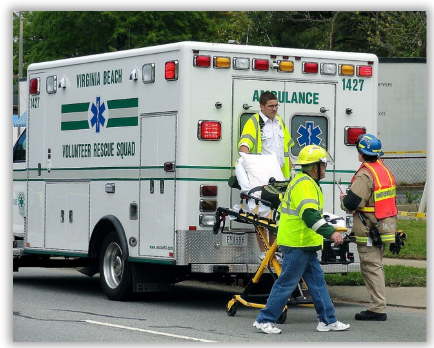
Vehicle Design Improvements

New technologies are being developed to alert drivers to potential unsafe conditions or to take over vehicle control when human reaction time is not sufficient. Many of these improvements are aimed at mitigating road departure, intersection, rear-end, and merging collisions. Partnerships and initiatives, such as Integrated Vehicle-Based Safety Systems, have been created between NHTSA and the automobile industry to develop and incorporate these pre-warning technologies into vehicles to improve overall safety.

According to NHTSA, vehicle-to-vehicle (V2V) communications can provide the vehicle and driver with 360-degree situational awareness to address crash situations. DOT research indicates that safety applications using this technology can address a large majority of crashes between two or more vehicles. NHTSA officials estimate that V2V communications could prevent up to 80 percent of crashes that don't involve drunken drivers or mechanical failure. The ultimate benefits of this technology would occur once most of the nation's entire vehicle fleet is equipped, which could take decades.

Vehicle safety engineers have also made strides in vehicle design to reduce injury severity. Each vehicle undergoes extensive crash tests to reduce the force of potential impacts to the front, sides, and rear. Tests to decrease the likelihood of rollovers are performed regularly. Sensors are strategically placed to effectively deploy air bags at impact. Improved seat belt designs as well as structure reinforcements are being improved to improve safety.

Emergency Response and Medical Services



Emergency Response and Medical Services is the post-crash care that involves the emergency responders who provide medical and trauma services after a crash has occurred.

The traveling public relies on first responders to provide timely emergency response at a crash site. First responders must quickly locate the crash, provide traffic control, stabilize any injury, and transport patients as necessary to an appropriate medical facility. These first responders, which often include Fire, Police, EMS, and the Safety Service Patrol, work in tandem to manage the incident to minimize injury, traffic backups, and the potential for secondary crashes.

Encouragement

Encouragement is an effective safety strategy for creating excitement and building momentum. Oftentimes, people need to be encouraged to use safe practices while driving, biking, and walking. Encouragement promotes safety and can be used to inform target audiences. Safety can be marketed as a healthy lifestyle, such as wearing helmets and seatbelts. Safety can be promoted through special events, such as Bike-to-Work Day or Free Car Seat and Booster Seat Inspection Days. Non-motorized travel can also be promoted through special events, such as hosting schoolwide competitions or celebrating walking or biking with student art or other projects. Walking and biking can also be encouraged through local recreation programs. Another effective strategy is to develop a public service announcement (PSA) advertisement campaign.

Evaluation

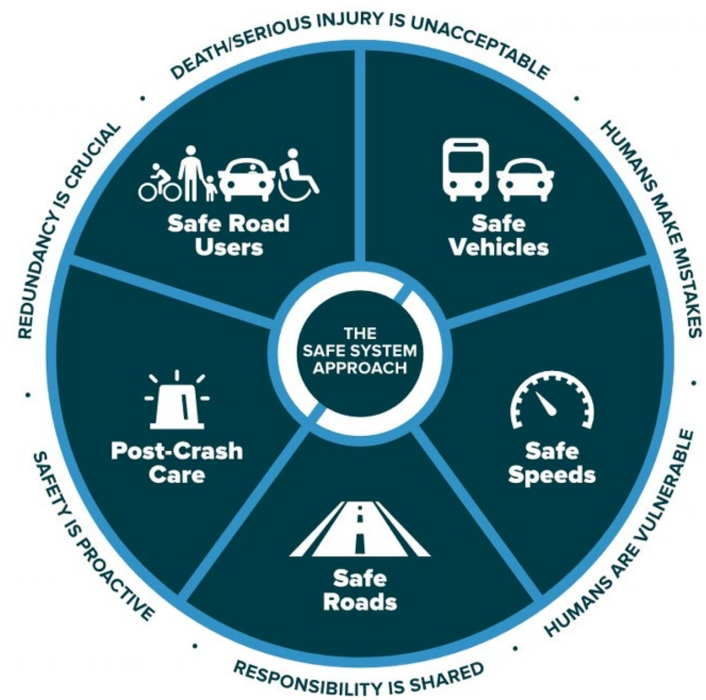
An important step is to determine if your strategies and safety improvements are effective and working. A program evaluation can provide continuous feedback in order to implement, evaluate, and improve safety areas. An evaluation also demonstrates the benefits of a program, such as increased walking/biking, congestion reduction, and user satisfaction. Some examples of evaluation would be schools and local governments that record and monitor walking and biking rates, crash patterns and rates, parent concerns, and traffic data. Student travel tallies and parent surveys are two methods for determining usage and measuring success. Evaluation activities can help set goals and establish baseline data for planning projects. Evaluation proves that you are making a difference.

Safe System Approach

In recent years there has been a new approach to roadway safety planning in the United States to reduce and hopefully eliminate fatalities and serious injuries. Referred to as the Safe System Approach, it takes the approach that humans make mistakes and that human bodies have a limited ability to tolerate crash impacts. The Safe System approach involves anticipating these mistakes by designing road infrastructure to keep the risk of a mistake low, but when the mistake does lead to a crash, the impact doesn't result in a fatality or serious injury. This is done through road design and operation that encourages safe speeds and manages the angle of crashes.

The Safe System Approach includes the following six principles:

- **Death/Serious Injury is Unacceptable** – While no crashes are desirable, the Safe System approach prioritizes crashes that result in death and serious injuries, since no one should experience either when using the transportation system.
- **Humans Make Mistakes** - People will inevitably make mistakes that can lead to crashes, but the transportation system can be designed and operated to accommodate human mistakes and injury tolerances and avoid death and serious injuries.
- **Humans Are Vulnerable** - People have limits for tolerating the forces resulting from a crash before death and serious injury occurs. It is critical to design and operate a transportation system that is human-centric and accommodates human vulnerabilities.
- **Responsibility is Shared** - All stakeholders (transportation system users and managers, vehicle manufacturers, etc.) must ensure that crashes don't lead to fatal or serious injuries.



Source: FHWA.

- **Safety is Proactive** - Proactive tools should be used to identify and mitigate latent risks in the transportation system, rather than waiting for crashes to occur and reacting afterwards.
- **Redundancy is Crucial** - Reducing risks requires that all parts of the transportation system are strengthened, so that if one part fails, the other parts still protect people.

The Safe System Approach considers five elements of a safe transportation system in an integrated and holistic manner. These elements are:

- **Safe Road Users** - The Safe System approach addresses the safety of all road users, including those who walk, bike, drive, ride transit, and travel by other modes.
- **Safe Vehicles** - Vehicles are designed and regulated to minimize the occurrence and severity of collisions using safety measures that incorporate the latest technology.
- **Safe Speeds** - Humans are unlikely to survive high-speed crashes. Reducing speeds can accommodate human injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility.
- **Safe Roads** - Designing to accommodate human mistakes and injury tolerances can greatly reduce the severity of crashes that do occur. Examples include physically separating people traveling at different speeds, providing dedicated times for different users to move through a space, and alerting users to hazards and other road users.
- **Post-Crash Care** - When a person is injured in a collision, they rely on emergency first responders to quickly locate them, stabilize their injury, and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site, traffic incident management, and other activities.

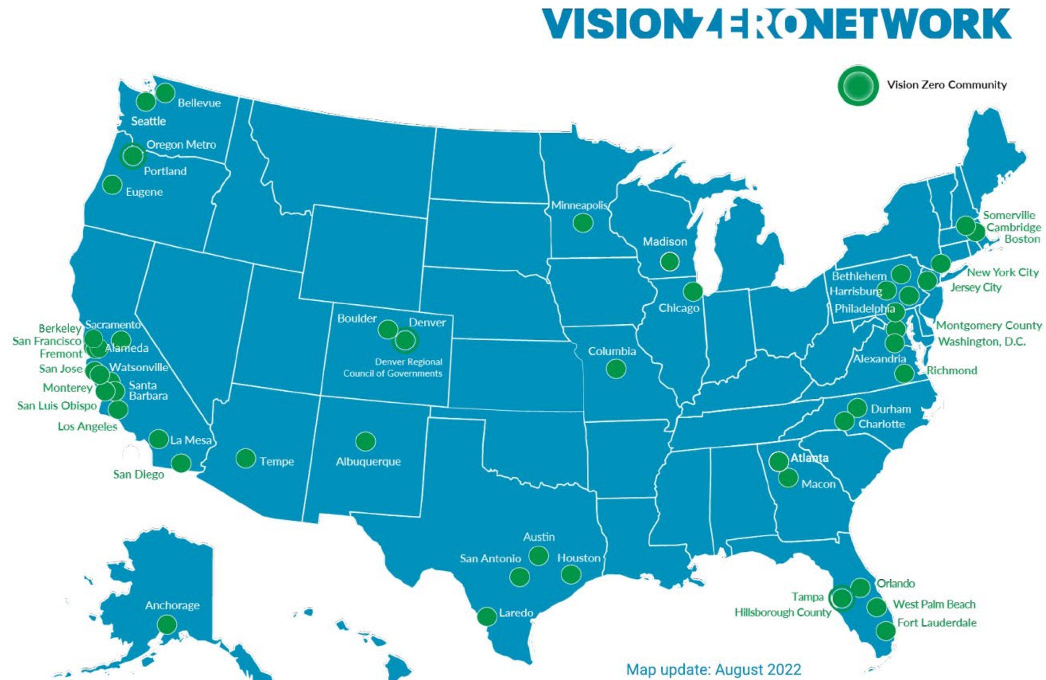
More information on the Safe System Approach is available on FHWA's website at https://safety.fhwa.dot.gov/zerodeaths/zero_deaths_vision.cfm.

A Future with Zero

The goal of achieving "Zero" that is associated with the Safe System Approach has ties leading back to Vision Zero. Vision Zero, a worldwide movement and strategy, aims to change how road safety is viewed and addressed. The long-term goal for Vision Zero is to have zero deaths and serious injuries occurring from traffic collisions. Vision Zero believes that no amount of traffic related deaths and serious injuries is acceptable.

Significant steps have been taken in Europe to drive down the catastrophic impacts of traffic collisions. Traffic related deaths in Sweden have more than halved since Vision Zero's launch in the country in 1997.[4] Implementing additional pedestrian improvements and lowering speed limits helped reduce traffic related deaths in Paris between 2001 and 2007.[5] Speed management has been Berlin's key in addressing road safety, and more than 70% of roadways in Berlin have speed limits of 20 mph.

The shift in how road safety is viewed and addressed is making more of a presence in the United States. In the traditional approach, addressing road safety centers on costs and benefits. The push to veer from this traditional approach and move towards a zero death/serious injuries concept has made it to the national level across three programs in the United States: Vision Zero, Towards Zero Deaths, and Road to Zero.



Source: Vision Zero Network

Figure 62 – Vision Zero Localities

Vision Zero in the United States

The Vision Zero Network is a non-profit organization that aims to help communities reach their Vision Zero goal of eliminating traffic related deaths and serious injuries while improving mobility for all users. The Vision Zero Network will recognize a locality as a Vision Zero Community if the following criteria are met:

- A clear goal of eliminating traffic fatalities and severe injuries has been set

[4] Swedish Transport Administration, *Vision zero – no fatalities or serious injuries through road accidents*, October 14, 2019.

[5] Leah Shahum, Vision Zero Network, *European Cities Lead the Way Toward Vision Zero*, April 13, 2015.

- The mayor has publicly, officially committed to Vision Zero
- A Vision Zero plan or strategy is in place, or the mayor has committed to doing so in a clear time frame
- Key departments (including transportation, public health, and mayors' offices) are leading the effort

As of August 2022, 45 communities across the United States have been recognized as Vision Zero Communities, as shown in **Figure 62**.

The effectiveness of Vision Zero relies heavily on the following strategies:

- Build and sustain leadership, collaboration, and accountability – especially among a diverse group of stakeholders to include transportation professionals, policymakers, public health officials, police and community members
- Collect, analyze, and use data to understand trends and potential disproportionate impacts of traffic deaths on certain populations
- Prioritize equity and community engagement
- Manage speed to safe levels
- Set a timeline to achieve zero traffic deaths and serious injuries, which brings urgency and accountability, and ensure transparency on progress and challenges

Toward Zero Deaths

In 2009, various traffic safety stakeholders gathered at a workshop in Savannah, Georgia where they discussed a need to develop a national strategic highway safety plan. The general consensus at this workshop was that there should be a highway safety vision in place and that a goal of zero traffic related deaths should be established. They agreed that even one death is unacceptable. Further discussions following the workshop eventually led to this effort being named as "Toward Zero Deaths: A National Strategy on Highway Safety."

There are multiple Toward Zero Deaths initiatives across the United States, including efforts in Virginia. For more information on Toward Zero Deaths, please visit https://www.towardzerodeaths.org/.

Road to Zero

Launched in 2016, the Road to Zero Coalition was established by bringing together multiple professionals who shared a common vision of achieving zero traffic deaths in the future. To reach zero, the Road to Zero Coalition determined that a three-piece strategy would be needed:

- **Double Down on What Works** – Over the years, the United States has accumulated a collection of effective road safety countermeasures and experts to implement them. The Road to Zero Coalition envisions maintaining and creating new partnerships with experts and professionals to develop new and more effective road safety countermeasures.
- **Accelerate Advanced Technology** - More and more vehicles are equipped with Advanced Driver Assistance

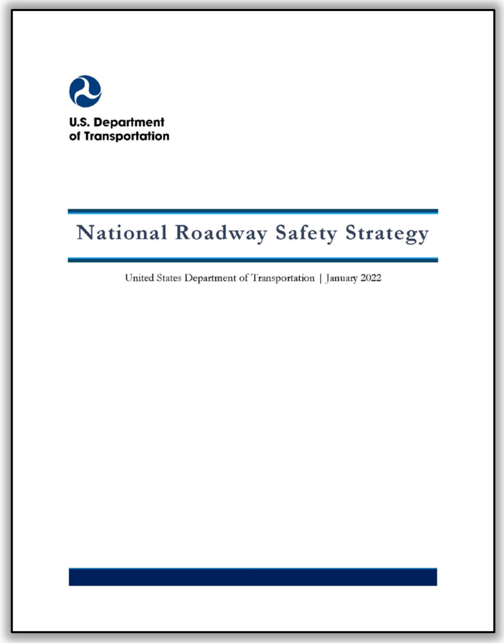
Systems (ADAS) such as lane departure warning, automatic emergency braking, and adaptive cruise control. Given more time, these existing technologies will improve. The RTZ Coalition envisions partnering with industry experts – manufacturers, technology providers, emergency medical and trauma systems, public safety/health groups – to help identify and prioritize safety applications and opportunities. Building these partnerships can improve the evaluation of safety benefits and help increase consumer interest and adoption through education and incentives.

- **Prioritize Safety** – The RTZ Coalition believes that safety should be ranked highest in priorities among all aspects in transportation. Opportunities for added safety can occur at different levels such as implementing safety programs locally to promote safety education in communities and implementing a large scale safety initiative such as the Safe System Approach statewide.

Federal Safety Planning Efforts

The United States Department of Transportation (USDOT) released the National Roadway Safety Strategy (NRSS) in 2022. The NRSS represents a comprehensive approach to reducing serious injuries and deaths on the nation's highways, roads and streets. The NRSS sets a vision and goal for the roadway safety. The USDOT vision for roadway safety is as follows:

> Together, we must strive for zero roadway fatalities. Zero is the only acceptable number of deaths on our highways, roads, and streets. The United States Department of Transportation is committed to taking substantial, comprehensive action to significantly reduce serious and fatal injuries on the Nation's roadways. However, no one will reach this goal acting alone. Reaching zero will require U.S. DOT to work with the entire roadway transportation community and the American people to lead a significant cultural shift that treats roadway deaths as unacceptable and preventable.


U.S. Department of Transportation

National Roadway Safety Strategy

United States Department of Transportation | January 2022

The NRSS also adopts the Safe System Approach principles that were described previously and identifies critical and significant actions the Department will take to pursue the five core objectives: safer people, safer roads, safer vehicles, safer speeds, and post-crash care.

More information on the USDOT's National Roadway Safety Strategy is available at https://www.transportation.gov/nrss/usdot-national-roadway-safety-strategy.

Virginia Safety Planning Efforts

This section details statewide safety planning efforts, including the Strategic Highway Safety Plan (SHSP), DMV Highway Safety Plan (HSP), the Virginia Pedestrian Safety Action Plan (PSAP), and the Virginia State Bicycle Policy Plan.

Strategic Highway Safety Plan

Strategic Highway Safety Plans (SHSP) are statewide, coordinated plans that provide a comprehensive framework for improving roadway safety. This is done by addressing the Es of transportation safety, which in Virginia's SHSP are Education, Enforcement and regulation, Engineering, and Emergency response. Each state must have and regularly update a Strategic Highway Safety Plan based on federal requirements that were created in the SAFETEA-LU legislation in 2005 and also included in current federal surface transportation legislation.

The first Virginia Strategic Highway Safety Plan was produced in 2006. The plan instituted a statewide transportation safety charter and committee and established statewide goals for reducing annual deaths and injuries from motor vehicle crashes. Updates to the plan were released in 2012 and 2016, and the most recent update – the 2022-2026 SHSP – was released in early 2022.

The plan was produced by VDOT as part of a collaborative effort. A wide variety of federal, state, local, and private sector stakeholders – including HRTPO – participated on the steering committee that helped develop the updated plan, as shown to the right.

Virginia Strategic Highway Safety Plan

Image Source: Virginia SHSP.

Virginia SHSP Steering Committee Safety Stakeholders

Image Source: Virginia SHSP.

In addition, the SHSP update also involved significant outreach to gather input from stakeholders across the state. Due to the COVID-19 pandemic, these regional "road shows" were held virtually in Fall 2021. Safety stakeholders attended five events that were conducted to discuss safety concerns in different regions of the state, including an Eastern Region meeting that included the Hampton Roads area.

The purpose of Virginia's updated SHSP is to significantly reduce fatalities and serious injuries on all public roads by identifying Virginia's key safety needs and guiding investment decisions. The plan reflects the "Toward Zero Deaths" initiative, which is a nationwide policy described previously that all roadway users should arrive safely at their destinations and even one death is unacceptable.

The 2022-2026 Virginia SHSP includes the following Vision, Mission, and Goal shown below. This Hampton Roads Regional Safety Study also includes a similar Vision and Mission as the Virginia SHSP.

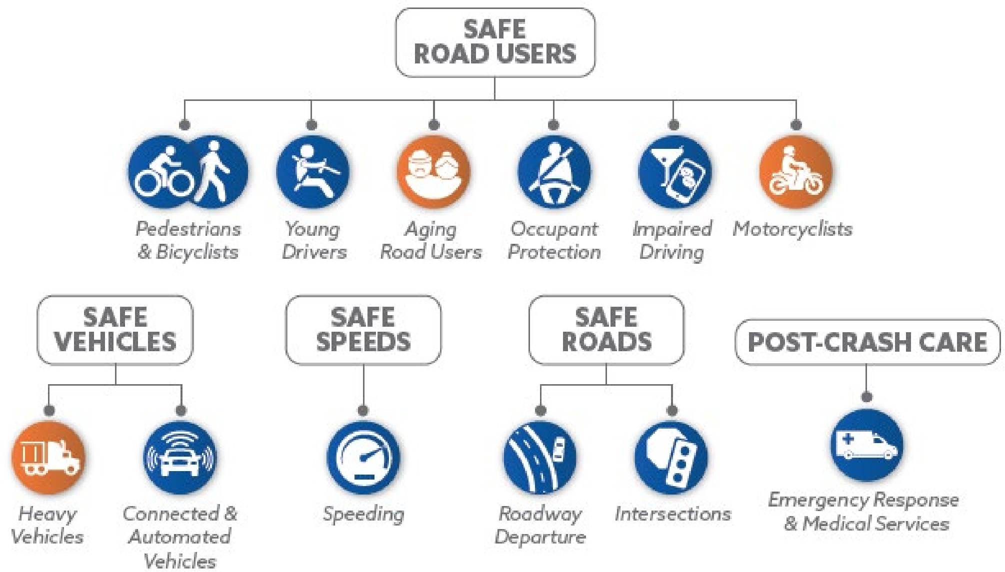
VISION *Towards Zero Deaths and Serious Injuries from motor vehicle crashes so that all road users arrive safely at their destination.*

MISSION *To fulfill the Vision through a collaborative, data-driven, multimodal and Safe System approach that incorporates actions from the four Es of road safety—Enforcement, Education, Engineering, and Emergency Response and Medical Services—to achieve safe travel for Everyone.*

GOAL *To **reduce deaths and severe injuries by half by 2045** (an average decline of approximately 2 to 4 percent per year).*

Based on an analysis of statewide crash data, the steering committee decided to focus the SHSP on twelve critical safety areas with the greatest promise to reduce fatalities and serious injuries. Each of these areas were categorized by the five elements included in the Safe System Approach – Safe Road Users, Safe Vehicles, Safe Speeds, Safe Roads, and Post-Crash Care. These twelve SHSP emphasis areas are shown to the right.

Because of the importance of crash data to the success of safety improvement functions such as the SHSP, the collection, management, and analysis of crash data is also a focus of the Virginia SHSP.



VIRGINIA SHSP EMPHASIS AREAS

Image Source: Virginia SHSP.

A number of strategies were developed to address each of these emphasis areas, which are detailed on the following pages.

SAFE ROAD USERS

Pedestrian and Bicyclists

Most people walk or bike as at least a portion of their trip. Pedestrians and bicyclists are among the most vulnerable users of the transportation network, as the lack of protection leads to a high likelihood of severe injuries or worse when involved in a crash. Vehicular speeds at the time of the crash greatly impact the severity of crashes with bicyclists and pedestrians, as shown in the table below.

Average Risk	Speed for Severe Injury	Speed for Risk of Death
10%	16 MPH	23 MPH
25%	23 MPH	32 MPH
50%	31 MPH	42 MPH
75%	39 MPH	50 MPH
90%	46 MPH	58 MPH

Bicyclist and Pedestrian Risk of Serious Injury and Death by Speed

Source: Virginia SHSP

From 2017-2021, 129 pedestrians were killed and another 598 pedestrians suffered serious injuries in Hampton Roads in crashes. In addition, 26 bicyclists were killed and 227 suffered serious injuries. Despite only comprising 2% of the traffic crashes in Hampton Roads from 2017-2021, bicyclists and pedestrians comprised 20% of the total fatalities and 10% of the serious injuries in the region during this period.

SHSP strategies for crashes involving bicyclists and pedestrians are shown to the right.

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.

- Revise design practices to emphasize context and target speed that reflects the needs of pedestrians and bicyclists. **[Long Term]**

Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.

- Update and enhance the Virginia Pedestrian Safety Action Plan (PSAP) biannually with VDH Health Opportunity Index and other transportation and social determinant for travel and risk considerations with potential travel demand inputs from recent research. Enhance the use of PSAP data and findings in project planning and development. Implement PSAP policy recommendations. **[Ongoing]**

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.

- Investigate and share successful education and enforcement initiatives that positively impact knowledge and compliance with traffic laws by motorists, bicyclists, and pedestrians including speeding, impaired or distracted driving, and midblock crossing. **[Ongoing]**
- Recruit new and effective partners to ensure the pedestrian and bicycle programs are reaching diverse and underserved communities and to ensure equity and social determinants of health are at the forefront to decrease pedestrian- and bicycle-related crashes. **[Ongoing]**
- Promote the collaborative effort Prioritizing Active Transportation, Health, and Safety (PATHS), which includes VDH, VDOT, and DMV to better serve community needs and improve health outcomes by cross sectorial sharing of knowledge, resources, and experience. **[Ongoing]**
- Continue the statewide DMV HSO pedestrian taskforce to assess and develop countermeasures to implement strategies and encourage existing coalitions to address pedestrian fatalities and serious injuries. **[Ongoing]**
- Provide outreach materials that are current and available from partners to advise and educate all road users on safe practices. This includes motorists when driving near and around pedestrians and bicyclists and facility use by bicyclists and pedestrians. **[Ongoing]**

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.

- Conduct pedestrian and bicyclist safety training events. Provide outreach materials that are current and available from partners to advise and educate pedestrians and bicyclists about maintaining visibility and practicing safe pedestrian and bicyclist actions. **[Ongoing]**
- Develop or enhance and disseminate educational materials and videos to educate road users and law enforcement on compliance with traffic control devices, factors associated with pedestrian and bicyclist crashes, and the significance of speed on pedestrian and bicyclist injury severity. Promote pedestrian- and bicyclist-related laws in an easy-to-understand manner for each age and community. **[Ongoing]**
- Provide resources to schools, including Safe Routes to Schools, to educate students how to walk or bicycle safely in environments with traffic and other safety risks. **[Ongoing]**

Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.

- Collect and use pedestrian and bicyclist crash, volume, and infrastructure data to identify trends and gaps to improve safety. Continue data integration and sharing with partners and stakeholders. **[Ongoing]**
- Enhance and deploy policy guidance on road crossing design considerations for uncontrolled, unsignalized, and traffic signal-controlled intersections during maintenance and construction project planning and development. Consider and implement proven pedestrian and bicyclist countermeasures, new technologies, or innovative designs at higher-risk crossing locations. **[Ongoing]**

YOUNG DRIVERS

Young drivers are overrepresented in terms of the number crashes compared to the number of licensed young drivers. Nationwide, young drivers accounted for 7.8% of all drivers involved in fatal crashes in 2019, but only 5.3% of all licensed drivers.

This is largely due to the lack of experience that young drivers have behind the wheel, and young drivers are more likely to engage in risky driver behaviors such as speeding. This is especially true for young male drivers, who were involved in 70% of all fatal crashes involving young drivers nationwide in 2019.

From 2017 to 2021, 98 fatalities and 1,367 serious injuries in Hampton Roads resulted from crashes involving young drivers, which comprise 13% of the 770 fatalities and 16% of the 8,428 serious injuries in the region during this period.

SHSP strategies for crashes involving young drivers are shown to the right.

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.
Distribute the 45-hour Parent Teen guide to promote meaningful parent engagement and provide coaching tips and sample lessons for developing safe, collision-free driving habits that will last a lifetime. **[Ongoing]**
Foster parent awareness and the attributes of graduated provisional licensing laws through engaging school outreach efforts. **[Ongoing]**
Conduct educational campaigns, events, trainings, and social media messaging and peer-to-peer initiatives on topics such as safety belt use, impaired driving, zero tolerance laws, distracted driving, speeding, and other highway safety issues (intersections, rail grade crossings, and Operation Lifesaver) for drivers aged 20 and younger, and continuously review and embrace research for evidence-based curricula and messaging. **[Ongoing]**
Review, on a continuous basis, education curricula and resources (Driver Education Curriculum, 45-Hour Parent/Teen Guide, Health Smart Virginia) for youth between the ages of 8 and 14 to develop a safety culture focused on the proper use of restraints, driver and passenger responsibilities, and shared road use (bicycle, pedestrian). **[Ongoing]**
Recruit new and effective partners to ensure targeted equitable messaging reaches drivers aged 20 and younger in diverse and underserved communities. **[Long Term]**
Educate highway safety partners on the Driver Education Curriculum content and continuously monitor and update the curriculum as needed. **[Long Term]**
Evaluate the effectiveness of all in-car and behind-the-wheel programs and research best practices for road skills testing, report findings, and make recommendations as necessary. **[Long Term]**
Review judicial licensing ceremony outcomes (survey judges and parents) and determine strategies and best practices for improving resources and materials. **[Long Term]**
Review and revise the content and resources for the Virginia Driver's Manual. **[Long Term]**

Aging Road Users

The United States population is living longer, which is leading to an increase in aging road users. Hampton Roads is no exception. As of 2021, 15.5% of the population in the Hampton Roads metropolitan statistical area (MSA) is aged 65 or older. By comparison, in 2010 only 11.6% of the region's population was 65 and older, and in 2000 this percentage was 10.3%. The aging of the regional population is expected to continue into the future, with 20% of the Hampton Roads population projected to be 65 and older in the year 2050.

People are not only expected to live longer than in the past but also drive longer. Aging tends to impact a driver's ability to drive safely, due to worsened vision, increased reaction time, and slower judgment. Older drivers and passengers are also more likely to sustain an injury if involved in a crash.

From 2017 to 2021, 164 fatalities and 1,360 serious injuries in Hampton Roads resulted from crashes with aging road users, which comprise 21% of the 770 fatalities and 16% of the 8,428 serious injuries in the region during this period.

SHSP strategies for crashes involving aging road users are shown to the right.

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.
Conduct education and awareness activities focusing on the mature driver and their caregivers and the general driving population to reduce crashes, injuries, and fatalities. **[Ongoing]**
Work with Department of Aging and Rehabilitation Services to conduct older driver assessments across the Commonwealth. **[Ongoing]**
Work with the Department of Aging and Rehabilitation Services and the Grand Driver coordinator to conduct CarFit events statewide. **[Ongoing]**
Recruit new and effective partners to make sure the aging road user program is reaching diverse and underserved communities and to ensure equity is at the forefront to decrease fatalities. **[Long Term]**
Develop and promote materials and resources, e.g., the DRPT Senior Navigator Transportation resource to educate seniors about available transportation options including transit for seniors and persons without access to automobiles. **[Long Term]**
Promote partnerships and educate safety professionals at metropolitan planning organizations, regional planning councils, and local governments on addressing the special needs of the aging population in their transportation, land use, and housing plans. **[Long Term]**
Provide law enforcement officers, front line licensing personnel, and health care providers resources to recognize, assess, and report at-risk aging drivers. **[Long Term]**
Develop materials to be distributed or provided by other means to seniors with information on innovative road improvements such as pedestrian Hybrid Beacon signals, roundabouts, etc. **[Long Term]**
Investigate the development of materials that educate older drivers on vehicle technology and how it improves safety and mobility. **[Short Term]**

Occupant Protection

Occupant protection involves the use of safety belts and child safety seats, which are two of the most effective devices to prevent fatalities and serious injuries resulting from a crash.

Virginia had an observed safety belt use rate of 85.4% in 2019. This is well below the national average usage rate of 90.7% and ranks Virginia only 41st highest among the 50 states and District of Columbia in terms of safety belt use. In Hampton Roads, however, the safety belt usage was lower, at 83.2% on the Southside and 79.7% on the Peninsula in 2019.

Lack of safety belt use is a particular problem for young drivers and passengers and for males. Nationwide, of those killed that were not wearing safety belts in 2019, 70% were male. Among those between the ages of 15-24 killed in traffic crashes nationwide in 2019, 58% were not using occupant protection.

Excluding crash types where occupant protection is not an option such as pedestrian, bicyclist, and motorcyclist crashes, 280 fatalities and 1,473 serious injuries in Hampton Roads resulted from crashes without occupant protection from 2017 to 2021. This comprises 57% of the 488 fatalities and 22% of the 6,594 serious injuries in the region during this period.

SHSP strategies for crashes without occupant protection are shown to the right.

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.
Conduct at least three statewide, high visibility seat belt enforcement campaigns with supporting media to educate the public on the importance of using seat belts and the enforcement of alcohol-related laws during nighttime hours to include seat belt enforcement and include a statewide observational pre- and post-survey. **[Ongoing]**
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.
Conduct seat belt educational and awareness campaigns to educate the public on the importance of using seat belts and include social media and messaging to reach diverse and underserved and areas of need communities. **[Ongoing]**
Conduct Virginia Child Passenger Safety (CPS) and Education Program to include outreach activities to Virginia's low-income populations, and areas of need including diverse and underserved communities. **[Short Term]**
Conduct child safety seat and safety belt checks across the Commonwealth providing statewide access to certified CPS technicians and provide child safety restraints to eligible parents/guardians through the Low-Income Safety Seat Distribution Program, especially in areas of need to include diverse and underserved communities. **[Ongoing]**
Recruit new and effective partners to ensure the occupant protection program is reaching diverse and underserved communities and to ensure equity is at the forefront of the program to increase the seat belt use rate and decrease unrestrained fatalities, serious injuries, and other consequences. **[Long Term]**
Coordinate the NHTSA Standardized CPS Technician Certification Courses, CPS Technician Refresher Courses, Renewal Course and CPS Special Needs Certification Courses. **[Ongoing]**
Use data and other sources to determine which population groups are choosing not to wear safety belts and determine why, if possible, to inform future education and communication initiatives. **[Long Term]**
Increase the number of certified CPS technicians/instructors, especially at mother/infant units, neonatal intensive care units, pediatric units, etc. in hospitals to provide staff education. **[Ongoing]**
Promote passage of a primary seat belt law and publicize safety belt use and the expected fatality and serious injury reductions that could be achieved with increased seat belt use. **[Long Term]**

IMPAIRED DRIVING

Impaired driving is comprised of what are referred to as the 4Ds – drunk, drugged, distracted, and drowsy driving. According to NHTSA, distracted driving is any activity that diverts attention from driving, including talking or texting on a phone, eating and drinking, talking to people in a vehicle, fiddling with the stereo, or using an entertainment or navigation system – anything that takes attention away from the task of safe driving.

From 2017 to 2021, 374 fatalities and 2,885 serious injuries in Hampton Roads resulted from impaired driving crashes, which comprise 49% of the 770 fatalities and 34% of the 8,428 serious injuries in the region during this period. The split in terms of the 4Ds are as follows:

- Alcohol Use – 273 fatalities (73% of 4D total)/1,281 serious injuries (44% of 4D total)
- Distracted Driving – 130 fatalities (35%)/1,830 serious injuries (63%)
- Drowsy Driving - 16 fatalities (4%)/286 serious injuries (10%)
- Drugged Driving - 34 fatalities (9%)/135 serious injuries (5%)

It should be noted that some crashes have multiple impaired driving characteristics, such as a crash with both alcohol use and distracted driving. In addition, these numbers may underestimate the number of crashes, particularly for distracted and drowsy driving, due to the difficulty of collecting accurate data at the crash scene.

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.
Conduct impaired driving high visibility enforcement (HVE) campaigns (to include saturation patrols and checkpoints) supported by a comprehensive media plan and provide support to the existing Driving Under the Influence (DUI) Task Force. **[Ongoing]**
Conduct alcoholic beverage compliance checks to reduce the incidence of underage alcohol purchases and overservice, and through youth peer-to-peer educational programs that focus on zero tolerance. **[Ongoing]**
Manage the ignition interlock program through VASAP and investigate new technological strategies. **[Long Term]**
Work with law enforcement officers and the toxicology labs to determine drugs present in drivers. **[Short Term]**
Monitor high Blood Alcohol Concentration (BAC) and repeat offenders through VASAP and recommend referrals for treatment assessment to include substance use disorders and/or mental health screenings when appropriate. **[Ongoing]**
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.
Increase the number of law enforcement officers who participate in trainings for Advanced Roadside Impaired Driving Enforcement (ARIDE), Drug Recognition Experts (DRE), Standardized Field Sobriety Training (SFST), Advanced DUI courses, and breath alcohol test equipment. **[Ongoing]**
Conduct training sessions for the Virginia Alcohol Safety Action Program (VASAP) program case managers and staff on DWI offender monitoring, ignition interlock and offender recidivism. **[Short Term]**
Conduct training and provide information at conferences for judges, prosecutors, and magistrates on DUI and drugged driving enforcement methods, DUI dockets, and DUI Courts. **[Ongoing]**
Coordinate with the Judicial Outreach Liaisons and the Traffic Safety Resource Prosecutors to work with the Virginia Supreme Court to assist with information dissemination and to establish a point of contact between the Highway Safety Office and the judiciary. **[Long Term]**
Conduct sports marketing related outreach efforts to reach high-risk populations. **[Short Term]**
Promote consumer awareness and acceptance of the Driver Alcohol Detection System for Safety (DADSS). **[Short Term]**
Recruit new and effective partners to make sure the alcohol and drug impaired driving program reaches diverse and underserved communities and to ensure equity is at the forefront to decrease alcohol related fatalities. **[Long Term]**
Investigate the possibility of conducting a distracted driving enforcement effort on handheld phone use and evaluate its effectiveness. **[Long Term]**

SHSP strategies for reducing impaired driving crashes are shown above.

Motorcyclists

One of the most vulnerable users of the transportation system are motorcyclists, since there is no protection between the motorcyclist, other vehicles, and the roadway.

This leads to the consequences of crashes involving motorcyclists to be more severe. From 2017 to 2021, 5% of all crashes involving motorcyclists in Hampton Roads led to fatalities and 35% of all crashes involving motorcyclists in Hampton Roads led to serious injuries. This compares to less than 1% of all crashes leading to fatalities and 5% leading to serious injuries during this time.

From 2017 to 2021, 129 fatalities and 1,007 serious injuries in Hampton Roads resulted from crashes involving motorcyclists, which comprise 17% of the 770 fatalities and 12% of the 8,428 serious injuries in the region during this period. This is much higher than the statewide figures of 11% of all fatalities and 10% of all serious injuries during this time.

SHSP strategies for reducing crashes involving motorcyclists are shown to the right.

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.
Deploy engineering solutions and best practices that address motorcyclist, moped, and motorized scooter-specific infrastructure issues, work zone issues and mitigation including drainage and shoulders, communication of road conditions, pavement conditions, enhanced road delineation, and traffic control devices. **[Long Term]**
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.
Conduct a motorcyclist safety media campaign that includes motorist awareness of motorcyclists and motor scooters, information for young and aging riders, and increase the media messaging in areas with high numbers of motorcyclist crashes and fatalities. **[Short Term]**
Increase participation and conduct the Basic Rider Training, 3-Wheeled Vehicle Training, and Advanced Rider Training courses throughout the Commonwealth through partnerships with the licensed Motorcyclist Training Sites. **[Ongoing]**
Distribute Rider Alert cards to all licensed training sites. **[Short Term]**
Increase the number of licensed motorcyclist training sites in areas with high numbers of motorcyclist crashes. **[Long Term]**
Recruit new and effective partners to make sure the motorcyclist safety program reaches diverse and underserved communities and to ensure equity is at the forefront of the program. **[Long Term]**
Conduct law enforcement training in motorcyclist DUI detection, motorcyclist crash investigation, Zero Tolerance, and motorcyclist specific laws. **[Long Term]**
Collect and link crash, injury, licensing (endorsement), violation, and registration data for analysis to identify high risk locations and behaviors related to motorcyclist, moped, and motorized scooter fatal and serious injury crashes. **[Long Term]**
Identify and support legislation and policies that acknowledge the importance of safety gear including helmets and address penalties for riding without an endorsement as well as behaviors such as speeding and/or careless driving. **[Long Term]**

SAFE VEHICLES

Heavy Vehicles

Freight transportation influences every aspect of our daily lives and keeps regional businesses and industries competitive in the local and global economy. This is particularly true for freight movement by truck since truck is the predominant mover of freight in Hampton Roads. However, trucks and other heavy vehicles, which include a number of other vehicle types including buses, farm equipment, and other large machinery, face unique safety challenges due to their size and weight.

From 2017 to 2021, 74 fatalities and 495 serious injuries in Hampton Roads resulted from crashes involving heavy vehicles, which comprise 10% of the 770 fatalities and 6% of the 8,428 serious injuries in the region during this period.

Although heavy vehicles are involved in all of the crashes shown above, that does not mean that the driver of the heavy vehicle was responsible for causing all of those crashes. In Hampton Roads, exactly half (50%) of the crashes involving heavy vehicles are the fault of the driver of the heavy vehicle.

SHSP strategies for reducing crashes involving heavy vehicles are shown to the right.

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.

- Provide additional truck parking facilities along highways, and additional information systems to inform truck drivers of available spaces. **[Long Term]**

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.

- Increase focused enforcement in high crash areas of speed, equipment, and weight enforcement violations based on crash data analysis. **[Ongoing]**
- Enforce CMV regulations regarding the work hours/driving times of commercial motor vehicle drivers to reduce the incidence of drowsy driving. **[Ongoing]**
- Conduct the multi-agency, multi-state CMV enforcement task forces to enforce CMV violations (seat belt, speed, follow too close, etc.). **[Ongoing]**
- Conduct current safety compliance reviews of high-risk carriers and educate new entrants into the commercial motor vehicle business. **[Ongoing]**
- Collaborate with the trucking and bus industry on programs and initiatives to improve safety and reduce crashes with an emphasis on impairment (drunk, drugged, distracted and drowsy driving). **[Ongoing]**
- Promote the FMCSA truck and bus course for law enforcement. **[Ongoing]**

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.

- Educate heavy vehicle drivers on the effects of fatigue, hours of service, speed, and use of safety belts. **[Ongoing]**
- Increase training and education for passenger vehicle drivers about how to interact with heavy vehicles, buses, streetcars, and light rail vehicles. **[Ongoing]**
- Develop a strategy to expand the use of technology at commercial vehicle enforcement facilities. **[Long Term]**
- Educate young drivers about the nuances of driving safely around heavy vehicles, buses, streetcars, and light rail vehicles through the Driver's Education curriculum. **[Ongoing]**

Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.

- Use Weigh-in-Motion and Mainline Bypass Technologies to effectively facilitate commerce and minimize CMV back up on Virginia's interstates. **[Ongoing]**

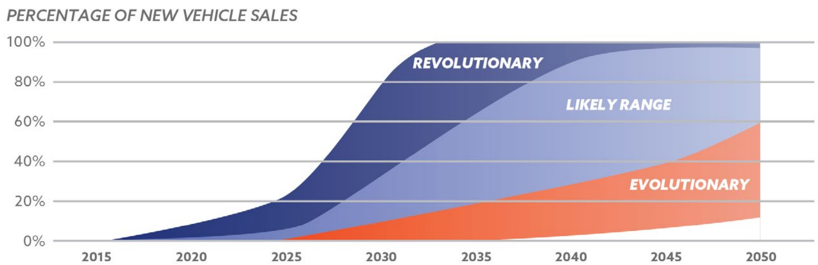
Connected and Automated Vehicles

Transportation is being transformed and will continue to be in future years by new technologies. Increasing vehicle electrification, automation, and connectivity has the potential to greatly reduce the number of fatalities and serious injuries.

Automated vehicles are advanced driver assistance systems where driving functions are handled by the vehicle rather than a human driver. In fully automated vehicles, the system will handle all driving tasks under all conditions on all roadways while passengers do not need to be engaged. Vehicle safety promises to be one of most important benefits of automated vehicles, largely due to removing the human driver and human error from the events that typically lead to crashes.

This is in addition to many of the crash avoidance technologies that have recently been installed on newer vehicles such as lane departure control, blind spot alerts, adaptive cruise control, and backup camera systems.

FIGURE 55. SCENARIOS WHEN FULLY AUTOMATED VEHICLES WILL BE MORE COMMON



Source: *ITS America – Data and the Digital Highway, ITS America Forum, November 5, 2018.*

Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.
Assess emerging connected vehicle datasets that produce estimates of safety surrogate measures such as excessive braking and acceleration for potential application in the network screening process. **[Long Term]**
Conduct pilots of smart intersection technologies that can detect vulnerable road users and alert connected vehicles to conflicts. **[Long Term]**
Develop and pilot advanced tools and methods to improve safety for the motorist and worker in construction and maintenance work zones, such as automated truck mounted attenuators, worker alerts, and advanced driver alerts of work zones. **[Long Term]**
Conduct a legal review and audit of the Code of Virginia to determine gaps in the existing code related to automated vehicles. **[Short Term]**
Evaluate existing driver education material and safety campaigns to determine opportunities to incorporate information about connected and automated vehicles use and benefits. **[Ongoing]**

It will take decades before fully automated vehicles will be common on public roadways. As shown in the figure to the left, projections from ITS America estimate that by the year 2045 the likely range of new vehicles sales with full automation will be 44 to 88 percent, with older vehicles remaining in the fleet. This level of automated vehicles would be projected to lead to a 38 to 67 percent reduction in severe crashes.

Wireless technologies can also be used to connect vehicles though vehicle-to-vehicle and vehicle-to-infrastructure communications. Connected vehicle technologies can be used to reduce crashes due to changing traffic flow and network patterns, reducing conflicts approaching intersections and interchanges, and improving other vehicle trajectories and controls.

SHSP strategies related to connected and automated vehicles are shown above.

SAFE SPEEDS

SPEEDING

One of the leading contributing factors to crashes with fatalities and serious injuries is speeding, and the prevalence of speeding-related crashes has increased since the pandemic began. Despite efforts to curtail speeding through engineering improvements, enforcement, and education, drivers continue to exceed speed limits and drive aggressively. In addition, speeding is commonly associated with other crash factors such as roadway departures, impaired driving, and a lack of restraint use.

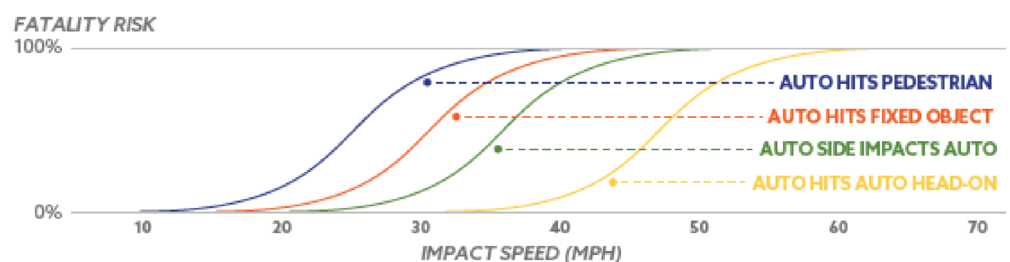
There is a direct connection between speeding and crash survivability. As shown below, fatality risk approaches 100% for pedestrians above 30 mph, and approaches 100% for drivers and passengers at ranges from 40-60 mph.

From 2017 to 2021, 347 fatalities and 2,386 serious injuries in Hampton Roads resulted from speed-related crashes, which comprise 45% of the 770 fatalities and 28% of the 8,428 serious injuries in the region during this period. However, since the beginning of the pandemic, these numbers are increasing. In 2017, 35% of fatalities and 26% of serious injuries in the region were the result of speed-related crashes. By 2021, these percentages had increased to 53% and 29% respectively.

SHSP strategies for reducing speed-related crashes are shown above.

Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.
Update and institutionalize context sensitive speed limit setting practices, with law enforcement collaboration, including within work zones and evaluate and enhance messaging on the benefits and use of such practices. **[Short Term]**
Disseminate information and train law enforcement on using network vehicle speed and related crash data (VTTI Study) to support proactive presence and engagement with motorists and riders. **[Short Term]**
Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.
Conduct high visibility speed selective enforcement mobilizations/patrols and conduct speed focused operations through local law enforcement and Virginia State Police. **[Ongoing]**
Develop guidelines and collaborate with localities implementing automated speed enforcement in school zones and encourage automated speed enforcement for appropriate work zones. **[Ongoing]**
Educate the judicial community on the need for consistent application of the law on speed-related offenses. **[Ongoing]**
Conduct training of police officers on speed enforcement best practices and current law. **[Short Term]**
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.
Educate to change the behavior of speeders and the overall driving population with persuasive messaging regarding the dangers of speed. **[Ongoing]**
Recruit new and effective partners to make sure the speed program is reaching diverse and underserved communities and to ensure equity is at the forefront to decrease speed-related fatalities. **[Short Term]**
Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.
Investigate the additional use of the Active Traffic Management System (ATMS) and Variable Speed Limit (VSL) practices on freeway corridors to harmonize speed and prevent weather and queue-related crashes. **[Ongoing]**
Identify and evaluate advanced tools and techniques to reduce speeding and where necessary, work with the General Assembly to explore the use of these tools. **[Ongoing]**

FIGURE 56. IMPACT OF SPEED ON CRASH SURVIVABILITY



Source: FHWA.

SAFE ROADS

Roadway Departure

Roadway departure crashes are the result of vehicles unintentionally leaving the travel lane to the left or right. Vehicles departing the travel lane often overturn or hit a fixed object. Roadway departure crashes often involve only one vehicle traveling at a high speed and result in fatalities or serious injuries. More people in Virginia were killed or seriously injured in crashes involving a roadway departure than any other emphasis area.

From 2017 to 2021, 306 fatalities and 2,415 serious injuries in Hampton Roads were the result of roadway departure crashes, which comprise 40% of the 770 fatalities and 29% of the 8,428 serious injuries in the region during this period.

Key issues for minimizing roadway departure crashes and their consequences are:

- **Roadside Conditions** – Design features that enhance the ability to recover, stop, or be shielded before overturning or hitting a fixed object after leaving the travel lanes.
- **Horizontal Curves** – Design horizontal curves with appropriate forward vision, and by appropriate use of warning signs and delineation.
- **Nighttime** – Implementing roadway lighting in those areas where a high proportion of nighttime crashes occur.
- **Behaviors** – Addressing impaired driving, speeding, and occupant protection behaviors would mitigate the severity of roadway departure crashes.

SHSP strategies for reducing roadway departure crashes are shown above.

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.

- Promote benefits and alternate funding of complete streets, road conversions, and road/roadside design improvements, based on potential for safety network screening, during capital project planning and design. **[Ongoing]**
- Improve related geometric data collection and safety analysis to promote infrastructure projects enhancing roadside design in the clear zone with context considerations to remove, relocate, shoulder, or delineate fixed objects. **[Long Term]**
- Review and improve related engineering and traffic control device standards and specifications. Expand the use of and maintain existing road and bridge delineation and visibility features. **[Ongoing]**
- Continue VDOT Systemic Implementation Plan for roadway departure-related traffic control devices and pavement countermeasures. **[Ongoing]**
- Complete Pavement Friction Management Program development and continue data collection and support improved analysis methods. Develop and promote high-friction surface treatment (HFST) knowledge and use where appropriate. Explore application of other pavement surfacing treatments that may offer properties that uniquely respond to specific safety concerns. **[Short Term]**

Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.

- Update Roadway Departure Plan network screening using recent safety performance research, curve inventory, and best countermeasure practices. Provide training on methods and countermeasures for consideration in maintenance and construction project planning and development. **[Short Term]**

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.

- Promote and support road safety action plans to locality, agency, and District staff through the Safety Circuit Rider Program. **[Ongoing]**

INTERSECTIONS

Intersections are locations where two or more roadways cross at the same grade, which results in conflicts between road users. From 2017 to 2021, 254 fatalities and 3,849 serious injuries in Hampton Roads occurred at intersections, which comprise 33% of the 770 fatalities and 46% of the 8,428 serious injuries in the region during this period.

Safety at intersections can be improved by various engineering countermeasures. These countermeasures, which are detailed later in this report, include solutions that separate conflicts by space or time, reduce the number of conflict points, reduce speeds, reduce the impact angle, and/or improve the visibility of the intersection.

Safety at intersections can also be improved by educating drivers, bicyclists, and pedestrians on how to safely travel through intersections and to better understand new intersection designs.

SHSP strategies for improving safety at intersections are shown to the right.

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.

Update the VDOT systemic safety implementation plans for unsignalized and signalized intersections. Continue evaluation and outreach on the benefits and expand the use of these improvements at locally maintained intersections. **[Ongoing]**

Implement safety action plan for passive and active public railroad highway grade crossings, including grade separations, intersection warning and signing, gating, signalized intersection interconnection, and information on Operation Lifesaver. **[Ongoing]**

Apply access management practices in project planning and development phases to ensure proper spacing and sight distance. Consider the impacts of access management on multimodal road users. **[Ongoing]**

Disseminate information, conduct training, and implement DRPT Multimodal System Design Guidelines (2020) and VDOT Complete Streets policy to apply practical design alternative assessments based on multimodal travel demand and safety performance. **[Short Term]**

Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.

Expand potential for safety improvement network screening to include road and intersection types not currently covered with safety performance functions or lacking traffic volumes. Consider using additional intersection and roadway inventory elements during development of safety performance functions. **[Ongoing]**

Promote the use of the Human Factors Guide in project planning and development and provide related application training on road and traffic control design assessments. **[Long Term]**

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.

Investigate alternate strategies to reduce red-light running for all users. Work with law enforcement and educators to initiate focused law enforcement and messaging/outreach activities to reduce red-light running. **[Long Term]**

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.

Improve users' knowledge of new and existing traffic control devices for intersections through publications, web brochures, Driver Education materials, the Safety Circuit Rider Program, and social media. **[Ongoing]**

Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.

Institutionalize the consideration of safe system and innovative designs through the Intersection and Interchange Control Assessment Program. Evaluate and enhance messaging on the benefits and use of innovative intersections and interchanges. **[Short Term]**

Complete deployment of VDOT modernized traffic signal control technologies and implement real-time signal monitoring and control strategies. Investigate and implement new technologies for conflict mitigation as they become available. **[Ongoing]**

POST-CRASH CARE

Emergency Response and Medical Services

In the event of a crash, providing post-crash care is essential to reducing the consequences of crashes. First responders must be able to quickly and accurately locate crashes and stabilize and transport injured people. Fire, police, and EMS must work together to manage the scene in order to assist those involved in the crash, provide traffic control, reduce the potential for secondary incidents, and investigate and document the causes of the crash.

Virginia aims to improve post-crash care through various programs to improve coordination among incident response personnel, tracking and reporting incident metrics and patient outcomes, and assessing challenges and successes of incident response. Some of these programs, along with SHSP strategies for improving emergency response and medical services, are shown to the right.

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.
Expand Move-Over law public messaging and investigate the cost and benefits of having attenuator vehicles more accessible while learning of emerging mitigating technology with CAV. **[Short Term]**
Increase the percentage of EMS on-scene arrival responses that are within State requirements. **[Ongoing]**
Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.
Evaluate best practices to efficiently collect, analyze, and share data from severe crash investigations (e.g., Total Station and Unmanned Aerial Vehicle (UAV) equipment and data). **[Long Term]**
Improve the Virginia EMS and Trauma Care System statewide comprehensive, robust prehospital data system with standard definitions. **[Ongoing]**
Improve to 100 percent compliance of EMS agencies reporting to VPHIB. **[Long Term]**
Work with authorized fire, EMS, law enforcement, and incident response personnel to promote and emphasize the benefits of internal multi-agency after action reviews and reports for crashes using best practices. Share any lessons learned between agencies. **[Ongoing]**
Develop Incident Command Mobile App for VDOT response personnel to enter and management to use real-time incident status with needed detours, pictures, and videos to improve the safety of responders and travelers. **[Short Term]**
Evaluate the current towing recovery incentive programs (TRIP) and update best practices, when necessary, to maintain and improve present incident clearance times. **[Ongoing]**
Investigate the legal, policy, procedural, and financial considerations to expedite the removal process of disabled and abandoned vehicles from 24 hours to 12 hours. **[Long Term]**
Investigate the legal, procedural, and financial considerations of "lift and tow" pilot to perform "emergency" relocations of disabled commercial motor vehicles and passenger vehicles on the interstate system. **[Long Term]**
Expand sharing 911 information on non-interstate (arterial) roads from more localities with VDOT Transportation Operations Centers to improve incident management and clearance while providing traveling public incident information. **[Long Term]**
Finalize localized interstate incident management plans with authorized fire, EMS, law enforcement, and incident response personnel. **[Short Term]**
Implement the Statewide Traffic Incident Management (STIM) committee initiatives to share information and garner input through the STIM website, propose quick clearance policy for consideration and implementation, and provide associated training (e.g., SHRP2 training). **[Ongoing]**

Virginia Highway Safety Plan

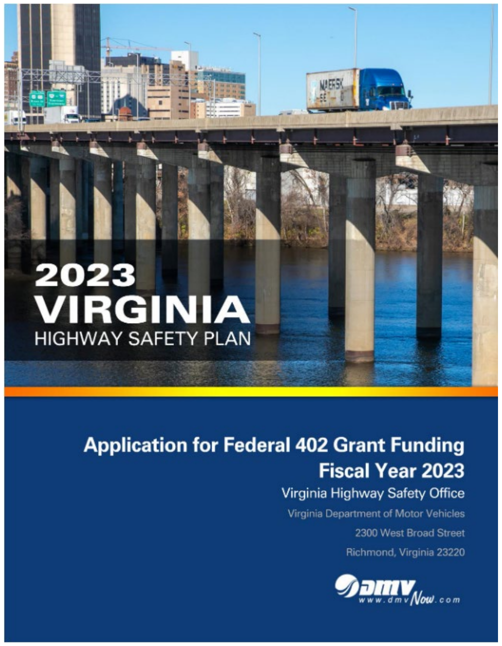
The Virginia Department of Motor Vehicles (DMV) prepares the Highway Safety Plan on an annual basis. According to the DMV, the Virginia Highway Safety Plan (HSP) describes the processes used to identify the state's traffic safety problems. It proposes projects and activities Virginia plans to implement to achieve its performance goals. The plan also includes performance measures and targets for each goal to track progress from a baseline toward meeting the goal by the specified target date. Additionally, the HSP describes the grant funded projects and activities that Virginia will implement to accomplish the identified goals.

The mission of the HSP is to "reduce crashes, injuries, fatalities and associated costs by identifying transportation safety issues and developing and implementing effective integrated programs and activities."

Similar to the Strategic Highway Safety Plan, the Highway Safety Plan includes efforts that reflect the Es of safety, including education, enforcement, engineering, and emergency response.

Funds are allocated for projects and activities that emphasize safety in various areas. Some of these include core areas such as occupant protection, alcohol use, speeding, motorcycle safety, young drivers, pedestrian safety, and bicyclist safety. Other areas include traffic records, drugged and distracted drivers, driver education, police traffic services, planning and administration, and seat belt use surveys.

Many of the projects and activities included in Virginia Highway Safety Plan are statewide efforts, such as television campaigns (including Click It and Ticket and Drive Sober or Get Pulled Over), social media campaigns, improvements to crash data, implementing



Virginia Highway Safety Plan

Image Source: DMV.

Driver Alcohol Detection System for Safety (DADSS), and assisting student programs such as the Youth of Virginia Speak Out (YOVASO) Program.

In addition, there are a number of projects and activities included in the Virginia Highway Safety Plan that are specific to Hampton Roads. These efforts in Hampton Roads are highlighted in **Figure 63**.

The Virginia Highway Safety Plan is available at https://www.dmv.virginia.gov/safety/grants-management.

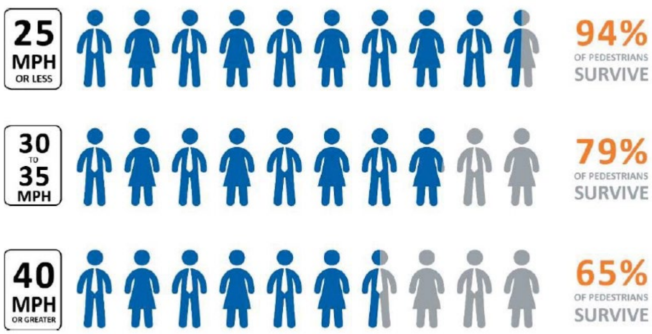
JURISDICTION/AGENCY	ACTIVITY	FY 2023 FUNDING
CHESAPEAKE CITY	SELECTIVE ENFORCEMENT - ALCOHOL	$17,724
	SELECTIVE ENFORCEMENT - POLICE TRAFFIC SERVICES	$16,124
CHESAPEAKE BAY BRIDGE-TUNNEL	SELECTIVE ENFORCEMENT - ALCOHOL	$8,225
	SELECTIVE ENFORCEMENT - SPEED	$4,590
CHKD	CHILD PASSENGER SAFETY PROGRAM	$26,130
DRIVE SAFE HAMPTON ROADS	OCCUPANT PROTECTION	$7,729
	SURVIVE THE DRIVE	$70,560
EVMS	ADVANCING CHILD OCCUPANT PROTECTION	$137,921
GLOUCESTER COUNTY	SELECTIVE ENFORCEMENT - ALCOHOL	$20,144
	SELECTIVE ENFORCEMENT - POLICE TRAFFIC SERVICES	$12,480
HAMPTON CITY	SELECTIVE ENFORCEMENT - SPEED	$37,725
ISLE OF WIGHT COUNTY	SELECTIVE ENFORCEMENT - ALCOHOL	$13,850
	SELECTIVE ENFORCEMENT - SPEED	$14,250
JAMES CITY COUNTY	SELECTIVE ENFORCEMENT - ALCOHOL	$19,585
	SELECTIVE ENFORCEMENT - SPEED	$25,466
NEWPORT NEWS CITY	SELECTIVE ENFORCEMENT - ALCOHOL	$54,100
NORFOLK CITY	SELECTIVE ENFORCEMENT - ALCOHOL	$39,939
	SELECTIVE ENFORCEMENT - OCCUPANT PROTECTION	$9,000
	SELECTIVE ENFORCEMENT - SPEED	$47,824
ODU POLICE	SELECTIVE ENFORCEMENT - POLICE TRAFFIC SERVICES	$24,800
ODU RESEARCH FOUNDATION	ANNUAL VIRGINIA SEAT BELT SURVEY	$248,143
	OCCUPANT PROTECTION - EVALUATION RESULTS	$138,286
POQUOSON CITY	SELECTIVE ENFORCEMENT - SPEED	$6,325
PORTSMOUTH CITY	SELECTIVE ENFORCEMENT - ALCOHOL	$31,607
	SELECTIVE ENFORCEMENT - POLICE TRAFFIC SERVICES	$25,285
SMITHFIELD TOWN	SELECTIVE ENFORCEMENT - ALCOHOL	$10,355
	SELECTIVE ENFORCEMENT - SPEED	$11,236
SUFFOLK CITY	SELECTIVE ENFORCEMENT - ALCOHOL	$11,272
	SELECTIVE ENFORCEMENT - POLICE TRAFFIC SERVICES	$15,870
SURRY COUNTY	SELECTIVE ENFORCEMENT - SPEED	$12,848
VIRGINIA BEACH CITY	SELECTIVE ENFORCEMENT - ALCOHOL	$47,200
	SELECTIVE ENFORCEMENT - OCCUPANT PROTECTION	$29,400
	SELECTIVE ENFORCEMENT - SPEED	$90,580
	TRAFFIC ENGINEERING - TRAINING	$20,000
WILLIAMSBURG CITY	SELECTIVE ENFORCEMENT - ALCOHOL	$15,800
	SELECTIVE ENFORCEMENT - BIKE/PED	$5,000
	SELECTIVE ENFORCEMENT - SPEED	$10,000
YORK COUNTY	SELECTIVE ENFORCEMENT - ALCOHOL	$22,800
	SELECTIVE ENFORCEMENT - POLICE TRAFFIC SERVICES	$32,900

FIGURE 63 – FY 2023 HIGHWAY SAFETY PLAN EFFORTS IN HAMPTON ROADS

Source: HRTPO analysis of Virginia Highway Safety Plan.

VDOT Pedestrian Safety Action Plan

Pedestrians are some of the most vulnerable users of the transportation network. As speeds increase, the survivability of pedestrians in the crash decreases as shown in the figure below.



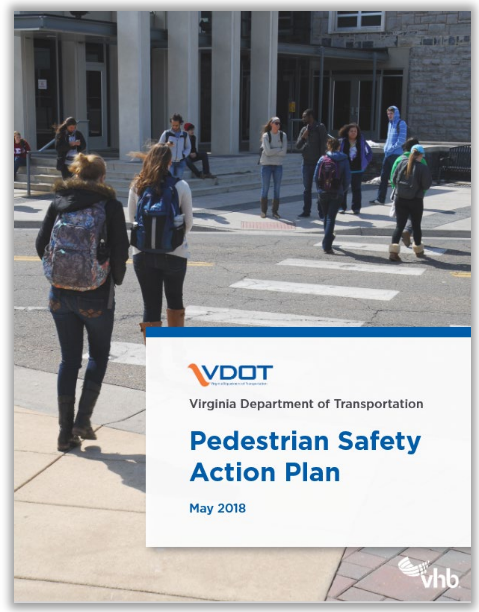
Due to the severe impact of crashes involving pedestrians, the locations and severity of crashes involving pedestrians were identified in the Crash Locations section of this report.

In response to the severity of and an increase in pedestrian fatality rates, VDOT completed the initial Pedestrian Safety Action Plan (PSAP) in 2018. The PSAP report was developed in coordination with various stakeholders in order to improve pedestrian safety and reduce pedestrian fatalities throughout the state. The PSAP includes:

- An inventory of key pedestrian safety issues, policies, and risk factors.
- An assessment and recommendations for addressing pedestrian safety through land development, roadway design, traffic engineering, and complete street policies.
- Considerations for integrating pedestrian safety into statewide funding programs.
- Countermeasure recommendations for priority sites with a history and risk for pedestrian crashes.
- Identification of maintenance issues that impact pedestrian access and safety.

The objectives of the PSAP include:

- Better understand pedestrian safety and crash trends throughout the state.
- Identify the locations with the highest numbers of pedestrian crashes.
- Consider the relationship between land use and pedestrian safety.
- Identify countermeasures that address key pedestrian safety issues.



- Develop potential HSIP pedestrian safety projects.
- Improve pedestrian safety and accommodations in work zones and roadway maintenance activities.
- Integrate pedestrian crash and exposure data considerations and safety elements into SMART SCALE projects.
- Consider VDOT policy, procedure, and practice changes to better promote safe pedestrian travel.
- Support implementation of the Virginia Strategic Highway Safety Plan (SHSP).
- Coordinate with the Virginia Highway Safety Plan and efforts led by DMV to improve public education and law enforcement for pedestrian safety.

The PSAP includes a list of recommended policy updates and additional guidance based on conversations with VDOT staff and stakeholders, a review of VDOT policy, and a review of best practices. These policy recommendations are:

- Create performance metrics for achieving pedestrian safety goals in the SHSP and priorities identified in the PSAP.
- Recommend that the Office of Intermodal Planning and Investment (OIPI) incorporates the findings of the PSAP into Virginia's SMART SCALE prioritization process.
- Form a VDOT working group or committee focusing on pedestrian safety and/or Complete Streets implementation.
- Develop training and distribute technical resources for selecting countermeasures.
- Create a flowchart or instructions for developing HSIP projects from PSAP selected priority corridors or crash cluster sites.
- Update VDOT-specific guidance on countermeasure selection and treatments at uncontrolled crossings and signalized intersection crossings.

OCEAN VIEW AVENUE ROAD DIET

Image Source: Google.

- Develop Road Diet or lane width reduction guidelines.
- Develop Pedestrian Priority Zones (PPZs) criteria and support speed-setting and design policies for high-risk corridors.
- Implement Work Zone Pedestrian and Bicycle Guidance as standards.
- Develop a checklist or model guidance for reviewing subdivisions or site plans for pedestrian safety.
- Update VDOT and local Traffic Impact Analysis (TIA) guidelines for pedestrian Levels of Service (LOS) to include mitigation options at uncontrolled crossings.
- Implement and improve existing multimodal design guidelines, with focus on pedestrian crossing improvements.
- Evaluate VDOT sidewalk maintenance policies for potential snow removal.

- Incorporate pedestrian safety treatments into routine maintenance activities, such as resurfacing and overlay projects.

In addition to recommended policy updates, the PSAP includes an analysis of the locations throughout the state with a high number of crashes involving pedestrians. These locations, referred to as crash clusters, are "hot spots" where a higher number of pedestrian crashes have occurred in close proximity to one another over short roadway segments or intersections.

This pedestrian crash analysis has been updated – referred to as PSAP 3.0 – with data through the year 2020. PSAP 3.0 includes a list of high priority crash clusters throughout the state, which includes 20 locations in Hampton Roads. These 20 locations are described in the Crash Locations section of this report.

The PSAP also includes a predictive systemic analysis to consider corridors that do not have a history of a high number of pedestrian crashes but should be prioritized for proactive crash countermeasure improvements based on pedestrian safety factors such as roadway characteristics and pedestrian exposure levels. These locations are referred to as PSAP priority corridors. The Hampton Roads PSAP priority corridors are:

- Ballentine Blvd – Princess Anne Rd to Kimball Terr
- Campostella Rd – Wilson Rd to Berkley Ave
- Chesapeake Blvd – Ocean View Ave to Tait Terr
- Granby St – Dupre Ave to Main St
- Holland Rd – Plaza Trail to Dam Neck Rd
- Jefferson Ave – Fort Eustis Blvd to 18th St
- Lafayette Blvd – Chesapeake Blvd to Dupont Cir
- Little Creek Rd – Shore Dr to Hampton Blvd

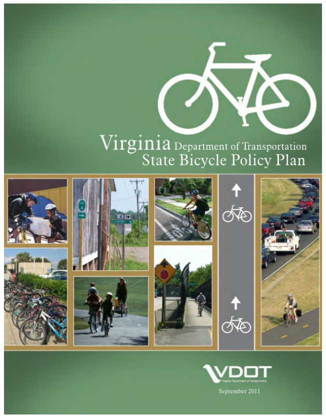
PACIFIC AVENUE PEDESTRIAN SAFETY IMPROVEMENTS
Image Source: Google.

- Sewells Point Rd – Little Creek Rd to Princess Anne Rd
- Tidewater Dr – Ocean View Ave to I-264
- Virginia Beach Blvd – Pacific Ave to Mayo Rd
- Warwick Blvd – Falls Reach Pkwy to 71st St
- Wilson Rd – Campostella Rd to Berkley Ave

Finally, the PSAP includes a list of countermeasures for each of the priority crash clusters and corridors. Sheets were created for each priority crash cluster and corridor that show the location, describe key roadway conditions, summarize crash types, and list countermeasure options.

The VDOT Pedestrian Safety Action Plan and PSAP Map Viewer is available at https://vdot.maps.arcgis.com/apps/webappviewer/index.html?id=02a155fedefa4e71bdb8c0cf524b636f.

VDOT State Bicycle Policy Plan



Similar to pedestrians, bicyclists are some of the most vulnerable users of the transportation network. Because of these severe impacts of crashes involving bicyclists, the locations and severity of crashes involving bicyclists were described in the Crash Locations section of this report.

Although Virginia does not have a plan specifically devoted to bicyclist safety similar to the PSAP, safety issues related to bicycling are addressed in the VDOT State Bicycle Policy Plan. The VDOT State Bicycle Policy Plan includes a Vision and Goals, existing conditions, current programs and policies, program and policy recommendations, and a timeframe and priorities.

The VDOT State Bicycle Policy Plan includes two goals:

- Increase the use of bicycling in Virginia to include a full and diverse range of the population for all trip purposes
- Improve safety and comfort of bicyclists throughout Virginia, reduce bicycle crashes

The Plan highlights a number of program and policy recommendations, and establishes priorities. Timelines are then given for each of these priorities. These priorities and timelines are shown in **Figure 64**.

The VDOT State Bicycle Policy Plan is available at https://www.vdot.virginia.gov/about/programs/bike-ped/.

Element 1: *Clarify Policies*			
Action	**(0-3 yr)**	**(3-5 yr)**	**Ongoing**
Action 1.1a: Develop Supplemental Design Policies (Appendix A)	✓		
Action 1.1b: Develop a process for installing and maintaining bike signage	✓		
Action 1.1c: Develop guidelines for providing bike parking, showers, and changing facilities at VDOT offices		✓	
Action 1.2a: Add policy clarification to decision tree process chart	✓		
Action 1.2b: Semi-annual review of the policy implementation process			✓
Action 1.3a: Consider a new directive allowing narrower lane widths	✓		
Action 1.3b: Proactive review of lane widths during projects to provide bike lanes or shoulders			✓
Action 1.4a: Value engineering consistently applies the Policy			✓
Action 1.5a: Routine upgrades to USBR 1 and 76 during highway projects			✓
Action 1.5b: Identify re-alignments and spur routes for USBR 1 and 76	✓		
Action 1.5c: Installation of new signs and route map development for long distance bike routes			✓
Action 1.6a: Develop list of current roadways where bicycle access is restricted	✓		
Action 1.6b: Establish protocol to determine when prohibitions are warranted	✓		
Action 1.6c: Develop policy to permit shared use paths in limited access rights-of-way		✓	
Action 1.7a: Prepare directive to preserve and/or replace existing bicycle accommodations	✓		
Action 1.7b: Expand bicycle information in the Maintenance Division Best Practices Manual		✓	
Action 1.7c: Establish procedures addressing the routine maintenance of bikeways, per Policy		✓	
Action 1.7d: Develop an Adopt-a-Route Program	✓		
Action1.8a: District offices ID locations where shoulders should be repaved			✓
Action 1.9a: Update Traffic Calming Guide to include bicycle friendly design provisions		✓	
Action 1.10a: Incorporate bicycle facility design guidance in VDOT geometric standards			✓
Action 1.11a: Website updates to ensure all bike/ped policies are in one place			✓

Figure 64 – VDOT State Bicycle Policy Plan Priorities and Timelines
Source: VDOT.

Element 2: *Provide Staff with Necessary Resources*			
Action	*(0-3 yr)*	*(3-5 yr)*	*Ongoing*
Action 2.1a: Establish mission and core responsibilities of the Bike and Pedestrian program (Appendix D)	✓		
Action 2.1b: Review/revise responsibilities of District bicycle and pedestrian coordinators	✓		
Action 2.1c: Establish communication methods between Central and District office bicycle staff	✓		
Action 2.2a: Offer multimodal training to VDOT staff and others			✓
Action 2.2b: Expand training opportunities to include webinars	✓		
Action 2.3a: Include bicycle responsibilities in job descriptions for new VDOT employees, where appropriate			✓
Action 2.4a: Continue to provide guidance on liability issues			✓

Element 3: *Improve Bicycle Outreach and Coordination*			
Action	*(0-3 yr)*	*(3-5 yr)*	*Ongoing*
Action 3.1a: Maintain a database of adopted local plans that address bicycling	✓		
Action 3.1b: Ensure local plans are reviewed during project scoping			✓
Action 3.1c: Work with local governments to ensure Policy is applied to locally-administered projects			✓
Action 3.2a: Periodic review of the content of the Bicycle and Pedestrian Program website			✓
Action 3.2b: Create centralized information area on website that provides easy-to-access guidance		✓	
Action 3.3a: Increase communication with VDOT Marketing, Communication, and Public Affairs Offices			✓
Action 3.4a: Continue to coordinate with Virginia Tourism Authority and others to promote bicycling			✓
Action 3.5a: Continue to involve the Bicycle Advisory Committee in Program activities			✓
Action 3.5b: Clarify the scope and responsibilities of the Committee	✓		
Action 3.6a: Collaborate with the Department of Education, particularly on Safe Routes to Schools issues	✓		
Action 3.6b: Participate in Road Safety Audits for schools on state-maintained roads			✓

Element 3: *Improve Bicycle Outreach and Coordination, Cont.*			
Action	*(0-3 yr)*	*(3-5 yr)*	*Ongoing*
Action 3.6c: Encourage good bicycle access in new school site design	✓		
Action 3.7a: Work with colleges and universities to promote bicycling to campus	✓		
Action 3.7b: Support the inclusion of a bike/ped transportation course at colleges and universities	✓		
Action 3.7c: Partner with colleges and universities on training courses	✓		
Action 3.7d: Encourage colleges and universities to provide bicycle safety classes			✓
Action 3.7e: Continue to work with college and universities to research bicycling issues in the Commonwealth			✓
Action 3.8a: Work with parks agencies at the national, state, and local level to build a network of bikeways			✓
Action 3.9a: Support projects and programs that encourage bike access to transit	✓		
Action 3.9b: Play a lead role in improving bike access to transit for smaller transit agencies		✓	

Element 4: *Measure and Evaluate Progress*			
Action	*(0-3 yr)*	*(3-5 yr)*	*Ongoing*
Action 4.1a: Establish benchmarks needed to measure progress toward the goals of this Plan	✓		
Action 4.2a: Provide leadership for a long-term bicycle and pedestrian data collection program			✓
Action 4.2b: Coordinate with organizations that already collect data to incorporate bicycle data			✓
Action 4.2c: Explore potential improvements to the collection and categorization of bicycle crash data	✓		

FIGURE 64 (CONTINUED) – VDOT STATE BICYCLE POLICY PLAN PRIORITIES AND TIMELINES

Source: VDOT.

Highway Safety Manual

The Highway Safety Manual (HSM)[6] is a document that provides safety planning methods and tools to consider when making decisions related to the design and operation of roadways. Developed for the American Association of State Highway and Transportation Officials (AASHTO), the widely accepted HSM provides a quantitative approach to assessing impacts on roadway safety. The HSM provides methods to predict the safety performance of roadways, select safety countermeasures, compare alternatives, and prioritize projects.

Applications of the HSM include:

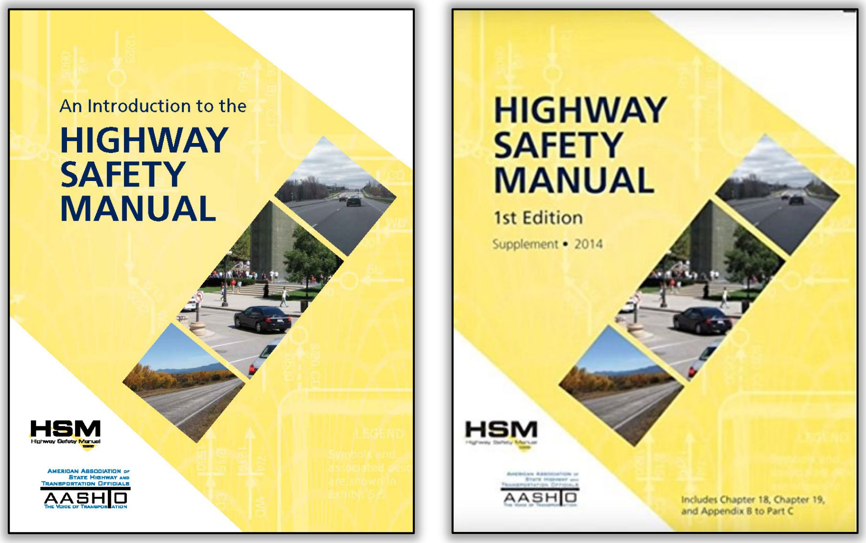
- Identifying locations with the most potential for crash reduction
- Identifying factors contributing to crashes and potential countermeasures to address these issues
- Conducting economic appraisals of potential improvements and prioritizing projects
- Evaluating the crash reduction benefits of implemented treatments
- Estimating potential effects on crashes of planning, design, operations, and policy decisions

The HSM was first published in 2010 with a supplement for freeways published in 2014. National Cooperative on Highway Research Program (NCHRP) Project Number 17-71 is currently updating the manual and incorporating state of the art research, lessons learned, and more. The second edition of the HSM is expected to be published by AASHTO in 2024.

[6] American Association of State Highway and Transportation Officials, *Highway Safety Manual*, 1st Edition, Volumes 1-3, 2010.

In addition to the Highway Safety Manual, predictive safety research has been conducted by the Virginia Transportation Research Council (VTRC) for the Virginia Department of Transportation (VDOT). The purpose of this research is to provide locally derived values for safety prediction models that can used by VDOT to prioritize safety improvements on roadways throughout the state.

More information on the Highway Safety Manual is available at https://www.highwaysafetymanual.org/Pages/default.aspx.



Highway Safety Manual and 2014 Supplement for Freeways

Road Safety Audits

According to FHWA, a Road Safety Audit (RSA) is a formal and independent safety performance review of an existing or future road or intersection by an experienced team of safety specialists addressing the safety of all road users[7]. The overall objective of an RSA is to analyze site crash trends and to develop and recommend potential safety countermeasures to mitigate them. FHWA works with state and local jurisdictions to integrate RSAs into the project development process for new road projects and encourages RSAs on existing roadways and intersections.

The goal of an RSA is to answer the following questions:

1) What elements of the road may present a safety concern: to what extent, to which road users, and under what circumstances?
2) What opportunities exist to eliminate or mitigate identified safety concerns?

A number of case studies show that most RSA benefits are qualitative rather than quantitative. Many of these benefits are immeasurable as the audits aim to prevent crashes from occurring. According to RSA pilot studies assessed by FHWA, several benefits of RSAs[8] were found:

- Provide safety beyond established standards
- Identify additional improvements that can be incorporated into the projects
- Introduce designs that reduce the number and severity of crashes
- May reduce costs by identifying safety issues and fixing them before projects are constructed
- Create consistency among all projects
- Encourage personnel to think about safety in the course of their normal activities, throughout all stages of a project
- Invite interdisciplinary input
- Enhance the quality of field reviews
- Provide learning experiences for audit team and design team members
- Help reduce costs by identifying safety issues and mitigating them before projects are built
- Integrate multimodal safety concerns
- Consider human factors in all facets of design
- Help reduce liability claims – a component of both agency and societal costs
- Provide feedback to highway designers that they can apply to other projects as appropriate
- Provide feedback that helps to affirm actions taken and to work through outstanding issues
- Ensure that high quality is maintained throughout a project's life cycle

In many places, Road Safety Audits are referred to as Road Safety Assessments. VDOT has released the *VDOT Road Safety Assessment Guidelines*[9] that describes the RSA process within Virginia. VDOT uses RSAs to guide the design and construction of engineering improvements to address several of the key components of *Virginia's Strategic Highway Safety Plan*, including intersection and roadway departure crashes. The VDOT Traffic Engineering Division promotes RSAs as the foundation of

[7] Federal Highway Administration, https://highways.dot.gov/safety/data-analysis-tools/rsa/road-safety-audits-rsa, as of November 2022.

[8] National Cooperative Highway Research Program, *Road Safety Audits: A Synthesis of Highway Practice*, Synthesis 336, Transportation Research Board, 2004, p.6.

[9] Virginia Department of Transportation, *VDOT Road Safety Assessment Guidelines*, May 2008.

transportation safety planning and recommends that RSAs be included throughout the project development and delivery process. VDOT conducts RSAs on existing roadways, and identified high crash locations.

VDOT has identified eight major steps for conducting an RSA:

1. Select candidate corridor segments or intersections
2. Select members of the assessment team for a specific Highway Safety Corridor
3. Conduct crash analysis and collect background information for the RSA team
4. Hold kick-off meeting
5. Conduct site field review
6. Develop countermeasures
7. Develop an RSA report and hold completion meeting
8. Implement countermeasures and monitor performance

Safety Laws in Virginia

According to Advocates for Highway and Auto Safety – an alliance of consumer, insurance, and health and safety groups that aims to improve roadway safety throughout the country – there are sixteen types of traffic safety laws that help reduce motor vehicle deaths and injuries (**Figure 65** on page 98). This list of sixteen traffic safety laws was produced based on government and private research, crash data, and experiences among each state. They address occupant protection, child passenger safety, teen driving, impaired driving, distracted driving, and automated enforcement to curb speed. Of these sixteen laws, Virginia currently only has six in place. Recommended laws that are not currently in effect in Virginia include a primary enforcement seat belt law (both front and rear), a booster seat law, various graduated driver license laws, a statewide open container law, and a cell phone restriction law for beginning teen drivers.

More information on the Advocates for Highway and Auto Safety analysis is available at https://saferoads.org/advocates-roadmap-reports/.

	Safety Law	Description	Law in VA?	# States with Law
Occupant Protection	Primary Enforcement Front Seat Belt Law	Allows law enforcement to stop and ticket someone when they see a violation of the seat belt law for front seat occupants.	NO	35
	Primary Enforcement Rear Seat Belt Law	Allows law enforcement to stop and ticket someone when they see a violation of the seat belt law for rear seat occupants.	NO	21
	All-Rider Motorcycle Helmet Law	Requires all motorcycle riders, regardless of age, to use a helmet that meets U.S. DOT standards.	YES	17
Child Passenger Safety	Rear Facing Through Age 2 or Older Law	Requires children to remain in a rear facing child restraint system in the rear seat from birth through age two or longer.	YES	20
	Booster Seat Law	Requires that children who have outgrown the forward facing safety seat requirements to be placed in a booster seat until age 8 and the height of 57 inches have been reached.	NO	16
	Rear Seat Through Age 12 Law	Requires children age 12 and younger to be properly restrained in a rear seat.	NO	2
Teen Driving	Minimum Ages for Learner's Permit and Licensing	A beginning teen driver is prohibited from obtaining a learner's permit until the age of 16 and is prohibited from obtaining a driver's license until the age of 17.	NO	7
	70 Hours of Supervised Driving Provision	A beginning teen driver must receive at least 70 hours of behind-the-wheel training with an adult licensed driver.	NO	1
	Nighttime Driving Restriction Provision	Prohibits unsupervised nighttime starting at 8 PM.	NO	1
	Passenger Restriction Provision	Prohibits non-familial teen passengers from riding with a teen driver without adult supervision.	NO	7
Impaired Driving	All-Offender Ignition Interlocks	Mandates the installation of ignition interlock devices (IIDs) on the vehicles of all convicted drunk driving offenders.	YES	30
	Open Container Law	Prohibits open containers of alcoholic beverages in the passenger area of a motor vehicle.	NO	38
Distracted Driving	All-Driver Text Messaging Restriction	Prohibits all drivers from sending, receiving, or reading a text message from any handheld or electronic data communication device, except in an emergency.	YES	46
	Graduated Driver Licensing (GDL) Cell Phone Restriction	Prohibits all use of cellular devices (hand-held, hands-free, and text messaging) by beginning teen drivers, except in an emergency, for the entire duration during the GDL program.	NO	29
Automated Enforcement to Curb Speed	Permits Automated Enforcement by Law	A state receives credit if it has enacted a law permitting the use of automated speed enforcement.	YES	26
	Automated Enforcement in Use	A state receives credit if automated speed enforcement is in use within the jurisdiction.	YES	20

FIGURE 65 – SAFETY LAWS THAT HELP REDUCE MOTOR VEHICLE DEATHS AND INJURIES

Source: Advocates for Highway and Auto Safety. Reflects data as of December 2023.

Safety Funding Sources

This section includes a summary of funding sources that are dedicated to improving roadway safety, such as the Highway Safety Improvement Program, the new Safe Streets and Roads for All program, and others.

Highway Safety Improvement Program

The primary mechanism for funding roadway safety improvements is the Highway Safety Improvement Program (HSIP). Federal legislation established the Highway Safety Improvement Program in order to achieve a significant reduction in traffic fatalities and serious injuries on public roads. The HSIP requires a data-driven, strategic approach to improving highway safety that focuses on performance.

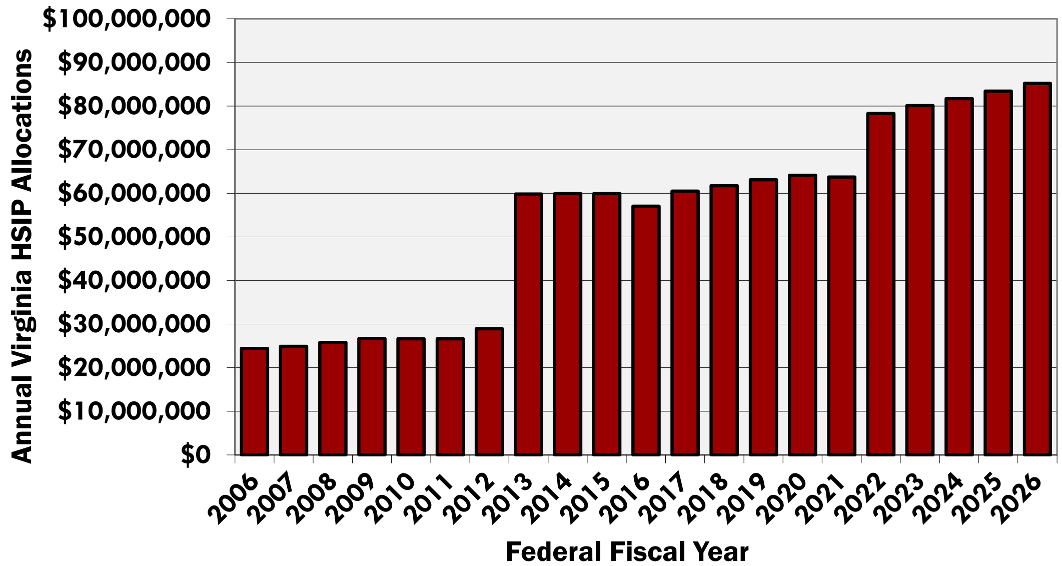


Figure 66 – Virginia Highway Safety Improvement Program Allocations

Source: FHWA.

The first major federal effort to improve roadway safety was The Highway Safety Act of 1966, which provided financial assistance to states to accelerate highway traffic safety programs. Starting in 1992, roadway safety funding was provided as a 10% setaside in funds from the Surface Transportation Program.

In 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) changed the Hazard Elimination Program to the Highway Safety Improvement Program and established it as a core Federal-aid program. SAFETEA-LU authorized an average of $1.55 billion annually to HSIP between Federal Fiscal Years (FFY) 2006 and 2009, and this average increased to $1.74 billion during SAFETEA-LU extensions in Federal Fiscal Years 2010 through 2012.

Funding for HSIP has been greatly increased since it was created under SAFETEA-LU, with further increases included in the current federal surface transportation authorization program, the Infrastructure Investment and Jobs Act (IIJA). Nearly $3 billion was allocated to the Highway Safety Improvement Program under the IIJA in Federal Fiscal Year 2022, and this number will increase annually, up to $3.2 billion in FFY 2026.

Virginia's HSIP funding has also greatly increased since the creation of the program (**Figure 66**). Virginia received an average apportionment of just over $25 million in Federal Fiscal Years 2006-2009 under SAFETEA-LU. Under the IIJA, that has increased to $80 million in Federal Fiscal Year 2023.

To be eligible for HSIP funding, a project must be a strategy, activity, or project on a public road that corrects or improves a hazardous road location or feature, or addresses a highway safety problem. In addition, HSIP funds should be used to advance implementation of the Safe System approach (described earlier in this report) and advance cost-effective projects that have the greatest potential to reduce roadway fatalities and serious injuries using proven, effective strategies and countermeasures. Projects must also be consistent with the statewide Strategic Highway Safety Plan to be eligible for HSIP funding.

Federal funds can generally be used to pay for up to 90% of eligible HSIP projects. For those HSIP projects that can be funded at up to 90% of the total cost, VDOT generally funds the remaining 10%. Federal law, however, permits certain types of HSIP projects to be paid for with 100% federal funds. Examples include bicycle and pedestrian safety projects, roundabouts, pavement markings, centerline and shoulder rumble strips and stripes, and installation of traffic signs.

A number of roadway safety projects using HSIP funding have been completed throughout Hampton Roads in recent years, which are further described later in this report.

More information on the Highway Safety Improvement Program is available at https://highways.dot.gov/safety/hsip. VDOT also maintains a HSIP page that provides information on the program, including information on how VDOT selects projects for HSIP funding and an application form for proposed HSIP projects. The Virginia Highway Safety Improvement Program site is located at https://www.virginiadot.org/business/ted_app_pro.asp.

SS4A Program

The Infrastructure Investment and Job Act (IIJA), which is also referred to as the Bipartisan Infrastructure Law (BIL), established the new Safe Streets and Roads for All (SS4A) discretionary program. The program appropriates $5 billion in funds between Federal Fiscal Years 2022-2026. The SS4A program is designed to fund regional, local, and Tribal safety initiatives through grants to prevent roadway deaths and serious injuries.

The following groups are eligible to apply to SS4A grant funding:

- Metropolitan Planning Organizations (MPOs)
- Counties/Cities/Towns
- Transit agencies
- Tribal governments
- Multijurisdictional groups comprised of these entities

The following activities are eligible for funding under the SS4A program:

- Develop a comprehensive safety action plan
- Conduct planning, design, and development activities in support of a safety action plan
- Carry out project and strategies that are identified in a safety action plan

As part of the SS4A program, there are recommendations for components that should be included in a comprehensive safety action plan. In order for an implementation project to be eligible for SS4A funding, it must be included in a comprehensive safety plan that satisfies these criteria. These components, which HRTPO staff are aiming to include in this safety study, are shown in **Figure 67** and described further below:

- **Leadership commitment and goal setting** that includes a goal timeline for eliminating roadway fatalities and serious injuries.

- **Planning structure** through a committee, task force, implementation group, or similar body charged with oversight of the Action Plan development, implementation, and monitoring.

- **Safety analysis** of the existing conditions and historical trends that provides a baseline level of crashes involving fatalities and serious injuries across a jurisdiction, locality, or region.

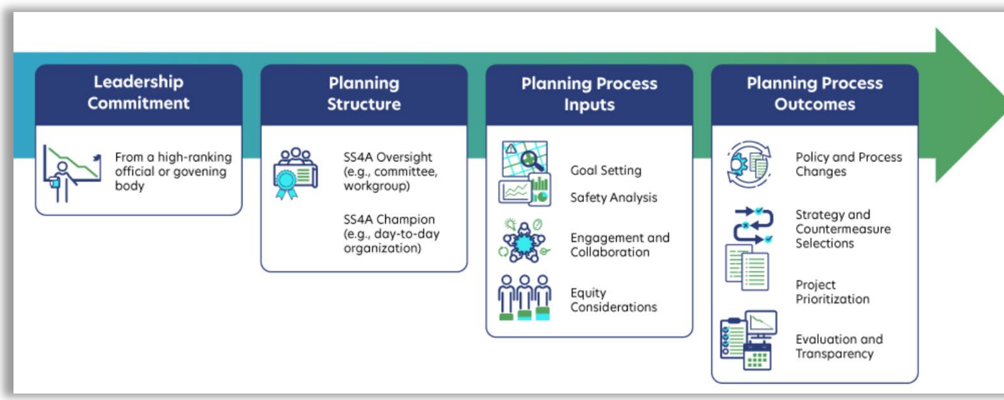


Figure 67 – SS4A Safety Action Plan Components

Source: USDOT.

- **Engagement and collaboration** with the public and relevant stakeholders, including the private sector and community groups, that allows for both community representation and feedback.

- **Equity** considerations developed through a plan using inclusive and representative processes.

- **Policy and process changes** that assess the current policies, plans, guidelines, and/or standards to identify opportunities to improve how processes prioritize transportation safety.

- **Strategy and project selections** that identify a comprehensive set of projects and strategies based on data, the best available evidence and noteworthy practices, and stakeholder input and equity considerations that will address the safety problems described in the safety action plan.

- **Progress and transparency methods** that measure progress over time after an Action Plan is developed or updated, including outcome data.

SS4A funds can also be allocated to activities that support or enhance an existing safety action plan. These types of activities include but are not limited to:

- Additional analysis
- Expanded data collection and evaluation using integrated data
- Testing Action Plan concepts before project and strategy implementation
- Feasibility studies using quick-build strategies that inform permanent projects in the future (e.g., paint, plastic bollards)
- Follow-up stakeholder engagement and collaboration
- Targeted equity assessments
- Progress report development
- Complementary planning efforts such as speed management plans, accessibility and transition plans, racial and health equity plans, and lighting management plans

Projects and activities that are identified in the safety action plans described previously can be funded through SS4A Implementation Grants. According to USDOT, the following are examples of infrastructure, behavioral, and operational projects and activities that can be funded through a SS4A Implementation Grant:

- **Applying low-cost roadway safety treatments**, such as turn lanes at intersections, centerline and shoulder rumble strips, wider edge lines, high-friction surface treatments, road diets, and better signage along high-crash corridors.

- **Identifying and correcting common risks** such as improving crosswalks by adding high-visibility pavement markings, lighting, and signage at transit stops, in a designated neighborhood, or along a busy public transportation route.

- **Transforming a roadway corridor** into a Complete Street with safety improvements to control speed, separate users, and improve visibility, along with other measures that improve safety for all users.

- **Installing pedestrian safety enhancements and closing network gaps** with sidewalks, flashing beacons, signal improvements, and audible pedestrian signals.

- **Working with community members in an identified problem area** to carry out quick-build street design changes informed by outreach and user input.

- **Supporting the development of bikeway networks** with bicycle lanes for different roadway volumes and speeds that are safe for people of all ages and abilities.

- **Carrying out speed management strategies** such as implementing traffic calming road design changes, addressing speed along key corridors through infrastructure, conducting education and outreach, setting appropriate speed limits, and making strategic use of speed safety cameras.

- **Creating safe routes to school and public transit services** through multiple activities that lead to people safely walking and biking in underserved communities.

- **Promoting the adoption of innovative technologies or strategies to promote safety** and protect vulnerable road users in high-traffic areas where commercial motor vehicles, pedestrians, bicyclists, motorcyclists, etc. interact.

- **Conducting education campaigns to accompany new or innovative infrastructure**, such as roundabouts, pedestrian hybrid beacons, or pedestrian-only zones.

- **Implementing standard and novel data collection and analysis technologies and strategies** to better understand vulnerable road user (pedestrian/bicycle/transit rider) network gaps and to collect exposure data.

- **Deploying advanced transportation technologies**, such as connected intersection-based safety solutions and vehicle-to-infrastructure (V2I) advisory systems.

- **Combating roadway departure crashes** through enhanced delineation, shoulder widening, rumble strips, and roadside safety improvements.

- **Evaluating and improving the safety of intersections** by considering innovative design changes, improved delineation, and advanced warning.

- **Improving first responder services** with improved crash data collection, formalizing street names and addresses, and enhancing emergency vehicle warning systems.

- **Unifying and integrating safety data across jurisdictions** where local agencies share their crash, roadway inventory, and traffic volume data to create an analytic data resource.

Safety action plan and implementation grants can be funded at up to 80% with SS4A funds. Grant applicants must provide a minimum 20% match with funding from non-federal sources for implementation activities.

More information on the Safe Streets and Roads for All program is available at https://www.transportation.gov/grants/SS4A.

OTHER FUNDING SOURCES

In addition to the federal SS4A program and the federal/state HSIP program, there are other funding sources that are used to improve safety. On a regional level, Regional Surface Transportation Program (RSTP) funding can be used for various improvements that can benefit safety. As an example, turn lanes were constructed in 2017 at the intersection of Route 258 and Route 620/Scotts Factory Road in Isle of Wight County using RSTP funds, and RSTP funding was partially used to fund the Mount Pleasant Road curve realignment in Chesapeake.

Many projects that use Congestion Management and Air Quality (CMAQ) funds – while improving air quality – also have positive impacts on vehicular and pedestrian safety. Signal retimings, turn bay additions, and multi-use paths are examples of the types of projects eligible for CMAQ funding that have safety benefits.

Another source of regional funding that can improve safety, particularly for bicyclists and pedestrians, is the Transportation Alternatives (TA) Program. TA set-aside funds can be used for various smaller-scale, non-traditional transportation projects. Project types related to improving safety include on- and off-road pedestrian and bicycle facilities and safe routes to school projects.

ROUTE 258 AT SCOTTS FACTORY ROAD SAFETY IMPROVEMENTS

Image Source: Google.

Hampton Roads Regional Concept of Transportation Operations – Traffic Incident Management Working Group (RCTO-TIM)

In Hampton Roads, the Regional Concept of Transportation Operations – Traffic Incident Management (RCTO-TIM) working group meets on a regular basis to develop and implement strategies to improve emergency response to roadway incidents in the region. The RCTO-TIM working group, which is led by VDOT, is comprised of various representatives from the Virginia State Police (VSP), local police, fire and rescue agencies, local traffic engineering and planning departments, HRTPO, as well as other operating and first responding agencies.

The goal of the Hampton Roads RCTO-TIM is to reduce the number of injuries incurred by responders while decreasing the clearance times associated with these incidents. The RCTO-TIM seeks to improve collaboration among the region's planners, operators, and responders to enhance various aspects of highway incident management.

The Hampton Roads RCTO-TIM has established six primary objectives:

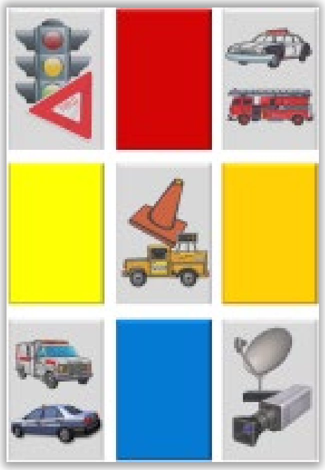
- **Objective 1** - Increase responder safety by eliminating struck-by incidents and fatalities
- **Objective 2** - Decrease incident clearance time
- **Objective 3** - Decrease secondary incident occurrences
- **Objective 4** - Improve inter-agency communication during incidents
- **Objective 5** - Identify existing regional incident management resources and establish plans for inter-agency utilization and acquisition
- **Objective 6** - Establish a regional incident management proactive and post-incident review consortium

VDOT Safety Service Patrol

Some accomplishments of the Hampton Roads RCTO-TIM include:

- Began a practice of collecting and analyzing traffic incident management performance measurement data.
- Annually produces performance measure reports to track progress toward the RCTO's operations objectives.
- Regularly holds post-incident reviews with key participants to discuss "lessons learned".
- Developed a standard hazmat reporting document.
- Planned joint outreach for the "Slow Down, Move Over" law.
- Worked to obtain three more Total Stations to be utilized by Virginia State Police in fatal incident investigations in order to reduce clearance times.
- Began consolidating and distributing real-time traffic incident information gathered from different agencies and jurisdictions to local traffic management centers and VDOT's Hampton Roads Transportation Operations Center (TOC).

- Distributed revisions to the Virginia Work Area Protection Manual to local first responders to improve safety for responders and the traveling public.
- Adopted Lane Designation Terminology to locate incidents faster and reduce clearance times.
- Installed 2/10th mile marker signs at various locations in the region to assist with identifying incident locations.
- Over 7,000 emergency responders have been trained in the region since 2011 using the Strategic Highway Research Program 2 (SHRP2) National Traffic Incident Management (TIM) Responder Training Program. Virginia is the second highest state in the U.S. for TIM training through this program.



More information on the Regional Concept of Transportation Operations – Traffic Incident Management (RCTO-TIM) working group is available at https://www.hrtpo.org/363/Traffic-Incident-Management.

Safety Programs and Educational Efforts

There are a number of regional, statewide, and national organizations and programs that have been created to improve various aspects of roadway safety. Some of these agencies address safety in a specific geographical region, while others were created to address specific issues such as bike safety or reducing alcohol-related crashes. Examples of some of these efforts are described below.

Drive Safe Hampton Roads

Drive Safe Hampton Roads is a regional organization with the goal of increasing the community's involvement and awareness of transportation safety issues. Founded in 1988, Drive Safe Hampton Roads is comprised of representatives from law enforcement, military, fire safety, commercial carriers, state and local governments, and the general public. Drive Safe Hampton Roads meets quarterly to discuss current safety programs, safety issues, and future safety projects

More information on Drive Safe Hampton Roads is included on the organization's website at http://www.drivesafehr.org.

DRIVE SMART Virginia

DRIVE SMART Virginia is an organization dedicated to raising traffic safety awareness in order to save lives and reduce injuries on the roadways of Virginia.

Founded in 1995, DRIVE SMART Virginia is led by safety advocates including the insurance industry, law enforcement, state and federal governments, military, media, and traffic safety organizations.

More information on DRIVE SMART Virginia is included on the organization's website at http://www.drivesmartva.org.

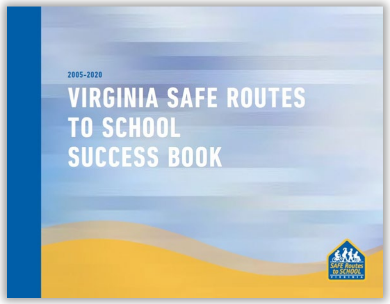
Safe Routes to School

The Safe Routes to School (SRTS) Program is a federally-funded program created by the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation. The purpose of the SRTS program is to:

- Enable and encourage children, including those with disabilities, to walk and bicycle to school.
- Make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age.

- Facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.

In July 2013, federal legislation merged SRTS into the new Transportation Alternatives program. SRTS projects are now eligible to compete for funding alongside other programs, including the Transportation Enhancements program and Recreational Trails program.



The VDOT Safe Routes to School Program has published both a five-year strategic plan to guide the commonwealth's work for the years 2021-2026 and a "Success Book" which documents the program's history and accomplishments back to 2005. The Strategic Plan and Success Book are available on VDOT's SRTS website at https://www.virginiadot.org/programs/srts.asp.

The Safe Routes to School program has funded SRTS coordinators at most school divisions in Hampton Roads and also sidewalk and crosswalk improvements at schools in Chesapeake, James City County, Portsmouth, Virginia Beach, and Williamsburg.

Other Safety Organizations

Many other organizations have been formed to improve automobile safety. Below are some examples:

Insurance Institute for Highway Safety (IIHS)

IIHS is an independent, nonprofit organization that performs research to prevent motor vehicle crashes and reduce injuries in existing crashes. IIHS focuses on a) countermeasures aimed at human, vehicular, and environmental factors in motor vehicle crashes, and b) on interventions that can occur before, during, and after crashes to reduce losses. The IIHS Vehicle Research Center opened in Virginia in 1992 with a state-of-the-art crash test facility.

More information is available at http://www.iihs.org.

Mothers Against Drunk Driving (MADD)

MADD is a nonprofit organization that seeks to stop drunk driving, support the victims of drunk driving crashes, and prevent underage drinking. The organization was founded in 1980 by Candice Lightner after her 13-year-old daughter was killed by a drunk driver.

More information is available at http://www.madd.org.

Safe Kids Worldwide

Safe Kids Worldwide is a global organization that is dedicated to preventing accidental childhood injuries, the leading cause of death of children 14 years and under. This organization works with a network of more than 600 coalitions in the United States and partners with organizations in 23 countries worldwide to reduce injuries from motor vehicles, sports, drownings, falls, burns, poisonings and more. Safe Kids administers the standardized National Child Passenger Safety (CPS) Certification Training Program, which certifies child passenger safety technicians and instructors. Safe Kids also promotes seat belt and car seat safety legislation for children.

More information is available at http://www.safekids.org.

AAA Foundation for Traffic Safety

The AAA Foundation for Traffic Safety (AAAFTS), founded in 1947, conducts research for various highway safety issues. The organization's mission is to identify traffic problems, foster research that seeks solutions, and disseminate information and educational materials. AAAFTS has funded over 250 studies designed to determine the causes of traffic crashes, prevent them, and minimize injuries. Focus areas of the foundation include safety patrols, driver education, distracted driving, senior safety and mobility, and teen driving.

More information is available at http://www.aaafoundation.org.

AARP Driver Safety Program

The AARP Driver Safety Program is the nation's first and largest driver safety program designed for drivers age 50 and older. The AARP course is offered in both classroom and online formats and covers issues such as normal changes in vision, hearing, and reaction time associated with aging. The course also provides practical techniques on how to adjust to these changes. Participants learn how to operate their personal vehicles more safely in today's increasingly challenging driving environment and receive a comprehensive review of the "rules of the road," with an emphasis on safety strategies. AARP offers an 8-hour Smart Driver online course, after which participants may be eligible for a reduction in automobile insurance premiums.

http://www.aarp.org/home-garden/transportation/driver_safety

Recent Safety Projects in Hampton Roads

HRTPO staff composed a list of recently completed safety projects in Hampton Roads that involve various improvements. These improvements include offsetting turn lanes, replacing an existing intersection with an interchange, construction of acceleration lanes, bicycle/pedestrian improvements, and other intersection improvements.

Fourteen locations were analyzed based on selecting a range of project types and crash data availability. For each of the fourteen projects (**Figure 68**), HRTPO staff analyzed crashes for five years before the completion of the project and five years after the completion of the project to determine the change in crashes. This data-driven approach can show the impact of completed safety projects on the number and distribution of crashes.

Figures 69-82 show the results for these locations.

UPC#	PROJECT NAME	PROJECT DESCRIPTION	LOCALITY	TOTAL BEFORE CRASHES	TOTAL AFTER CRASHES	% CHANGE
81455	MOUNT PLEASANT RD	IMPROVE HORIZONAL ALIGNMENT	CHESAPEAKE	4	3	-25%
81446	GREENBRIER PKWY AT FAIRWAY RD	INSTALL TRAFFIC SIGNAL	CHESAPEAKE	4	5	25%
86607	OAK GROVE RD AT GREENTREE RD	REDESIGN INTERSECTION (UPGRADE TO ROUNDABOUT)	CHESAPEAKE	9	3	-67%
104686	ROUTE 17 AT ROUTE 628	INSTALL A NEW TRAFFIC SIGNAL	GLOUCESTER COUNTY	18	16	-11%
100626	GEORGE WASHINGTON MEMORIAL HWY	RETROFIT BICYCLE-PEDESTRIAN IMPROVEMENTS INTO GW MEMORIAL HWY WIDENING PROJECT	GLOUCESTER COUNTY	1	1	0%
83200	BIG BETHEL RD AT RADFORD DR	INSTALL A NEW TRAFFIC SIGNAL	HAMPTON	10	9	-10%
83199	HAMPTON ROADS CENTER PKWY AT BIG BETHEL RD	CONSTRUCT AN ACCELERATION LANE ON EASTBOUND HAMPTON ROADS CENTER PKWY	HAMPTON	27	27	0%
89900	KECOUGHTAN RD AT POWHATAN PKWY	INSTALL A NEW TRAFFIC SIGNAL	HAMPTON	22	11	-50%
17728	COURTLAND INTERCHANGE	ELIMINATE THE EXISTING SIGNALIZED INTERSECTION	SOUTHAMPTON	17	11	-35%
100604	BRIDGE RD AT BENNETTS PASTURE RD	UPGRADE THE INTERSECTION TO ADDRESS TURN LANE QUEUE PROBLEMS	SUFFOLK	15	13	-13%
100539	PROVIDENCE RD	INSTALL PEDESTRIAN SIGNALS AND ADA RAMPS	VIRGINIA BEACH	1	1	0%
100540	DAM NECK RD AT HARPERS RD	OFFSET EXISTING LEFT TURN LANES AND MODIFY EXISTING SIGNAL HEADS	VIRGINIA BEACH	47	40	-15%
100540	SHORE DR AT HELICOPTER RD	GEOMETRIC IMPROVEMENTS TO EXISTING LEFT TURN LANES AND MODIFYING SIGNAL HEADS	VIRGINIA BEACH	37	46	24%
98279	LONGHILL RD AT OLDE TOWNE RD	SIGNAL UPGRADE AND INSTALL A MEDIAN BARRIER ON THE SOUTHERN LEG OF THE INTERSECTION	WILLIAMSBURG	23	12	-48%

Figure 68 – Recent Safety Projects in Hampton Roads Analyzed in this Study

UPC#: 81455	Locality: Chesapeake	Mount Pleasant Rd	Improve horizontal alignment of curve

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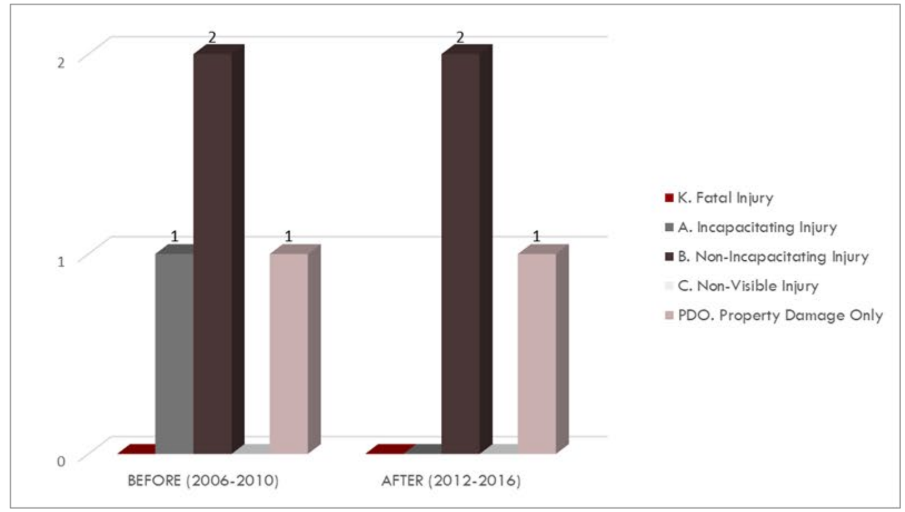
A F T E R



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	4
Total After Crashes	3
% Change	-25%

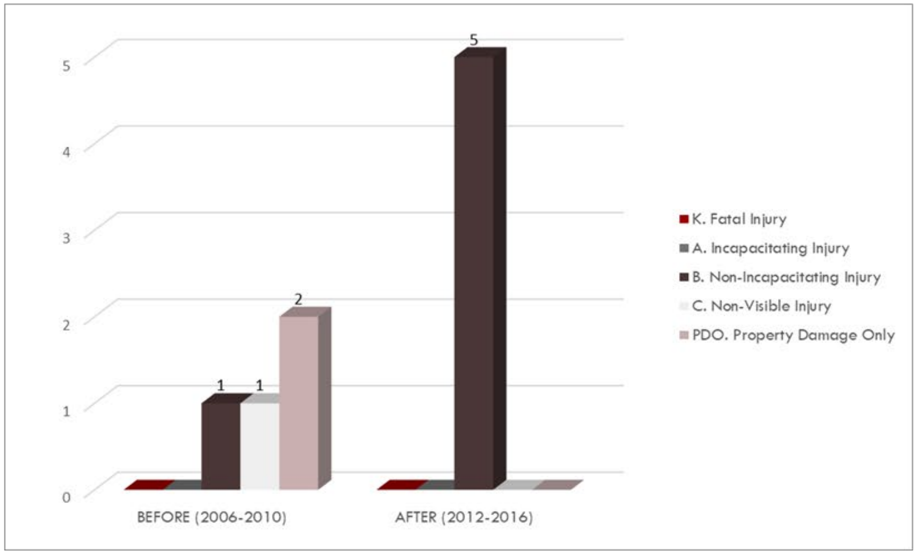
FIGURE 69 – MOUNT PLEASANT ROAD PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

UPC#: 81446	Locality: Chesapeake	Greenbrier Pkwy at Fairway Rd	Install traffic signal

B E F O R E

A F T E R



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	4
Total After Crashes	5
% Change	25%

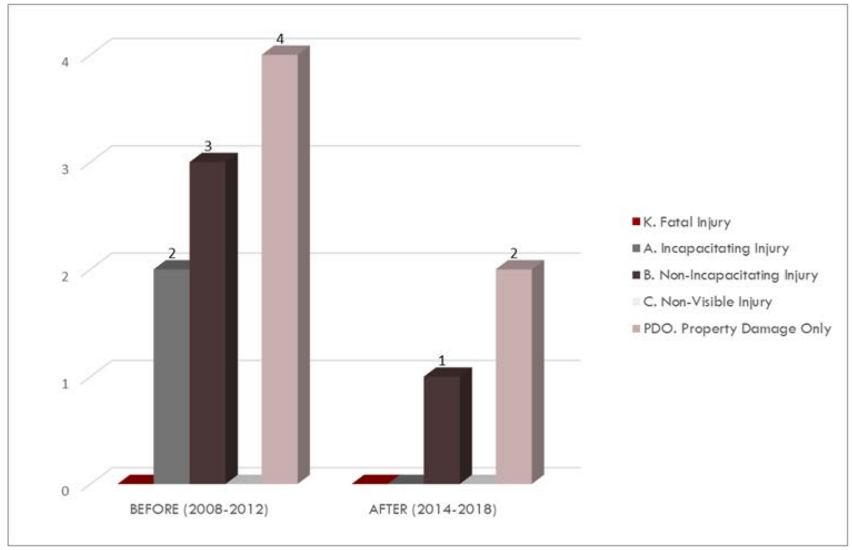
FIGURE 70 – GREENBRIER PARKWAY AT FAIRWAY ROAD PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

UPC#: 86607	**Locality: Chesapeake**	**Oak Grove Rd at Greentree Rd**	**Redesign intersection (upgrade to roundabout)**

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

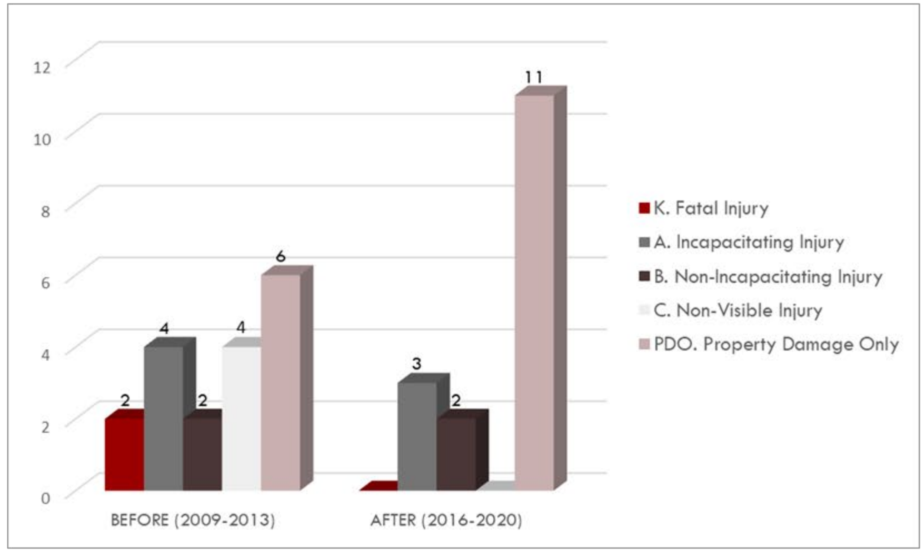
Total Before Crashes	9
Total After Crashes	3
% Change	-67%

FIGURE 71 – OAK GROVE ROAD AT GREENTREE ROAD PROJECT SAFETY IMPACTS
Source: HRTPO analysis of VDOT crash data.

UPC#: 104686	Locality: Gloucester County	Route 17 at Route 628	Install a new traffic signal at the intersection of GW Memorial Hwy (Route 17) and T. C. Walker Rd (Route 628)

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	18
Total After Crashes	16
% Change	-11%

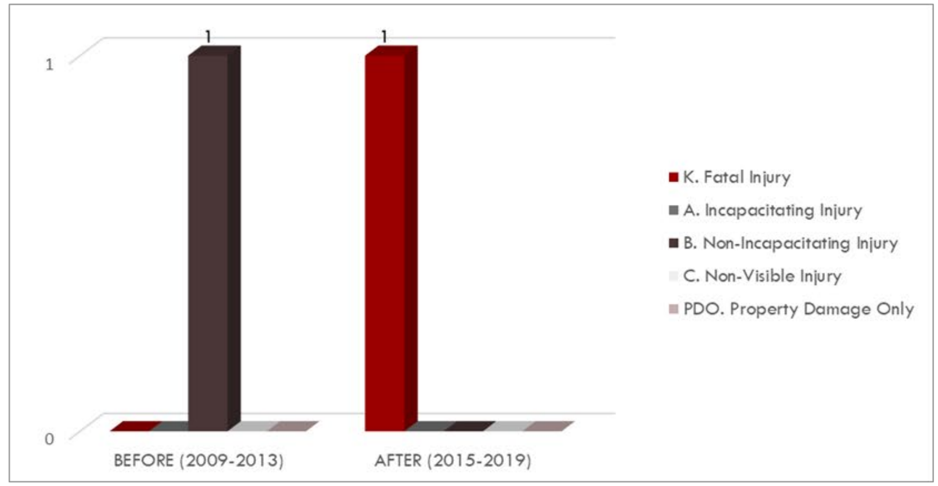
FIGURE 72 – ROUTE 17 AT ROUTE 628 PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

UPC#: 100626	Locality: Gloucester County	George Washington Memorial Hwy	Retrofit bicycle-pedestrian improvements into GW Memorial Hwy widening project from the Coleman Bridge to Farmwood Rd

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

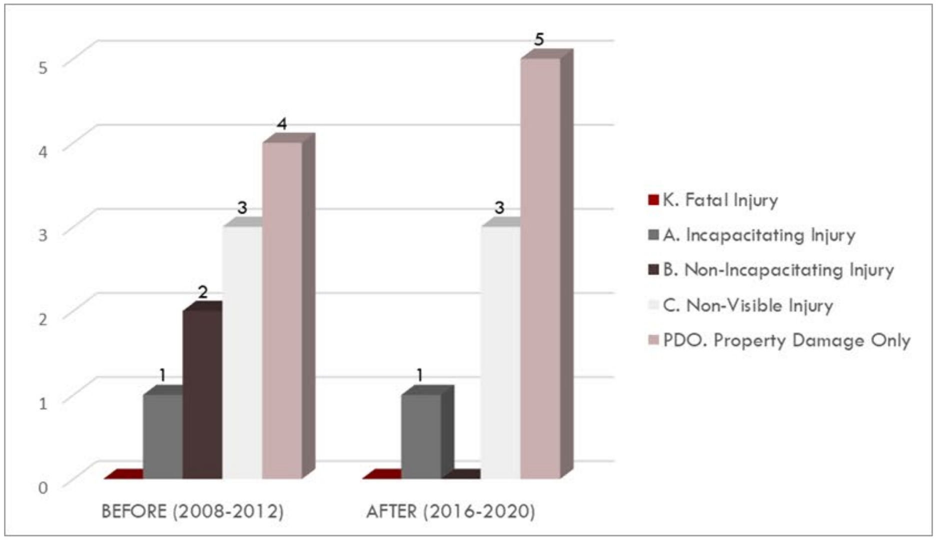
Total Before Crashes	1
Total After Crashes	1
% Change	0%

Figure 73 – George Washington Memorial Highway Project Safety Impacts
Source: HRTPO analysis of VDOT crash data.

UPC#: 83200	Locality: Hampton	Big Bethel Rd at Radford Dr	Install a traffic signal at the intersection of Big Bethel Rd and Radford Dr

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

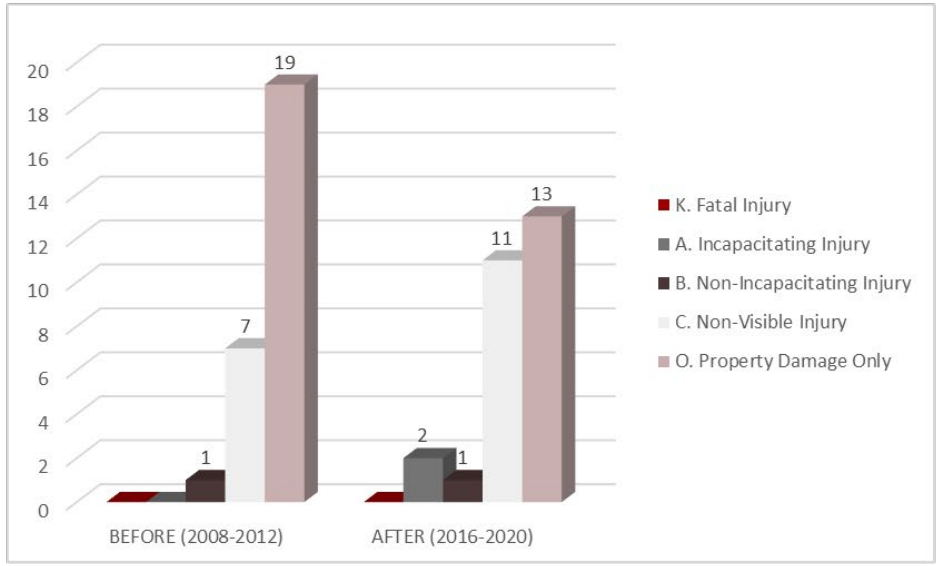
Total Before Crashes	10
Total After Crashes	9
% Change	-10%

FIGURE 74 – BIG BETHEL ROAD AT RADFORD DRIVE PROJECT SAFETY IMPACTS
Source: HRTPO analysis of VDOT crash data.

UPC#: 83199	Locality: Hampton	Hampton Roads Center Pkwy at Big Bethel Rd	Construct an acceleration lane on eastbound Hampton Roads Center Pkwy

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	27
Total After Crashes	27
% Change	0

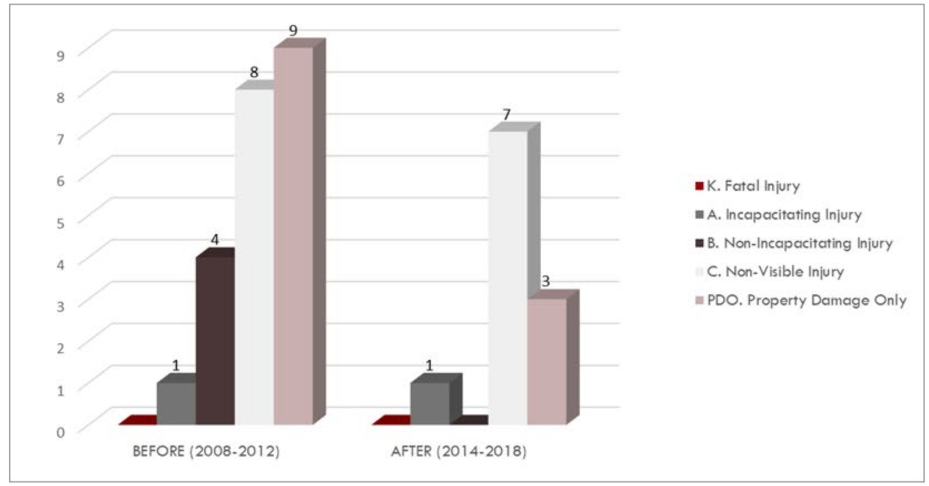
FIGURE 75 – HAMPTON ROADS CENTER PARKWAY AT BIG BETHEL ROAD PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

UPC#: 89900	Locality: Hampton	Kecoughtan Rd at Powhatan Pkwy	Install new traffic signal

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	22
Total After Crashes	11
% Change	-50%

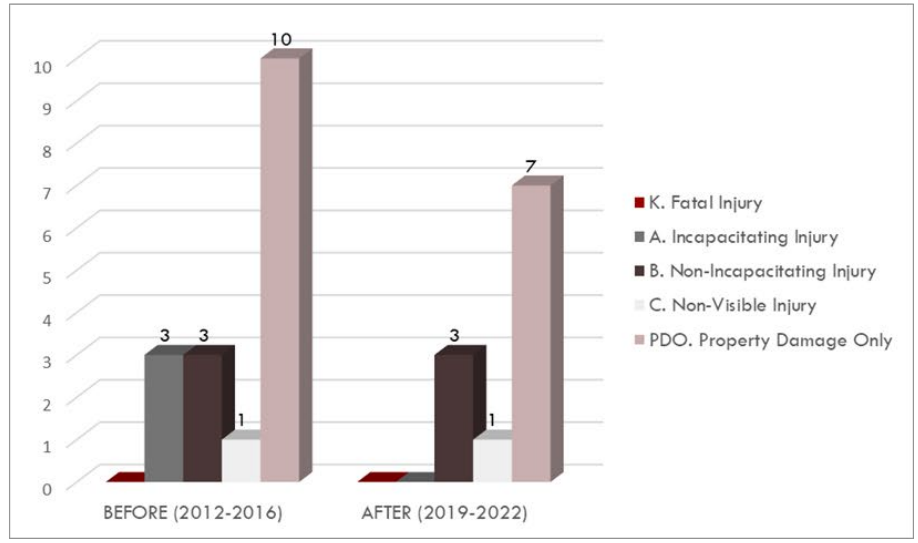
Figure 76 – Kecoughtan Road at Powhatan Parkway Project Safety Impacts

Source: HRTPO analysis of VDOT crash data.

UPC#: 17728	**Locality: Southampton County**	**Courtland Interchange**	**Eliminate the existing signalized intersection at Routes 58 and Business Route 58 east of Courtland**

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	17
Total After Crashes	11
% Change	-35%

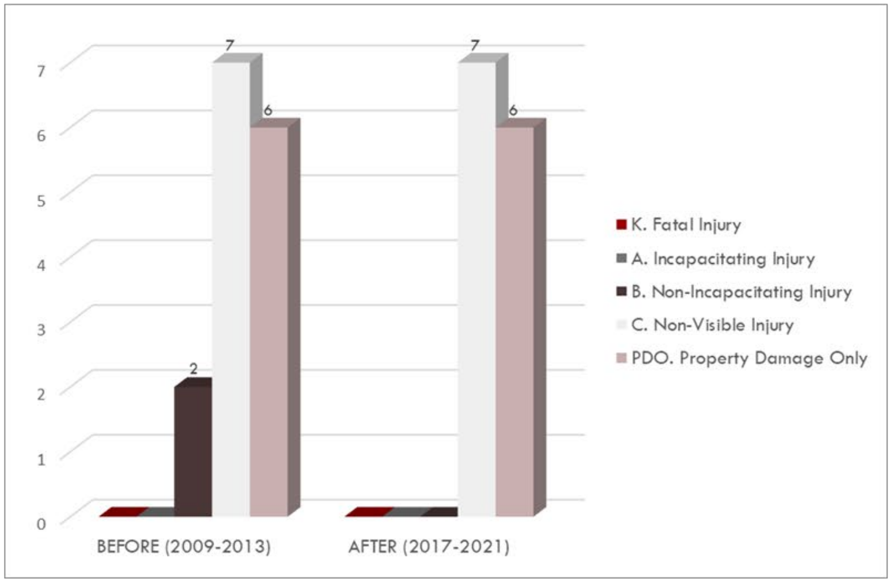
Figure 77 – Courtland Interchange Project Safety Impacts

Source: HRTPO analysis of VDOT crash data.

UPC#: 100604	Locality: Suffolk	Bridge Rd at Bennetts Pasture Rd	Upgrade the intersection of Bridge Rd and Bennetts Pasture Rd to address intersection deficiencies and turn lane queue problems

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	15
Total After Crashes	13
% Change	-13%

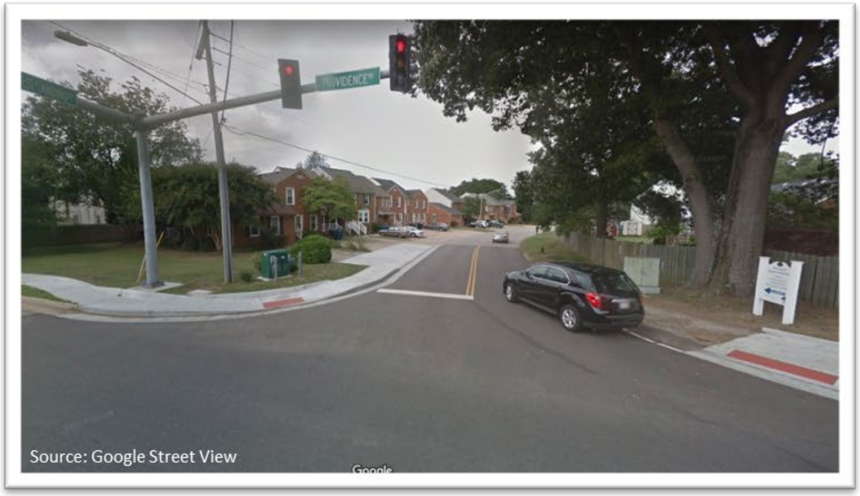
FIGURE 78 – BRIDGE ROAD AT BENNETTS PASTURE ROAD PROJECT SAFETY IMPACTS

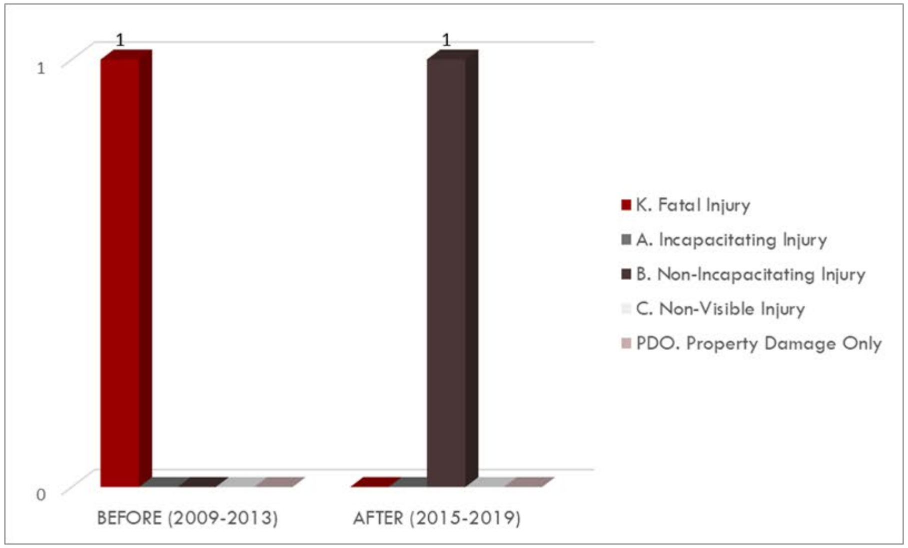
Source: HRTPO analysis of VDOT crash data.

UPC#: 100539	Locality: Virginia Beach	Providence Rd	Install pedestrian signals and ADA ramps at existing signalized intersections along Providence Rd from Matyiko Dr to Whitehurst Landing Rd

BEFORE

AFTER





Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	1
Total After Crashes	1
% Change	0%

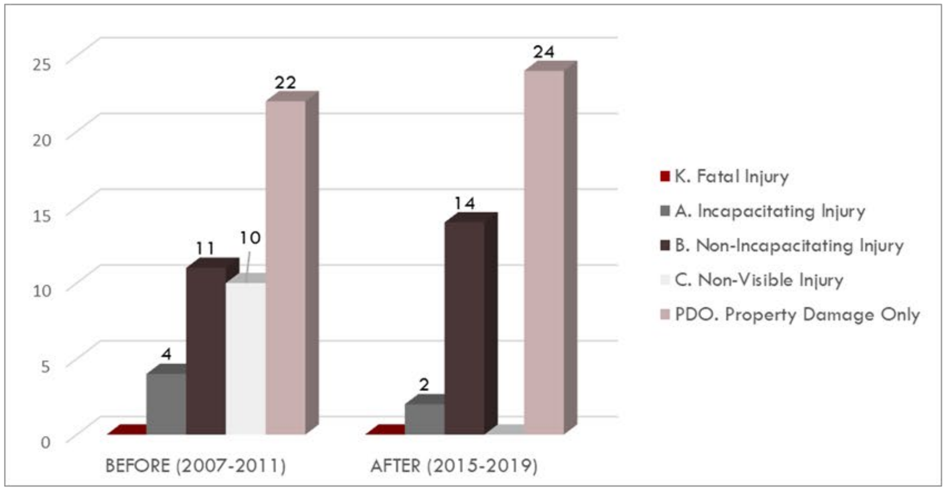
FIGURE 79 – PROVIDENCE ROAD PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

UPC#: 100540	Locality: Virginia Beach	Dam Neck Rd at Harpers Rd	Offset existing left turn lanes, new signal poles, and modifying existing signal heads

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	47
Total After Crashes	40
% Change	-15%

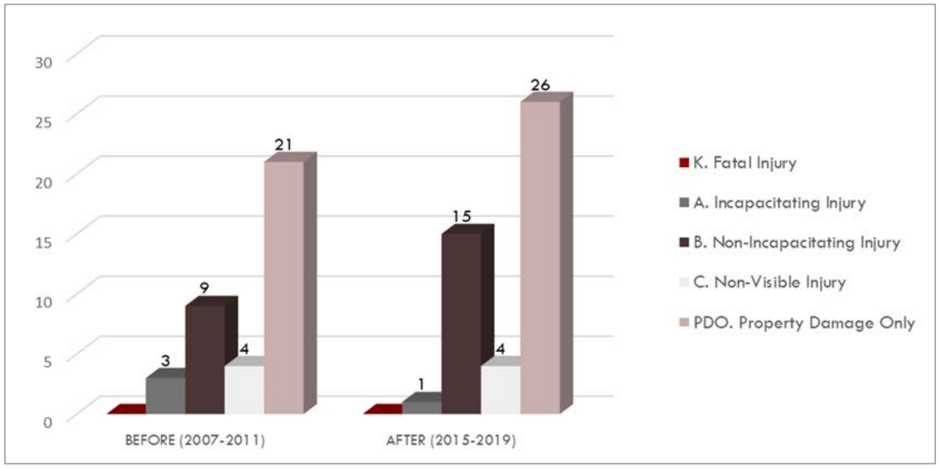
FIGURE 80 – DAM NECK ROAD AT HARPERS ROAD PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

UPC#: 100540	Locality: Virginia Beach	Shore Dr at Helicopter Rd	Geometric improvements to existing left turn lanes, new signal poles, and modifying existing signal heads

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	37
Total After Crashes	46
% Change	24%

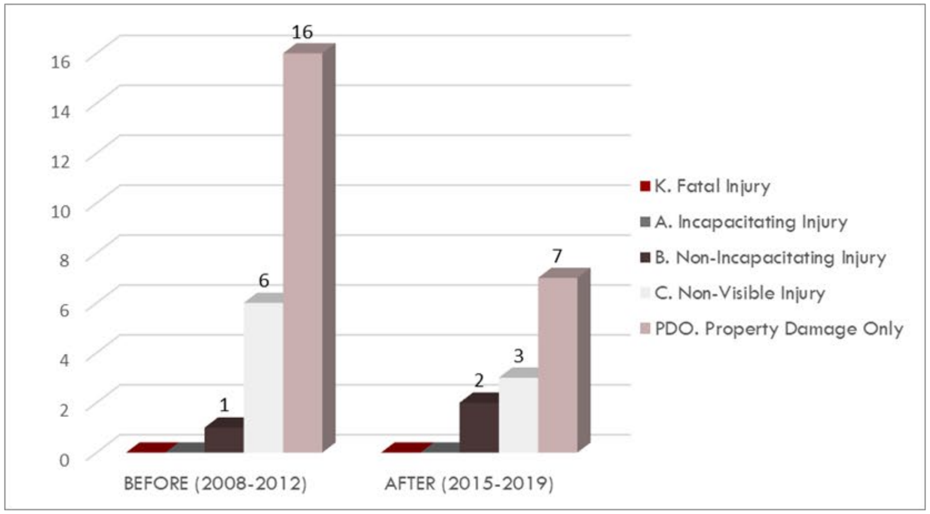
FIGURE 81 – SHORE DRIVE AT HELICOPTER ROAD PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

UPC#: 98279	Locality: Williamsburg	Longhill Rd at Olde Towne Rd	Signal upgrade and install median barrier on southern leg of intersection

BEFORE

AFTER



Total Crashes Before and After the Improvement for Movements Impacted by the Project

Total Before Crashes	23
Total After Crashes	12
% Change	-48%

FIGURE 82 – LONGHILL ROAD AT OLDE TOWNE ROAD PROJECT SAFETY IMPACTS

Source: HRTPO analysis of VDOT crash data.

Equity Analysis

Equity is the fair inclusion into a society in which all can participate, prosper, and reach their full potential. When planning with an equity lens, planners recognize that planning practices may disproportionately impact underserved communities and aspire to circumvent that outcome. In recent years, planning with an equity lens has been put to the forefront at the federal level. The Safe Streets and Roads for All (SS4A) Grant Program, established through the Infrastructure Investment and Jobs Act, funds efforts aimed at preventing roadway deaths and serious injuries. One of the essential activities under the SS4A Grant Program is the inclusion of equity considerations in a safety action plan.

To assist stakeholders with safety funding opportunities, such as the SS4A Grant Program, a three-part equity analysis was conducted for the high crash locations as part of this study. The equity analysis incorporates the following tools: HRTPO Title VI/Environmental Justice Tool, White House Council on Environmental Quality's (CEQ) Climate and Environmental Justice Screening Tool, United States Department of Transportation's (USDOT) Equitable Transportation Community Explorer, and Streetlight Insight. This study includes a one-page summary detailing the results of the equity analysis for each high crash location.

HRTPO Title VI/Environmental Justice Methodology

The HRTPO Title VI/Environmental Justice Methodology is used in the Long-Range Transportation Plan (LRTP) process to help evaluate the potential impacts LRTP projects may pose for the Transportation Vulnerable communities in the region. The HRTPO Title VI/Environmental Justice

HRTPO Title VI/Environmental Justice Candidate Project Evaluations

Methodology was used in the evaluation of candidate projects for the 2040 LRTP and the 2045 LRTP. As part of this study, HRTPO staff applied the HRTPO Title VI/ Environmental Justice Methodology to evaluate the potential impacts of the high crash locations onto the Transportation Vulnerable communities.

For more information on the HRTPO Title VI/ Environmental Justice Methodology, please visit the HRTPO EJ Methodology Tool website.

CEQ and USDOT Equity Tools

As part of this study's equity analysis, HRTPO staff used the CEQ's Climate and Environmental Justice Screening Tool and the USDOT's Equitable Transportation Community Explorer. The Climate and Environmental Justice Screening Tool helps users identify communities experiencing burdens across eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. HRTPO staff used the Climate and Environmental Justice Screening Tool to help determine whether each high crash location existed in a disadvantaged community.

The Equitable Transportation Community Explorer, an interactive web application, was used to help determine a jurisdiction's population covered by the SS4A applicant as well as the percent of population living in Disadvantaged Census Tracts.

STREETLIGHT INSIGHT

StreetLight Insight provides big data analytics to help transportation professionals better understand the characteristics and impacts of transportation. As part of this study, HRTPO staff conducted analyses through Streetlight Insight to evaluate the origins and destinations of traffic entering the high crash locations. Equity-related metrics from the Origin-Destination analyses, including race, disability status, income, and auto ownership, were collected and evaluated for each high crash location.

EQUITY ANALYSIS ONE-PAGE SUMMARY KEY

The following figures detail the components that comprise the equity analysis one-page summaries that were developed for each of the high crash locations.

1 High Crash Location and Locality Name

2 High Crash Location Map

3 The HRTPO Environmental Justice Impact Score (Transportation Vulnerability Score) represents the potential impact that the high crash location could have on the listed Transportation Vulnerable communities. If a Transportation Vulnerable community's presence existed in more than 50% of the Census Block Groups that are within a buffer area around the high crash location, HRTPO staff flagged that Transportation Vulnerable community as being highly affected by the high crash location (indicated with a Y). The HRTPO Transportation Vulnerable scores range from a high of 9 to a low of 0.

4 This is the data that was populated using the CEQ's Climate and Environmental Justice Screening Tool and the USDOT's Equitable Transportation Community Explorer. HRTPO staff used the Equitable Transportation Community Explorer to help determine a locality's population covered by the SS4A applicant as well as the percent of population living in Disadvantaged Census Tracts. Using the Climate and Environmental Justice Screening Tool, HRTPO staff indicated whether the high crash location existed in a USDOT defined disadvantaged community.

5 A summary table from the StreetLight Insight Origin-Destination analysis that compares the average daily trips entering the high crash location against the average daily trips taken regionally for the listed demographic groups. If the average daily trips entering the high crash location is equal to or greater than the average daily trips taken regionally, they are highlighted in red.

6 The StreetLight Insight Origin-Destination analysis captured the users who traveled through the high crash location to complete their trip. These are the findings from the analysis.

FIGURE 83 - EQUITY ANALYSIS ONE-PAGE SUMMARY KEY

1

INTERSECTION #7 – 39TH STREET AT ROANOKE AVENUE
NEWPORT NEWS

5

2

EQUITY ANALYSIS

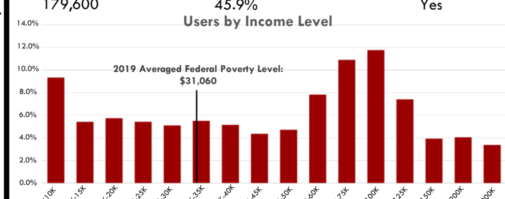
Average Daily Trips	Entering Intersection	Regionally
Average Daily Trips Made by Minorities	67.3%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	6.8%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	4.9%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	2.4%	3.1%
Average Daily Trips Made by Persons with a Disability	16.0%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	31.0%	18.9%

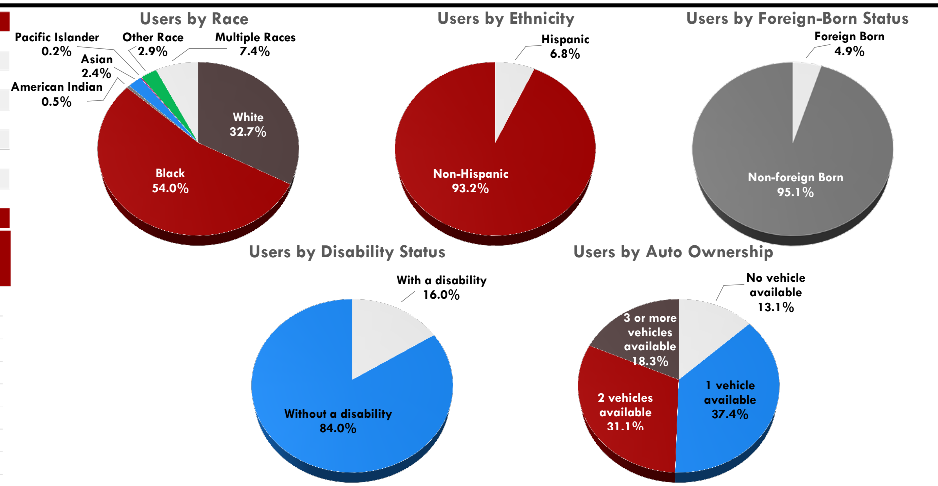
3

HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	Y
Elderly Populations	N
Female Head of Households	Y
Households Receiving Food Stamps	Y
Households Receiving Cash Public Assistance	Y
Limited English Proficiency Populations	N
Low-Income Households	Y
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	7

4

Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
179,600	45.9%	Yes





Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

6

FIGURE 83 (CONTINUED) - EQUITY ANALYSIS ONE-PAGE SUMMARY KEY

General Crash Countermeasures

Several crash countermeasures exist to address roadway safety issues. According to the Highway Safety Manual (HSM), a "countermeasure" is a roadway strategy intended to decrease crash frequency, severity, or both, at a site.

The National Cooperative Highway Research Program (NCHRP) and other research programs have conducted studies to evaluate the potential of various crash countermeasures. The purpose of this section is to discuss the use and application of crash countermeasures to improve roadway safety in Hampton Roads. The main objectives of this section are to:

- Describe the countermeasure selection process
- Provide examples of factors contributing to the cause of crashes and crash countermeasures for various crash patterns
- Assess countermeasure effectiveness using Crash Modification Factors (CMF) for various safety improvement types

Countermeasure Selection Process

According to the HSM, there are three primary steps to selecting a countermeasure(s) for a crash site:

- Identify factors contributing to the cause of crashes at the subject site;
- Identify countermeasures that may address the contributing factors; and
- Assess countermeasure effectiveness

Diagnosing the problem and identifying countermeasures is a skill developed through experience and often involves engineering judgment. Some countermeasures may be identified during a field study, while others may be developed upon analysis of observed crash data patterns using collision diagrams. Many safety problems have multiple solutions (i.e., a combination of countermeasures); thus, it is important to identify all available options. Consideration must also be given to what is physically, financially, and politically feasible in each jurisdiction. According to the FHWA's Manual[10], three questions should be answered for each type of crash identified:

- What road user actions lead to the occurrence of crashes?
- What site conditions contribute to these driver actions?
- What can be done to reduce the chances of such actions, i.e., what are the potential countermeasures?

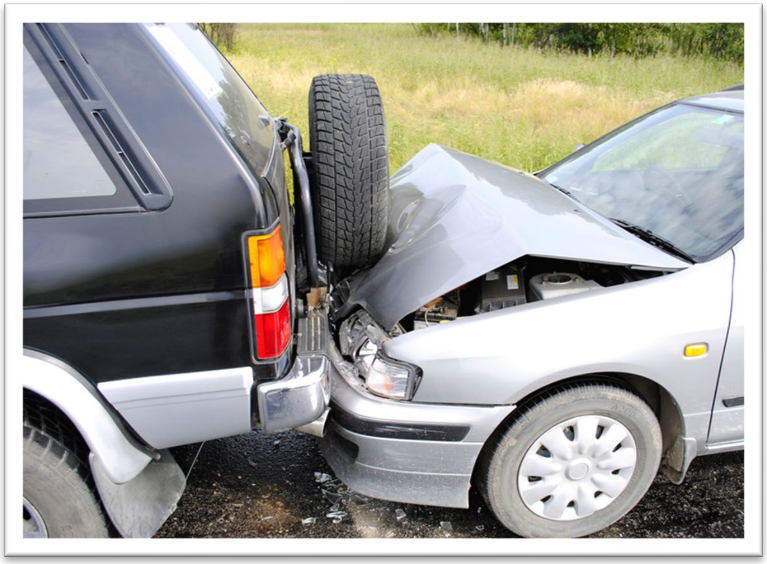
Identifying Causes and Countermeasures

Listed in **Figures 84 A-L** are examples of probable causes of crashes and corresponding general countermeasures by crash pattern. VDOT produced this list for the state's Highway Safety Improvement Program (HSIP) project application process. It is not intended to be a comprehensive list for every crash type – all crashes have unique characteristics that may require additional countermeasures to remedy the problem.

[10] US Department of Transportation, Federal Highway Administration (FHWA), *Highway Safety Improvement (HSIP) Manual*, Report No. FHWA-SA-09-029, January 2010, p. 3-10.

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Driver not aware of intersection	➤ Install/improve warning signs
	➤ Consider flashing signal
Slippery surface	➤ Overlay pavement
	➤ Provide adequate drainage
	➤ Groove pavement
	➤ Provide "slippery when wet" signs
Large number of turning vehicles	➤ Create left or right-turn lanes
	➤ Prohibit turns
	➤ Increase curb radii
Inadequate roadway lighting	➤ Improve roadway lighting
Lack of adequate gaps	➤ Provide traffic signal (if warranted)
	➤ Provide stop signs
Crossing Pedestrians	➤ Install/improve signing or marking of pedestrian crosswalks
Excessive speed on approach	➤ Reduce speed limit on approaches

FIGURE 84A – REAR-END COLLISIONS AT UNSIGNALIZED INTERSECTIONS



Source: http://www.floridainjurylawyer-blog.com

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Slippery surface	➤ Overlay pavement
	➤ Provide adequate drainage
	➤ Groove pavement
	➤ Reduce speed limit on approaches
	➤ Provide "slippery when wet" signs
Large number of turning vehicles	➤ Create left or right-turn lanes
	➤ Prohibit turns
	➤ Increase curb radii
	➤ Provide special phase for left-turning traffic
Poor visibility of signals	➤ Install/improve advance warning devices
	➤ Install overhead signals
	➤ Install 12 inch signal lenses
	➤ Install visors
	➤ Install back plates
	➤ Relocate signal heads
	➤ Add additional signal heads
	➤ Remove obstacles
	➤ Reduce speed limit on approaches
Inadequate signal timing	➤ Adjust yellow phase
	➤ Provide progression through a set of signalized intersections
	➤ Add all-red clearance phase
Unwarranted signals	➤ Remove signals (see MUTCD)
Inadequate roadway lighting	➤ Improve roadway lighting
Crossing Pedestrians	➤ Install/improve signing or marking of pedestrian crosswalks
	➤ Provide pedestrian "walk" phase

FIGURE 84B – REAR-END COLLISIONS AT SIGNALIZED INTERSECTIONS

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Restricted sight distance	➤ Remove sight obstructions
	➤ Restrict parking near corners
	➤ Install stop signs
	➤ Install warning signs
	➤ Install signal
	➤ Install yield signs
	➤ Channelize intersections
	➤ Install advance markings to supplement signs
	➤ Install guide markings
Large total intersection volume	➤ Install signal
	➤ Reroute through traffic
Excessive speed on approaches	➤ Install rumble strips
Inadequate roadway lighting	➤ Improve roadway lighting
Inadequate advance warning signs	➤ Install advance intersection warning signs
Inadequate traffic control devices	➤ Upgrade traffic control devices
	➤ Increase enforcement

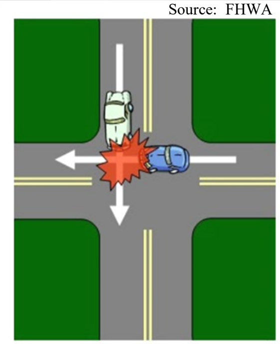
FIGURE 84C – RIGHT-ANGLE COLLISIONS AT UNSIGNALIZED INTERSECTIONS

Source: FHWA

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Restricted sight distance	➤ Remove sight obstructions
	➤ Restrict parking near corners
	➤ Install warning signs
	➤ Reduce speed limit on approaches
	➤ Channelize intersections
	➤ Install advance markings to supplement signs
Excessive speed on approaches	➤ Increase yellow phase
	➤ Install rumble strips
Poor visibility of signals	➤ Install/improve advance warning devices
	➤ Install overhead signals
	➤ Install 12 inch signal lenses
	➤ Install visors
	➤ Install back plates
	➤ Relocate signal heads
	➤ Add additional signal heads
	➤ Add illuminated name signs
Inadequate signal timing	➤ Adjust yellow phase
	➤ Add all-red clearance phase
	➤ Improve controller
	➤ Install signal actuation
	➤ Retime signals
	➤ Provide progression through a set of signalized intersections
Inadequate roadway lighting	➤ Improve roadway lighting
Inadequate advance warning signs	➤ Install advance intersection warning signs
Large total intersection volume	➤ Retime signals
	➤ Add traffic lane

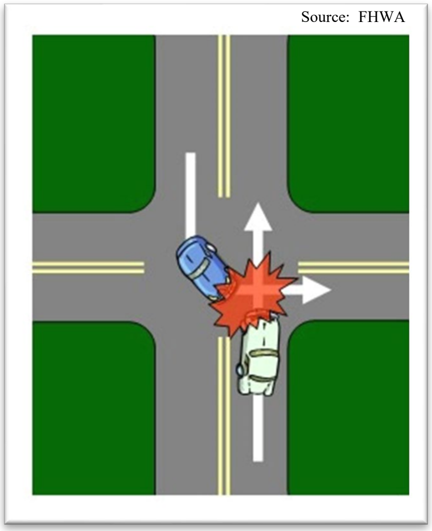
FIGURE 84D – RIGHT-ANGLE COLLISIONS AT SIGNALIZED INTERSECTIONS

Source: FHWA



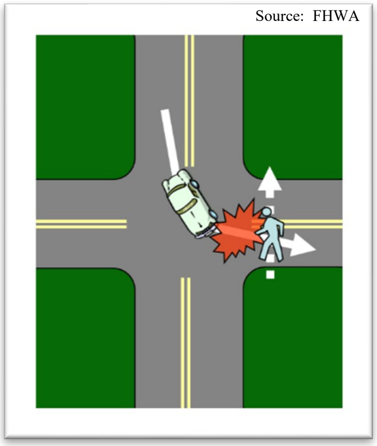
PROBABLE CAUSE	GENERAL COUNTERMEASURES
Large volume of left-turns	➤ Create one-way street
	➤ Widen road
	➤ Provide left-turn signal phases
	➤ Prohibit left-turns
	➤ Reroute left-turn traffic
	➤ Channelize intersection
	➤ Install stop signs
	➤ Revise signal sequence
	➤ Provide turning arrows/guide markings
	➤ Provide traffic signal (if warranted)
	➤ Retime traffic signals
Restricted sight distance	➤ Remove obstacles
	➤ Provide adequate channelization
	➤ Provide special phase for left-turning traffic
	➤ Provide left-turn slots
	➤ Install warning signs
Too short yellow phase	➤ Increase yellow phase
	➤ Provide all red phase
Absence of special left-turning phase	➤ Provide special phase for left-turning traffic
Excessive speed on approaches	➤ Reduce speed limit on approaches

FIGURE 84E – LEFT-TURN HEAD-ON COLLISIONS



PROBABLE CAUSE	GENERAL COUNTERMEASURES
Restricted sight distance	➤ Remove sight obstructions
	➤ Install pedestrian crossings
	➤ Install/improve pedestrian crossing signs
	➤ Reroute pedestrian paths
	➤ Prohibit curb parking near crosswalks
Inadequate protection for pedestrians	➤ Add pedestrian refuge islands
	➤ Install pedestrian barriers
School crossing area	➤ Use crossing guard at school crossing areas
Inadequate signals	➤ Install pedestrian signals
Inadequate phasing signal	➤ Change timing of pedestrian phase
Driver had inadequate warning of frequent mid-block crossings	➤ Prohibit parking
	➤ Install warning signs
	➤ Lower speed limit
	➤ Install pedestrian barriers
Inadequate pavement markings	➤ Install new thermoplastic markings
	➤ Supplement markings with appropriate signing
	➤ Upgrade pavement markings
Inadequate gaps at unsignalized intersections	➤ Provide traffic signal (if warranted)
	➤ Install pedestrian crosswalk and signs
	➤ Install pedestrian signals
Inadequate roadway lighting	➤ Improve roadway lighting
Excessive vehicle speed	➤ Install proper warning signs
	➤ Install pedestrian barriers
	➤ Increase enforcement

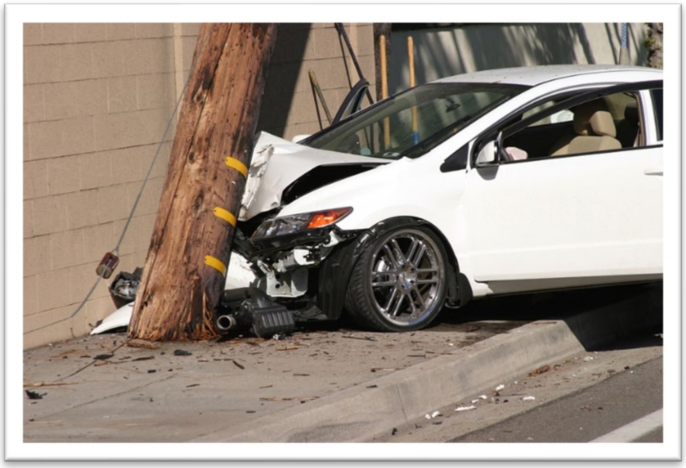
FIGURE 84F – PEDESTRIAN-VEHICLE COLLISIONS



PROBABLE CAUSE	GENERAL COUNTERMEASURES
Slippery pavement	➤ Overlay existing pavement
	➤ Provide adequate drainage
	➤ Groove existing pavement
	➤ Reduce speed limit
	➤ Provide "slippery when wet" signage
Roadway design inadequate for traffic conditions	➤ Widen lanes
	➤ Relocate islands
	➤ Close curb lanes
	➤ Install guardrails
Poor delineation	➤ Install/improve pavement markings
	➤ Install roadside delineators
	➤ Install advance warning signs
Inadequate roadway lighting	➤ Improve roadway lighting
Inadequate shoulder	➤ Upgrade roadway shoulders
Improper channelization	➤ Improve channelization
Inadequate pavement maintenance	➤ Perform road surface repair
Poor visibility	➤ Increase size of signs

FIGURE 84G – RUN-OFF-ROADWAY COLLISIONS

Source: www.autoinsurance.net



PROBABLE CAUSE	GENERAL COUNTERMEASURES
Obstructions in or too close to roadway	➤ Remove obstacles
	➤ Install barrier curbing
	➤ Install breakaway features to light poles, signposts, etc.
	➤ Install guardrail
	➤ Install crash cushioning devices
Inadequate roadway lighting	➤ Improve roadway lighting
Inadequate pavement markings	➤ Install reflector pavement markings
Inadequate signs, delineators and guardrails	➤ Install reflector paint and/or reflectors on the obstruction
Inadequate roadway design	➤ Provide proper superelevation
	➤ Improve superelevation at curves
	➤ Install appropriate warning signs and delineators
Slippery pavement	➤ Improve skid resistance
	➤ Provide adequate drainage
	➤ Provide "slippery when wet" signage
	➤ Provide wider lanes

FIGURE 84H – FIXED OBJECT COLLISIONS

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Inadequate roadway design	➤ Create one-way streets to provide wider lanes
Improper road maintenance	➤ Perform necessary road surface repairs
Inadequate shoulders	➤ Improve shoulders
Excessive vehicle speed	➤ Install median devices
	➤ Remove constrictions such as parked vehicles
Inadequate pavement markings	➤ Install or refurbish center lines, lane lines, and pavement edge lines
	➤ Install reflectorized lines, edges
Inadequate channelization	➤ Install acceleration and deceleration lanes
	➤ Channelize intersection
	➤ Provide turning bays
Inadequate signing	➤ Place direction and lane change signs to give proper advance warning
	➤ Add illuminated name signs

FIGURE 84I – SIDESWIPE OR HEAD-ON COLLISIONS

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Left-turning vehicles	➤ Install median devices
	➤ Install two-way left-turn lanes
Improperly located driveways	➤ If possible, regulate minimum spacing of driveways
	➤ Regulate minimum corner clearance
	➤ If possible, move driveway to side street
	➤ Install curbing to define driveway locations
	➤ If possible, consolidate adjacent driveways
Right-turning vehicles	➤ Provide right-turn lanes
	➤ Restrict parking near driveways
	➤ Increase the width of driveways
	➤ Widen through lanes
	➤ Increase curb radii
Large volume of through traffic	➤ If possible, move driveway to side street
	➤ Construct a local service road
	➤ Reroute through traffic
Large volume of driveway traffic	➤ Signalize driveway
	➤ Provide acceleration and deceleration lanes
	➤ Channelize driveway
Restricted sight distance	➤ Remove sight obstructions
	➤ Restrict parking near driveway
	➤ Install/improve street lighting
	➤ Reduce speed limit
Inadequate roadway lighting	➤ Improve street lighting

FIGURE 84J – DRIVEWAY-RELATED COLLISIONS

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Inadequate pavement markings	➤ Upgrade pavement markings
Slippery pavement	➤ Overlay existing pavement
	➤ Groove existing pavement
	➤ Reduce speed limit
	➤ Provide "slippery when wet" signage
	➤ Skid-proof roadway
Inadequate drainage	➤ Provide adequate drainage

FIGURE 84K – WET-PAVEMENT COLLISIONS

PROBABLE CAUSE	GENERAL COUNTERMEASURES
Poor visibility or lighting	➤ Install/improve street lighting
	➤ Install/improve delineation markings
	➤ Install/improve warning signs
Poor sign quality	➤ Upgrade signing
	➤ Provide illuminated signs
Inadequate channelization or delineation	➤ Install pavement markings
	➤ Improve delineation markings
	➤ Provide raised markers
	➤ Upgrade advance warning signing

FIGURE 84L – NIGHTTIME COLLISIONS

Source: www.southboroughnews.com

ASSESS COUNTERMEASURE EFFECTIVENESS

An important step toward developing countermeasures for safety issues is assessing the effectiveness of individual or groups of countermeasures before the final selection of treatments. This assessment can be accomplished through a benefit/cost (B/C) analysis, which compares all of the expected benefits associated with a countermeasure, expressed in monetary terms, to the cost of implementation. A benefit/cost analysis provides a quantitative measure to help stakeholders prioritize countermeasures and optimize the return on investment. For this study, a benefit/cost analysis was not included; this B/C analysis should be performed in order to prioritize potential safety improvements. VDOT's Highway Safety Improvement Program (HSIP) website contains an excel worksheet for systematic safety improvement proposals, including a benefit-cost analysis.

CRASH MODIFICATION FACTORS (CMF)

Crash Modification Factors (CMF) are useful for estimating changes in safety performance or benefits that can be expected when implementing a countermeasure. Developed using various forms of statistical analyses, CMFs provide average changes in frequency, and sometimes severity, which are commonly observed when a treatment is installed.

CMFs are based on research and are generally available for engineering countermeasures. In 2009, FHWA launched the Crash Modification Factors Clearinghouse (www.cmfclearinghouse.org), an online database and search tool designed to access studies published on various improvements to reduce crashes. This website aims to provide the most up-to-date factors and supporting documentation to help transportation engineers identify countermeasures for their safety needs. This database is a web-based repository of more than 6,000 CMFs for hundreds of treatments.

On the CMF Clearinghouse website, an online search for a countermeasure will often result in many CMFs for a single treatment. As a result, VDOT has assembled and produced a Virginia State Preferred CMF List (**Figure 86** on pages 136-147) that contains common CMFs relative to Virginia. This list includes CMFs with high quality ratings and includes the applicable crash type, area type, severity, service life, functional class, and site description. These CMFs will be used to support Virginia's HSIP program as well as other, broader applications throughout the state.

Mathematically, a CMF is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site. For example, a CMF of 0.77 means that a countermeasure is expected to reduce the number of injury crashes by (1 – [23/100] = 0.77), or 23 percent. A CMF > 1.0 means an increase in crashes can be expected. For example, a CMF of 1.23 means that a treatment is expected to increase the number of property damage crashes by 23 percent. To estimate future expected crash frequency with the treatment, CMFs are applied to expected crash frequency assuming no other changes. For example, a stop-controlled intersection has experienced five crashes per year. A treatment is installed with a CMF of 0.77, so the expected crash frequency with the countermeasure installation would be 5 x 0.77 = 3.85 crashes per year, a reduction of 1.15 crashes annually.

For many high-crash locations, more than one treatment may be implemented simultaneously. According to the HSIP manual, CMFs are assumed to be multiplicative, i.e., one may multiply them by each other to calculate a combined CMF:

$$CMF_{combined} = CMF_1 \times CMF_2 \times CMF_3 \times \ldots \times CMF_i$$

It is important to note that one should multiply CMFs together only if the effects of each CMF are independent, otherwise it may overestimate the combined effect of multiple countermeasures, especially when more than one countermeasure addresses the same crash type. Engineering judgment is necessary when using multiple countermeasures.

VDOT's Virginia State Preferred CMF List consists of three tables (CMFs, CMFunction Equations, and References) which describe and provide supporting documentation for the CMFs. This study only includes the table of preferred CMFs. CMFs should be selected based on applicability, where the characteristics associated with the CMF closely match the characteristics of the scenario at hand. For example, CMFs often vary by crash type and crash severity. CMFs may also be specific to urban or rural areas and should be applied to the matching situations.

Virginia's State Preferred CMF List provides CMFs by crash type and severity for the identified countermeasures. The countermeasures are separated into four categories:

- Bike/Pedestrian
- Interchanges
- Intersections
- Segments

For each countermeasure, the following information is provided:

- Countermeasure name
- Applicable crash type, using codes defined within the key
- Area type, using codes defined within the key
- CMFs for five severity categories:
    - Fatality (K)
    - Serious Injury (A)
    - Minor Injury and Possible Injury (BC)
    - Property Damage Only Crash (O)
    - All Severities
- The anticipated service life for the treatment
- The applicable functional class
- A general site description
- The designated prior condition for the countermeasure
- Reference for the CMF(s)

When applying these CMFs, analysts should carefully apply the CMF only to the designated crash types and severities. However, these crash types should not limit consideration of the countermeasure's usage. Just because a CMF is not available for the specific conditions does not mean the countermeasure is not useful in that context, there may just not be enough research conducted on it.

Figure 85 shows the preferred CMF list key with crash types. Photos of select crash countermeasures listed in **Figure 86** are shown in **Figure 87**, starting on page 148.

PREFERRED CMF LIST KEY

Key
Crash Type

VP	Vehicle-Pedestrian	**SC**	Secondary Crashes
VT	Vehicle-Train	**VB**	Vehicle-Bicycle
SV	Single Vehicle	**HO**	Head-On
CM	Cross-Median	**CFO**	Crashes with Fixed Objects
F	Frontal		
O	Opposing Direction Sideswipe		

Key
Area Type

U+S	Urban and Suburban
Sub	Suburban

▲ *Refer to the HSIP or SmartScale website.*
△ *Refer to specific treatment*
** *Refer to Equations Sheet on page 14*

FIGURE 85 – PREFERRED CMF LIST KEY Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
BIKE/PED	Add Crosswalk	VP	-	1	1	1	1	1	2	-	Pedestrian Crossing	No Marked Crosswalk	FHWA Safety Report
	Add Crosswalk Lighting	VP	-	0.56	0.41	0.41	0.56	0.56	15	-	Pedestrian Crosswalk	No Lighting Present	CMF ID: 441, 2379
	Add Curb Extensions/ Corner Bulb Outs	VP	-	1	1	1	1	1	20	-	Pedestrian Crossing at an Intersection Approach	No Bulb Outs or Curb Extensions Present	NYC Study
	Add Median Pedestrian Island	VP	-	0.75	0.75	0.75	0.75	0.75	20	-	Multilane Pedestrian Crossing	One-Stage At-Grade Pedestrian Crossing	PED CMF Toolbox
	Add or Upgrade Sidewalk	VP	-	0.12	0.12	0.12	0.12	0.12	20	-	Roadway Segment with Pedestrian Traffic Along Roadside	No Sidewalk or Deficient Sidewalk Present	PED CMF Toolbox
	Add Pedestrian Bridge	VP	-	0.1	0.1	0.1	0.14	0.14	30	-	High-Volume Pedestrian Crossing	At-Grade Pedestrian Crossing	PED CMF Toolbox
	Add Pedestrian Hybrid Beacon (PHB)	VP	U+S	0.453	0.453	0.453	0.453	0.453	20	Minor Arterial	Mid-Block Pedestrian Crossing	No Pedestrian Hybrid Beacon Present	CMF ID: 9020
	Add PHB, Advanced Yield/ Stop Markings	VP	U+S	0.432	0.432	0.432	0.432	0.432	20	Minor Arterial	Mid-Block Pedestrian Crossing	No Pedestrian Hybrid Beacon Present	CMF ID: 9021
	Add Pedestrian Signal Heads	ALL	U+S	0.85	0.85	0.85	0.96	0.92	20	-	Signalized Intersection with Pedestrian Crossings	No Pedestrian Signals Present	CMF ID: 8480, 8481
	Add Rectangular Rapid Flashing Beacon (RRFB)	VP	U+S	0.526	0.526	0.526	0.526	0.526	6	Minor Arterial	Mid-Block Pedestrian Crossing	No RRFB present	CMF ID: 9024
	Add Shared Use Path	VB	Urban	1	0.41	0.41	1	0.75	20	-	Roadway segment with Pedestrian and Bicycle Traffic	No Shared-Use Path Present	CMF ID: 4102, 9250
	Change Pedestrian Phase to Barnes Dance	VP	Urban	0.49	0.49	0.49	0.49	0.49	20	-	Signalized Intersection with Pedestrian Crossings	No Pedestrian Phasing or Standard Pedestrian Phasing	CMF ID: 4117
	Convert from Walk/ Don't Walk to Pedestrian Countdown	VP	-	0.3	0.3	0.3	0.3	0.3	20	-	Signalized Intersection with Walk/Don't Walk Pedestrian Signals	Walk/Don't Walk Pedestrian Signal	CMF ID: 5272
	Convert Mid-Block Crossing to HAWK	VP	U+S	0.453	0.453	0.453	0.453	0.453	20	Minor Arterial	Mid-Block Pedestrian Crossing	Mid-Block Crossing with No PHB or HAWK Present	CMF ID: 9020
	Convert Standard Crosswalk Pavement Marking to High-Visibility Crosswalk	VP	-	0.63	0.63	0.63	0.63	0.63	2	-	Pedestrian Crossing with Standard Crosswalk Pavement Markings	Standard Crosswalk Pavement Markings	CMF ID: 2697
	Implement Leading Pedestrian Interval	VP	Urban	0.413	0.413	0.413	0.413	0.413	20	Principal Arterial - Other	Signalized Intersection with Pedestrian Crossings	Signalized intersection with Pedestrian Signal Heads and No Leading Interval	CMF ID: 1993

FIGURE 86 – VIRGINIA STATE PREFERRED CRASH MODIFICATION FACTOR (CMF) LIST

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
BIKE/PED	Install PHB or HAWK with Advanced Stop or Yield Markings and Signs	VP	U+S	0.432	0.432	0.432	0.432	0.432	20	Minor Arterial	Mid-Block Pedestrian Crossing	No PHB or HAWK at Mid-Block Crossing	CMF ID: 9021
BIKE/PED	Install Raised Pedestrian Crossing	ALL	-	0.64	0.64	0.64	0.7	0.7	20	-	Pedestrian Crossing	At-Grade Pedestrian Crossing	PED CMF Toolbox
BIKE/PED	Prohibit Left Turns	VP	-	0.9	0.9	0.9	0.9	0.9	6	-	Intersection with Left Turns into Pedestrian Crossings	Left Turns Allowed	Ped CMF Toolbox
BIKE/PED	Remove Parking Near Intersection	VP	-	0.7	0.7	0.7	0.7	0.7	△	-	Intersection with Parking on Approaches	Parking Present Near Intersection Approaches	PED CMF Toolbox
BIKE/PED	Upgrade Crosswalk to High-Visibility	VP	-	0.52	0.52	0.52	0.52	0.6	2	-	Pedestrian Crosswalk	Standard Crosswalk Markings	CMF ID: 298, 4123
BIKE/PED	Widen Sidewalk at Intersection	ALL	-	1	1.12	1.12	1	1.04	20	-	Intersection with Sidewalks	Existing Sidewalk Width	CMF ID: 413
INTERCHANGE	Add Auxiliary Lane Between Entrance and Exit Ramps	ALL	-	0.77	0.77	0.77	0.79	0.79	20	Principal Arterial-Other Freeways and Expressways	Freeway Interchange Weaving Area	No Auxiliary Lane Present	CMF ID: 7440, 7441
INTERCHANGE	Add Collector-Distributor Road	ALL	-	0.9	0.9	0.9	0.9	0.9	20	-	Freeway Interchange Area	No Collector-Distributor Road Present	ISATe, HSM Chapters 18 and 19
INTERCHANGE	Add Entrance Ramp to One Side of Freeway	ALL	-	▲	▲	▲	▲	▲	20	-	Directional Freeway Segment	Freeway Segment with No Entrance Ramp	ISATe, HSM Chapters 18 and 19
INTERCHANGE	Add Exit Ramp to One Side of Freeway	ALL	-	▲	▲	▲	▲	▲	20	-	Directional Freeway Segment	Freeway Segment with No Exit Ramp	ISATe, HSM Chapters 18 and 19
INTERCHANGE	Convert Diamond Interchange to Diverging Diamond Interchange	ALL	Sub	0.59	0.59	0.59	0.67	0.67	20	Principal Arterial - Interstate	Diamond Interchange	Traditional Diamond Interchange	CMF ID: 8258, 8278
INTERCHANGE	Convert Diamond Interchange to SPUI	ALL	-	0.62	0.62	0.62	0.62	0.62	20	-	Diamond Interchange	Traditional Diamond Interchange	VDOT Planning Level CMFs, ISATe
INTERCHANGE	Extend Deceleration Lane Length by 100 Feet	ALL	-	0.93	0.93	0.93	0.93	0.93	20	-	Freeway Segment with Deceleration Lane	Existing Deceleration Lane Length	CMD ID: 475
INTERCHANGE	Interchange Lighting	Night Time	-	0.5	0.5	0.5	0.5	0.5	15	Principal Arterial - Interstate	Freeway Interchange	No Highway Lighting Present	CMF ID: 1283

Figure 86 (continued) – Virginia State Preferred Crash Modification Factor (CMF) List

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
INTERSECTION	Change from Permitted Left-Turn to Permitted/ Protected	Left Turn	Urban	0.862	0.862	0.862	0.862	0.862	20	-	Signalized Intersection	Permissive Left-Turn Phasing	CMF ID: 4270
	Change from Permitted Left-Turn to Protected on Major Approach	Angle	Urban	0.01	0.01	0.01	0.01	0.01	20	-	Signalized Intersection	Permissive Left-Turn Phasing on a Major Approach	CMF ID: 335
	Change from Permitted/ Protected Left-Turn to Protected on Major	Angle	Urban	0.01	0.01	0.01	0.01	0.01	20	-	Signalized Intersection	Protected/Permissive or Vice-Versa Left-Turn Phasing on a Major Approach	CMF ID: 339
	Change from Permitted/ Protected Left-Turn to Protected on Minor Approach	Angle	Urban	0.04	0.04	0.04	0.04	0.04	20	-	Signalized Intersection	Protected/Permissive or Vice-Versa Left-Turn Phasing on a Minor Approach	CMF ID: 337
	Change from Pretimed Signal to Actuated Signal	ALL	-	0.8	0.8	0.8	0.8	0.9	20	-	Signalized Intersection	Pretimed Signal Control	NCDOT CRF List 1.6
	Change from Protected Left-Turn to Flashing Yellow Arrow	Left Turn	Urban	2.242	2.242	2.242	2.242	2.242	20	-	Signalized Intersection	Protected Left-Turn Phasing	CMF ID: 4173
	Change from Protected/ Permissive Left-Turn to Flashing Yellow Arrow	Left Turn	Urban	0.806	0.806	0.806	0.806	0.806	20	-	Signalized Intersection	Protected/Permissive Left-Turn Phasing	CMF ID: 4177
	Change Number of Approaches with Left-Turn Lanes from X Approaches to Y Approaches	ALL	ALL	**	**	**	**	**	20	-	Signalized Intersection	Left-Turn Lanes on X Number of Approaches	HSM
	Change Number of Approaches with Prohibited Right Turn on Red from X Approaches to Y Approaches	ALL	-	**	**	**	**	**	20	-	Signalized Intersection	Right Turn on Red Permitted on X Number of Approaches	CMF ID: 5194
	Change Number of Approaches with Right-Turn Lanes from X Approaches to Y Approaches	ALL	-	**	**	**	**	**	20	-	Signalized Intersection	Right-Turn Lanes on X Number of Approaches	HSM Table 10-14, 12-26
	Change Number of Cycles per Hour from X Cycles per Hour to Y Cycles per Hour	Rear End	U+S	**	**	**	**	**	20	Arterial	Signalized Intersection	X Cycles per Hour	CMF ID: 3072

FIGURE 86 (CONTINUED) – VIRGINIA STATE PREFERRED CRASH MODIFICATION FACTOR (CMF) LIST

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
INTERSECTION	Change from Permitted Left-Turn to Permitted/ Protected	Left Turn	Urban	0.862	0.862	0.862	0.862	0.862	20	-	Signalized Intersection	Permissive Left-Turn Phasing	CMF ID: 4270
	Change from Permitted Left-Turn to Protected on Major Approach	Angle	Urban	0.01	0.01	0.01	0.01	0.01	20	-	Signalized Intersection	Permissive Left-Turn Phasing on a Major Approach	CMF ID: 335
	Change from Permitted/ Protected Left-Turn to Protected on Major Approach	Angle	Urban	0.01	0.01	0.01	0.01	0.01	20	-	Signalized Intersection	Protected/Permissive or Vice-Versa Left-Turn Phasing on a Major Approach	CMF ID: 339
	Change from Permitted/ Protected Left-Turn to Protected on Minor Approach	Angle	Urban	0.04	0.04	0.04	0.04	0.04	20	-	Signalized Intersection	Protected/Permissive or Vice-Versa Left-Turn Phasing on a Minor Approach	CMF ID: 337
	Change from Pretimed Signal to Actuated Signal	ALL	-	0.8	0.8	0.8	0.8	0.9	20	-	Signalized Intersection	Pretimed Signal Control	NCDOT CRF List 1.6
	Change from Protected Left-Turn to Flashing Yellow Arrow	Left Turn	Urban	2.242	2.242	2.242	2.242	2.242	20	-	Signalized Intersection	Protected Left-Turn Phasing	CMF ID: 4173
	Change from Protected/ Permissive Left-Turn to Flashing Yellow Arrow	Left Turn	Urban	0.806	0.806	0.806	0.806	0.806	20	-	Signalized Intersection	Protected/Permissive Left-Turn Phasing	CMF ID: 4177
	Change Number of Approaches with Left-Turn Lanes from X Approaches to Y Approaches	ALL	ALL	**	**	**	**	**	20	-	Signalized Intersection	Left-Turn Lanes on X Number of Approaches	HSM
	Change Number of Approaches with Prohibited Right Turn on Red from X Approaches to Y Approaches	ALL	-	**	**	**	**	**	20	-	Signalized Intersection	Right Turn on Red Permitted on X Number of Approaches	CMF ID: 5194
	Change Number of Approaches with Right-Turn Lanes from X Approaches to Y Approaches	ALL	-	**	**	**	**	**	20	-	Signalized Intersection	Right-Turn Lanes on X Number of Approaches	HSM Table 10-14, 12-26
	Change Number of Cycles per Hour from X Cycles per Hour to Y Cycles per Hour	Rear End	U+S	**	**	**	**	**	20	Arterial	Signalized Intersection	X Cycles per Hour	CMF ID: 3072

Figure 86 (continued) – Virginia State Preferred Crash Modification Factor (CMF) List

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
INTERSECTION	Channelize Right Turn	ALL	-	0.65	0.65	0.65	1	0.88	20	-	Signalized Intersection	No Right-Turn Channelization	FHWA CMF Desktop Reference Guide
	Closed Loop Signal System	ALL	-	0.85	0.85	0.85	0.85	0.85	20	-	Signalized Intersection	Signal System that is Not Closed Loop	NCDOT CRF List 1.7
	Convert from Pedestal- Mounted Traffic Signal to Mast Arm-Mounted Traffic Signal	ALL	Urban	0.56	0.56	0.56	0.49	0.51	20	-	Signalized Intersection	Pedestal-Mounted Signal	CMF ID: 1424, 1425
	Convert from Span Wire-Mounted Traffic Signal to Mast Arm-Mounted Traffic Signal	ALL	ALL	0.98	0.98	0.98	0.97	0.97	20	-	Signalized Intersection	Span Wire-Mounted Signal	UVA Khattak and Fontaine Study
	Convert to LED Signal Heads - 3-Leg Intersection	ALL	-	1.41	1.41	1.41	0.929	0.929	20	-	3-Leg Signalized Intersection	Incandascent Signal Bulbs	UVA CMF
	Convert to LED Signal Heads - 4-Leg Intersection	ALL	-	0.986	0.986	0.986	0.932	0.932	20	-	4-Leg Signalized Intersection	Incandascent Signal Bulbs	UVA CMF
	Extend Left-Turn Lane	ALL	-	0.85	0.85	0.85	1	0.95	20	-	Signalized Intersection	Existing Turn-Lane Length	FHWA Desktop Reference
	Extend Right-Turn Lane	ALL	-	0.85	0.85	0.85	1	0.95	20	-	Signalized Intersection	Existing Turn-Lane Length	FHWA Desktop Reference
	Increase All-Red Clearance Interval	ALL	Urban	0.863	0.863	0.863	0.798	0.798	20	-	Signalized Intersection	Short All-Red Clearance Interval	CMF ID: 4211, 4212
	Increase Left-Turn Lane Offset	ALL	-	0.644	0.644	0.644	0.662	0.662	20	-	Signalized Intersection	Zero or Negative Left-Turn Lane Offset	CMF ID: 6095, 6096
	Increase Yellow Change Interval by 1 Second	ALL	Urban	1.07	1.07	1.07	1.14	1.14	20	-	Signalized Intersection	Existing Yellow Interval	CMF ID:4207, 4208
	Install Red-Light Camera	ALL	U+S	0.676	0.676	0.676	1.014	0.916	20	-	Signalized Intersection	No Red-Light Camera Present	CMF ID: 6876, 6877
	Offset Right-Turn Lane	N/A	-	1	1	1	1	1	20	-	Signalized Intersection	No Offset for Right-Turn Lane	N/A
	Permit Right Turn on Red	ALL	-	1.07	1.07	1.07	1.07	1.07	20	-	Signalized Intersection	Right Turn on Red Prohibited	CMF ID: 4580
	Replace 8-inch Signal Heads with 12-inch Signal Heads	ALL	U+S	0.97	0.97	0.97	0.97	0.97	20	-	Signalized Intersection	8-inch Signal Heads	CMF ID: 2334

Figure 86 (continued) – Virginia State Preferred Crash Modification Factor (CMF) List

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
INTERSECTION	Retroreflective Backplates and LED Signal Heads	Night Time	-	0.65	0.65	0.65	0.74	0.74	20	-	Signalized Intersections	No Retroreflective Backplates and Non-LED Signal Heads	UVA CMF
	Add Left-Turn Lane to Major Approach of 3-Leg Stop-Controlled Intersection	ALL	-	0.56	0.56	0.56	0.56	0.56	20	-	3-Leg Stop-Controlled Intersection	Left-Turn Lanes on X Number of Approaches	HSM Table 11-22
	Change Number of Uncontrolled Approaches with Left-Turn Lanes from X Approaches to Y Approaches at 4-Leg Intersection	ALL	-	**	**	**	**	**	20	-	4-Leg Stop-Controlled Intersection	Left-Turn Lanes on X Number of Approaches	HSM Table 10-13
	Change Number of Uncontrolled Approaches with Right-Turn Lanes from X to Y at Intersection of Rural, Multilane Highway	ALL	Rural	**	**	**	**	**	20	-	Stop-Controlled Intersection - Rural Multilane Highway	Right-Turn Lanes on X Number of Approaches	HSM Table 11-23
	Change Number of Uncontrolled Approaches with Right-Turn Lanes from X to Y at Intersection of Rural, Two-Lane Roads	ALL	Rural	**	**	**	**	**	20	-	Stop-Controlled Intersection - Rural Two-Lane Road	Right-Turn Lanes on X Number of Approaches	HSM Table 10-14
	Change Number of Uncontrolled Approaches with Right-Turn Lanes from X to Y at Urban or Suburban Arterial Intersection	ALL	U+S	**	**	**	**	**	20	-	Stop-Controlled Intersection - Urban and Suburban Arterial	Right-Turn Lanes on X Number of Approaches	HSM Table 12-26
	High-Friction Surface Treatment on Approach	ALL	-	0.799	0.799	0.799	0.799	0.799	10	-	Stop-Controlled Intersection Approach	Standard Pavement on Intersection Approach	CMF ID: 2259
	Increase Intersection Sight Distance from X Feet of Available Sight Distance to Y Feet	Angle & Left Turn	-	**	**	**	**	**	10	-	Stop-Controlled Intersection Approach	Intersection Sight Distance of X Feet	NCHRP 17-59, Report 875
	Intersection Collision Warning System	ALL	-	0.742	0.742	0.742	0.704	0.704	6	-	Stop-Controlled Intersection	No Collision Warning System Present	CMF ID: 8474, 8475
	Reduce Intersection Skew from X to Y - 3-Leg Intersection	ALL	Rural	**	**	**	**	**	20	-	3-Leg Stop-Controlled Intersection	Intersection Skew Angle of X Degrees	HSM Equation: 10-22
	Reduce Intersection Skew from X to Y - 4-Leg Intersection	ALL	Rural	**	**	**	**	**	20	-	4-Leg Stop-Controlled Intersection	Intersection Skew Angle of X Degrees	HSM Equation: 10-23

Figure 86 (continued) – Virginia State Preferred Crash Modification Factor (CMF) List

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
INTERSECTION	Systemic Signage and Pavement Marking Improvements	ALL	-	0.899	0.899	0.899	0.917	0.917	6	-	Stop-Controlled Intersection	Stop-Controlled Intersection with No Supplemental Signage	FHWA Proven Safety Countermeasures, CMF ID: 8867, 8866
	Transverse Rumble Strips	ALL	Rural	0.987	0.987	0.987	1.191	1.118	10	Minor Arterial	Stop-Controlled Intersection Approach	No Transverse Rumble Strips Present	CMF ID: 2707, 2708, 2706
	Add Quadrant Roadway to Intersection	N/A	-	-	-	-	-		20	-	Conventional Intersection	Conventional Intersection	N/A
	Convert 3-Leg Signalized Intersection to Continuous Green T-Intersection	ALL	-	0.846	0.846	0.846	0.958	0.958	20	-	3-Leg Signalized Intersection	Standard 3-Leg Signalized Intersection	CMF ID: 8655, 8656
	Convert At-Grade Intersection to Interchange	ALL	-	0.58	0.43	0.43	0.64	0.58	20	-	4-Leg Intersection	At-Grade Intersection	CMF ID: 459, 460, 461
	Convert 4-Leg Intersection to Two Offset T-Intersections	ALL	Urban	0.75	0.75	0.75	1	1	20	-	4-Leg Stop-Controlled Intersection	4-Leg Stop-Controlled Intersection	HSM CMF: Table 14-2
	Convert Minor Stop-Control to All-Way Stop Control	ALL	ALL	0.23	0.23	0.23	0.319	0.319	20	-	Minor Stop-Controlled Intersection	Stop-Control on Minor Approaches	CMF ID: 3127, 3128
	Convert Signalized Intersection to Roundabout	ALL	-	0.52	0.22	0.22	0.52	0.52	20	-	Signalized Intersection	Signalized Intersection	CMF ID: 225, 226
	Convert Stop-Controlled Intersection to Roundabout	ALL	ALL	0.56	0.18	0.18	0.56	0.56	20	-	Stop-Controlled Intersection	Minor Stop-Controlled Intersection	CMF ID: 227, 228
	Convert Stop-Controlled Intersection to Signalized Intersection	ALL	ALL	0.642	0.642	0.642	0.639	0.639	20	-	Stop-Controlled Intersection	Minor Stop-Controlled Intersection	CMF ID: 7983, 7986
	Convert to Displaced Left- Turn Intersection	ALL	-	0.81	0.81	0.81	0.76	1.11	20	-	High-Speed Intersection	Traditional Intersection	FHWA TechBrief; CMF ID: [illegible]
	Convert to J-Turn Intersection	ALL	Rural	0.652	0.463	0.463	0.652	0.63	20	Principal Arterial-Other	High-Speed Intersection	At-Grade Minor Stop-Controlled Intersection	CMF ID: 5555, 5556
	Convert to Median U-Turn Intersection	ALL	-	0.70	0.70	0.70	0.91	0.63	20	Arterial	High-Speed Intersection	Conventional Signalized Intersection	FHWA TechBrief; CMF ID: [illegible]
	Convert to Signalized Intersection to Signalized RCUT	ALL	-	0.78	0.78	0.78	0.85	0.85	20	-	High-Speed Signalized Intersection	Conventional Signalized Intersection	FHWA Report
	Convert to Signalized Intersection to Unsignalized RCUT	N/A	-	-	-	-	-		20	-	High-Speed Signalized Intersection	Signalized Intersection	N/A

FIGURE 86 (CONTINUED) – VIRGINIA STATE PREFERRED CRASH MODIFICATION FACTOR (CMF) LIST

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
INTERSECTION	Convert to Unsignalized Intersection to Unsignalized RCUT	ALL	Rural	0.37	0.37	0.37	0.54	0.54	20	Principal Arterial-Other	High-Speed Stop-Controlled Intersection	Conventional Unsignalized Intersection	CMF ID: 4883, 4884
INTERSECTION	Convert Two Offset T-Intersection, Offset by X Miles, to T-Intersections with Major Road AADT	ALL	Rural	**	**	**	**	**	20	-	Offset T-Intersections	T-Intersections Offset by X Miles	HSM Eqn 10-17
INTERSECTION	Convert Unsignalized Intersection to Unsignalized Superstreet Intersection	ALL	Rural	0.37	0.37	0.37	0.54	0.54	20	Principal Arterial-Other	High-Speed Stop-Controlled Intersection	Stop-Control on Minor Approaches	CMF ID: 4883, 4884
INTERSECTION	Install Interim Roundabout	ALL	ALL	0.23	0.23	0.23	0.319	0.319	5	-	Stop-Controlled Intersection	Stop-Control on Minor Approaches	CMF ID: 3127, 3128
INTERSECTION	Remove Unwarranted Signal	ALL	U	0.76	0.76	0.76	0.76	0.76	20	Minor Arterial, Collectors	Signalized Intersection of One-Way Streets	Unwarranted Traffic Signal	CMF ID: 332
INTERSECTION	Install Temporary Traffic Circle	N/A	-	-	-	-	-		2	-	Unsignalized Intersection	No Control, Yield Control, or Stop Controlled	N/A
SEGMENTS (FREEWAY)	Active Traffic Management with Hard Shoulder Running	ALL	-	0.69	0.69	0.69	0.75	0.75	20	Principal Arterial - Interstate	Freeway Segment	No Active Traffic Management or Hard Shoulder Running	UVA CMF
SEGMENTS (FREEWAY)	Active Traffic Management without Hard Shoulder Running	ALL	-	1.18	1.18	1.18	1.16	1.16	20	Principal Arterial - Interstate	Freeway Segment	No Active Traffic Management	UVA CMF
SEGMENTS (FREEWAY)	Add Cable Median Barrier	CM,F, O, HO	Rural	0.09	0.09	0.09	0.09	0.09	15	Principal Arterial - Interstate	Freeway Segment with Traversable Median	No Median Barrier Present	CMF ID: 1966
SEGMENTS (FREEWAY)	Add Rumble Strips to Inside Shoulder	SV	-	0.811	0.811	0.811	1	1	10	Principal Arterial - Intersectate	Freeway Segment	No Rumble Strips Present on Inside Shoulder	HSM Eqn 18-36
SEGMENTS (FREEWAY)	Add Median Concrete Barrier	CM,F, O,HO	Rural	0	0	0	0	0	15	Principal Arterial – Other Freeways and Expressways	Freeway Segment	No Median Barrier Present	CMF ID: 2256
SEGMENTS (FREEWAY)	Add Median Guardrail	CM	-	0.22	0.22	0.22	0.22	0.22	15	Principal Arterial – Other Freeways and Expressways	Freeway Segment	No Median Barrier Present	CMF ID: 51

FIGURE 86 (CONTINUED) – VIRGINIA STATE PREFERRED CRASH MODIFICATION FACTOR (CMF) LIST

Source: VDOT

SEGMENTS (FREEWAY)

COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
Add Rumble Strips to Outside Shoulder	SV	-	0.811	0.811	0.811	1	1	10	Principal Arterial - Intersectate	Freeway Segment	No Rumble Strips Present on Outside Shoulder	HSM Eqn 18-36
Add Raised Pavement Markers	ALL	Rural	0.87	0.87	0.87	0.87	0.87	2	Principal Arterial - Other Freeways and Expressways	Freeway Segment	No Raised Pavement Markers Present	CMF ID: 5498
Add Roadside Guardrail	ALL	-	0.84	0.84	0.99	1.06	1.06	15	Principal Arterial - Other Freeways and Expressways	Freeway Segment	No Roadside Barrier Present	CMF ID: 8391, 8392, 8393
Implement Incident Management to Reduce Incident Duration Time	SC	-	0.85	0.85	0.85	0.85	0.85	6	Principal Arterial - Interstate	Freeway Segment	No Incident Management Program	VA Planning Level CMFs
Implement Variable Speed Limits	ALL	Urban	0.71	0.71	0.71	0.75	0.71	6	Principal Arterial - Interstate	Freeway Segment	Static Posted Speed Limit	CMF ID: 8730, 8731
Rural: Widen from 4 Lanes to 6 Lanes	ALL	Rural	0.7	0.7	0.7	0.7	0.7	20	-	Rural Freeway Segment	4-Lane Cross-Section	VDOT SPFs, Crash Rate Ratios
Upgrade Horizontal Curve Signage	ALL	Rural	0.75	0.75	0.75	0.82	0.82	6	-	Freeway Horizontal Curve Segment	No Horizontal Curve Signs or Dirty Signs with No Retroreflectivity	CMF ID: 2431, 2433
Upgrade Pavement Markings to Wet-Reflective Pavement Markings	ALL	-	0.881	0.881	0.881	1.032	1.032	2	Principal Arterial - Other Freeways and Expressways	Freeway Segment	Standard Pavement Markings	CMF ID: 8093, 8134
Upgrade Roadside Guardrail	ALL	-	0.95	0.95	0.95	0.95	0.95	10	-	Freeway Segment with Roadside Guardrail	Damaged or Below Standard Guardrail	Desktop Reference Guide
Urban: Widen from 4 Lanes to 6 Lanes	ALL	Urban	0.9	0.9	0.9	0.9	0.9	20	-	Urban Freeway Segment	4-Lane Cross-Section	VDOT SPFs, Crash Rate Ratios
Urban: Widen from 4 Lanes to 8+ Lanes	ALL	Urban	0.75	0.75	0.75	0.75	0.75	20	-	Urban Freeway Segment	4-Lane Cross-Section	VDOT SPFs, Crash Rate Ratios
Urban: Widen from 6 Lanes to 8+ Lanes	ALL	Urban	0.8	0.8	0.8	0.8	0.8	20	-	Urban Freeway Segment	6-Lane Cross-Section	VDOT SPFs, Crash Rate Ratios

Figure 86 (continued) – Virginia State Preferred Crash Modification Factor (CMF) List

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
SEGMENTS (FREEWAY)	Widen Clear Zone from X Feet to Y Feet	SV	-	**	**	**	1	**	20	-	Freeway Segment	Clear Zone Width of X Feet	HSM Eqn 18-38
SEGMENTS (FREEWAY)	Widen Median from X Feet to Y Feet	ALL	-	**	**	**	**	**	20	-	Freeway Segment	Median Width of X Feet	HSM Equation 18-27
SEGMENTS (FREEWAY)	Widen Paved Inside Shoulder from X Feet to Y Feet	ALL	-	**	**	**	**	**	20	-	Freeway Segment	Inside Shoulder Width of X Feet	HSM Eqn 18-26
SEGMENTS (FREEWAY)	Widen Paved Outside Shoulder on Horizontal Curve from X Feet to Y Feet	SV	-	**	**	**	**	**	20	-	Freeway Horizontal Curve Segment	Outside Shoulder Width of X Feet	HSM Eqn 18-35 and Table 18-21
SEGMENTS (FREEWAY)	Widen Paved Outside Shoulder on Horizontal Tangent from X Feet to Y Feet	SV	-	**	**	**	1	**	20	-	Freeway Horizontal Tangent Segment	Outside Shoulder Width of X Feet	HSM Eqn 18-35 and Table 18-21
SEGMENTS (NON-FREEWAY)	Add Automated Speed Enforcement Cameras	ALL	-	0.83	0.83	0.83	0.84	0.84	6	-	Non-Freeway Segment	No Automated Speed Enforcement Present	CMF ID: 2688, 4583
SEGMENTS (NON-FREEWAY)	Add Auxiliary Passing Lane	ALL	Rural	0.67	0.67	0.67	0.58	0.58	20	-	Rural Two-Lane Undivided Highway	No Passing Lanes Present	CMF ID: 9111, 9112
SEGMENTS (NON-FREEWAY)	Add Centerline Rumble Strips (Including Sinusoidal/ Mumble)	HO, O	Rural	0.55	0.55	0.55	0.63	0.63	10	-	Non-Freeway Segment	No Centerline Rumble Strips Present	CMF ID: 3355, 3360
SEGMENTS (NON-FREEWAY)	Add Chevron Signs at Horizontal Curves	Night Time	Rural	0.75	0.75	0.75	0.75	0.75	6	-	Small Radius Horizontal Curve on Rural Two-Lane Undivided Highway	No Chevrons Present	CMF ID: 2439
SEGMENTS (NON-FREEWAY)	Add Chevron Signs, Curve Warning Signs, and Sequential Flashing Beacons	Night Time	-	0.592	0.592	0.592	0.592	0.592	6	-	Horizontal Curve on Multilane Highway	No Curve Delineation Treatment Present	CMF ID: 1852
SEGMENTS (NON-FREEWAY)	Add Raised Pavement Markers	ALL	Rural	0.81	0.81	0.81	0.81	0.81	2	Principal Arterial - Other Freeways and Expressways	Non-Freeway Segment	No Raised Pavement Markers Present	CMF ID: 5496
SEGMENTS (NON-FREEWAY)	Add Safety Edge	Run Off Road	Rural	0.79	0.79	0.79	0.79	0.79	15	Principal Arterial - Other	Two-Lane Undivided Rural Highway	No Safety Edge Present	FHWA Proven Safety Countermeasures

Figure 86 (continued) – Virginia State Preferred Crash Modification Factor (CMF) List
Source: VDOT

SEGMENTS (NON-FREEWAY)

COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
Add Segment Lighting	Night Time	Urban	0.68	0.68	0.68	0.76	0.74	15	Minor Arterial	Non-Freeway Segment	No Lighting Present	CMF ID: 7781, 7782, 7783
Add Shoulder Rumble Strips (Including Sinusoidal/ Mumble)	Run Off Road-right	Rural	0.83	0.83	0.83	0.84	0.84	10	-	Non-Freeway Segment	No Shoulder Rumble Strips Present	CMF ID: 3442, 3447
Add Two-Way Left-Turn Lane (2U to 3T)	ALL	-	0.739	0.739	0.739	0.797	0.797	20	-	Two-Lane Undivided Highway	No TWLTL Present	CMF ID: 2341, 2346
Add Two-Way Left-Turn Lane (4U to 5T)	ALL	Urban	0.45	0.45	0.45	0.45	0.45	20	-	Four-Lane Undivided Highway	No TWLTL Present	CMF ID: 4084
Breakaway Supports for Utility Poles in Clear Zones	ALL	Rural	0.94	0.94	0.94	1.00	1	10	-	Non-Freeway Segment	Non-Breakaway Supports	HSM Eqn 10-20
Change 4" Wide Edgelines to 6" Wide Edgelines	ALL	Rural	0.635	0.635	0.635	0.877	0.825	2	-	Rural Two-Lane Highway	4" Edgelines	CMF ID: 4737, 4738, 4736
Change Driveway Density (Driveways/Mile) from X to Y	ALL	Rural	**	**	**	**	**	20	Principal Arterial - Other	Rural Non-Freeway Segment	Driveway Density of X Driveways per Mile	CMF ID: 1973, 2248
Change Roadside Hazard Rating from X to Y by Flattening Roadside Slope	ALL	Rural	**	**	**	**	**	20	-	Two-Lane Undivided Highway	Roadside Hazard Rating of X ■	HSM Eqn 10-20
Change Superelevation Variance from X to Y (if Variance Between 0.01 and 0.02)	ALL	Rural	**	**	**	**	**	20	-	Horizontal Curve on Two-Lane Undivided Highway	Superelevation Deficiency of X Feet per Foot in Decimal	HSM Eqn 10-15
Change Superelevation Variance from X to Y (if Variance Greater than 0.02)	ALL	Rural	**	**	**	**	**	20	-	Horizontal Curve on Two-Lane Undivided Highway	Superelevation Deficiency of X Feet per Foot in Decimal	HSM Eqn 10-16
Dynamic Speed Feedback Signs	ALL	Rural	0.95	0.95	0.95	0.95	0.95	6	-	Two-Lane Undivided Highway	No Dynamic Speed Feedback Sign Present	CMF ID: 6885
Flatten Horizontal Curve	ALL	Rural	▲	▲	▲	▲	0.315	20	-	Horizontal Curve on Two-Lane Undivided Highway	Please use the Existing Horizontal Curve Geometry Tab to Calculate the CMFs	CMF ID: 9271, 9272, 9525
Implement High-Friction Surface Treatment on Horizontal Curve	ALL	-	0.759	0.759	0.759	0.759	0.759	10	-	Horizontal Curve on Non-Freeway Segment	Horizontal Curve with Standard Pavement	CMF ID: 7900
Increase Stopping Sight Distance on Crest Vertical Curve	ALL	Rural	0.76	0.76	0.76	0.82	0.7	20	-	Crest Vertical Curve on Two-Lane Highway	Crest Vertical Curve with Inadequate Sight Distance	CMF ID: 6868, 6869, 6870

FIGURE 86 (CONTINUED) – VIRGINIA STATE PREFERRED CRASH MODIFICATION FACTOR (CMF) LIST

Source: VDOT

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	ALL SEVERITIES	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
SEGMENTS (NON-FREEWAY)	Pave Unpaved Shoulder	ALL	Rural	0.97	0.97	0.97	0.97	0.97	20	-	Two-Lane Undivided Rural Highway	Unpaved Shoulder	HSM Eqn 10-12, Table 10-9 and 10-10
	Pavement Resurfacing - Rural	ALL	Rural	1.03	1.03	1.03	1.03	1.03	10	-	Two-Lane Undivided Highway	Old Pavement	CMF ID: 5626
	Pavement Resurfacing - Urban	ALL	Urban	0.894	0.894	0.894	0.929	0.929	10	Principal Arterial - Other	Non-Freeway Segment	Old Pavement	CMF ID: 9289, 9290
	Prohibit On-Street Parking	ALL	Urban	0.78	0.78	0.78	0.72	0.74	20	Principal Arterial - Other	Urban Arterial with Street Parking	On-Street Parking Allowed	CMF ID: 4574, 4575
	Remove or Relocate Fixed Object Outside of Clear Zone	CFO	-	0.62	0.62	0.62	0.62	0.62	20	-	Non-Freeway Segment	Fixed Object within Clear Zone	CMF ID: 1024, 1044
	Road Diet (4U to 3T)	ALL	Urban	0.71	0.71	0.71	0.71	0.71	20	Minor Arterial	4-Lane Undivided Highway	4-Lane Cross-Section	CMF ID: 199
	Upgrade Chevrons with Flourescent Sheeting	Night time	Rural	0.65	0.65	0.65	0.65	0.65	6	-	Horizontal Curve on Rural Two-Lane Undivided Highway	No Signs Present, Signs with No Fluorescent Sheeting, or Dirty Signs	CMF ID: 2434
	Upgrade Pavement Markings by Increasing Retroreflectivity	Night time	-	0.81	0.81	0.81	0.81	0.81	2	-	Non-Freeway Segment	Edgeline, Centerline, and Skip Line Pavement Markings with Low Retroreflectivity	CMF ID: 2116, 2117, 2120
	Upgrade Pavement Markings to Wet-Reflective Pavement Markings	ALL	-	0.881	0.881	0.881	1.032	1.032	2	Principal Arterial - Other Freeways and Expressways	Non-Freeway Segment	Traditional Pavement Markings	CMF ID: 8093, 8134
	Widen Clear Zone	ALL	Rural	0.78	0.78	0.78	0.78	0.78	20	-	Rural Two-Lane Highway	Rural Two-Lane Highway with Narrow Clear Zone	CMF ID: 35
	Widen Lane	ALL	Rural	0.87	0.87	0.87	0.87	0.87	20	-	Two-Lane Undivided Highway	Narrow Lane Width	HSM Table 10-8, Eqn 10-11
	Widen Average Shoulder Width	HO, CFO, O, S	Rural	▲	▲	▲	▲	▲	20	-	Two-Lane Undivided Highway	Existing Shoulder Width	HSM Table 10-9

FIGURE 86 (CONTINUED) – VIRGINIA STATE PREFERRED CRASH MODIFICATION FACTOR (CMF) LIST

Source: VDOT

Figure 87 – Crash Countermeasure Examples

Photo Source: FHWA

Optimize Change Intervals at Signalized Intersections

Convert Intersection to Roundabout

Interconnect and Optimize Traffic Signals

Add Channelized Right Turn Lane

Figure 87 (continued) – Crash Countermeasure Examples

Photo Source: FHWA, VDOT, Google

Automated Speed Enforcement Cameras

Variable Speed Limits

Flashing Yellow Arrow and Retroreflective Backplates

Displaced Left Turn Intersection

Figure 87 (continued) – Crash Countermeasure Examples

Photo Source: VDOT

Continuous Green-T Intersection

Restricted Crossing U-Turn (RCUT)

Median U-Turn Intersection

Center Turn Overpass Intersection

Figure 87 (continued) – Crash Countermeasure Examples

Photo Source: FHWA

Eliminate Parking at Intersection

Install Flashing Light On Sign (Linked to Signal)

Add Exclusive Left Turn Phase

Prohibit Turns

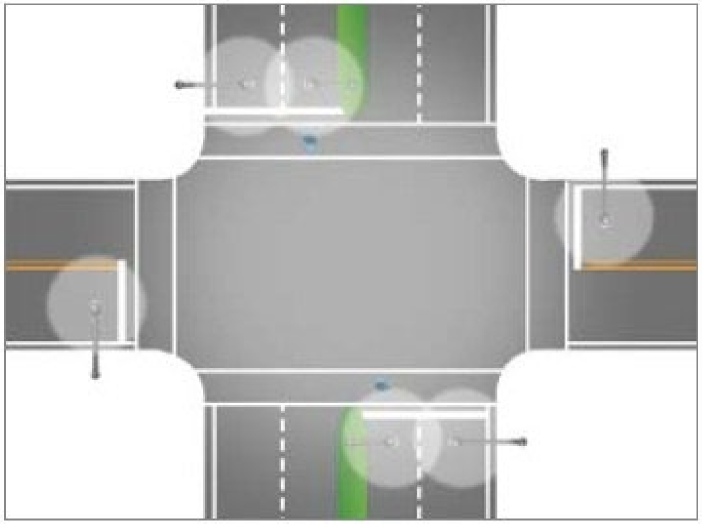
Figure 87 (continued) – Crash Countermeasure Examples

Photo Source: FHWA

Improve Pavement Markings

Add Pedestrian Phase

Install Shoulder Rumble Strip



Install Intersection Lighting

High Crash Location Analysis

This section provides a detailed safety analysis of sixteen intersection locations (one per Hampton Roads jurisdiction) based on the crash analysis highlighted earlier in this report.

One of the purposes of this study is to assist Hampton Roads localities obtain federal and state funding for roadway safety improvements. Based on this, rather than looking solely at data on a regional level, HRTPO staff is analyzing one selected location in each of the sixteen Hampton Roads localities.

Since each locality may prioritize various crash measures differently and since some candidate locations may have recently been examined as part of other planning efforts, staff from each locality was asked to select which intersection to analyze in this study. Localities were asked to select an intersection for further analysis based on ranking high in the five factors that were detailed earlier in this study:

- Total number of crashes
- Crash rate per 100 million entering vehicles
- Total number of fatal and serious injury crashes
- Fatal and serious injury crash rate per 100 million entering vehicles
- VDOT Potential for Safety Improvement (PSI)

Figures 88 and 89 show the 16 high crash intersection locations in each locality that were selected for further analysis in this study.

JURISDICTION	LOCATION
CHESAPEAKE	BATTLEFIELD BLVD at WOODLAKE DR/DEBAUN AVE
FRANKLIN	ARMORY DR at COLLEGE DR
GLOUCESTER	ROUTE 198 at ROUTE 606 (HARCUM RD)
HAMPTON	ARMISTEAD AVE at LaSALLE AVE
ISLE OF WIGHT	ROUTE 17 at SMITHS NECK RD
JAMES CITY	ROUTE 199 at QUARTERPATH RD/MOUNTS BAY RD
NEWPORT NEWS	39th ST at ROANOKE AVE
NORFOLK	COLLEY AVE at 26th ST/27th ST
POQUOSON	WYTHE CREEK RD at VICTORY BLVD/LITTLE FLORIDA RD
PORTSMOUTH	HIGH ST at PENINSULA AVE
SOUTHAMPTON	ROUTE 58 at ROUTE 308 (THREE CREEKS RD)
SUFFOLK	PORTSMOUTH BLVD at NANSEMOND PKWY/E WASHINGTON ST
SURRY	ROUTE 10 at HOG ISLAND RD/MOUNT RAY DR
VIRGINIA BEACH	ROSEMONT RD at HOLLAND RD
WILLIAMSBURG	ROUTE 132 (HENRY ST) at ROUTE 132Y
YORK	HAMPTON HWY at YORKTOWN RD/THEATRE RD

Figure 88 – 16 High Crash Intersections

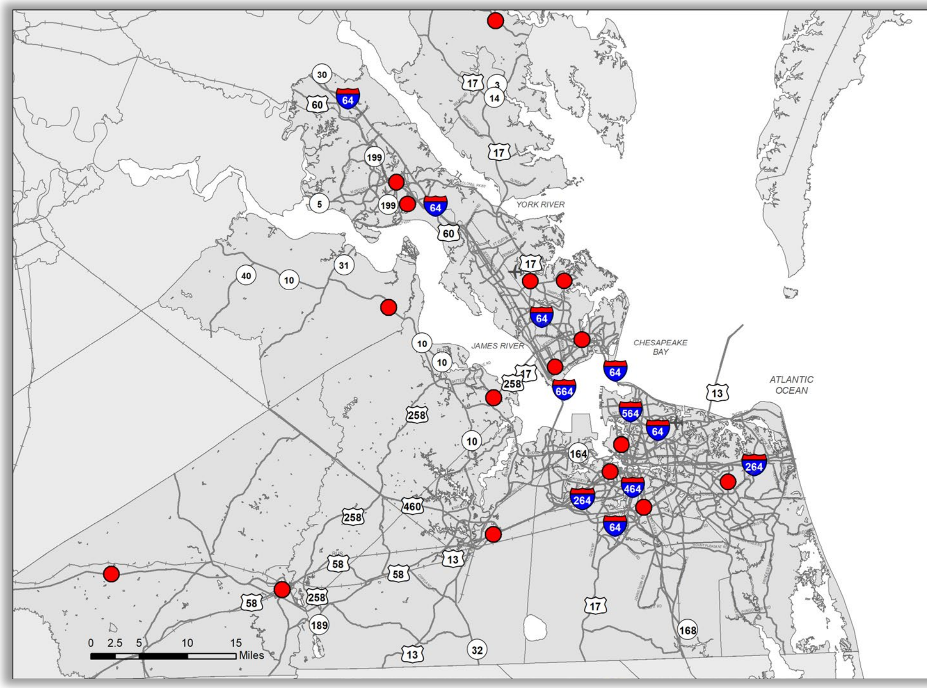
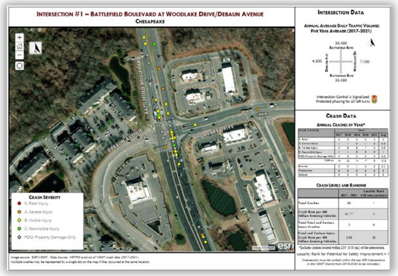


Figure 89 – 16 High Crash Intersections

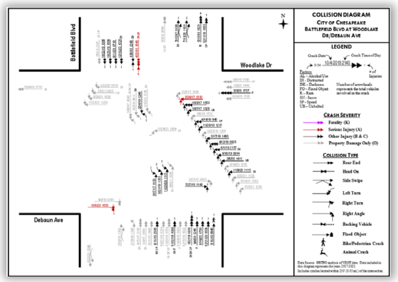
Source: HRTPO.

The following information is included for each of the sixteen intersections analyzed in detail in this study:

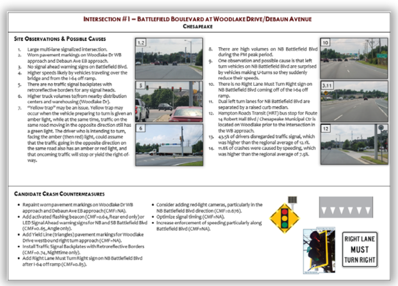
- **Summary Sheet (Page 1)** – Includes an aerial image of the intersection with crash locations by crash severity from VDOT's online crash data tool. Crash locations are shown for the high crash intersection and nearby vicinity. Multiple crashes may be represented by a single dot on the map if they occurred at the same location. It also shows recent traffic volumes for each leg of the intersection, intersection control, a summary of crashes by year and severity (within 250 feet of the intersection), and crash levels and rankings.

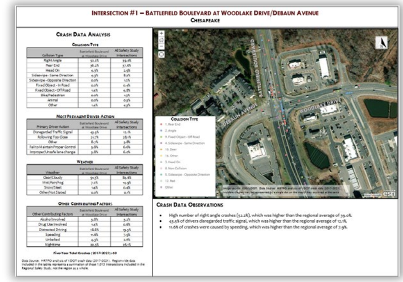


- **Collision Diagram (Page 2)** – Shows the location and type of each crash (within 250 feet of the intersection). Details are also provided for each crash including date, time of day, crash severity, number of vehicles, and selected crash characteristics.

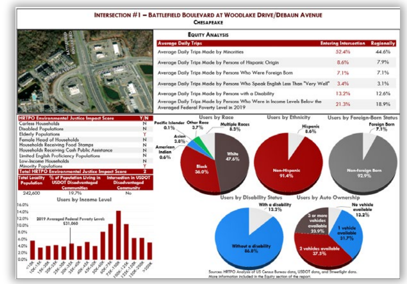


- **Crash Data Analysis (Page 3)** – Shows crash statistics by collision type, most prevalent driver action, weather, and other contributing factors (alcohol use, drug use, distracted driving, speeding, seat belt use, and nighttime). It includes the total crashes in the five-year period (2017-2021). This page also provides crash locations by collision type for the high crash intersection and nearby vicinity. Multiple crashes may be represented by a single dot on the map if they occurred at the same location. Finally, a list of crash data observations are provided.

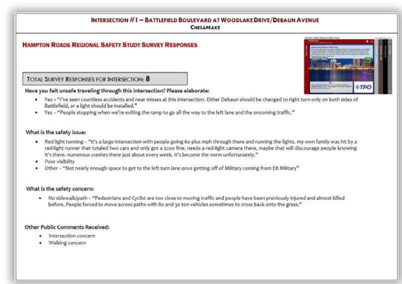




- **Equity Analysis (Page 4)** – Contains equity-related information for each high crash location. This includes summaries of users that travel through each intersection. Information on whether the location is in a USDOT Disadvantaged Community and HRTPO transportation vulnerability (or Environmental Justice) factors are also included.

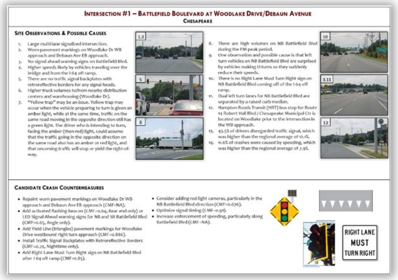


- **Hampton Roads Regional Safety Study Survey Responses (Page 5)** – As part of this study, HRTPO conducted a survey to collect public input on safety. This page provides the total number of responses received for this high crash intersection and specific public comments. These comments were



considered and used in the development of candidate crash countermeasures.

- **Site Observations and Possible Causes & Candidate Crash Countermeasures (Page 6)** – Provides observations and possible causes of crashes based on aerial photography and intersection site visits conducted in Spring/Summer 2023. This page also contains a list of potential crash countermeasures developed by HRTPO staff based on intersection characteristics, collision diagrams, crash data analysis, intersection site visits, public survey comments, and engineering judgment. For each of the crash countermeasures, an estimate of the reduction in crashes is provided based on existing traffic characteristics and Crash Modification Factors (CMF). A CMF of 0.80 indicates that the described countermeasure would be expected to reduce crashes by 1 – 0.80, or 20%. In addition, some images that illustrate the candidate crash countermeasure s are provided.



Some acronyms used in this analysis include:

- NB – northbound
- SB – southbound
- EB – eastbound
- WB – westbound
- NE – northeast
- NW – northwest
- SE – southeast
- SW – southwest
- CMF – Crash Modification Factor
- K – crash with at least one fatality
- A – crash with at least one severe or serious injury
- B – crash with at least one visible injury
- C – crash with at least one non-visible injury
- O or PDO – property damage only
- NA – not applicable
- mph – miles per hour
- UPC – VDOT project number
- Veh-ped – Vehicle-pedestrian

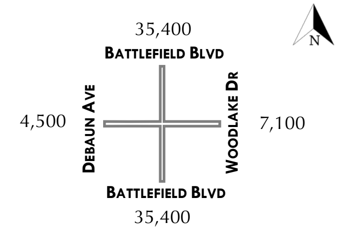
Intersection #1 – Battlefield Boulevard at Woodlake Drive/Debaun Avenue

Chesapeake

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Signalized
Protected phasing for all left turns

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	1	1	0	1	0	0.6
B. Visible Injury	3	9	9	7	0	5.6
C. Nonvisible Injury	1	1	0	3	0	1
PDO. Property Damage Only	5	9	5	6	8	6.6
TOTAL	10	20	14	17	8	13.8
Bicycle	0	0	1	0	0	0.2
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

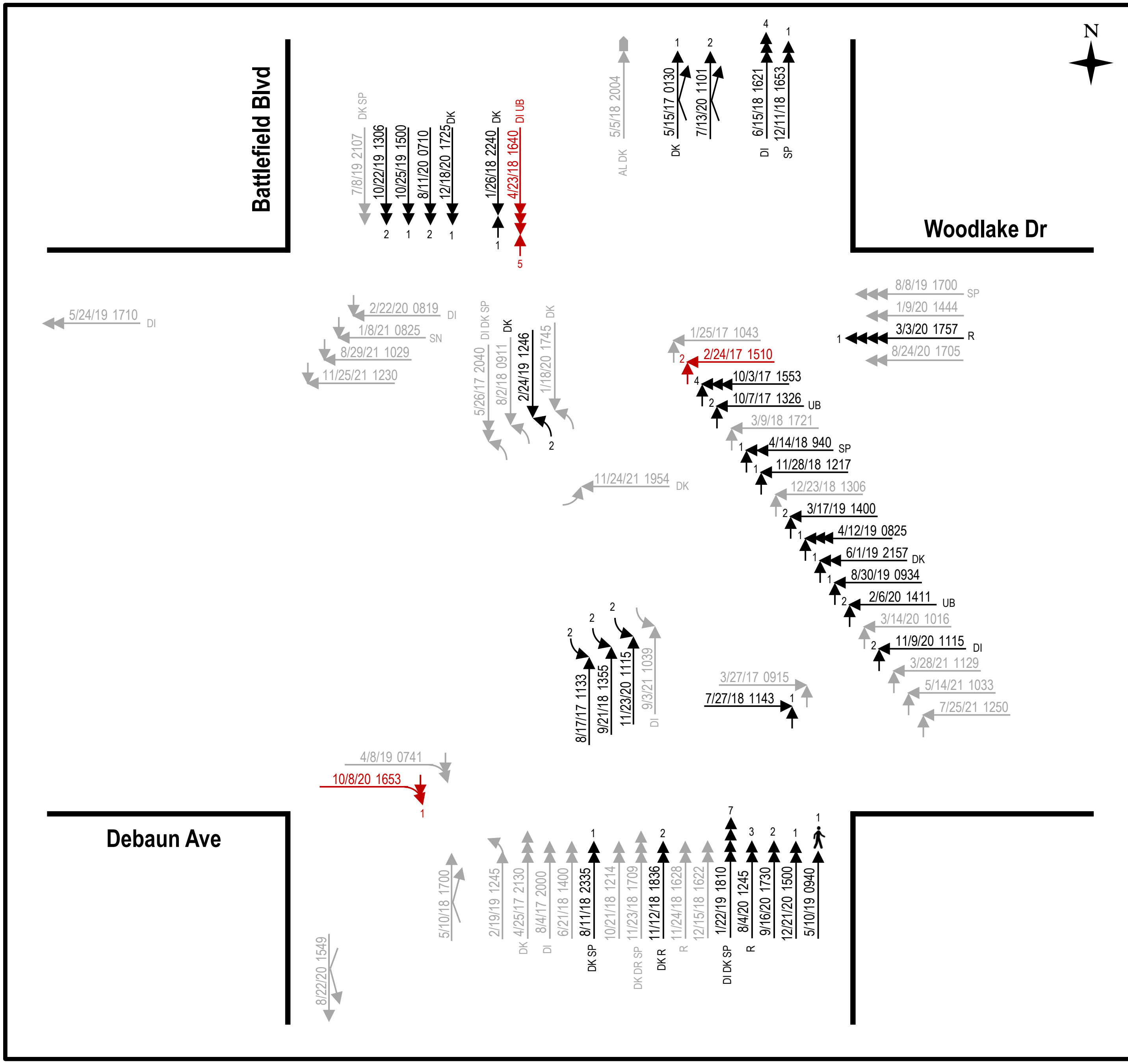
Crash Levels and Ranking

	2017 - 2021	Locality Rank (128 intersections)
Total Crashes	69	1
Crash Rate per 100 Million Entering Vehicles	91.77	4
Total Fatal and Serious Injury Crashes	3	6
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	3.99	20

Locality Rank for Potential for Safety Improvement = 1

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

CITY OF CHESAPEAKE
BATTLEFIELD BLVD AT WOODLAKE DR/DEBAUN AVE

LEGEND

Crash Date
Crash Time of Day
DI DK 10/4/2019 2140 1
Factors
# of Injuries

Factors
- AL – Alcohol Use
- DI - Distracted
- DK – Darkness
- FO – Fixed Object
- R – Rain
- SN - Snow
- SP - Speed
- UB – Unbelted

Number of arrowheads represents the total vehicles involved in the crash

CRASH SEVERITY

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

COLLISION TYPE

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021. Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #1 – Battlefield Boulevard at Woodlake Drive/Debaun Avenue
Chesapeake

Crash Data Analysis

Collision Type

Collision Type	Battlefield Boulevard at Woodlake Drive	All Safety Study Intersections
Right Angle	52.2%	39.0%
Rear End	36.2%	37.6%
Head On	4.3%	2.9%
Sideswipe - Same Direction	4.3%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	1.4%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	1.4%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Battlefield Boulevard at Woodlake Drive	All Safety Study Intersections
Disregarded Traffic Signal	43.5%	12.1%
Following Too Close	21.7%	28.1%
Other	8.7%	5.8%
Fail to Maintain Proper Control	5.8%	6.6%
Improper/Unsafe lane change	5.8%	6.0%

Weather

Weather	Battlefield Boulevard at Woodlake Drive	All Safety Study Intersections
Clear/Cloudy	91.3%	84.6%
Mist/Rain/Fog	7.2%	14.9%
Snow/Sleet	1.4%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Battlefield Boulevard at Woodlake Drive	All Safety Study Intersections
Alcohol Involved	5.8%	5.2%
Drug Use Involved	1.4%	0.6%
Distracted Driving	18.8%	19.5%
Speeding	11.6%	7.9%
Unbelted	4.3%	2.6%
Nighttime	20.3%	26.1%

Five-Year Total Crashes (2017-2021): 69

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Crash Data Observations

- High number of right angle crashes (52.2%), which was higher than the regional average of 39.0%.
- 43.5% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
- 11.6% of crashes were caused by speeding, which was higher than the regional average of 7.9%.

INTERSECTION #1 – BATTLEFIELD BOULEVARD AT WOODLAKE DRIVE/DEBAUN AVENUE
CHESAPEAKE

EQUITY ANALYSIS

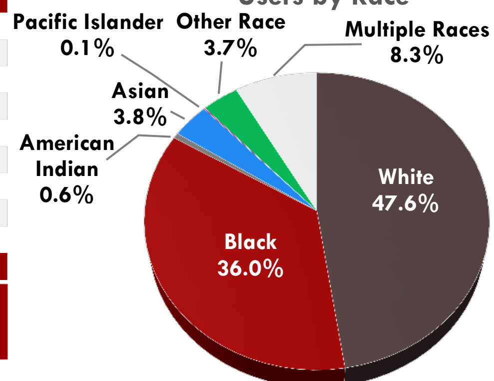
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	52.4%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	8.6%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	7.1%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	3.4%	3.1%
Average Daily Trips Made by Persons with a Disability	13.2%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	21.3%	18.9%

*Percentages in red are higher than the regional average.

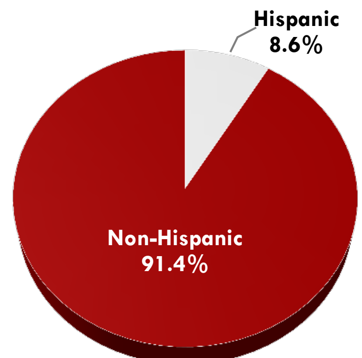
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	N
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	2

Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
242,600	19.7%	No

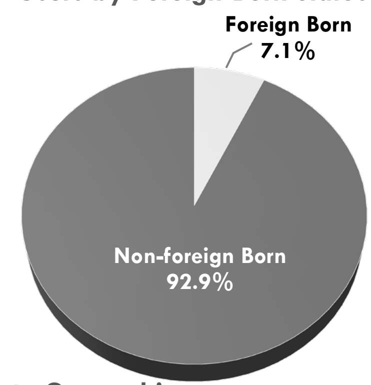
Users by Race



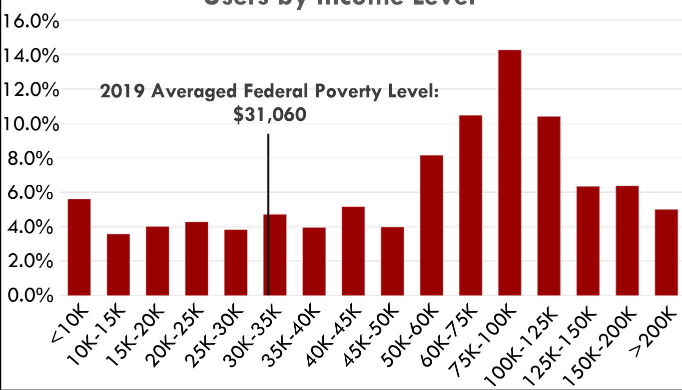
Users by Ethnicity



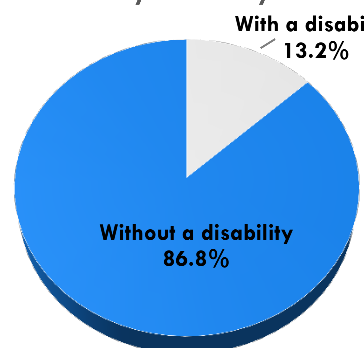
Users by Foreign-Born Status



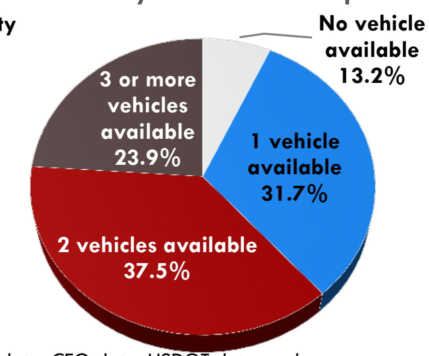
Users by Income Level



Users by Disability Status



Users by Auto Ownership



Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #1 – Battlefield Boulevard at Woodlake Drive/Debaun Avenue
Chesapeake

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: 8

Have you felt unsafe traveling through this intersection? Please elaborate:

- Yes – "I've seen countless accidents and near misses at this intersection. Either Debaun should be changed to right turn only on both sides of Battlefield, or a light should be installed."
- Yes – "People stopping when we're exiting the ramp to go all the way to the left lane and the oncoming traffic."

What is the safety issue/concern:

- Red light running – "It's a large intersection with people going 60 plus mph through there and running the lights. My own family was hit by a red-light runner that totaled two cars and only got a $200 fine. needs a red-light camera there, maybe that will discourage people knowing it's there. numerous crashes there just about every week. It's become the norm unfortunately."
- Poor visibility
- Other – "Not nearly enough space to get to the left turn lane once getting off of Military coming from EB Military"
- No sidewalk/path – "Pedestrians and Cyclist are too close to moving traffic and people have been previously injured and almost killed before. People forced to move across paths with 80 and 30 ton vehicles sometimes to cross back onto the grass."

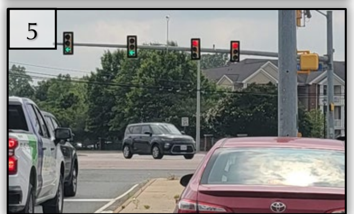
Other Public Comments Received:

- Intersection concern
- Walking concern

Intersection #1 – Battlefield Boulevard at Woodlake Drive/Debaun Avenue
Chesapeake

Site Observations & Possible Causes

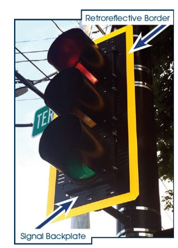
1. Large multi-lane signalized intersection.
2. Worn pavement markings on Woodlake Dr WB approach and Debaun Ave EB approach.
3. No signal ahead warning signs on Battlefield Blvd.
4. Higher speeds likely by vehicles traveling over the bridge and from the I-64 off ramp.
5. There are no traffic signal backplates with retroreflective borders for any signal heads.
6. Higher truck volumes to/from nearby distribution centers and warehousing (Woodlake Dr).
7. "Yellow trap" may be an issue. Yellow trap may occur when the vehicle preparing to turn is given an amber light, while at the same time, traffic on the same road moving in the opposite direction still has a green light. The driver who is intending to turn, facing the amber (then red) light, could assume that the traffic going in the opposite direction on the same road also has an amber or red light, and that oncoming traffic will stop or yield the right-of-way.



8. There are high volumes on NB Battlefield Blvd during the PM peak period.
9. One observation and possible cause is that left turn vehicles on NB Battlefield Blvd are surprised by vehicles making U-turns so they suddenly reduce their speeds.
10. There is no Right Lane Must Turn Right sign on NB Battlefield Blvd coming off of the I-64 off ramp.
11. Dual left turn lanes for NB Battlefield Blvd are separated by a raised curb median.
12. Hampton Roads Transit (HRT) bus stop for Route 14 Robert Hall Blvd / Chesapeake Municipal Ctr is located on Woodlake prior to the intersection in the WB approach.
13. 43.5% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
14. 11.6% of crashes were caused by speeding, which was higher than the regional average of 7.9%.

Candidate Crash Countermeasures

- Repaint worn pavement markings on Woodlake Dr WB approach and Debaun Ave EB approach (CMF=NA).
- Add activated flashing beacon (CMF=0.64, Rear end only) or LED Signal Ahead warning signs for NB and SB Battlefield Blvd (CMF=0.65, Angle only).
- Add Yield Line (triangles) pavement markings for Woodlake Drive westbound right turn approach (CMF=0.886).
- Install Traffic Signal Backplates with Retroreflective Borders (CMF=0.74, Nighttime only).
- Add Right Lane Must Turn Right sign on NB Battlefield Blvd after I-64 off ramp (CMF=0.85).
- Consider adding red-light cameras, particularly in the NB Battlefield Blvd direction (CMF=0.676).
- Optimize signal timing (CMF=0.91). Signal performance should be evaluated to ensure that detectors are working properly, and that signal timing is correct.
- Increase enforcement of speeding, particularly along Battlefield Blvd (CMF=NA).
- Signs or pavement markings conveying destination information could reduce the number of vehicles merging at the last minute (CMF-NA).

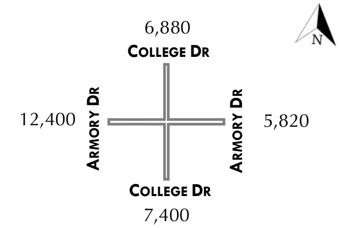


INTERSECTION #2 – ARMORY DRIVE AT COLLEGE DRIVE
FRANKLIN

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

INTERSECTION DATA

ANNUAL AVERAGE DAILY TRAFFIC VOLUMES FIVE YEAR AVERAGE (2017-2021)



Intersection Control = Signalized
Protected/Permitted for Armory Dr left turns
Split phasing for College Dr approaches

CRASH DATA

ANNUAL CRASHES BY YEAR*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	0	0	0	0	0	0
B. Visible Injury	3	1	3	3	0	2
C. Nonvisible Injury	0	1	3	1	0	1
PDO. Property Damage Only	1	5	4	2	1	2.6
TOTAL	4	7	10	6	1	5.6
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	1	0	0.2
Animal	0	0	0	0	0	0

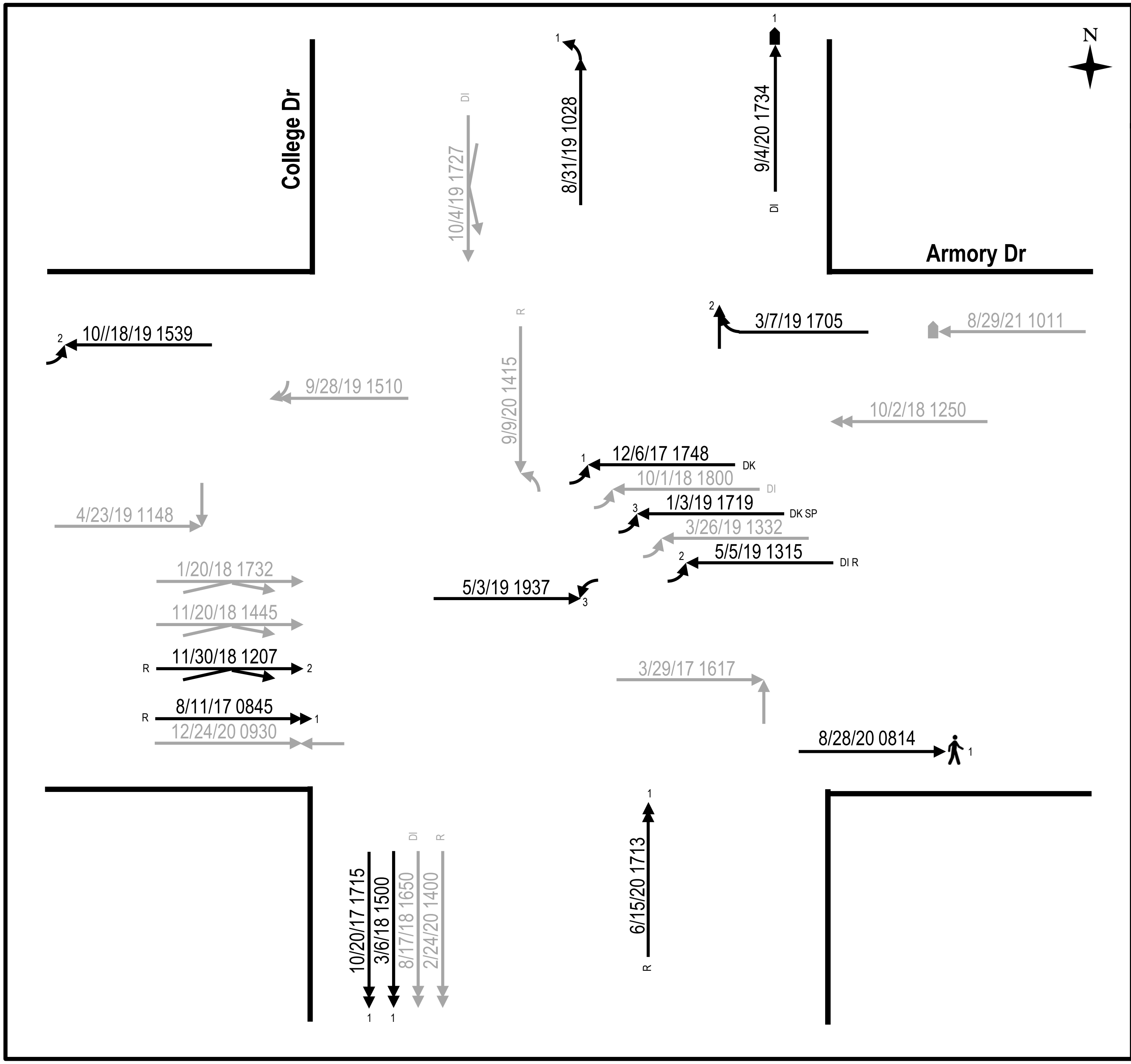
CRASH LEVELS AND RANKING

	2017 - 2021	Locality Rank (13 intersections)
Total Crashes	28	1
Crash Rate per 100 Million Entering Vehicles	94.42	1
Total Fatal and Serious Injury Crashes	0	4
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	0.00	4

Locality Rank for Potential for Safety Improvement = 1

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

City of Franklin
Armory Dr at College Dr

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

\# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

Crash Severity

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #2 – Armory Drive at College Drive
Franklin

Crash Data Analysis

Collision Type

Collision Type	Armory Drive at College Drive	All Safety Study Intersections
Right Angle	39.3%	39.0%
Rear End	28.6%	37.6%
Head On	3.6%	2.9%
Sideswipe - Same Direction	14.3%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	3.6%	4.8%
Bike/Pedestrian	3.6%	1.3%
Animal	0.0%	0.3%
Other	7.1%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Armory Drive at College Drive	All Safety Study Intersections
Following Too Close	21.4%	28.1%
Other Improper Turn	25.0%	2.3%
Did Not Have Right-of-Way	7.1%	17.9%
Fail to Maintain Proper Control	7.1%	6.6%
Improper or Unsafe Lane Change	7.1%	6.0%

Weather

Weather	Armory Drive at College Drive	All Safety Study Intersections
Clear/Cloudy	75.0%	84.6%
Mist/Rain/Fog	21.4%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	3.6%	0.1%

Other Contributing Factors

Other Contributing Factors	Armory Drive at College Drive	All Safety Study Intersections
Alcohol Involved	0.0%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	17.9%	19.5%
Speeding	3.6%	7.9%
Unbelted	0.0%	2.6%
Nighttime	7.1%	26.1%

Five-Year Total Crashes (2017-2021): 28

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Crash Data Observations

- Higher percentage of Sideswipe – Same Direction crashes (14.3%) compared to the regional average of 8.2%.
- 25% of drivers had Other Improper Turn, which was higher than the regional average of 2.3%.
- 21.4% of crashes occurred during Mist/Rain/Fog, which was higher than the regional average of 14.9%.

Intersection #2 – Armory Drive at College Drive
Franklin

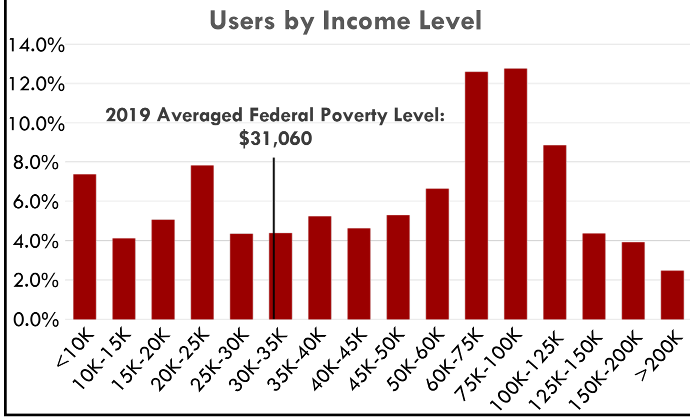
Equity Analysis

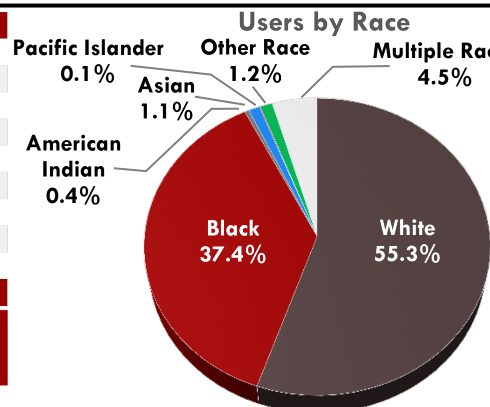
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	44.7%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	3.0%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	1.8%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	0.7%	3.1%
Average Daily Trips Made by Persons with a Disability	14.8%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	28.8%	18.9%

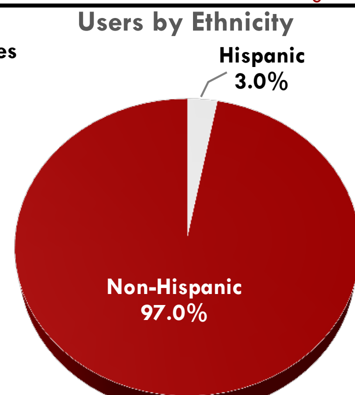
*Percentages in red are higher than the regional average.

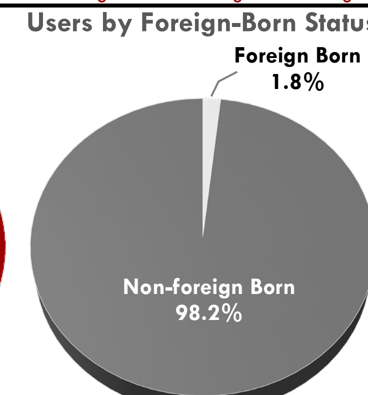
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	Y
Elderly Populations	Y
Female Head of Households	Y
Households Receiving Food Stamps	Y
Households Receiving Cash Public Assistance	Y
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	**7**

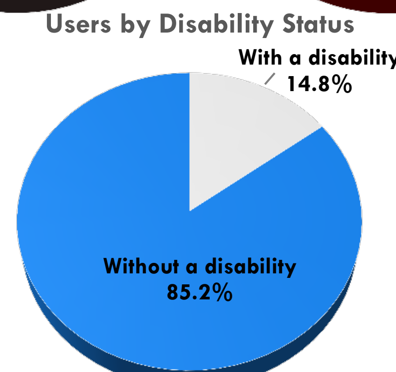
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
8,000	46.3%	No

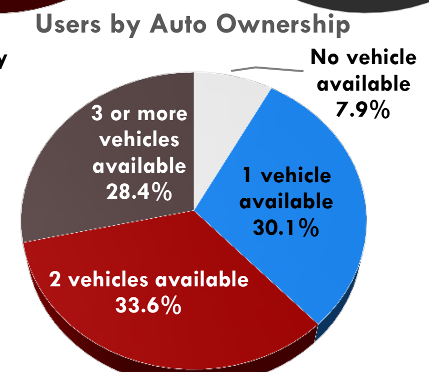












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

INTERSECTION #2 – ARMORY DRIVE AT COLLEGE DRIVE

FRANKLIN

HAMPTON ROADS REGIONAL SAFETY STUDY SURVEY RESPONSES

TOTAL SURVEY RESPONSES FOR INTERSECTION: **0**

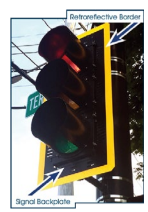
INTERSECTION #2 – ARMORY DRIVE AT COLLEGE DRIVE
FRANKLIN

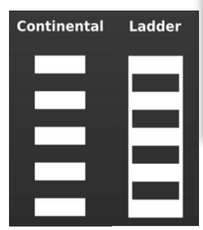
SITE OBSERVATIONS & POSSIBLE CAUSES

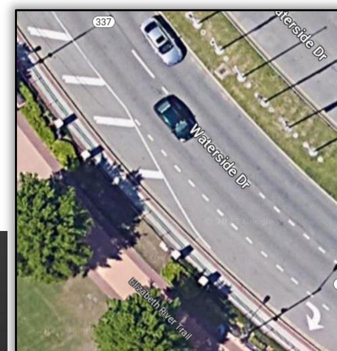
1) Worn pavement markings.
2) Worn pedestrian crossing markings.
3) Split phase signal timings on NB/SB College Dr.
4) Left turns are protected/permitted on EB/WB Armory Dr using 5-section signal heads.
5) There is no Right Lane Must Turn Right sign on EB Armory Dr.
6) EB left turn sight distance is an issue due to opposing left turns.
7) Check NB left turn volumes – may be able to improve lane usage.
8) There are no traffic signal backplates with retroreflective borders for any signal heads.
9) 21.4% of crashes occurred during Mist/Rain/Fog.

CANDIDATE CRASH COUNTERMEASURES

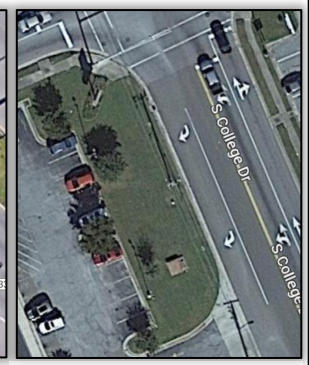
- Recheck/optimize signal timings, especially for left turns (CMF=0.91). Check NB left turn volumes – may be able to improve lane usage.
- Add flashing left turn yellow arrow signals on EB and WB Armory Dr with Left Turn YIELD on Flashing signs, which would require replacing 5-section heads with 4-section Flashing Yellow Arrow signal heads (CMF=0.857, Left turn only).
- Consider protected left turns for Armory Drive approaches (CMF=0.01, Angle only) if it doesn't cause queuing.
- Consider adding 4-foot raised median along Armory Drive to the west of the intersection (CMF=0.697).
- Remove 1st driveway for Sunoco (closest to intersection) or designate driveway as Right-in Right-out only (CMF=0.70).
- Replace pedestrian crossings with high visibility continental or ladder crossings (CMF=0.63, Veh-ped only).
- Add pedestrian pushbuttons and signals (CMF=0.85).
- Repaint pavement markings (stop bars, arrows) and pedestrian crossing markings (CMF=NA).
- Add hatching on SB leg to distinguish right turn deceleration lane and direct vehicles into the through lane (see Norfolk Waterside example and aerial photo of SB leg) (CMF=NA). Could also consider a bulb-out, which would shorten the pedestrian crossing.
- Add Right Lane Must Turn Right signs on EB Armory Dr (CMF=0.85).
- Install Traffic Signal Backplates with Retroreflective Borders (CMF=0.74, Nighttime only).







Norfolk Waterside example



Southbound leg right turn lane

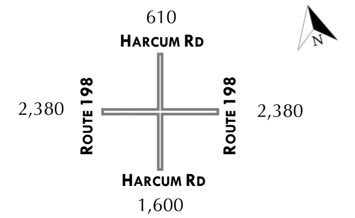
Intersection #3 – Route 198 at Route 606 (Harcum Road)

Gloucester County

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Two-way Stop for Route 606 (Harcum Rd) approaches

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	1	0	1	0	0	0.4
B. Visible Injury	2	0	1	0	0	0.6
C. Nonvisible Injury	0	0	0	0	0	0
PDO. Property Damage Only	0	0	0	1	0	0.2
TOTAL	3	0	2	1	0	1.2
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

Crash Levels and Ranking

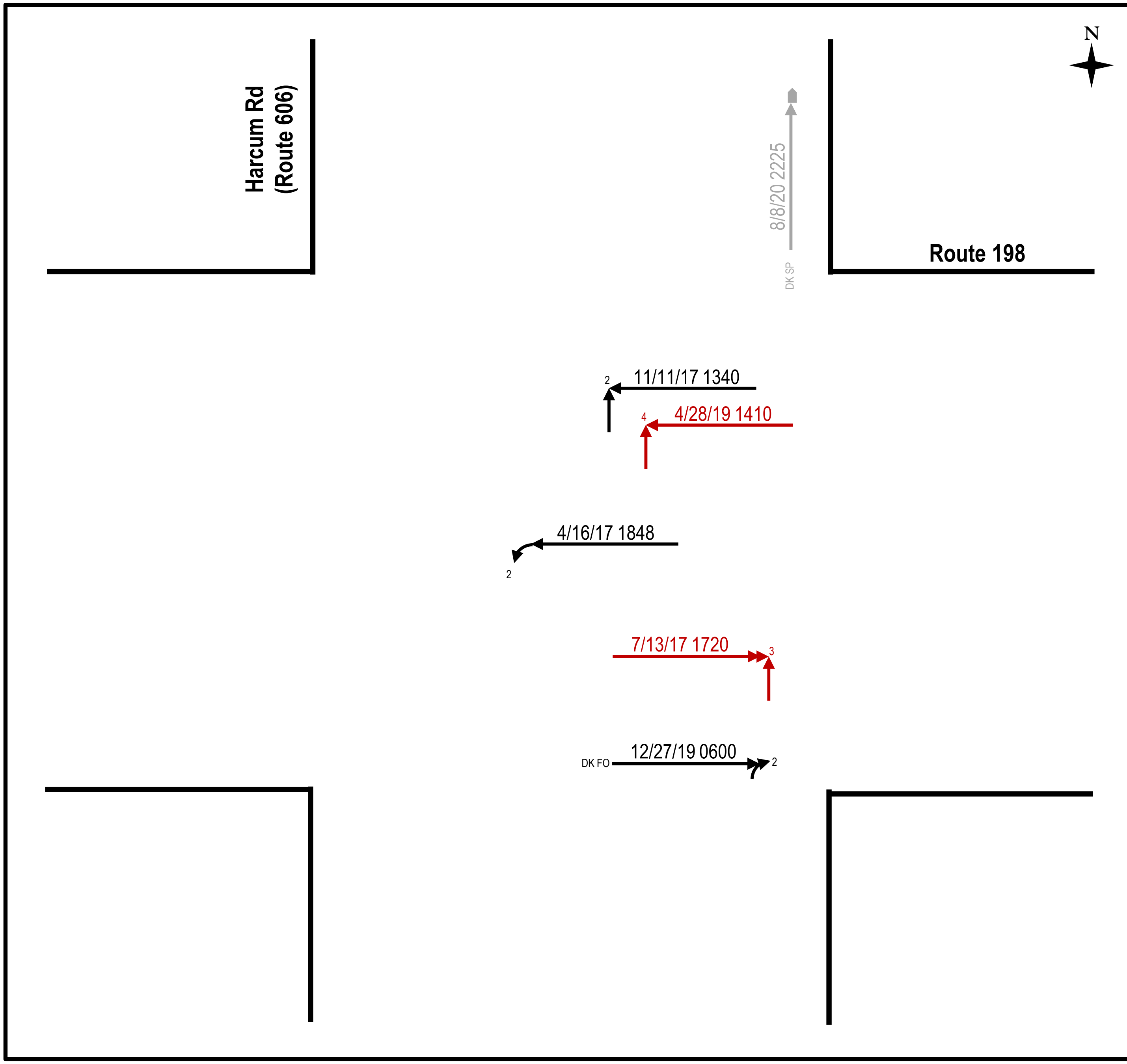
	2017 - 2021	Locality Rank (26 intersections)
Total Crashes	6	20
Crash Rate per 100 Million Entering Vehicles	94.34	2
Total Fatal and Serious Injury Crashes	2	7
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	31.45	2

Locality Rank for Potential for Safety Improvement = NA

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.

COLLISION DIAGRAM
Gloucester County
Route 198 at Route 606 (Harcum Rd)



LEGEND

Crash Date — Crash Time of Day — DI DK 10/4/2019 2140 1 — # of Injuries

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

Number of arrowheads represents the total vehicles involved in the crash

Crash Severity
- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type
- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #3 – Route 198 at Route 606 (Harcum Road)
Gloucester County

Crash Data Analysis

Collision Type

Collision Type	Route 198 at Route 606 (Harcum Rd)	All Safety Study Intersections
Right Angle	83.3%	39.0%
Rear End	0.0%	37.6%
Head On	0.0%	2.9%
Sideswipe - Same Direction	0.0%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	16.7%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	0.0%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Route 198 at Route 606 (Harcum Rd)	All Safety Study Intersections
Did not have right-of-way	66.7%	17.9%
Fail to Maintain Proper Control	16.7%	8.5%
Other Improper Passing	16.7%	1.0%

Weather

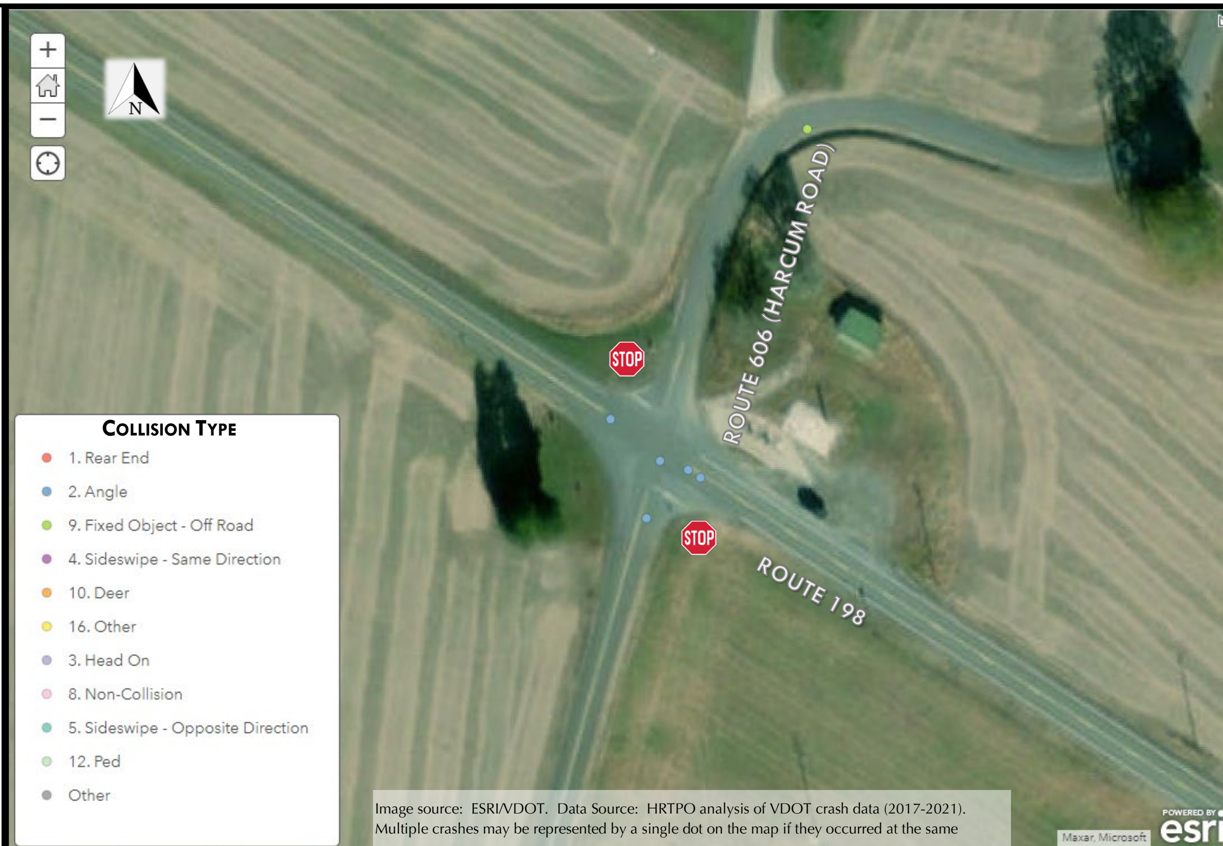
Weather	Route 198 at Route 606 (Harcum Rd)	All Safety Study Intersections
Clear/Cloudy	83.3%	84.6%
Mist/Rain/Fog	16.7%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Route 198 at Route 606 (Harcum Rd)	All Safety Study Intersections
Alcohol Involved	16.7%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	0.0%	19.5%
Speeding	16.7%	7.9%
Unbelted	0.0%	2.6%
Nighttime	33.3%	26.1%

Five-Year Total Crashes (2017-2021): 6

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.



Crash Data Observations

- 83.3% of crashes were Right Angle, which was higher than the regional average of 39.0%.
- 16.7% of crashes were Fixed Object – Off Road, which as higher than the regional average of 4.8%.
- 66.7% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
- 16.7% of crashes involved alcohol, which was higher than the regional average of 5.2%.
- 16.7% of crashes involved speeding, which was higher than the regional average of 7.9%.
- 33.3% of crashes occurred during nighttime, which was higher than the regional average of 26.1%.

INTERSECTION #3 – ROUTE 198 AT ROUTE 606 (HARCUM ROAD)
GLOUCESTER COUNTY

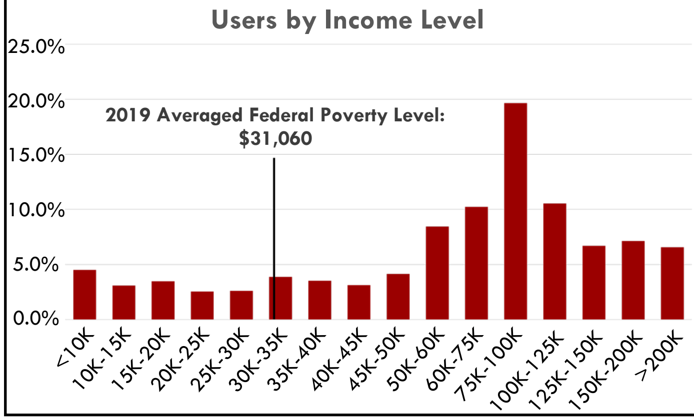
EQUITY ANALYSIS

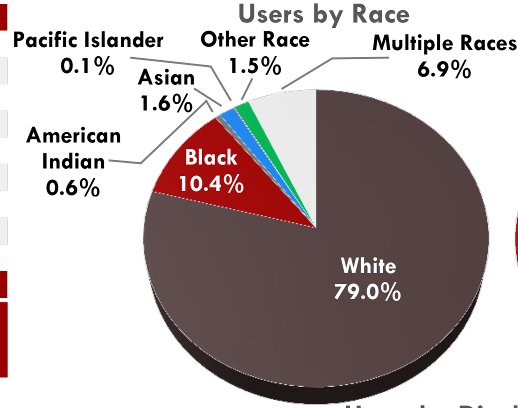
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	21.0%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	4.0%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	3.6%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	1.2%	3.1%
Average Daily Trips Made by Persons with a Disability	15.8%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	16.2%	18.9%

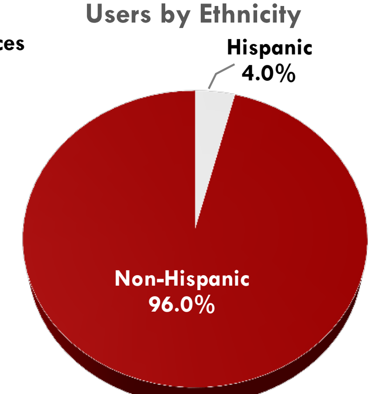
*Percentages in red are higher than the regional average.

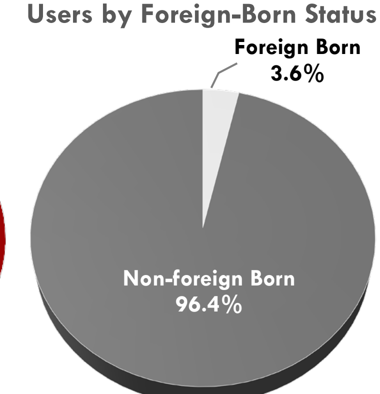
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	Y
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	**2**

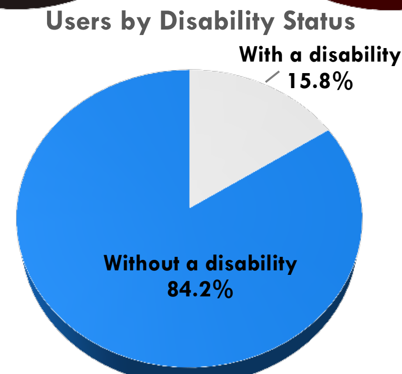
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
37,400	26.2%	No

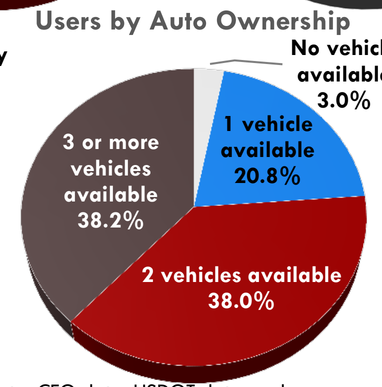












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #3 – Route 198 at Route 606 (Harcum Road)

Gloucester County

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: **0**

INTERSECTION #3 – ROUTE 198 AT ROUTE 606 (HARCUM ROAD)

GLOUCESTER COUNTY

SITE OBSERVATIONS & POSSIBLE CAUSES

1. Stop bars pavement markings are worn for Route 606 (Harcum Road) approaches.
2. High speeds (55 mph+) along Route 198.
3. Stop ahead sign for southbound Route 606 (Harcum Road) is too far back from the intersection.
4. The crops in the fields in season may block sight distance for turning vehicles at both Route 606 (Harcum Road) northbound and southbound approaches.
5. There are no turn bays at the intersection.
6. No intersection lighting currently.
7. 83.3% of crashes were Right Angle, which was higher than the regional average of 39.0%.
8. 16.7% of crashes involved alcohol, which was higher than the regional average of 5.2%.
9. 16.7% of crashes involved speeding, which was higher than the regional average of 7.9%.
10. 33.3% of crashes occurred during nighttime, which was higher than the regional average of 26.1%.

CANDIDATE CRASH COUNTERMEASURES

- Replace Stop Signs for both Route 606 (Harcum Road) approaches with retroreflective panel and strip on sign support pole (CMF=0.909). Consider adding a 2nd Stop Sign on the left side of the road (CMF=0.899).
- Repaint stop bars for Route 606 (Harcum Road) approaches (CMF=0.899).
- Consider moving stop ahead sign closer to the intersection for southbound Route 606 (Harcum Road) (CMF=NA).
- Consider adding intersection lighting (CMF=0.881, Nighttime only).
- Consider adding right turn and/or left turn bays along Route 198 (CMF=0.925).
- Add intersection ahead signs for both eastbound and westbound approaches of Route 198 (CMF=0.899).
- Educate drivers about the dangers of driving while intoxicated and increase enforcement on speeding (CMF=NA).

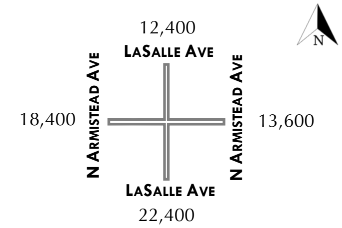
Intersection #4 – N Armistead Avenue at LaSalle Avenue

Hampton

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Signalized
Protected/Permitted phasing for Armistead Ave left turns
Split phasing for LaSalle Avenue approaches

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	3	3	1	0	1	1.6
B. Visible Injury	0	1	2	0	2	1
C. Nonvisible Injury	13	15	13	14	25	16
PDO. Property Damage Only	11	11	8	6	9	9
TOTAL	27	30	24	20	37	27.6
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

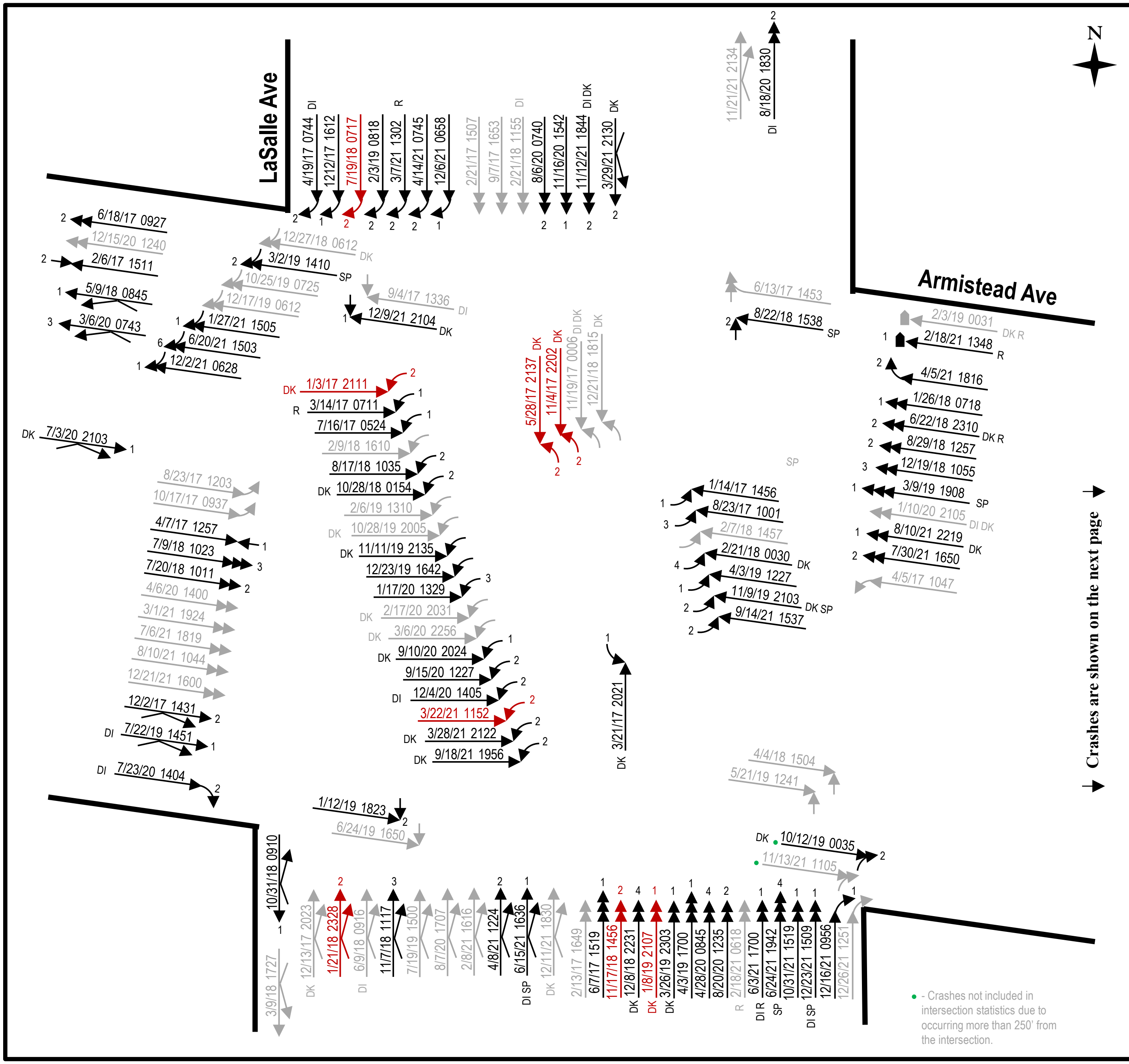
Crash Levels and Ranking

	2017 - 2021	Locality Rank (86 intersections)
Total Crashes	138	7
Crash Rate per 100 Million Entering Vehicles	226.40	1
Total Fatal and Serious Injury Crashes	8	14
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	13.12	26

Locality Rank for Potential for Safety Improvement = 6

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

City of Hampton
Armistead Ave at LaSalle Ave

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
- AL – Alcohol Use
- DI - Distracted
- DK – Darkness
- FO – Fixed Object
- R – Rain
- SN - Snow
- SP - Speed
- UB – Unbelted

# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

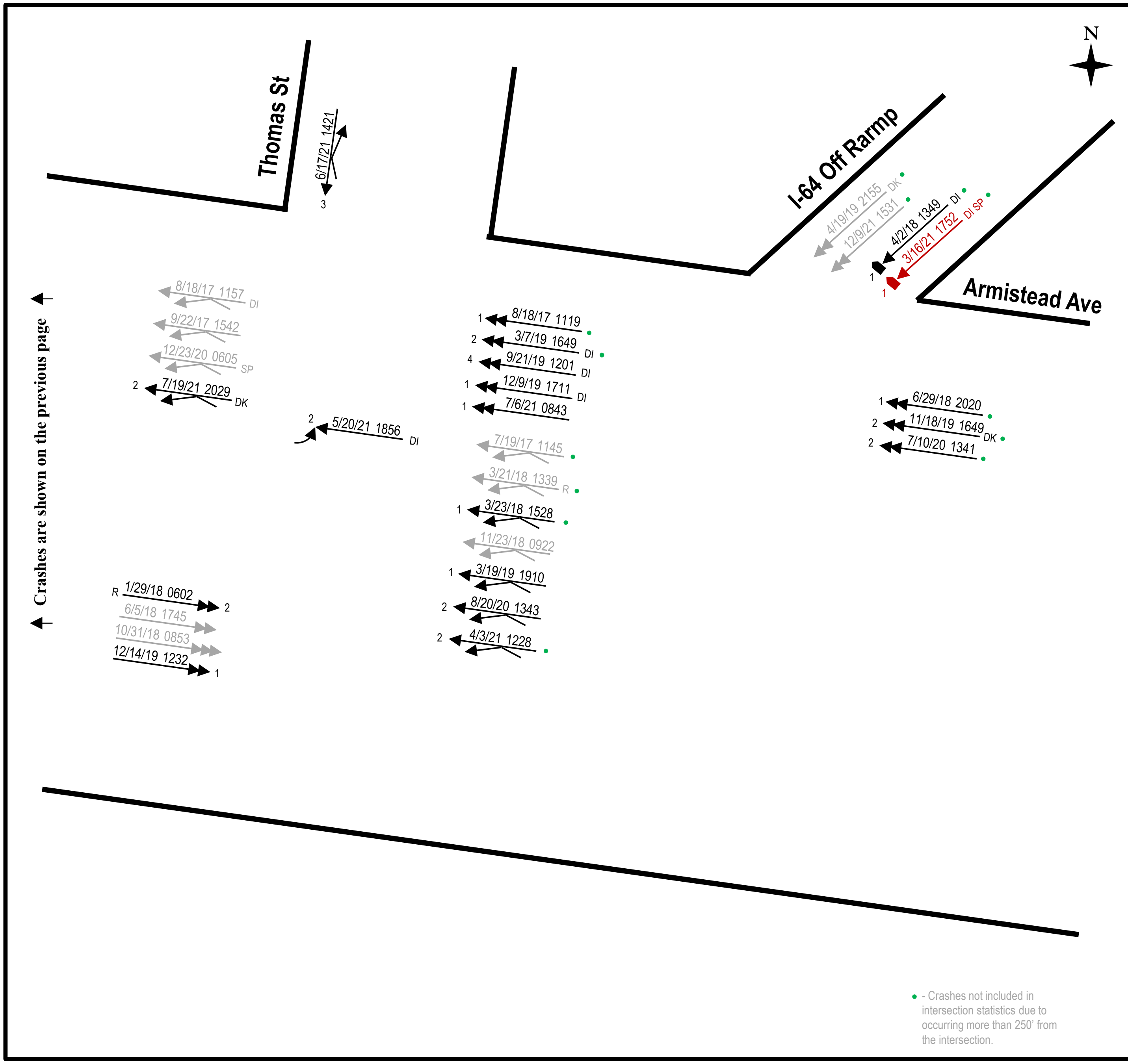
Crash Severity

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

City of Hampton
Armistead Ave at LaSalle Ave

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
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- Fatality (K)
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Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

INTERSECTION #4 – N ARMISTEAD AVENUE AT LASALLE AVENUE
HAMPTON

CRASH DATA ANALYSIS

COLLISION TYPE

Collision Type	N Armistead Ave at LaSalle Ave	All Safety Study Intersections
Right Angle	33.3%	39.0%
Rear End	39.9%	37.6%
Head On	3.6%	2.9%
Sideswipe - Same Direction	14.5%	8.2%
Sideswipe - Opposite Direction	1.4%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	1.4%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	5.8%	4.3%

MOST PREVALENT DRIVER ACTION

Primary Driver Action	N Armistead Ave at LaSalle Ave	All Safety Study Intersections
Following Too Close	29.0%	28.1%
Did Not Have Right-of-Way	24.6%	17.9%
Improper or Unsafe Lane Change	10.9%	6.0%
Hit and Run	7.2%	3.4%
Disregarded Traffic Signal	5.1%	12.1%

WEATHER

Weather	N Armistead Ave at LaSalle Ave	All Safety Study Intersections
Clear/Cloudy	94.2%	84.6%
Mist/Rain/Fog	5.8%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

OTHER CONTRIBUTING FACTORS

Other Contributing Factors	N Armistead Ave at LaSalle Ave	All Safety Study Intersections
Alcohol Involved	0.7%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	15.9%	19.5%
Speeding	5.8%	7.9%
Unbelted	0.0%	2.6%
Nighttime	24.6%	26.1%

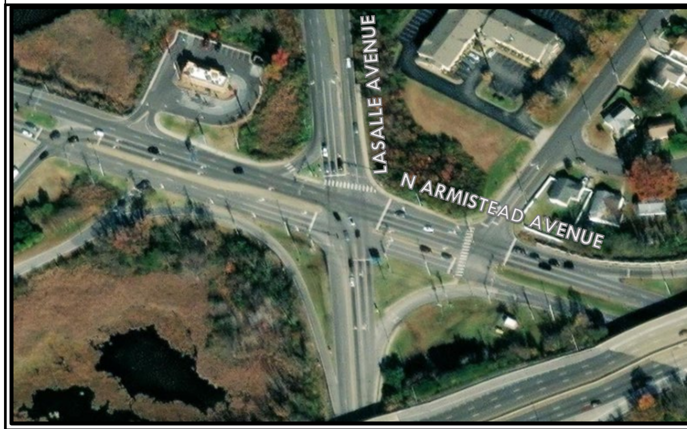
Five-Year Total Crashes (2017-2021): 138

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

CRASH DATA OBSERVATIONS

- Higher percentage of Sideswipe – Same Direction crashes (14.5%) compared to the regional average of 8.2%.
- 24.6% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
- 10.9% of crashes resulted from improper or unsafe lane change, which was higher than the regional average of 6.0%.
- 7.2% of crashes were hit and run, which was higher than the regional average of 3.4%.

INTERSECTION #4 – N ARMISTEAD AVENUE AT LASALLE AVENUE
HAMPTON



EQUITY ANALYSIS

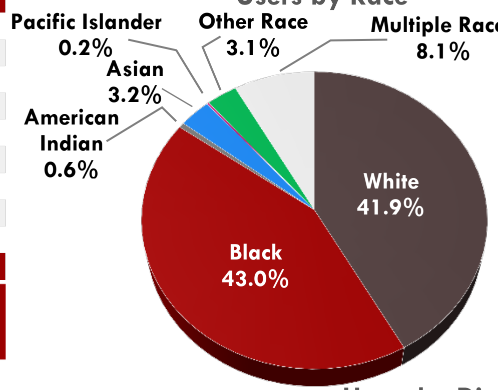
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	58.1%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	7.6%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	5.8%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	2.7%	3.1%
Average Daily Trips Made by Persons with a Disability	14.5%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	25.2%	18.9%

*Percentages in red are higher than the regional average.

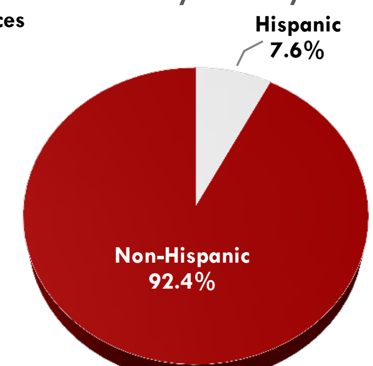
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	Y
Elderly Populations	N
Female Head of Households	Y
Households Receiving Food Stamps	Y
Households Receiving Cash Public Assistance	Y
Limited English Proficiency Populations	N
Low-Income Households	Y
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	7

Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
135,200	26.4%	Yes

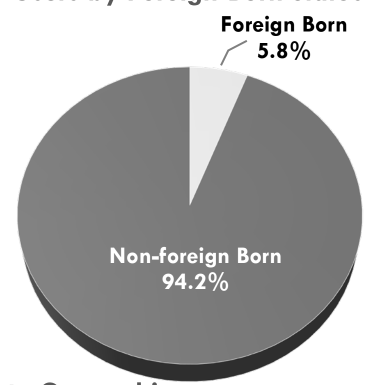
Users by Race



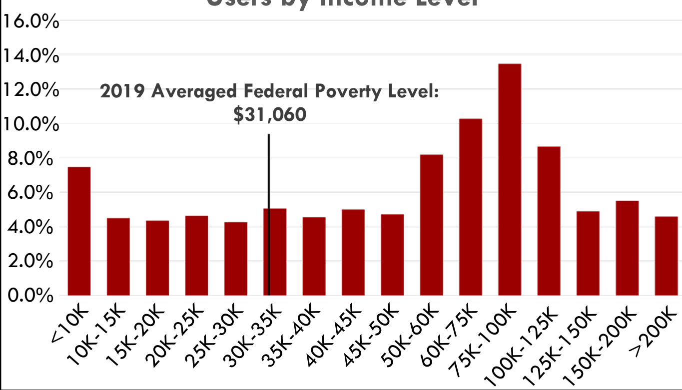
Users by Ethnicity



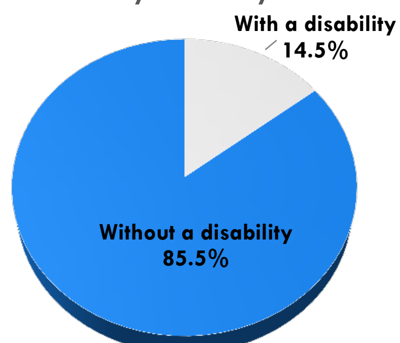
Users by Foreign-Born Status



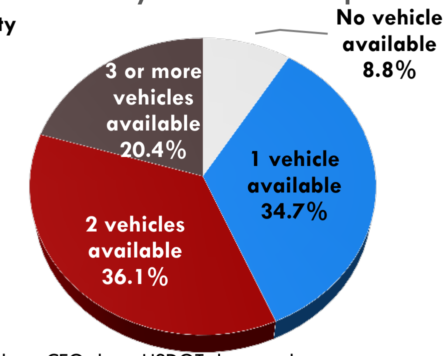
Users by Income Level



Users by Disability Status



Users by Auto Ownership



Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #4 – N Armistead Avenue at LaSalle Avenue
Hampton

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: **18**

Have you felt unsafe traveling through this intersection? Please elaborate:

- Yes – “Too much going on. Southbound Lasalle has to get left immediately after light to turn on Thomas St. Traffic from base on Lasalle crossing multiple lanes to get on 64 West. Coming off highway onto NB Lasalle near Thomas St also very dangerous for motorists turning onto Thomas St.”
- Yes – “Poor design getting on interstate.”
- Yes – “I see accidents here all the time. drivers coming off the ramp from 64 onto armistead who should stop at thomas are unaware of the light there. additionally, people run both these lights all the time. drivers coming off thomas onto armistead cannot see around to the left. people run lights and it is very dangerous.”
- Yes – “People block the intersection and run stoplights”
- Yes – “People exiting the expressway are funneled into turning lanes. If they do not want to turn onto LaSalle they will do dangerous things to get over quickly.”
- Yes – “Is sometimes hard to get from the yield sign to the left turn lanes due to traffic backed up almost to the intersection”

What is the safety issue/concern:

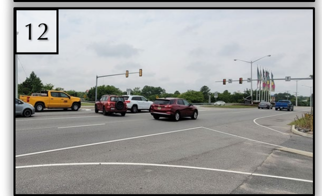
- Confusing intersection design – “Too much going on. Southbound Lasalle has to get left immediately after light to turn on Thomas St. Traffic from base on Lasalle crossing multiple lanes to get on 64 West. Coming off highway onto NB Lasalle near Thomas St also very dangerous for motorists turning onto Thomas St.”
- Confusing intersection design – “People not from the area are often confused by the lights around this interchange. Better signage would help.”
- Confusing intersection design – “Insufficient merge off interstate. No signage on Armistead indicating the inside lane at Thomas is for traffic wanting to get onto W64. Through lane traffic on Armistead [attempt] to [merge] at the ramp light”
- Confusing intersection design
- Intersection is too large – “Cars will block intersection when traffic is high resulting in other vehicles not accessing the light.”
- Speeding
- Insufficient green light provided
- Red light running
- Poor signage – “Hard to tell which lane to be in for which outlet, need to merge too quickly from right to left to get on highway”
- Poor visibility – “The road is poorly designed”
- No sidewalk/path – “Need actual shoulders / sidewalk to make any pedestrians / bicyclists just a little bit safer.”

INTERSECTION #4 – N ARMISTEAD AVENUE AT LASALLE AVENUE
HAMPTON

SITE OBSERVATIONS & POSSIBLE CAUSES

1) Left turns on Armistead Ave approaches are controlled by protected-permissive phasing. NB and SB LaSalle Ave approaches are controlled by split phasing.
2) EB approach has a single right turn lane. WB approach has a right turn and a through/right turn lane. NB and SB approaches have channelized right turn lanes with yield control.
3) There is only 150 feet on Armistead Ave between the signalized intersections with LaSalle Ave and Thomas St. Heavy weave area in WB direction in a short area.
4) Long traffic queues exist for the leftmost NB left turn lane and vehicles are not utilizing the through/left turn lane on NB LaSalle Ave to WB Armistead Ave because of traffic accessing WB I-64 on ramp.
5) Pavement markings on NB LaSalle Ave are worn.
6) Higher than expected pedestrian activity was observed. Worn pathways in grass areas were found from pedestrian movements. There are limited sidewalks and crosswalks at the intersection. Pedestrians were crossing south leg of intersection where there are no crosswalks or sidewalks.
7) There is low visibility of Thomas St signal and no signal ahead signs on the I-64 WB off ramp to WB Armistead Ave. Yield ahead signs installed September 2018.

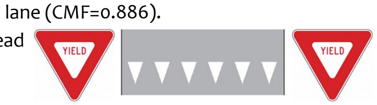
8) Hampton Roads Transit (HRT) bus stops are located just north and west of the intersection.
9) Some traffic signal heads are missing backplates. There are no traffic signal backplates with retroreflective borders for any signal heads in the three intersections.
10) Yield sign on SB LaSalle Ave channelized right turn lane is obstructed by vegetation. Right turn volumes at this location are high.
11) "Left Turn YIELD on Green" (LTYOG) sign on WB Armistead Ave is at street level, while the LTYOG sign on EB Armistead Ave is on the mast arm next to the signal head.
12) Painted triangle pavement markings do not restrict exiting vehicles from Burger King and entering WB left turn lane to I-64 ramp and blocking vehicles in through lanes.
13) Vegetation is blocking signage along WB N Armistead Ave between Thomas St and LaSalle Ave.
14) The left lane on WB Armistead Ave becomes a left turn only lane at the I-64 WB on ramp. There are no warning signs.



CANDIDATE CRASH COUNTERMEASURES

- Extend Patrick St from Thomas St to LaSalle Ave (north of Super 8) as shown in the picture to the right. Restrict turn movements to right in/right out at Thomas St and remove traffic signal (CMF=0.55).
- Repaint pavement markings including crosswalk for NB LaSalle Ave (CMF=NA).
- Replace all "Left Turn YIELD on Green" signs with "Left Turn YIELD on Flashing" signs on signal mast arms, which would require replacing 5-section heads with 4-section Flashing Yellow Arrow signal heads (CMF=0.857, Left turn only).
- Eliminate I-64W exit 265B ramp (Rte 134 west), direct all I-64 exiting traffic (Rte 134 east & west) to exit 265A ramp, keep continuous free flow lane from I-64 exit 265A ramp to SB LaSalle Ave, split/realign I-64 exit 265A ramp to the current signalized intersection just west of the subject intersection (including new dual left and right turn lanes) (CMF=NA).
- Add "Left Lane Must Turn Left" warning signs on EB Armistead Ave that becomes a left turn only at the I-64 WB on ramp (CMF=0.85).

- Add Yield Line (triangles) pavement markings and 2nd yield sign in the grass triangle areas for SB LaSalle Ave channelized right turn lane (CMF=0.886).
- Trim vegetation (SB LaSalle Ave, WB N Armistead Ave, I-64 WB off ramp to WB Armistead Ave) (CMF=NA).



- Install Traffic Signal Backplates with Retroreflective Borders for N Armistead Ave at LaSalle Ave and adjacent intersections (CMF=0.74, Nighttime only).
- Consider adding a right turn bay for NB LaSalle Ave prior to channelized right turn lane (CMF=0.85).
- Add raised curb triangle for Burger King driveway to improve safety for entering and exiting vehicles (CMF=NA).
- Add signal ahead signs on the I-64 WB off ramp to WB Armistead Ave (CMF=0.65, Angle only).
- Optimize signal timing at intersection and adjacent intersections (CMF=0.91).
- Add dotted lane line extensions for NB and SB LaSalle Ave to keep left turning vehicles in the correct lane (CMF=0.90).
- Add interstate route shields and "ONLY" pavement markings to innermost WB thru lane on N Armistead Ave and innermost NB left-turn lane on LaSalle Ave (CMF=NA).

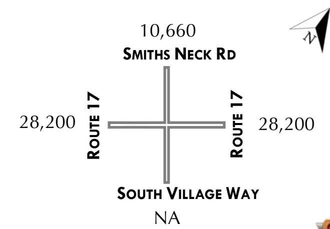
Intersection #5 – Route 17 (Carrollton Boulevard) at Smiths Neck Road

Isle of Wight County

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Signalized
Protected phasing for Carrollton Blvd NB left turns
Protected/Permitted phasing for Carrollton Blvd SB left turns
Split phasing for Smiths Neck approaches

Crash Data

Annual Crashes by Year*

Crash Severity	Year					
	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	4	1	2	1	0	1.6
B. Visible Injury	4	7	1	2	1	3
C. Nonvisible Injury	0	0	0	0	1	0.2
PDO. Property Damage Only	8	3	8	2	9	6
TOTAL	16	11	11	5	11	10.8
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	1	0	0	0.2

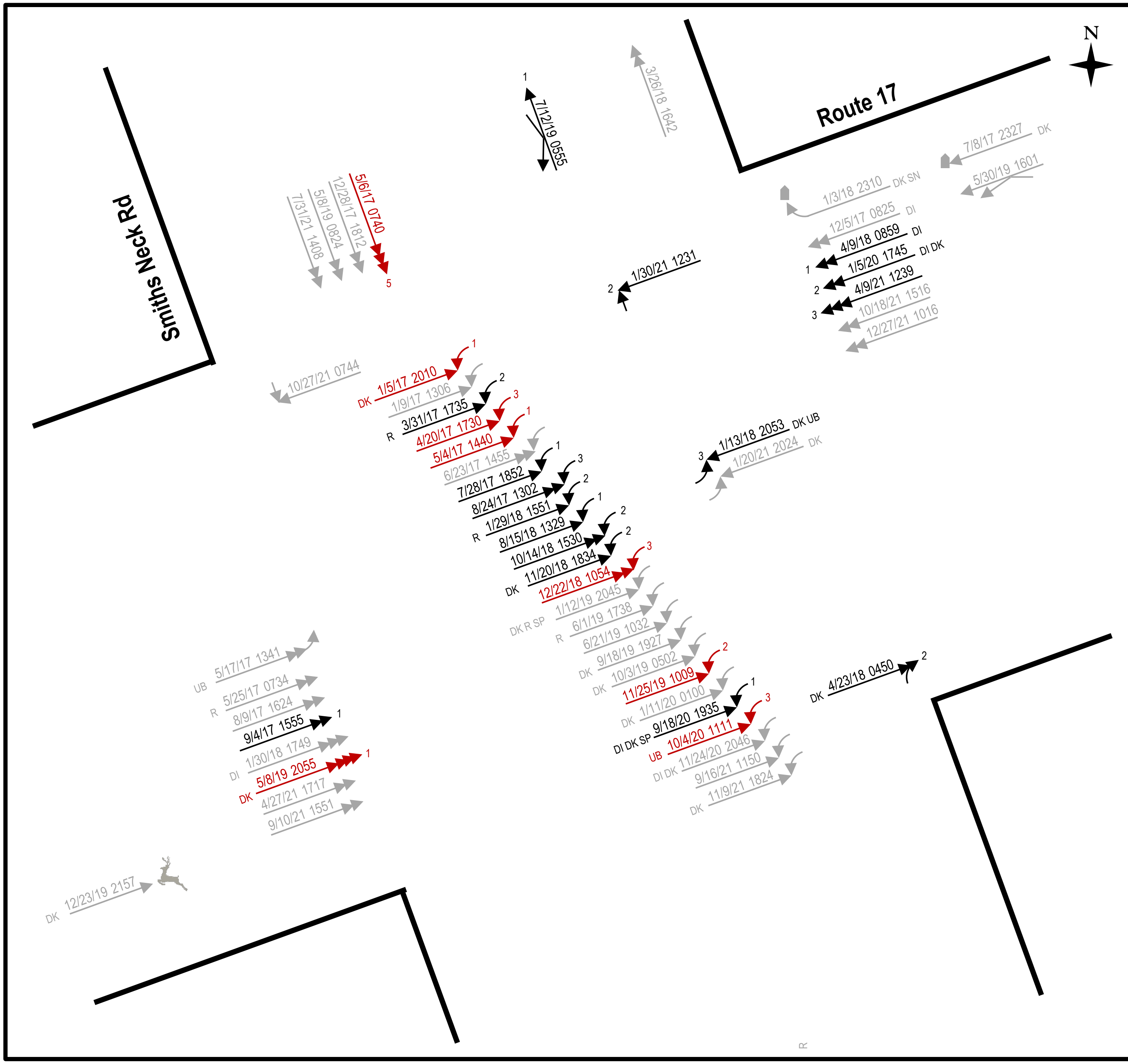
Crash Levels and Ranking

	2017 - 2021	Locality Rank (24 intersections)
Total Crashes	54	1
Crash Rate per 100 Million Entering Vehicles	88.25	6
Total Fatal and Serious Injury Crashes	8	1
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	13.07	3

Locality Rank for Potential for Safety Improvement = 1

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

Isle of Wight County
Route 17 at Smiths Neck Rd

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

\# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

Crash Severity

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

INTERSECTION #5 – ROUTE 17 (CARROLLTON BOULEVARD) AT SMITHS NECK ROAD

ISLE OF WIGHT COUNTY

CRASH DATA ANALYSIS

COLLISION TYPE

Collision Type	Route 17 at Smiths Neck Road	All Safety Study Intersections
Right Angle	37.0%	39.0%
Rear End	35.2%	37.6%
Head On	11.1%	2.9%
Sideswipe - Same Direction	3.7%	8.2%
Sideswipe - Opposite Direction	1.9%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	1.9%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	1.9%	0.3%
Other	7.4%	4.3%

MOST PREVALENT DRIVER ACTION

Primary Driver Action	Route 17 at Smiths Neck Road	All Safety Study Intersections
Did Not Have Right-of-Way	37.0%	17.9%
Following Too Close	22.2%	28.1%
Other	9.3%	5.8%
Fail to Maintain Proper Control	7.4%	6.6%
Other Improper Turn	7.4%	2.3%

WEATHER

Weather	Route 17 at Smiths Neck Road	All Safety Study Intersections
Clear/Cloudy	88.9%	84.6%
Mist/Rain/Fog	9.3%	14.9%
Snow/Sleet	1.9%	0.4%
Other/Not Stated	0.0%	0.1%

OTHER CONTRIBUTING FACTORS

Other Contributing Factors	Route 17 at Smiths Neck Road	All Safety Study Intersections
Alcohol Involved	3.7%	5.2%
Drug Use Involved	1.9%	0.6%
Distracted Driving	11.1%	19.5%
Speeding	5.6%	7.9%
Unbelted	3.7%	2.6%
Nighttime	22.2%	26.1%

Five-Year Total Crashes (2017-2021): 54

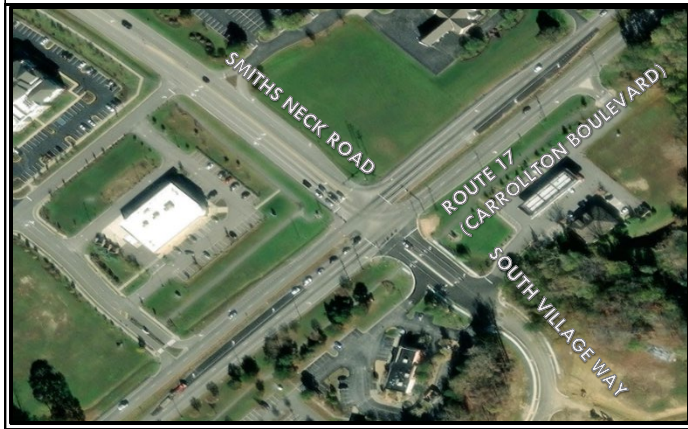
Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

CRASH DATA OBSERVATIONS

- High number of Route 17 (Carrollton Blvd) southbound left turn crashes.
- Higher number of head on crashes (11.1%), which was higher than the regional average of 2.9%.
- 37.0% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.

HAMPTON ROADS TPO

Intersection #5 – Route 17 (Carrollton Boulevard) at Smiths Neck Road
Isle of Wight County



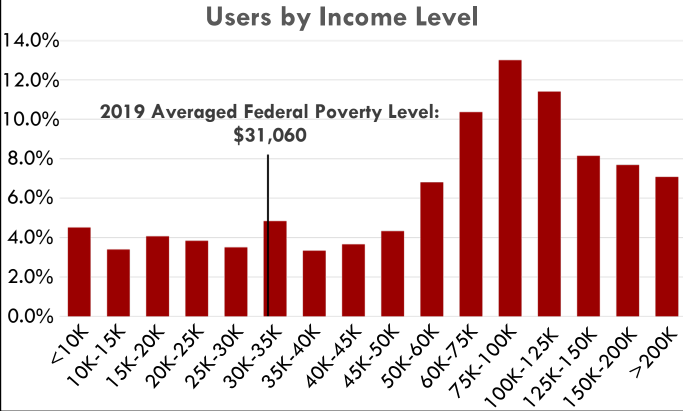
Equity Analysis

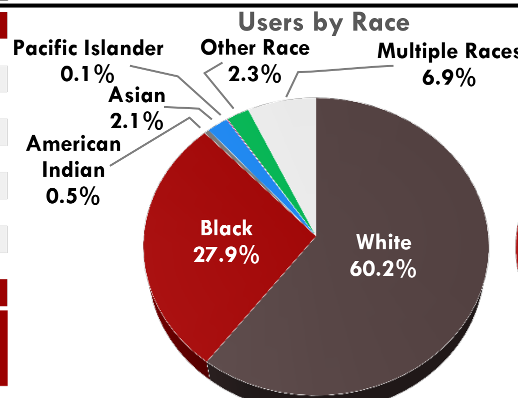
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	39.8%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	5.7%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	4.7%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	2.3%	3.1%
Average Daily Trips Made by Persons with a Disability	14.4%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	19.3%	18.9%

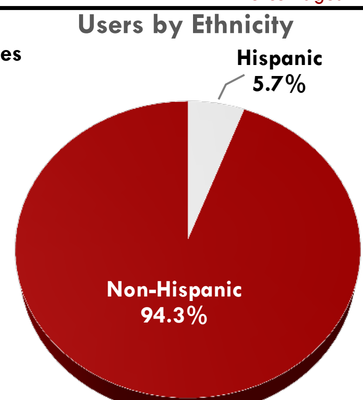
*Percentages in red are higher than the regional average.

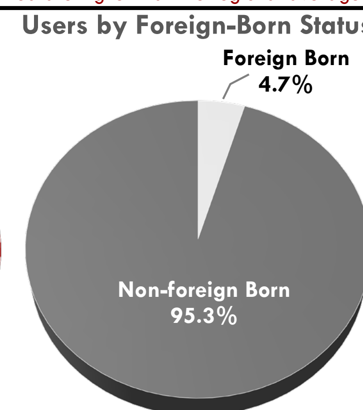
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	N
Elderly Populations	N
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	**0**

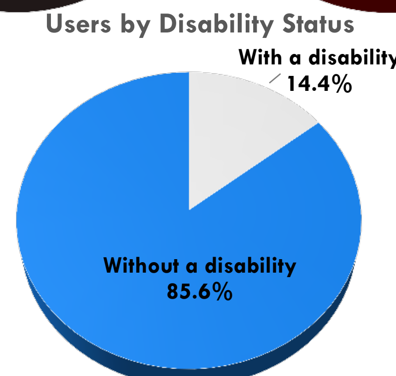
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
37,100	56.6%	No

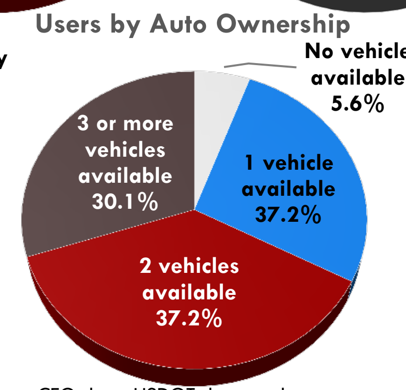












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

INTERSECTION #5 – ROUTE 17 (CARROLLTON BOULEVARD) AT SMITHS NECK ROAD

ISLE OF WIGHT COUNTY

HAMPTON ROADS REGIONAL SAFETY STUDY SURVEY RESPONSES

TOTAL SURVEY RESPONSES FOR INTERSECTION: **13**

What is the safety issue/concern:

- Poor visibility – “Traffic going south on 17 should not have left yellow arrow option into 7 eleven”
- “Speeding/Drag [Racing especially] at night – Rt 17 north and south”
- Insufficient green light provided – “Right turn lane backs up traffic all the way to the bridge at times – There should be two lanes with a green arrow to turn right here”
- Insufficient green light provided – “The light coordination in front of the dunkin donuts and food lion coming into carrollton from the bridge is ill designed. There is a back up every work day from 3pm - 530pm. The lights need to be configured to be green at the same time to push the flow of afterwork traffic.”
- Insufficient green light provided – “The turn lane is not long enough and the lights are not synchronized. The traffic gets backed up unnecessarily!”
- Confusing intersection design
- Other – “Excessive traffic causing aggressive driving and accidents.”
- Unsafe crossing – “Pedestrian crossing needed here.”
- Unsafe crossing – “No crosswalks for pedestrians to get from Houses/condos/ apartments to nearby shopping centers across 17 and Smiths Neck Rd. Maybe a pedestrian bridge like I've seen in Hampton.”
- Requires bike lane/path – “Need bike lanes to get to the bike trails in Nike Park and Smithfield”

INTERSECTION #5 – ROUTE 17 (CARROLLTON BOULEVARD) AT SMITHS NECK ROAD

ISLE OF WIGHT COUNTY

SITE OBSERVATIONS & POSSIBLE CAUSES

1) New developments are being built on the east leg of intersection. Sidewalks only on this leg.
2) Lighting is in place.
3) Pavement markings (right turn arrow and stop bar) are worn for Carrolton Blvd SB right turn lane.
4) Protected phasing for Carrollton Blvd NB left turns.
5) Protected/Permitted phasing for Carrollton Blvd SB left turns.
6) Split phasing for Smiths Neck approaches.
7) Four section flashing yellow arrow signal with "Left Turn YIELD on Flashing Yellow" sign for Carrolton SB.
8) Offsets for left turn lanes make visibility difficult for Carrollton Blvd SB permissive left turns.
9) Traffic Signal Backplates with Retroreflective Borders are present.
10) There are no Signal Ahead warning signs for any of the approaches.
11) Speed limit on Carrollton Blvd is 55 mph to the south of the intersection and 45 mph to the north.
12) Carrollton Blvd NB and SB left turn lane pavement is relatively new.
13) Multi-use trail on east side along Carrollton Blvd.
14) No pedestrian crosswalks or signals for the intersection.
15) High number of Route 17 (Carrollton Blvd) southbound left turn crashes.
16) Higher number of head on crashes (11.1%).

CANDIDATE CRASH COUNTERMEASURES

- Repaint pavement markings for SB Carrolton Blvd (right turn arrow and stop bar) (CMF=NA).
- Change from Protected/Permitted phasing for Carrollton SB left turns to Protected phasing (CMF=0.01, angle only).
- If keeping Protected/Permitted phasing for Carrollton Blvd SB, fix offsets for left turn lanes for Carrollton Blvd SB and NB approaches by moving to the left into the median so that the sight distance is improved (CMF=0.644).
- Consider using protected only phasing during the peak hours.
- Recheck/optimize signal timing (CMF=0.91).
- Add activated flashing beacon (CMF=0.64, Rear end only) or LED Signal Ahead warning signs for NB and SB Carrollton Blvd (CMF=0.65, Angle only).

- Add high visibility continental pedestrian crosswalks (CMF=0.63, veh-ped only) and signals (CMF=0.92) and connections to nearby multi-use paths/sidewalks.
- Note: There is currently an RSTP Project (UPC 123641) - Route 17 Widening Improvements at Smiths Neck Road. The proposed improvements consist of adding a third travel lane along the southbound lanes of Route 17 between the James River Bridge and the Route 17/Smiths Neck Road intersection. It adds a continuous right turn lane at the Smiths Neck Road intersection. It also provides pedestrian sidewalk connections for gaps in the existing pedestrian network between Eagle Harbor Apartments, the shopping center, and The Nest apartment complex, and the VDOT Park & Ride Lot on Smiths Neck Road. Estimated Start Date: 2028, Estimated Completion Date: 2034
Overall Project Cost: $12,300,000

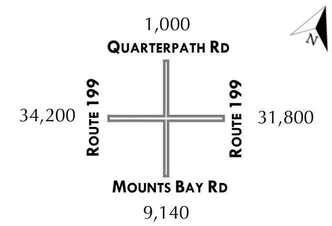
Intersection #6 – Route 199 at Quarterpath Road/Mounts Bay Road

James City County

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Signalized
Protected phasing for all left turns

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	0	0	0	1	0	0.2
B. Visible Injury	1	2	0	0	1	0.8
C. Nonvisible Injury	4	4	3	1	4	3.2
PDO. Property Damage Only	8	3	6	3	9	5.8
TOTAL	13	9	9	5	14	10
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

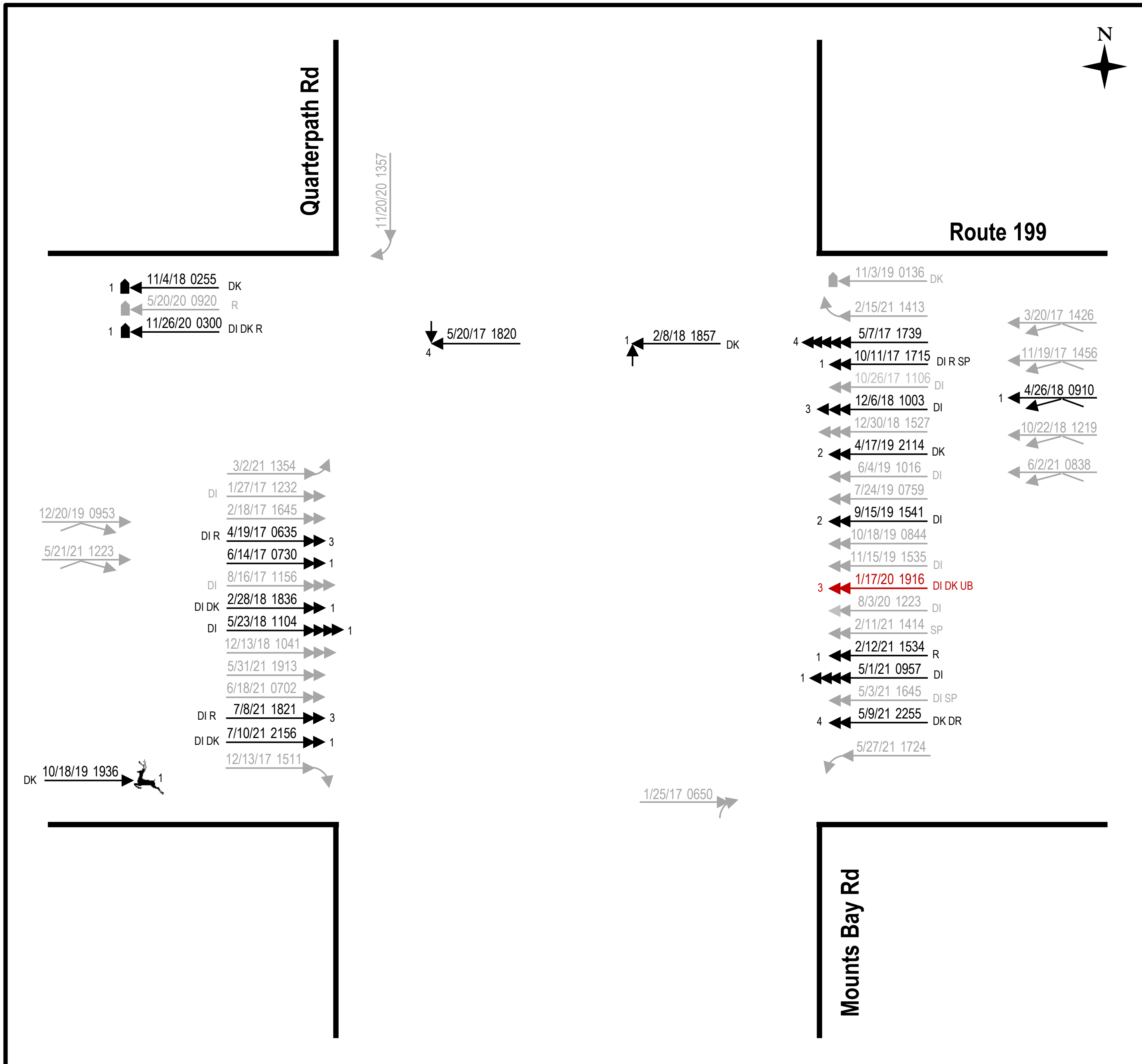
Crash Levels and Ranking

	2017 - 2021	Locality Rank (30 intersections)
Total Crashes	50	3
Crash Rate per 100 Million Entering Vehicles	71.97	9
Total Fatal and Serious Injury Crashes	1	4
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	1.44	10

Locality Rank for Potential for Safety Improvement = NA

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

James City County
Route 199 at Quarterpath Rd/Mounts Bay Rd

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
- AL – Alcohol Use
- DI - Distracted
- DK – Darkness
- FO – Fixed Object
- R – Rain
- SN - Snow
- SP - Speed
- UB – Unbelted

\# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

Crash Severity

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #6 – Route 199 at Quarterpath Road/Mounts Bay Road

James City County

Crash Data Analysis

Collision Type

Collision Type	Route 199 at Mounts Bay Rd	All Safety Study Intersections
Right Angle	14.0%	39.0%
Rear End	66.0%	37.6%
Head On	0.0%	2.9%
Sideswipe - Same Direction	8.0%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	2.0%	0.4%
Fixed Object - Off Road	6.0%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	2.0%	0.3%
Other	2.0%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Route 199 at Mounts Bay Rd	All Safety Study Intersections
Following Too Close	26.0%	28.1%
No Improper Action	16.0%	8.5%
Fail to Maintain Proper Control	10.0%	6.6%
Other	10.0%	5.8%
Improper or Unsafe Lane Change	8.0%	6.0%

Weather

Weather	Route 199 at Mounts Bay Rd	All Safety Study Intersections
Clear/Cloudy	84.0%	84.6%
Mist/Rain/Fog	14.0%	14.9%
Snow/Sleet	2.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Route 199 at Mounts Bay Rd	All Safety Study Intersections
Alcohol Involved	12.0%	5.2%
Drug Use Involved	2.0%	0.6%
Distracted Driving	36.0%	19.5%
Speeding	6.0%	7.9%
Unbelted	4.0%	2.6%
Nighttime	22.0%	26.1%

Five-Year Total Crashes (2017-2021): 50

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Crash Data Observations

- High number of rear end crashes (66%), which was higher than the regional average of 37.6%.
- 26% of drivers were following too close.
- 10% of drivers failed to maintain proper control, which was higher than the regional average of 6.6%
- 12% of crashes involved the use of alcohol, which was higher than the regional average of 5.2%.
- 2% of crashes involved the use of drugs.
- 36% of crashes resulted from distracted driving, which was higher than the regional average of 19.5%.
- 4% of crashes involved people that were not wearing their seatbelts.

INTERSECTION #6 – ROUTE 199 AT QUARTERPATH ROAD/MOUNTS BAY ROAD
JAMES CITY COUNTY

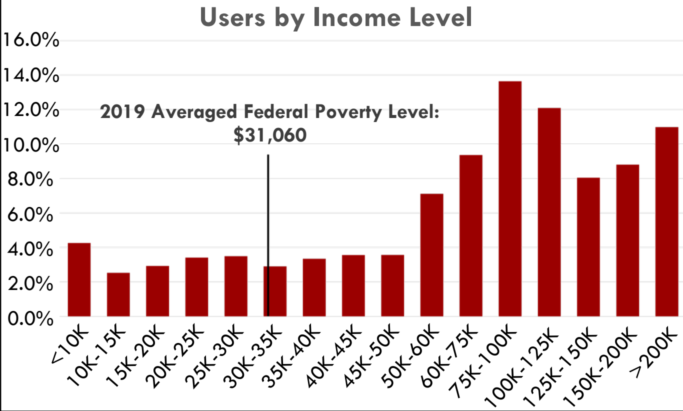
EQUITY ANALYSIS

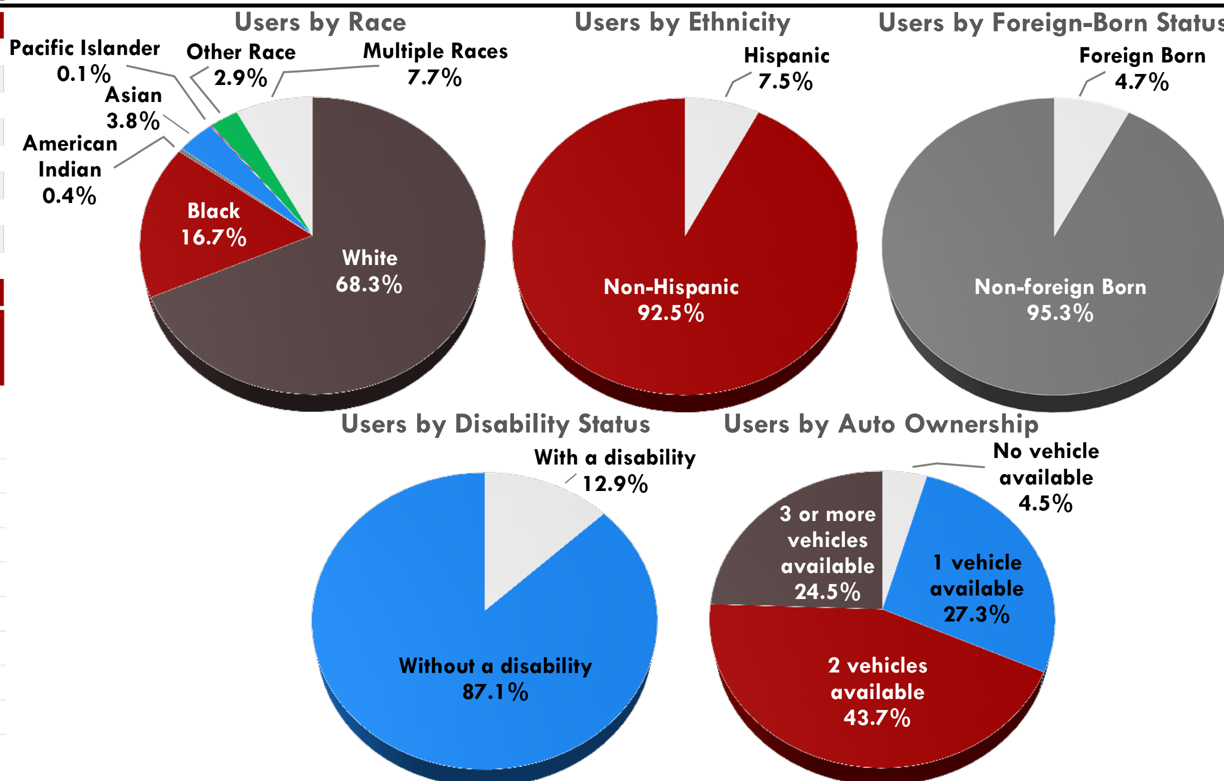
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	31.7%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	7.5%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	7.6%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	3.0%	3.1%
Average Daily Trips Made by Persons with a Disability	12.9%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	16.6%	18.9%

*Percentages in red are higher than the regional average.

HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	Y
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	2

Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
76,000	5.8%	No





Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #6 – Route 199 at Quarterpath Road/Mounts Bay Road
James City County

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: **5**

What is the safety issue/concern:

- Speeding – "TOURIST NOT KNOWING WHERE THEY AE GOING, CARS COMING OUT OF SHOPPING CENTERS TOO FAST."
- Speeding – "Many traffic studies show the reduction of speed saves lives. Reducing the speed on 199 will not only save lives, but it will decrease traffic congestion, reduce time spent in the vehicle, allow everyone to spend more time with families, and reduce the stress that comes with driving. With all the red lights on 199; this need not be treated like a highway, but a local street. Eliminating the slinky will greatly reduce accidents and fatalities on 199."
- Insufficient green light provided – "Takes too long to get through light on 199"
- Other – "High speed allowed in close proximity to stopped cars awaiting left turn"
- No sidewalk/path – "Intersection coming out of kingsmill going to Harris teeter area very dangerous for walkers and bikers need crosswalk"

INTERSECTION #6 – ROUTE 199 AT QUARTERPATH ROAD/MOUNTS BAY ROAD

JAMES CITY COUNTY

SITE OBSERVATIONS & POSSIBLE CAUSES

1. High speed approaches on Route 199 (55 mph speed limit).
2. Lighting only on Quarterpath Road (Williamsburg). No lighting along Route 199. Only one small light for Mounts Bay Road approach.
3. No advance traffic signal ahead warning signs on Route 199 in either direction.
4. Skid marks along Route 199 eastbound approach.
5. Traffic Signal Backplates with Retroreflective Borders are present.
6. High number of rear end crashes (66%), which was higher than the regional average of 37.6%.
7. 10% of drivers failed to maintain proper control, which was higher than the regional average of 6.6%
8. 12% of crashes involved the use of alcohol, which was higher than the regional average of 5.2%.
9. 2% of crashes involved the use of drugs.
10. 36% of crashes resulted from distracted driving, which was higher than the regional average of 19.5%.

CANDIDATE CRASH COUNTERMEASURES

- Add activated flashing beacon (CMF=0.64, Rear end only) or LED Signal Ahead warning signs for eastbound and westbound Route 199 (CMF=0.65, Angle only).
- Add lighting along Route 199. Add more lighting on Mounts Bay Road. (CMF=0.881, Nighttime only)
- Consider reducing Speed Limit from 55 mph to 45 mph along Route 199 approaching the signalized intersection (CMF=0.56 for K/Fatal crashes, CMF=0.78 for A/Severe, B/Visible, & C/Nonvisible injury crashes, and CMF=0.85 for PDO/Property Damage Only crashes).
- Educate drivers about the dangers of alcohol/drug use and distracted driving (CMF=NA).
- Optimize signal timing (CMF=0.91).

Intersection #7 – 39th Street at Roanoke Avenue

Newport News

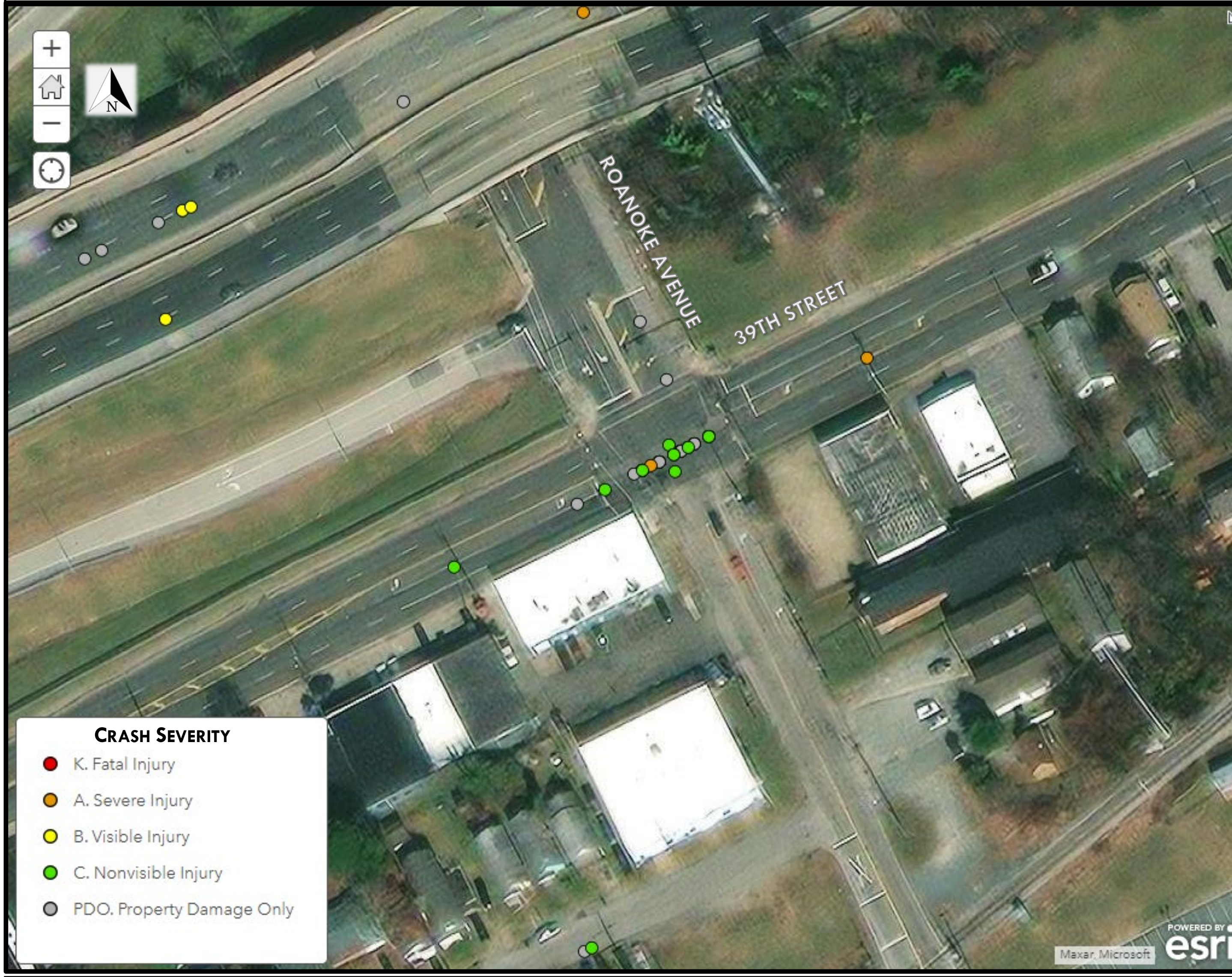


Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes
Five Year Average (2017-2021)

2,180
Roanoke Ave

9,100 39th St — 39th St 9,100

Roanoke Ave
2,180

Intersection Control = Signalized
Protected/Permitted for 39th St left turns
Protected/Permitted for southbound Roanoke Ave left turns
Permitted for northbound Roanoke Ave left turns

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	0	1	1	0	2	0.8
B. Visible Injury	0	0	0	0	1	0.2
C. Nonvisible Injury	6	5	4	2	1	3.6
PDO. Property Damage Only	2	5	3	1	0	2.2
TOTAL	8	11	8	3	4	6.8
Bicycle	0	0	0	0	1	0.2
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

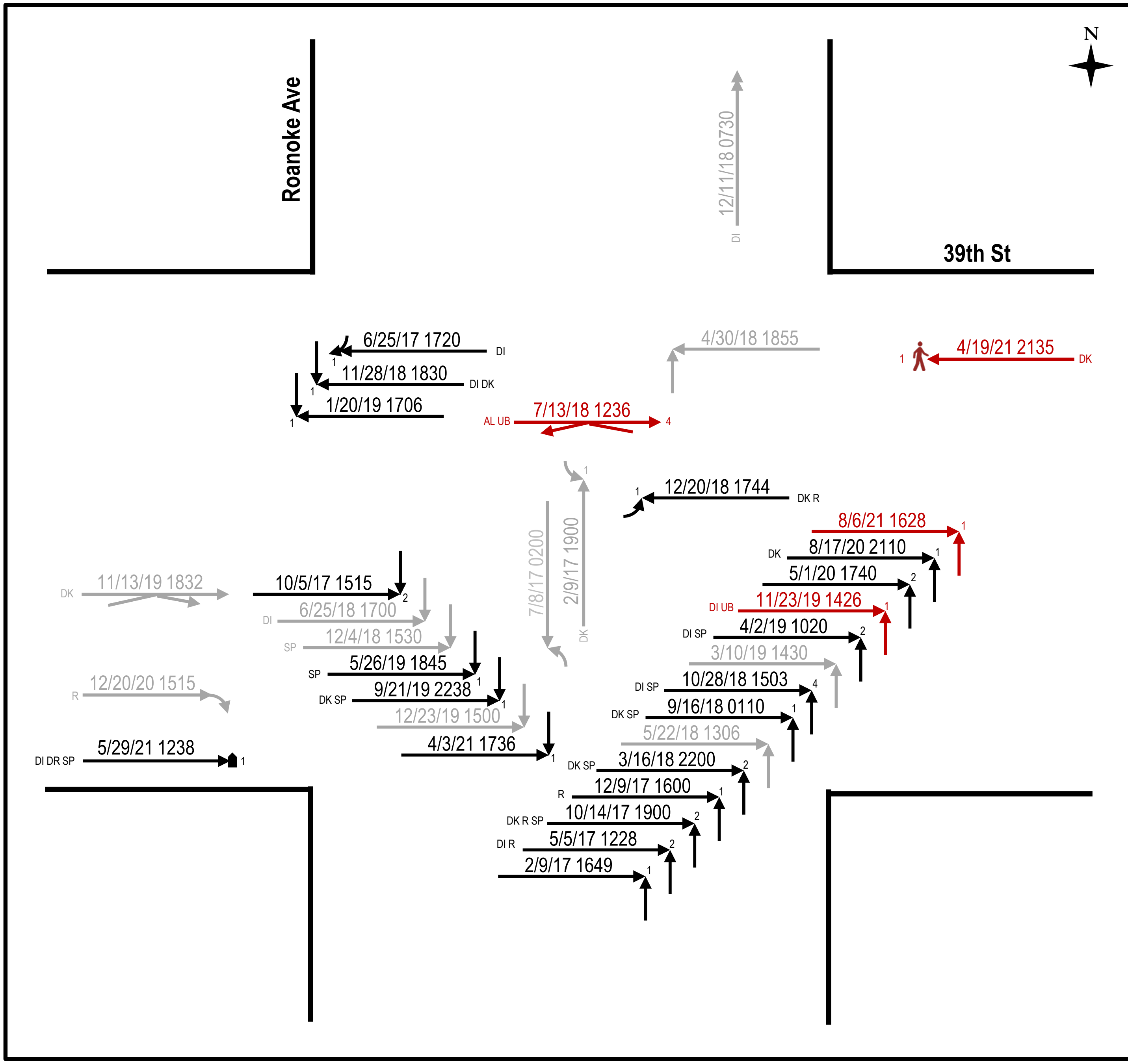
Crash Levels and Ranking

	2017 - 2021	Locality Rank (82 intersections)
Total Crashes	34	32
Crash Rate per 100 Million Entering Vehicles	165.16	3
Total Fatal and Serious Injury Crashes	4	9
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	19.43	2

Locality Rank for Potential for Safety Improvement = 19

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

CITY OF NEWPORT NEWS
39TH ST AT ROANOKE AVE

LEGEND

Crash Date · Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

CRASH SEVERITY

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

COLLISION TYPE

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #7 – 39th Street at Roanoke Avenue
Newport News

Crash Data Analysis

Collision Type

Collision Type	39th Street at Roanoke Avenue	All Safety Study Intersections
Right Angle	85.3%	39.0%
Rear End	5.9%	37.6%
Head On	2.9%	2.9%
Sideswipe - Same Direction	0.0%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	2.9%	4.8%
Bike/Pedestrian	2.9%	1.3%
Animal	0.0%	0.3%
Other	0.0%	4.3%

Most Prevalent Driver Action

Primary Driver Action	39th Street at Roanoke Avenue	All Safety Study Intersections
Disregarded Traffic Signal	52.9%	12.1%
Other	14.7%	5.8%
No Improper Action	11.8%	8.5%
Did Not Have Right-of-Way	8.8%	17.9%
Other Improper Turn	2.9%	2.3%

Weather

Weather	39th Street at Roanoke Avenue	All Safety Study Intersections
Clear/Cloudy	85.3%	84.6%
Mist/Rain/Fog	14.7%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	39th Street at Roanoke Avenue	All Safety Study Intersections
Alcohol Involved	5.9%	5.2%
Drug Use Involved	2.9%	0.6%
Distracted Driving	23.5%	19.5%
Speeding	23.5%	7.9%
Unbelted	5.9%	2.6%
Nighttime	29.4%	26.1%

Five-Year Total Crashes (2017-2021): 34

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021). Multiple crashes may be represented by a single dot on the map if they occurred at the same

Crash Data Observations

- High number of Roanoke Ave northbound right-angle crashes with 39th St eastbound vehicles.
- High number of right-angle crashes (85.3%), which was higher than the regional average of 39.0%.
- 52.9% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
- 23.5% of crashes resulted from distracted driving, which was higher than the regional average of 19.5%.
- 23.5% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
- 5.9% of crashes involved people that were unbelted, which was higher than the regional average of 2.6%.
- 29.4% of crashes occurred during nighttime, which was higher than the regional average of 26.1%.

INTERSECTION #7 – 39TH STREET AT ROANOKE AVENUE
NEWPORT NEWS

EQUITY ANALYSIS

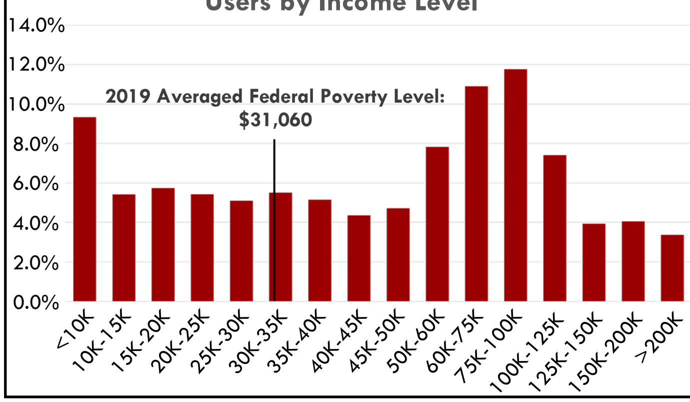
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	67.3%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	6.8%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	4.9%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	2.4%	3.1%
Average Daily Trips Made by Persons with a Disability	16.0%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	31.0%	18.9%

*Percentages in red are higher than the regional average.

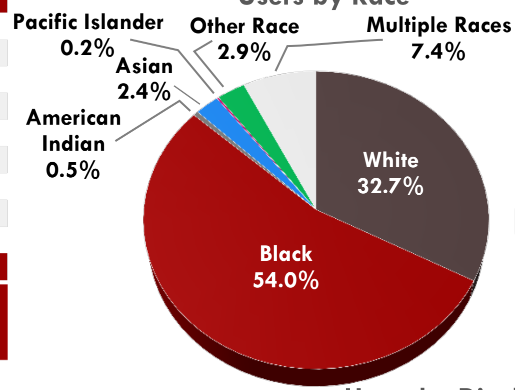
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	Y
Elderly Populations	N
Female Head of Households	Y
Households Receiving Food Stamps	Y
Households Receiving Cash Public Assistance	Y
Limited English Proficiency Populations	N
Low-Income Households	Y
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	7

Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
179,600	45.9%	Yes

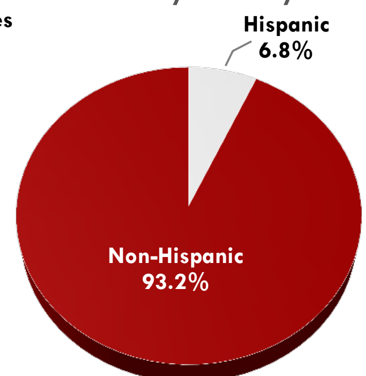
Users by Income Level



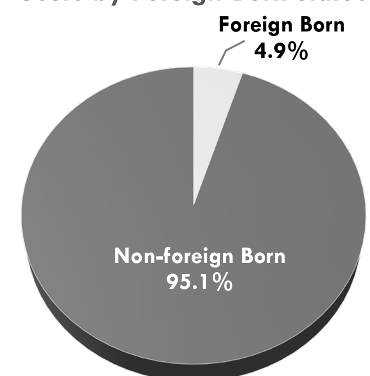
Users by Race



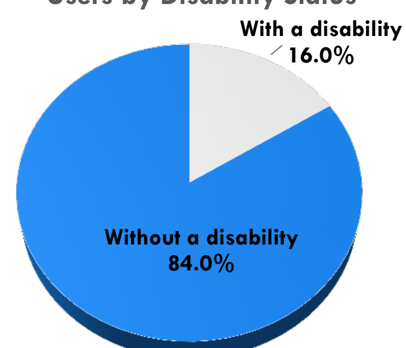
Users by Ethnicity



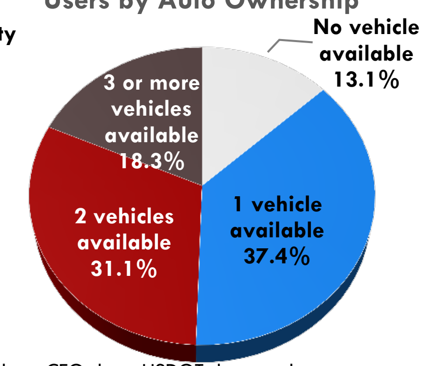
Users by Foreign-Born Status



Users by Disability Status



Users by Auto Ownership



Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #7 – 39th Street at Roanoke Avenue
Newport News

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: 3

What is the safety issue/concern:

- Red light running – "There are 2 traffic lights on Roanoke that drivers are thinking they have the right away."
- Confusing intersection design
- Other – "better turn lanes and overall better visibility"

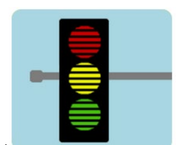
Intersection #7 – 39th Street at Roanoke Avenue
Newport News

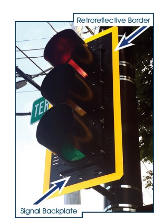
Site Observations & Possible Causes

1. Difficult to see traffic signals behind tall vehicles, especially in SB direction at 39th St.
2. Backups occur along Roanoke Ave between 39th St and I-664 ramp. Vehicles have short queue storage between signals and may block intersections during congested periods.
3. Vegetation is blocking visibility on north leg of intersection.
4. Signals at both intersections are operated by a single controller box.
5. EB right turn from I-664 ramp is hard to see SB Roanoke Ave traffic with vegetation and fence. RTOR should probably be prohibited.
6. SB at 39th St are conventional traffic signal heads with no louvers.
7. NB traffic signal at ramp – green traffic signal is visible from several blocks away.
8. Traffic signal heads for I-664 ramp at Roanoke Ave are very close to the traffic signal heads at 39th St so it is confusing for vehicles traveling SB and NB through the intersections. Vehicles currently see both green and red lights simultaneously.
9. There are no reflective backplates on traffic signal heads.
10. Building in SW corner blocks the view for NB vehicles. There is a NO TURN ON RED for NB approach.
11. There is no sidewalk on the southeast corner.
12. Standard pedestrian crosswalks (parallel lines) are present.
13. Pedestrian crosswalk pavement markings are worn/missing for south leg.
14. Louvers were installed at similar traffic signal located on Chestnut Ave near 39th St recently according to Newport News police (between Aug 2015 and Aug 2017.
15. High number of Roanoke Ave northbound right-angle crashes with 39th St eastbound vehicles.
16. High number of right-angle crashes (85.3%), which was higher than the regional average of 39.0%.
17. 52.9% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
18. 23.5% of crashes resulted from distracted driving, which was higher than the regional average of 19.5%.
19. 23.5% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
20. 29.4% of crashes occurred during nighttime, which was higher than the regional average of 26.1%.
21. According to NN staff (2/2/24): Crash occurred on 5/9/22 that removed the signal pole for southbound on Roanoke. This crash damaged the signal pole near the building on Roanoke. The temporary repair was to put in a span wire to keep the signal operational. Due to being on a span these can't have programmable or filtered displays. There is a project that has been bid and as of 2/2/24 is going through the award process. Expected to be mast arm by the end of 2024. Note that all of these crashes occurred prior to the crash that knocked down the pole.
22. According to NN staff, there are currently programmable signal heads for NB on the green and for SB on the green at the interstate off-ramp.

Candidate Crash Countermeasures

- Install louvers/masking/visors on traffic signal heads for northbound Roanoke Ave at the I-664 ramp, and for southbound Roanoke Ave at 39th St (CMF=NA).
- Install Traffic Signal Backplates with Retroreflective Borders (CMF=0.74, Nighttime Only).
- Remove existing span wire signal and replace with a mast arm signal for the south leg of the intersection (CMF=0.98). Relocate no U-turn sign to mast arm signal (CMF=NA).
- Trim/remove vegetation for the north leg of the intersection (CMF=NA).
- Install sidewalk on the southeast corner of the intersection (CMF=0.12, veh-ped only).
- Repaint with high-visibility pedestrian crosswalks (continental or ladder style) (CMF=0.63, veh-ped only).
- Consider relocating I-664 ramp (CMF=NA).
- Evaluate lighting at the intersection (CMF = 0.881, Nighttime only).
- Optimize signal timing at intersection and adjacent intersections (CMF=0.91).
- Educate drivers about the dangers of distracted driving and not wearing a seat belt and increase enforcement of speeding (CMF=NA).





HAMPTON ROADS TPO

Intersection #8A – Colley Avenue at 26th Street
Norfolk

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)

12,020 Colley Ave

3,940 26th St

26th St

Colley Ave 12,020

Intersection Control = Signalized
One-way for eastbound 26th St with no turn on red
Prohibited left turns for northbound Colley Ave
Protected/Permitted for southbound Colley Ave left turns

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	0	0	0	1	1	0.4
B. Visible Injury	1	2	2	4	3	2.4
C. Nonvisible Injury	2	0	0	1	0	0.6
PDO. Property Damage Only	7	6	7	5	8	6.6
TOTAL	10	8	9	11	12	10
Bicycle	0	0	0	0	1	0.2
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

Crash Levels and Ranking

	2017 - 2021	Locality Rank (182 intersections)
Total Crashes	50	15
Crash Rate per 100 Million Entering Vehicles	171.66	2
Total Fatal and Serious Injury Crashes	2	19
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	6.87	14

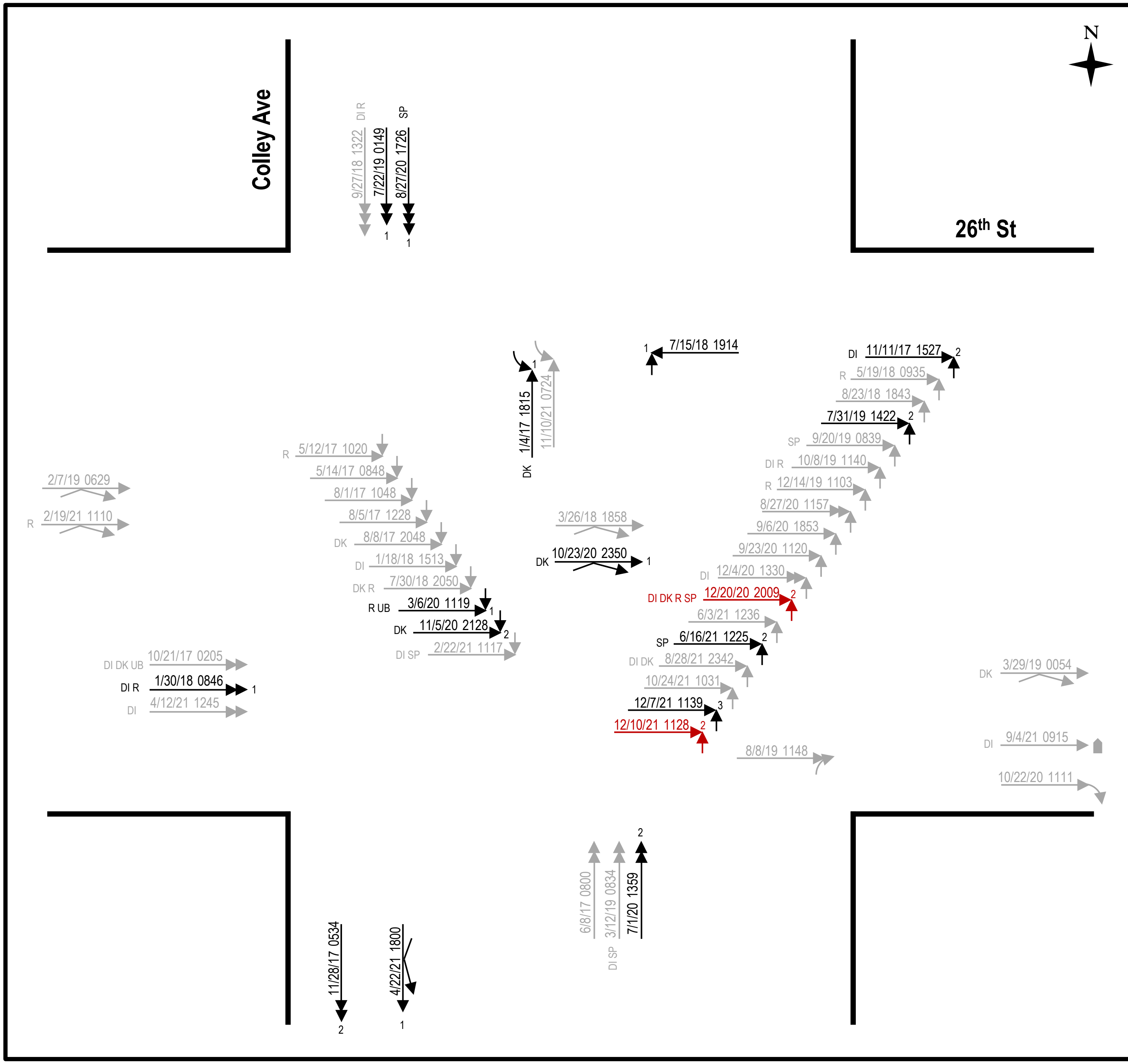
Locality Rank for Potential for Safety Improvement = 7

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.

COLLISION DIAGRAM

CITY OF NORFOLK
COLLEY AVE AT 26TH ST



LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

# of Injuries

Factors
- AL – Alcohol Use
- DI - Distracted
- DK – Darkness
- FO – Fixed Object
- R – Rain
- SN - Snow
- SP - Speed
- UB – Unbelted

Number of arrowheads represents the total vehicles involved in the crash

CRASH SEVERITY
- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

COLLISION TYPE
- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

INTERSECTION #8A – COLLEY AVENUE AT 26TH STREET
NORFOLK

CRASH DATA ANALYSIS

COLLISION TYPE

Collision Type	Colley Avenue at 26th Street	All Safety Study Intersections
Right Angle	66.0%	39.0%
Rear End	16.0%	37.6%
Head On	2.0%	2.9%
Sideswipe - Same Direction	8.0%	8.2%
Sideswipe - Opposite Direction	4.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	2.0%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	2.0%	4.3%

MOST PREVALENT DRIVER ACTION

Primary Driver Action	Colley Avenue at 26th Street	All Safety Study Intersections
Disregarded Traffic Signal	38.0%	12.1%
No Improper Action	24.0%	8.5%
Following Too Close	26.0%	28.1%
Other	6.0%	5.8%
Fail to Maintain Proper Control	4.0%	6.6%

WEATHER

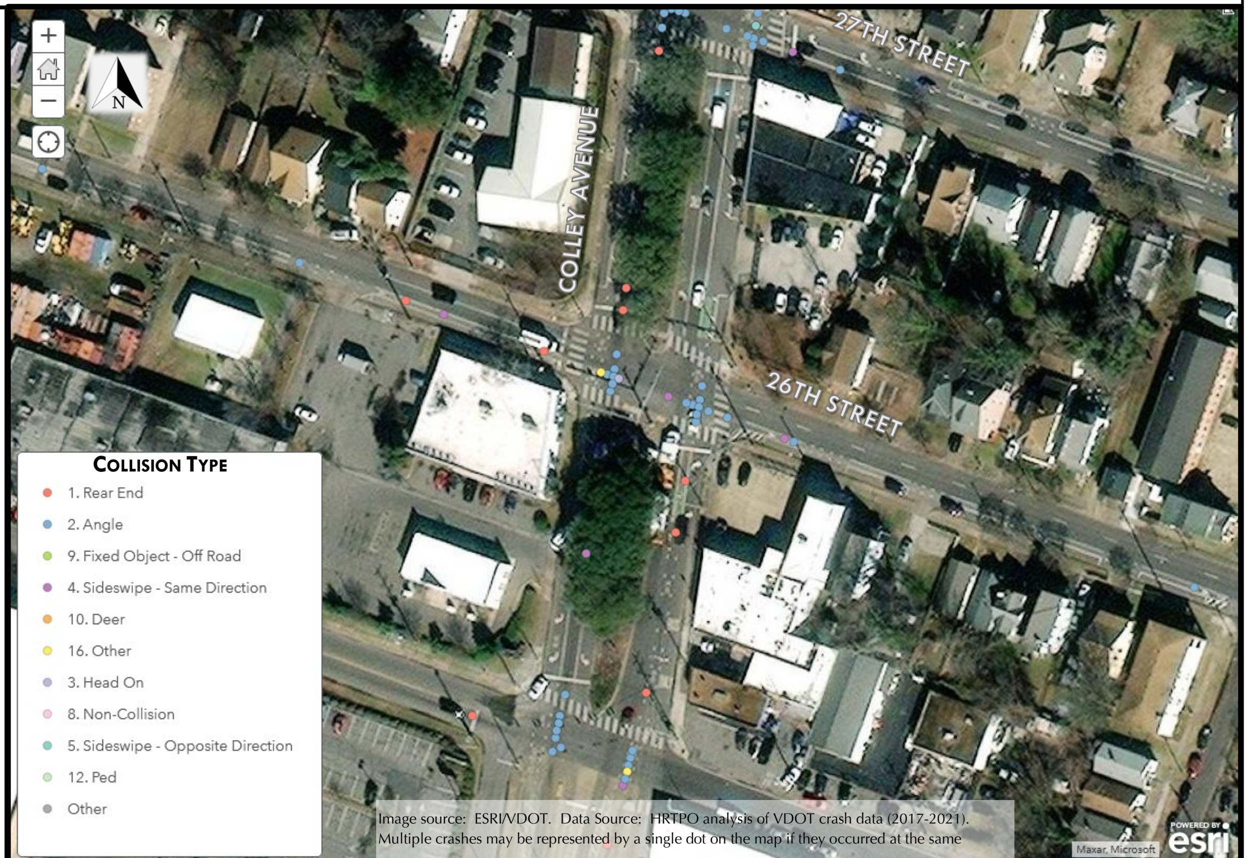
Weather	Colley Avenue at 26th Street	All Safety Study Intersections
Clear/Cloudy	80.0%	84.6%
Mist/Rain/Fog	20.0%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

OTHER CONTRIBUTING FACTORS

Other Contributing Factors	Colley Avenue at 26th Street	All Safety Study Intersections
Alcohol Involved	4.0%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	34.0%	19.5%
Speeding	12.0%	7.9%
Unbelted	6.0%	2.6%
Nighttime	18.0%	26.1%

Five-Year Total Crashes (2017-2021): 50

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.



CRASH DATA OBSERVATIONS

- High number of Colley Ave northbound right-angle crashes with 26th St eastbound vehicles.
- High number of right-angle crashes (66%), which was higher than the regional average of 39.0%.
- 38% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
- 20% of crashes occurred during Mist/Rain/Fog, which was higher than the regional average of 14.9%.
- 34% of crashes resulted from distracted driving, which was higher than the regional average of 19.5%.
- 12% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
- 6% of crashes involved people that were unbelted, which was higher than the regional average of 2.6%.

INTERSECTION #8A – COLLEY AVENUE AT 26TH STREET
NORFOLK

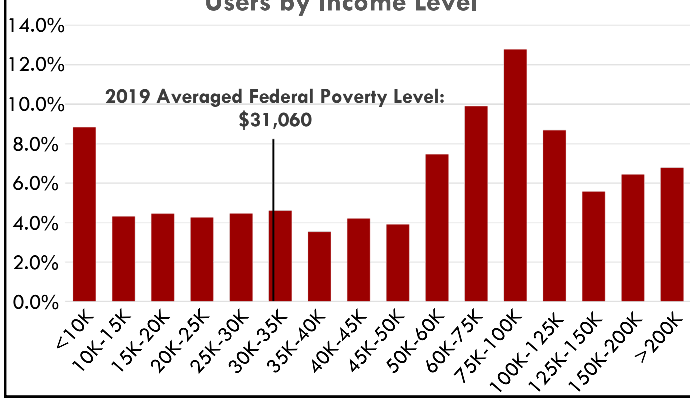
EQUITY ANALYSIS

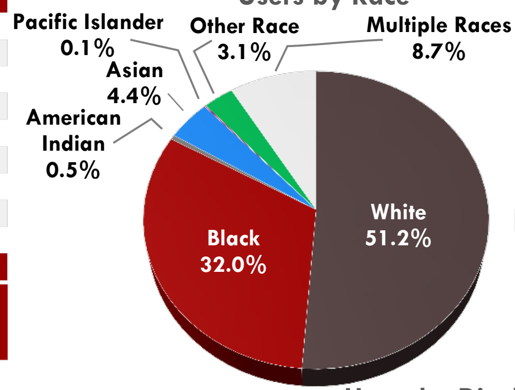
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	48.8%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	7.9%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	7.8%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	2.8%	3.1%
Average Daily Trips Made by Persons with a Disability	11.3%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	26.2%	18.9%

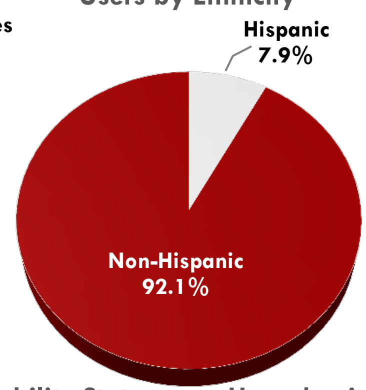
*Percentages in red are higher than the regional average.

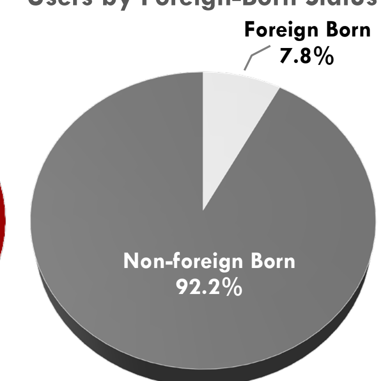
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	N
Elderly Populations	N
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	1

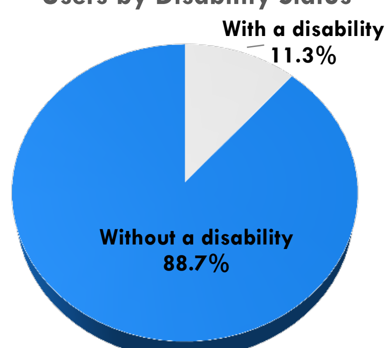
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
244,300	40.2%	Yes

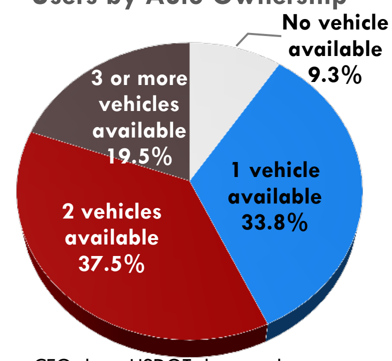






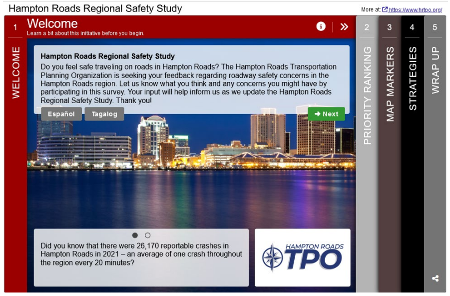






Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

INTERSECTION #8A/8B – COLLEY AVENUE AT 26TH STREET/27TH STREET
NORFOLK



HAMPTON ROADS REGIONAL SAFETY STUDY SURVEY RESPONSES

TOTAL SURVEY RESPONSES FOR INTERSECTION: **6**

Have you felt unsafe traveling through this intersection? Please elaborate:

- Yes – "The intersections of 25th, 26th, 27th with Colley Ave all have lights that are out of sync (on Colley) and close together, often causing driver confusion as to which light they are actually looking at as they tend to see a green light ahead and think their light is green when it is not and get hit by a vehicle on one of the east west streets. Speeding is also a huge factor for most of the city."
- Yes
- Yes

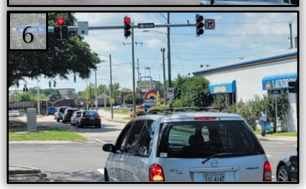
What is the safety issue/concern:

- Red light running
- Red light running
- Need protected left turn – "Traveling south, making a left onto 26th from Colley gets dicey because people traveling north then turning right onto 26th (or sometimes even continuing north on Colley) will try to go around, to the right of others slowing down that are traveling north on Colley."
- Speeding – "Speeding cars may not notice other cars in the intersection. Buildings obscure view of traffic coming from intersecting street."

INTERSECTION #8A – COLLEY AVENUE AT 26TH STREET
NORFOLK

SITE OBSERVATIONS & POSSIBLE CAUSES

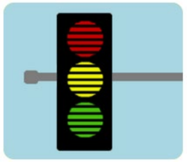
1. Far right traffic signal head and two No Turn on Red signs are obstructed by tree branches along 26th St eastbound.
2. Traffic signal heads in place for all approaches with no backplates with retroreflective borders.
3. Shared bike lanes are present along NB and SB Colley Ave and EB 26th St.
4. Large tree limbs in the median along Colley Ave overhang and partially obstruct views of traffic signals and signs, particularly for taller vehicles.
5. A possible cause of right-angle crashes for NB Colley Ave is that the conventional traffic signals downstream at 27th St are easily seen (no louvers) by drivers at 26th St stop bar. There are times during the cycle where 27th St signal is green and the 26th St signal is red.
6. A possible cause of right-angle crashes for SB Colley Ave is that the conventional traffic signals downstream at 25th St are easily seen (no louvers) by drivers at 26th St stop bar. There are times during the cycle where 25th St signal is green and the 26th St signal is red.
7. Pedestrian signals and crosswalks are present for all four legs of the intersection.
8. Pavement markings are in good condition.
9. Intersection lighting is present.



10. Protected/Permitted for SB Colley Ave left turns. Permitted left turns are difficult as large trees in the median along Colley Ave obstruct sight distance.
11. Permitted left turns for southbound Colley Ave operate with five section head green ball signal and Left Turn YIELD on Green sign. No flashing yellow arrow signal or sign is in place.
12. Hampton Roads Transit (HRT) bus stops for Route 4 Church St are located along Colley Ave prior to the intersection in the NB and SB approaches.
13. Traffic queues along SB Colley Ave back up from 25th St into the 26th St intersection.
14. High number of Colley Ave northbound right-angle crashes with 26th St eastbound vehicles.
15. High number of right-angle crashes (66%), which was higher than the regional average of 39.0%.
16. 38% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
17. 34% of crashes resulted from distracted driving, which was higher than the regional average of 19.5%.
18. 12% of crashes resulted from speeding, which was higher than the regional average of 7.9%.

CANDIDATE CRASH COUNTERMEASURES

- Trim tree limbs for the 26th St EB approach (CMF=NA).
- Install Traffic Signal Backplates with Retroreflective Borders (CMF=0.74, Nighttime only).
- Trim or remove large trees in the median along Colley Ave for both the north and south legs of the intersection to improve sight distance (CMF=NA).
- Install louvers/masking/visors on traffic signal heads for along Colley Ave SB at 25th St and NB at 27th St (CMF=NA). These improvements will block the visibility of 25th St and 27th signal heads for vehicles at 26th St.
- Consider changing protected/permissive SB Colley Ave left turns to protected only (CMF=0.01, angle only).
- If keeping protected-permissive phasing, install four section flashing yellow arrow signal with “Left Turn YIELD on Flashing Yellow” sign for SB Colley Ave at 26th St (CMF=0.806, left turn only).
- Optimize signal timing at intersection and adjacent intersections (CMF=0.91).
- Educate drivers about the dangers of distracted driving and not wearing a seat belt and increase enforcement of speeding (CMF=NA).



Intersection #8B – Colley Avenue at 27th Street
Norfolk

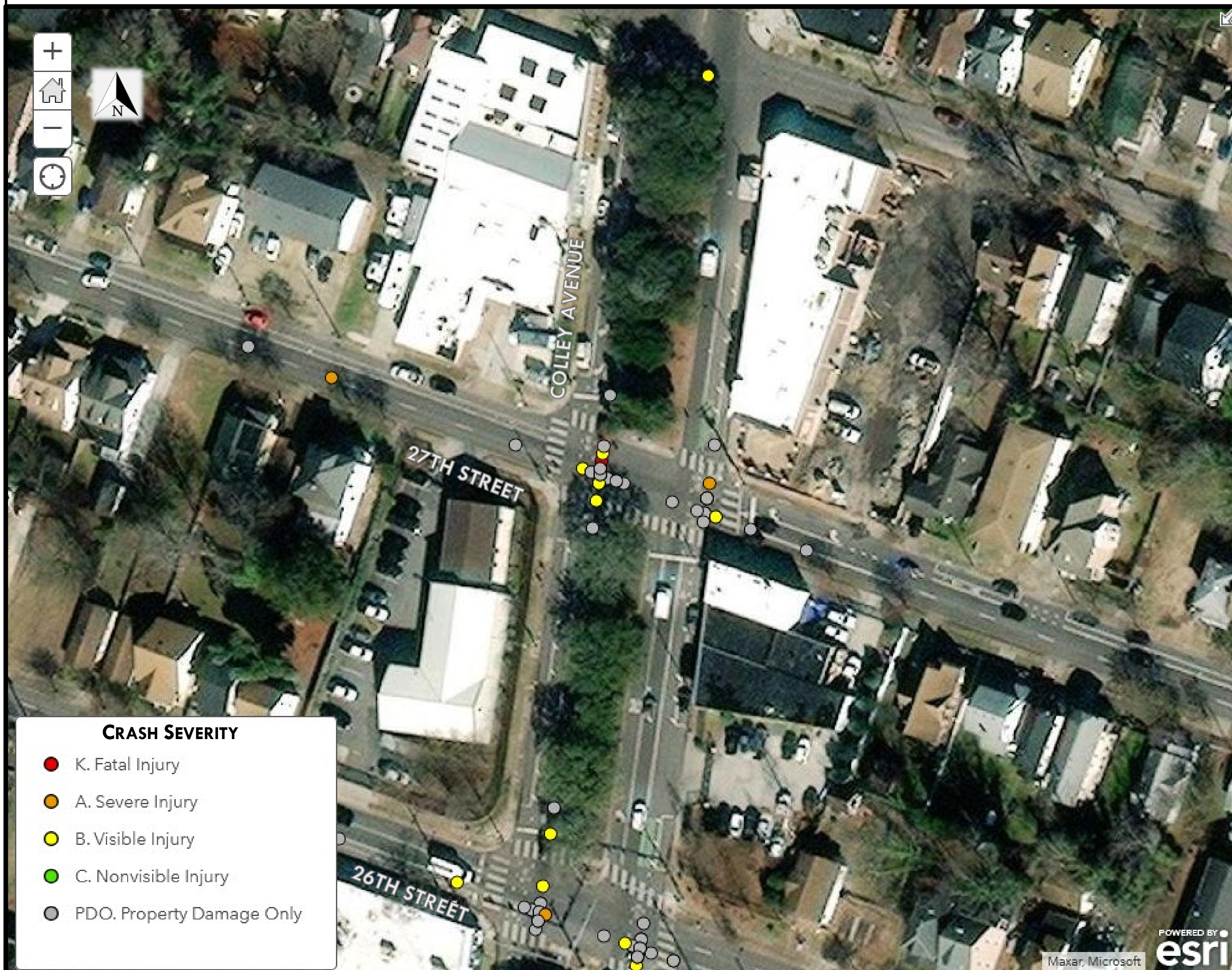
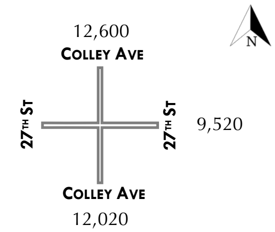


Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes
Five Year Average (2017-2021)



Intersection Control = Signalized
One-way for westbound 27th St with no turn on red
Prohibited left turns for southbound Colley Ave
Permitted for northbound Colley Ave left turns

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	1	0	0	0.2
A. Severe Injury	1	0	1	0	1	0.6
B. Visible Injury	1	2	2	2	3	2
C. Nonvisible Injury	0	0	1	0	0	0.2
PDO. Property Damage Only	3	3	6	9	11	6.4
TOTAL	5	5	11	11	15	9.4
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

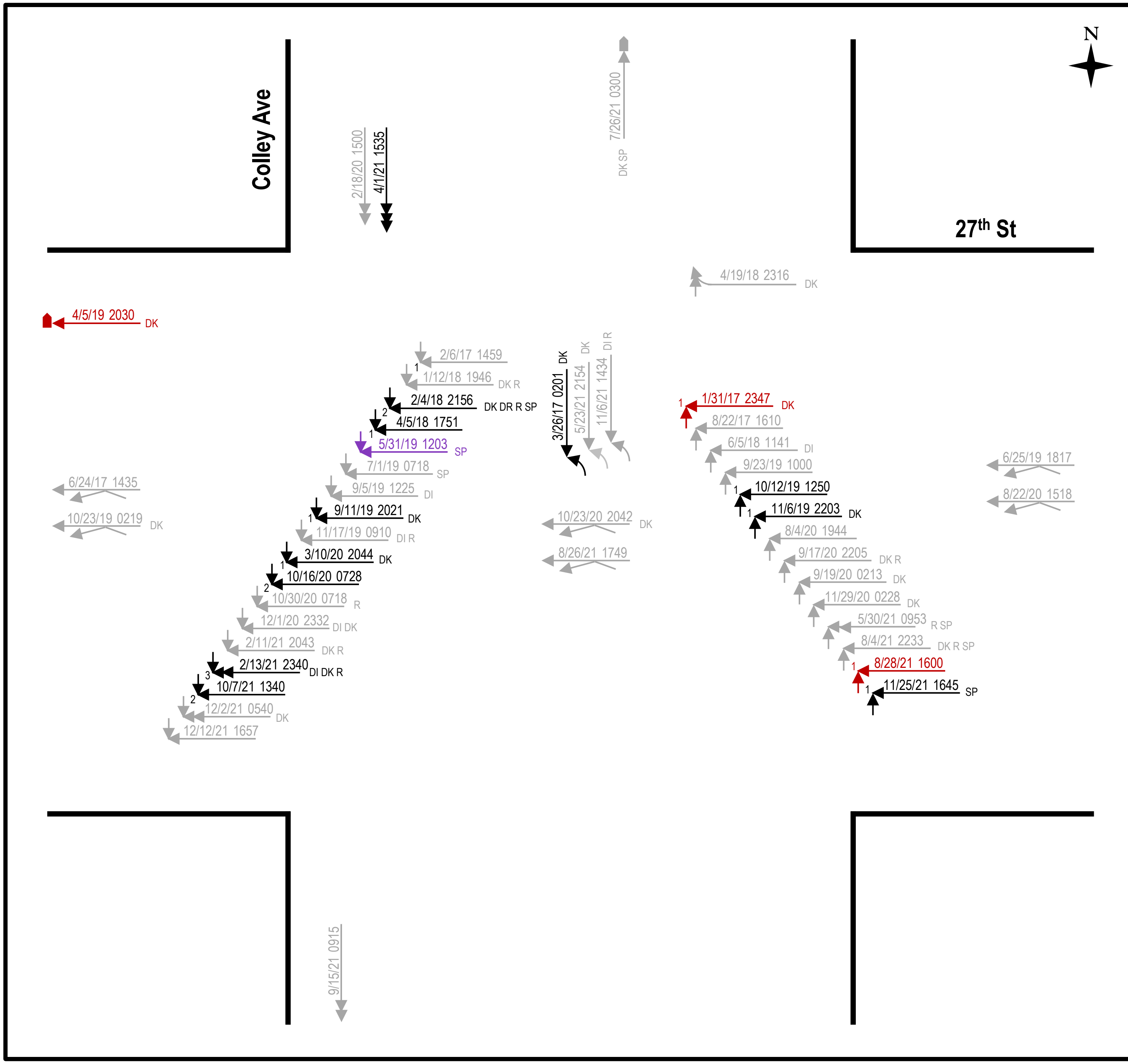
Crash Levels and Ranking

	2017 - 2021	Locality Rank (182 intersections)
Total Crashes	47	18
Crash Rate per 100 Million Entering Vehicles	117.97	7
Total Fatal and Serious Injury Crashes	4	8
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	10.04	5

Locality Rank for Potential for Safety Improvement = 21

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

CITY OF NORFOLK
COLLEY AVE AT 27TH ST

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

CRASH SEVERITY

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

COLLISION TYPE

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #8B – Colley Avenue at 27th Street
Norfolk

Crash Data Analysis

Collision Type

Collision Type	Colley Avenue at 27th Street	All Safety Study Intersections
Right Angle	80.9%	39.0%
Rear End	6.4%	37.6%
Head On	0.0%	2.9%
Sideswipe - Same Direction	4.3%	8.2%
Sideswipe - Opposite Direction	2.1%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	4.3%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	2.1%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Colley Avenue at 27th Street	All Safety Study Intersections
Disregarded Traffic Signal	42.6%	12.1%
No Improper Action	21.3%	8.5%
Other	6.4%	5.8%
Fail to Maintain Proper Control	6.4%	6.6%
Did Not Have Right-of-Way	6.4%	17.9%

Weather

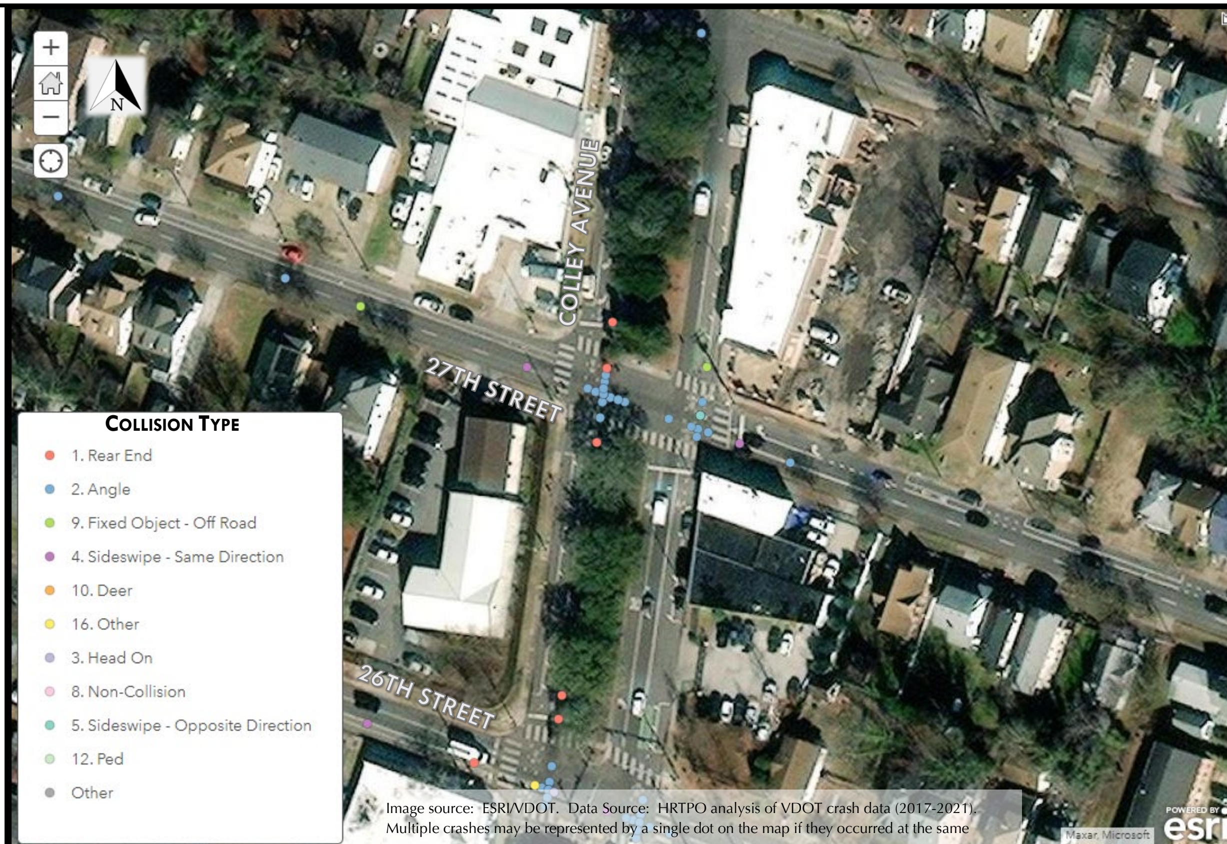
Weather	Colley Avenue at 27th Street	All Safety Study Intersections
Clear/Cloudy	78.7%	84.6%
Mist/Rain/Fog	21.3%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Colley Avenue at 27th Street	All Safety Study Intersections
Alcohol Involved	8.5%	5.2%
Drug Use Involved	2.1%	0.6%
Distracted Driving	17.0%	19.5%
Speeding	14.9%	7.9%
Unbelted	4.3%	2.6%
Nighttime	23.4%	26.1%

Five-Year Total Crashes (2017-2021): 47

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.



Crash Data Observations

- High number of Colley Ave southbound right-angle crashes with 27th St westbound vehicles.
- High number of right-angle crashes (80.9%), which was higher than the regional average of 39.0%.
- 42.6% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
- 21.3% of crashes occurred during Mist/Rain/Fog, which was higher than the regional average of 14.9%.
- 8.5% of crashes involved the use of alcohol, which was higher than the regional average of 5.2%.
- 14.9% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
- 4.3% of crashes involved people that were unbelted, which was higher than the regional average of 2.6%.

INTERSECTION #8B – COLLEY AVENUE AT 27TH STREET
NORFOLK

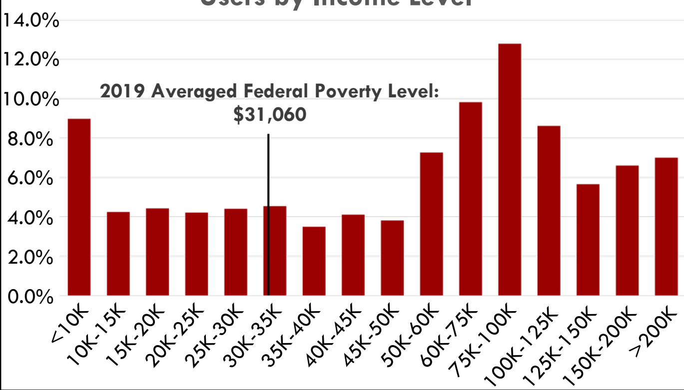
EQUITY ANALYSIS

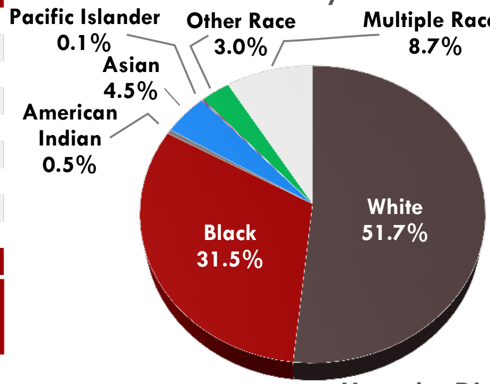
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	48.3%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	7.8%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	8.0%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	2.7%	3.1%
Average Daily Trips Made by Persons with a Disability	11.0%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	26.3%	18.9%

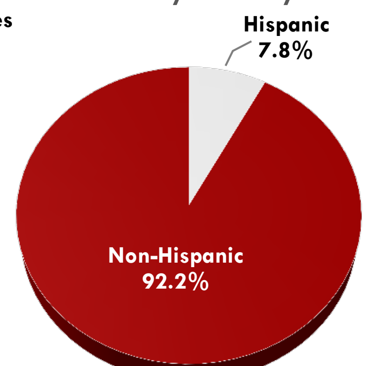
*Percentages in red are higher than the regional average.

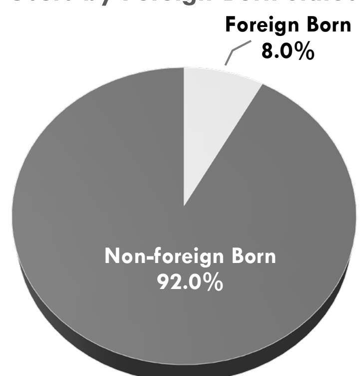
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	N
Elderly Populations	N
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	Y
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	**2**

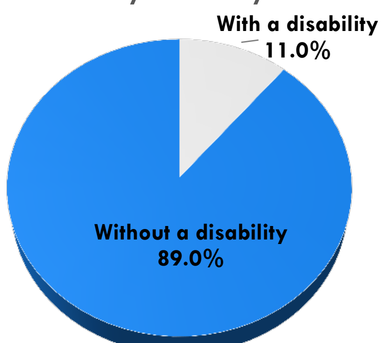
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
244,300	40.2%	Yes

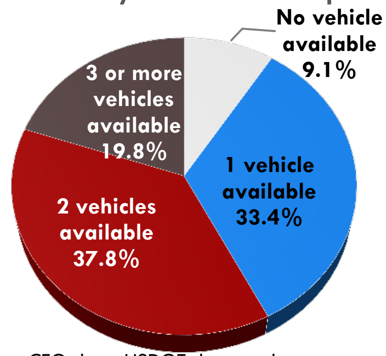












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

INTERSECTION #8A/8B – COLLEY AVENUE AT 26TH STREET/27TH STREET
NORFOLK

HAMPTON ROADS REGIONAL SAFETY STUDY SURVEY RESPONSES

TOTAL SURVEY RESPONSES FOR INTERSECTION: **6**

Have you felt unsafe traveling through this intersection? Please elaborate:

- Yes – “The intersections of 25th, 26th, 27th with Colley Ave all have lights that are out of sync (on Colley) and close together, often causing driver confusion as to which light they are actually looking at as they tend to see a green light ahead and think their light is green when it is not and get hit by a vehicle on one of the east west streets. Speeding is also a huge factor for most of the city.”
- Yes
- Yes

What is the safety issue/concern:

- Red light running
- Red light running
- Need protected left turn – “Traveling south, making a left onto 26th from Colley gets dicey because people traveling north then turning right onto 26th (or sometimes even continuing north on Colley) will try to go around, to the right of others slowing down that are traveling north on Colley.”
- Speeding – “Speeding cars may not notice other cars in the intersection. Buildings obscure view of traffic coming from intersecting street.”

INTERSECTION #8B – COLLEY AVENUE AT 27TH STREET
NORFOLK

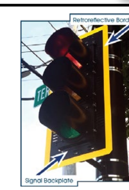
SITE OBSERVATIONS & POSSIBLE CAUSES

1. On-street parking on the right side of NB and SB Colley Ave and WB 27th St.
2. Traffic signal heads are mounted on span wire for all approaches with no backplates with retroreflective borders.
3. Building in SE corner blocks the view for WB 27th St and NB Colley Ave vehicles.
4. Bike lanes are present along NB and SB Colley Ave and WB 27th St.
5. For WB 27th St approach, Right Lane MUST Turn Right and No Turn on Red signs are in place for right lane.
6. Large tree limbs in the median of Colley Ave overhang and partially obstruct views of traffic signals and signs, particularly for taller vehicles.
7. A possible cause of right-angle crashes for SB Colley Ave is that the conventional traffic signals downstream at 26th St are easily seen (no louvers) by drivers at 27th St stop bar. There are times during the cycle where 26th St signal is green and the 27th St signal is red.
8. Pedestrian signals and crosswalks are present for all four legs of the intersection. Eastern leg is a bicycle/pedestrian shared crosswalk.
9. Pavement markings are in good condition.
10. Intersection lighting is present.

11. Permitted only for NB Colley Ave left turns. Permitted left turns are difficult as large trees in the median along Colley Ave obstruct sight distance.
12. Permitted left turns for NB Colley Ave do not have a dedicated signal and or Left Turn YIELD on Green sign. No flashing yellow arrow signal or sign is in place.
13. Traffic queues along SB Colley Ave back up from 26th St into the 27th St intersection.
14. One-way signs for 27th St along NB/SB Colley Ave are mounted at ground level and can be blocked by taller vehicles.
15. No Left Turn sign at ground level for SB Colley Ave may be difficult to see if there are taller vehicles in the left lane.
16. Colley Ave median on the south leg extends too far into the intersection which makes it difficult for WB 27th St left turns.
17. High number of Colley Ave southbound right-angle crashes with 27th St westbound vehicles.
18. High number of right-angle crashes (80.9%), which was higher than the regional average of 39.0%.
19. 42.6% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
20. 21.3% of crashes occurred during Mist/Rain/Fog, which was higher than the regional average of 14.9%.
21. 8.5% of crashes involved the use of alcohol, which was higher than the regional average of 5.2%.
22. 14.9% of crashes resulted from speeding, which was higher than the regional average of 7.9%.

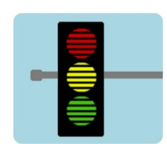
CANDIDATE CRASH COUNTERMEASURES

- Install Traffic Signal poles with mast arms (CMF=0.98).
- Install Traffic Signal Backplates with Retroreflective Borders (CMF=0.74, Nighttime Only).
- Trim or remove large trees in the median of Colley Ave for both the north and south legs of the intersection to improve sight distance (CMF=NA).
- Install louvers/masking/visors on traffic signal heads for along Colley Ave SB at 26th St (CMF=NA). These improvements will block the visibility of 26th St signal heads for SB vehicles at 27th St.
- Consider changing protected/permissive NB Colley Ave left turns to protected only (CMF=0.01, angle only). Add traffic signal head for left turns (CMF=NA).
- If keeping protected-permissive phasing, install four section flashing yellow arrow signal with "Left Turn YIELD on Flashing Yellow" sign for NB Colley Ave at 27th St (CMF=0.806, left turn only).
- Optimize signal timing at intersection and adjacent intersections (CMF=0.91).
- Add additional One-way signs for NB Colley Ave on NE corner traffic signal pole and in median of Colley Ave on the south side of the intersection (CMF=NA).
- If traffic signal poles and mast arms are installed:
  - Add No Left Turn sign and One-way sign on the mast arm for SB Colley Ave (CMF=NA).
  - Add No Right Turn sign and One-way sign on the mast arm for NB Colley Ave (CMF=NA).
- Educate drivers about the dangers of driving while intoxicated and increase enforcement of speeding (CMF=NA).



R6-1


R3-2




R3-1

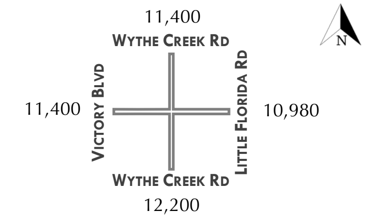
HAMPTON ROADS TPO

Intersection #9 – Wythe Creek Road at Victory Boulevard/Little Florida Road
Poquoson

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Signalized
Protected/Permitted phasing for all left turns

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	1	1	1	1	0	0.8
B. Visible Injury	2	2	2	1	5	2.4
C. Nonvisible Injury	2	0	2	14	7	5
PDO. Property Damage Only	5	8	5	3	9	6
TOTAL	10	11	10	19	21	14.2
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

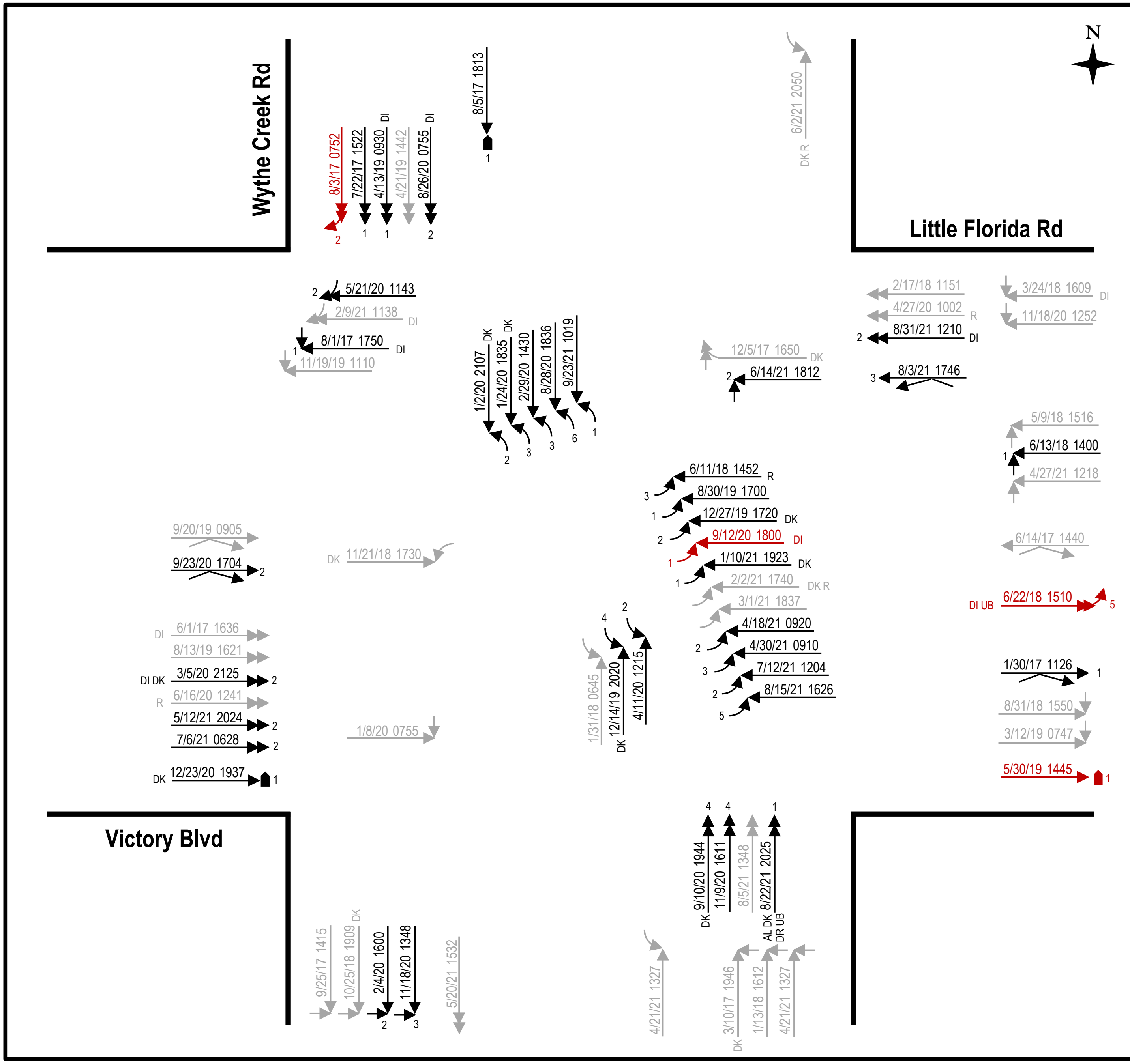
Crash Levels and Ranking

	2017 - 2021	Locality Rank (5 intersections)
Total Crashes	71	1
Crash Rate per 100 Million Entering Vehicles	169.22	1
Total Fatal and Serious Injury Crashes	4	1
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	9.53	2

Locality Rank for Potential for Safety Improvement = 1

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

City of Poquoson

Wythe Creek Rd at Victory/Little Florida

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

Crash Severity

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021. Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #9 – Wythe Creek Road at Victory Boulevard/Little Florida Road

Poquoson

Crash Data Analysis

Collision Type

Collision Type	Wythe Creek Rd at Victory Blvd	All Safety Study Intersections
Right Angle	43.7%	39.0%
Rear End	29.6%	37.6%
Head On	1.4%	2.9%
Sideswipe - Same Direction	5.6%	8.2%
Sideswipe - Opposite Direction	5.6%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	2.8%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	9.9%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Wythe Creek Rd at Victory Blvd	All Safety Study Intersections
Did Not Have Right-of-Way	33.8%	17.9%
No Improper Action	21.1%	8.5%
Following Too Close	14.1%	28.1%
Disregarded Traffic Signal	7.0%	12.1%
Other	7.0%	5.8%

Weather

Weather	Wythe Creek Rd at Victory Blvd	All Safety Study Intersections
Clear/Cloudy	93.0%	84.6%
Mist/Rain/Fog	7.0%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Wythe Creek Rd at Victory Blvd	All Safety Study Intersections
Alcohol Involved	4.2%	5.2%
Drug Use Involved	2.8%	0.6%
Distracted Driving	18.3%	19.5%
Speeding	1.4%	7.9%
Unbelted	2.8%	2.6%
Nighttime	21.1%	26.1%

Five-Year Total Crashes (2017-2021): 71

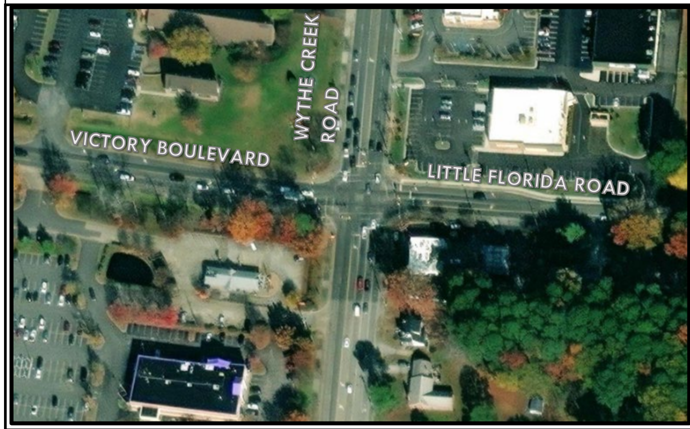
Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Crash Data Observations

- 33.8% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
- Higher number of Victory Blvd eastbound left turn crashes with Victory Blvd westbound vehicles.
- 18.3% of crashes resulted from distracted driving.

INTERSECTION #9 – WYTHE CREEK ROAD AT VICTORY BOULEVARD/LITTLE FLORIDA ROAD

POQUOSON



EQUITY ANALYSIS

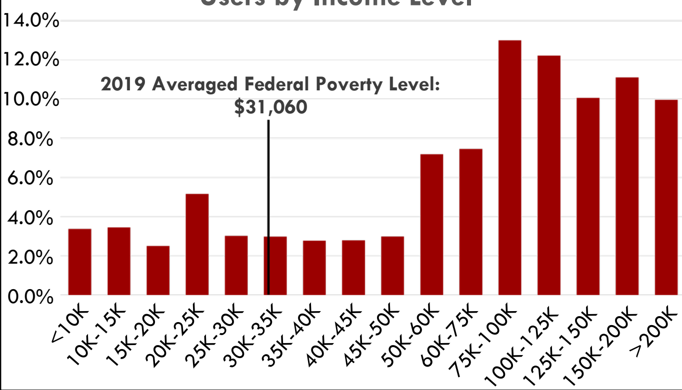
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	21.6%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	5.2%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	5.2%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	1.7%	3.1%
Average Daily Trips Made by Persons with a Disability	12.9%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	17.5%	18.9%

*Percentages in red are higher than the regional average.

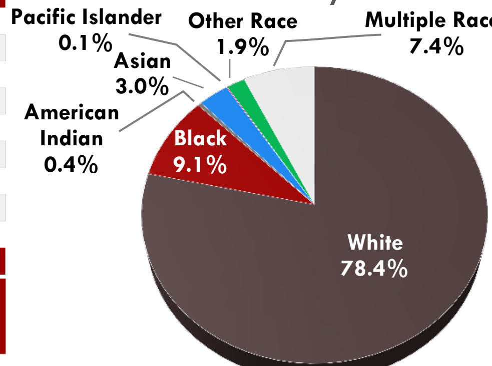
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	N
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	1

Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
12,100	0.0%	No

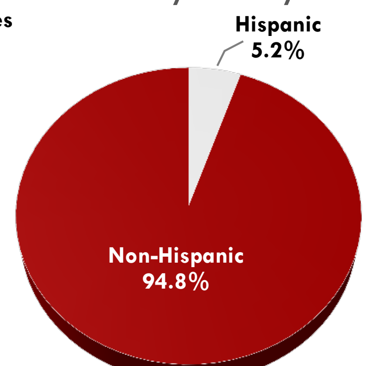
Users by Income Level



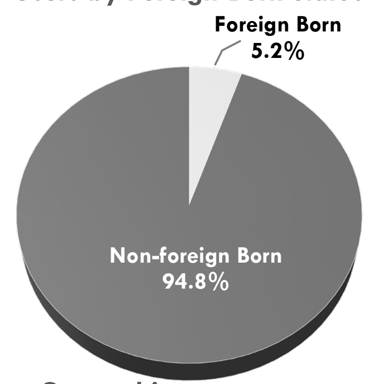
Users by Race



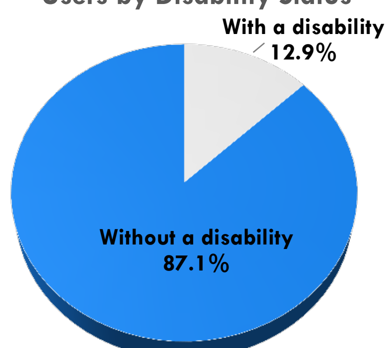
Users by Ethnicity



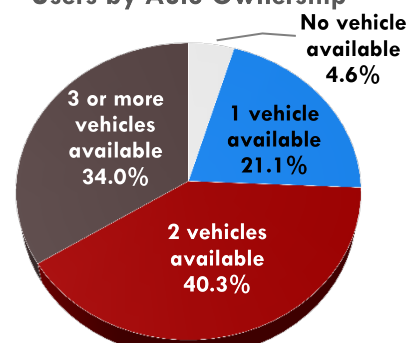
Users by Foreign-Born Status



Users by Disability Status

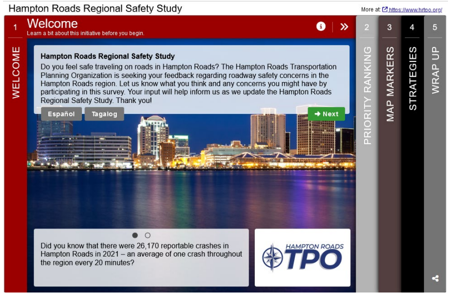


Users by Auto Ownership



Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #9 – Wythe Creek Road at Victory Boulevard/Little Florida Road
Poquoson



Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: 3

Have you felt unsafe traveling through this intersection? Please elaborate:

- No

What is the safety issue/concern:

- Red light running
- Poor Visibility – "Drivers moving west from Little Florida Rd turning left onto [Wythe] Creek Rd cannot see the drivers approaching the intersection eastbound from Victory, because of the eastbound drivers turning left onto Wythe Creek Rd. The line of cars waiting to turn left on [Wythe] Creek block the view."

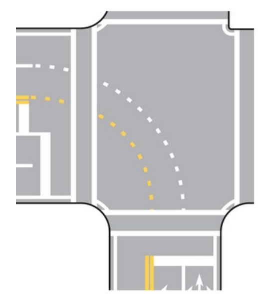
Intersection #9 – Wythe Creek Road at Victory Boulevard/Little Florida Road
Poquoson

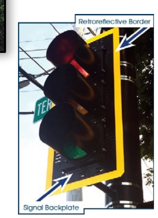
Site Observations & Possible Causes

1. Left turn vehicles were observed crossing over the double yellow line when traveling to the receiving lane.
2. Vehicles on the south leg of the intersection make dangerous turns into and out of driveways to/from the undivided roadway.
3. Worn pavement markings (turn arrows, stop bars, ped crossings).
4. Vegetation is blocking pedestrian signals.
5. Crepe Myrtle trees block signs and are too close to traffic lanes as they will be a hazard for larger trucks and vehicles.
6. Permitted left turns for all approaches.
7. Five section traffic signal heads are in place for all approaches with no backplates with retroreflective borders.
8. There is an all pedestrian phase when pedestrian button is pushed.
9. Access point from Little Florida Rd to CVS was removed a year ago.
10. Small incline for the WB approach into the intersection.
11. 33.8% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
12. Higher number of Victory Blvd eastbound left turn crashes with Little Florida Rd westbound vehicles.

Candidate Crash Countermeasures

- Add dotted lane line extensions to keep left turning vehicles in the correct lane (CMF=0.90).
- Consider adding a raised median along Wythe Creek Road as well as Victory Boulevard/Little Florida Road approaches (CMF=0.697).
- Restripe pedestrian crosswalks with ladder striping for all approaches (CMF=0.63, veh-ped only).
- Clear vegetation from pedestrian signals (CMF=NA).
- Install Traffic Signal Backplates with Retroreflective Borders (CMF=0.74, Nighttime Only).
- Consider adding protected left turn phases during AM and PM peak periods, which would require replacing 5-section heads with 4-section Flashing Yellow Arrow signal heads (CMF=0.01, angle only).
- If keeping protective-permissive phasing, add Left Turn YIELD On Flashing signs for all left turn lanes for all approaches, which would require 4-section Flashing Yellow Arrow signal heads (CMF=0.806, left turn only).
- Redesignate driveway for 7-eleven along Little Florida Road as right-in and right-out only (CMF=NA).
- Remove crepe myrtle trees between the sidewalk and the roadway as necessary to improve visibility of signage within the functional area of the intersection (CMF=NA).
- Consider adding Signal Ahead warning sign for EB approach (CMF=0.65, Angle only).
- Optimize signal timing (CMF=0.91).





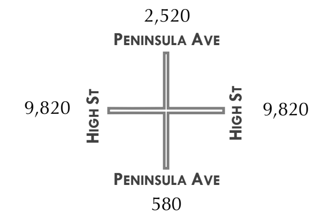
Intersection #10 – High Street at Peninsula Avenue

Portsmouth

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Two-way Stop for Peninsula Ave approaches

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	0	2	2	1	2	1.4
B. Visible Injury	0	0	0	0	0	0
C. Nonvisible Injury	1	1	3	2	0	1.4
PDO. Property Damage Only	0	1	0	0	2	0.6
TOTAL	1	4	5	3	4	3.4
Bicycle	0	0	0	0	0	0
Pedestrian	0	1	1	0	0	0.4
Animal	0	0	0	0	0	0

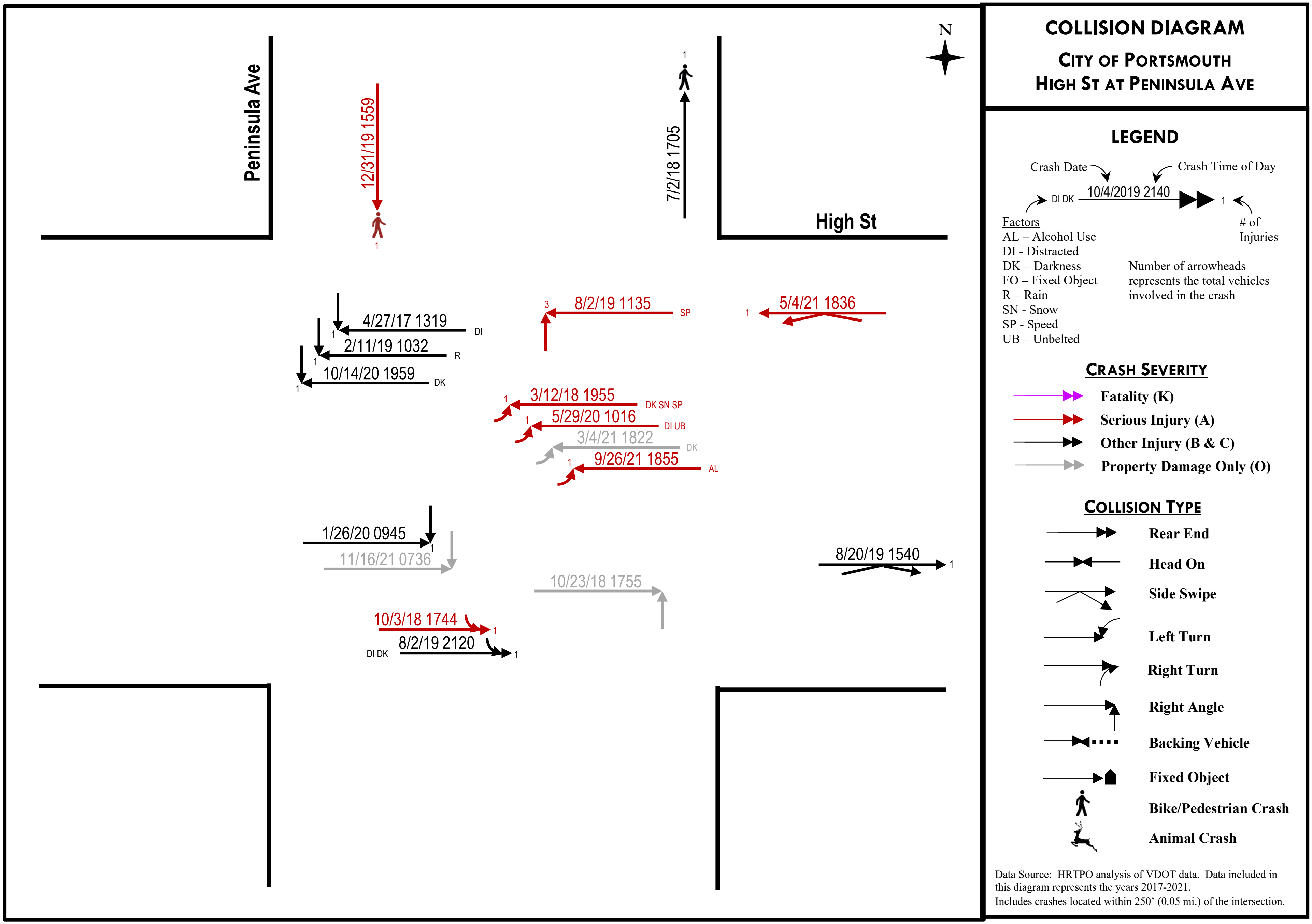
Crash Levels and Ranking

	2017 - 2021	Locality Rank (86 intersections)
Total Crashes	17	39
Crash Rate per 100 Million Entering Vehicles	81.92	15
Total Fatal and Serious Injury Crashes	7	4
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	33.73	3

Locality Rank for Potential for Safety Improvement = 26

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.


COLLISION DIAGRAM
CITY OF PORTSMOUTH
HIGH ST AT PENINSULA AVE
N
Peninsula Ave
High St
12/31/19 1559
1
7/2/18 1705
1
4/27/17 1319
DI
1
2/11/19 1032
R
1
10/14/20 1959
DK
1
3
8/2/19 1135
SP
1
5/4/21 1836
1
3/12/18 1955
DK SN SP
1
5/29/20 1016
DI UB
3/4/21 1822
DK
1
9/26/21 1855
AL
1/26/20 0945
1
11/16/21 0736
8/20/19 1540
1
10/23/18 1755
10/3/18 1744
1
DI DK
8/2/19 2120
1
LEGEND
Crash Date
Crash Time of Day
DI DK
10/4/2019 2140
1
Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted
# of Injuries
Number of arrowheads represents the total vehicles involved in the crash
CRASH SEVERITY
Fatality (K)
Serious Injury (A)
Other Injury (B & C)
Property Damage Only (O)
COLLISION TYPE
Rear End
Head On
Side Swipe
Left Turn
Right Turn
Right Angle
Backing Vehicle
Fixed Object
Bike/Pedestrian Crash
Animal Crash
Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #10 – High Street at Peninsula Avenue

Portsmouth

Crash Data Analysis

Collision Type

Collision Type	High St at Peninsula Ave	All Safety Study Intersections
Right Angle	52.9%	39.0%
Rear End	0.0%	37.6%
Head On	11.8%	2.9%
Sideswipe - Same Direction	0.0%	8.2%
Sideswipe - Opposite Direction	5.9%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	0.0%	4.8%
Bike/Pedestrian	11.8%	1.3%
Animal	0.0%	0.3%
Other	17.6%	4.3%

Most Prevalent Driver Action

Primary Driver Action	High St at Peninsula Ave	All Safety Study Intersections
Did not have right-of-way	35.3%	17.9%
No Improper Action	29.4%	8.5%
Disregarded Stop or Yield Sign	11.8%	1.0%
Improper Turn From Wrong Lane	5.9%	0.9%
Improper/Unsafe lane change	5.9%	6.0%

Weather

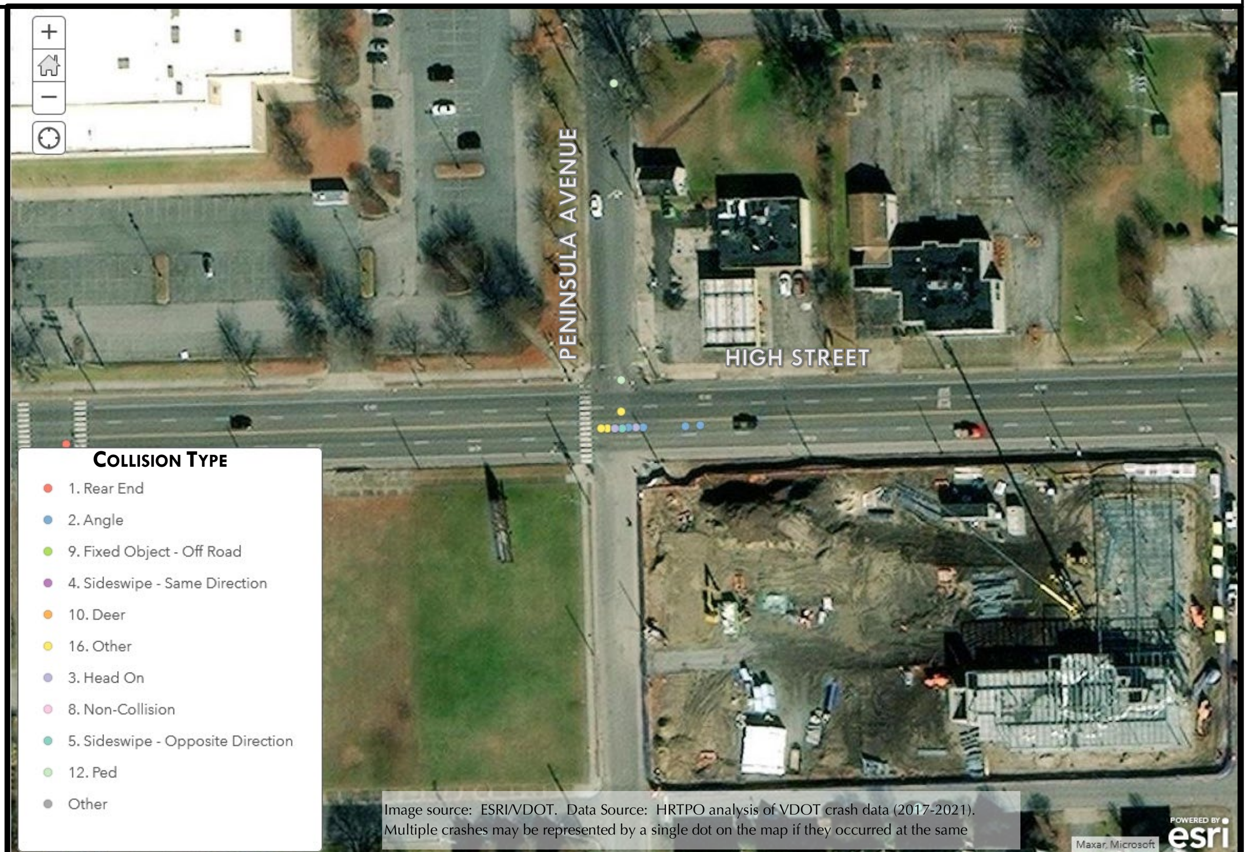
Weather	High St at Peninsula Ave	All Safety Study Intersections
Clear/Cloudy	88.2%	84.6%
Mist/Rain/Fog	5.9%	14.9%
Snow/Sleet	5.9%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	High St at Peninsula Ave	All Safety Study Intersections
Alcohol Involved	5.9%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	17.6%	19.5%
Speeding	11.8%	7.9%
Unbelted	5.9%	2.6%
Nighttime	23.5%	26.1%

Five-Year Total Crashes (2017-2021): 17

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.



Crash Data Observations

- High percentage of crashes with serious injuries.
- 4 High St eastbound left turn crashes with High St westbound vehicles.
- Higher number of right-angle crashes (52.9%), which was higher than the regional average of 39.0%.
- 11.8% of crashes involved bike/pedestrians, which was higher than the regional average of 1.3%
- 35.3% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
- 11.8% of drivers disregarded the stop sign, which was higher than the regional average of 1.0%.
- 11.8% of crashes resulted from speeding, which was higher than the regional average of 7.9%.

INTERSECTION #10 – HIGH STREET AT PENINSULA AVENUE
PORTSMOUTH

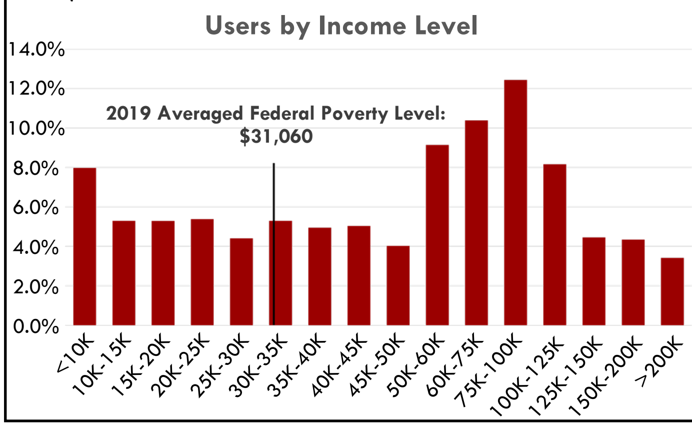
EQUITY ANALYSIS

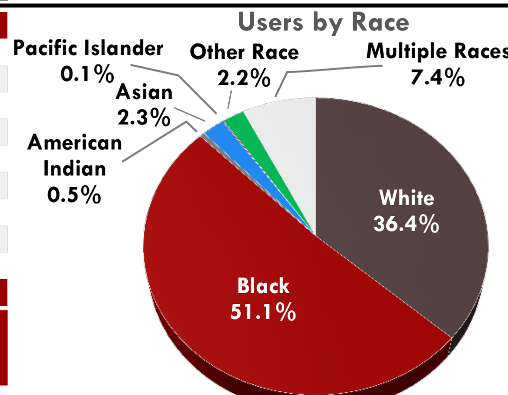
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	63.6%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	5.7%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	4.2%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	1.9%	3.1%
Average Daily Trips Made by Persons with a Disability	14.7%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	28.4%	18.9%

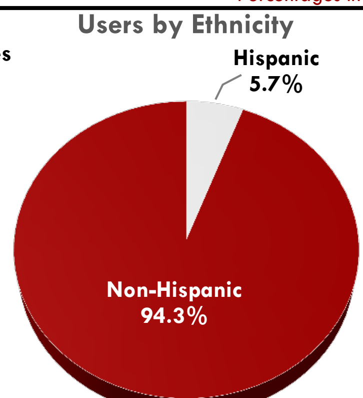
*Percentages in red are higher than the regional average.

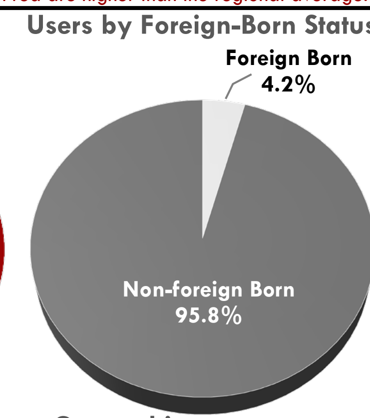
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	Y
Elderly Populations	N
Female Head of Households	Y
Households Receiving Food Stamps	Y
Households Receiving Cash Public Assistance	Y
Limited English Proficiency Populations	N
Low-Income Households	Y
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	7

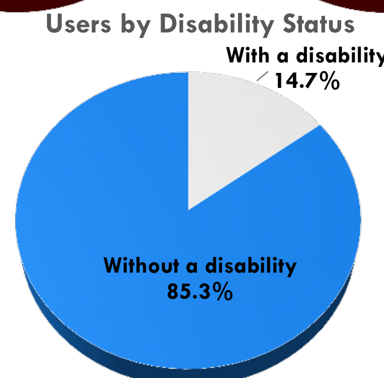
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
95,000	55.4%	Yes

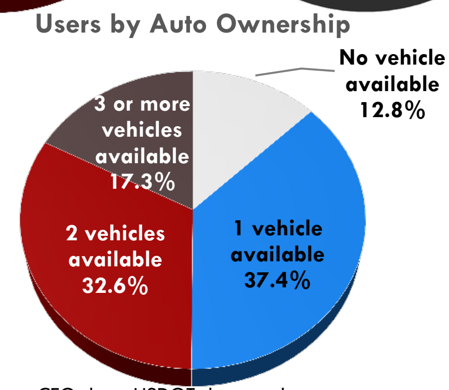












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #10 – High Street at Peninsula Avenue

Portsmouth

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: 1

Have you felt unsafe traveling through this intersection? Please elaborate:

- No

What is the safety issue/concern:

- Speeding – "The road design and posted speed limit do not match. It feels like a 45mph zone with the wide lanes and open atmosphere, even though it's a 30mph zone. Pedestrians often cross here too, adding another hazard."

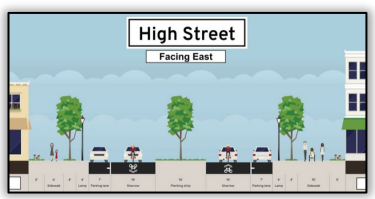
Intersection #10 – High Street at Peninsula Avenue
Portsmouth

Site Observations & Possible Causes

1) Two-way Stop for Peninsula Ave approaches.
2) High St is a 4-lane undivided roadway with parking on the shoulder. Shared bike lane marked on right lane.
3) No stop bar pavement markings for Peninsula Ave approaches.
4) High visibility continental pedestrian crosswalk on the west leg of intersection across High St. Crosswalk is slightly worn on the northern half.
5) No crosswalk on south leg across Peninsula Ave.
6) Crosswalk on north leg across Peninsula Ave is worn and barely visible.
7) Stop Sign for SB Peninsula Ave is difficult to see due to nearby powerline pole.
8) Lighting is present at the intersection.
9) Sidewalks present at all four intersection legs.
10) Roadway is currently designed for travel speeds higher than the posted 35 mph speed limit.
11) High pedestrian activity observed.

Candidate Crash Countermeasures

- Replace Stop Signs for both Peninsula Ave approaches with retroreflective panel and strip on sign support pole (CMF=0.909).
- Consider placing stop signs on both the left and right side of the intersection approaches for Peninsula Ave (CMF=0.89).
- Add stop bars for both Peninsula Ave approaches (CMF=0.899).
- Add high visibility continental pedestrian crosswalks on the north and south legs across Peninsula Ave. Repaint north half of continental pedestrian crosswalk on the west leg that is worn (CMF=0.63, veh-ped only).
- Check to see if a traffic signal is warranted for the intersection (CMF=0.65).
- Consider relocating powerline pole for Peninsula Ave SB approach so the stop sign is more visible (CMF=NA).
- Increase enforcement of speeding and driver awareness of bicycles and pedestrians (CMF=NA).



- Consider adding a left turn lane for eastbound traffic at the upstream Jamestown Ave, which would encourage drivers to use that route prior to the high school and potentially alleviate some left turn crashes.
- Note: The City of Portsmouth was awarded a $19.3 million RAISE grant in 2022 to revitalize the High Street corridor. This project will include a road diet by converting the existing four-lane undivided arterial to a two-lane divided road section with a 16-foot-wide raised median. This will allow for road integration of vehicles, pedestrians, cyclists, and transit users. The project focuses on High Street between the Martin Luther King Expressway (Route 164) and Chestnut Street and aims to extend the streetscape design of the Downtown area farther west and connect the area with opportunities to the east. Overall Project Cost: $24.1 Million

Intersection #11 – Route 58 at Route 308 (Three Creeks Road)

Southampton County

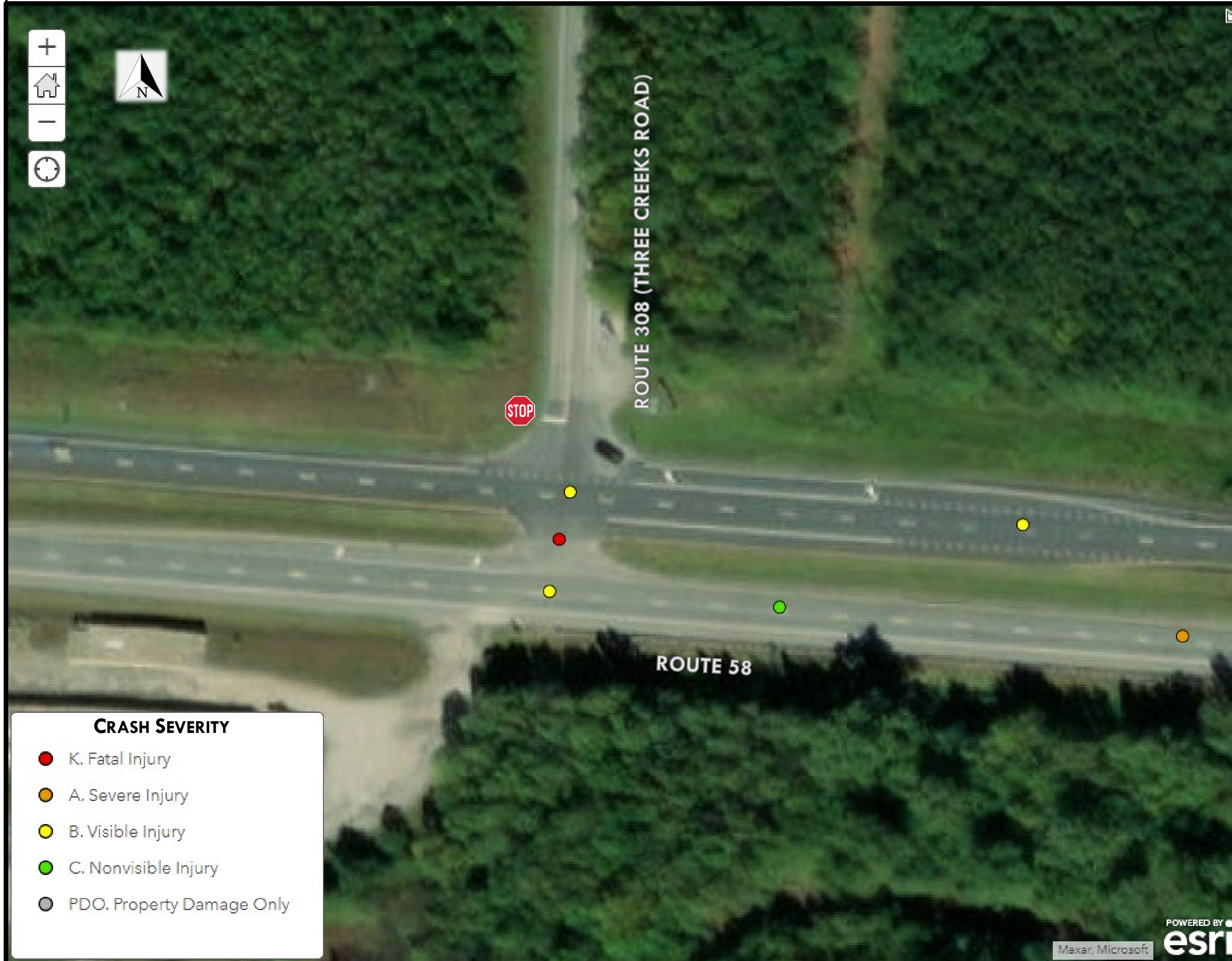


Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)

Intersection Control = Two-way Stop with private driveway

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	1	0	0.2
A. Severe Injury	0	0	0	1	0	0.2
B. Visible Injury	0	1	0	1	0	0.4
C. Nonvisible Injury	1	0	0	0	0	0.2
PDO. Property Damage Only	0	0	0	0	0	0
TOTAL	1	1	0	3	0	1
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

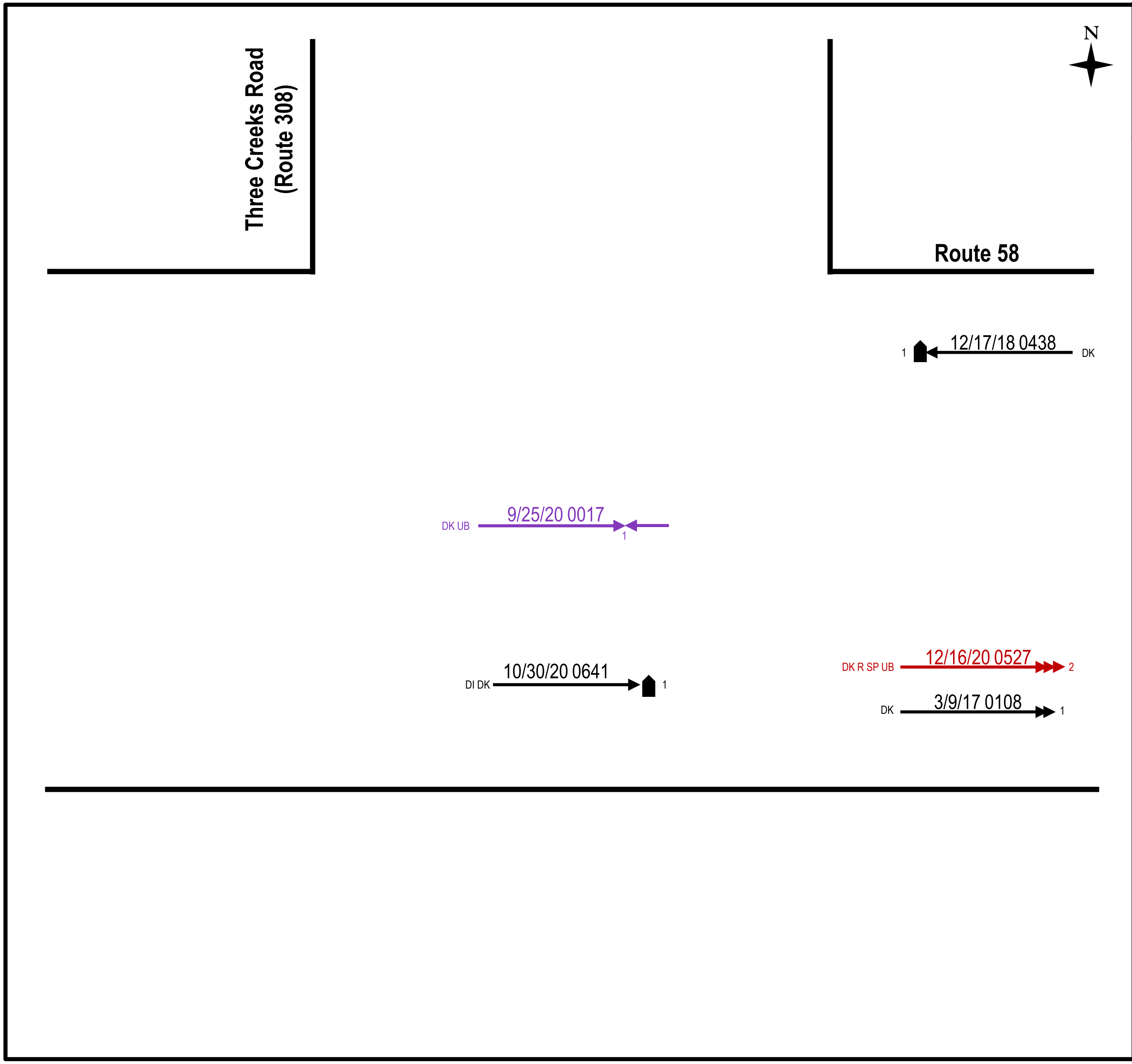
Crash Levels and Ranking

	2017 - 2021	Locality Rank (13 intersections)
Total Crashes	5	1
Crash Rate per 100 Million Entering Vehicles	19.45	6
Total Fatal and Serious Injury Crashes	2	1
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	7.78	1

Locality Rank for Potential for Safety Improvement = NA

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

SOUTHAMPTON COUNTY
ROUTE 58 AT ROUTE 308 (THREE CREEKS RD)

LEGEND

Crash Date
Crash Time of Day
DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

CRASH SEVERITY

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

COLLISION TYPE

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #11 – Route 58 at Route 308 (Three Creeks Road)

Southampton County

Crash Data Analysis

Collision Type

Collision Type	Route 58 at Route 308 (Three Creeks Rd)	All Safety Study Intersections
Right Angle	0.0%	39.0%
Rear End	40.0%	37.6%
Head On	20.0%	2.9%
Sideswipe - Same Direction	0.0%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	40.0%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	0.0%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Route 58 at Route 308 (Three Creeks Rd)	All Safety Study Intersections
No Improper Action	40.0%	8.5%
Wrong Side Of Road - Not Overtaking	20.0%	0.4%
Exceeded Speed Limit	20.0%	0.7%
Other	20.0%	5.8%

Weather

Weather	Route 58 at Route 308 (Three Creeks Rd)	All Safety Study Intersections
Clear/Cloudy	80.0%	84.6%
Mist/Rain/Fog	20.0%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Route 58 at Route 308 (Three Creeks Rd)	All Safety Study Intersections
Alcohol Involved	0.0%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	20.0%	19.5%
Speeding	20.0%	7.9%
Unbelted	40.0%	2.6%
Nighttime	100.0%	26.1%

Five-Year Total Crashes (2017-2021): 5

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Crash Data Observations

- 1 head on crash that resulted in a fatality.
- 2 fixed object – off road crashes (40%), which was higher than the regional average of 4.8%.
- 20% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
- 40% of crashes involved drivers/passengers that were unbelted, which was higher than the regional average of 2.6%.
- 100% of crashes occurred during nighttime, which was higher than the regional average of 26.1%.

INTERSECTION #11 – ROUTE 58 AT ROUTE 308 (THREE CREEKS ROAD)
SOUTHAMPTON COUNTY

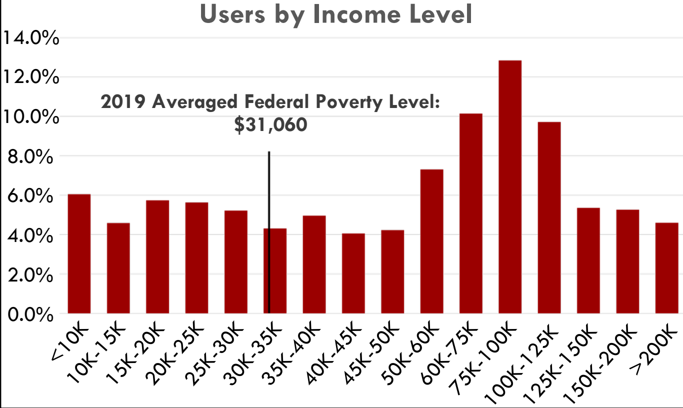
EQUITY ANALYSIS

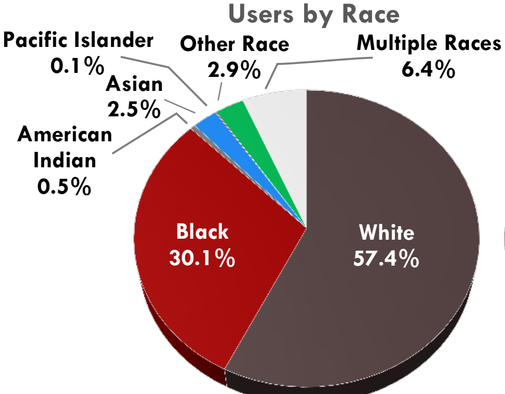
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	42.6%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	6.6%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	5.2%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	2.7%	3.1%
Average Daily Trips Made by Persons with a Disability	14.5%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	27.2%	18.9%

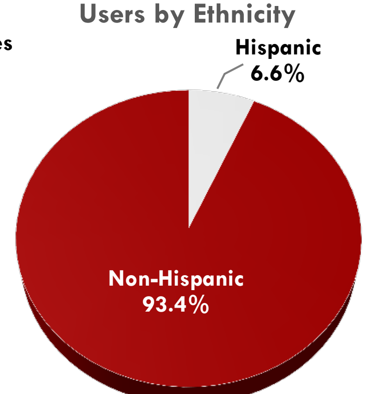
*Percentages in red are higher than the regional average.

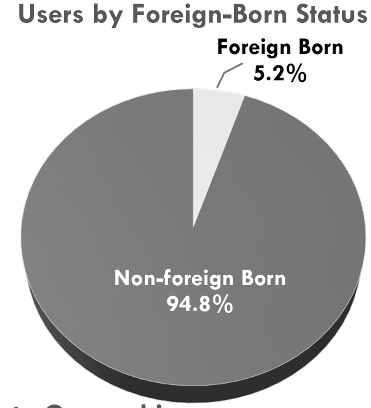
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	N
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	Y
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	3

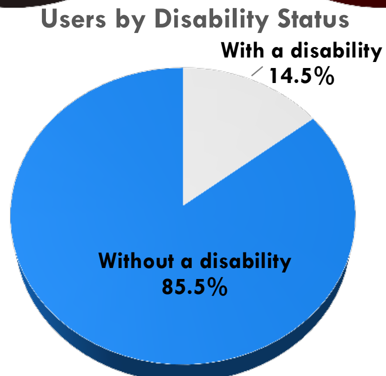
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
17,800	0.0%	No

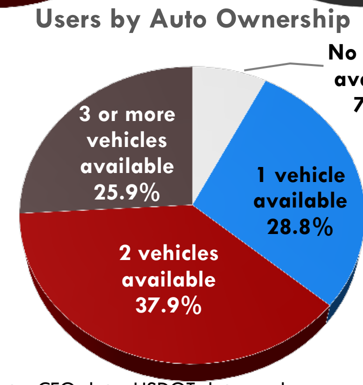












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #11 – Route 58 at Route 308 (Three Creeks Road)

Southampton County

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: **0**

INTERSECTION #11 – ROUTE 58 AT ROUTE 308 (THREE CREEKS ROAD)

SOUTHAMPTON COUNTY

SITE OBSERVATIONS & POSSIBLE CAUSES

1. No intersection lighting.
2. High travel speeds along Route 58.
3. Vehicles stop in front of the Stop Bar for Route 308 (Three Creeks Rd) southbound approach. Stop Bar is far back from the intersection.
4. Visible rut/tire tracks in the median/inside shoulder for southbound left turning vehicles, which impacts eastbound acceleration along Route 58.
5. No retroreflective strip on existing stop sign support.
6. Tree blocks view to the east from the Route 308 southbound approach stop bar.
7. 2 fixed object – off road crashes (40%), which was higher than the regional average of 4.8%.
8. 20% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
9. 40% of crashes involved drivers/passengers that were unbelted, which was higher than the regional average of 2.6%.
10. 100% of crashes occurred during nighttime, which was higher than the regional average of 26.1%.

CANDIDATE CRASH COUNTERMEASURES

- Add intersection lighting (CMF=0.881, Nighttime only).
- Move up Stop Sign and Stop Bar for Route 308 (Three Creeks Rd) southbound approach (CMF=0.899).
- Consider placing stop signs on both the left and right side of the intersection southbound approach for Route 308 (Three Creeks Rd) (CMF=0.89).
- Improve turning radius in the median/inside shoulder for southbound left turning vehicles by adding additional pavement (CMF=NA).
- Replace Stop Signs with retroreflective panel and strip on sign support pole (CMF=0.909).
- Trim tree/vegetation that blocks view to the east from the Route 308 southbound approach stop bar (CMF=NA).

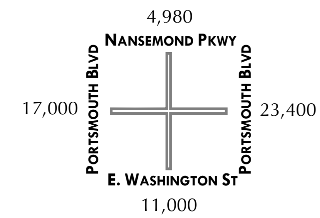
- Educate drivers about the dangers of not wearing a seat belt and increase enforcement of speeding (CMF=NA).
- Maintenance/reconstruction of the crossover could potentially improve vehicles overcorrecting if they run off the edge of pavement (CMF=NA).

Intersection #12 – Portsmouth Boulevard at Nansemond Parkway/E. Washington Street
Suffolk

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Signalized
Protected phasing for Portsmouth Blvd left turns
Split phasing for Nansemond Pkwy and
E Washington St approaches

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	1	0	1	0	0	0.4
B. Visible Injury	2	1	0	2	0	1
C. Nonvisible Injury	10	4	5	3	8	6
PDO. Property Damage Only	6	9	7	7	3	6.4
TOTAL	19	14	13	12	11	13.8
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

Crash Levels and Ranking

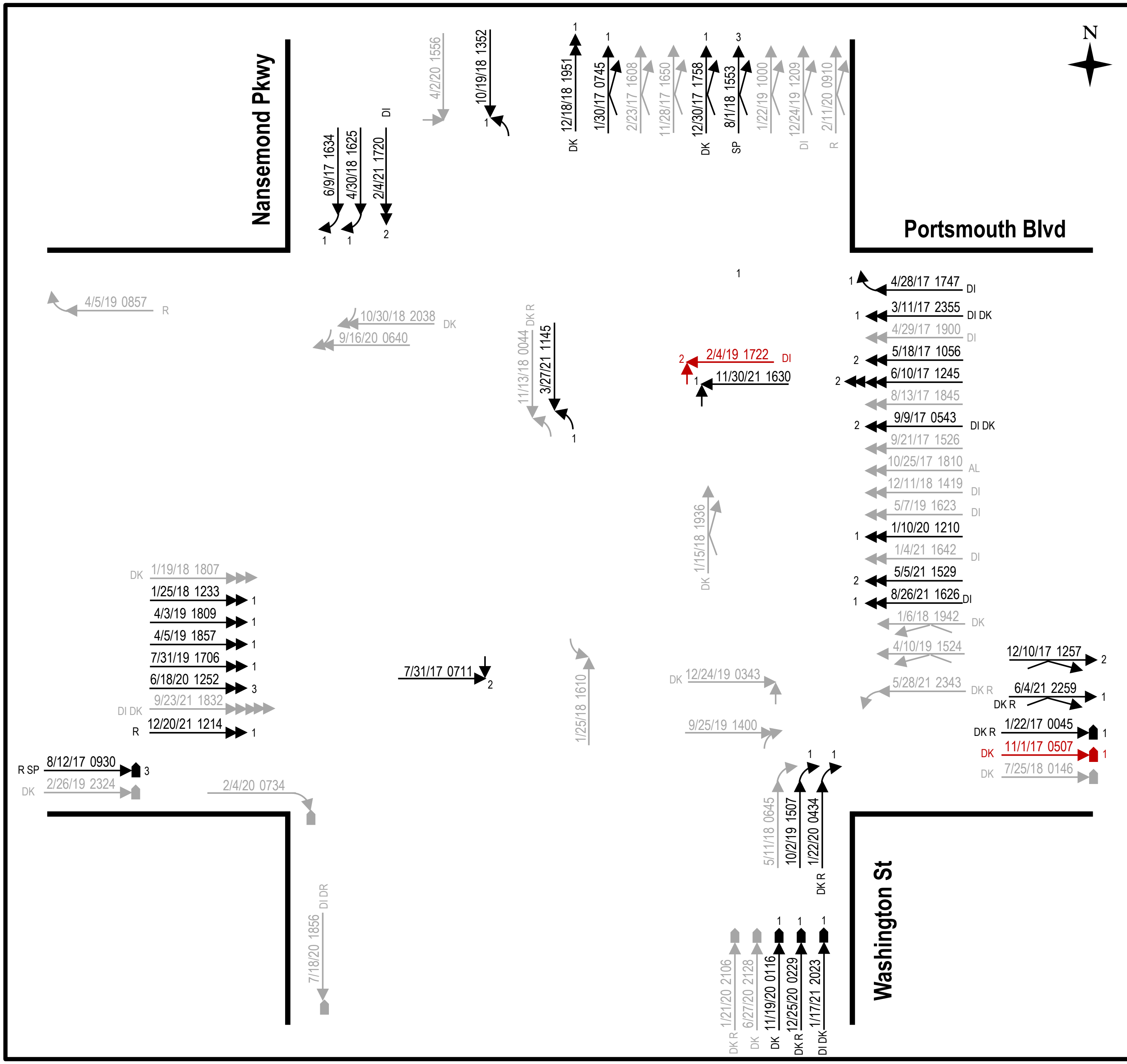
	2017 - 2021	Locality Rank (72 intersections)
Total Crashes	69	2
Crash Rate per 100 Million Entering Vehicles	134.12	4
Total Fatal and Serious Injury Crashes	2	4
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	3.89	17

Locality Rank for Potential for Safety Improvement = 4

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.

HAMPTON ROADS TPO



COLLISION DIAGRAM

CITY OF SUFFOLK
PORTSMOUTH BLVD AT NANSEMOND PKWY/E WASHINGTON ST

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

\# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

CRASH SEVERITY

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

COLLISION TYPE

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021. Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #12 – Portsmouth Boulevard at Nansemond Parkway/E. Washington Street
Suffolk

Crash Data Analysis

Collision Type

Collision Type	Portsmouth Blvd at Nansemond Pkwy	All Safety Study Intersections
Right Angle	21.7%	39.0%
Rear End	43.5%	37.6%
Head On	0.0%	2.9%
Sideswipe - Same Direction	13.0%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	11.6%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	10.1%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Portsmouth Blvd at Nansemond Pkwy	All Safety Study Intersections
Following Too Close	23.2%	28.1%
Fail to Maintain Proper Control	20.3%	6.6%
No Improper Action	15.9%	8.5%
Other	13.0%	5.8%
Did Not Have Right-of-Way	10.1%	17.9%

Weather

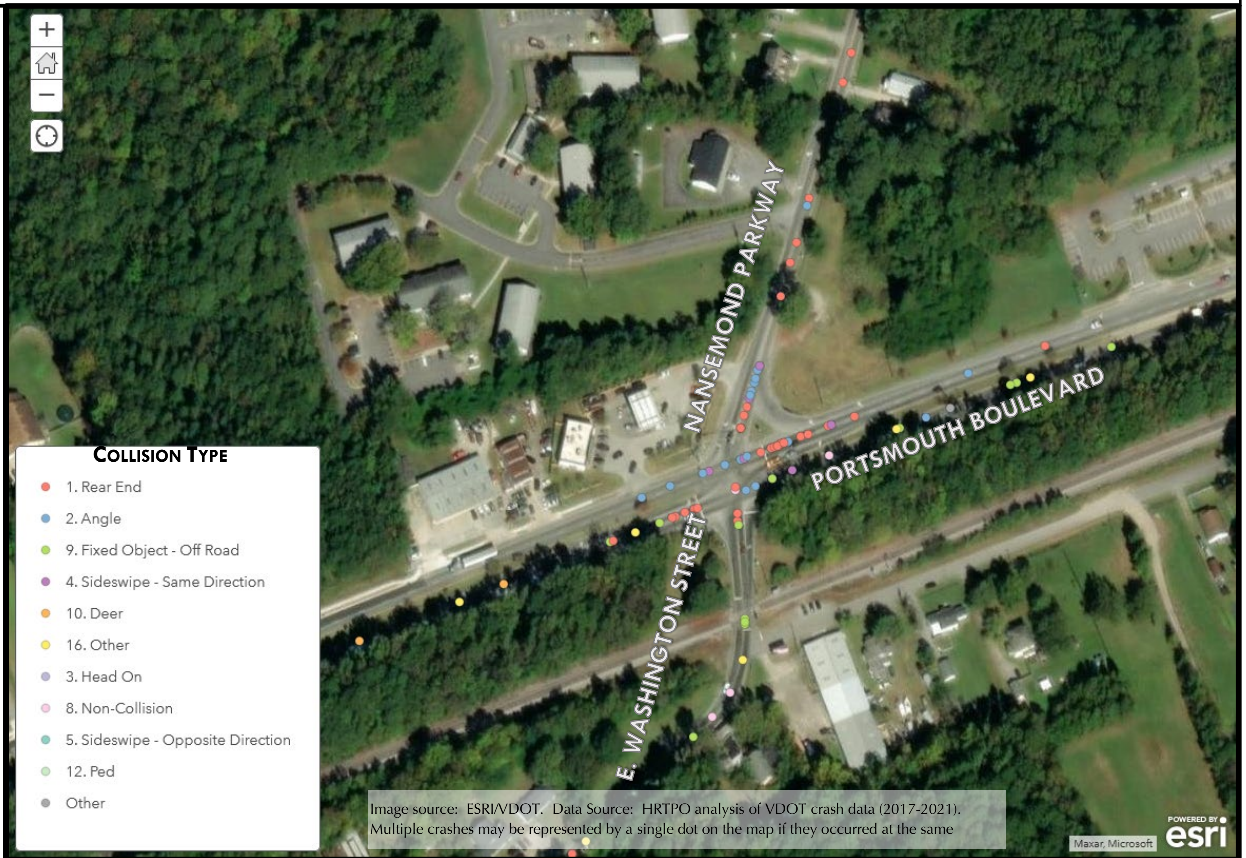
Weather	Portsmouth Blvd at Nansemond Pkwy	All Safety Study Intersections
Clear/Cloudy	84.1%	84.6%
Mist/Rain/Fog	15.9%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Portsmouth Blvd at Nansemond Pkwy	All Safety Study Intersections
Alcohol Involved	4.3%	5.2%
Drug Use Involved	1.4%	0.6%
Distracted Driving	23.2%	19.5%
Speeding	4.3%	7.9%
Unbelted	0.0%	2.6%
Nighttime	33.3%	26.1%

Five-Year Total Crashes (2017-2021): 69

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.



Crash Data Observations

- Higher number of rear end crashes (43.5%), which was higher than the regional average of 37.6%. Many rear end crashes were along the Portsmouth Blvd westbound approach.
- Higher percentage of Sideswipe – Same Direction crashes (13%) compared to the regional average of 8.2%.
- Higher percentage of fixed object – off road crashes (11.6%), which was higher than the regional average of 4.8%.
- 20.3% of drivers failed to maintain proper control, which was higher than the regional average of 6.6%.
- 23.2% of crashes resulted from distracted driving, which was higher than the regional average of 19.5%.
- 33.3% of crashes occurred during nighttime, which was higher than the regional average of 26.1%.

INTERSECTION #12 – PORTSMOUTH BOULEVARD AT NANSEMOND PARKWAY/E. WASHINGTON STREET

SUFFOLK

EQUITY ANALYSIS

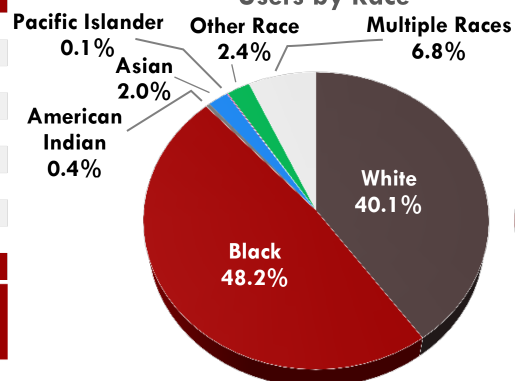
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	59.9%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	5.7%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	3.9%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	1.9%	3.1%
Average Daily Trips Made by Persons with a Disability	13.9%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	27.4%	18.9%

*Percentages in red are higher than the regional average.

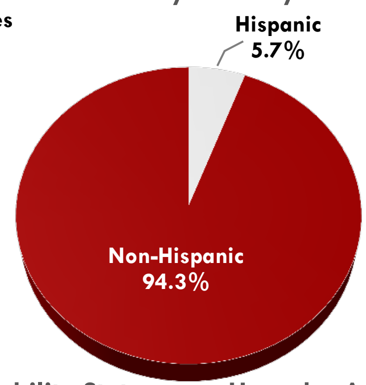
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	N
Elderly Populations	N
Female Head of Households	Y
Households Receiving Food Stamps	Y
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	Y
Total HRTPO Transportation Vulnerability Score	**3**

Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
91,400	38.7%	Yes

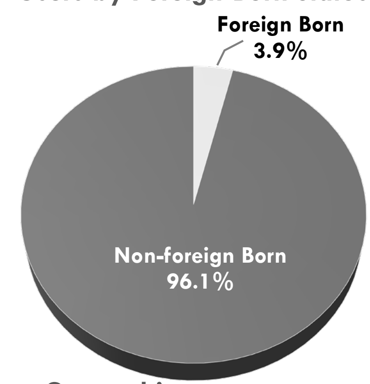
Users by Race



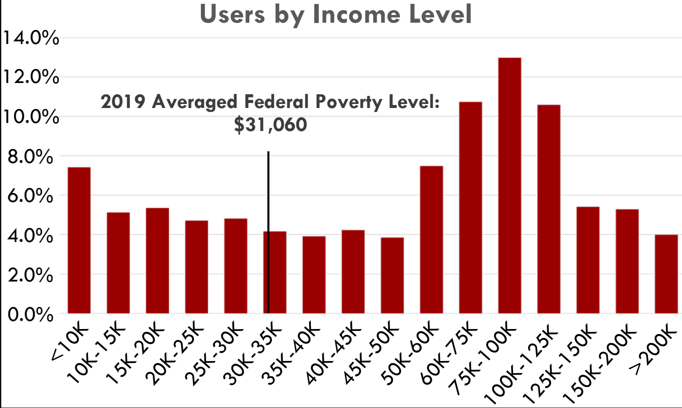
Users by Ethnicity



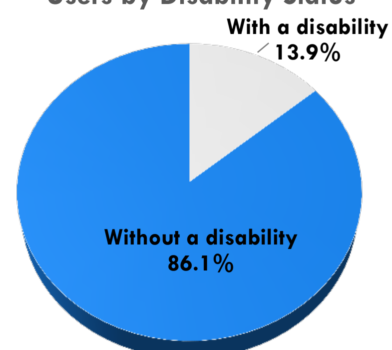
Users by Foreign-Born Status



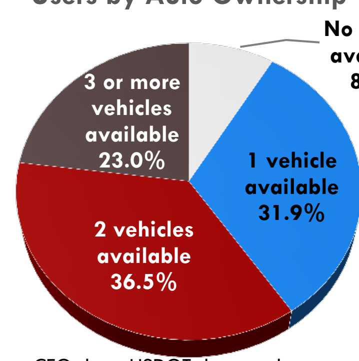
Users by Income Level



Users by Disability Status



Users by Auto Ownership



Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

INTERSECTION #12 – PORTSMOUTH BOULEVARD AT NANSEMOND PARKWAY/E. WASHINGTON STREET

SUFFOLK

HAMPTON ROADS REGIONAL SAFETY STUDY SURVEY RESPONSES

TOTAL SURVEY RESPONSES FOR INTERSECTION: 2

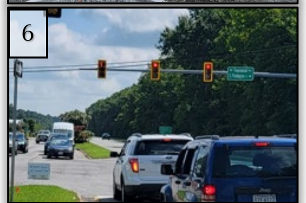
What is the safety issue/concern:

- "There are too many vehicles on road in Suffolk While population has increased 50% in last 20 years haven't seen roadways increase in capacity and very poor rd maintenance This applies to all roads in Suffolk. There have been many rd project on comp plans for us but they seem to just keep getting push down the road another 10 years. Very poor implementation by Suffolk leaders keep putting warehouses up all over city instead of central location that incudes good roads and rail service."

Intersection #12 – Portsmouth Boulevard at Nansemond Parkway/E. Washington Street
Suffolk

Site Observations & Possible Causes

1. Yield sign for WB Portsmouth Blvd channelized right turn lane is located too far around the curve for turning vehicles to see it.
2. 7-Eleven driveway on Nansemond Pkwy is within the functional area of the intersection. Nansemond Pkwy does not have a raised curb median, so NB vehicles are allowed to make left turns into the property which interfere with SB vehicles along Nansemond Pkwy.
3. Traffic signal backplates have retroreflective borders that may have been added recently.
4. Utility pole near Royal Farms development in the northeast corner is close to the road.
5. There are no Signal Ahead signs are located along EB or WB Portsmouth Blvd approaches.
6. Overhead powerlines partially obstruct the view of the traffic signals for the EB Portsmouth Blvd approach.
7. No lighting for the south leg of the intersection. Lighting present for the other three legs.
8. Red light running cameras installation appears to be in progress for south, east, and west legs.
9. There is a slight skew to the intersection layout. Protected phasing for Portsmouth Blvd left turns. Split phasing for Nansemond Pkwy and E Washington St approaches.
10. The mast arm and signal heads for the SB approach are not over the receiving lane.



11. There are many utility poles and signs for NB E. Washington St approach near the right turn lane between the train tracks and the intersection. Many are bent and have steel reinforcements from previous collisions.
12. The right turn lane for the NB approach is too narrow after the train tracks and vehicles are driving on the shoulder to avoid vehicles in the left/through lane. Queue storage for the left/through lane only allows 4-5 vehicles after the train tracks.
13. The guardrail along the curve before the train tracks for the NB approach is bent back from previous collisions. This curve is causing problems with run off the road crashes. No chevron curve warning signs are present for NB travel, and only one chevron curve warning sign is present for SB travel.
14. The guardrail on the west side of the south leg along E. Washington St is bent/damaged from a prior collision. Left turning trucks for WB Portsmouth Blvd onto SB E. Washington St had difficulty with their turning radius and nearly hit this guardrail.
15. The Signal Ahead sign for NB E. Washington St is dirty and difficult to see. Vegetation partially obstructs the sign as well.
16. Vegetation north of 7-Eleven driveway along Nansemond Pkwy blocks visibility.

Candidate Crash Countermeasures

- Add Yield Line (triangles) pavement markings and 2nd yield sign in the triangle areas for WB Portsmouth Blvd channelized right turn lane (CMF=0.886). Add diagonal cross hatch pavement markings to center island to narrow channelized right turn lane width (CMF=NA).
- Add raised curb median along Nansemond Pkwy near intersection to restrict turning conflicts for 7-Eleven driveway (CMF=0.697). Note that this improvement is under construction with the Royal Farms development in the NE quadrant. Other roadway improvements include extension of the right turn lane on Portsmouth Blvd, right and left turn lanes serving the Nansemond Pkwy entrance and the addition of a left turn lane serving the Heritage Acres entrance.
- Add activated flashing beacon (CMF=0.64, Rear end only) or LED Signal Ahead signs for EB and WB Portsmouth Blvd (CMF=0.65, Angle only).
- Consider widening NB approach with left turn, through, and right turn lane. Clear vegetation near right turn lane and move utility poles and signs further away from roadway (CMF=0.97).

- Add queue cutter signal with loop detection to activate the signal when queues extend near railroad tracks (CMF=NA).
- Install Do No Stop on Tracks sign for NB approach prior to railroad tracks (CMF=0.85).
- Repair bent guardrails on the south leg along E. Washington St for both SB and NB directions (CMF=NA).
- Add chevron curve warning signs for E. Washington St for NB and SB (only 1 sign currently) directions prior to the train tracks (CMF=0.75, Nighttime only).
- Replace Signal Ahead sign for NB E. Washington St with high visibility retroreflective material (CMF=NA).
- Clear vegetation just north of 7-Eleven driveway along Nansemond Pkwy (CMF=NA).
- Optimize signal timing (CMF=0.91).
- Educate drivers about the dangers of distracted driving (CMF=NA).
- Evaluate WB left turn lane storage length during peak periods and consider extending if inadequate.

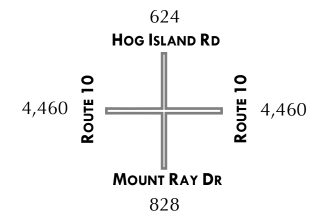

Intersection #13 – Route 10 at Hog Island Road/Mount Ray Drive

Surry County

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Two-way Stop for Hog Island Rd and Mount Ray Dr approaches

Crash Data

Annual Crashes by Year*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	0	0	0	1	0	0.2
B. Visible Injury	0	1	1	0	0	0.4
C. Nonvisible Injury	0	0	0	0	0	0
PDO. Property Damage Only	1	3	0	2	3	1.8
TOTAL	1	4	1	3	3	2.4
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	1	0	0	0	1	0.4

Crash Levels and Ranking

	2017 - 2021	Locality Rank (5 intersections)
Total Crashes	12	1
Crash Rate per 100 Million Entering Vehicles	126.79	1
Total Fatal and Serious Injury Crashes	1	1
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	10.57	1

Locality Rank for Potential for Safety Improvement = 1

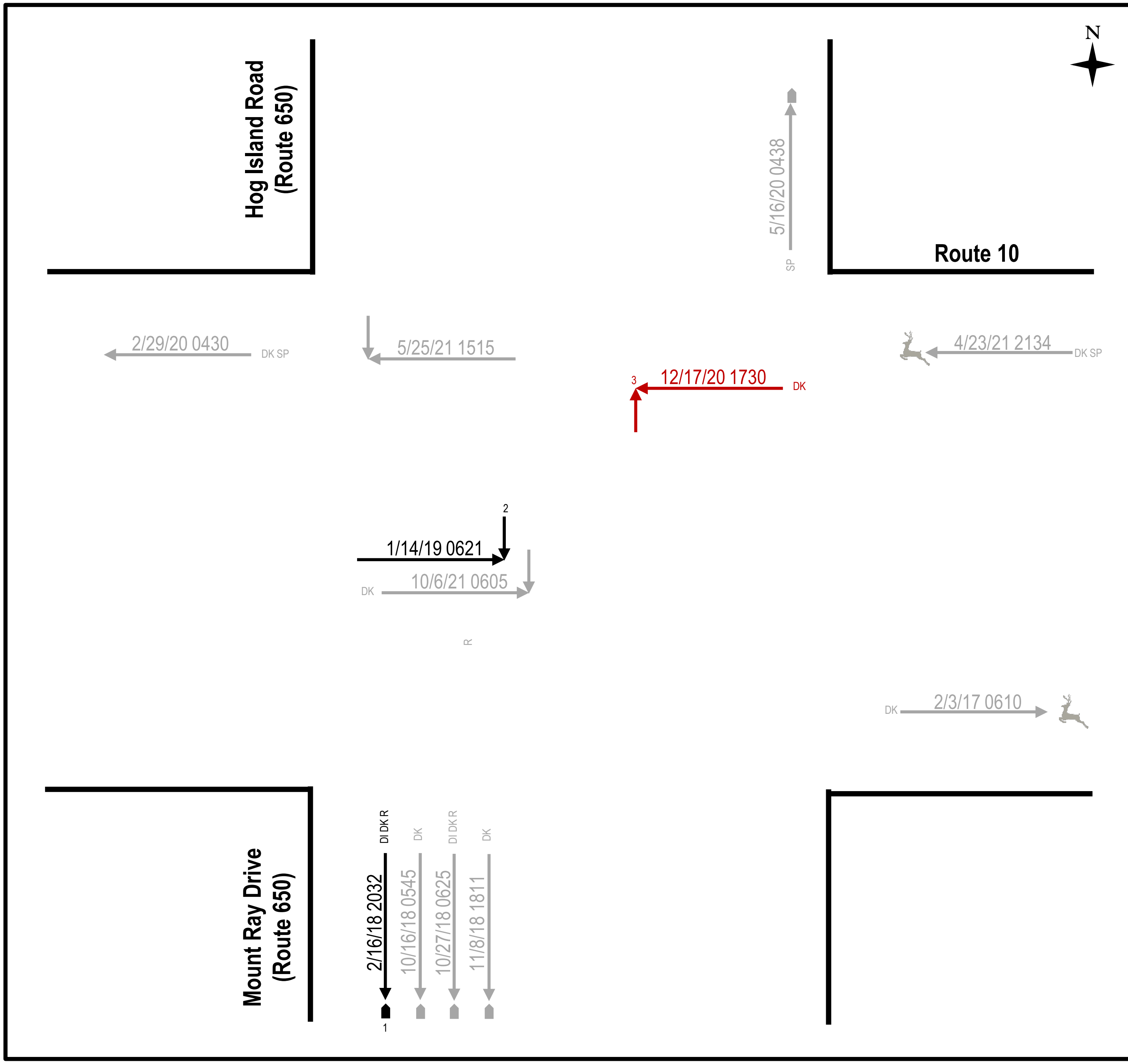
(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.

COLLISION DIAGRAM

Surry County

Route 10 at Hog Island Rd/Mount Ray Dr



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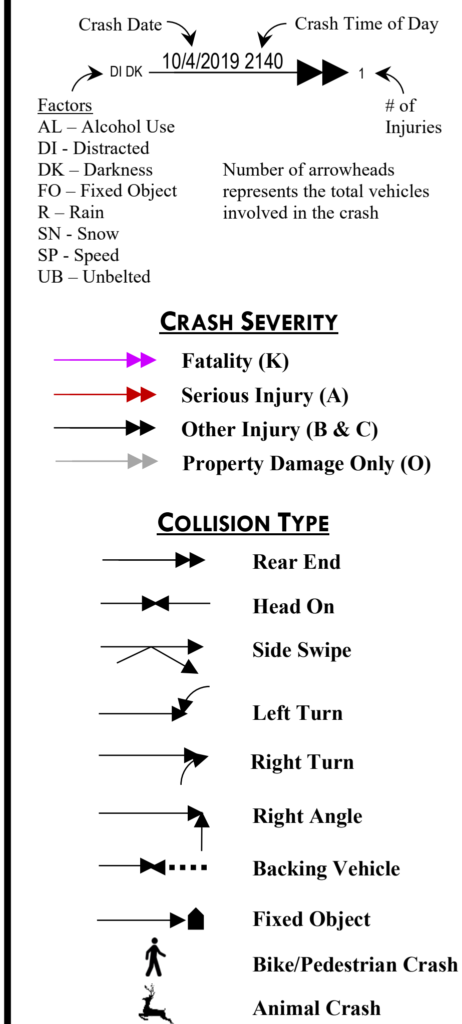


Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #13 – Route 10 at Hog Island Road/Mount Ray Drive

Surry County

Crash Data Analysis

Collision Type

Collision Type	Route 10 at Hog Island Rd/Mount Ray Dr	All Safety Study Intersections
Right Angle	33.3%	39.0%
Rear End	0.0%	37.6%
Head On	0.0%	2.9%
Sideswipe - Same Direction	0.0%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	50.0%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	16.7%	0.3%
Other	0.0%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Route 10 at Hog Island Rd/Mount Ray Dr	All Safety Study Intersections
No Improper Action	33.3%	8.5%
Disregarded Stop or Yield Sign	33.3%	1.0%
Fail to Maintain Proper Control	16.7%	6.6%
Other	8.3%	5.8%
Avoiding Animal	8.3%	0.2%

Weather

Weather	Route 10 at Hog Island Rd/Mount Ray Dr	All Safety Study Intersections
Clear/Cloudy	83.3%	84.6%
Mist/Rain/Fog	16.7%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Route 10 at Hog Island Rd/Mount Ray Dr	All Safety Study Intersections
Alcohol Involved	0.0%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	16.7%	19.5%
Speeding	25.0%	7.9%
Unbelted	0.0%	2.6%
Nighttime	75.0%	26.1%

Five-Year Total Crashes (2017-2021): 12

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Crash Data Observations

- High percentage of fixed object – off road crashes (50%), which was higher than the regional average of 4.8%.
- Higher percentage of crashes with animals (16.7%), which was higher than the regional average of 0.3%.
- 8.3% of crashes were trying to avoid an animal.
- 33.3% of drivers disregarded stop or yield sign, which was higher than the regional average of 1%.
- 16.7% of drivers failed to maintain proper control, which was higher than the regional average of 6.6%.
- 25% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
- High percentage of crashes occurred during nighttime (75%), which was higher than the regional average of 26.1%.

INTERSECTION #13 – ROUTE 10 AT HOG ISLAND ROAD/MOUNT RAY DRIVE
SURRY COUNTY

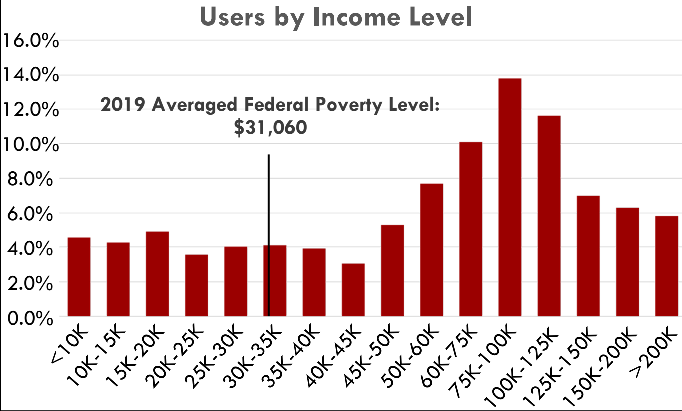
EQUITY ANALYSIS

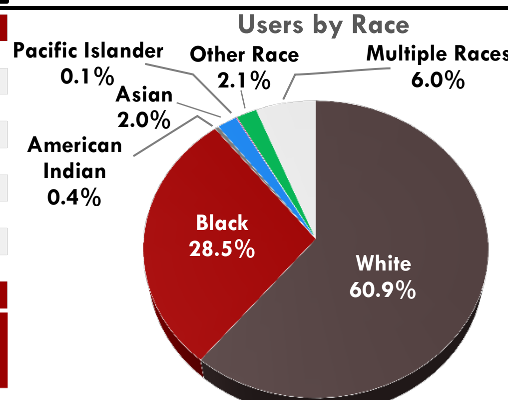
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	39.1%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	5.0%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	4.3%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	1.8%	3.1%
Average Daily Trips Made by Persons with a Disability	14.3%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	21.3%	18.9%

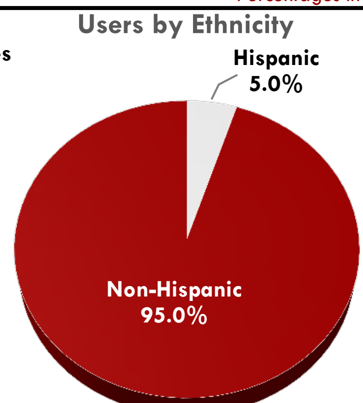
*Percentages in red are higher than the regional average.

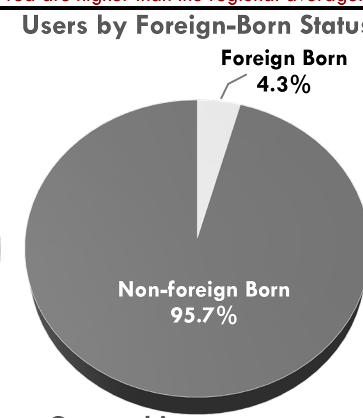
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	N
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	**1**

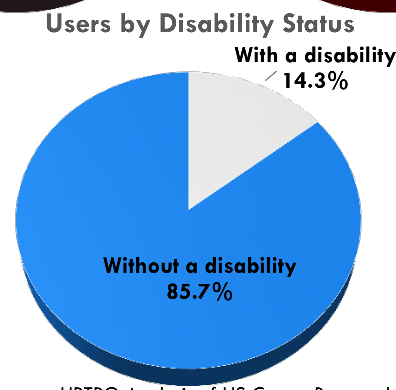
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
6,500	100.0%	Yes

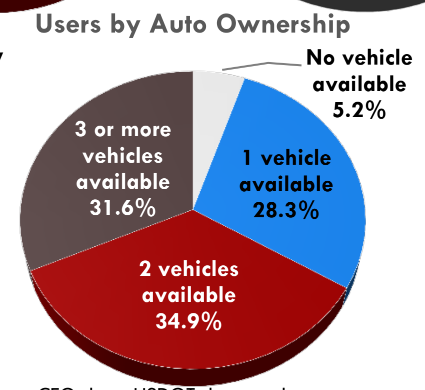












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #13 – Route 10 at Hog Island Road/Mount Ray Drive

Surry County

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: 0

INTERSECTION #13 – ROUTE 10 AT HOG ISLAND ROAD/MOUNT RAY DRIVE

SURRY COUNTY

SITE OBSERVATIONS & POSSIBLE CAUSES

1. No intersection lighting.
2. There are no edge lines on the Mount Ray Drive approach.
3. Stop Sign for Mount Ray Drive approach on the left side is partially blocked by vegetation.
4. No retroreflective strip on existing stop sign supports.
5. Curve on the southbound leg (Mount Ray Drive) likely contributes to off road crashes.
6. Southbound approach has no “cross traffic does not stop” sign.
7. High percentage of fixed object – off road crashes (50%), which was higher than the regional average of 4.8%.
8. Higher percentage of crashes with animals (16.7%), which was higher than the regional average of 0.3%.
9. Historical marker has slight impact on southbound visibility.
10. 8.3% of crashes were trying to avoid an animal.
11. 33.3% of drivers disregarded stop or yield sign, which was higher than the regional average of 1%.
12. 16.7% of drivers failed to maintain proper control, which was higher than the regional average of 6.6%.
13. 25% of crashes resulted from speeding, which was higher than the regional average of 7.9%.
14. High percentage of crashes occurred during nighttime (75%), which was higher than the regional average of 26.1%.

CANDIDATE CRASH COUNTERMEASURES

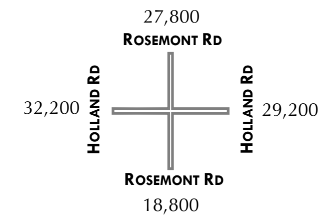
- Add 2nd Stop Sign for Hog Island Road southbound approach of the left side (CMF=0.899).
- Ensure vegetation is clear for Hog Island Road southbound approach (CMF=NA).
- Replace Stop Signs with retroreflective panel and strip on sign support pole for northbound and southbound approaches (CMF=0.909).
- Evaluate and add lighting to the intersection (CMF=0.881, Nighttime only).
- Add edge lines on Mount Ray Drive on both sides to clearly define where vehicles should travel and to prevent off road crashes (CMF=0.899). Consider adding chevrons and/or edge line rumble strips to Mount Ray Road just after leaving the intersection to account for horizontal curvature.
- Add “cross traffic does not stop” sign for southbound approach (CMF=0899).
- Add Deer Crossing signs along Route 10 near this intersection (CMF=0.899).

Intersection #14 – Rosemont Road at Holland Road
Virginia Beach

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes
Five Year Average (2017-2021)



Intersection Control = Signalized
Protected/Permitted phasing for all left turns

Crash Data

Annual Crashes by Year*

Crash Severity	Year					
	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	2	0	0	1	1	0.8
B. Visible Injury	4	11	11	7	13	9.2
C. Nonvisible Injury	0	0	1	1	0	0.4
PDO. Property Damage Only	14	12	27	15	10	15.6
TOTAL	20	23	39	24	24	26
Bicycle	0	0	2	0	0	0.4
Pedestrian	0	0	1	0	1	0.4
Animal	0	0	0	0	0	0

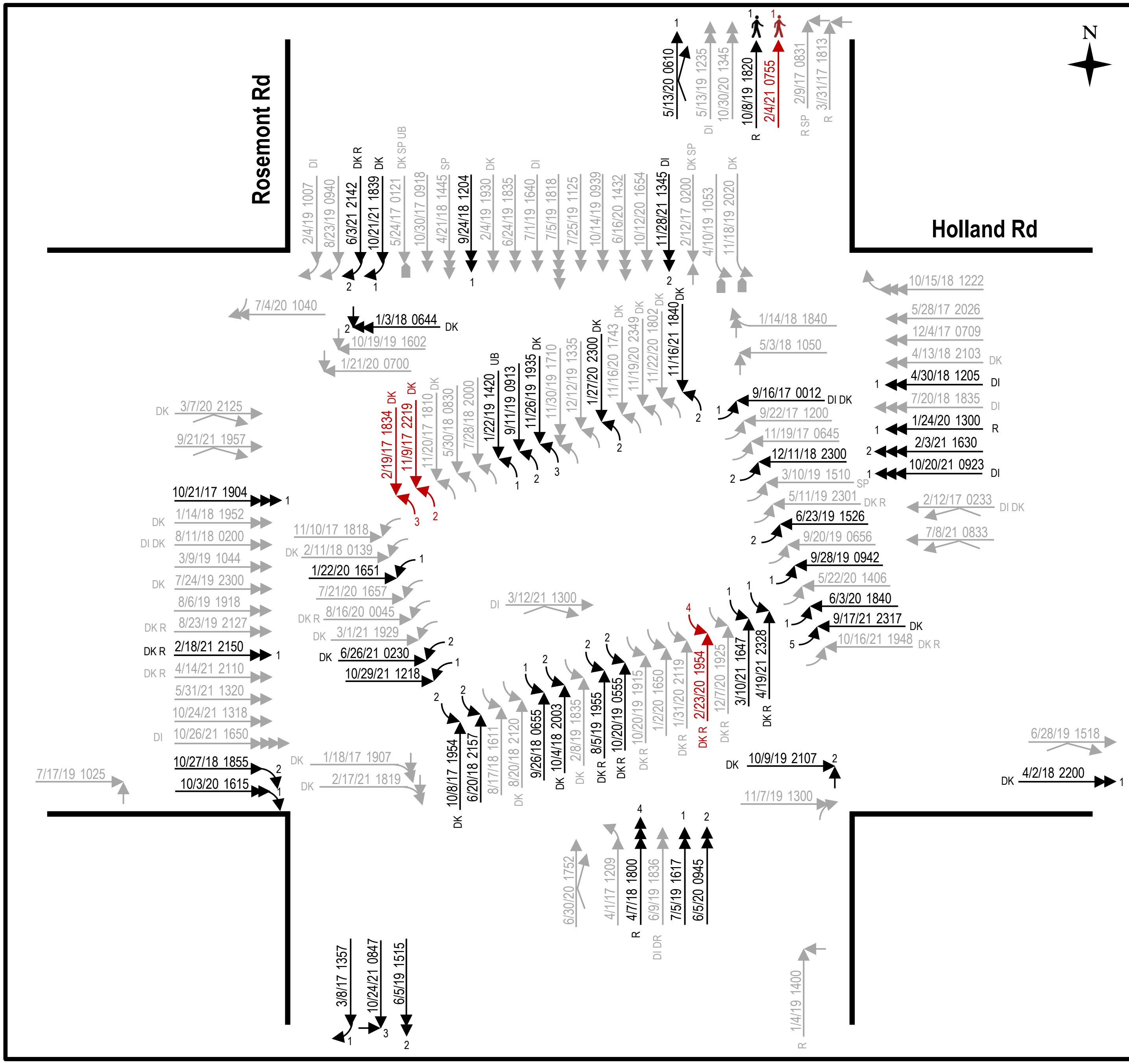
Crash Levels and Ranking

	2017 - 2021	Locality Rank (214 intersections)
Total Crashes	130	4
Crash Rate per 100 Million Entering Vehicles	131.91	4
Total Fatal and Serious Injury Crashes	4	4
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	4.06	23

Locality Rank for Potential for Safety Improvement = 2

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

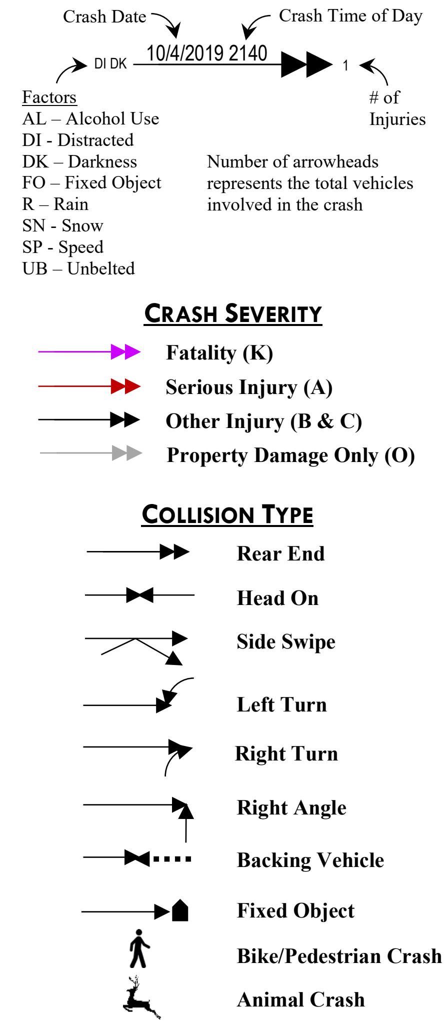
*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

City of Virginia Beach
Rosemont Rd at Holland Rd

LEGEND



Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021. Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #14 – Rosemont Road at Holland Road
Virginia Beach

Crash Data Analysis

Collision Type

Collision Type	Rosemont Road at Holland Road	All Safety Study Intersections
Right Angle	50.0%	39.0%
Rear End	36.2%	37.6%
Head On	3.8%	2.9%
Sideswipe - Same Direction	5.4%	8.2%
Sideswipe - Opposite Direction	0.8%	1.2%
Fixed Object - In Road	0.8%	0.4%
Fixed Object - Off Road	1.5%	4.8%
Bike/Pedestrian	1.5%	1.3%
Animal	0.0%	0.3%
Other	0.0%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Rosemont Road at Holland Road	All Safety Study Intersections
Did not have right-of-way	40.8%	17.9%
Following Too Close	30.8%	28.1%
No Improper Action	6.2%	8.5%
Other	5.4%	5.8%
Improper or Unsafe Lane Change	5.4%	6.0%

Weather

Weather	Rosemont Road at Holland Road	All Safety Study Intersections
Clear/Cloudy	83.8%	84.6%
Mist/Rain/Fog	16.2%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Rosemont Road at Holland Road	All Safety Study Intersections
Alcohol Involved	7.7%	5.2%
Drug Use Involved	0.8%	0.6%
Distracted Driving	10.8%	19.5%
Speeding	3.8%	7.9%
Unbelted	1.5%	2.6%
Nighttime	40.0%	26.1%

Five-Year Total Crashes (2017-2021): 130

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

Crash Data Observations

- Higher number of right-angle crashes (50%), which was higher than the regional average of 39.0%.
- 40.8% of crashes occurred when the driver did not have right-of-way, which was higher than the regional average of 17.9%.
- 30.8% of drivers were following too close, which was slightly higher than the regional average of 28.1%.
- 16.2% of crashes occurred during mist/rain/fog, which was slightly higher than the regional average of 14.9%.
- 7.7% of crashes involved alcohol, which was slightly higher than the regional average of 5.2%.
- High percentage of crashes occurred during nighttime (40%), which was higher than the regional average of 26.1%.

Intersection #14 – Holland Road at Rosemont Road
Virginia Beach

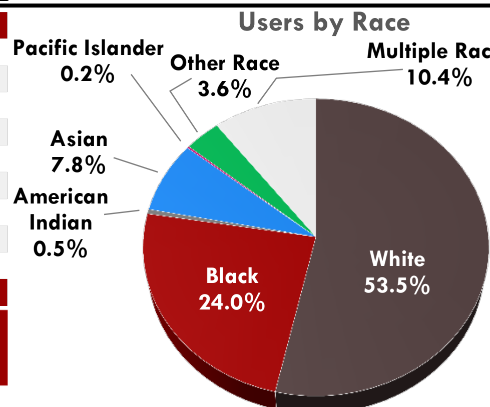
Equity Analysis

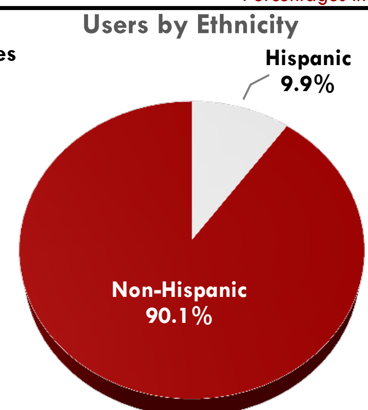
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	46.5%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	9.9%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	9.5%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	4.4%	3.1%
Average Daily Trips Made by Persons with a Disability	11.6%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	15.3%	18.9%

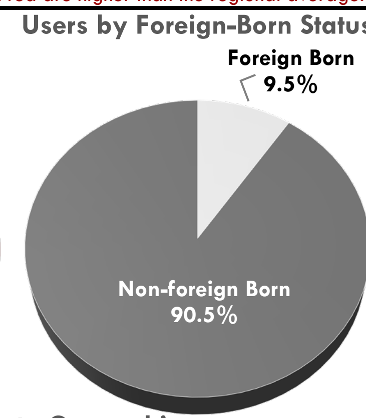
*Percentages in red are higher than the regional average.

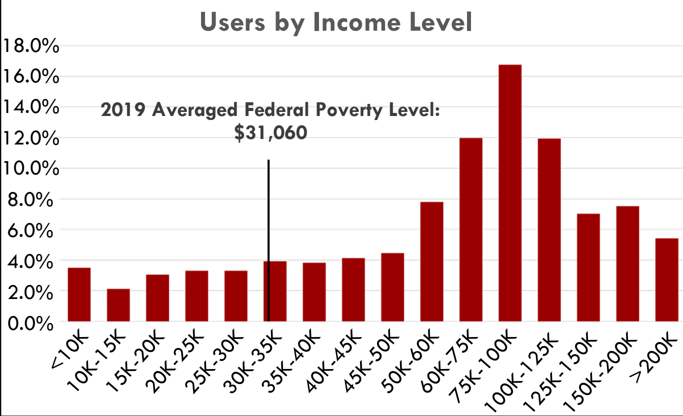
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	Y
Elderly Populations	N
Female Head of Households	Y
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	**2**

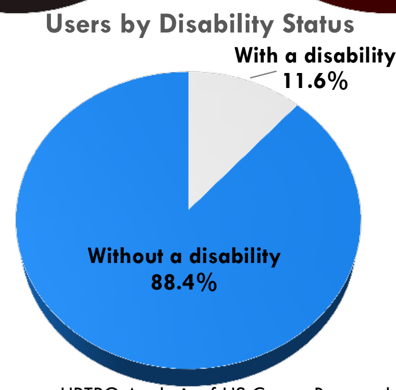
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
450,900	5.7%	No

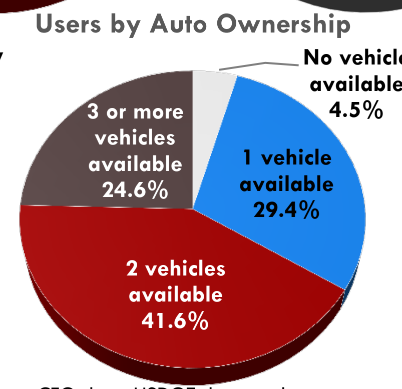






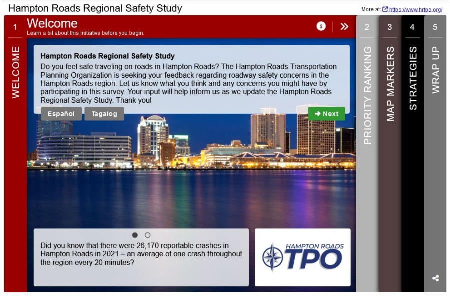






Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #14 – Rosemont Road at Holland Road
Virginia Beach



Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: **7**

Have you felt unsafe traveling through this intersection? Please elaborate:

- Yes – "The lights don't seemed to be timed right or many people run the yellow/red lights."
- Yes

What is the safety issue/concern:

- Need protected left turn – "When making a u turn at the light it's a very tight turn. There have been numerous accidents in this intersection. Make it a no u turn intersection."
- Red light running – "Busy at all hours- distracted drivers & speed & drivers run the red lights."
- Other – "All lane widths are too narrow, the road is not smooth and flowing, insufficient turning lane length, width and shoulder. MOST importantly all STOP bars away from each other. The point vehicles enter the intersection should be farther away from each other. The intersection is therefore too small, the lane widths too narrow, AND the cross-traffic visibility too poor."
- Other – "Need intersection redesign. Two turn lanes need each way. Red light camera isn't helping."

Intersection #14 – Rosemont Road at Holland Road
Virginia Beach

Site Observations & Possible Causes

1. Left turns on all approaches are controlled by protected-permissive phasing. Vehicles in left turn lane get trapped during permissive phase and have to run the red light or back up so they are not in the intersection.
2. Rosemont Rd approaches have channelized right turn lanes with yield control. Holland Rd approaches have single right turn lanes.
3. EB Holland Road and SB Rosemont Road approaches are congested during the PM Peak Period. Based on field visit, few vehicles were making left turns during the permissive phase due to heavy through movements.
4. The length of the EB Holland Rd left turn lane is not sufficient for given signal timing.
5. Pavement markings (stop bars, pedestrian crosswalks, turn arrows, etc) are worn.
6. Mixture of incandescent and LED lighting at intersection.
7. Curb ramps are located at the center of the curb radius for the northeast and southwest corners rather than perpendicular to the cross street.
8. Ped signal (NE quadrant) is too high.
9. No U-turn restrictions for any left turn lanes. Vehicles had trouble making U-turns.

10. Four section flashing yellow arrow signals are in place for all approaches. There are no Left Turn Yield On Flashing Signs for all approaches. Google map street view shows that these signs were installed but have been removed.
11. Red-light cameras are installed on EB and WB Holland Rd. Photo enforced signs are installed on NB and SB Rosemont Rd. These can potentially contribute to rear end crashes.
12. Right-of-way limited for all approaches.
13. Holland Shoppes (NE quadrant) driveway is close to intersection along NB Rosemont Rd. Four driveways at Soaps N Suds (NW quadrant) are close to intersection.
14. Power lines partially obstruct view of signals for NB approach.
15. Utility pole in triangle island (NW quadrant) partially obstructs view for SB and EB right turns.
16. EB and WB Holland Rd right turn lanes have signal heads with green right turn arrows. It was observed that the pedestrian crossing signal (across Rosemont Rd) is active for pedestrians at the same time as the green right turn arrows, which is dangerous for pedestrians.
17. Pavement markings (dashed lane line) for NB and SB Rosemont Rd receiving lanes are worn.
18. Yield sign for NB Rosemont Rd channelized right turn lane partially blocked by Exxon/7-Eleven sign.

Candidate Crash Countermeasures

- Use protected left turn phasing for all approaches (CMF=0.01 major, CMF=0.04 minor, angle). Implement and evaluate impacts to congestion to improve safety. Option: use protective left turn phasing only during peak periods.
- Restripe pavement markings for all approaches, including NB and SB Rosemont Rd receiving lanes (dashed lane line) (CMF=NA).
- Add yield line (triangles) pavement markings and 2nd yield sign in the triangle areas for NB and SB Rosemont Rd channelized right turn lanes (CMF=0.886). Relocate the yield sign for the NB Rosemont Rd channelized right turn lane for better visibility (CMF=NA).
- Consider removing red-light cameras and signs (to reduce rear end crashes) (CMF=NA).
- Lower ped signal head on NE corner (CMF=NA).
- Upgrade handicap ramps to code (CMF=NA).
- Educate drivers about the dangers of driving while intoxicated (CMF=NA).
- Change signal heads for EB and WB Holland Rd right turn lanes from green arrows to green balls. Study right turn overlap with pedestrian movements (CMF=NA).

- If keeping protective-permissive phasing, add Left Turn Yield On Flashing Signs for all left turn lanes for all approaches. Evaluate permissive left turns during peak periods to verify how many vehicles are making left turns during permissive phase (CMF=NA).
- Consider adding dotted lane line extensions to keep left turning vehicles in the correct lane (CMF=0.90).
- Evaluate lighting at night and consider upgrading incandescent lights. Add new lighting on NE and SE corners (CMF=0.881, Nighttime only).
- Consider/evaluate through/right and dual left turn lanes for EB Holland Rd (CMF=NA).
- Consider adding dual left turns for all approaches with protected left turn phasing (CMF=0.97).
- Close Holland Shoppes (NE quadrant) driveway. Close 2 driveways for Soaps N Suds on Holland Rd (NW quadrant) and relocate access to Grant Ave from Holland Rd (CMF=0.93).
- Conduct site visits during rain event to see if there is ponding (CMF=NA).
- Consider relocating power lines to underground and remove power pole on NW corner (CMF=NA).
- Evaluate left turn offsets (CMF=0.644).
- Add pedestrian warning signs for channelized right turn lanes (CMF=0.75, veh-ped only).
- Add right lane pavement markings and extend curb out in NW corner near Soaps N Suds (CMF=NA).

INTERSECTION #15 – ROUTE 132 (HENRY STREET) AT ROUTE 132Y/VISITOR CENTER DRIVE
WILLIAMSBURG

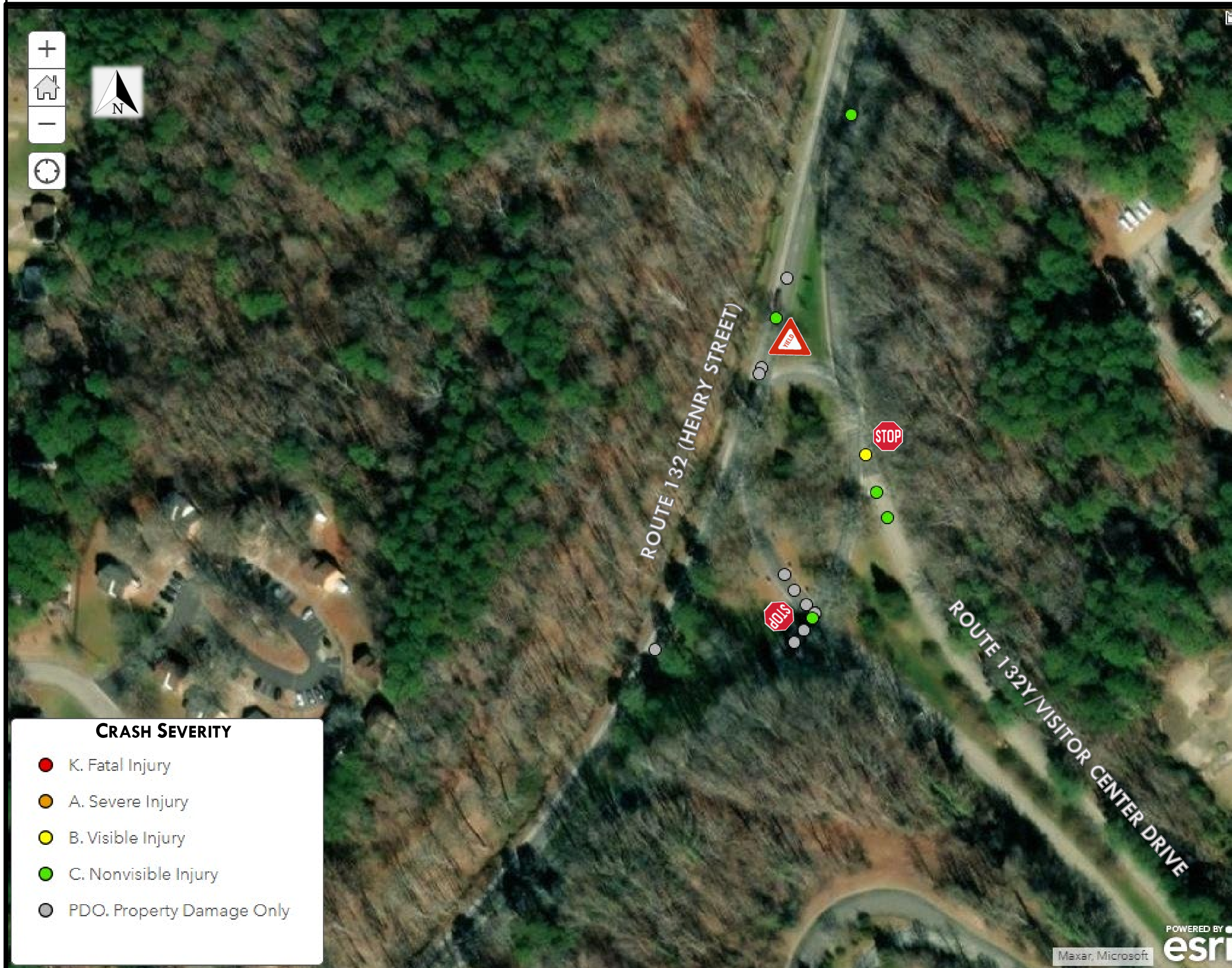
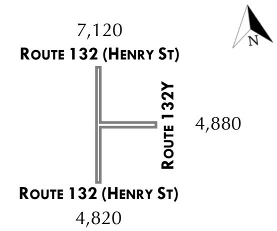


Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

INTERSECTION DATA

ANNUAL AVERAGE DAILY TRAFFIC VOLUMES FIVE YEAR AVERAGE (2017-2021)



Intersection Control = Multi-direction Stop with Yield

CRASH DATA

ANNUAL CRASHES BY YEAR*

Crash Severity	2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	0	0	0	1	0	0.2
B. Visible Injury	0	1	0	0	1	0.4
C. Nonvisible Injury	2	1	3	1	1	1.6
PDO. Property Damage Only	3	5	2	0	1	2.2
TOTAL	5	7	5	2	3	4.4
Bicycle	0	0	0	1	0	0.2
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

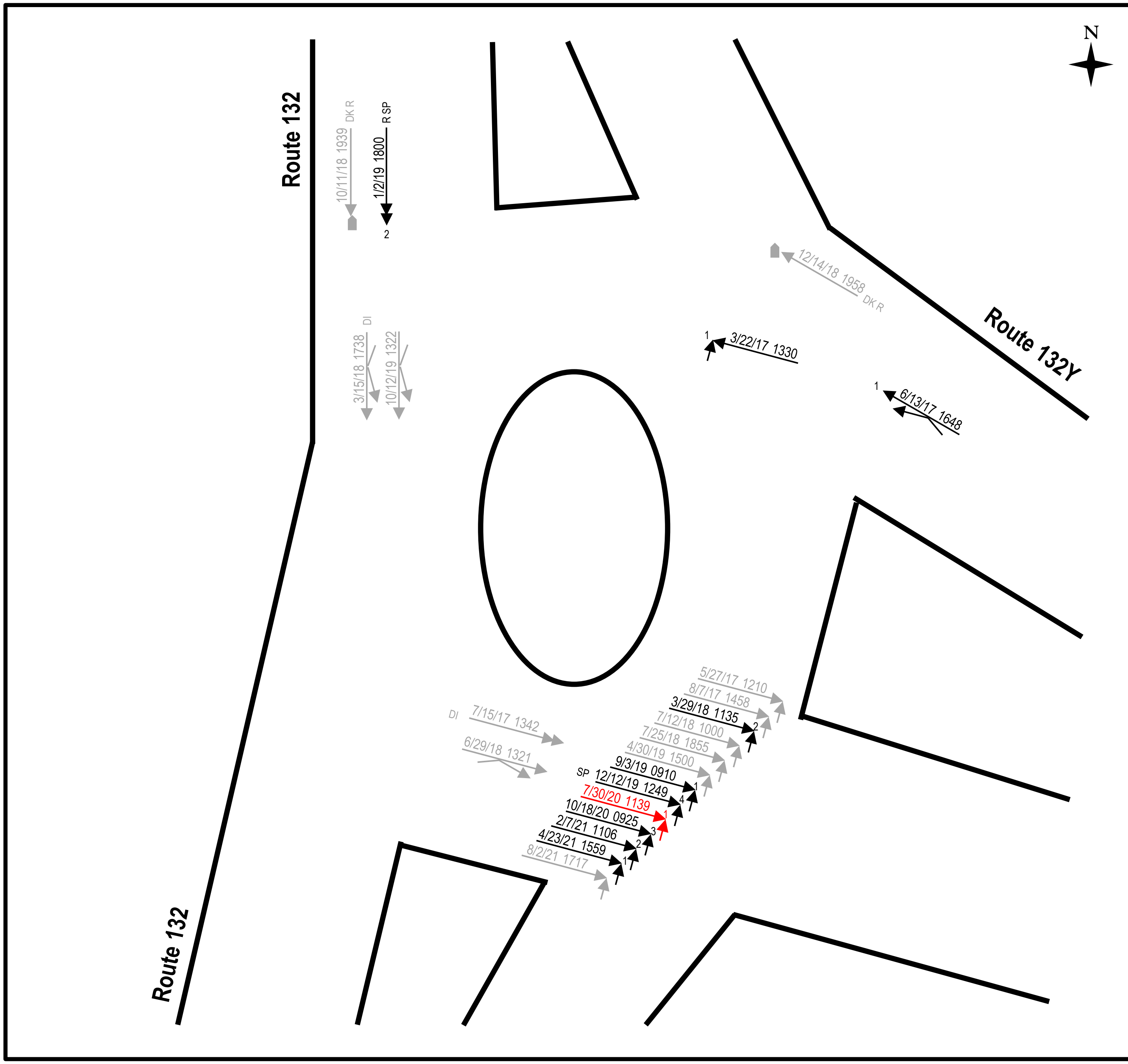
CRASH LEVELS AND RANKING

	2017 - 2021	Locality Rank (86 intersections)
Total Crashes	22	5
Crash Rate per 100 Million Entering Vehicles	143.34	1
Total Fatal and Serious Injury Crashes	1	4
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	6.52	3

Locality Rank for Potential for Safety Improvement = NA

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.



COLLISION DIAGRAM

City of Williamsburg
Route 132 at Route 132Y

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
- AL – Alcohol Use
- DI - Distracted
- DK – Darkness
- FO – Fixed Object
- R – Rain
- SN - Snow
- SP - Speed
- UB – Unbelted

\# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

Crash Severity

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250' (0.05 mi.) of the intersection.

Intersection #15 – Route 132 (Henry Street) at Route 132Y/Visitor Center Drive

Williamsburg

Crash Data Analysis

Collision Type

Collision Type	Route 132 (Henry St) at Route 132Y	All Safety Study Intersections
Right Angle	50.0%	39.0%
Rear End	4.5%	37.6%
Head On	4.5%	2.9%
Sideswipe - Same Direction	9.1%	8.2%
Sideswipe - Opposite Direction	9.1%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	0.0%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	22.7%	4.3%

Most Prevalent Driver Action

Primary Driver Action	Route 132 (Henry St) at Route 132Y	All Safety Study Intersections
Did Not Have Right-of-Way	36.4%	17.9%
Disregarded Stop or Yield Sign	22.7%	1.0%
No Improper Action	13.6%	8.5%
Improper or Unsafe Lane Change	13.6%	6.0%
Following Too Close	4.5%	28.1%

Weather

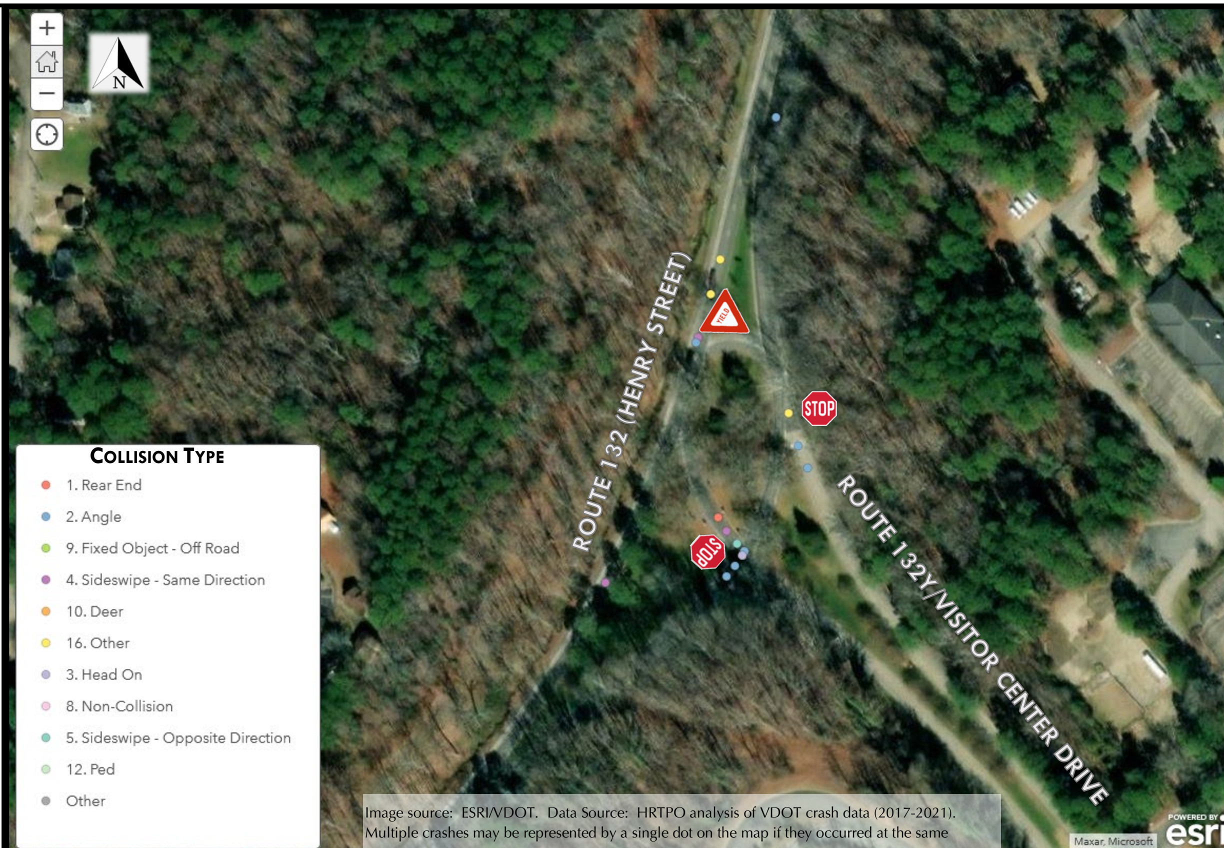
Weather	Route 132 (Henry St) at Route 132Y	All Safety Study Intersections
Clear/Cloudy	86.4%	84.6%
Mist/Rain/Fog	13.6%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

Other Contributing Factors

Other Contributing Factors	Route 132 (Henry St) at Route 132Y	All Safety Study Intersections
Alcohol Involved	0.0%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	9.1%	19.5%
Speeding	9.1%	7.9%
Unbelted	0.0%	2.6%
Nighttime	13.6%	26.1%

Five-Year Total Crashes (2017-2021): 22

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.



Crash Data Observations

- High number of right-angle crashes (50%), which was higher than the regional average of 39.0%.
- 13 crashes were right-angle crashes involving vehicles traveling eastbound on Route 132Y with vehicles traveling northbound on Route 132.
- 9.1 % of crashes were Sideswipe – Opposite Direction collision type, which were higher than the regional average of 1.2%.
- 36.4% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
- 22.7% of drivers disregarded stop or yield sign, which was higher than the regional average of 1%.
- 13.6% of drivers had an improper or unsafe lane change, which was higher than the regional average of 6.0%.

INTERSECTION #15 – ROUTE 132 (HENRY STREET) AT ROUTE 132Y/VISITOR CENTER DRIVE

WILLIAMSBURG

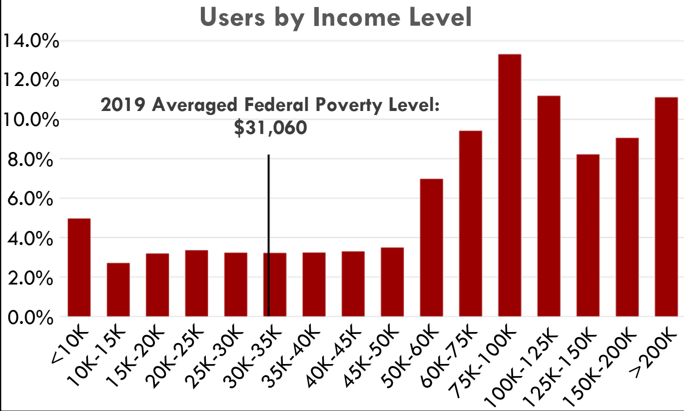
EQUITY ANALYSIS

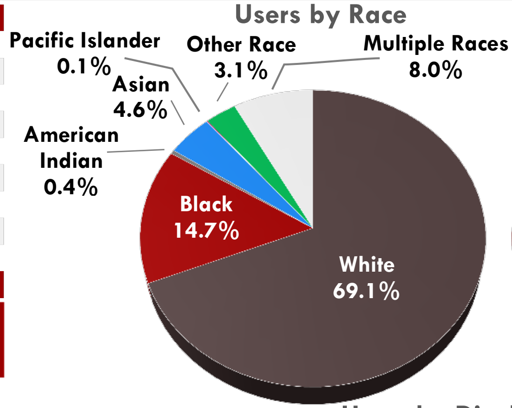
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	30.9%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	7.9%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	8.3%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	3.6%	3.1%
Average Daily Trips Made by Persons with a Disability	12.5%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	17.5%	18.9%

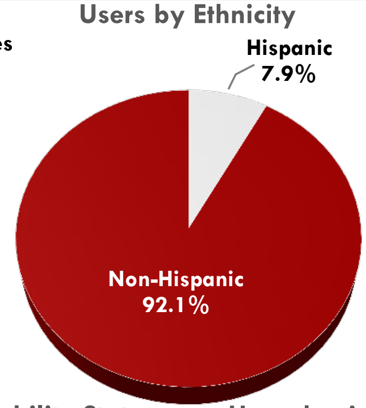
*Percentages in red are higher than the regional average.

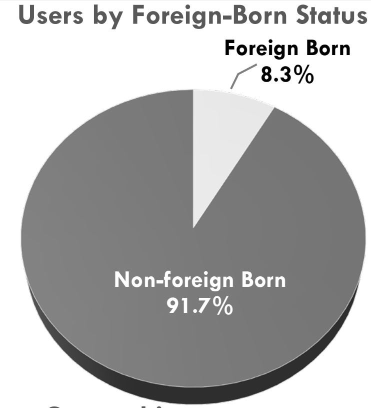
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	Y
Disabled Populations	Y
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	3

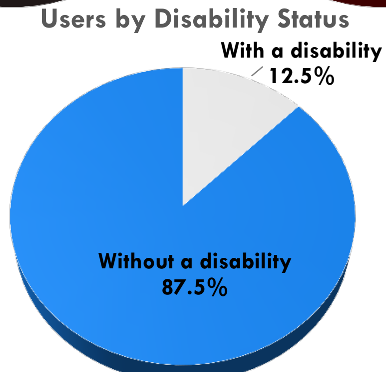
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
15,000	0.0%	No

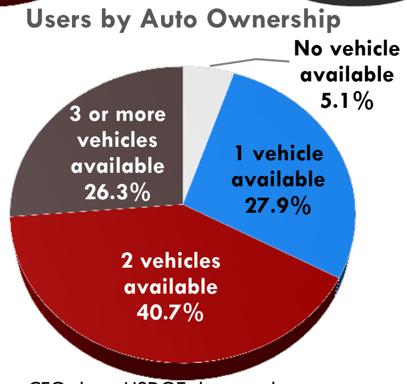












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

INTERSECTION #15 – ROUTE 132 (HENRY STREET) AT ROUTE 132Y/VISITOR CENTER DRIVE

WILLIAMSBURG

HAMPTON ROADS REGIONAL SAFETY STUDY SURVEY RESPONSES

TOTAL SURVEY RESPONSES FOR INTERSECTION: 2

Other Public Comments Received:

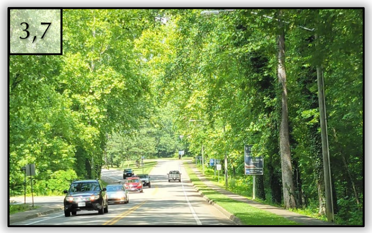
- Although two responses were collected for this location, no specific comments were received.

INTERSECTION #15 – ROUTE 132 (HENRY STREET) AT ROUTE 132Y/VISITOR CENTER DRIVE

WILLIAMSBURG

SITE OBSERVATIONS & POSSIBLE CAUSES

1. Stop signs are located on both sides, however, they do not have retroreflective strips on the stop sign supports.
2. No yield line pavement markings for westbound approach.
3. Vegetation throughout the intersection.
4. "Stop sign ahead" signs are present for the northwestbound approach.
5. "Stop sign ahead" and "traffic from right does not stop" signs are present for the eastbound approach.
6. Intersection is not easily visible in the northbound direction.
7. Lighting is present throughout the intersection, however, some lighting may be impacted by vegetation.
8. High number of right-angle crashes (50%), which was higher than the regional average of 39.0%.
9. 13 crashes were right-angle crashes involving vehicles traveling eastbound on Route 132Y with vehicles traveling northbound on Route 132.
10. 9.1 % of crashes were Sideswipe – Opposite Direction collision type, which were higher than the regional average of 1.2%.
11. 36.4% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
12. 22.7% of drivers disregarded stop or yield sign, which was higher than the regional average of 1%.
13. 13.6% of drivers had an improper or unsafe lane change, which was higher than the regional average of 6.0%.



CANDIDATE CRASH COUNTERMEASURES

- Design and construct a roundabout (CMF=0.52 for K and O crashes, CMF=0.22 for A, B, and C crashes).
- Add retroreflective strip on stop sign support poles for eastbound and northwest bound approaches (CMF=0.909).
- Add Yield Line (triangles) pavement markings for westbound approach (CMF=0.886).
- Consider moving "Stop sign ahead" signs farther back (CMF=NA).
- Evaluate lighting at the intersection during the night and add lighting (CMF = 0.881, Nighttime only) or trim vegetation (CMF=NA), as necessary.

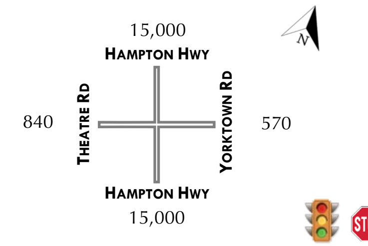
Intersection #16 – Hampton Highway at Yorktown Road/Theatre Road

York County

Image source: ESRI/VDOT. Data Source: HRTPO analysis of VDOT crash data (2017-2021).
Multiple crashes may be represented by a single dot on the map if they occurred at the same location.

Intersection Data

Annual Average Daily Traffic Volumes Five Year Average (2017-2021)



Intersection Control = Signalized, Stop Control for Theatre Rd
Protected/Permitted phasing for Hampton Hwy SB left turns
Protected/Permitted phasing for Hampton Hwy NB U-turns

Crash Data

Annual Crashes by Year*

Crash Severity	Year 2017	2018	2019	2020	2021	Avg
K. Fatal	0	0	0	0	0	0
A. Severe Injury	1	0	0	0	0	0.2
B. Visible Injury	3	4	1	1	1	2
C. Nonvisible Injury	1	0	0	0	0	0.2
PDO. Property Damage Only	5	2	6	4	4	4.2
TOTAL	10	6	7	5	5	6.6
Bicycle	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0
Animal	0	0	0	0	0	0

Crash Levels and Ranking

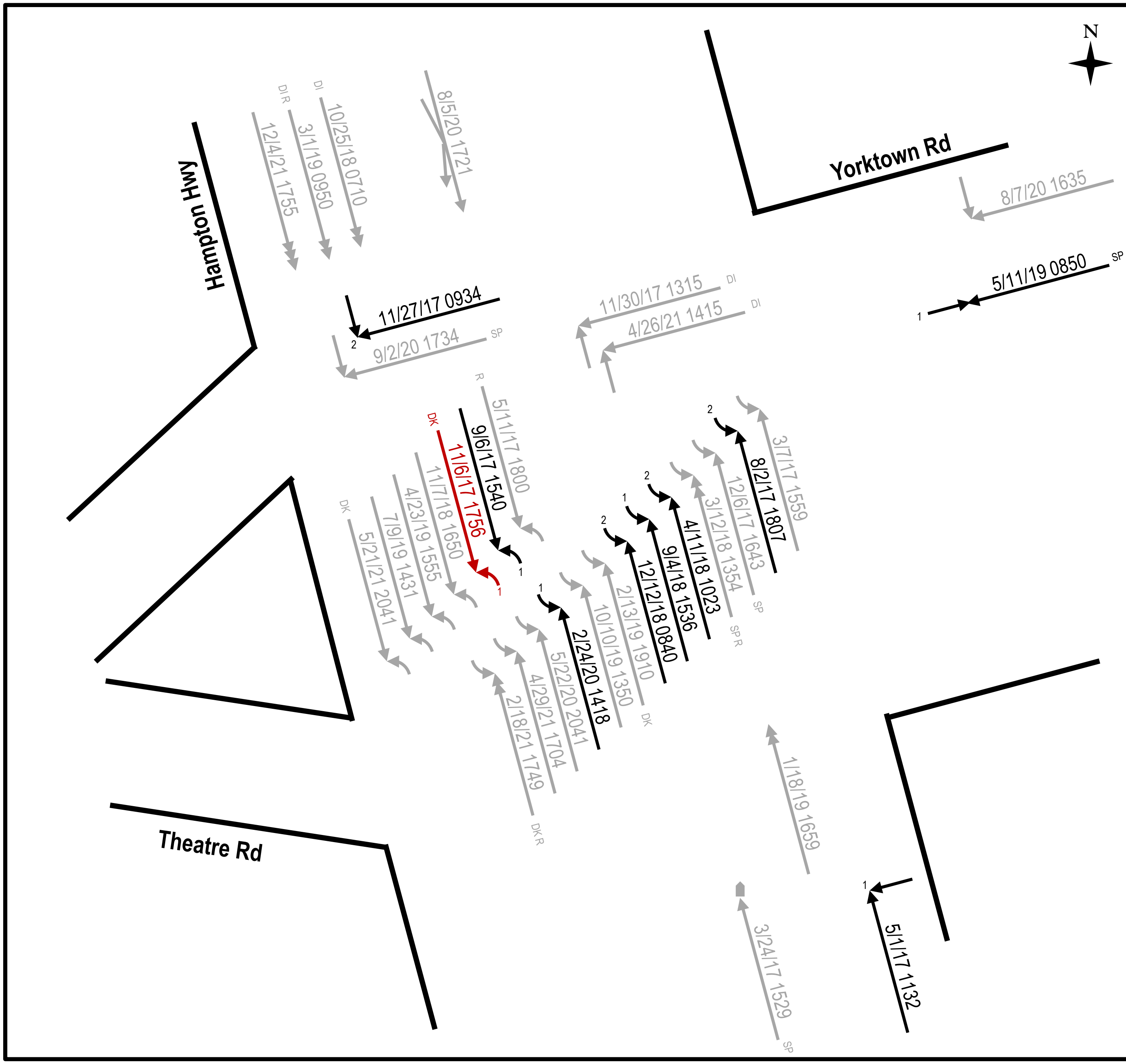
	2017 - 2021	Locality Rank (29 intersections)
Total Crashes	33	8
Crash Rate per 100 Million Entering Vehicles	115.14	1
Total Fatal and Serious Injury Crashes	1	10
Fatal and Serious Injury Crash Rate per 100 Million Entering Vehicles	3.49	13

Locality Rank for Potential for Safety Improvement = 3

(Intersection must be ranked within the top 400 intersections in the VDOT district from 2016-2020 to be included.)

*Includes crashes located within 250' (0.05 mi.) of the intersection.

HAMPTON ROADS TPO



COLLISION DIAGRAM

York County
Hampton Hwy at Yorktown Rd/ Theatre Rd

LEGEND

Crash Date — Crash Time of Day

DI DK 10/4/2019 2140 1

Factors
AL – Alcohol Use
DI - Distracted
DK – Darkness
FO – Fixed Object
R – Rain
SN - Snow
SP - Speed
UB – Unbelted

\# of Injuries

Number of arrowheads represents the total vehicles involved in the crash

Crash Severity

- Fatality (K)
- Serious Injury (A)
- Other Injury (B & C)
- Property Damage Only (O)

Collision Type

- Rear End
- Head On
- Side Swipe
- Left Turn
- Right Turn
- Right Angle
- Backing Vehicle
- Fixed Object
- Bike/Pedestrian Crash
- Animal Crash

Data Source: HRTPO analysis of VDOT data. Data included in this diagram represents the years 2017-2021.
Includes crashes located within 250’ (0.05 mi.) of the intersection.

INTERSECTION #16 – HAMPTON HIGHWAY AT YORKTOWN ROAD/THEATRE ROAD
YORK COUNTY

CRASH DATA ANALYSIS

COLLISION TYPE

Collision Type	Hampton Hwy at Yorktown Rd	All Safety Study Intersections
Right Angle	75.8%	39.0%
Rear End	12.1%	37.6%
Head On	3.0%	2.9%
Sideswipe - Same Direction	3.0%	8.2%
Sideswipe - Opposite Direction	0.0%	1.2%
Fixed Object - In Road	0.0%	0.4%
Fixed Object - Off Road	0.0%	4.8%
Bike/Pedestrian	0.0%	1.3%
Animal	0.0%	0.3%
Other	6.1%	4.3%

MOST PREVALENT DRIVER ACTION

Primary Driver Action	Hampton Hwy at Yorktown Rd	All Safety Study Intersections
Did Not Have Right-of-Way	57.6%	17.9%
No Improper Action	18.2%	8.5%
Disregarded Traffic Signal	15.2%	12.1%
Fail to Maintain Proper Control	3.0%	6.6%
Following Too Close	3.0%	28.1%

WEATHER

Weather	Hampton Hwy at Yorktown Rd	All Safety Study Intersections
Clear/Cloudy	90.9%	84.6%
Mist/Rain/Fog	12.1%	14.9%
Snow/Sleet	0.0%	0.4%
Other/Not Stated	0.0%	0.1%

OTHER CONTRIBUTING FACTORS

Other Contributing Factors	Hampton Hwy at Yorktown Rd	All Safety Study Intersections
Alcohol Involved	0.0%	5.2%
Drug Use Involved	0.0%	0.6%
Distracted Driving	12.1%	19.5%
Speeding	15.2%	7.9%
Unbelted	0.0%	2.6%
Nighttime	18.2%	26.1%

Five-Year Total Crashes (2017-2021): 33

Data Source: HRTPO analysis of VDOT crash data (2017-2021). Regionwide data included in the tables represents a summation of those 1,013 intersections included in the Regional Safety Study, not the region as a whole.

CRASH DATA OBSERVATIONS

- High number of right-angle crashes (75.8%), which was higher than the regional average of 39.0%.
- High number of Hampton Hwy southbound left turn crashes with Hampton Hwy northbound vehicles.
- 57.6% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
- 15.2% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
- 15.2% of crashes involved drivers that were speeding, which was higher than the regional average of 7.9%.

Intersection #16 – Hampton Highway at Yorktown Road/Theatre Road
York County

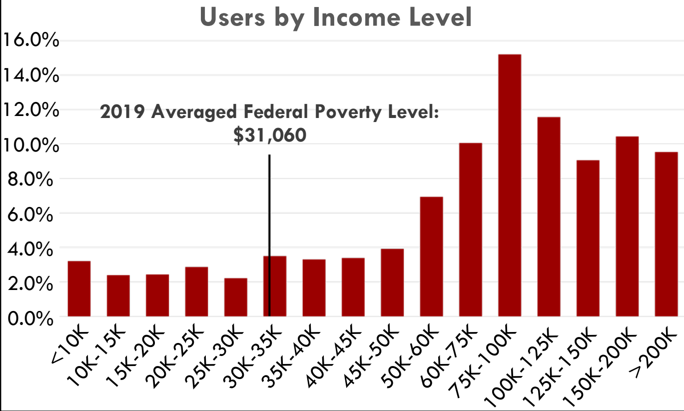
Equity Analysis

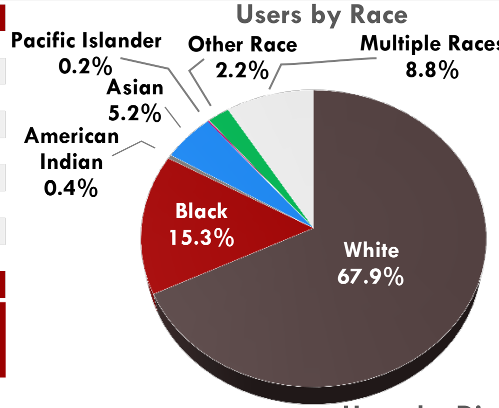
Average Daily Trips	Entering Intersection*	Regionally
Average Daily Trips Made by Minorities	32.1%	44.6%
Average Daily Trips Made by Persons of Hispanic Origin	6.8%	7.9%
Average Daily Trips Made by Persons Who Were Foreign Born	7.7%	7.1%
Average Daily Trips Made by Persons Who Speak English Less Than "Very Well"	3.2%	3.1%
Average Daily Trips Made by Persons with a Disability	12.5%	12.6%
Average Daily Trips Made by Persons Who Were in Income Levels Below the Averaged Federal Poverty Level in 2019	13.1%	18.9%

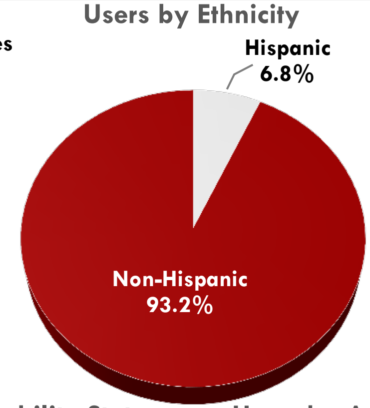
*Percentages in red are higher than the regional average.

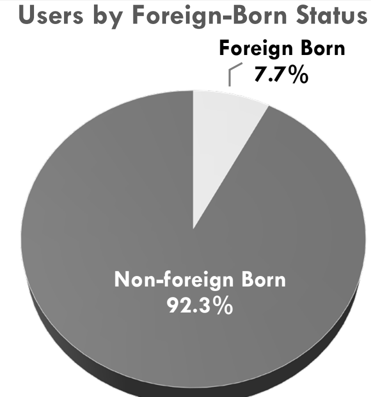
HRTPO Transportation Vulnerability Score	Y/N
Carless Households	N
Disabled Populations	N
Elderly Populations	Y
Female Head of Households	N
Households Receiving Food Stamps	N
Households Receiving Cash Public Assistance	N
Limited English Proficiency Populations	N
Low-Income Households	N
Minority Populations	N
Total HRTPO Transportation Vulnerability Score	1

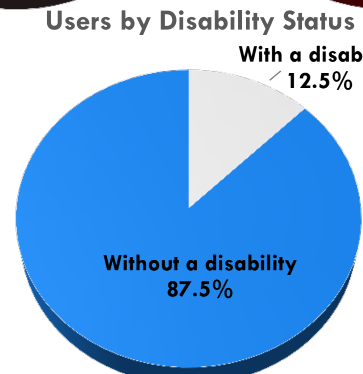
Total Locality Population	% of Population Living in USDOT Disadvantaged Communities	Intersection in USDOT Disadvantaged Community
68,400	0.0%	No

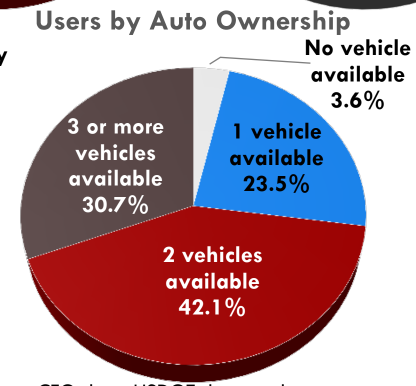












Sources: HRTPO Analysis of US Census Bureau data, CEQ data, USDOT data, and Streetlight data. More information included in the Equity section of the report.

Intersection #16 – Hampton Highway at Yorktown Road/Theatre Road
York County

Hampton Roads Regional Safety Study Survey Responses

Total Survey Responses for Intersection: 7

Have you felt unsafe traveling through this intersection? Please elaborate:

- Yes – "Cars turning right from Yorktown Rd going towards Rt 17. Visibility is limited. Needs to be 'no turn on red' during high traffic count hours"
- Yes

What is the safety issue/concern:

- Confusing intersection design – "Many accidents at this intersection. No access to Theater Rd. Fast moving vehicles, blind U turn."
- Confusing intersection design
- Red light running – "Being cut off in right lane heading north, suspect others late for work or school."
- Other – "Drivers entering Hampton Hwy from Rte 17 northbound and attempting to turn left onto [Yorktown Rd] must yield to drivers entering Hampton Hwy from southbound Rte 17 and must move through the Hampton Hwy southbound lane to get into the left turn lane. This is dangerous for everyone entering Hampton Hwy from Rte 17. Also, the southbound light for those turning left on [Yorktown Rd] should never be flashing yellow, only green or red."

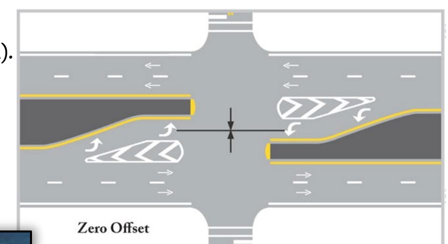
Intersection #16 – Hampton Highway at Yorktown Road/Theatre Road
York County

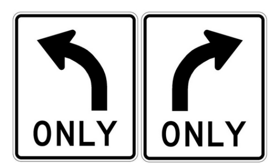
Site Observations & Possible Causes

1. U-turns only sign at ground level for Hampton Highway northbound may be difficult to see if there are taller vehicles in the left turn lane. Left turn YIELD on flashing yellow is confusing to drivers as U-turns are only allowed and not left turns.
2. Higher travel speeds along Hampton Highway.
3. One-way sign on the west side of the intersection is damaged.
4. One-way sign on the southeast corner of the intersection near the dentist office is not necessary.
5. Stop sign for Theatre Road appears to be recently replaced from off-road incidents.
6. Four section traffic signal heads for both Hampton Hwy approaches and all signals have backplates with retroreflective borders.
7. Left turn lanes for northbound and southbound Hampton Highway have negative off-set, which makes it difficult for turning vehicles to see opposing vehicles during the permissive phase.
8. The median for the southern leg (Hampton Highway) extends into the intersection which makes it difficult for WB left turn and NB U-turn vehicles.
9. WB Yorktown Rd signal heads have green ball and should only have left and right green arrows.
10. High number of right-angle crashes (75.8%), which was higher than the regional average of 39.0%.
11. High number of Hampton Hwy southbound left turn crashes with Hampton Hwy northbound vehicles.
12. 57.6% of drivers did not have right-of-way, which was higher than the regional average of 17.9%.
13. 15.2% of drivers disregarded traffic signal, which was higher than the regional average of 12.1%.
14. 15.2% of crashes involved drivers that were speeding, which was higher than the regional average of 7.9%.

Candidate Crash Countermeasures

- Consider adding a median opening at Uppershire Way/Industry Drive, which would reduce the number of Hampton Highway northbound U-turns (CMF=NA).
- Add U-turn YIELD on Flashing, U-turn only sign, and four section U-turn signal mast arm for Hampton Highway northbound (see example below from an intersection in Richmond). Consider making U-turns protected only during AM or PM peak periods if Hampton Highway southbound traffic is heavy (CMF=0.01, angle only).
- Remove one-way sign on the southeast corner of the intersection near dentist office (CMF=NA).
- Realign left turn lanes for northbound and southbound Hampton Highway to zero offset to improve sight distance for left turning vehicles (CMF=0.644).
- Trim the end of the median for the Hampton Highway southern leg to improve turning radius for left turn and U-turn vehicles (CMF=NA).
- Replace signal heads for westbound Yorktown Rd approach with left and right green arrows only. Add left turn only and right turn only signs on the mast arm (CMF=NA).
- Recheck/optimize signal timing (CMF=0.91).
- Extend northbound left turn lane, if needed (CMF=0.95).
- Replace damaged one-way sign on the west side of the intersection (CMF=NA).
- Check southbound left turn bay length during congested periods to see if storage is adequate (CMF=0.95).
- Increase enforcement of speeding (CMF=NA).



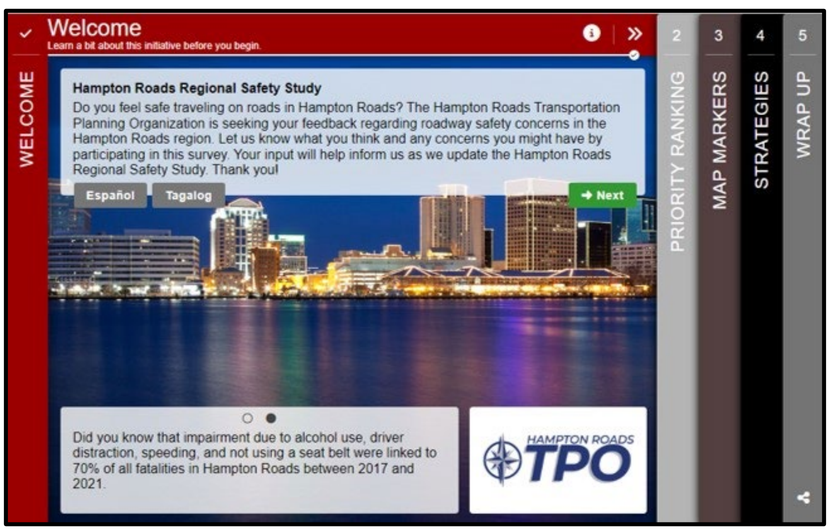


Regional Safety Study Survey

As part of this Regional Safety Study update, HRTPO staff wanted to gather feedback from the public on their thoughts on roadway safety in the region. HRTPO staff prepared a survey in order to gather this feedback from the public. The survey was hosted on the Metroquest platform and was open from July 17, 2023 until August 31, 2023. A total of 1,485 responses were received for the Hampton Roads Regional Safety Study Survey.

News of the survey was distributed through a variety of methods. Each of the major television channels in the region, which includes WAVY/WVBT (Channel 10/Channel 43), WTKR/WGNT (Channel 3/Channel 27), and WVEC (Channel 13) provided stories during their newscasts and on their websites publicizing the survey.

In addition, a link to the survey was provided on the HRTPO Facebook page, and advertisements for the survey were also purchased on Facebook by the HRTPO. Various Hampton Roads localities also provided information on the survey on their Facebook and Twitter/X feeds.

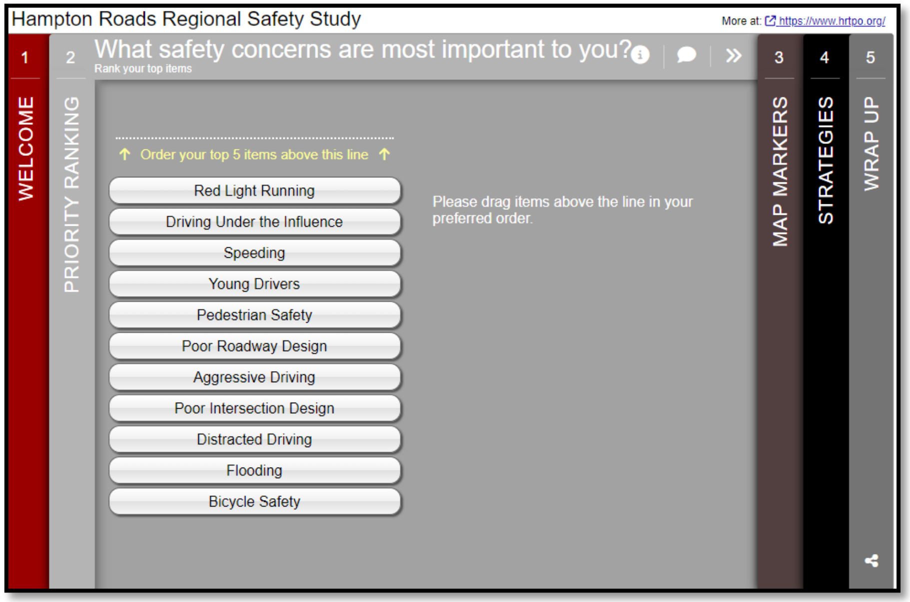


The survey was comprised of five tabs (or pages), including the Introduction, Safety Concerns/Priority Ranking, Crash Locations/Map Markers, Strategies, and Wrap Up. Each of these pages is summarized below.

Page 1 - Introduction

The first page welcomed users to the survey and gave a brief background on the Hampton Roads Regional Safety Study and the survey. In addition, a couple of regional safety facts were shown on the bottom of the page. Users could also translate the survey into Spanish or Tagalog on this page.

Page 2 - Safety Concerns/Priority Ranking



On the second page of the survey, respondents were asked to prioritize their general safety concerns. A total of eleven safety concerns were listed (as shown to the right), which were selected based on factors such as whether they are Virginia Strategic Highway Safety Plan emphasis areas. Respondents were asked to select five safety concerns from the list and to list them in prioritized order in terms of which were the most important to them.

A total of 1,331 survey respondents provided feedback for prioritizing safety concerns.

Figure 90 shows the percentage of survey responses that included each of the various safety concerns in their Top 5 prioritized list. The safety concerns that were included in the Top 5 in the most responses are Aggressive Driving (included in the Top 5 in 80% of survey responses), followed by Distracted Driving (78%) and Speeding (67%). The safety concerns that were included the least in responses are Young Drivers (included in the Top 5 in 12% of survey responses), followed by Flooding (21%) and Bicycle Safety (21%).

Figure 91 on page 261 shows the number of survey responses that included each of the various safety concerns as their #1 ranked concern on their prioritized list. The list of top ranked concerns closely matches the

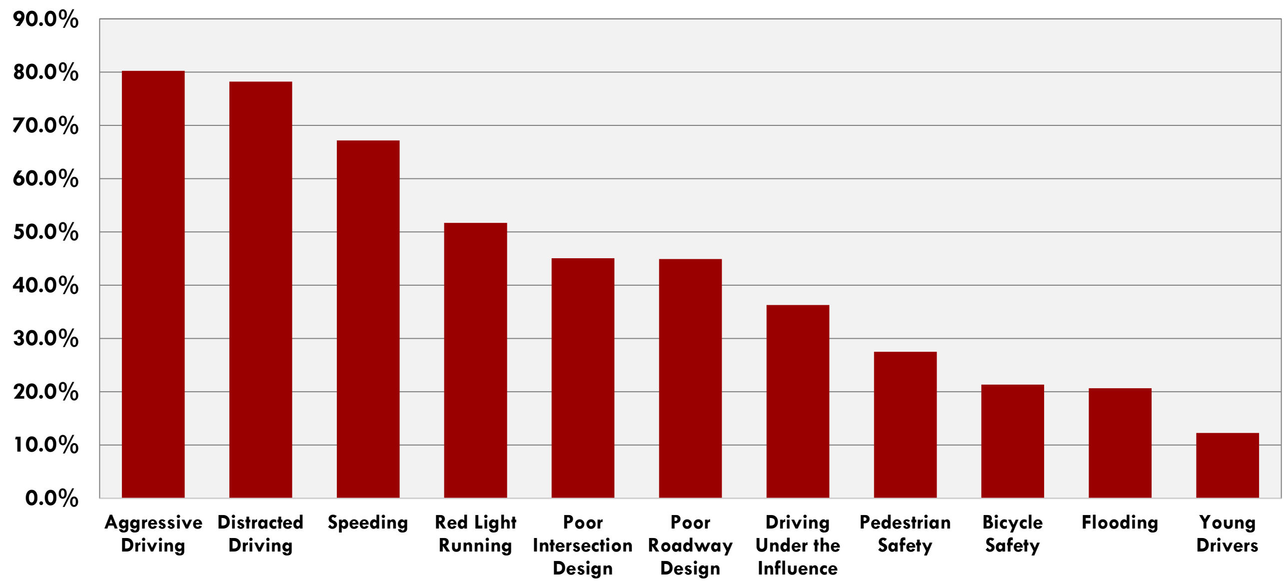


Figure 90 – Percentage of Survey Responses with Each Safety Concern in the Top 5

Source: HRTPO.

Top 5 prioritized concerns. The safety concerns that were most often listed as the top safety concern in survey responses are Aggressive Driving (312 survey responses), followed by Distracted Driving (239 responses) and Speeding (197 responses). The safety concerns that were included the least as top safety concerns in responses are Young Drivers (18 survey responses), followed by Flooding (42 responses) and Bicycle Safety (44 responses).

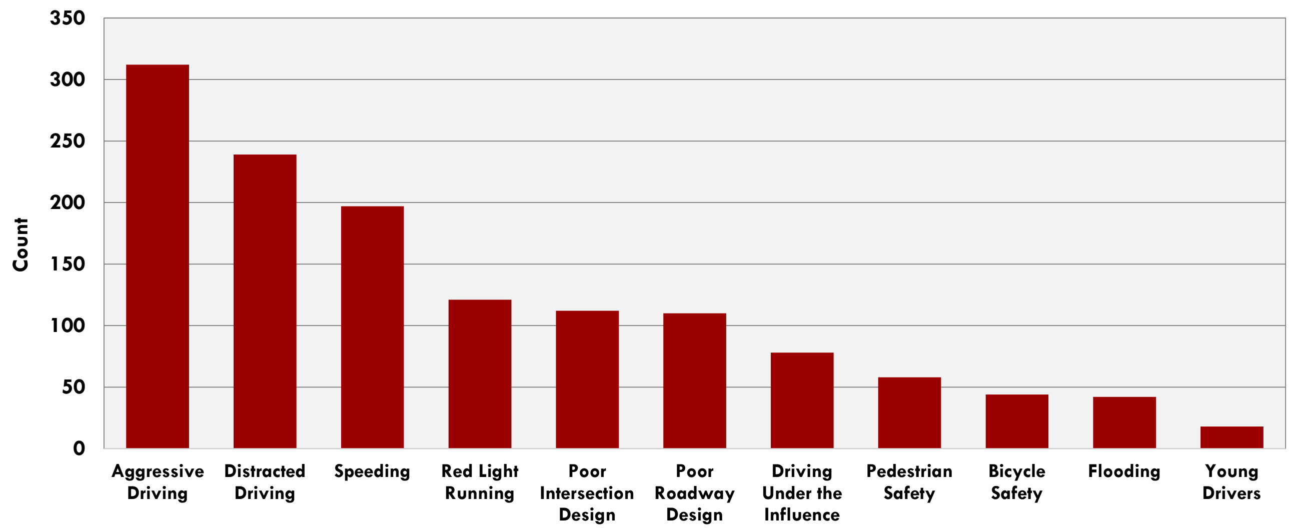


FIGURE 91 – NUMBER OF SURVEY RESPONSES WITH EACH SAFETY CONCERN RANKED #1

Source: HRTPO.

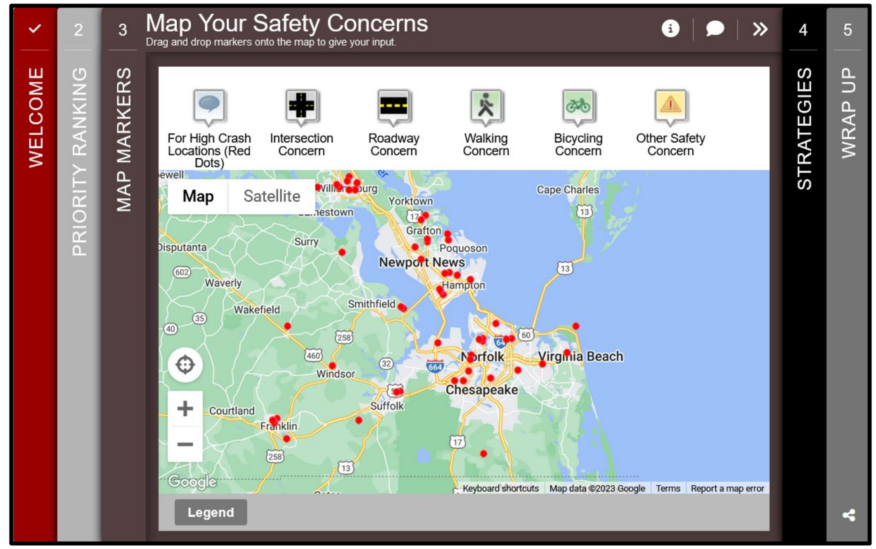
PAGE 3 - LOCATIONS

On the third page of the survey, respondents were asked to provide comments on locations throughout the region where they experienced safety concerns. Users were able to categorize their comments as intersection concerns, roadway concerns, walking concerns, bicycling concerns, concerns for high crash locations, or other safety concerns.

The survey presented a map of Hampton Roads, with High Crash Locations shown as red dots. These High Crash Locations not only included the 16 intersections analyzed in depth in this study but also those locations that ranked highest in at least one of the five measures (number of crashes, crash rate, number of fatal and serious injury crashes, fatal and serious injury crash rate, and Potential for Safety Improvement) in each locality. Survey respondents, however, could provide comments on any location in the region, not only those shown by red dots on the map.

A total of 2,596 comments were provided by survey respondents for specific locations of safety concerns. Comments were incorporated for the 16 intersections that were analyzed in the High Crash Location section shown previously in this report. In addition, the entire set of comments were shared with each locality and VDOT in order to assist with their safety planning efforts.

A breakdown of the jurisdictions of each of the locations is shown in **Figure 92**. The locality with the most comments on locations with safety concerns is Norfolk, with 489 of the 2,596 comments. This is followed by Virginia Beach (437 comments), Hampton (401 comments), Chesapeake (345 comments), and Newport News (328 comments).



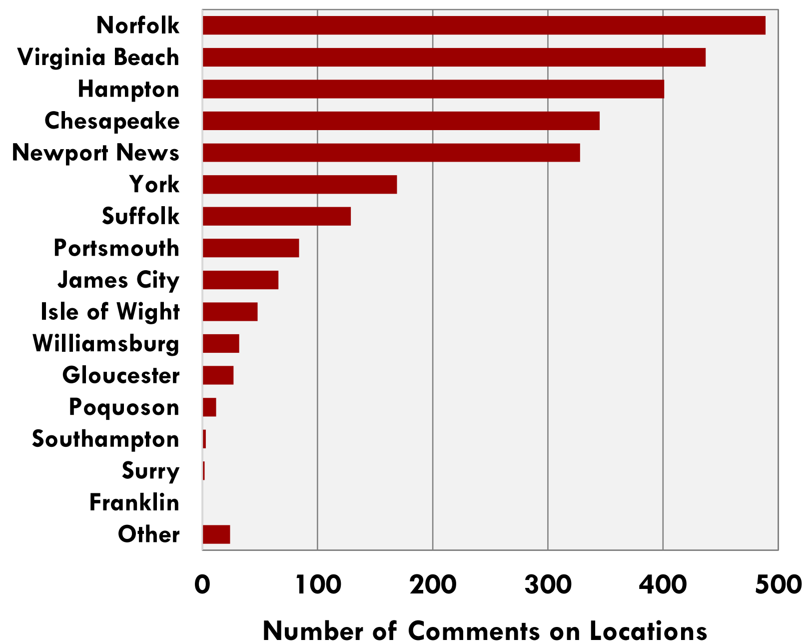


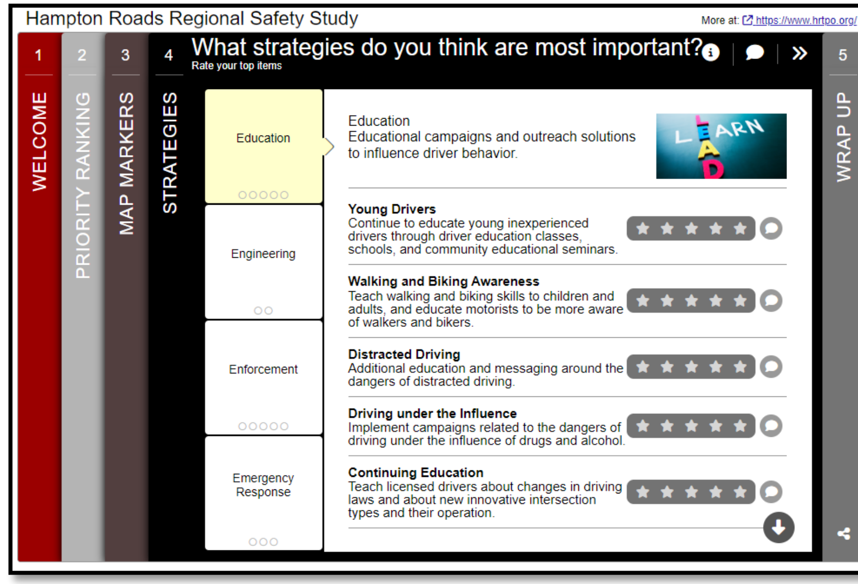
FIGURE 92 – NUMBER OF COMMENTS ON LOCATIONS BY JURISDICTION

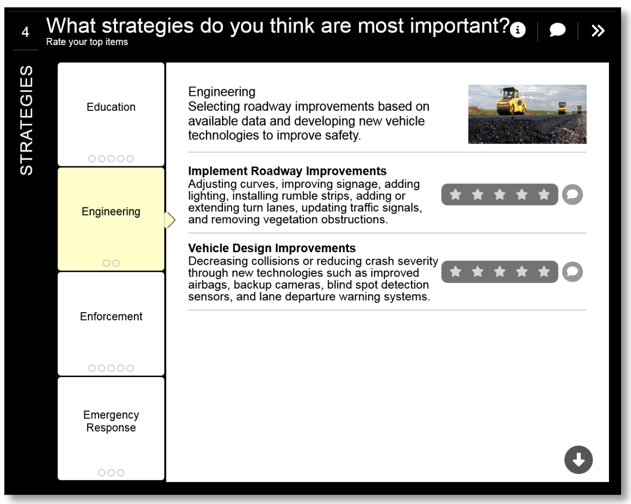
Source: HRTPO.

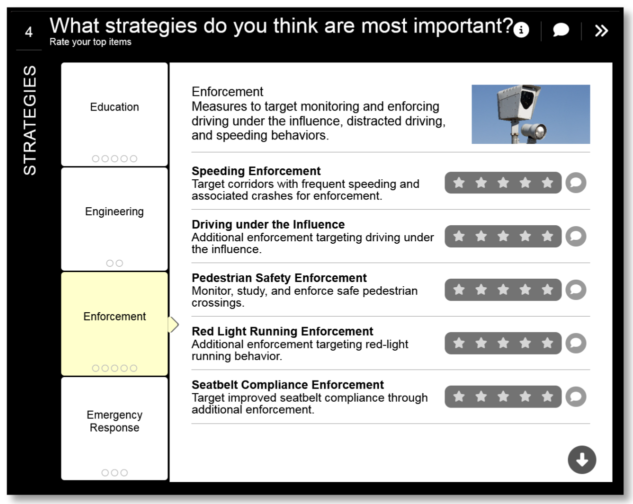
Page 4 - Strategies

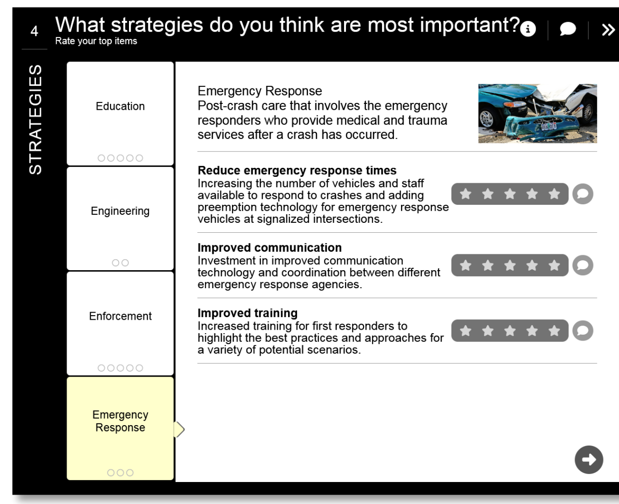
On the fourth page of the survey, respondents were asked to prioritize potential strategies that can be used to improve roadway safety. Strategies were broken down into four categories – education, engineering, enforcement, and emergency response. A number of potential strategies were listed for each of the four categories (as shown in the images on this page), and respondents were asked to rate each of the strategies on a scale from one star (least important) to five stars (most important).

A total of 958 respondents provided feedback for ranking roadway safety strategies.









EDUCATION

Survey respondents were asked to rate various educational campaigns and outreach solutions that help influence driver behavior. These educational strategies were classified by young drivers, walking and biking awareness, distracted driving, driving under the influence of drugs and alcohol, and continuing education.

Respondents were asked to rank each of these five educational strategies on a scale from 1 to 5 stars, as shown in **Figure 93**. The highest ranked of the educational strategies is Distracted Driving, at an average of 4.57 stars. This was followed by Driving Under the Influence of Drugs and Alcohol (4.17 stars), Young Drivers (4.05 stars), Continuing Education (3.83 stars), and the lowest rated strategy is Walking and Biking Awareness (3.80 stars).

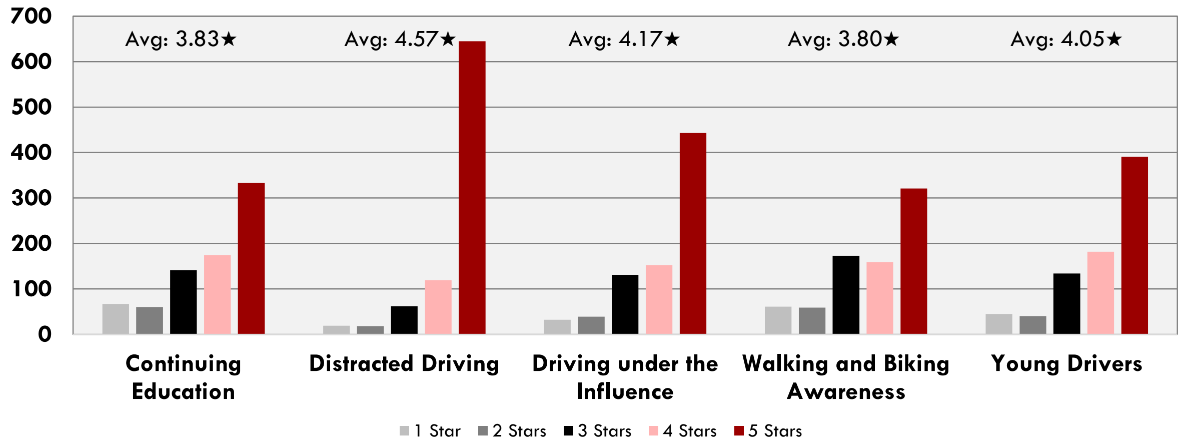


FIGURE 93 – EDUCATION SAFETY STRATEGY RATINGS

Source: HRTPO.

ENGINEERING

Survey respondents were asked to rate various engineering improvements, both to the roadway as well as to the design of motor vehicles.

Respondents were asked to rank the two engineering strategies on a scale from 1 to 5 stars, as shown in **Figure 94**. The highest ranked engineering strategy is Implementing Roadway Improvements, at an average of 4.65 stars. Vehicle Design Improvements ranked lower with an average of 3.52 stars.

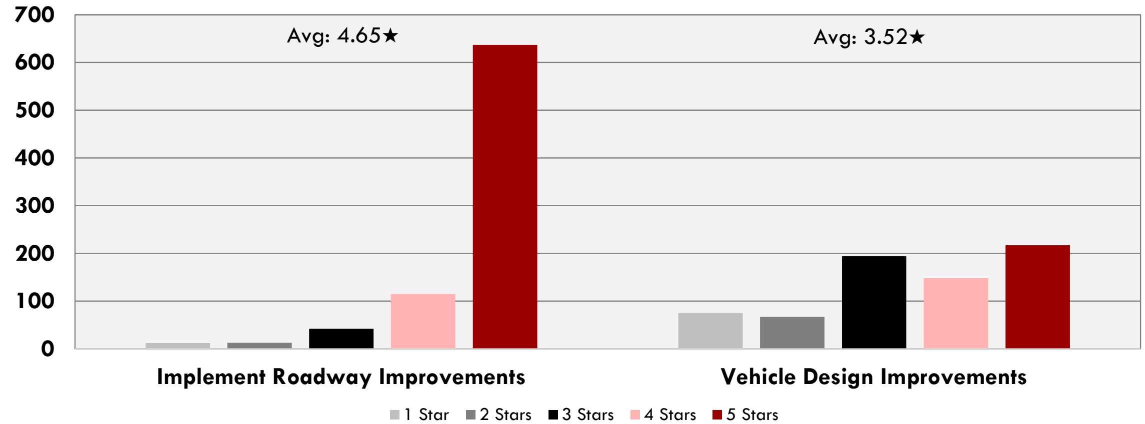


FIGURE 94 – ENGINEERING SAFETY STRATEGY RATINGS

Source: HRTPO.

Enforcement

Survey respondents were asked to rate various enforcement measures. These measures include additional and targeted enforcement for speeding, driving under the influence of drugs and alcohol, pedestrian safety, red light running, and seat belt compliance.

Respondents were asked to rank these enforcement strategies from 1 to 5 stars, as shown in **Figure 95**. The highest ranked of the enforcement strategies are Speeding enforcement and Red Light Running enforcement, both at an average of 4.26 stars, followed closely by Driving Under the Influence enforcement at 4.25 stars. This was followed by Pedestrian Safety enforcement (3.93 stars) and Seat Belt Compliance enforcement (3.29 stars).

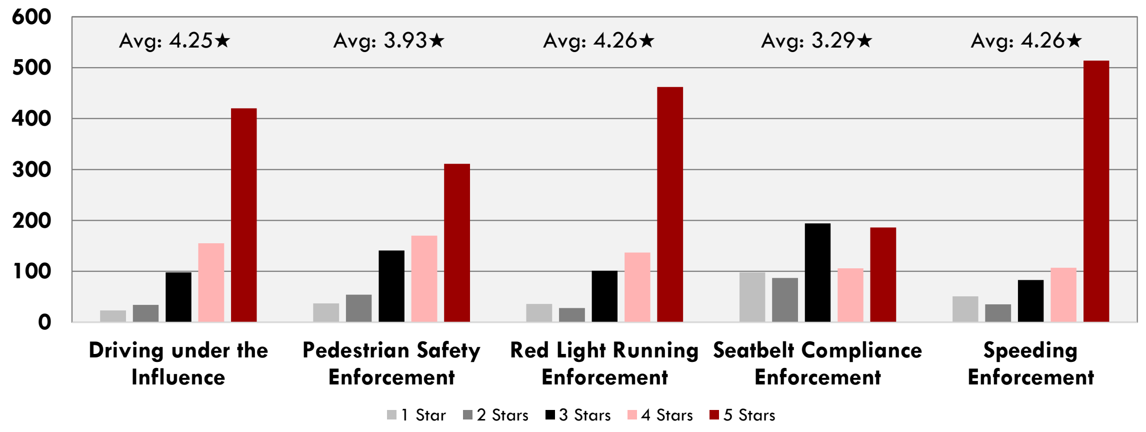


Figure 95 – Enforcement Safety Strategy Ratings

Source: HRTPO.

Emergency Response

Survey respondents were asked to rate various emergency response measures that would improve post-crash care. These measures include reducing emergency response times, improving communication, and improving training.

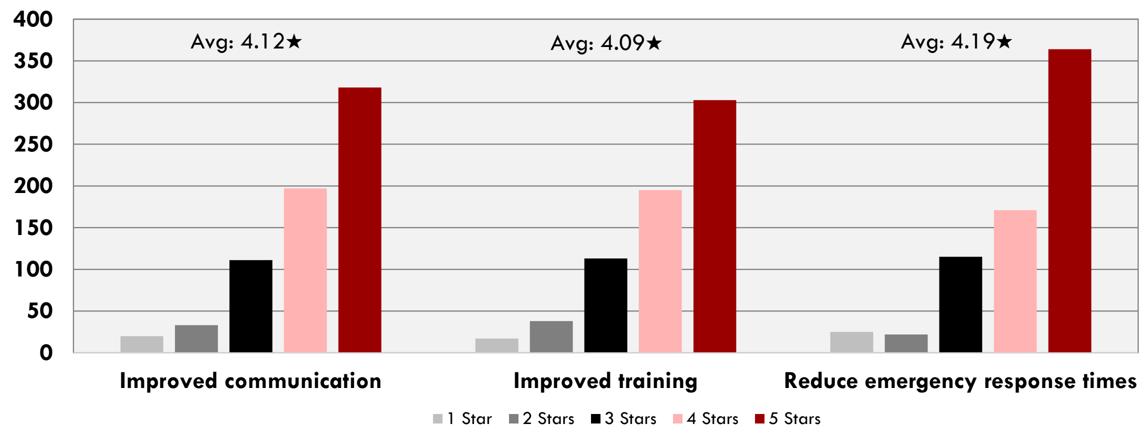


Figure 96 – Emergency Response Safety Strategy Ratings

Source: HRTPO.

Respondents ranked the three emergency response strategies from 1 to 5 stars, as shown in **Figure 96**. The highest ranked of the emergency response strategies is Reduce Emergency Response Times, at an average of 4.19 stars. This was followed closely by Improved Communication (4.12 stars) and Improved Training (4.09 stars).

Overall Results

In addition to analyzing each of the four safety strategy categories (education, engineering, enforcement, and emergency response) separately, HRTPO staff also compared each of the fifteen strategies that were listed in the survey.

The highest ranked of the fifteen safety strategies, as shown in **Figure 97**, is Implementing Roadway Improvements, at an average of 4.65 stars. The next highest ranked strategies are Distracted Driving Education (4.57 stars), followed by the three enforcement strategies of Speeding Enforcement (4.26 stars), Red Light Running Enforcement (4.26 stars), and Driving Under the Influence Enforcement (4.25 stars).

The lowest ranked safety strategies in the survey were Walking and Biking Awareness Education (3.80 stars), Vehicle Design Engineering Improvements (3.52 stars), and Seatbelt Compliance Enforcement (3.29 stars).

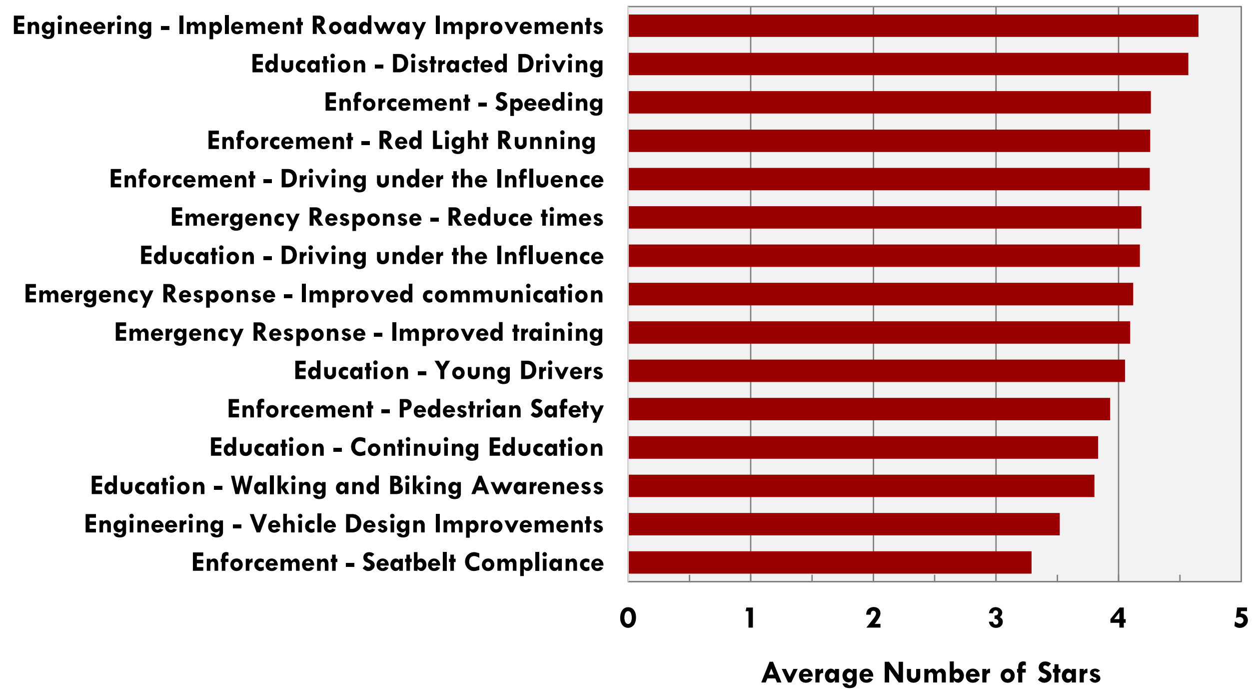


Figure 97 – Safety Strategy Average Ratings

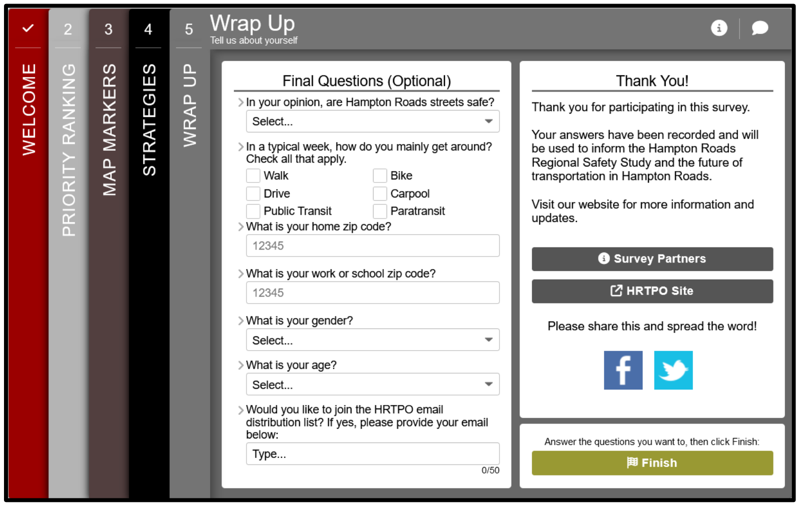
Source: HRTPO.

Page 5 – Wrap Up

On the final page of the survey, respondents were asked to provide information about themselves, including age, gender, home zip code, and work/school zip code. In addition, respondents were asked the general questions on whether they consider Hampton Roads streets safe and how they mainly travel during the week.

A total of 962 respondents provided their home zip code, and 814 respondents provided their work or school zip code. Survey responses were received from throughout the region, with the largest localities providing the most responses.

Figure 98 and **Figure 99** show the location of survey responses by home location. Not surprisingly, the localities with the largest populations in the region also had the largest number of survey responses. Virginia Beach had the largest number of responses (196 survey responses, or 20% of the total), followed by Norfolk (165 responses, 17%) and Hampton (133 responses, 14%).



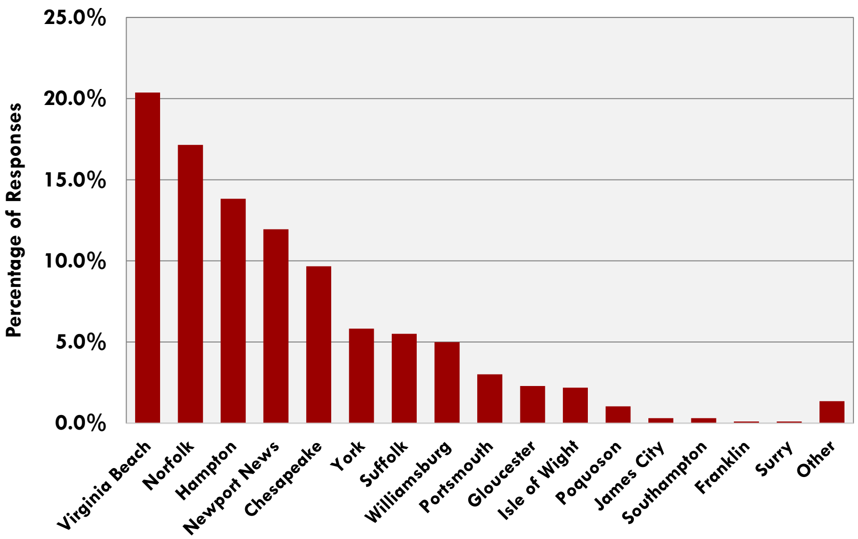


Figure 98 – Survey Responses by Home Location

Source: HRTPO.

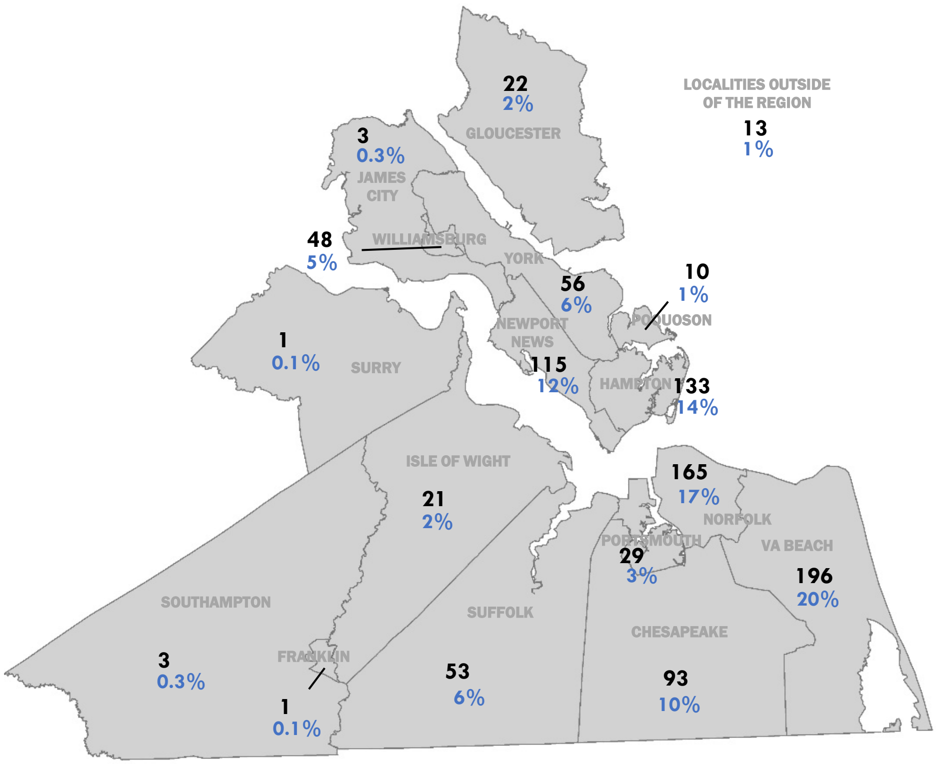


Figure 99 – Survey Responses by Home Location

Source: HRTPO.

Figure 100 and **Figure 101** show the location of survey responses by work/school location. Similar to the home locations, the localities with the largest number of jobs in the region also had the largest number of survey responses. Virginia Beach as a work/school location had the largest number of responses (164 survey responses, or 20% of the total), followed by Norfolk (144 survey responses, or 20% of the total), followed by Norfolk (144 responses, 18%) and Newport News (134 responses, 16%).

In addition to home and work/school locations, survey respondents were asked the question of how they mainly travel during the week. A total of 1,346 responses were provided to this question. As shown in **Figure 102**, 71% of survey respondents stated that they mainly drive a vehicle to travel each week. This is followed by walking (18%) and bicycling (10%). All other modes comprised 1% or less of survey responses.

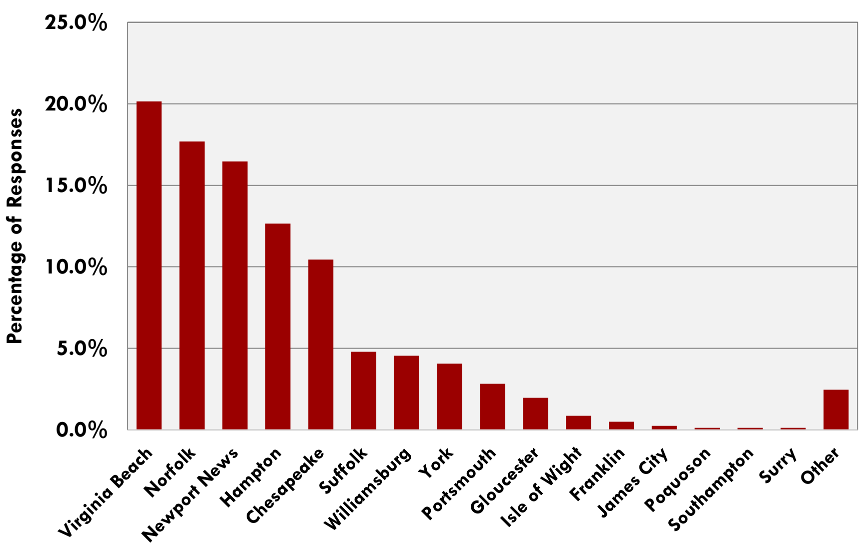


FIGURE 100 – SURVEY RESPONSES BY WORK/SCHOOL LOCATION

Source: HRTPO.

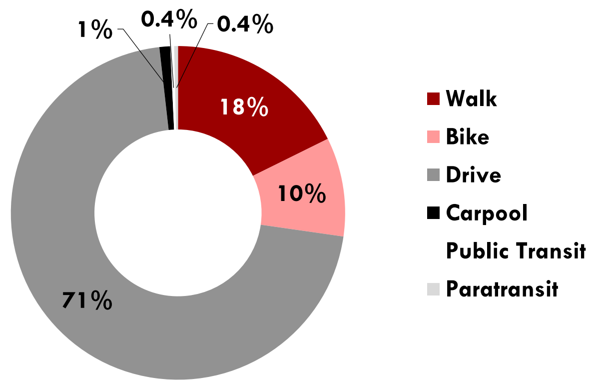


FIGURE 102 – HOW SURVEY RESPONDENTS MAINLY TRAVEL EACH WEEK

Source: HRTPO.

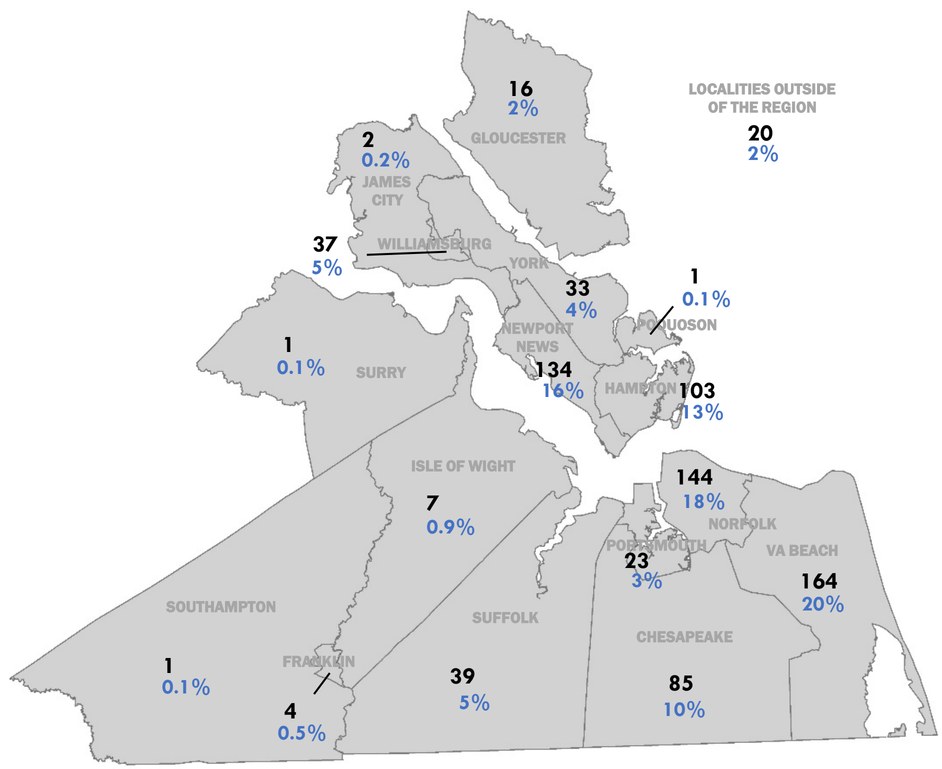


FIGURE 101 – SURVEY RESPONSES BY WORK/SCHOOL LOCATION

Source: HRTPO.

Survey respondents were also asked information regarding their gender and age. A total of 943 responses were received to the question regarding gender and 925 responses were received for the question regarding age. **Figure 103** shows the responses to these two questions. The majority of survey respondents (55%) were female, and the age groups that were most represented in the survey responses were 65 and older (29%), 55 to 64 (24%), and 45 to 54 (20%).

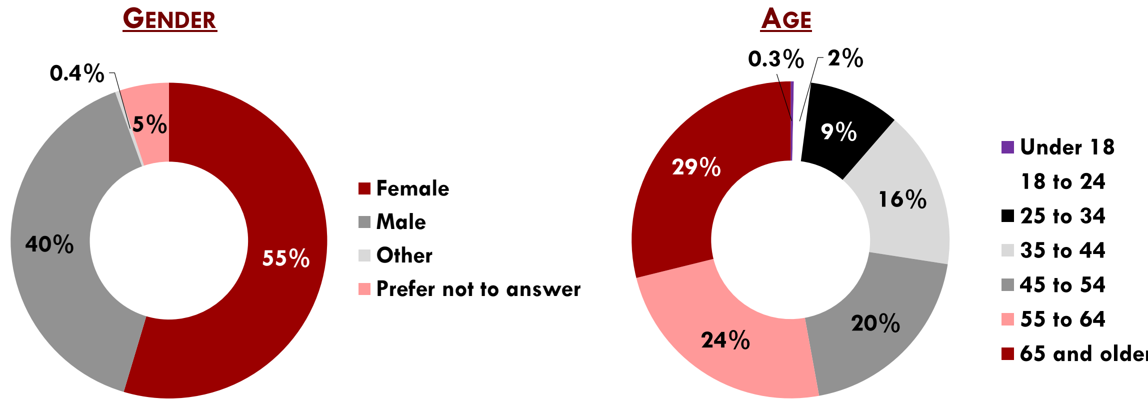


FIGURE 103 – SURVEY RESPONSES BY GENDER AND AGE

Source: HRTPO.

Finally, survey respondents were asked the general question on whether they consider Hampton Roads streets to be safe. A total of 959 responses were provided for this question. As shown in **Figure 104**, many more survey respondents answered that they considered Hampton Roads streets unsafe than answered that they are safe. Only 21% of survey respondents agreed that they thought Hampton Roads streets were safe, with less than 1% responding that they strongly agreed. However, 33% of respondents disagreed and 14% strongly disagreed to the question on Hampton Roads streets being safe. The remaining 32% of respondents answered that they were neutral on this question.

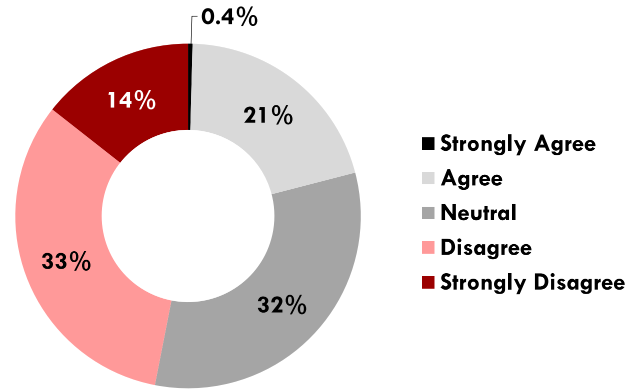


FIGURE 104 – SURVEY RESPONSES TO "ARE HAMPTON ROADS STREETS SAFE?

Source: HRTPO.

Summary and Next Steps

Each year there are tens of thousands of crashes on the Hampton Roads roadway network, resulting in millions of dollars of damage, injuries, and the loss of life. These crashes have a wide range of impacts on families, friends, and society as a whole. Because of these impacts, roadway safety planning is an integral part of the HRTPO regional transportation planning process.

This *Hampton Roads Regional Safety Study – 2023 Update* includes:

- An introduction to the study, including highlights of previous and current HRTPO safety planning efforts.
- A Vision, Mission, and Goal for the study.
- An analysis of the recent trends in roadway safety in Hampton Roads. This includes information related to crashes and the injuries and fatalities resulting from traffic crashes. Crash data for each Hampton Roads jurisdiction is included, and comparisons with other metropolitan areas in Virginia are also examined.
- An examination of the characteristics of crashes, injuries and fatalities in Hampton Roads. Examples include crash types, driver actions, alcohol usage, speeding, and distracted driving.
- An analysis of the locations of crashes, injuries, and fatalities on the Hampton Roads roadway system. Details are provided on how the crash data was collected and analyzed. The number of crashes for each mile of the regional freeway system and over 1,000 intersections is shown, as is the rate based on the severity of crashes and the exposure to crashes.
- A description of many of the national, statewide, and local efforts to improve roadway safety. Examples of ongoing initiatives are provided including the Highway Safety Improvement Program (HSIP), the Virginia Strategic Highway Safety Plan (SHSP), the VDOT Pedestrian Safety Action Plan (PSAP), and other safety programs and educational efforts.
- An analysis of equity considerations. Equity is the fair inclusion into a society in which all can participate, prosper, and reach their full potential. In recent years, planning with an equity lens has been put to the forefront at the federal, state, regional, and local levels, and one of the essential activities under the SS4A Grant Program is the inclusion of equity considerations.
- A description of the wide range of countermeasures that exist to address both general and specific roadway safety problems. Crash modification factors are described and included in this section.
- A number of locations throughout Hampton Roads are identified and studied in depth based on the analysis of crash locations. This section provides a detailed safety analysis for the top intersections in each Hampton Roads locality. Collision diagrams, summaries of crash characteristics at each location, equity considerations, public feedback, site observations and possible causes, and candidate crash countermeasures are included.

In November 2021 the Infrastructure Investment and Jobs Act (IIJA) was signed into law. In addition to providing additional funding for the existing Highway Safety Improvement Program (HSIP), the IIJA established a new federal discretionary safety program called the Safe Streets and Roads for All (SS4A) program. The SS4A program provides an additional $5 billion to fund projects and activities through grants submitted by MPOs, cities and counties, transit agencies, or tribal governments. This study is designed to meet the eligibility requirements for a Comprehensive Safety Action Plan in the new Safe Streets and Roads for All (SS4A) program. These requirements include:

- **Leadership commitment and goal setting** that includes a goal timeline for eliminating roadway fatalities and serious injuries.
- **Planning structure** through a committee, task force, implementation group, or similar body charged with oversight of the Action Plan development, implementation, and monitoring.
- **Safety analysis** of the existing conditions and historical trends that provides a baseline level of crashes involving fatalities and serious injuries across a jurisdiction, locality, or region.
- **Engagement and collaboration** with the public and relevant stakeholders, including the private sector and community groups, that allows for both community representation and feedback.
- **Equity** considerations developed through a plan using inclusive and representative processes.
- **Policy and process changes** that assess the current policies, plans, guidelines, and/or standards to identify opportunities to improve how processes prioritize transportation safety.
- **Strategy and project selections** that identify a comprehensive set of projects and strategies based on data, the best available evidence and noteworthy practices, and stakeholder input and equity considerations that will address the safety problems described in the safety action plan.
- **Progress and transparency methods** that measure progress over time after an Action Plan is developed or updated, including outcome data.

A number of next steps are recommended based on the contents of this report:

- **Implement crash countermeasures at high crash locations.** HRTPO staff evaluated one high crash intersection in each Hampton Roads locality as part of this study. Based on an analysis of the crash data, site observations, and public feedback, a list of candidate crash countermeasures was developed. Locality staff may use this analysis to seek funding for safety improvements from programs such as the Safe Streets and Roads for All (SS4A) program, the Highway Safety Improvement Program (HSIP), the Virginia SMART SCALE Program, Regional Surface Transportation Program (RSTP) or Congestion Mitigation and Air Quality Program (CMAQ) funds, etc.

- **Continue incorporating safety into the HRTPO transportation planning and programming process.** Because of the importance of roadway safety, safety must be an integral part of the metropolitan transportation planning and programming process.

  HRTPO staff will continue to collect crash data from VDOT and DMV on an annual basis, including jurisdictional summaries and data corresponding to each individual crash. HRTPO staff will continue to periodically analyze this data and incorporate it into regional databases and map shapefiles.

  Safety is incorporated into both the Hampton Roads Long-Range Transportation Planning (LRTP) process and the Congestion Management Process (CMP). The HRTPO uses its Project Prioritization Tool to score both LRTP and RSTP candidate projects. HRTPO staff scores each candidate project based its utility, viability, and economic vitality. Roadway safety, based on recent crash history, is considered in the score of the project's utility.

  The HRTPO's Congestion Management Process also incorporates roadway safety. Corridors throughout the region are ranked based on a variety of factors, including roadway safety. Those corridors that rank the highest are analyzed in detail and strategies are recommended to improve congestion and mobility in the corridor. Many of these strategies improve safety in addition to congestion. HRTPO staff will continue to incorporate roadway safety into these products and many other regional planning efforts.

- **Continue building on efforts to improve roadway safety.** This study highlighted a number of efforts to improve roadway safety such as the Safe System Approach, Vision Zero, the Virginia Strategic Highway Safety Plan, the Virginia DMV Highway Safety Plan, the Virginia Pedestrian Safety Action Plan, and the Highway Safety Manual. HRTPO staff will continue to monitor and participate in these efforts as they evolve and are updated.

- **Assist localities with their safety planning efforts.** Most localities in Hampton Roads have roadway safety planning programs, and some localities are currently preparing their own safety action plans. HRTPO staff will assist localities with their safety planning efforts as requested, and will ensure that the Regional Safety Study complements locality efforts.

- **Continue the Regional Safety Study Working Group.** An 18-member working group was created to assist with the development of this safety study update. The Regional Safety Study Working Group should continue to meet regularly after this document is approved in order to further assist with local and regional roadway safety planning efforts and to guide the implementation of improvements detailed in this study.

- **Update the Regional Safety Study on a recurring basis.** HRTPO staff plans to continue making updates to the Regional Safety Study on a recurring basis, similar to the five-year update cycle to the Hampton Roads Long-Range Transportation Plan and the Hampton Roads Congestion Management Process report.

Appendix A – Crashes, Injuries, and Fatalities by Year and Jurisdiction

Jurisdiction	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Chesapeake	3,193	3,104	3,141	3,274	3,594	3,652	3,442	3,364	2,977	2,521	2,394	2,295	2,418	2,597	2,613	2,685	2,502	2,377	2,549	2,484	2,114	2,328
Franklin	107	110	74	75	47	98	97	82	50	53	81	91	87	86	87	87	92	90	97	85	78	55
Gloucester	490	466	494	505	475	419	440	461	436	428	352	357	392	402	413	436	408	425	427	413	372	386
Hampton	3,050	3,158	3,663	4,115	3,862	3,875	3,488	3,225	3,173	2,823	2,794	2,765	2,862	2,907	2,874	2,903	2,987	3,108	3,242	3,272	3,253	3,518
Isle of Wight	517	516	568	567	592	586	595	528	538	439	349	402	446	512	560	601	631	610	605	620	585	672
James City	499	513	558	656	650	703	759	726	608	660	698	703	741	770	734	819	869	1,002	976	869	706	804
Newport News	3,867	3,750	3,861	3,900	4,211	4,160	4,258	4,034	3,630	3,219	2,901	2,863	3,065	3,034	3,100	3,003	3,581	3,491	3,546	3,526	3,030	3,393
Norfolk	5,542	5,359	5,705	5,810	5,703	5,749	5,400	5,092	4,868	4,270	4,137	4,223	4,323	4,352	3,905	3,816	4,163	4,199	4,181	4,241	3,835	4,399
Poquoson	80	93	91	81	86	83	94	103	68	79	54	84	109	100	69	83	79	78	89	70	99	94
Portsmouth	1,729	1,691	1,928	2,061	2,036	1,718	1,753	1,294	868	510	360	1,420	1,421	1,220	1,162	985	1,275	1,361	1,360	1,363	1,317	1,554
Southampton	320	314	277	376	410	296	321	274	312	297	220	210	203	198	218	206	203	201	211	233	232	211
Suffolk	1,204	1,337	1,379	1,566	1,678	1,618	1,742	1,844	1,590	1,374	1,216	1,251	1,456	1,413	1,420	1,550	1,605	1,692	1,768	1,737	1,507	1,748
Surry	113	111	107	115	117	141	139	127	133	112	140	105	107	121	92	96	118	80	99	113	103	95
Virginia Beach	7,679	7,788	8,478	8,653	8,324	8,292	8,268	7,823	7,258	6,301	6,463	6,279	6,419	6,521	6,544	6,887	7,204	6,741	6,399	5,992	5,300	5,805
Williamsburg	185	215	222	204	186	186	171	236	181	141	160	162	173	194	195	215	216	209	206	212	122	165
York	857	868	896	1,089	1,137	1,053	1,052	1,063	909	778	823	905	970	947	888	938	920	1,101	1,161	1,020	813	943
Hampton Roads	29,432	29,393	31,442	33,047	33,108	32,629	32,019	30,276	27,599	24,005	23,142	24,115	25,192	25,374	24,874	25,310	26,853	26,765	26,916	26,250	23,466	26,170
Virginia	141,650	144,585	147,737	154,848	153,907	153,849	151,692	145,405	135,282	116,744	116,386	120,513	123,579	121,763	120,282	125,800	128,525	127,375	131,848	128,172	105,600	118,498
HR % of state	20.8%	20.3%	21.3%	21.3%	21.5%	21.2%	21.1%	20.8%	20.4%	20.6%	19.9%	20.0%	20.4%	20.8%	20.7%	20.1%	20.9%	21.0%	20.4%	20.5%	22.2%	22.1%
United States	6,394,000	6,323,000	6,316,000	6,289,000	6,143,000	6,159,000	5,974,000	6,024,000	5,811,000	5,505,000	5,419,000	5,338,000	5,615,000	5,687,000	6,064,000	6,296,000	6,821,000	6,453,000	6,734,681	6,756,084	5,250,837	N/A

Hampton Roads Traffic Crashes, 2000 to 2021

Source: HRTPO analysis of Virginia DMV data.

Jurisdiction	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Chesapeake	2,198	2,162	2,095	2,106	2,279	2,167	2,084	2,126	1,924	1,566	1,483	1,452	1,769	1,893	1,853	1,948	1,928	1,838	1,825	1,760	1,379	1,484
Franklin	59	51	31	37	14	64	49	36	32	14	51	56	68	66	67	64	78	76	78	51	69	41
Gloucester	396	347	407	365	360	317	327	345	355	333	288	268	323	324	370	285	275	253	260	277	242	235
Hampton	1,833	1,914	1,963	1,961	1,677	1,785	1,465	1,349	1,530	1,505	1,419	1,536	1,460	1,626	1,566	1,811	2,202	2,477	2,735	2,899	3,209	3,676
Isle of Wight	382	381	370	354	341	395	311	306	330	315	221	249	245	265	244	242	307	241	226	229	218	229
James City	324	366	383	385	384	403	375	373	323	451	623	654	447	438	442	482	522	715	756	759	545	618
Newport News	2,241	2,212	2,287	2,279	2,532	2,418	2,235	1,844	1,965	1,894	1,755	1,700	1,834	1,849	1,808	1,829	2,124	2,105	2,074	2,276	1,830	1,928
Norfolk	3,008	2,906	3,062	3,053	2,951	2,664	2,624	2,246	2,448	2,506	2,417	2,435	2,529	2,588	2,252	2,261	2,581	2,298	2,142	2,224	2,020	2,253
Poquoson	25	58	54	35	30	35	40	37	23	43	39	37	56	41	32	29	28	39	48	72	154	118
Portsmouth	1,269	1,111	1,209	1,274	1,265	942	871	648	485	334	199	891	929	847	809	688	932	1,036	930	1,033	1,006	1,104
Southampton	284	260	219	262	263	239	243	209	205	166	155	153	159	165	167	147	168	204	200	169	208	164
Suffolk	880	1,006	941	1,033	1,066	1,010	1,106	921	787	877	787	778	972	911	915	1,125	1,114	1,196	1,173	1,249	1,002	1,225
Surry	68	69	60	59	66	84	69	58	76	103	67	61	69	76	46	72	58	41	27	68	37	46
Virginia Beach	4,241	4,057	4,009	4,066	3,771	3,705	3,563	3,347	3,345	3,342	3,376	3,116	3,478	3,703	3,561	3,363	3,720	3,416	3,285	3,160	2,629	2,906
Williamsburg	103	108	103	119	99	99	94	95	99	76	93	113	96	117	111	94	149	139	133	181	126	98
York	549	555	592	677	717	672	570	554	538	479	476	539	600	523	472	515	442	504	556	488	328	406
Hampton Roads	17,860	17,563	17,785	18,065	17,815	16,999	16,026	14,494	14,465	14,004	13,449	14,038	15,034	15,432	14,715	14,955	16,628	16,578	16,448	16,895	15,002	16,531
Virginia	79,806	80,187	78,896	78,842	78,487	76,023	73,348	68,822	69,130	62,976	61,418	63,382	67,004	65,114	63,384	65,029	67,292	65,306	66,523	65,708	52,668	58,786
HR % of state	22.4%	21.9%	22.5%	22.9%	22.7%	22.4%	21.8%	21.1%	20.9%	22.2%	21.9%	22.1%	22.4%	23.7%	23.2%	23.0%	24.7%	25.4%	24.7%	25.7%	28.5%	28.1%
United States	3,189,000	3,033,000	2,926,000	2,889,000	2,788,000	2,699,000	2,575,000	2,491,000	2,346,000	2,217,000	2,239,000	2,217,000	2,362,000	2,313,000	2,338,000	2,443,000	3,062,000	2,745,000	2,710,059	2,740,141	2,282,015	N/A

HAMPTON ROADS TRAFFIC CRASH INJURIES, 2000 TO 2021

Source: HRTPO analysis of Virginia DMV data.

Jurisdiction	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Chesapeake	12	20	19	17	13	21	26	25	15	18	13	24	13	11	9	18	19	19	20	17	12	24
Franklin	2	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	2	0	0	0	0	0
Gloucester	3	9	5	4	3	7	11	5	12	4	15	6	7	3	4	5	5	7	5	1	6	5
Hampton	5	6	10	9	14	3	8	11	14	5	10	15	9	9	11	8	8	8	11	13	20	11
Isle of Wight	6	7	5	7	7	6	10	11	9	6	6	3	4	6	9	2	4	4	3	11	6	11
James City	7	4	6	5	6	8	7	4	9	4	2	6	1	8	5	8	4	15	2	1	8	11
Newport News	11	10	11	13	12	13	8	13	9	13	12	13	9	11	10	15	17	16	17	17	22	16
Norfolk	22	25	10	15	13	15	18	10	19	24	9	17	18	25	20	15	18	20	16	24	25	28
Poquoson	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0
Portsmouth	4	5	9	7	11	1	5	2	4	5	2	8	3	3	5	5	8	13	11	6	2	12
Southampton	8	7	3	4	8	10	8	10	4	7	9	2	5	8	4	5	2	4	6	11	2	7
Suffolk	13	17	20	8	16	8	12	26	17	8	15	11	12	14	12	15	7	18	5	10	8	13
Surry	6	1	1	2	1	4	2	4	2	0	3	0	0	1	1	2	3	1	0	3	4	0
Virginia Beach	24	31	27	27	22	31	22	25	31	27	19	24	15	27	30	16	19	25	37	22	26	34
Williamsburg	0	0	1	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	1	1	0
York	9	10	9	11	5	12	4	8	8	2	6	5	2	4	5	5	9	5	6	9	7	7
Hampton Roads	132	153	136	129	131	139	141	155	153	124	121	136	99	131	125	121	125	155	139	147	150	179
Virginia	930	935	913	942	922	946	961	1,026	821	756	740	764	775	741	700	753	761	843	819	827	847	968
HR % of state	14.2%	16.4%	14.9%	13.7%	14.2%	14.7%	14.7%	15.1%	18.6%	16.4%	16.4%	17.8%	12.8%	17.7%	17.9%	16.1%	16.4%	18.4%	17.0%	17.8%	17.7%	18.5%
United States	41,945	42,196	43,005	42,884	42,836	43,510	42,708	41,259	37,423	33,883	32,999	32,479	33,782	32,894	32,675	35,485	37,806	37,133	36,835	36,355	38,824	42,915

HAMPTON ROADS TRAFFIC CRASH FATALITIES, 2000 TO 2021

Source: HRTPO analysis of Virginia DMV data.

Appendix B – Hampton Roads Freeway Crash Data

JURIS-DICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR	TOTAL CRASHES	CRASH RATE PER 100MVMT	REGIONAL RANK	TOTAL F+SI CRASHES	F+SI RATE PER 100MVMT	REGIONAL RANK	REGIONAL PSI RANK
JCC	I-64	NEW KENT CL	RTE 30	EB	64	45.24	177	4	2.83	145	-
JCC	I-64	NEW KENT CL	RTE 30	WB	57	41.15	185	7	5.05	82	-
JCC	I-64	RTE 30	CROAKER RD (RTE 607)	EB	112	45.01	179	12	4.82	90	-
JCC	I-64	RTE 30	CROAKER RD (RTE 607)	WB	66	28.14	204	5	2.13	165	-
JCC/YC	I-64	CROAKER RD (RTE 607)	RTE 199/646	EB	122	69.22	115	7	3.97	116	-
JCC/YC	I-64	CROAKER RD (RTE 607)	RTE 199/646	WB	90	52.58	156	6	3.51	129	-
YC	I-64	RTE 199/646	RTE 143	EB	147	53.61	154	6	2.19	164	216
YC	I-64	RTE 199/646	RTE 143	WB	231	93.92	75	15	6.10	64	96
YC	I-64	RTE 143	RTE 199 (EAST OF WILLIAMSBURG)	EB	243	95.27	72	9	3.53	128	167
YC	I-64	RTE 143	RTE 199 (EAST OF WILLIAMSBURG)	WB	319	138.12	32	11	4.76	93	46
YC	I-64	RTE 199 (EAST OF WILLIAMSBURG)	GROVE CONNECTOR	EB	123	133.08	37	3	3.25	133	91
YC	I-64	RTE 199 (EAST OF WILLIAMSBURG)	GROVE CONNECTOR	WB	103	120.11	48	2	2.33	161	271
YC/JCC/NN	I-64	GROVE CONNECTOR	RTE 143 (NORTH)	EB	232	86.85	87	11	4.12	112	76
YC/JCC/NN	I-64	GROVE CONNECTOR	RTE 143 (NORTH)	WB	250	87.32	84	9	3.14	136	41
NN	I-64	RTE 143 (NORTH)	YORKTOWN RD	EB	126	197.03	18	9	14.07	11	14
NN	I-64	RTE 143 (NORTH)	YORKTOWN RD	WB	96	153.98	23	3	4.81	91	20
NN	I-64	YORKTOWN RD	FORT EUSTIS BLVD	EB	162	88.76	80	4	2.19	163	136
NN	I-64	YORKTOWN RD	FORT EUSTIS BLVD	WB	180	94.01	74	9	4.70	94	55
NN	I-64	FORT EUSTIS BLVD	JEFFERSON AVE	EB	222	50.64	161	20	4.56	97	-
NN	I-64	FORT EUSTIS BLVD	JEFFERSON AVE	WB	301	72.17	112	13	3.12	138	-
NN	I-64	JEFFERSON AVE	OYSTER POINT RD	EB	76	43.36	180	8	4.56	96	338
NN	I-64	JEFFERSON AVE	OYSTER POINT RD	WB	143	79.46	100	8	4.45	102	224
NN	I-64	OYSTER POINT RD	J C MORRIS BLVD	EB	96	47.42	170	12	5.93	67	-
NN	I-64	OYSTER POINT RD	J C MORRIS BLVD	WB	100	50.29	163	12	6.04	65	-
NN/HAM	I-64	J C MORRIS BLVD	HRC PARKWAY	EB	210	47.57	169	22	4.98	83	-
NN/HAM	I-64	J C MORRIS BLVD	HRC PARKWAY	WB	235	51.62	159	21	4.61	95	-
HAM	I-64	HRC PARKWAY	MAGRUDER BLVD	EB	56	55.32	151	7	6.92	52	-
HAM	I-64	HRC PARKWAY	MAGRUDER BLVD	WB	47	47.35	171	4	4.03	115	-
HAM	I-64	MAGRUDER BLVD	MERCURY BLVD	EB	82	51.04	160	5	3.11	139	-
HAM	I-64	MAGRUDER BLVD	MERCURY BLVD	WB	47	29.26	203	7	4.36	106	-
HAM	I-64	MERCURY BLVD	I-664	EB	140	103.73	64	13	9.63	31	-
HAM	I-64	MERCURY BLVD	I-664	WB	109	79.11	101	17	12.34	18	-
HAM	I-64	I-664	ARMISTEAD AVE	EB	106	119.08	50	8	8.99	34	228
HAM	I-64	I-664	ARMISTEAD AVE	WB	77	84.07	91	7	7.64	43	-
HAM	I-64	ARMISTEAD AVE	SETTLERS LANDING RD	EB	381	202.76	17	19	10.11	28	6
HAM	I-64	ARMISTEAD AVE	SETTLERS LANDING RD	WB	156	87.46	82	16	8.97	35	-
HAM	I-64	SETTLERS LANDING RD	MALLORY ST	EB	123	302.77	4	2	4.92	85	35
HAM	I-64	SETTLERS LANDING RD	MALLORY ST	WB	53	116.35	51	3	6.59	57	-
HAM/NOR	I-64/HRBT	MALLORY ST	OCEAN VIEW AVE	EB	764	241.79	11	27	8.54	39	2
HAM/NOR	I-64/HRBT	MALLORY ST	OCEAN VIEW AVE	WB	768	252.10	10	22	7.22	46	-
NOR	I-64	OCEAN VIEW AVE	4TH VIEW AVE	EB	90	61.83	135	2	1.37	188	-
NOR	I-64	OCEAN VIEW AVE	4TH VIEW AVE	WB	205	141.49	31	2	1.38	187	3
NOR	I-64	4TH VIEW AVE	BAY AVE	EB	49	63.87	128	2	2.61	155	-
NOR	I-64	4TH VIEW AVE	BAY AVE	WB	159	211.32	16	2	2.66	151	47
NOR	I-64	BAY AVE	I-564/LITTLE CREEK RD	EB	119	77.60	103	4	2.61	154	-

JURIS-DICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR	TOTAL CRASHES	CRASH RATE PER 100MVMT	REGIONAL RANK	TOTAL F+SI CRASHES	F+SI RATE PER 100MVMT	REGIONAL RANK	REGIONAL PSI RANK
NOR	I-64	BAY AVE	I-564/LITTLE CREEK RD	WB	163	111.08	57	7	4.77	92	-
NOR	I-64 REV	I-564/LITTLE CREEK RD	TIDEWATER DR	R	23	61.88	134	1	2.69	149	-
NOR	I-64	I-564/LITTLE CREEK RD	TIDEWATER DR	EB	96	80.24	99	7	5.85	68	104
NOR	I-64	I-564/LITTLE CREEK RD	TIDEWATER DR	WB	142	114.21	54	4	3.22	134	54
NOR	I-64 REV	TIDEWATER DR	CHESAPEAKE BLVD	R	15	45.40	174	0	0.00	194	-
NOR	I-64	TIDEWATER DR	CHESAPEAKE BLVD	EB	106	104.53	63	4	3.94	117	283
NOR	I-64	TIDEWATER DR	CHESAPEAKE BLVD	WB	143	129.39	42	5	4.52	98	27
NOR	I-64 REV	CHESAPEAKE BLVD	NORVIEW AVE	R	5	16.22	214	0	0.00	194	-
NOR	I-64	CHESAPEAKE BLVD	NORVIEW AVE	EB	125	114.94	53	8	7.36	45	140
NOR	I-64	CHESAPEAKE BLVD	NORVIEW AVE	WB	96	82.12	95	4	3.42	130	-
NOR	I-64 REV	NORVIEW AVE	MILITARY HWY	R	4	10.32	218	1	2.58	156	-
NOR	I-64	NORVIEW AVE	MILITARY HWY	EB	155	102.02	66	8	5.27	79	99
NOR	I-64	NORVIEW AVE	MILITARY HWY	WB	86	56.94	148	8	5.30	78	-
NOR	I-64 REV	MILITARY HWY	NORTHAMPTON BLVD	R	4	11.77	216	0	0.00	194	-
NOR	I-64	MILITARY HWY	NORTHAMPTON BLVD	EB	139	121.82	47	5	4.38	105	238
NOR	I-64	MILITARY HWY	NORTHAMPTON BLVD	WB	162	123.75	45	9	6.88	53	-
NOR	I-64 REV	NORTHAMPTON BLVD	I-264	R	15	22.80	211	1	1.52	180	-
NOR	I-64	NORTHAMPTON BLVD	I-264	EB	1175	399.40	1	13	4.42	103	1
NOR	I-64	NORTHAMPTON BLVD	I-264	WB	300	91.18	79	8	2.43	158	-
NOR/VB	I-64	I-264	INDIAN RIVER RD	EB	312	96.27	70	11	3.39	131	34
NOR/VB	I-64	I-264	INDIAN RIVER RD	WB	426	130.34	41	11	3.37	132	21
VB/CHES	I-64	INDIAN RIVER RD	GREENBRIER PKWY	EB	114	34.82	196	9	2.75	146	-
VB/CHES	I-64	INDIAN RIVER RD	GREENBRIER PKWY	WB	141	41.95	183	6	1.79	173	-
CHES	I-64	GREENBRIER PKWY	BATTLEFIELD BLVD	EB	120	104.71	62	8	6.98	50	-
CHES	I-64	GREENBRIER PKWY	BATTLEFIELD BLVD	WB	107	95.98	71	2	1.79	172	-
CHES	I-64	BATTLEFIELD BLVD	I-464	EB	286	255.34	9	10	8.93	36	29
CHES	I-64	BATTLEFIELD BLVD	I-464	WB	114	111.17	56	5	4.88	88	291
CHES	I-64	I-464	GEORGE WASHINGTON HWY	EB	523	147.29	27	15	4.22	109	17
CHES	I-64	I-464	GEORGE WASHINGTON HWY	WB	405	109.61	59	15	4.06	114	-
CHES	I-64	GEORGE WASHINGTON HWY	MILITARY HWY	EB	157	137.07	34	6	5.24	81	186
CHES	I-64	GEORGE WASHINGTON HWY	MILITARY HWY	WB	144	126.34	43	5	4.39	104	316
CHES	I-64	MILITARY HWY	I-264&664	EB	114	61.99	133	9	4.89	87	-
CHES	I-64	MILITARY HWY	I-264&664	WB	149	87.01	85	7	4.09	113	-
CHES/PORT	I-264	I-64&664	GREENWOOD DR	EB	57	69.56	114	7	8.54	40	-
CHES/PORT	I-264	I-64&664	GREENWOOD DR	WB	75	92.20	77	10	12.29	19	58
PORT	I-264	GREENWOOD DR	VICTORY BLVD	EB	43	73.08	110	5	8.50	41	-
PORT	I-264	GREENWOOD DR	VICTORY BLVD	WB	64	125.84	44	7	13.76	12	212
PORT	I-264	VICTORY BLVD	PORTSMOUTH BLVD	EB	22	58.21	142	4	10.58	25	-
PORT	I-264	VICTORY BLVD	PORTSMOUTH BLVD	WB	22	59.50	137	1	2.70	148	-
PORT	I-264	PORTSMOUTH BLVD	FREDERICK BLVD	EB	34	83.86	92	2	4.93	84	-
PORT	I-264	PORTSMOUTH BLVD	FREDERICK BLVD	WB	26	56.29	150	5	10.82	24	-
PORT	I-264	FREDERICK BLVD	DES MOINES AVE	EB	46	100.95	67	7	15.36	6	-
PORT	I-264	FREDERICK BLVD	DES MOINES AVE	WB	42	78.30	102	3	5.59	73	-
PORT	I-264	DES MOINES AVE	EFFINGHAM ST	EB	79	185.47	19	4	9.39	33	116
PORT	I-264	DES MOINES AVE	EFFINGHAM ST	WB	37	83.26	93	3	6.75	55	334

JURIS-DICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR	TOTAL CRASHES	CRASH RATE PER 100MVMT	REGIONAL RANK	TOTAL F+SI CRASHES	F+SI RATE PER 100MVMT	REGIONAL RANK	REGIONAL PSI RANK
PORT/NOR	I-264/DOWNTOWN TUNNEL	EFFINGHAM ST	I-464	EB	214	273.95	6	8	10.24	26	13
PORT/NOR	I-264/DOWNTOWN TUNNEL	EFFINGHAM ST	I-464	WB	110	150.25	26	1	1.37	189	296
NOR	I-264/BERKLEY BRIDGE	I-464	WATERSIDE/CITY HALL/TIDEWATER	EB	141	217.11	14	2	3.08	142	186
NOR	I-264/BERKLEY BRIDGE	I-464	WATERSIDE/CITY HALL/TIDEWATER	WB	196	331.31	3	6	10.14	27	16
NOR	I-264	WATERSIDE/CITY HALL/TIDEWATER	BRAMBLETON AVE	EB	37	49.27	166	2	2.66	150	135
NOR	I-264	WATERSIDE/CITY HALL/TIDEWATER	BRAMBLETON AVE	WB	64	91.71	78	1	1.43	185	168
NOR	I-264	BRAMBLETON AVE	BALLENTINE BLVD	EB	55	64.90	127	0	0.00	194	-
NOR	I-264	BRAMBLETON AVE	BALLENTINE BLVD	WB	127	141.57	30	2	2.23	162	39
NOR	I-264	BALLENTINE BLVD	MILITARY HWY	EB	250	105.51	61	23	9.71	30	35
NOR	I-264	BALLENTINE BLVD	MILITARY HWY	WB	175	69.19	116	8	3.16	135	168
NOR	I-264	MILITARY HWY	I-64	EB	127	259.21	8	3	6.12	63	282
NOR	I-264	MILITARY HWY	I-64	WB	105	299.69	5	5	14.27	10	284
NOR	I-264	I-64	NEWTOWN RD/WCL VA. BEACH	EB	165	134.80	36	6	4.90	86	90
NOR	I-264	I-64	NEWTOWN RD/WCL VA. BEACH	WB	389	366.36	2	13	12.24	20	10
VB	I-264	NEWTOWN RD/ECL NORFOLK	WITCHDUCK RD	EB	410	161.12	22	11	4.32	107	26
VB	I-264	NEWTOWN RD/ECL NORFOLK	WITCHDUCK RD	WB	299	110.73	58	20	7.41	44	102
VB	I-264	WITCHDUCK RD	INDEPENDENCE BLVD	EB	306	145.65	28	5	2.38	160	21
VB	I-264	WITCHDUCK RD	INDEPENDENCE BLVD	WB	250	119.52	49	12	5.74	71	108
VB	I-264	INDEPENDENCE BLVD	ROSEMONT RD	EB	256	83.21	94	18	5.85	69	132
VB	I-264	INDEPENDENCE BLVD	ROSEMONT RD	WB	275	87.42	83	14	4.45	101	141
VB	I-264	ROSEMONT RD	LYNNHAVEN PKWY	EB	133	63.02	131	4	1.90	168	-
VB	I-264	ROSEMONT RD	LYNNHAVEN PKWY	WB	145	66.91	120	8	3.69	124	-
VB	I-264	LYNNHAVEN PKWY	LASKIN RD	EB	139	86.60	88	3	1.87	169	-
VB	I-264	LYNNHAVEN PKWY	LASKIN RD	WB	122	73.29	108	4	2.40	159	-
VB	I-264	LASKIN RD	FIRST COLONIAL RD	EB	42	60.41	136	5	7.19	47	-
VB	I-264	LASKIN RD	FIRST COLONIAL RD	WB	42	51.96	157	5	6.19	62	368
VB	I-264	FIRST COLONIAL RD	BIRDNECK RD	EB	31	42.49	182	4	5.48	77	-
VB	I-264	FIRST COLONIAL RD	BIRDNECK RD	WB	37	48.55	168	4	5.25	80	220
VB	I-264	BIRDNECK RD	PARKS AVE	EB	18	152.41	24	2	16.93	3	355
VB	I-264	BIRDNECK RD	PARKS AVE	WB	12	94.46	73	2	15.74	5	-
CHES	I-464	I-64	MILITARY HWY	NB	49	93.18	76	1	1.90	167	278
CHES	I-464	I-64	MILITARY HWY	SB	71	130.49	40	3	5.51	75	312
CHES	I-464	MILITARY HWY	FREEMAN AVE	NB	29	62.02	132	4	8.55	38	-
CHES	I-464	MILITARY HWY	FREEMAN AVE	SB	28	58.99	139	2	4.21	110	-
CHES	I-464	FREEMAN AVE	POINDEXTER ST	NB	58	65.82	123	6	6.81	54	337
CHES	I-464	FREEMAN AVE	POINDEXTER ST	SB	51	56.98	147	4	4.47	100	-
CHES/NOR	I-464	POINDEXTER ST	SOUTH MAIN ST	NB	54	99.02	69	0	0.00	194	-
CHES/NOR	I-464	POINDEXTER ST	SOUTH MAIN ST	SB	45	85.11	90	2	3.78	119	-
NOR	I-464	SOUTH MAIN ST	I-264	NB	74	272.29	7	1	3.68	125	117
NOR	I-464	SOUTH MAIN ST	I-264	SB	60	215.48	15	4	14.37	9	-
NOR	I-564	ADMIRAL TAUSSIG BLVD	INTERNATIONAL TERMINAL BLVD	NB	75	122.02	46	1	1.63	178	146
NOR	I-564	ADMIRAL TAUSSIG BLVD	INTERNATIONAL TERMINAL BLVD	SB	35	50.25	164	1	1.44	184	-
NOR	I-564	INTERNATIONAL TERMINAL BLVD	I-64	NB	80	144.03	29	2	3.60	126	279
NOR	I-564	INTERNATIONAL TERMINAL BLVD	I-64	SB	59	150.84	25	5	12.78	15	138
CHES	I-664	I-64 & I-264	ROUTES 13/58/460	SB	80	49.57	165	3	1.86	170	-

JURIS-DICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR	TOTAL CRASHES	CRASH RATE PER 100MVMT	REGIONAL RANK	TOTAL F+SI CRASHES	F+SI RATE PER 100MVMT	REGIONAL RANK	REGIONAL PSI RANK
CHES	I-664	I-64 & I-264	ROUTES 13/58/460	NB	70	39.84	188	2	1.14	191	-
CHES	I-664	ROUTES 13/58/460	DOCK LANDING RD	SB	93	99.87	68	8	8.59	37	-
CHES	I-664	ROUTES 13/58/460	DOCK LANDING RD	NB	69	75.96	105	5	5.50	76	391
CHES	I-664	DOCK LANDING RD	PORTSMOUTH BLVD	SB	48	56.52	149	3	3.53	127	-
CHES	I-664	DOCK LANDING RD	PORTSMOUTH BLVD	NB	58	66.99	119	6	6.93	51	-
CHES	I-664	PORTSMOUTH BLVD	PUGHSVILLE RD	SB	77	50.42	162	4	2.62	153	-
CHES	I-664	PORTSMOUTH BLVD	PUGHSVILLE RD	NB	71	45.38	175	6	3.83	118	-
CHES/SUF	I-664	PUGHSVILLE RD	BRIDGE RD	SB	46	41.57	184	2	1.81	171	-
CHES/SUF	I-664	PUGHSVILLE RD	BRIDGE RD	NB	44	37.80	193	2	1.72	175	-
SUF	I-664	BRIDGE RD	WESTERN FWY	SB	8	103.58	65	0	0.00	194	-
SUF	I-664	BRIDGE RD	WESTERN FWY	NB	14	176.26	21	1	12.59	16	-
SUF	I-664	WESTERN FWY	COLLEGE DR	SB	33	37.92	192	1	1.15	190	-
SUF	I-664	WESTERN FWY	COLLEGE DR	NB	98	111.96	55	7	8.00	42	231
SUF/NN	I-664/MMMBT	COLLEGE DR	TERMINAL AVE	SB	207	57.44	143	9	2.50	157	28
SUF/NN	I-664/MMMBT	COLLEGE DR	TERMINAL AVE	NB	835	223.36	13	42	11.23	22	3
NN	I-664	TERMINAL AVE	23RD ST	SB	86	230.62	12	6	16.09	4	-
NN	I-664	TERMINAL AVE	23RD ST	NB	72	130.68	39	6	10.89	23	-
NN	I-664	23RD ST	CHESTNUT AVE	SB	145	135.81	35	7	6.56	58	125
NN	I-664	23RD ST	CHESTNUT AVE	NB	74	69.71	113	4	3.77	120	390
NN/HAM	I-664	CHESTNUT AVE	ABERDEEN RD	SB	64	132.85	38	3	6.23	61	290
NN/HAM	I-664	CHESTNUT AVE	ABERDEEN RD	NB	42	88.09	81	0	0.00	194	-
HAM	I-664	ABERDEEN RD	POWER PLANT PKWY	SB	41	42.66	181	3	3.12	137	-
HAM	I-664	ABERDEEN RD	POWER PLANT PKWY	NB	68	72.54	111	6	6.40	60	234
HAM	I-664	POWER PLANT PKWY	I-64	SB	91	82.08	96	3	2.71	147	369
HAM	I-664	POWER PLANT PKWY	I-64	NB	147	137.59	33	7	6.55	59	101
CHES	CHESAPEAKE EXPWY	GALLBUSH RD	BATTLEFIELD BLVD (NEAR INDIAN CREEK)	NB	8	29.97	201	1	3.75	121	-
CHES	CHESAPEAKE EXPWY	GALLBUSH RD	BATTLEFIELD BLVD (NEAR INDIAN CREEK)	SB	8	29.97	201	1	3.75	121	-
CHES	CHESAPEAKE EXPWY	BATTLEFIELD BLVD (NEAR INDIAN CREEK)	HILLCREST PKWY	NB	4	14.87	215	0	0.00	194	-
CHES	CHESAPEAKE EXPWY	BATTLEFIELD BLVD (NEAR INDIAN CREEK)	HILLCREST PKWY	SB	5	18.59	213	1	3.72	123	-
CHES	CHESAPEAKE EXPWY	HILLCREST PKWY	BATTLEFIELD BLVD (S OF GREAT BRIDGE)	NB	4	5.30	220	0	0.00	194	-
CHES	CHESAPEAKE EXPWY	HILLCREST PKWY	BATTLEFIELD BLVD (S OF GREAT BRIDGE)	SB	7	9.28	219	2	2.65	152	-
CHES	CHESAPEAKE EXPWY	BATTLEFIELD BLVD (S OF GREAT BRIDGE)	HANBURY RD	NB	2	11.12	217	0	0.00	194	-
CHES	CHESAPEAKE EXPWY	BATTLEFIELD BLVD (S OF GREAT BRIDGE)	HANBURY RD	SB	7	38.91	190	0	0.00	194	-
CHES	CHESAPEAKE EXPWY	HANBURY RD	MT PLEASANT RD	NB	12	20.99	212	0	0.00	194	-
CHES	CHESAPEAKE EXPWY	HANBURY RD	MT PLEASANT RD	SB	15	26.24	207	1	1.75	174	-
CHES	CHESAPEAKE EXPWY	MT PLEASANT RD	BATTLEFIELD BLVD (N OF GREAT BRIDGE)	NB	34	24.14	209	2	1.42	186	-
CHES	CHESAPEAKE EXPWY	MT PLEASANT RD	BATTLEFIELD BLVD (N OF GREAT BRIDGE)	SB	47	33.36	198	1	0.71	193	300
CHES	CHESAPEAKE EXPWY	BATTLEFIELD BLVD (N OF GREAT BRIDGE)	DOMINION BLVD	NB	32	27.05	206	2	1.69	176	-
CHES	CHESAPEAKE EXPWY	BATTLEFIELD BLVD (N OF GREAT BRIDGE)	DOMINION BLVD	SB	27	22.82	210	2	1.69	176	-
CHES	CHESAPEAKE EXPWY	DOMINION BLVD	I-64	NB	11	30.99	200	0	0.00	194	-
CHES	CHESAPEAKE EXPWY	DOMINION BLVD	I-64	SB	21	59.17	138	0	0.00	194	249
PORT	M L K FREEWAY	I-264	HIGH ST	NB	8	35.92	194	1	4.49	99	-
PORT	M L K FREEWAY	I-264	HIGH ST	SB	8	35.92	194	0	0.00	194	-
PORT	M L K FREEWAY	HIGH ST	LONDON BLVD	NB	6	76.87	104	3	38.43	1	-
PORT	M L K FREEWAY	HIGH ST	LONDON BLVD	SB	9	115.30	52	3	38.43	1	-

JURIS-DICTION	FACILITY	SEGMENT FROM	SEGMENT TO	DIR	TOTAL CRASHES	CRASH RATE PER 100MVMT	REGIONAL RANK	TOTAL F+SI CRASHES	F+SI RATE PER 100MVMT	REGIONAL RANK	REGIONAL PSI RANK
PORT	M L K FREEWAY	LONDON BLVD	WESTERN FREEWAY/MIDTOWN TUNNEL	NB	37	80.45	98	6	13.05	13	-
PORT	M L K FREEWAY	LONDON BLVD	WESTERN FREEWAY/MIDTOWN TUNNEL	SB	30	65.23	125	6	13.05	13	-
SUF/CHES	ROUTE 13/58/460	SUFFOLK BYPASS	I-664	EB	266	63.08	130	30	7.11	48	40
SUF/CHES	ROUTE 13/58/460	SUFFOLK BYPASS	I-664	WB	193	45.77	173	25	5.93	66	-
YC	ROUTE 199	MOORETOWN RD	I-64	EB	14	67.82	118	0	0.00	194	-
YC	ROUTE 199	MOORETOWN RD	I-64	WB	37	179.24	20	1	4.84	89	293
YC	ROUTE 199	RICHMOND RD (RTE 60)	MOORETOWN RD	EB	12	73.19	109	0	0.00	194	-
YC	ROUTE 199	RICHMOND RD (RTE 60)	MOORETOWN RD	WB	14	85.39	89	0	0.00	194	-
JCC	ROUTE 199	RICHMOND RD (RTE 60)	LONGHILL RD (RTE 612)	EB	35	51.75	158	1	1.48	183	348
JCC	ROUTE 199	RICHMOND RD (RTE 60)	LONGHILL RD (RTE 612)	WB	32	47.31	172	0	0.00	194	-
JCC	ROUTE 199	LONGHILL RD (RTE 612)	MONTICELLO AVE (RTE 321)	EB	20	39.42	189	0	0.00	194	-
JCC	ROUTE 199	LONGHILL RD (RTE 612)	MONTICELLO AVE (RTE 321)	WB	23	45.34	176	1	1.97	166	-
JCC	ROUTE 199	MONTICELLO AVE (RTE 321)	JOHN TYLER HWY (RTE 5)	EB	37	109.00	60	0	0.00	194	-
JCC	ROUTE 199	MONTICELLO AVE (RTE 321)	JOHN TYLER HWY (RTE 5)	WB	13	38.30	191	0	0.00	194	-
SUF	SW SUFFOLK BYPASS	HOLLAND RD	CAROLINA RD	NB	13	45.03	178	0	0.00	194	-
SUF	SW SUFFOLK BYPASS	HOLLAND RD	CAROLINA RD	SB	8	27.71	205	0	0.00	194	-
SUF	SUFFOLK BYPASS	HOLLAND RD	PITCHKETTLE RD	EB	26	40.32	186	2	3.10	140	-
SUF	SUFFOLK BYPASS	HOLLAND RD	PITCHKETTLE RD	WB	37	57.37	145	1	1.55	179	-
SUF	SUFFOLK BYPASS	PITCHKETTLE RD	PRUDEN BLVD	EB	44	66.59	121	1	1.51	181	-
SUF	SUFFOLK BYPASS	PITCHKETTLE RD	PRUDEN BLVD	WB	21	31.78	199	1	1.51	181	-
SUF	SUFFOLK BYPASS	PRUDEN BLVD	GODWIN BLVD	EB	36	75.61	106	0	0.00	194	-
SUF	SUFFOLK BYPASS	PRUDEN BLVD	GODWIN BLVD	WB	36	75.61	106	0	0.00	194	-
SUF	SUFFOLK BYPASS	GODWIN BLVD	WILROY RD	EB	56	55.26	152	3	2.96	143	237
SUF	SUFFOLK BYPASS	GODWIN BLVD	WILROY RD	WB	56	55.26	152	3	2.96	143	-
SUF	SUFFOLK BYPASS	WILROY RD	ROUTES 13/58/460	EB	55	58.94	140	4	4.29	108	-
SUF	SUFFOLK BYPASS	WILROY RD	ROUTES 13/58/460	WB	24	25.72	208	1	1.07	192	340
SUF	WESTERN FWY	BRIDGE RD	I-664	EB	10	57.37	144	1	5.74	70	-
SUF	WESTERN FWY	BRIDGE RD	I-664	WB	11	63.11	129	2	11.47	21	-
SUF	WESTERN FWY	I-664	COLLEGE DR	EB	16	66.55	122	1	4.16	111	-
SUF	WESTERN FWY	I-664	COLLEGE DR	WB	14	58.23	141	0	0.00	194	-
SUF/PORT	WESTERN FWY	COLLEGE DR	TOWN POINT RD	EB	34	57.00	146	6	10.06	29	-
SUF/PORT	WESTERN FWY	COLLEGE DR	TOWN POINT RD	WB	20	33.53	197	4	6.71	56	-
PORT	WESTERN FWY	TOWN POINT RD	CEDAR LN	EB	38	53.13	155	4	5.59	74	-
PORT	WESTERN FWY	TOWN POINT RD	CEDAR LN	WB	47	65.72	124	5	6.99	49	-
PORT	WESTERN FWY	CEDAR LN	APM BLVD	EB	46	86.87	86	5	9.44	32	-
PORT	WESTERN FWY	CEDAR LN	APM BLVD	WB	26	49.10	167	3	5.67	72	-
PORT	WESTERN FWY	APM BLVD	WEST NORFOLK RD	EB	26	80.49	97	4	12.38	17	-
PORT	WESTERN FWY	APM BLVD	WEST NORFOLK RD	WB	13	40.25	187	1	3.10	141	-
PORT	WESTERN FWY	WEST NORFOLK RD	MLK FREEWAY/MIDTOWN TUNNEL	EB	58	65.13	126	13	14.60	7	248
PORT	WESTERN FWY	WEST NORFOLK RD	MLK FREEWAY/MIDTOWN TUNNEL	WB	61	68.50	117	13	14.60	7	-

Total Crashes - Total number of crashes within each freeway segment from 2017-2021
Crash Rate per 100MVMT - Total number of crashes divided by the number of vehicles that travel the freeway segment x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within each freeway segment from 2017-2021
F+SI Rate per 100MVMT - Total number of fatal and serious injury crashes divided by the number of vehicles that travel the freeway segment x 100 million
Locality PSI Rank - Rank of freeway segment in terms of Potential for Safety Improvement (PSI). Segment must be ranked within the top 400 segments in the VDOT district to be included.

Appendix C – Hampton Roads Intersection Crash Data by Jurisdiction

CHESAPEAKE

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
CHES	BATTLEFIELD BLVD	WOODLAKE DR/DEBAUN AVE	69	1	91.77	4	3	6	3.99	20	1
CHES	GREENBRIER PKWY	EDEN WAY	59	2	47.69	30	1	30	0.81	69	-
CHES	BATTLEFIELD BLVD	GREAT BRIDGE BLVD/KEMPSVILLE RD	52	3	50.25	27	0	71	0.00	71	-
CHES	BATTLEFIELD BLVD	VOLVO PKWY	52	3	35.84	50	1	30	0.69	70	-
CHES	GEORGE WASHINGTON HWY	MILITARY HWY	51	5	78.28	10	7	1	10.74	3	5
CHES	BATTLEFIELD BLVD	CAMPOSTELLA RD	46	6	80.66	8	2	11	3.51	34	10
CHES	MOUNT PLEASANT RD	CENTERVILLE TPKE	45	7	92.35	3	4	3	8.21	6	4
CHES	MILITARY HWY	CAMPOSTELLA RD	44	8	67.44	13	4	3	6.13	11	9
CHES	KEMPSVILLE RD	GREENBRIER PKWY/BUTTS STATION RD	43	9	51.90	24	2	11	2.41	47	-
CHES	GREENBRIER PKWY	CROSSWAYS BLVD	41	10	27.86	73	2	11	1.36	66	-
CHES	KEMPSVILLE RD	GREEN TREE RD	38	11	58.65	18	5	2	7.72	7	8
CHES	BATTLEFIELD BLVD	HANBURY RD	37	12	85.08	5	1	30	2.30	48	6
CHES	GEORGE WASHINGTON HWY/MILL CREEK PKWY	GEORGE WASHINGTON HWY/OLD MILL RD	37	12	50.06	28	1	30	1.35	67	-
CHES	GREENBRIER PKWY	VOLVO PKWY	35	14	34.06	58	3	6	2.92	40	-
CHES	BATTLEFIELD BLVD	JOHNSTOWN RD/MOUNT PLEASANT RD	33	15	56.23	20	1	30	1.70	61	-
CHES	GREENBRIER PKWY	WOODLAKE DR	32	16	33.49	60	2	11	2.09	52	-
CHES	MILITARY HWY	CANAL DR	32	16	45.31	34	3	6	4.25	19	-
CHES	MILITARY HWY	GREENBRIER PKWY	32	16	38.41	41	0	71	0.00	71	-
CHES	MILITARY HWY	SPARROW RD	32	16	51.97	23	1	30	1.62	63	12
CHES	BATTLEFIELD BLVD	CEDAR RD	31	20	34.67	54	2	11	2.24	49	-
CHES	BATTLEFIELD BLVD	OAK GROVE RD/HOLLYWOOD DR	31	20	34.52	56	4	3	4.45	17	-
CHES	GEORGE WASHINGTON HWY	CANAL DR	29	22	52.27	22	1	30	1.80	58	-
CHES	MOUNT PLEASANT RD	HILLWELL RD	29	22	79.33	9	0	71	0.00	71	13
CHES	PORTSMOUTH BLVD	DOCK LANDING RD	29	22	51.68	25	2	11	3.56	32	-
CHES	MILITARY HWY	GALBERRY RD	28	25	135.30	2	3	6	14.50	1	3
CHES	MILITARY HWY	OLD GREENBRIER RD	28	25	40.44	37	2	11	2.89	41	-
CHES	BATTLEFIELD BLVD	BYRON ST	27	27	28.34	71	1	30	1.05	68	-
CHES	GEORGE WASHINGTON HWY/MOSES GRANDY TRAI	GEORGE WASHINGTON HWY	27	27	57.28	19	1	30	2.12	50	-
CHES	PORTSMOUTH BLVD	GUM RD	27	27	45.66	32	0	71	0.00	71	-
CHES	PROVIDENCE RD	SPARROW RD	27	27	69.59	12	0	71	0.00	71	16
CHES	WESTERN BRANCH BLVD/BRIDGE RD	CHURCHLAND BLVD	27	27	65.61	14	1	30	2.43	46	-
CHES	MILITARY HWY	DEEP CREEK BLVD	26	32	71.34	11	3	6	8.23	5	7
CHES	PORTSMOUTH BLVD	TAYLOR RD	25	33	37.48	43	1	30	1.50	64	-
CHES	VOLVO PKWY	EDEN WAY	25	33	45.08	35	2	11	3.61	30	-
CHES	MILITARY HWY	PARAMOUNT AVE	24	35	39.02	40	1	30	1.63	62	19
CHES	MILITARY HWY	SHELL RD	24	35	33.45	61	1	30	1.39	65	-
CHES	TAYLOR RD	BRUCE RD	22	37	42.75	36	1	30	1.94	54	-
CHES	BRIDGE RD	DUNEDIN DR	21	38	51.48	26	1	30	2.45	45	11
CHES	BATTLEFIELD BLVD	ALBEMARLE DR	20	39	28.95	70	0	71	0.00	71	-
CHES	INDIAN RIVER RD	SPARROW RD	20	39	35.75	51	1	30	1.79	59	21
CHES	MILITARY HWY	CAVALIER BLVD/I-64 RAMP	20	39	37.40	44	2	11	3.74	27	-
CHES	BATTLEFIELD BLVD	OLD BATTLEFIELD BLVD	19	42	38.12	42	1	30	2.01	53	-
CHES	KEMPSVILLE RD	VOLVO PKWY	19	42	24.50	83	0	71	0.00	71	-
CHES	PUGHSVILLE RD/TAYLOR RD	TAYLOR RD/LYNNHURST BLVD	19	42	34.99	53	1	30	1.84	55	-
CHES	WESTERN BRANCH BLVD	TAYLOR RD	19	42	39.89	38	1	30	2.10	51	-
CHES	VOLVO PKWY	EXECUTIVE BLVD	18	46	34.13	57	2	11	3.79	23	-
CHES	CAMPOSTELLA RD	LIBERTY ST/BORDER RD	17	47	82.43	7	2	11	9.70	4	14
CHES	CEDAR RD	WATERS RD	17	47	30.21	67	1	30	1.78	60	-
CHES	BATTLEFIELD BLVD	KNELLS RIDGE BLVD	16	49	21.49	93	2	11	2.69	43	-
CHES	ATLANTIC AVE	OLD ATLANTIC AVE/MARTIN AVE	15	50	47.69	31	2	11	6.36	9	-

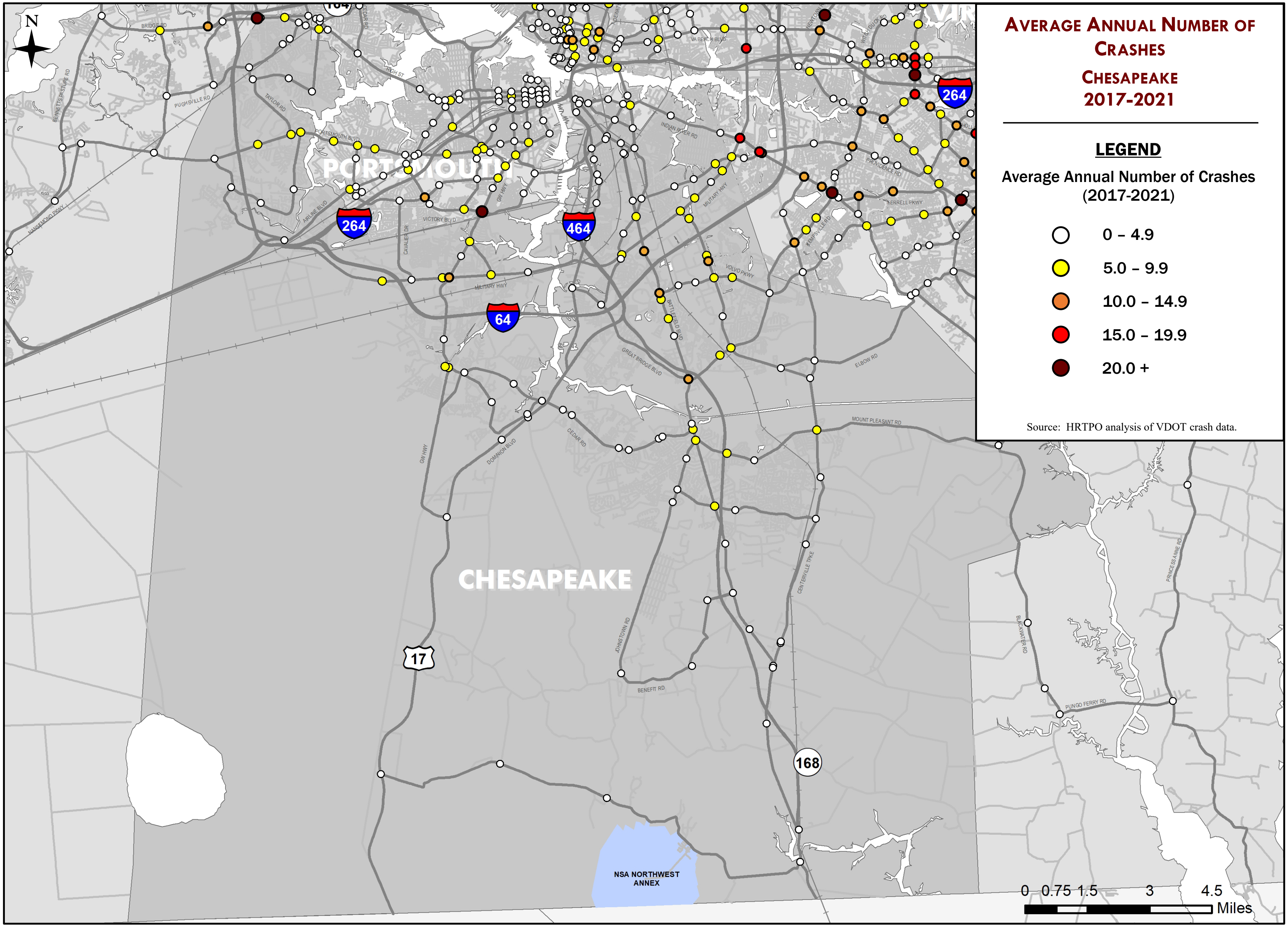
CHESAPEAKE (CONTINUED)

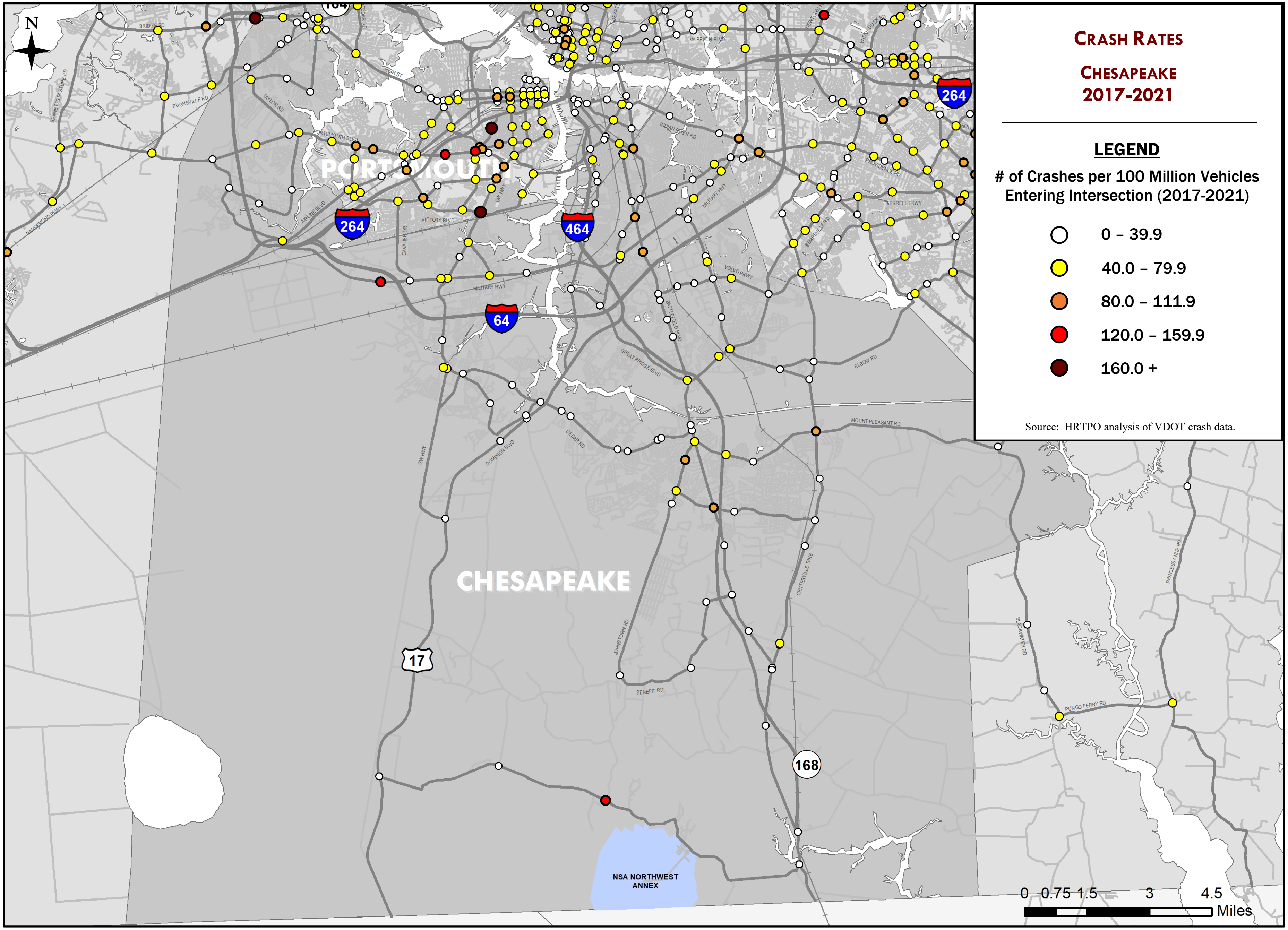
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
CHES	BATTLEFIELD BLVD	GALLBUSH RD	15	50	29.83	68	0	71	0.00	71	-
CHES	BATTLEFIELD BLVD	HILLCREST PKWY	15	50	26.69	78	2	11	3.56	33	18
CHES	CEDAR RD	CAHOON PKWY	15	50	27.31	76	1	30	1.82	57	-
CHES	PROVIDENCE RD	CAMPOSTELLA RD	15	50	39.71	39	0	71	0.00	71	-
CHES	AIRLINE BLVD	JOLLIFF RD	14	55	54.33	21	1	30	3.88	22	-
CHES	CEDAR RD	BELLS MILL RD W	14	55	26.01	80	2	11	3.72	29	-
CHES	GEORGE WASHINGTON HWY	GALBERRY RD	14	55	20.79	94	0	71	0.00	71	-
CHES	WESTERN BRANCH BLVD	POPLAR HILL RD	14	55	33.74	59	0	71	0.00	71	-
CHES	BAINBRIDGE BLVD	FREEMAN AVE	12	59	45.41	33	1	30	3.78	24	-
CHES	VOLVO PKWY	CROSSWAYS BLVD	12	59	22.70	91	0	71	0.00	71	-
CHES	CEDAR RD	ALBEMARLE DR	11	61	20.22	95	1	30	1.84	56	-
CHES	JOHNSTOWN RD	PARKER RD	11	61	83.48	6	0	71	0.00	71	-
CHES	TOWNE POINT RD	CHURCHLAND BLVD	11	61	23.69	87	0	71	0.00	71	-
CHES	BAINBRIDGE BLVD	PARK AVE	10	64	58.98	17	1	30	5.90	13	-
CHES	BATTLEFIELD BLVD	HICKORY RD E	10	64	23.88	86	2	11	4.78	15	-
CHES	POINDEXTER ST	BAINBRIDGE BLVD	10	64	37.20	45	1	30	3.72	28	-
CHES	TAYLOR RD	BRUIN DR	10	64	33.25	62	1	30	3.32	36	-
CHES	TAYLOR RD	DUNEDIN DR	10	64	36.17	49	0	71	0.00	71	15
CHES	BAINBRIDGE BLVD	PORTLOCK RD	9	69	36.18	48	0	71	0.00	71	-
CHES	CAMPOSTELLA RD	PORTLOCK RD	9	69	27.87	72	1	30	3.10	37	-
CHES	CENTERVILLE TPKE	HICKORY RD E	9	69	64.63	15	0	71	0.00	71	-
CHES	GREENBRIER PKWY	EXECUTIVE BLVD	9	69	17.46	101	0	71	0.00	71	-
CHES	HILLCREST PKWY	EDINBURGH PKWY	9	69	35.59	52	0	71	0.00	71	-
CHES	LIBERTY ST	OLD ATLANTIC AVE/LATHAM AVE	9	69	61.64	16	0	71	0.00	71	-
CHES	MOSES GRANDY TRAIL	MILLVILLE RD	9	69	32.15	65	1	30	3.57	31	-
CHES	ATLANTIC AVE	PROVIDENCE RD	8	76	23.89	85	1	30	2.99	39	-
CHES	CEDAR RD	BELLS MILL RD E	8	76	15.12	102	2	11	3.78	26	-
CHES	CENTERVILLE TPKE	BUTTS STATION RD	8	76	21.54	92	1	30	2.69	42	-
CHES	PROVIDENCE RD	OLD GREENBRIER RD	8	76	26.92	77	2	11	6.73	8	-
CHES	BAINBRIDGE BLVD	CHESAPEAKE DR	7	80	36.92	46	0	71	0.00	71	-
CHES	BAINBRIDGE BLVD	ROSEMONT AVE	7	80	36.33	47	0	71	0.00	71	-
CHES	CENTERVILLE TPKE	ELBOW RD	7	80	24.45	84	1	30	3.49	35	-
CHES	CENTERVILLE TPKE	ETHRIDGE MANOR BLVD	7	80	27.32	75	1	30	3.90	21	-
CHES	GEORGE WASHINGTON HWY	CAMELOT BLVD	7	80	26.49	79	1	30	3.78	24	-
CHES	GEORGE WASHINGTON HWY/DOMINION BLVD	GEORGE WASHINGTON HWY	7	80	25.76	82	0	71	0.00	71	-
CHES	JOHNSTOWN RD	HANBURY RD	7	80	48.10	29	2	11	13.74	2	-
CHES	LIBERTY ST	POINDEXTER ST/22ND ST	7	80	33.01	63	1	30	4.72	16	-
CHES	MOSES GRANDY TRAIL	CEDAR RD/SHIPYARD RD	7	80	23.35	90	0	71	0.00	71	-
CHES	PORTSMOUTH BLVD	JOLLIFF RD	7	80	20.02	96	0	71	0.00	71	-
CHES	BAINBRIDGE BLVD	VIRGINIA AVE	6	90	31.64	66	1	30	5.27	14	-
CHES	BATTLEFIELD BLVD	INDIAN CREEK RD	6	90	18.81	97	0	71	0.00	71	-
CHES	BUTTS STATION RD	ELBOW RD	6	90	18.81	97	0	71	0.00	71	-
CHES	HANBURY RD/ETHERIDGE MANOR BLVD	HILLWELL RD	6	90	18.20	100	0	71	0.00	71	-
CHES	MOUNT PLEASANT RD	FENTRESS AIRFIELD RD	6	90	25.81	81	1	30	4.30	18	-
CHES	BALLAHACK RD	BUNCH WALNUTS RD	5	95	146.20	1	0	71	0.00	71	-
CHES	INDIAN RIVER RD	TATEMSTOWN RD	5	95	12.77	106	1	30	2.55	44	-
CHES	MOUNT PLEASANT RD	FENTRESS RD	5	95	13.78	105	0	71	0.00	71	-
CHES	BAINBRIDGE BLVD	BARNES RD	4	98	23.68	88	1	30	5.92	12	-
CHES	BAINBRIDGE BLVD	GREAT BRIDGE BLVD	4	98	34.63	55	0	71	0.00	71	-
CHES	BATTLEFIELD BLVD	BENEFIT RD	4	98	11.77	108	0	71	0.00	71	-

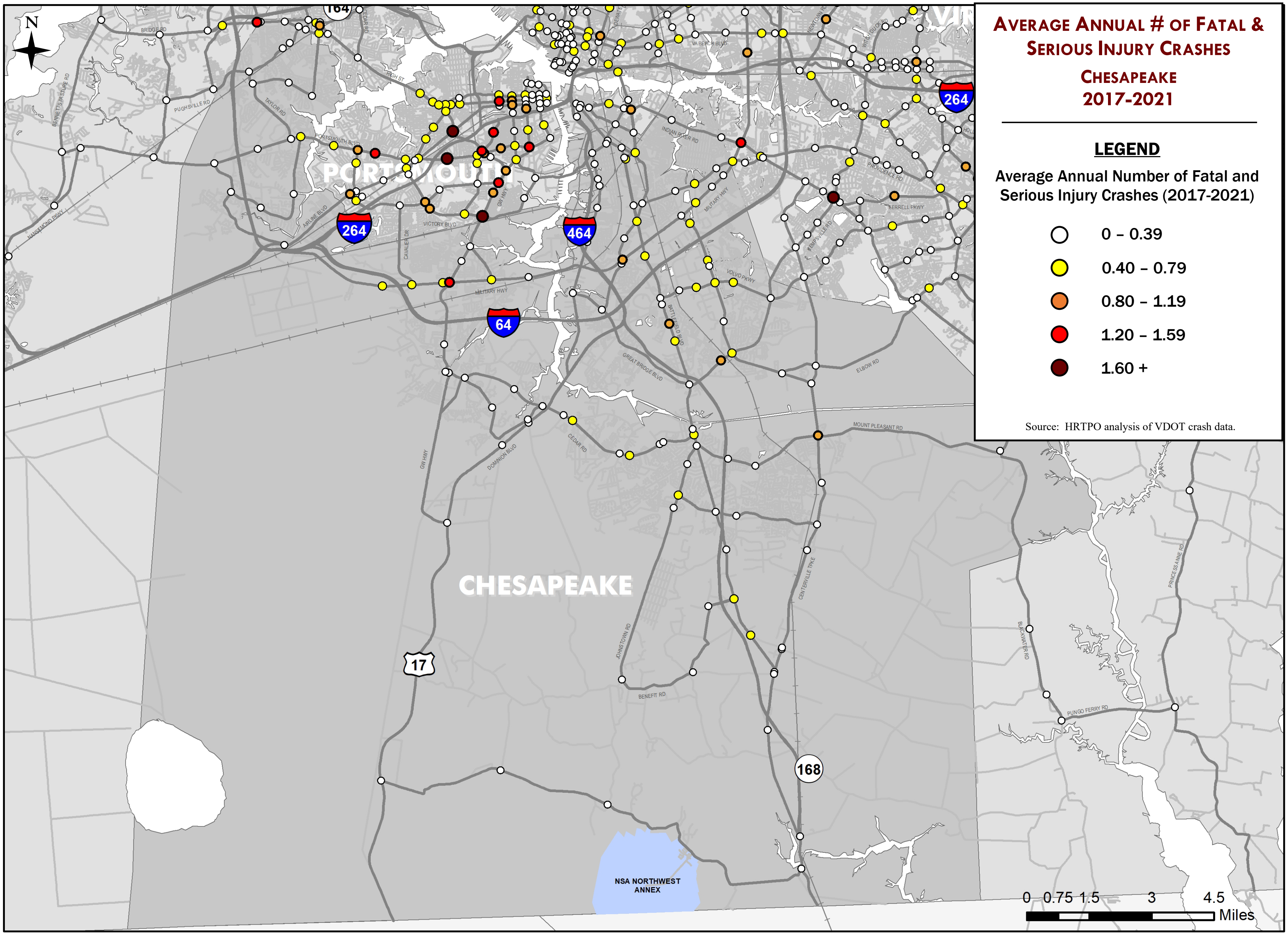
CHESAPEAKE (CONTINUED)

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
CHES	CAMPOSTELLA RD	BERKLEY AVE EXT	4	98	10.70	110	0	71	0.00	71	-
CHES	CEDAR RD	MILLVILLE RD	4	98	32.47	64	0	71	0.00	71	-
CHES	JOHNSTOWN RD	WATERS RD	4	98	29.82	69	0	71	0.00	71	-
CHES	POINDEXTER ST	CHESAPEAKE AVE	4	98	23.57	89	0	71	0.00	71	-
CHES	PROVIDENCE RD	DUNBARTON DR	4	98	12.31	107	0	71	0.00	71	-
CHES	BATTLEFIELD BLVD	CENTERVILLE TPKE	3	106	7.46	116	0	71	0.00	71	-
CHES	BATTLEFIELD BLVD	HILLWELL RD	3	106	7.17	117	0	71	0.00	71	-
CHES	CEDAR RD	BRIARFIELD DR	3	106	5.91	120	0	71	0.00	71	-
CHES	GREAT BRIDGE BLVD	CAMPOSTELLA RD	3	106	18.72	99	1	30	6.24	10	-
CHES	ROUTE 17	BALLAHACK RD	3	106	11.49	109	0	71	0.00	71	-
CHES	BENEFIT RD	SIGN PINE RD	2	111	27.40	74	0	71	0.00	71	-
CHES	BRUCE RD	BRUIN DR	2	111	7.48	115	0	71	0.00	71	-
CHES	BRUCE RD	TYRE NECK RD	2	111	10.04	112	0	71	0.00	71	-
CHES	CAMPOSTELLA RD	LINDALE DR	2	111	14.21	104	0	71	0.00	71	-
CHES	DOMINION BLVD	WEST RD	2	111	10.35	111	0	71	0.00	71	-
CHES	DOMINION BLVD	SCENIC PKWY	2	111	6.17	119	1	30	3.08	38	-
CHES	BENEFIT RD	JOHNSTOWN RD	1	117	14.81	103	0	71	0.00	71	-
CHES	CENTERVILLE TPKE	FENTRESS RD	1	117	5.44	121	0	71	0.00	71	-
CHES	CENTERVILLE TPKE	HEAD OF RIVER RD	1	117	8.30	113	0	71	0.00	71	-
CHES	DOCK LANDING RD	EMERALD WOODS DR	1	117	7.51	114	0	71	0.00	71	-
CHES	OLD ATLANTIC AVE	PARK AVE	1	117	6.88	118	0	71	0.00	71	-
CHES	ROUTE 17	DOUGLAS RD	1	117	3.91	122	0	71	0.00	71	-
CHES	BALLAHACK RD	LAKE DRUMMOND CAUSEWAY	0	123	0.00	123	0	71	0.00	71	-
CHES	CEDAR RD	SCENIC PKWY	0	123	0.00	123	0	71	0.00	71	-
CHES	CENTERVILLE TPKE	LAND OF PROMISE RD	0	123	0.00	123	0	71	0.00	71	-
CHES	DOCK LANDING RD	WOODLAND DR	0	123	0.00	123	0	71	0.00	71	-
CHES	JOLLIFF RD	DOCK LANDING RD	0	123	0.00	123	0	71	0.00	71	-
CHES	MOSES GRANDY TRAIL	CEDAR RD/SEBRIELL WAY	0	123	0.00	123	0	71	0.00	71	-

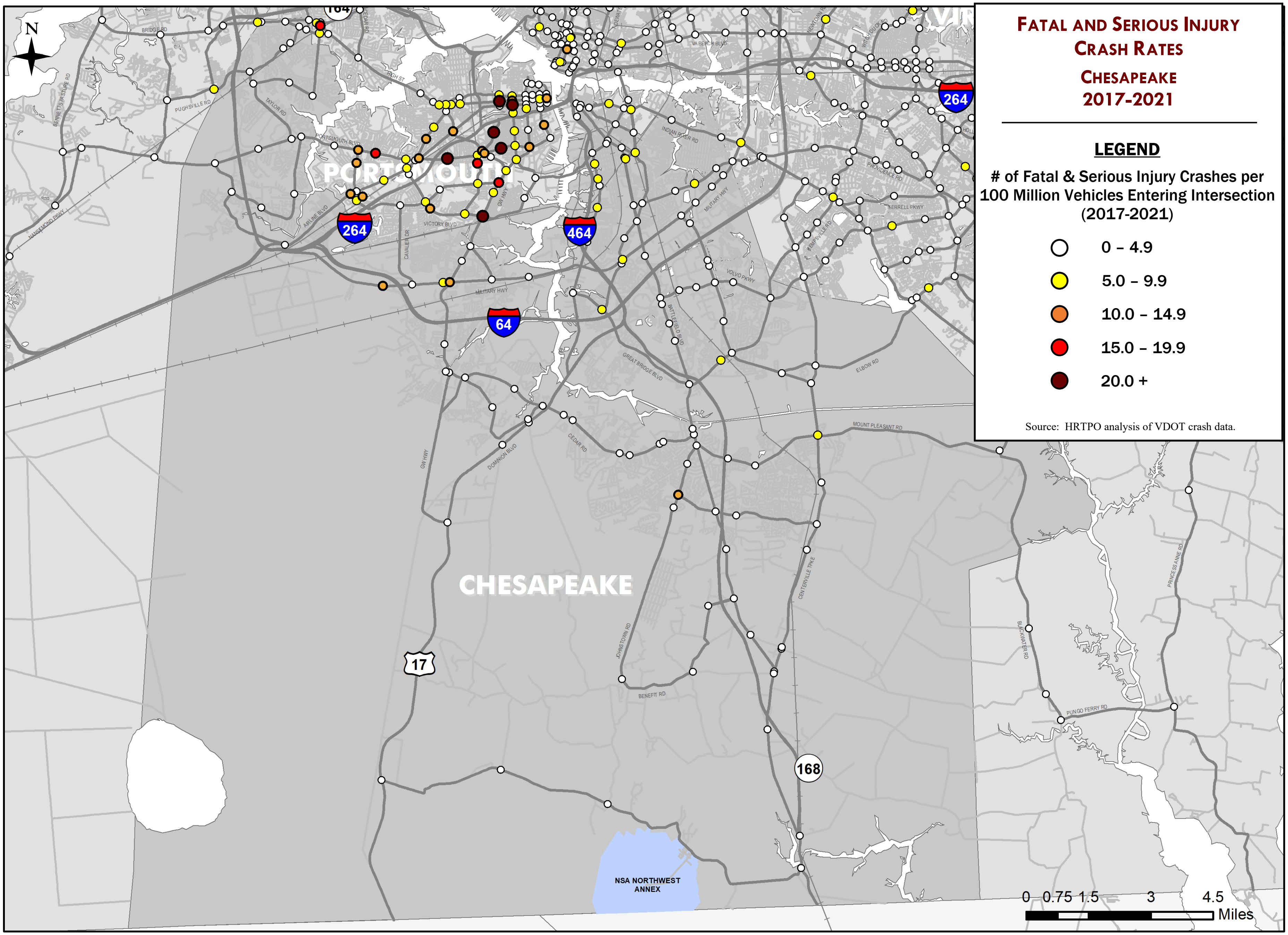
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

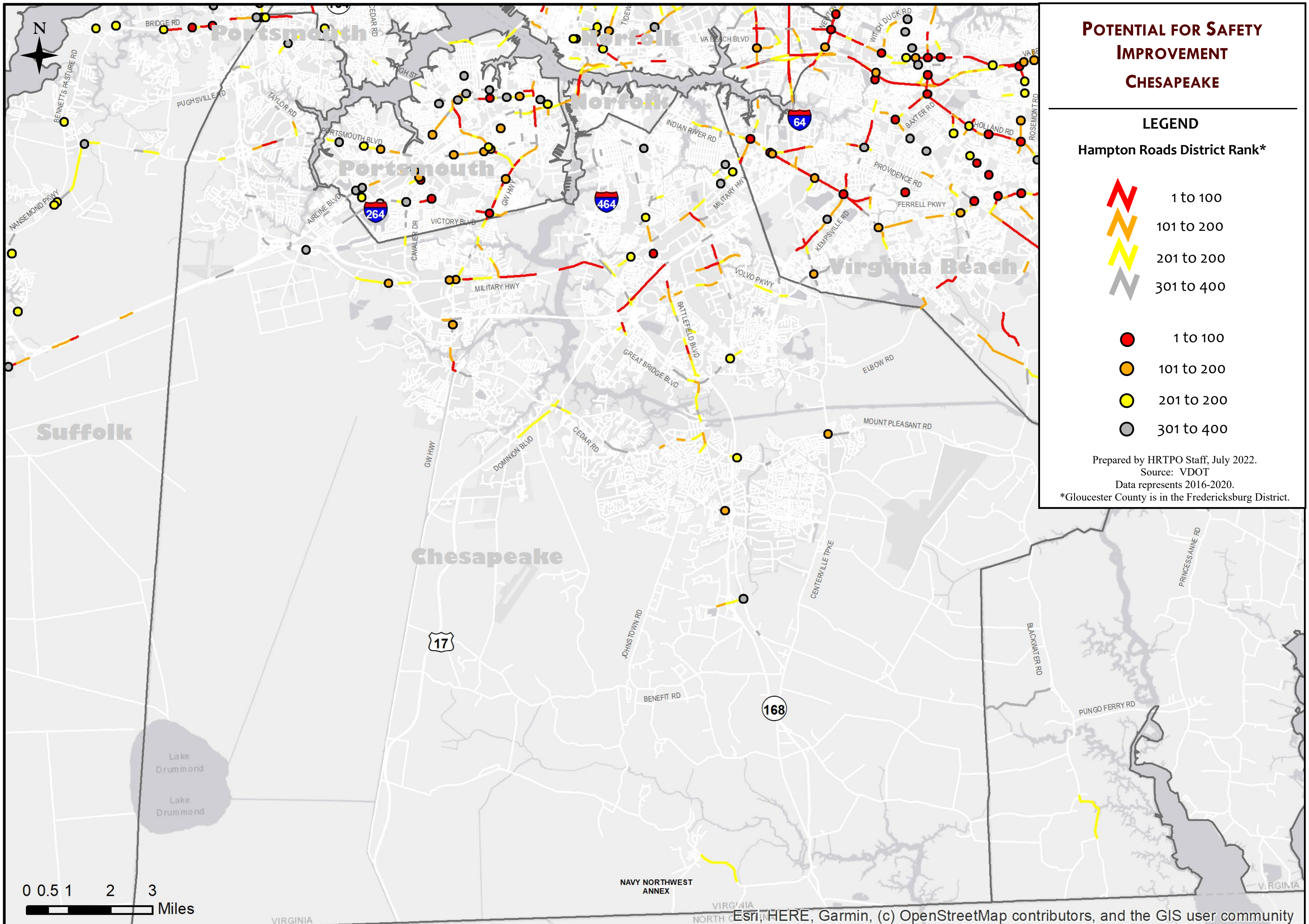

AVERAGE ANNUAL NUMBER OF CRASHES
CHESAPEAKE
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
PORTSMOUTH
CHESAPEAKE
NSA NORTHWEST ANNEX
264
464
64
17
168
N
0 0.75 1.5 3 4.5
Miles

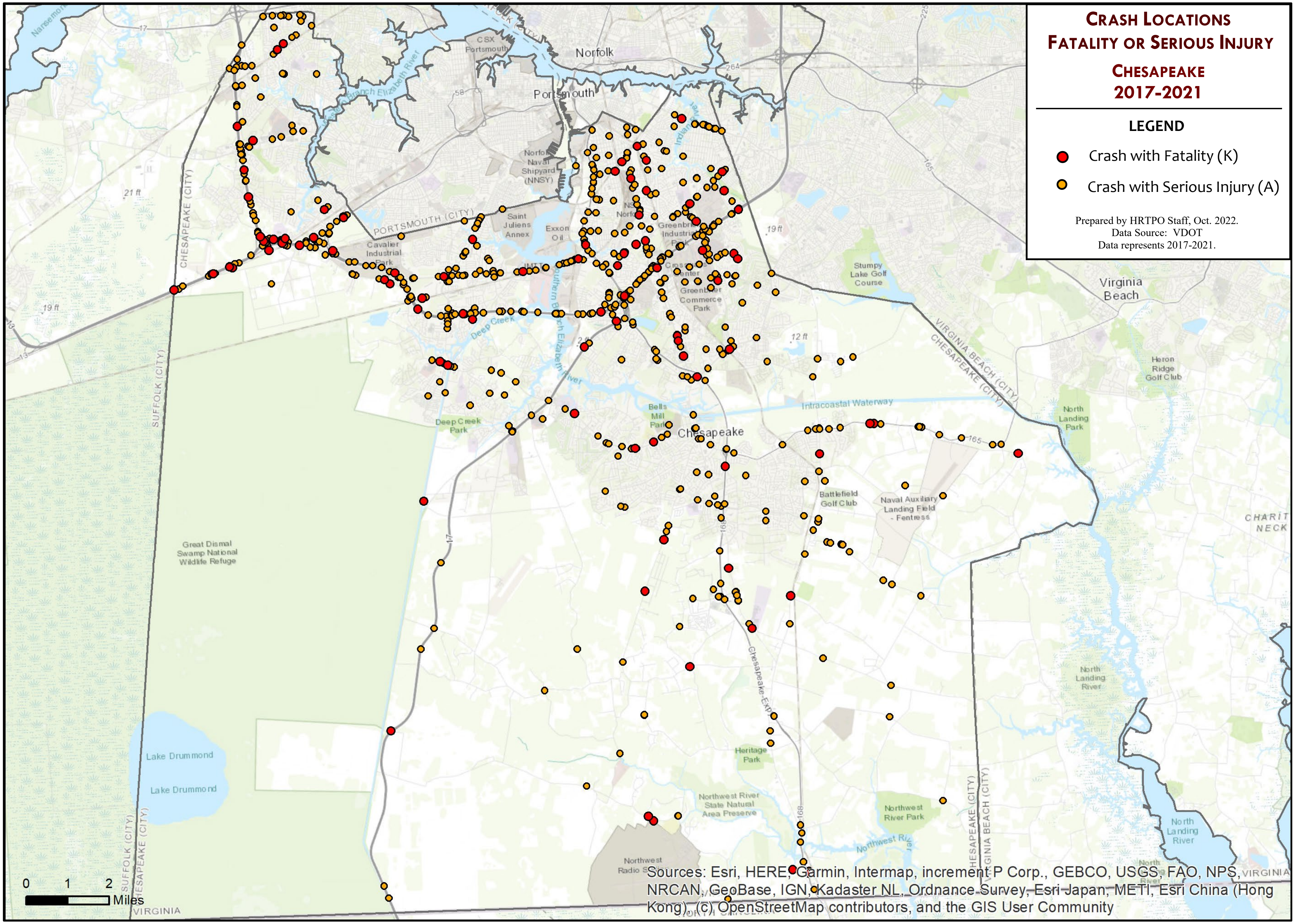

CRASH RATES
CHESAPEAKE
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
PORTSMOUTH
CHESAPEAKE
NSA NORTHWEST ANNEX
264
464
64
17
168
0 0.75 1.5 3 4.5 Miles
N



HAMPTON ROADS TPO


N
FATAL AND SERIOUS INJURY
CRASH RATES
CHESAPEAKE
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
PORTSMOUTH
CHESAPEAKE
264
464
64
17
168
NSA NORTHWEST ANNEX
0 0.75 1.5 3 4.5
Miles

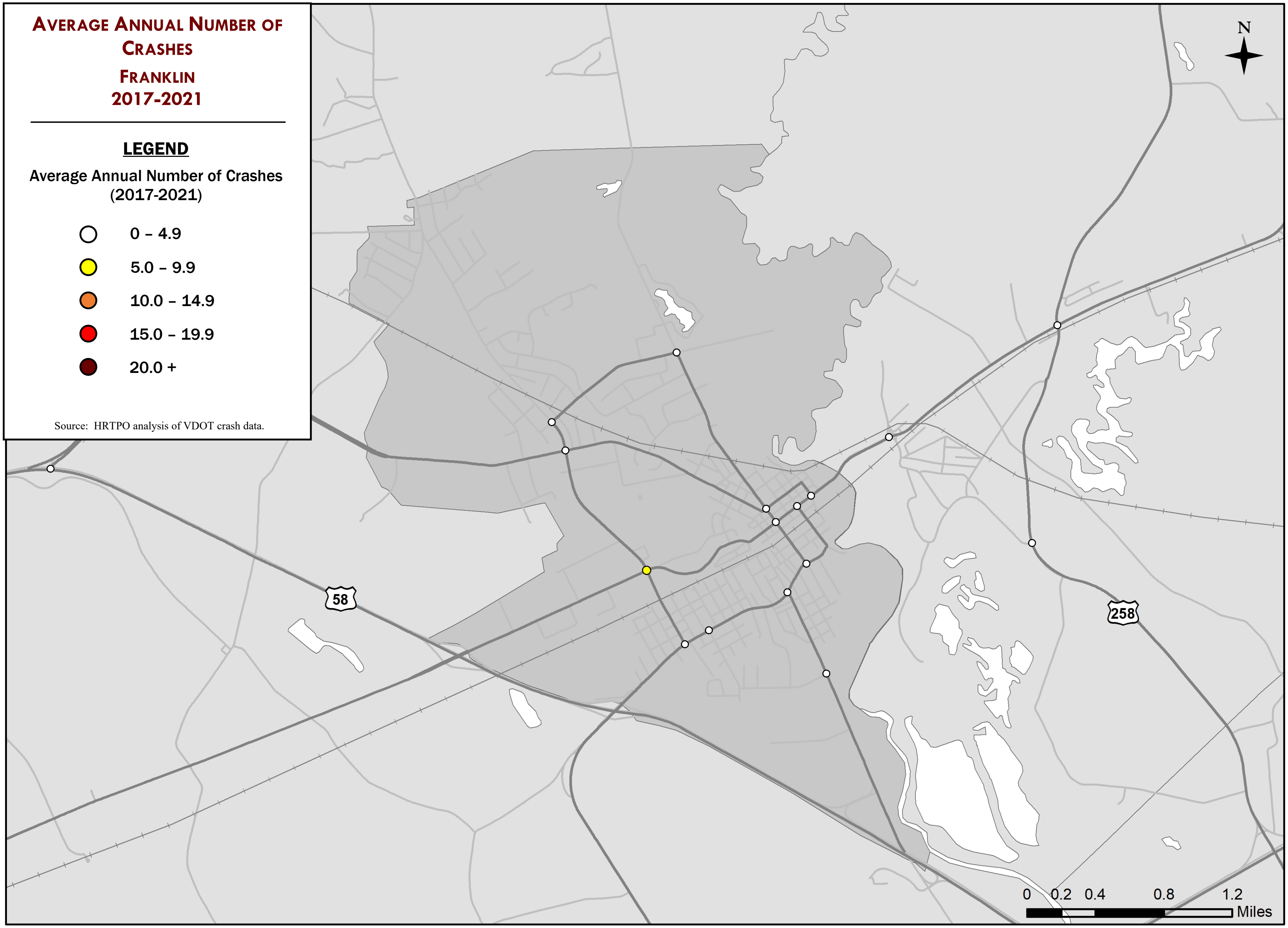

Potential for Safety Improvement
Chesapeake
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
Portsmouth
Norfolk
Virginia Beach
Suffolk
Chesapeake
Lake Drummond
NAVY NORTHWEST ANNEX
MILITARY HWY
BATTLEFIELD BLVD
GREAT BRIDGE BLVD
VOLVO PKWY
MOUNT PLEASANT RD
ELBOW RD
CEDAR RD
DOMINION BLVD
GW HWY
CENTERVILLE TPKE
JOHNSTOWN RD
BENEFIT RD
PUNGO FERRY RD
BLACKWATER RD
PRINCESS ANNE RD
INDIAN RIVER RD
PROVIDENCE RD
FERRELL PKWY
KEMPSVILLE RD
VICTORY BLVD
PORTSMOUTH BLVD
AIRLINE BLVD
NANSEMOND PKWY
BENNETTS PASTURE RD
PUGHSVILLE RD
TAYLOR RD
BRIDGE RD
CAVALIER DR
HOLLAND RD
BAXTER RD
WITCH DUCK RD
ROSEMONT RD
VA BEACH BLVD
264
464
64
17
168
0 0.5 1 2 3
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

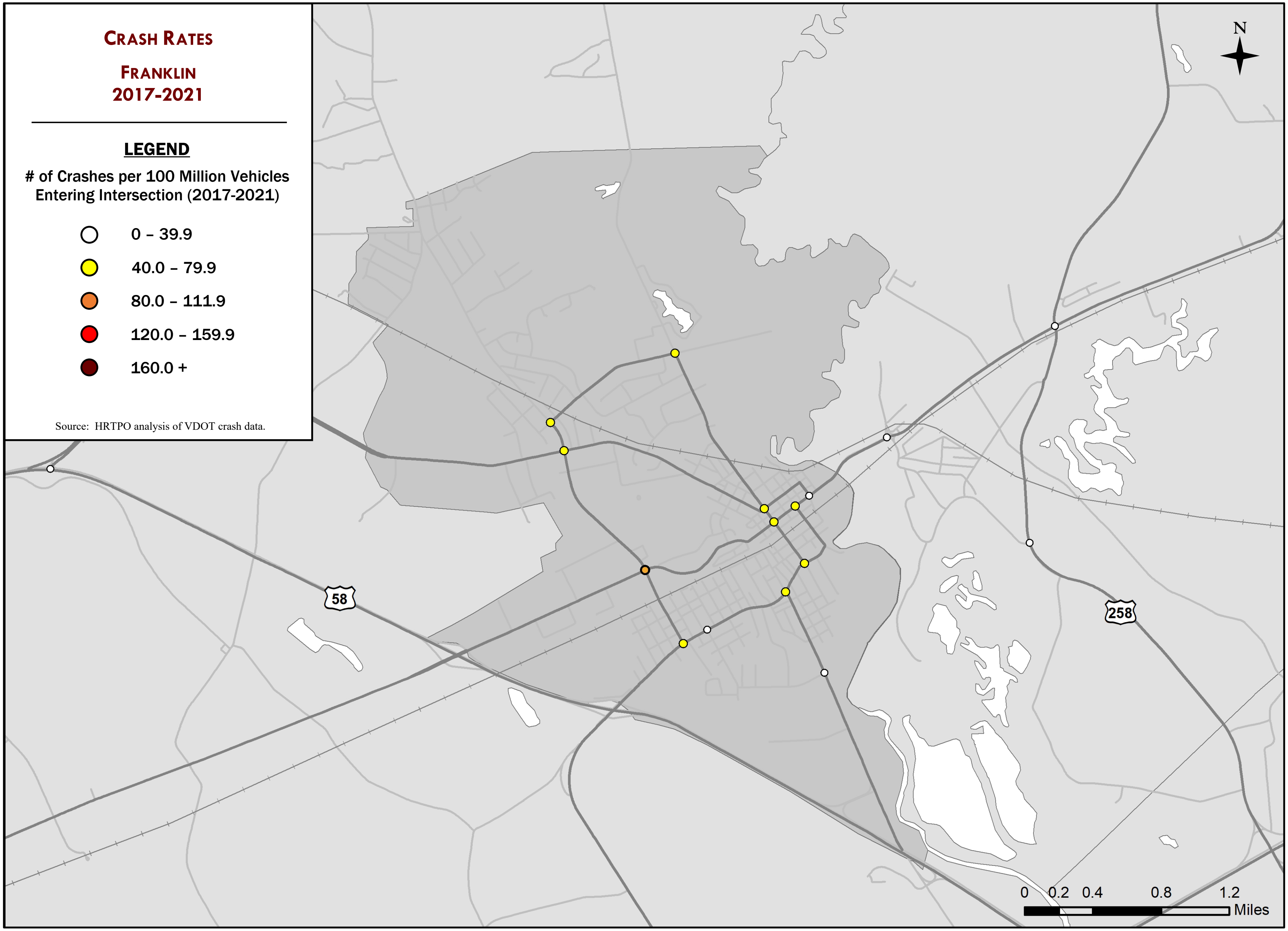

CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
CHESAPEAKE
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Norfolk
Portsmouth
Chesapeake
Virginia Beach
Great Dismal Swamp National Wildlife Refuge
Lake Drummond
Intracoastal Waterway
0 1 2 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

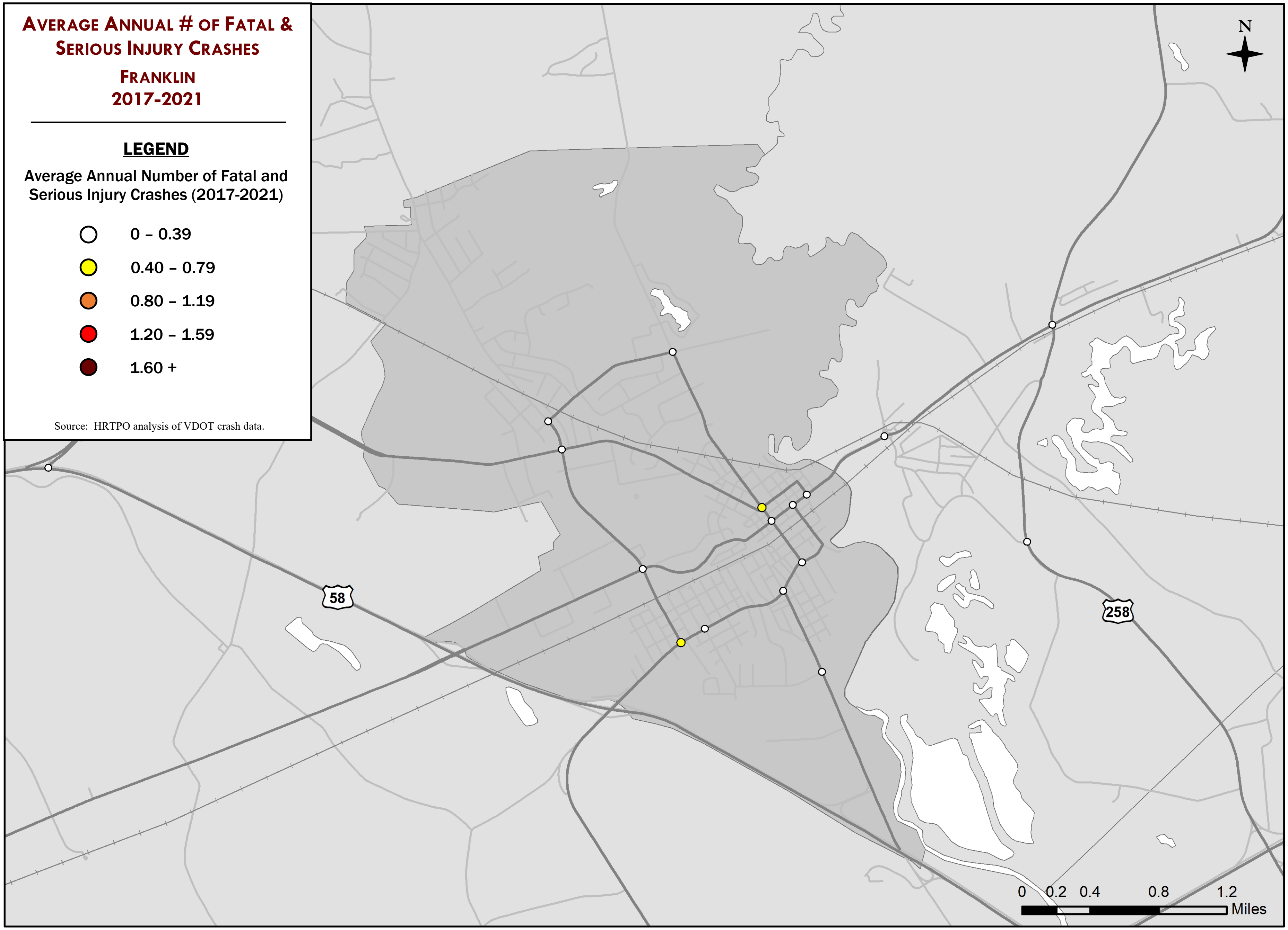
FRANKLIN

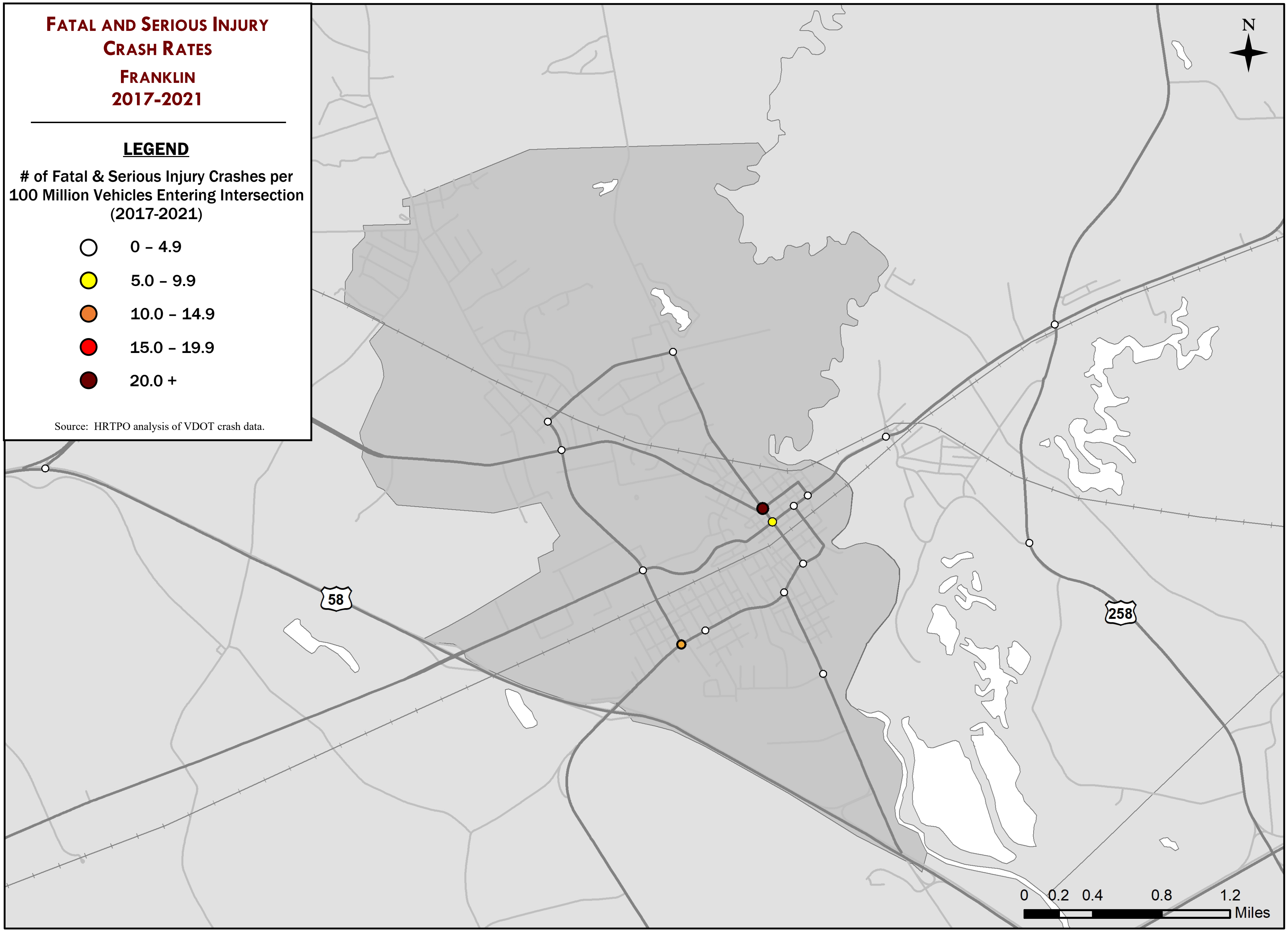
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
FR	ARMORY DR	COLLEGE DR	28	1	94.42	1	0	4	0.00	4	1
FR	SECOND AVE	HIGH ST	12	2	78.28	2	1	3	6.52	3	-
FR	CLAY ST	COLLEGE DR/HUNTERDALE RD	10	3	48.02	7	0	4	0.00	4	-
FR	HUNTERDALE RD	FAIRVIEW DR	10	3	65.66	3	0	4	0.00	4	-
FR	SOUTH ST	COLLEGE DR	9	5	49.07	6	2	1	10.90	2	-
FR	SOUTH ST	PRETLOW ST	8	6	46.36	9	0	4	0.00	4	-
FR	SECOND AVE	MAIN ST	6	7	51.29	5	0	4	0.00	4	-
FR	FOURTH AVE	HIGH ST	5	8	61.15	4	2	1	24.46	1	-
FR	SECOND AVE	MECHANIC ST	5	8	35.47	11	0	4	0.00	4	-
FR	SOUTH ST	HIGH ST	4	10	40.42	10	0	4	0.00	4	-
FR	HIGH ST	FAIRVIEW DR	3	11	47.17	8	0	4	0.00	4	-
FR	PRETLOW RD	MORTON ST	1	12	19.63	12	0	4	0.00	4	-
FR	SOUTH ST	BANK ST	1	12	6.72	13	0	4	0.00	4	-

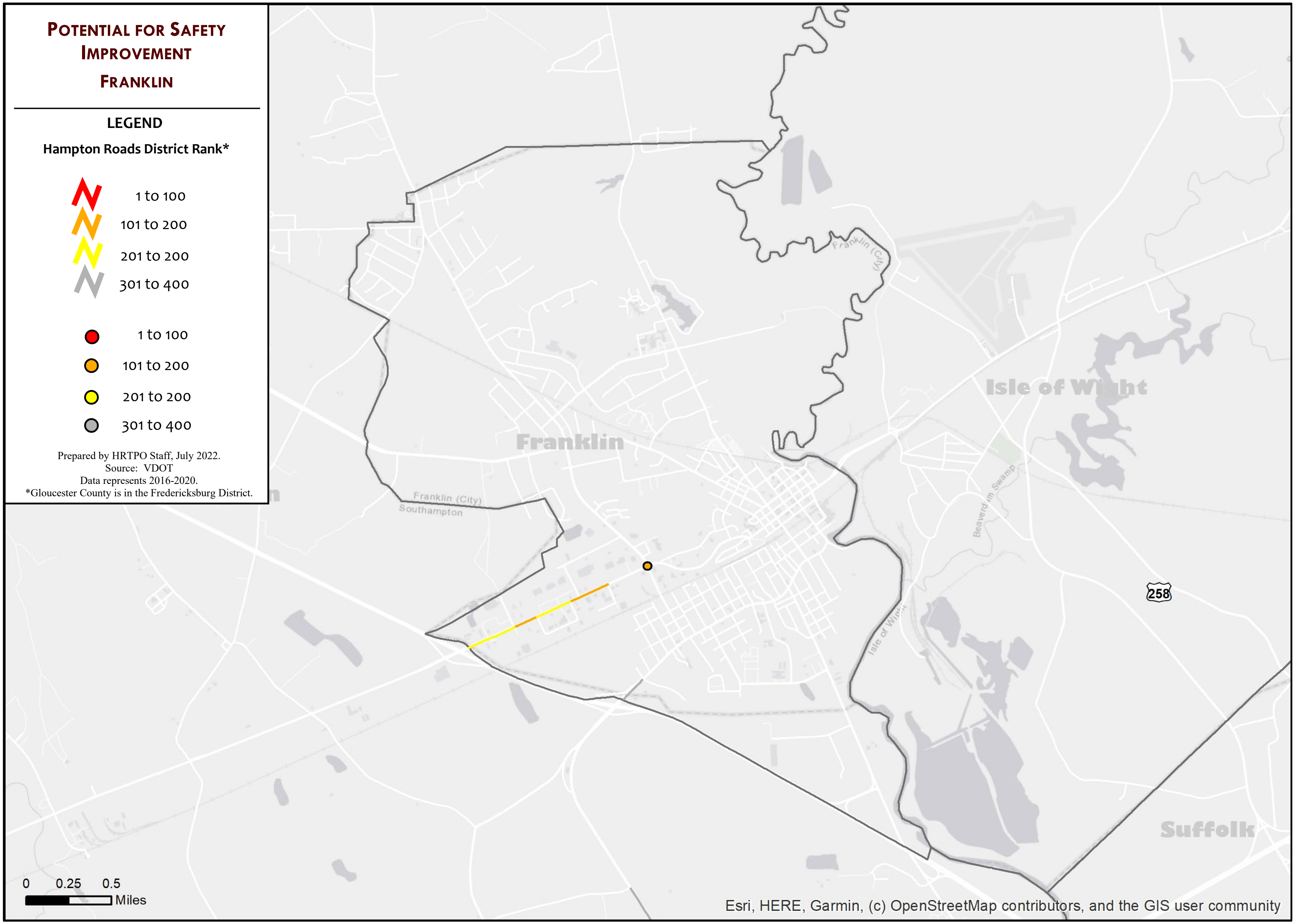
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

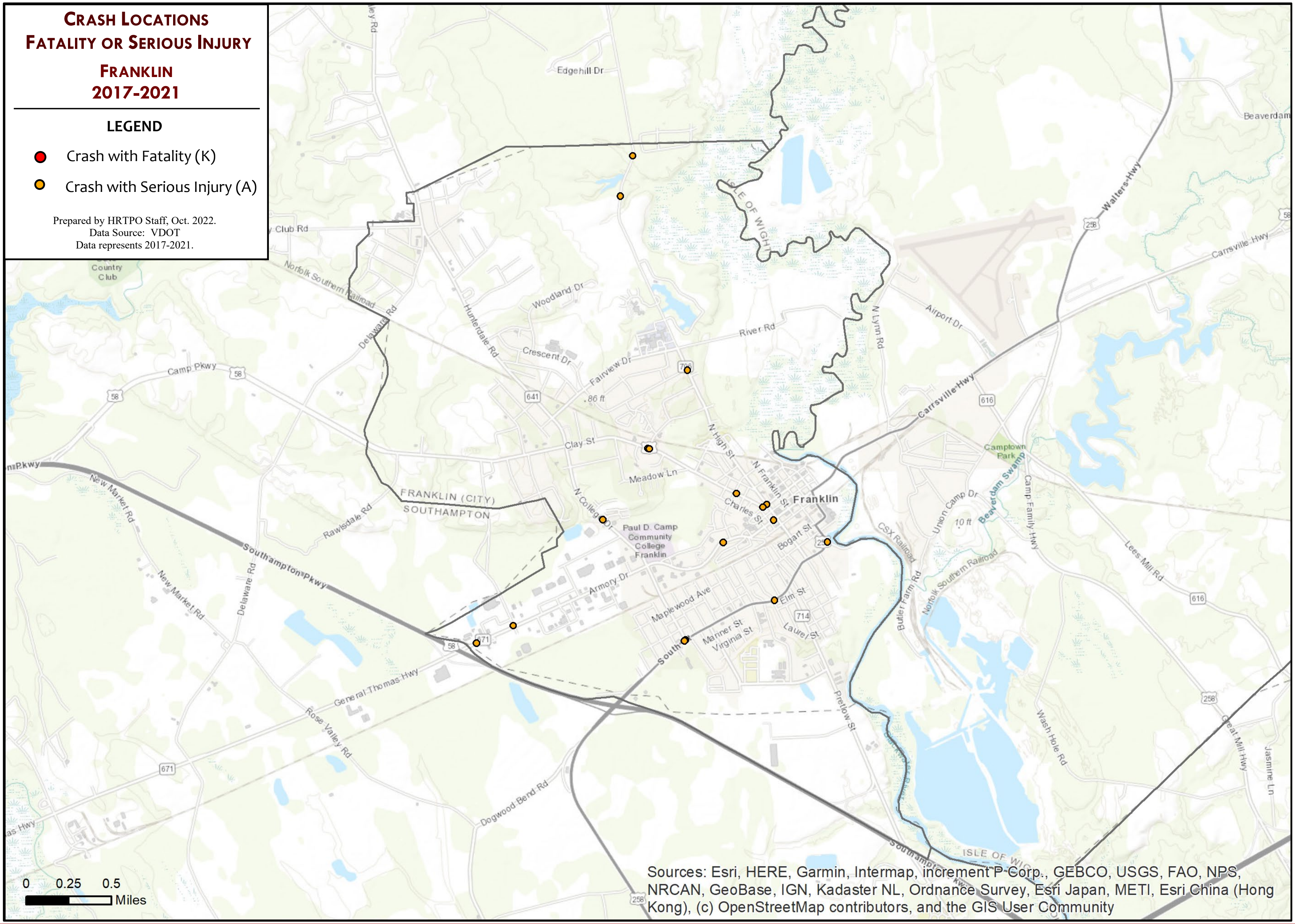

Average Annual Number of Crashes
Franklin
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
58
258
0 0.2 0.4 0.8 1.2 Miles


CRASH RATES
FRANKLIN
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
58
258
0 0.2 0.4 0.8 1.2
Miles


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
FRANKLIN
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
58
258
0
0.2
0.4
0.8
1.2
Miles


FATAL AND SERIOUS INJURY CRASH RATES
FRANKLIN
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
58
258
0 0.2 0.4 0.8 1.2 Miles

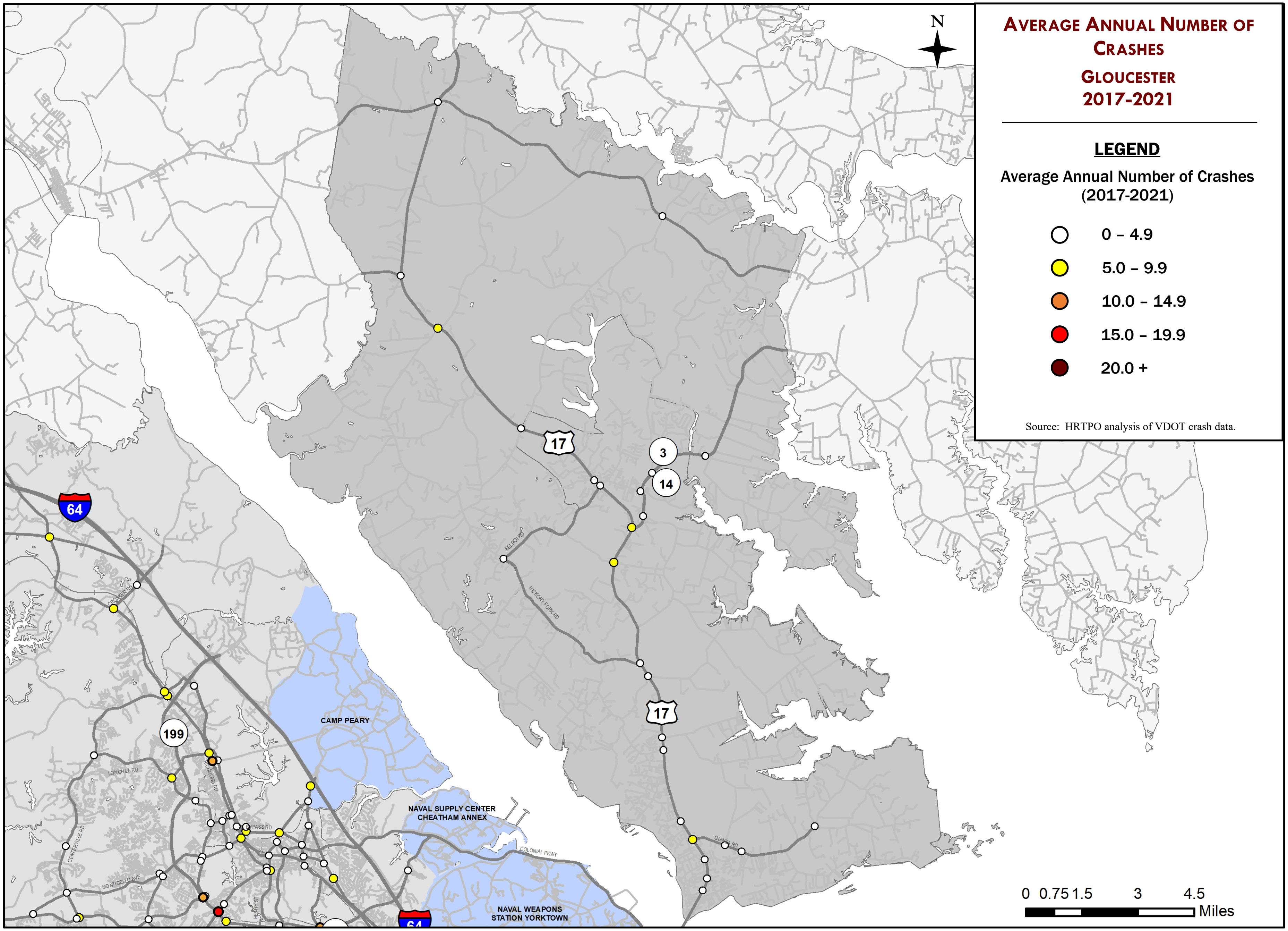

POTENTIAL FOR SAFETY IMPROVEMENT
FRANKLIN
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
Franklin
Isle of Wight
Suffolk
Franklin (City)
Southampton
Beaverdam Swamp
258
0 0.25 0.5
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community


CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
FRANKLIN
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Franklin
FRANKLIN (CITY)
SOUTHAMPTON
ISLE OF WIGHT
Paul D. Camp Community College Franklin
Camptown Park
0 0.25 0.5 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

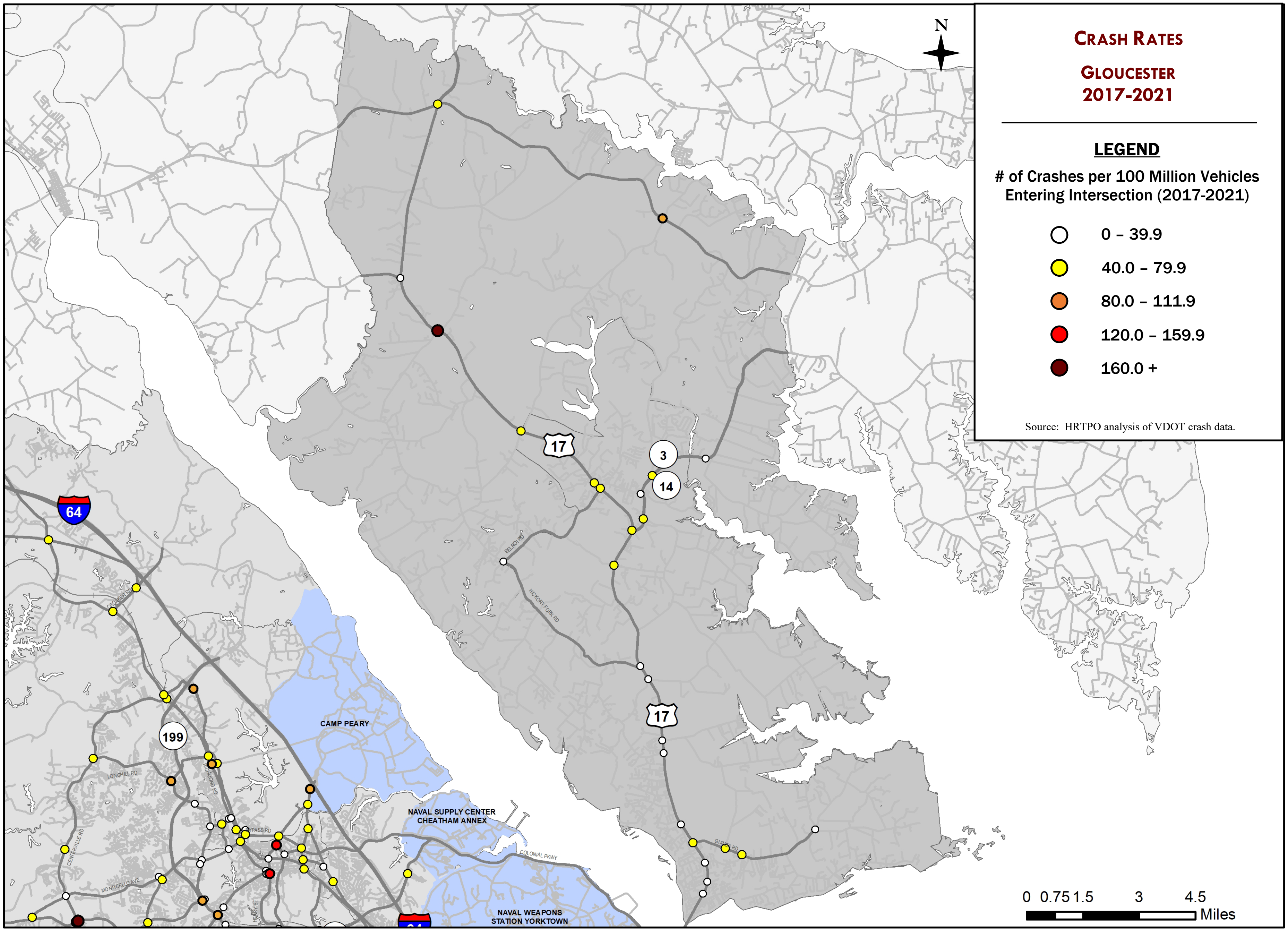
GLOUCESTER

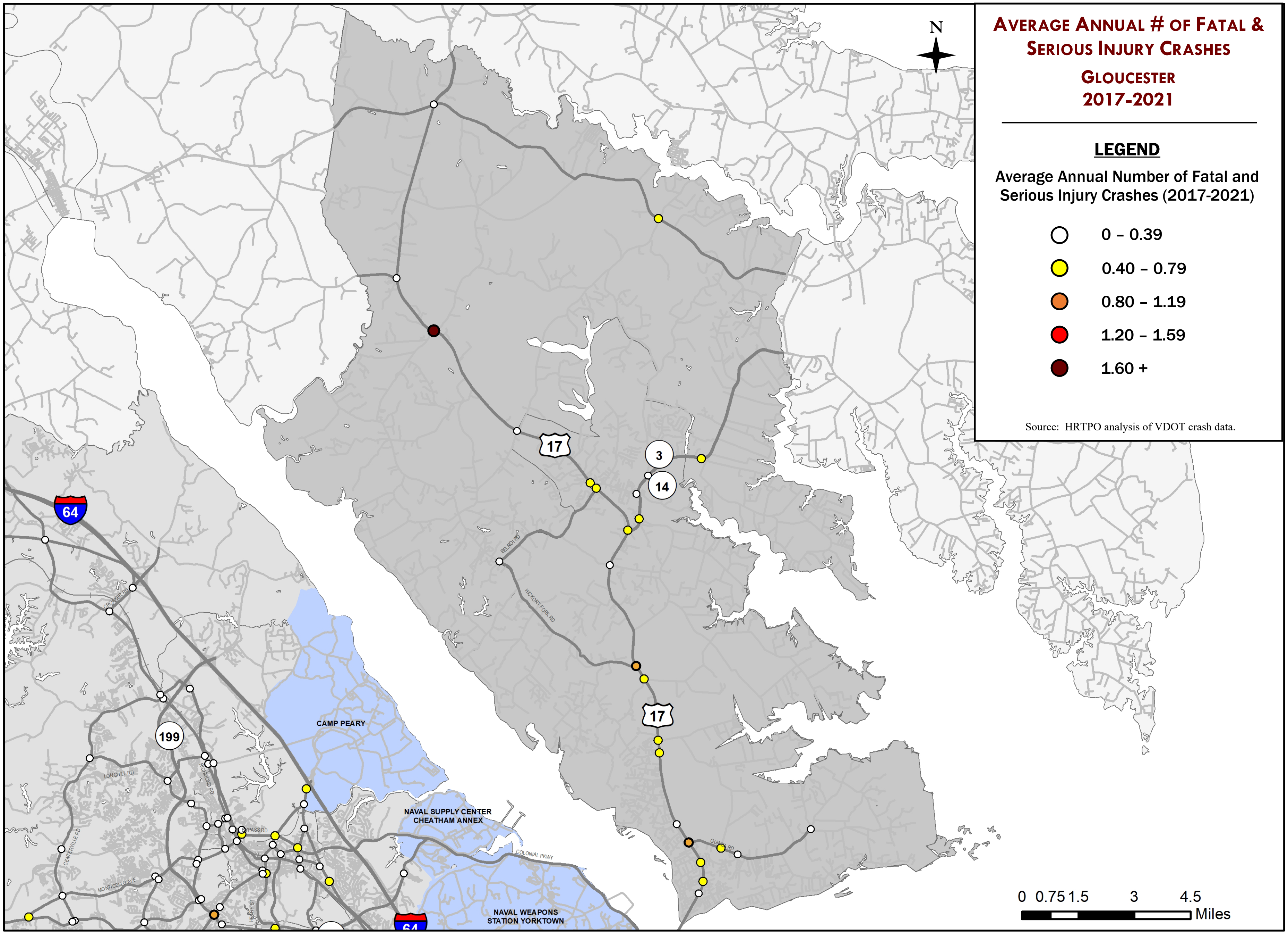
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
GLO	ROUTE 17	ROUTE 17 BUS SOUTH (MAIN ST)	35	1	48.13	10	3	4	4.13	14	-
GLO	ROUTE 17	ROUTE 610 (DAVENPORT RD/WOODS CROSS RD)	33	2	164.06	1	9	1	44.74	1	1
GLO	ROUTE 17	GUINEA RD	31	3	46.59	11	4	3	6.01	6	3
GLO	ROUTE 17	ROUTE 615 (BURLEIGH RD/SHORE LN)	28	4	52.13	7	1	16	1.86	22	-
GLO	ROUTE 17	ROUTE 636 (BRAYS POINT RD)	23	5	38.64	14	3	4	5.04	11	-
GLO	ROUTE 17	ROUTE 17 BUS NORTH	22	6	57.84	4	2	7	5.26	9	4
GLO	ROUTE 17	ROUTE 1216 NORTH (HAYES RD)	22	6	35.57	15	1	16	1.62	24	-
GLO	ROUTE 17	BELROI RD	20	8	48.66	9	2	7	4.87	12	-
GLO	ROUTE 17	ROUTE 636 (PROVIDENCE RD)	20	8	32.70	16	2	7	3.27	19	-
GLO	ROUTE 17	ROUTE 641 (TIDEMILL RD)	20	8	32.56	17	2	7	3.26	20	-
GLO	BUSINESS ROUTE 17 (MAIN ST)	ROUTE 629 (T C WALKER RD)	19	11	44.10	13	2	7	4.64	13	-
GLO	ROUTE 17	ROUTE 606 (ARK RD/FARYS MILL RD)	18	12	63.06	3	1	16	3.50	16	-
GLO	ROUTE 3/14	ROUTE 605 (CRAB THICKET RD)	17	13	45.35	12	1	16	2.67	21	-
GLO	ROUTE 17	HICKORY FORK RD	17	13	27.28	19	5	2	8.02	5	-
GLO	ROUTE 17	ROUTE 614 (FEATHER BED LN)	16	15	27.38	18	2	7	3.42	17	-
GLO	ROUTE 17	ROUTE 33/198	13	16	50.20	8	1	16	3.86	15	-
GLO	MAIN ST	ROUTE 3/14	10	17	21.82	20	0	25	0.00	25	-
GLO	ROUTE 216 (GUINEA RD)	ROUTE 641 (TIDEMILL RD)	9	18	53.90	6	1	16	5.99	7	-
GLO	ROUTE 216 (GUINEA RD)	ROUTE 641 (LOW GROUND RD)	8	19	54.35	5	3	4	20.38	3	-
GLO	ROUTE 198	ROUTE 606 (HARCUM RD)	6	20	94.34	2	2	7	31.45	2	-
GLO	ROUTE 3/14	ROUTE 623 (WARE NECK RD)	5	21	14.72	22	2	7	5.89	8	-
GLO	ROUTE 17	ROUTE 1216 SOUTH (HAYES RD)	4	22	6.77	25	2	7	3.39	18	-
GLO	HICKORY FORK RD	BELROI RD	2	23	17.07	21	1	16	8.53	4	-
GLO	ROUTE 17	ROUTE 14	2	23	10.20	24	1	16	5.10	10	-
GLO	ROUTE 17	ROUTE 1208 (GREATE RD)	2	23	3.34	26	1	16	1.67	23	-
GLO	ROUTE 216 (GUINEA RD)	ROUTE 649 (MARYUS RD)	1	26	11.29	23	0	25	0.00	25	-

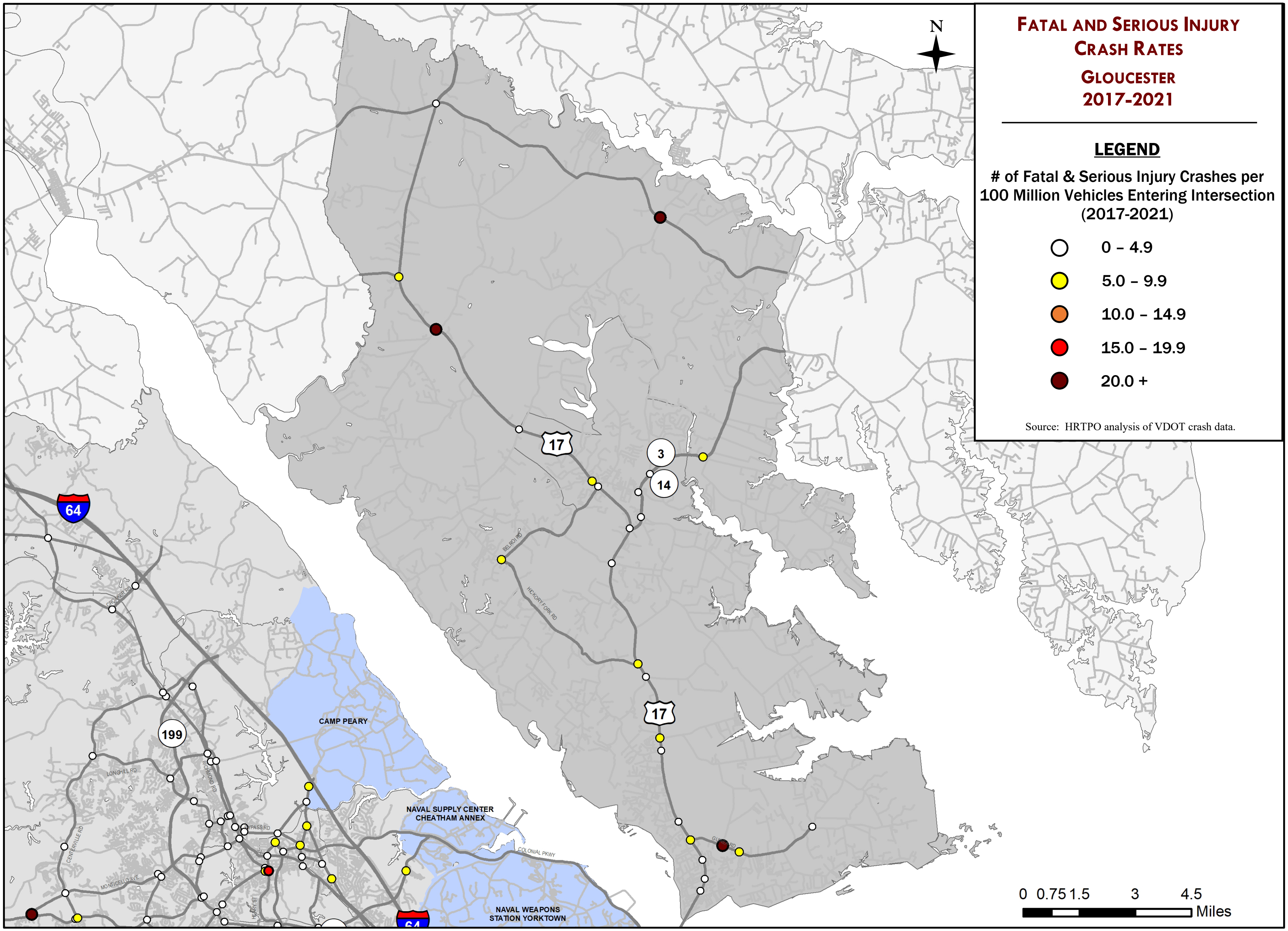
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

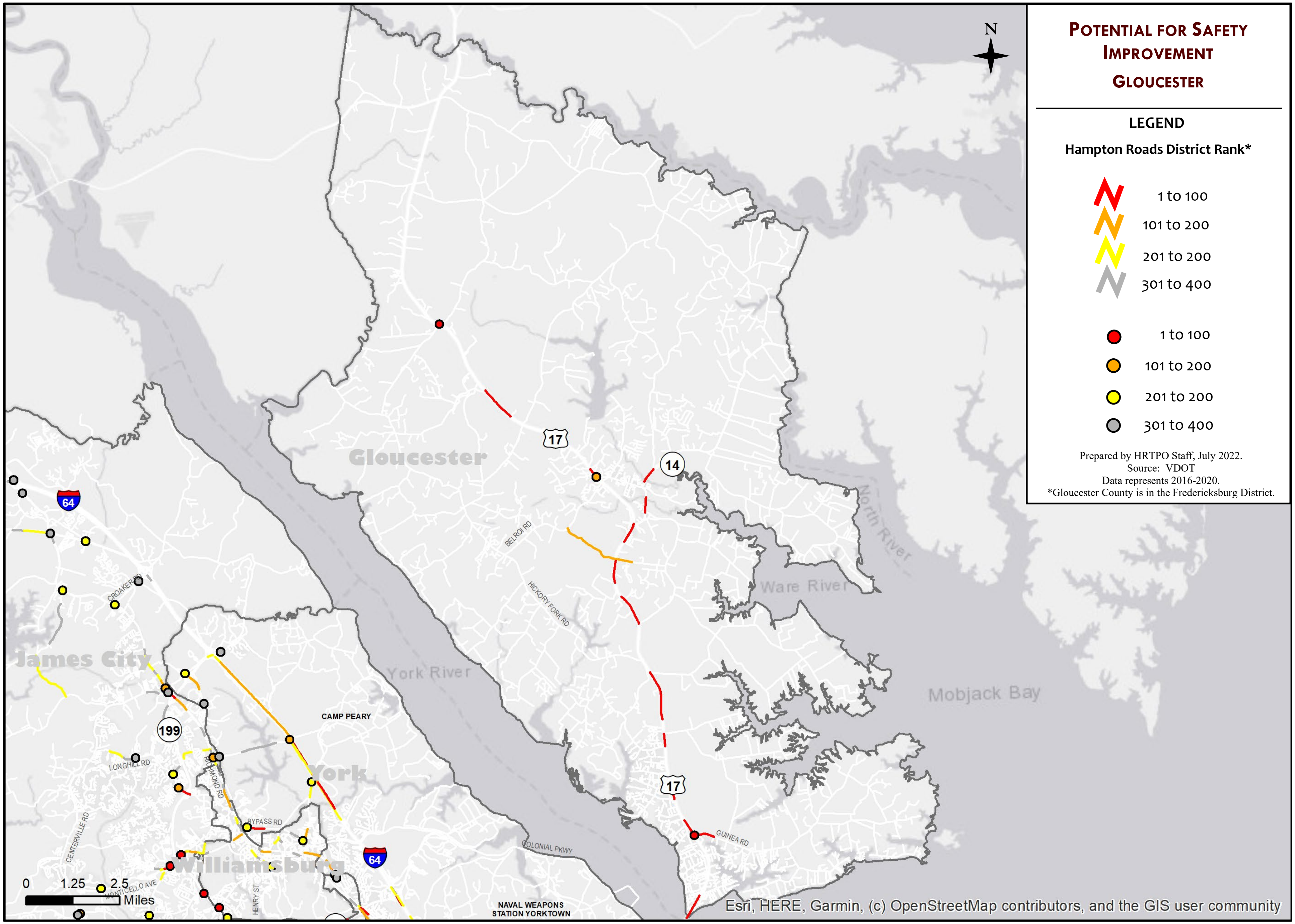


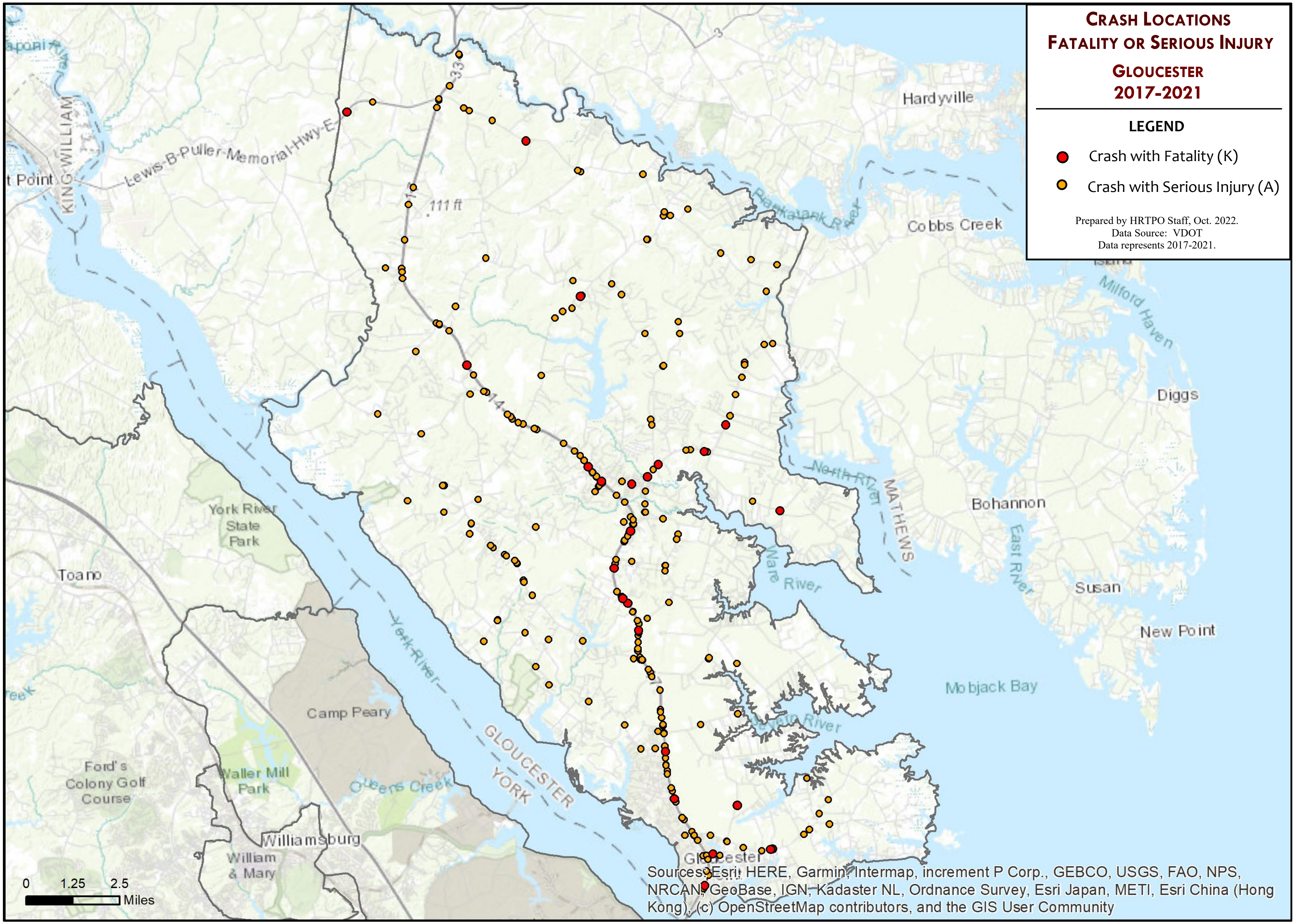
Average Annual Number of Crashes
Gloucester
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
17
3
14
64
199
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COLONIAL PKWY
0 0.75 1.5 3 4.5 Miles


N
CRASH RATES
GLOUCESTER
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
17
3
14
64
199
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COLONIAL PKWY
0 0.75 1.5 3 4.5
Miles


Average Annual # of Fatal & Serious Injury Crashes
Gloucester
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
17
3
14
64
199
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
0 0.75 1.5 3 4.5
Miles


FATAL AND SERIOUS INJURY
CRASH RATES
GLOUCESTER
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
17
3
14
64
199
CAMP PEARY
NAVAL SUPPLY CENTER
CHEATHAM ANNEX
NAVAL WEAPONS
STATION YORKTOWN
0 0.75 1.5 3 4.5
Miles


POTENTIAL FOR SAFETY IMPROVEMENT
GLOUCESTER
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
N
Gloucester
James City
York
Williamsburg
York River
Ware River
North River
Mobjack Bay
CAMP PEARY
NAVAL WEAPONS STATION YORKTOWN
BELROI RD
HICKORY FORK RD
GUINEA RD
COLONIAL PKWY
CROAKER RD
LONGHILL RD
RICHMOND RD
BYPASS RD
CENTERVILLE RD
MONTICELLO AVE
HENRY ST
17
14
64
199
0 1.25 2.5 Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community



Crash Locations
Fatality or Serious Injury
Gloucester
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Hardyville
Cobbs Creek
Milford Haven
Diggs
Bohannon
MATHEWS
North River
Ware River
East River
Susan
New Point
Mobjack Bay
Severn River
Gloucester
Piankatank River
Lewis-B-Puller-Memorial-Hwy-E
KING WILLIAM
111 ft
York River State Park
Toano
York River
GLOUCESTER
YORK
Camp Peary
Ford's Colony Golf Course
Waller Mill Park
Queens Creek
Williamsburg
William & Mary
0 1.25 2.5 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Hampton

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
HAM	MERCURY BLVD	POWER PLANT PKWY/TODDS LN	267	1	188.78	4	17	1	12.02	31	1
HAM	MERCURY BLVD	COLISEUM DR	226	2	187.60	5	17	1	14.11	22	-
HAM	MERCURY BLVD	ARMISTEAD AVE	181	3	144.79	16	15	4	12.00	32	2
HAM	MERCURY BLVD	ABERDEEN RD	177	4	150.93	14	9	10	7.67	56	3
HAM	MERCURY BLVD	CUNNINGHAM DR	147	5	147.25	15	12	6	12.02	30	5
HAM	HRC PKWY	BIG BETHEL RD	143	6	169.24	9	13	5	15.39	18	4
HAM	ARMISTEAD AVE	LASALLE AVE	138	7	226.40	1	8	14	13.12	26	6
HAM	MERCURY BLVD	FOX HILL RD/CHERRY ACRES DR	121	8	159.57	11	9	10	11.87	33	12
HAM	MERCURY BLVD	BIG BETHEL RD	114	9	113.22	29	11	8	10.93	37	7
HAM	SETTLERS LANDING RD	TYLER ST/I-64 RAMP	94	10	182.65	7	4	35	7.77	55	8
HAM	MERCURY BLVD	ORCUTT AVE	93	11	106.05	34	12	6	13.68	24	16
HAM	POWER PLANT PKWY	BRIARFIELD RD/QUEEN ST	87	12	180.30	8	6	23	12.43	27	9
HAM	ARMISTEAD AVE	HRC PKWY/ARMISTEAD POINTE PKWY	78	13	141.76	18	5	29	9.09	45	10
HAM	COLISEUM DR	CUNNINGHAM DR	78	13	123.35	23	6	23	9.49	43	-
HAM	MERCURY BLVD	ROANOKE AVE/WHEALTON RD	72	15	85.60	49	6	23	7.13	58	17
HAM	LASALLE AVE	SETTLERS LANDING RD	70	16	142.22	17	16	3	32.51	3	-
HAM	MERCURY BLVD	PEMBROKE AVE	67	17	154.06	12	4	35	9.20	44	23
HAM	POWHATAN PKWY	PEMBROKE AVE	66	18	151.00	13	6	23	13.73	23	15
HAM	WOODLAND RD	MERCURY BLVD	65	19	135.42	20	10	9	20.83	11	11
HAM	NEIL ARMSTRONG PKWY	BUTLER FARM RD	63	20	96.29	41	4	35	6.11	62	-
HAM	HRC PKWY	COLISEUM DR	59	21	98.86	38	7	18	11.73	34	-
HAM	PEMBROKE AVE	ABERDEEN RD	58	22	137.64	19	9	10	21.36	10	14
HAM	ABERDEEN RD	BRIARFIELD RD	57	23	113.57	28	8	14	15.94	16	26
HAM	TODDS LN	BIG BETHEL RD	56	24	106.32	33	2	57	3.80	71	25
HAM	MERCURY BLVD	ANDREWS BLVD	54	25	101.68	36	1	65	1.88	79	21
HAM	KING ST	RIP RAP RD	52	26	164.51	10	5	29	15.82	17	39
HAM	LASALLE AVE	PEMBROKE AVE	51	27	108.82	32	7	18	14.94	20	24
HAM	MERCURY BLVD	MALLORY ST	48	28	197.01	3	8	14	32.84	2	18
HAM	CUNNINGHAM DR/TODDS LN	TODDS LN/LAKESHORE DR	45	29	80.98	52	5	29	9.00	46	-
HAM	MERCURY BLVD	OLD BUCKROE RD	45	29	185.95	6	9	10	37.19	1	27
HAM	WOODLAND RD	COUNTY ST	45	29	212.20	2	6	23	28.29	6	-
HAM	ABERDEEN RD	ALUMINUM AVE	44	32	113.83	27	7	18	18.11	14	-
HAM	NEIL ARMSTRONG PKWY	COMMANDER SHEPPARD BLVD/SEMPLE FARM RD	42	33	73.71	59	7	18	12.29	29	37
HAM	SETTLERS LANDING RD/QUEEN ST	PEMBROKE AVE	42	33	124.94	22	8	14	23.80	7	28
HAM	PEMBROKE AVE	WOODLAND RD	39	35	99.03	37	4	35	10.16	39	19
HAM	SETTLERS LANDING RD	ARMISTEAD AVE	39	35	111.59	30	1	65	2.86	74	22
HAM	ARMISTEAD AVE	TIDE MILL LN	35	37	76.38	55	3	45	6.55	60	-
HAM	FOX HILL RD	HARRIS CREEK RD	33	38	89.12	48	3	45	8.10	53	-
HAM	SETTLERS LANDING RD	KECOUGHTAN RD	32	39	94.42	44	1	65	2.95	73	-
HAM	BRIARFIELD RD	BIG BETHEL RD	31	40	117.96	26	3	45	11.42	35	36
HAM	COMMANDER SHEPPARD BLVD	WYTHE CREEK RD	31	40	76.86	54	1	65	2.48	76	-
HAM	LASALLE AVE	VICTORIA BLVD	31	40	119.54	24	5	29	19.28	12	45
HAM	MERCURY BLVD	CHESTNUT AVE	31	40	36.62	80	4	35	4.72	68	-
HAM	TODDS LN	ABERDEEN RD/HUNT CLUB BLVD	30	44	66.12	64	3	45	6.61	59	33
HAM	ARMISTEAD AVE	PEMBROKE AVE	29	45	81.87	51	3	45	8.47	49	35
HAM	ARMISTEAD AVE	BUTLER FARM RD	28	46	75.77	58	5	29	13.53	25	-
HAM	ARMISTEAD AVE	RIP RAP RD	28	46	76.18	56	2	57	5.44	65	42
HAM	TODDS LN	ORCUTT AVE	28	46	67.00	63	4	35	9.57	42	-
HAM	KING ST	LITTLE BACK RIVER RD	26	49	65.31	65	1	65	2.51	75	-
HAM	TODDS LN	WHEALTON RD	26	49	77.43	53	2	57	5.96	64	34

HAMPTON (CONTINUED)

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
HAM	PEMBROKE AVE	OLD BUCKROE RD	24	51	119.44	25	6	23	29.86	5	50
HAM	BIG BETHEL RD	SAUNDERS RD	23	52	51.02	71	4	35	8.87	47	53
HAM	LASALLE AVE	TIDE MILL LN	23	52	97.47	40	4	35	16.95	15	48
HAM	BIG BETHEL RD	THOMAS NELSON DR	22	54	58.38	67	3	45	7.96	54	-
HAM	FOX HILL RD	NICKERSON BLVD	22	54	72.31	61	3	45	9.86	40	47
HAM	KECOUGHTAN RD	LASALLE AVE	22	54	125.57	21	4	35	22.83	8	46
HAM	PEMBROKE AVE	KING ST	22	54	75.91	57	3	45	10.35	38	38
HAM	LASALLE AVE	SHELL RD	21	58	95.04	43	5	29	22.63	9	56
HAM	PEMBROKE AVE	EATON ST	21	58	97.60	39	4	35	18.59	13	-
HAM	WOODLAND RD	ANDREWS BLVD	21	58	67.85	62	2	57	6.46	61	30
HAM	POWHATAN PKWY	VICTORIA BLVD	20	61	90.64	47	1	65	4.53	69	51
HAM	ARMISTEAD AVE	CONVENTION CENTER BLVD/REESE DR	19	62	52.43	69	0	80	0.00	80	-
HAM	FOX HILL RD	WOODLAND RD	19	62	52.42	70	3	45	8.28	50	44
HAM	SETTLERS LANDING RD	EATON ST	19	62	38.00	78	2	57	4.00	70	-
HAM	ARMISTEAD AVE	PINE CHAPEL RD	18	65	49.02	72	3	45	8.17	51	-
HAM	PEMBROKE AVE	BACK RIVER RD	18	65	109.47	31	1	65	6.08	63	43
HAM	MALLORY ST	MELLEN ST	17	67	93.85	45	2	57	11.04	36	-
HAM	POWHATAN PKWY	SHELL RD	17	67	72.77	60	7	18	29.97	4	49
HAM	MALLORY ST	COUNTY ST	16	69	84.87	50	1	65	5.30	66	-
HAM	COMMANDER SHEPPARD BLVD	ARMISTEAD AVE	15	70	40.53	75	3	45	8.11	52	55
HAM	OLD BUCKROE RD	NICKERSON BLVD	15	70	92.66	46	2	57	12.36	28	52
HAM	POWER PLANT PKWY	PINE CHAPEL RD	15	70	37.14	79	0	80	0.00	80	-
HAM	FOX HILL RD	CLEMWOOD PKWY	14	73	33.35	81	1	65	2.38	77	-
HAM	KECOUGHTAN RD	POWHATAN PKWY	14	73	101.79	35	2	57	14.54	21	-
HAM	SETTLERS LANDING RD	KING ST	14	73	32.51	82	1	65	2.32	78	-
HAM	COLISEUM DR	PINE CHAPEL RD	13	76	55.61	68	0	80	0.00	80	-
HAM	KECOUGHTAN RD	VICTORIA BLVD	12	77	61.34	66	3	45	15.33	19	-
HAM	SETTLERS LANDING RD	BACK RIVER RD	12	77	43.63	74	1	65	3.64	72	-
HAM	MALLORY ST	PEMBROKE AVE	11	79	95.22	42	1	65	8.66	48	-
HAM	HARRIS CREEK RD	LITTLE BACK RIVER RD	9	80	47.24	73	1	65	5.25	67	-
HAM	FOX HILL RD/SILVER ISLES BLVD	OLD BUCKROE RD	8	81	39.42	76	0	80	0.00	80	-
HAM	BIG BETHEL RD	SEMPLE FARM RD	4	82	17.33	85	0	80	0.00	80	-
HAM	IGNALLS RD	MERCURY BLVD	4	82	39.07	77	1	65	9.77	41	-
HAM	OLD BUCKROE RD	ANDREWS BLVD	4	82	28.84	83	1	65	7.21	57	-
HAM	LITTLE BACK RIVER RD	CLEMWOOD PKWY	3	85	14.89	86	0	80	0.00	80	-
HAM	COLISEUM DR	CONVENTION CENTER BLVD	2	86	22.14	84	0	80	0.00	80	-

Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
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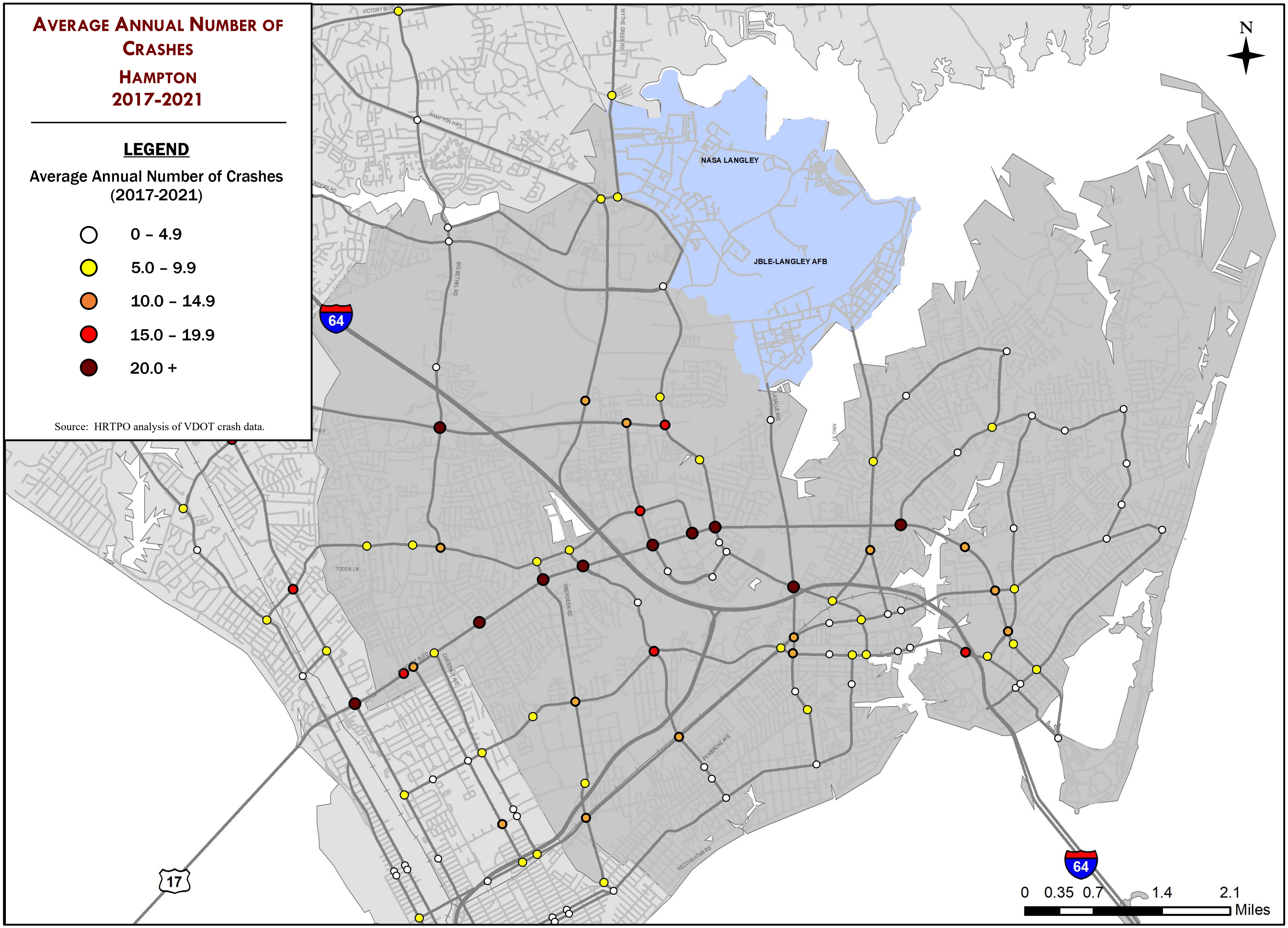
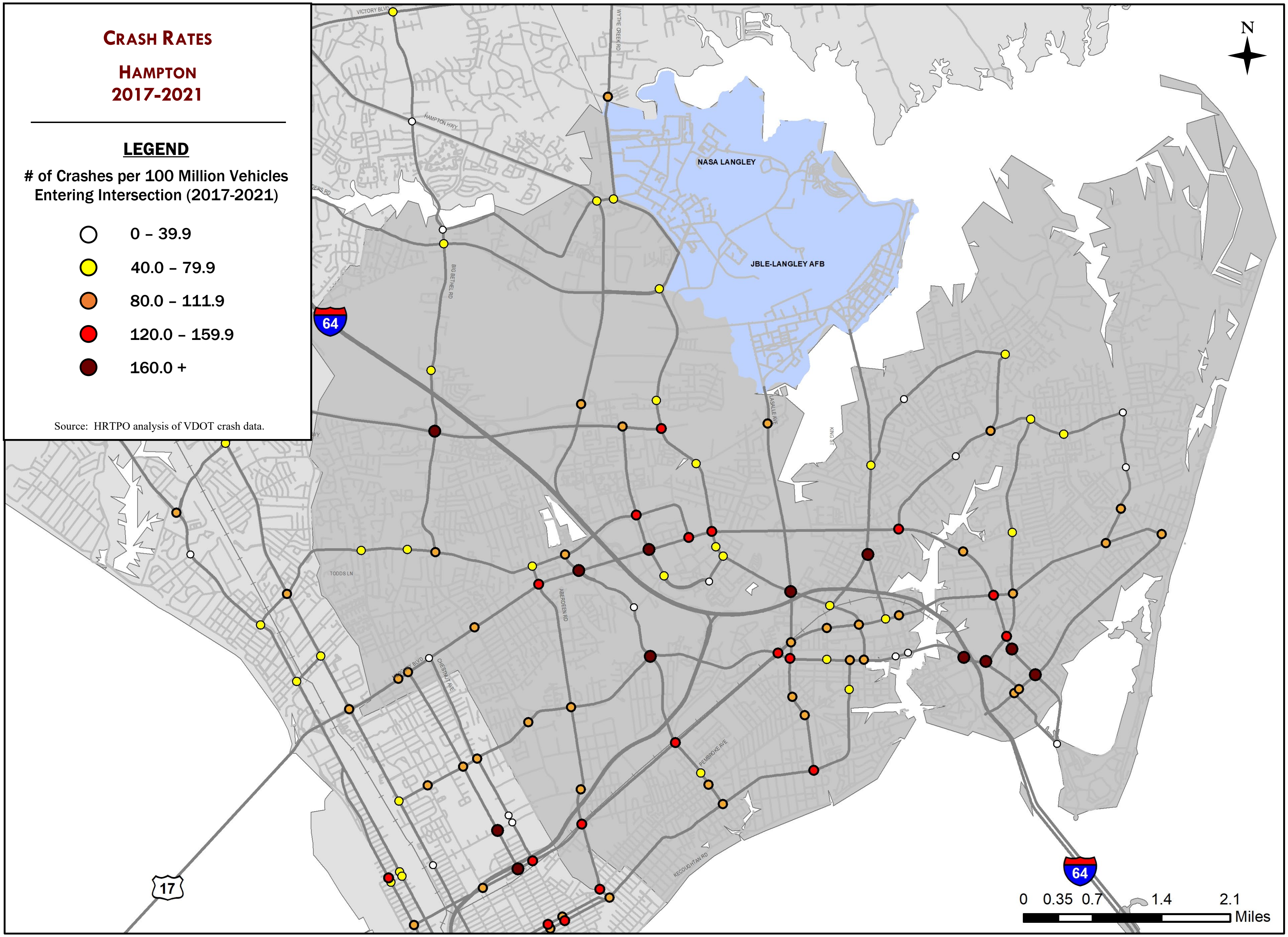
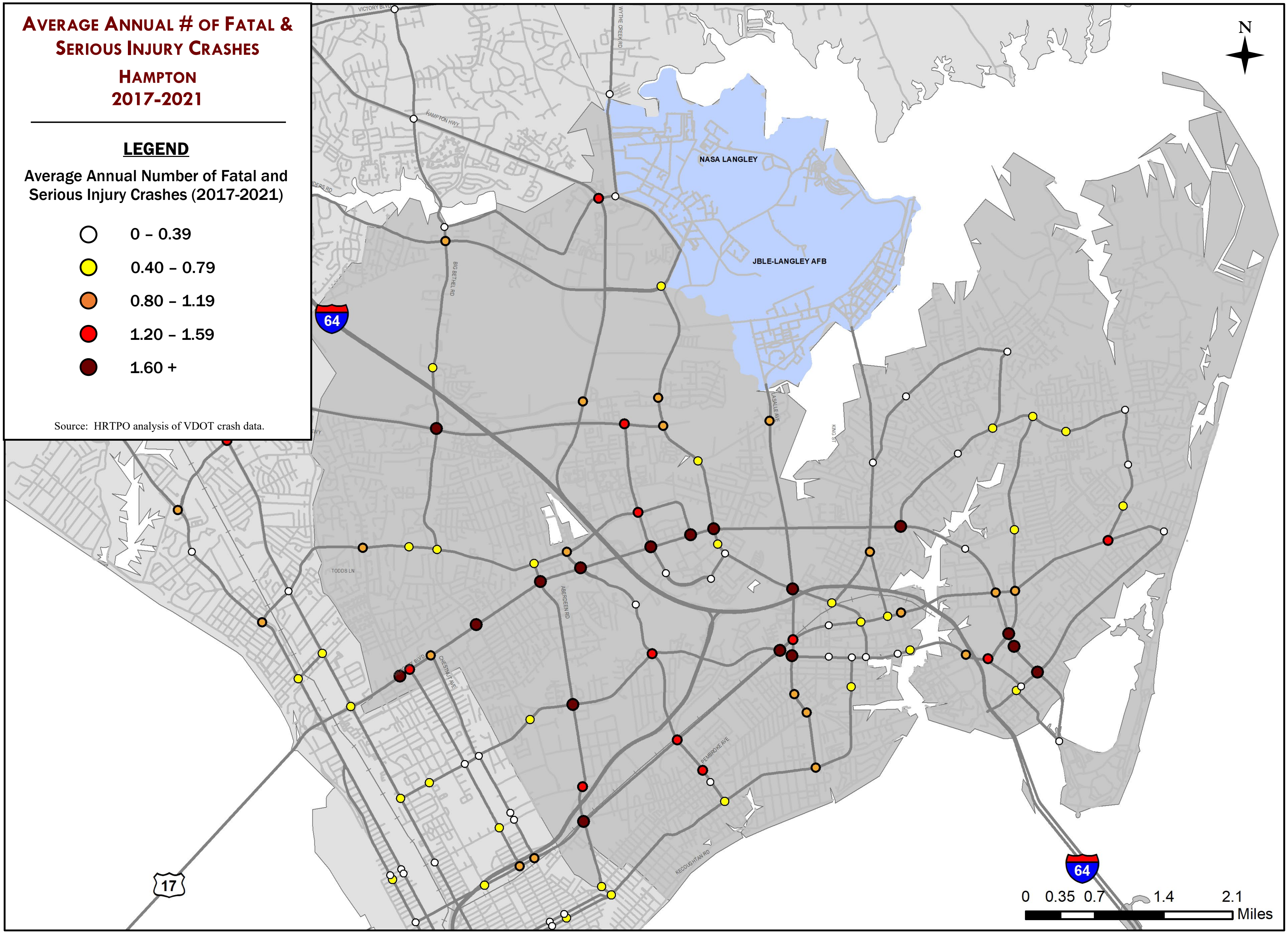
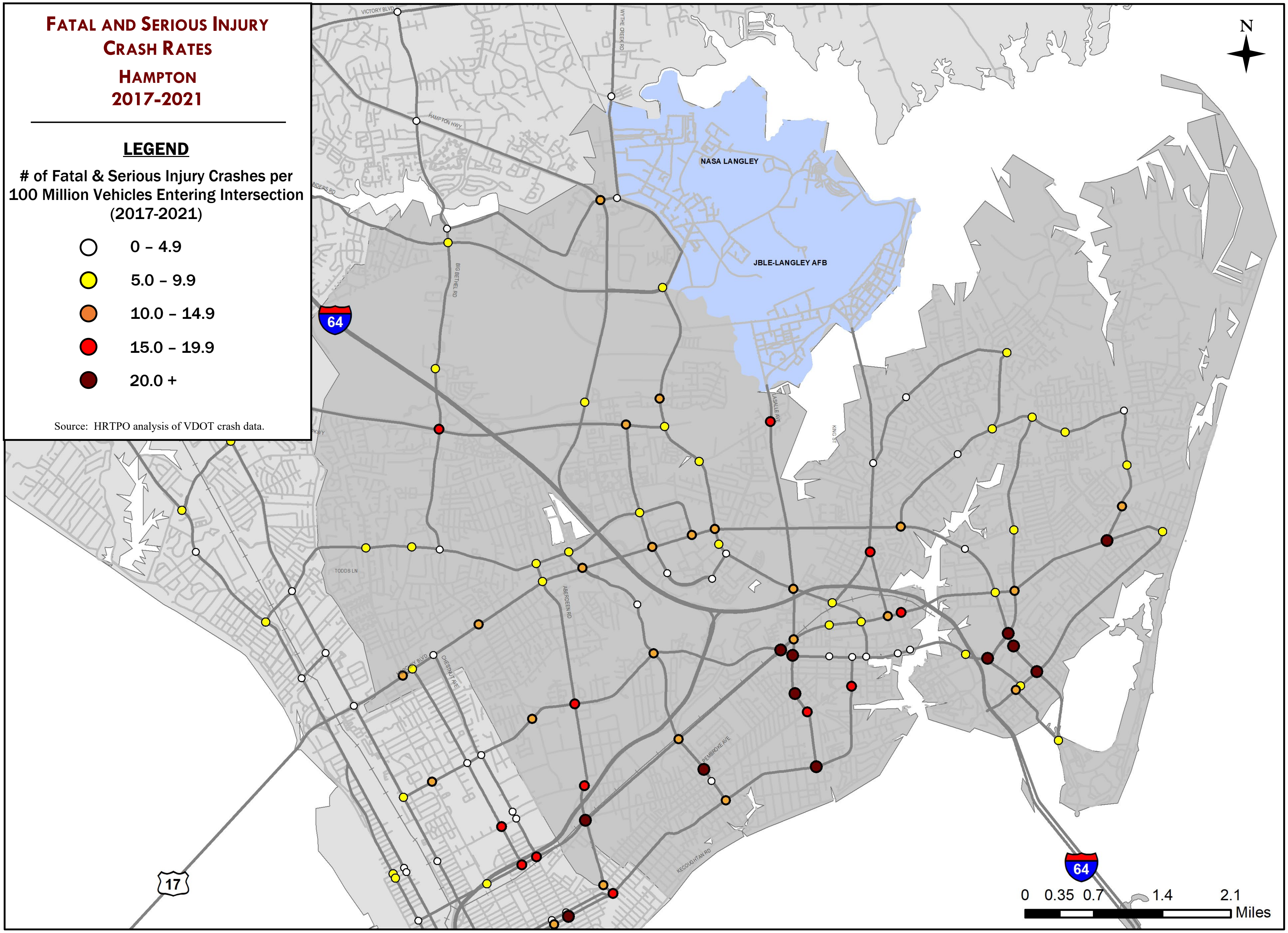
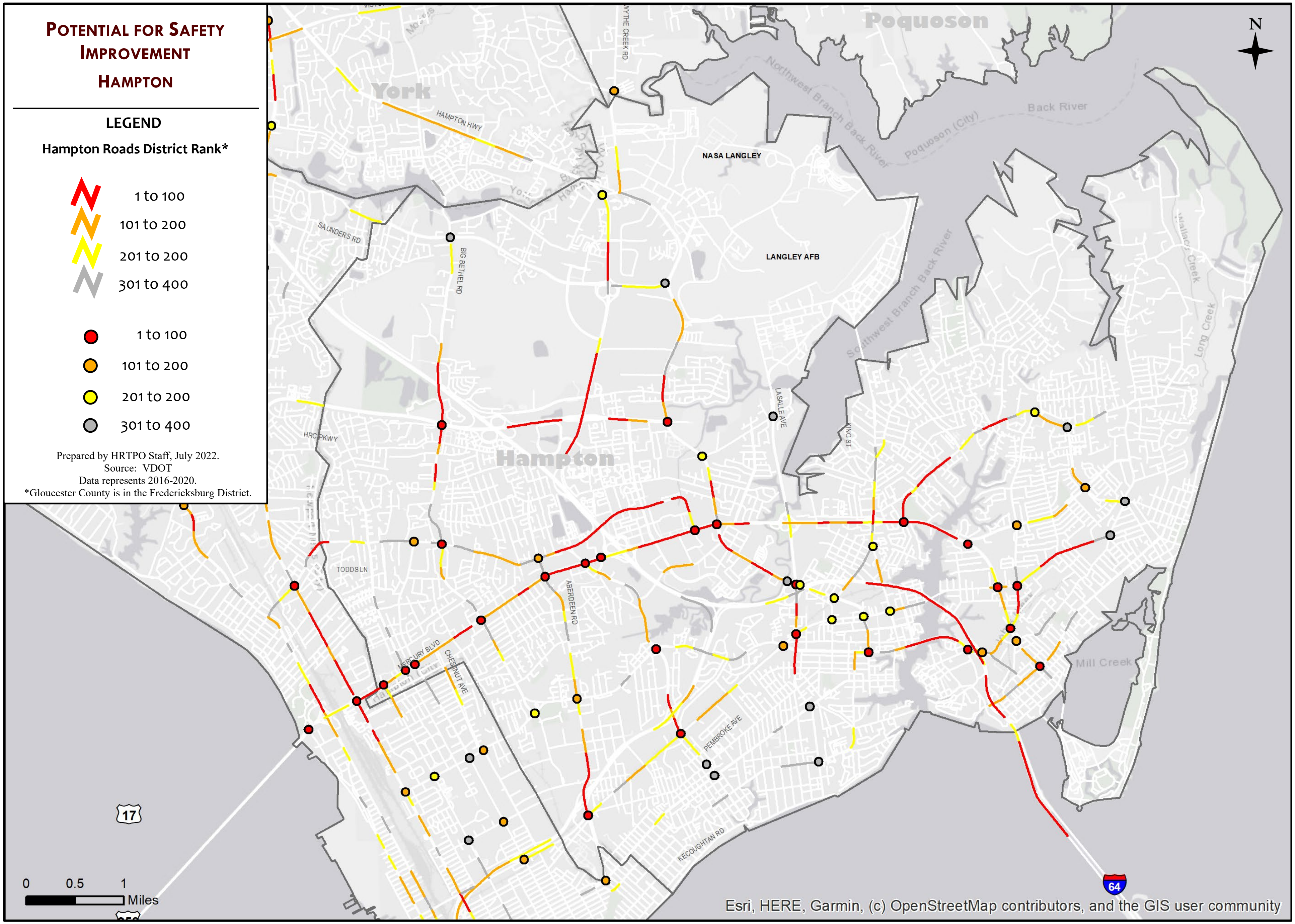

Average Annual Number of Crashes
Hampton
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
NASA LANGLEY
JBLE-LANGLEY AFB
64
64
17
0 0.35 0.7 1.4 2.1
Miles

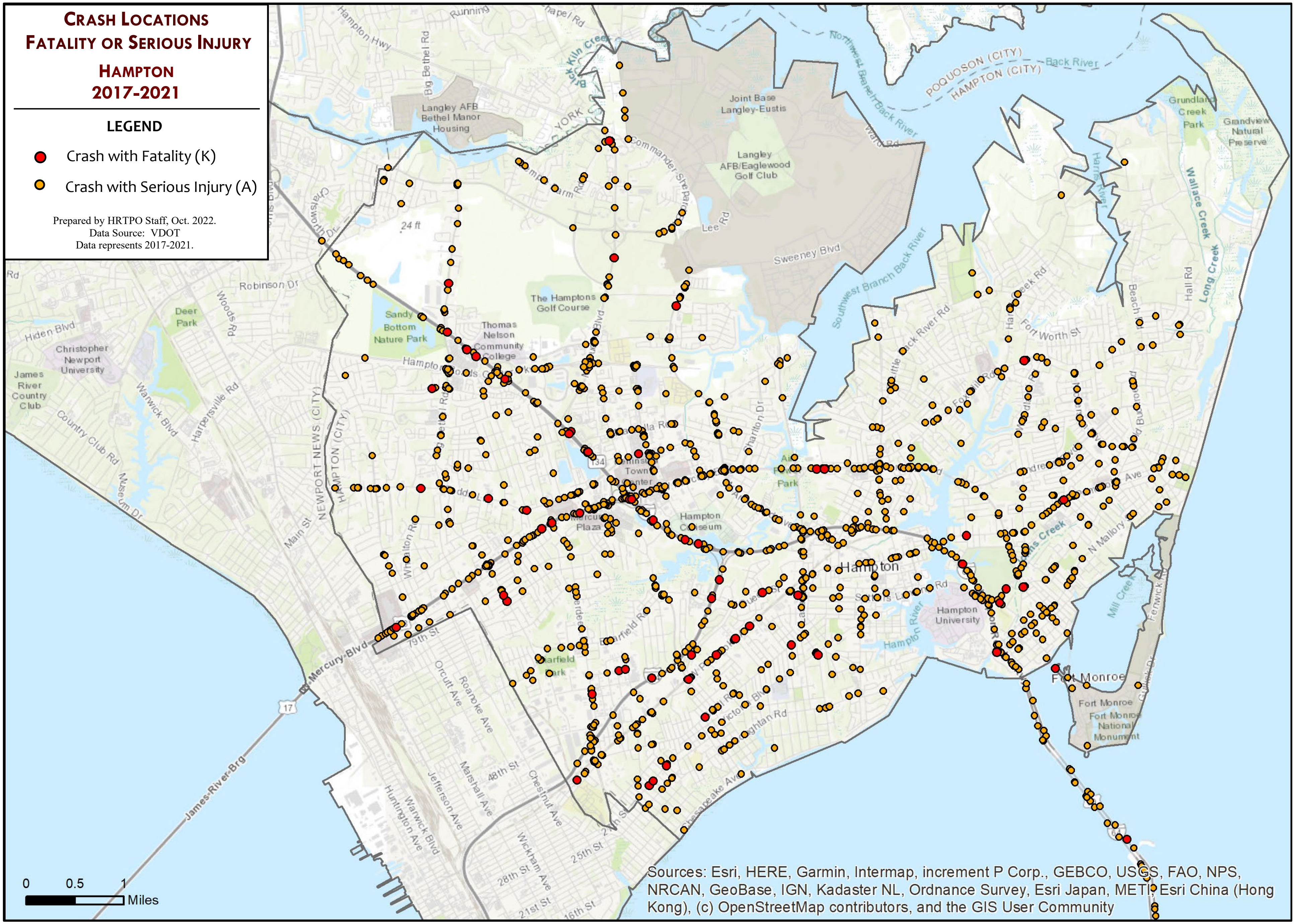

CRASH RATES
HAMPTON
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
NASA LANGLEY
JBLE-LANGLEY AFB
64
17
0 0.35 0.7 1.4 2.1
Miles


Average Annual # of Fatal & Serious Injury Crashes
Hampton
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
NASA LANGLEY
JBLE-LANGLEY AFB
64
17
N
0 0.35 0.7 1.4 2.1
Miles



FATAL AND SERIOUS INJURY CRASH RATES
HAMPTON
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
NASA LANGLEY
JBLE-LANGLEY AFB
64
17
N
0 0.35 0.7 1.4 2.1
Miles

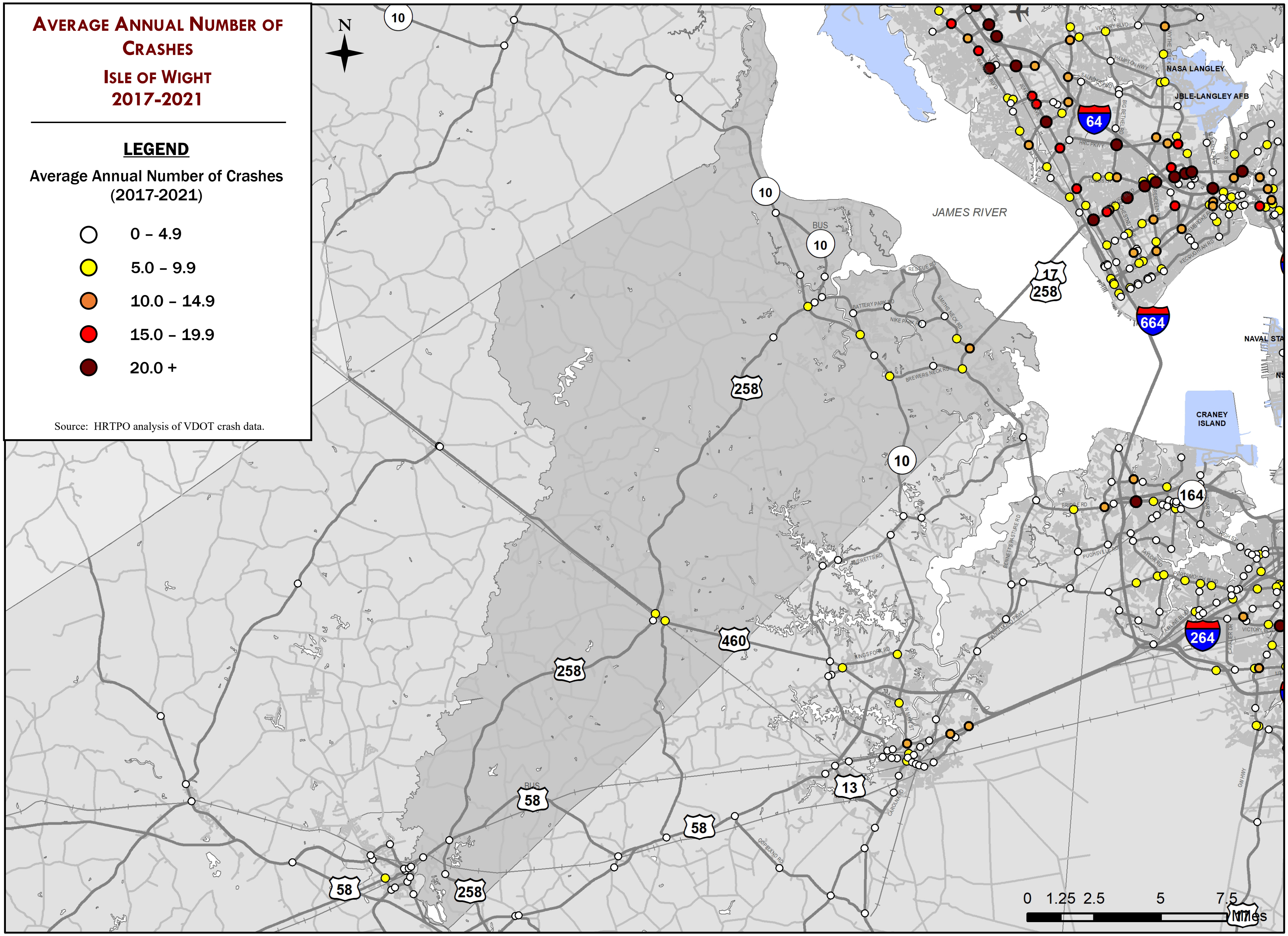

Potential for Safety Improvement
Hampton
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
N
Poquoson
York
Hampton
NASA LANGLEY
LANGLEY AFB
Back River
Northwest Branch Back River
Southwest Branch Back River
Poquoson (City)
Wallace Creek
Long Creek
Mill Creek
HAMPTON HWY
SAUNDERS RD
BIG BETHEL RD
HRC PKWY
TODDS LN
ABERDEEN RD
MERCURY BLVD
CHESTNUT AVE
PEMBROKE AVE
KECOUGHTAN RD
LASALLE AVE
KING ST
17
64
0 0.5 1
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

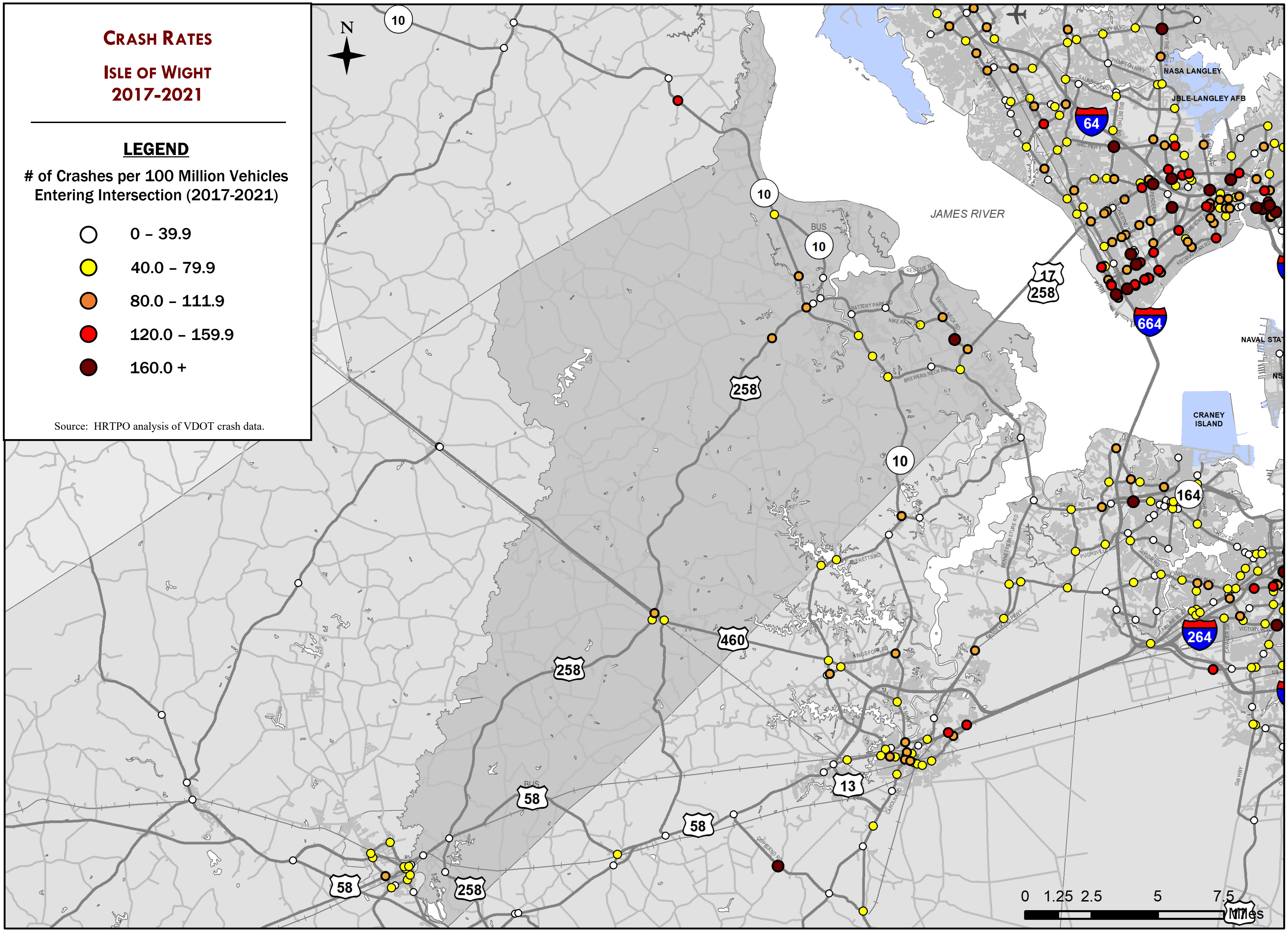

CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
HAMPTON
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Joint Base Langley-Eustis
Langley AFB/Eaglewood Golf Club
Langley AFB Bethel Manor Housing
The Hamptons Golf Course
Sandy Bottom Nature Park
Thomas Nelson Community College
Christopher Newport University
James River Country Club
Deer Park
Hampton Coliseum
Hampton
Hampton University
Fort Monroe
Fort Monroe National Monument
Grundland Creek Park
Grandview Natural Preserve
POQUOSON (CITY)
HAMPTON (CITY)
NEWPORT NEWS (CITY)
Back River
Southwest Branch Back River
Northwest Branch Back River
Mercury Blvd
James River Brg
0 0.5 1 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

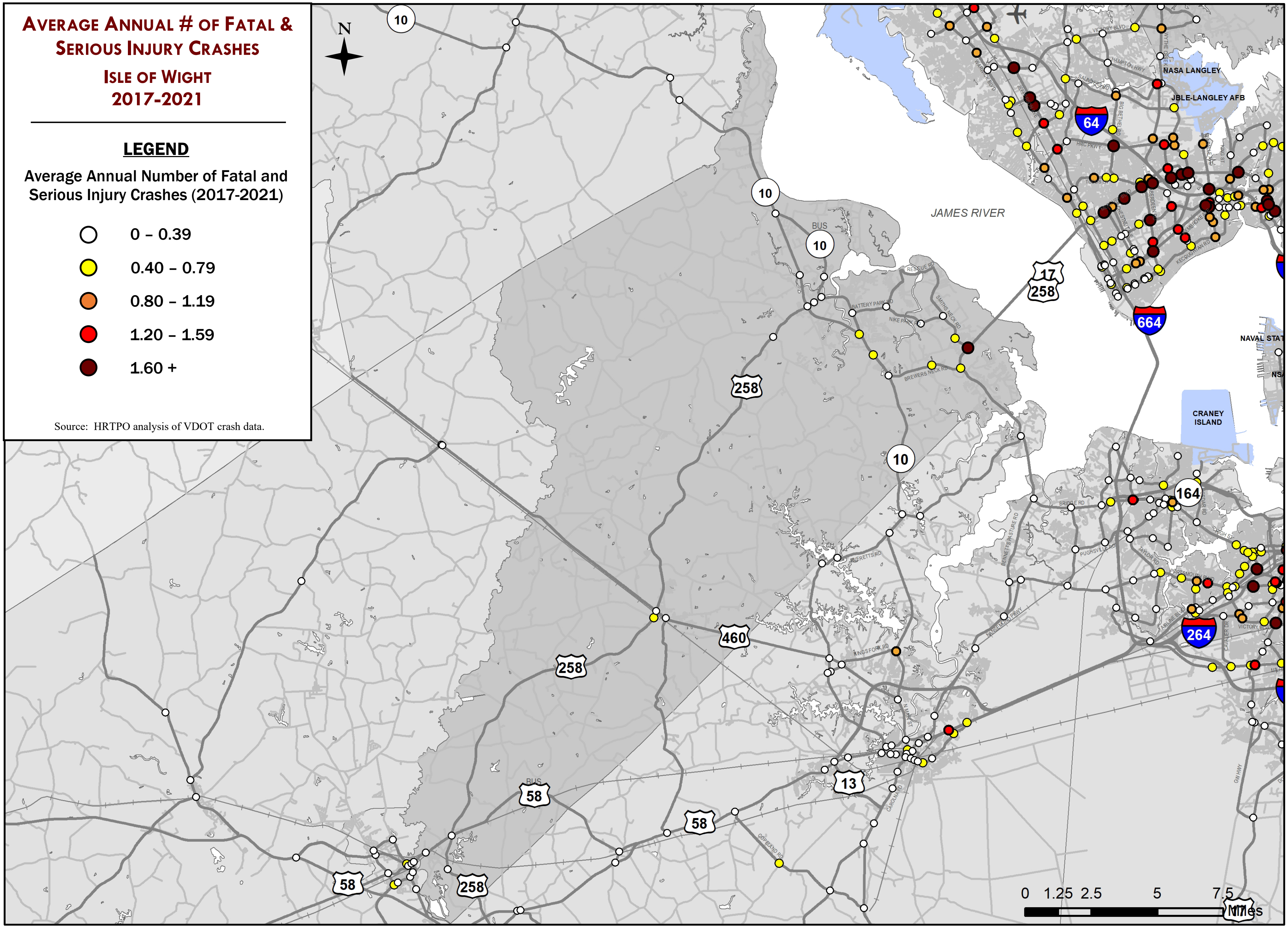
Isle of Wight

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
IW	CARROLLTON BLVD	SMITHS NECK RD	54	1	88.25	6	8	1	13.07	3	1
IW	BENNS CHURCH BLVD	BREWERS NECK RD	42	2	79.25	8	1	8	1.89	13	3
IW	ROUTE 460	ROUTE 258	40	3	114.75	2	1	8	2.87	10	7
IW	SMITHS NECK RD	ROUTE 665 (REYNOLDS DR)	40	3	202.57	1	3	2	15.19	2	2
IW	CARROLLTON BLVD	BREWERS NECK BLVD	35	5	56.91	14	3	2	4.88	7	-
IW	ROUTE 10 BYPASS	MAIN ST	35	5	83.35	7	1	8	2.38	12	11
IW	BENNS CHURCH BLVD/ROUTE 10 BYPASS	CHURCH ST S	32	7	62.85	12	2	5	3.93	9	6
IW	ROUTE 460	COURT ST/CHURCH ST/BANK ST	27	8	71.68	9	1	8	2.65	11	10
IW	BENNS CHURCH BLVD	ROUTE 644 (TURNER DR)	22	9	46.33	15	2	5	4.21	8	-
IW	SMITHS NECK RD	TITUS CREEK DR	17	10	113.46	3	0	14	0.00	14	-
IW	ROUTE 258	ROUTE 620 (FOURSQUARE RD)	16	11	94.68	5	0	14	0.00	14	14
IW	ROUTE 10 BYPASS	ROUTE 666 (BERRY HILL RD)	15	12	97.61	4	1	8	6.51	6	-
IW	BREWERS NECK RD	ROUTE 670 (NORSWORTHY DR)	11	13	24.04	21	3	2	6.56	5	-
IW	BATTERY PARK RD	NIKE PARK RD	8	14	38.66	16	0	14	0.00	14	-
IW	NIKE PARK RD	TITUS CREEK DR	8	14	65.04	11	0	14	0.00	14	-
IW	ROUTE 10 BYPASS/OLD STAGE HWY	BUS RTE 10 N (OLD STAGE HWY)	8	14	57.45	13	1	8	7.18	4	-
IW	ROUTE 258	ROUTE 603 (BLACKWATER RD)	8	14	65.64	10	2	5	16.41	1	-
IW	CHURCH ST S	BATTERY PARK RD	6	18	19.33	23	0	14	0.00	14	-
IW	CHURCH ST	MAIN ST	5	19	27.32	19	0	14	0.00	14	-
IW	CHURCH ST N	ROUTE 666 (BERRY HILL RD)	5	19	38.53	17	0	14	0.00	14	-
IW	BUS ROUTE 58/258 (CARRSVILLE HWY)	JAMESTOWN LN	3	21	24.12	20	0	14	0.00	14	-
IW	BUSINESS ROUTE 258 (MAIN ST)	CARY ST	2	22	22.32	22	0	14	0.00	14	-
IW	ROUTE 258	ROUTE 260 (UNION CAMP DR)	2	22	36.19	18	0	14	0.00	14	-
IW	BUS ROUTE 58/258 (CARRSVILLE HWY)	ROUTE 258	1	24	8.34	24	0	14	0.00	14	-

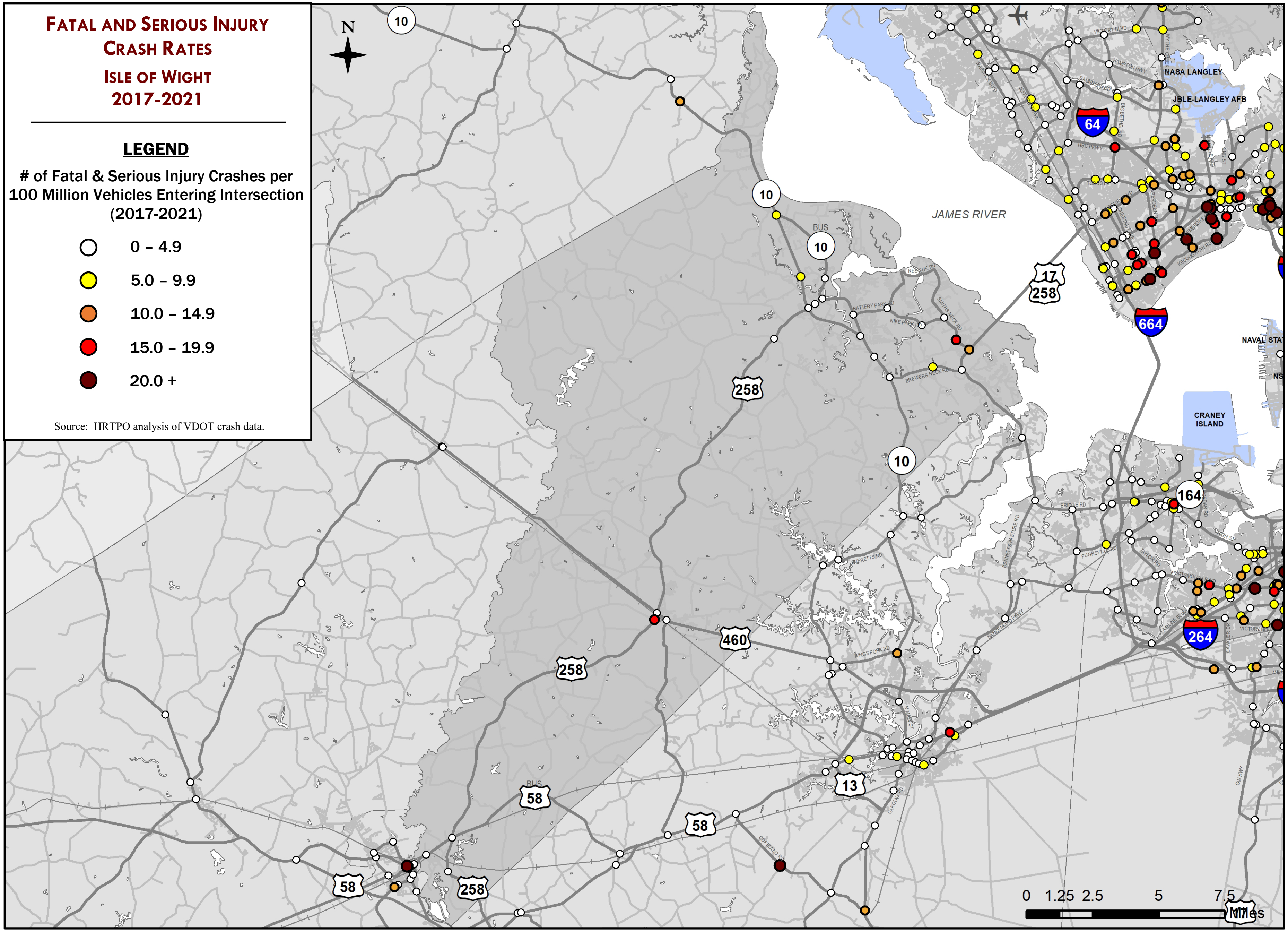
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.


AVERAGE ANNUAL NUMBER OF CRASHES
ISLE OF WIGHT
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
JAMES RIVER
NASA LANGLEY
JBLE-LANGLEY AFB
CRANEY ISLAND
0 1.25 2.5 5 7.5 Miles

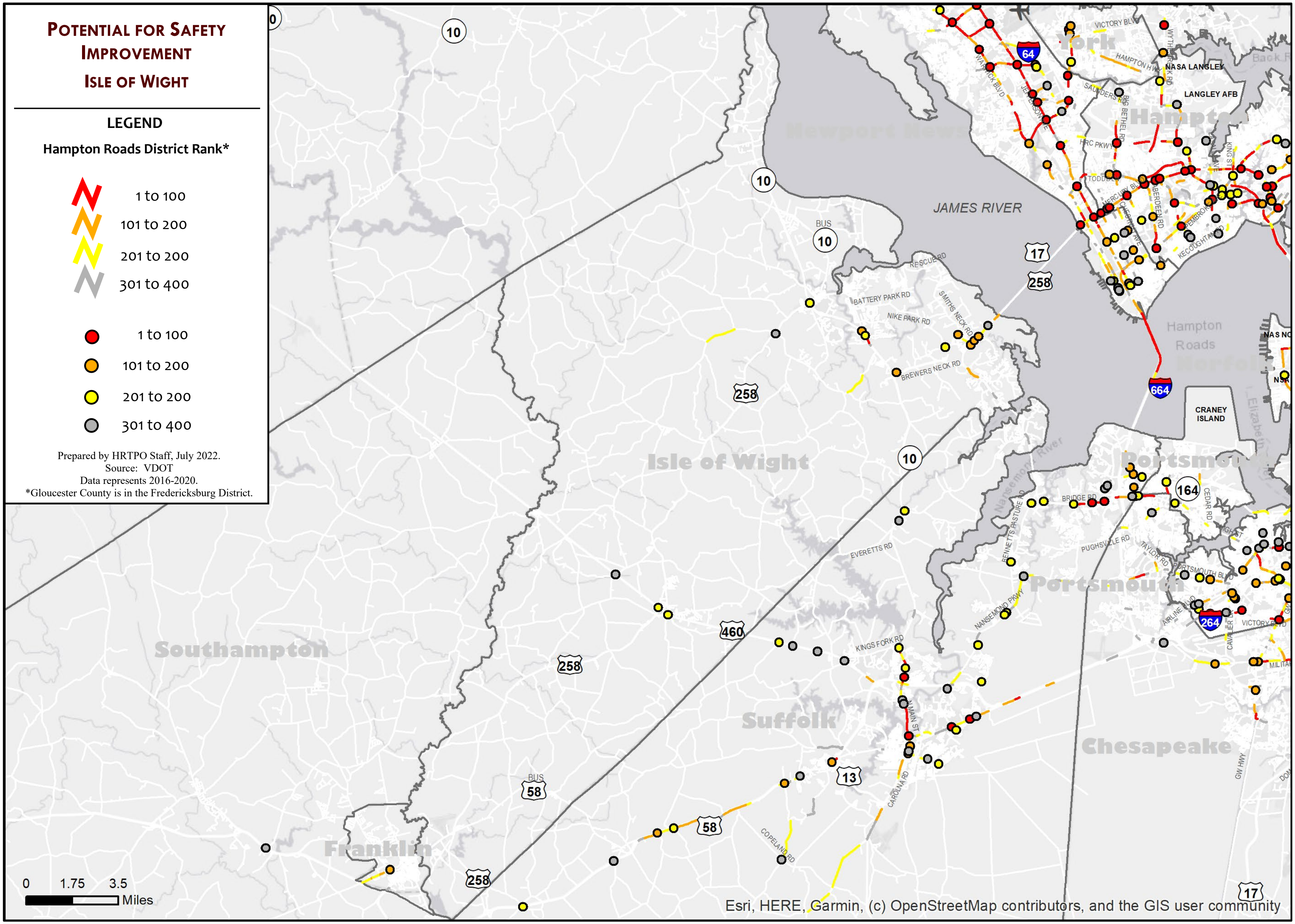

CRASH RATES
ISLE OF WIGHT
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
JAMES RIVER
NASA LANGLEY
JBLE-LANGLEY AFB
CRANEY ISLAND
10
BUS 10
17
258
460
58
BUS 58
13
64
664
264
164
0 1.25 2.5 5 7.5 Miles

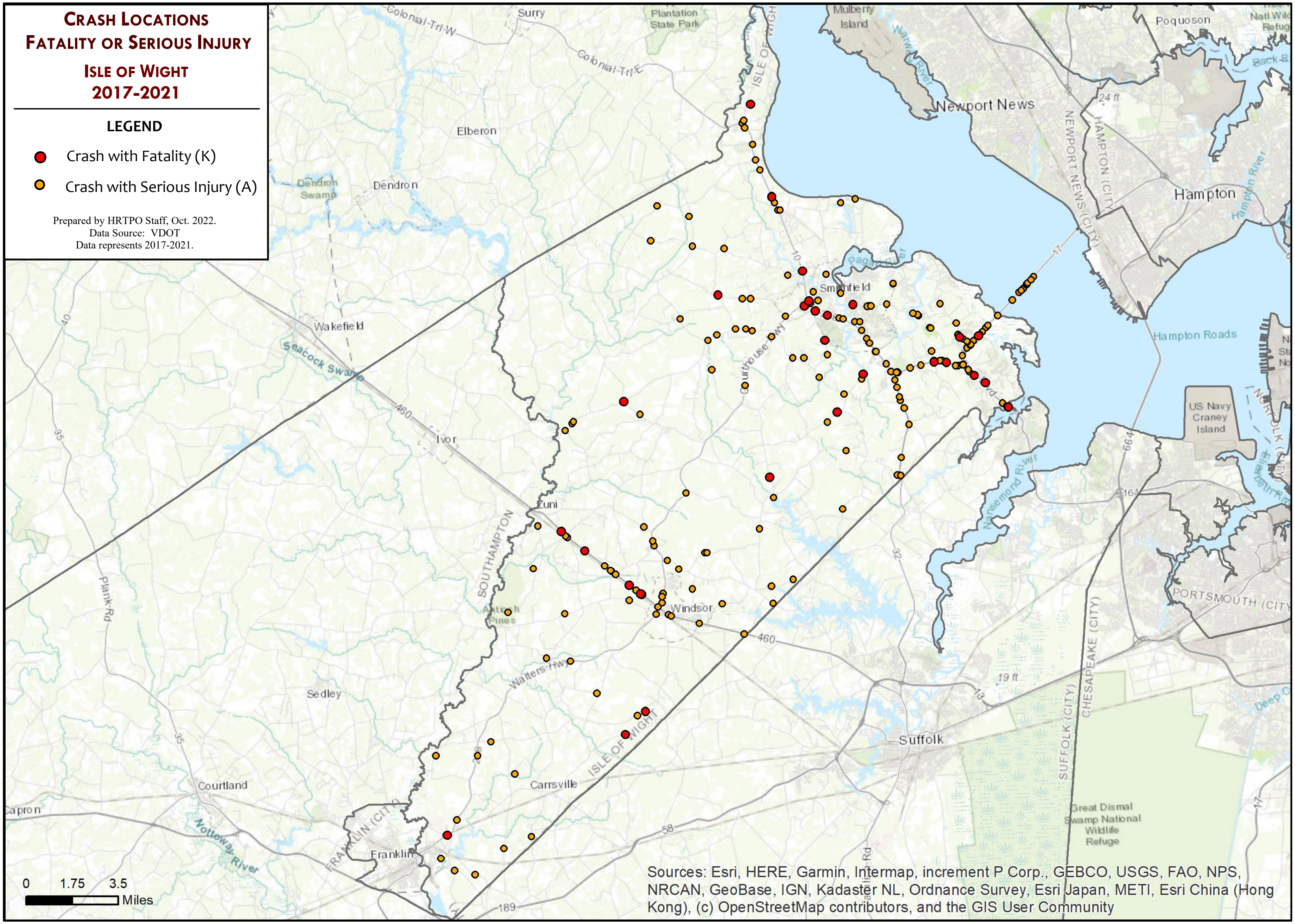


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
ISLE OF WIGHT
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
JAMES RIVER
NASA LANGLEY
JBLE-LANGLEY AFB
CRANEY ISLAND
10
258
460
58
13
17
64
664
264
164
0 1.25 2.5 5 7.5 Miles



FATAL AND SERIOUS INJURY CRASH RATES
ISLE OF WIGHT
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
JAMES RIVER
NASA LANGLEY
JBLE-LANGLEY AFB
CRANEY ISLAND
0 1.25 2.5 5 7.5 Miles

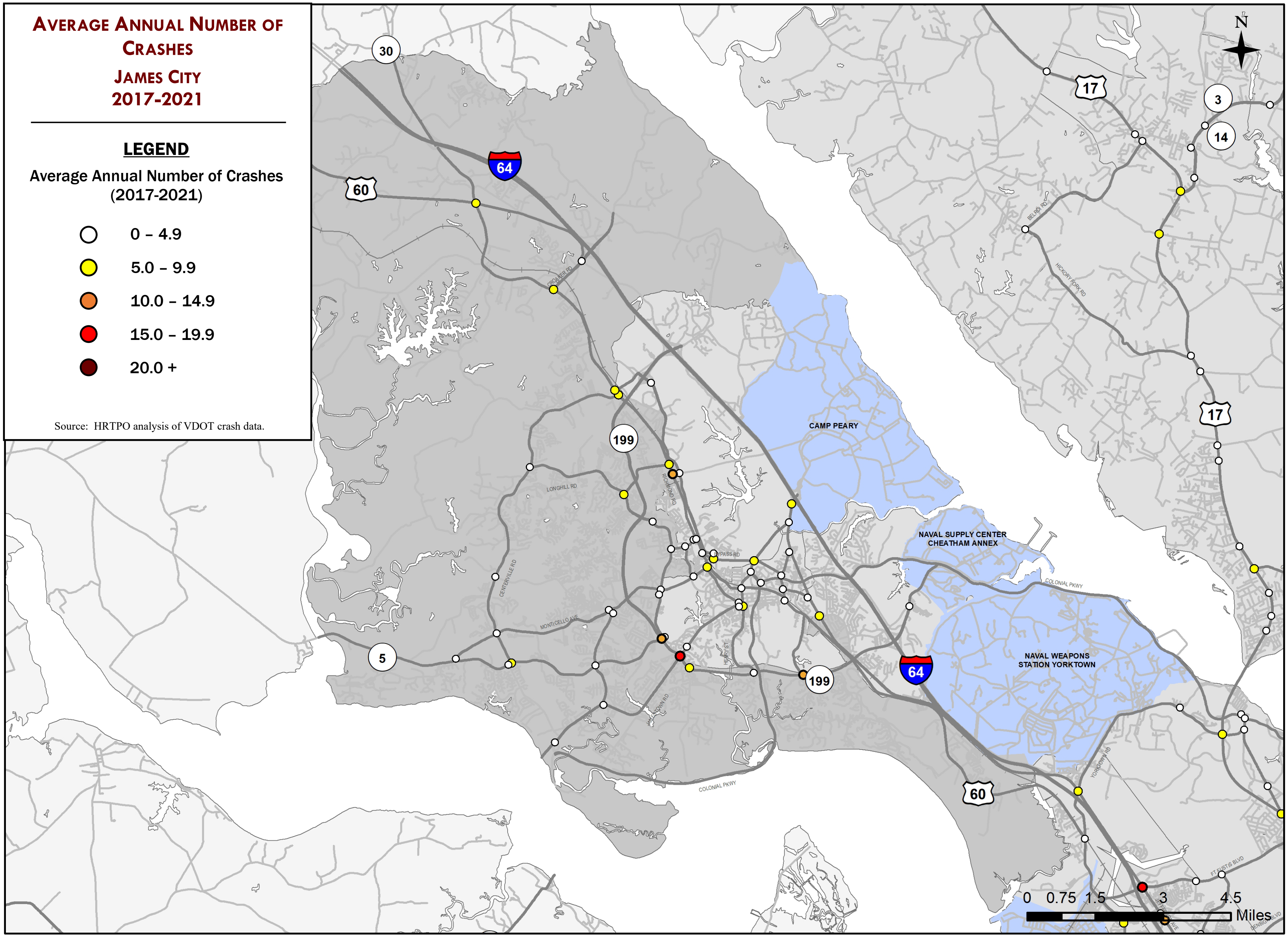

POTENTIAL FOR SAFETY IMPROVEMENT
ISLE OF WIGHT
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
0 1.75 3.5
Miles
Isle of Wight
Southampton
Franklin
Suffolk
Chesapeake
Portsmouth
Newport News
York
Hampton
Norfolk
JAMES RIVER
Hampton Roads
CRANEY ISLAND
LANGLEY AFB
NASA LANGLEY
Nansemond River
Elizabeth
BATTERY PARK RD
NIKE PARK RD
BREWERS NECK RD
SMITHS NECK RD
RESCUE RD
EVERETTS RD
KINGS FORK RD
BENNETTS PASTURE RD
NANSEMOND PKWY
BRIDGE RD
PUGHSVILLE RD
TAYLOR RD
PORTSMOUTH BLVD
AIRLINE BLVD
VICTORY BLVD
CEDAR RD
CAROLINA RD
COPELAND RD
MAIN ST
GW HWY
KECOUGHTAN RD
HAMPTON HWY
SAUNDERS RD
BIG BETHEL RD
MERCURY BLVD
ABERDEEN RD
WARWICK BLVD
JEFFERSON AVE
VICTORY BLVD
HRC PKWY
10
BUS 10
17
258
BUS 58
58
13
460
164
64
664
264
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

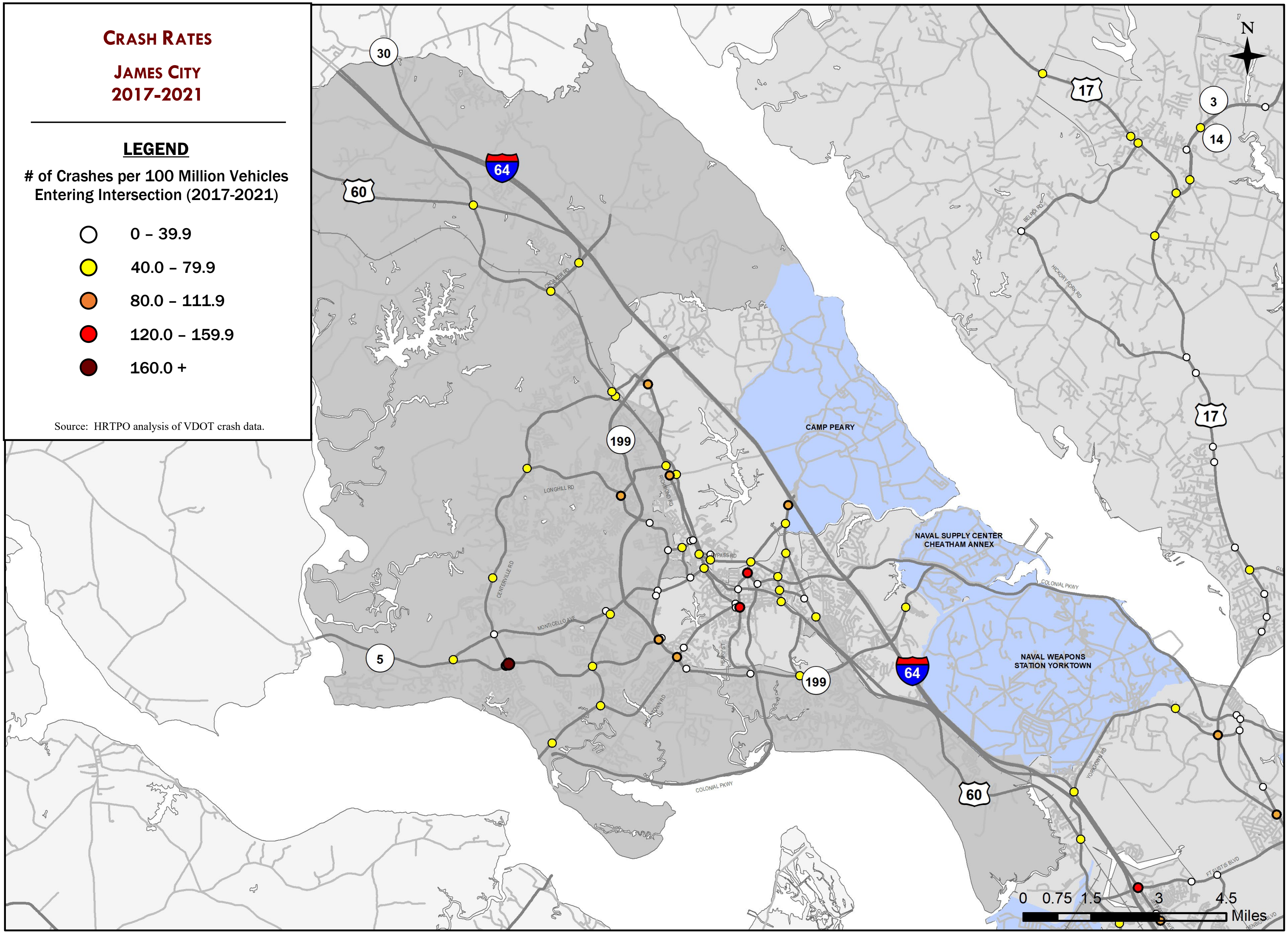

Crash Locations
Fatality or Serious Injury
Isle of Wight
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Surry
Elberon
Dendron
Wakefield
Ivor
Zuni
Windsor
Smithfield
Newport News
Hampton
Poquoson
Hampton Roads
US Navy Craney Island
Suffolk
Carrsville
Sedley
Courtland
Franklin
Capron
Great Dismal Swamp National Wildlife Refuge
0 1.75 3.5 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

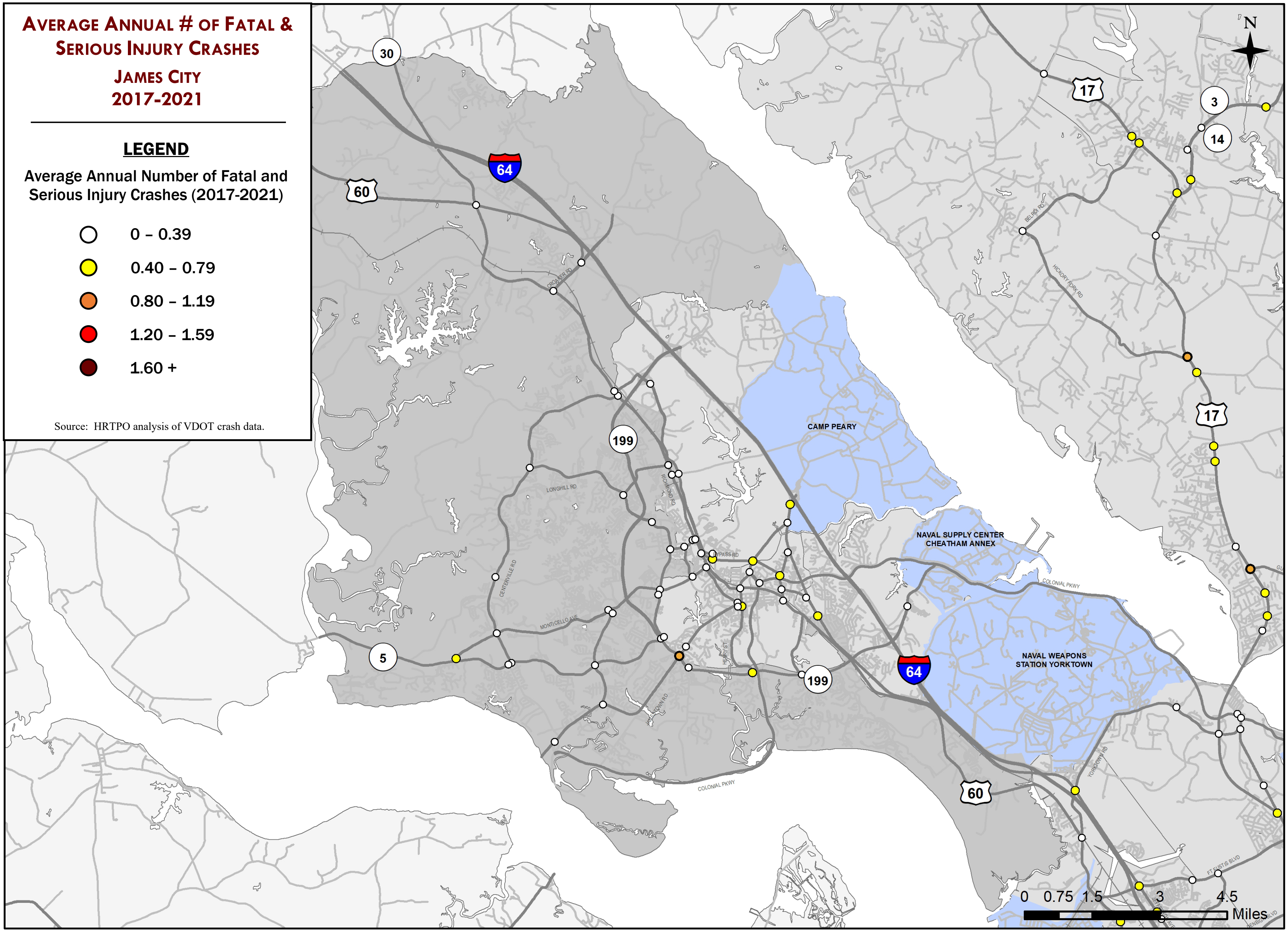
JAMES CITY

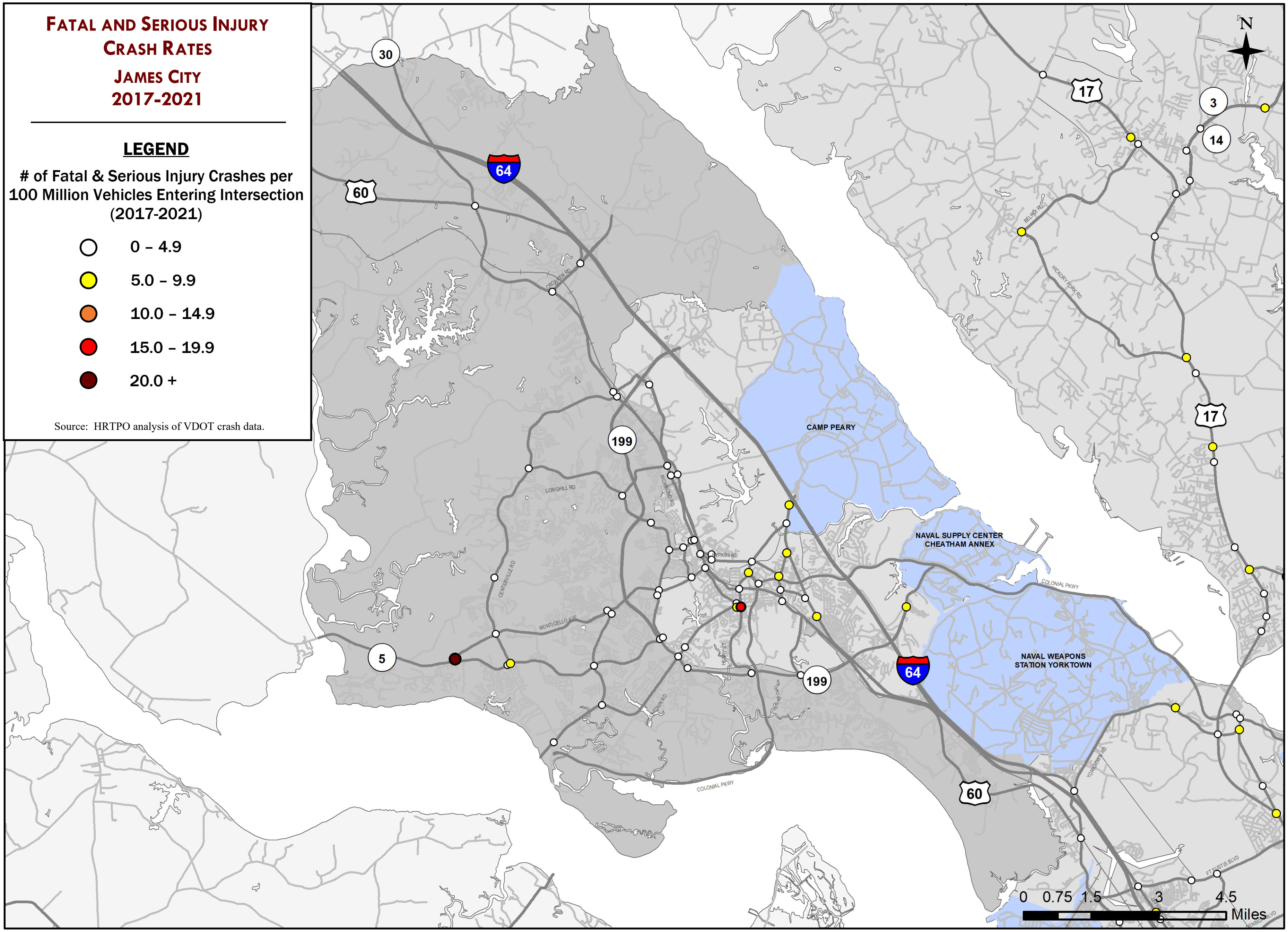
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
JCC	ROUTE 199	JOHN TYLER HWY	72	1	86.42	5	1	4	1.20	12	1
JCC	RICHMOND RD	AIRPORT RD	52	2	115.73	2	1	4	2.23	7	4
JCC	ROUTE 199	QUARTERPATH RD/MOUNTS BAY RD	50	3	71.97	8	1	4	1.44	10	-
JCC	RICHMOND RD	CENTERVILLE RD	35	4	71.61	9	0	13	0.00	13	19
JCC	RICHMOND RD	CROAKER RD	29	5	66.35	13	0	13	0.00	13	15
JCC	LONGHILL RD	OLDE TOWNE RD/DEVON RD	28	6	97.29	3	0	13	0.00	13	12
JCC	BARHAMSVILLE RD/RICHMOND RD	RICHMOND RD/ROCHAMBEAU DR	27	7	74.27	7	1	4	2.75	6	22
JCC	RICHMOND RD	OLDE TOWNE RD	27	7	70.55	10	0	13	0.00	13	-
JCC	JOHN TYLER HWY	CENTERVILLE RD	26	9	186.47	1	1	4	7.17	2	5
JCC	MERRIMAC TRAIL	PENNIMAN RD	25	10	69.43	11	2	1	5.55	3	7
JCC	ROUTE 199	BROOKWOOD DR	25	10	35.12	21	1	4	1.40	11	8
JCC	MONTICELLO AVE	NEWS RD	24	12	39.36	20	1	4	1.64	9	-
JCC	ROUTE 199	HENRY ST/KINGSPOINT DR	21	13	31.74	23	2	1	3.02	5	-
JCC	JOHN TYLER HWY	IRONBOUND RD	20	14	67.90	12	0	13	0.00	13	13
JCC	CROAKER RD	ROCHAMBEAU DR	19	15	52.63	17	0	13	0.00	13	24
JCC	MONTICELLO AVE	IRONBOUND RD	18	16	32.01	22	1	4	1.78	8	-
JCC	CENTERVILLE RD	LONGHILL RD	14	17	58.38	14	0	13	0.00	13	-
JCC	JOHN TYLER HWY	GREENSPRINGS RD	14	17	87.17	4	0	13	0.00	13	20
JCC	IRONBOUND RD	NEWS RD	13	19	77.67	6	0	13	0.00	13	-
JCC	JAMESTOWN RD	SANDY BAY RD	9	20	49.39	18	0	13	0.00	13	-
JCC	DEPUE DR/IRONBOUND RD	IRONBOUND RD/GALT DR	8	21	29.03	25	0	13	0.00	13	-
JCC	CENTERVILLE RD	NEWS RD	7	22	57.25	15	0	13	0.00	13	-
JCC	JAMESTOWN RD	GREENSPRINGS RD/RTE 359	7	22	43.05	19	0	13	0.00	13	-
JCC	JOHN TYLER HWY/STRAWBERRY PLAINS RD	JOHN TYLER HWY	6	24	29.17	24	0	13	0.00	13	-
JCC	MONTICELLO AVE	CENTERVILLE RD	5	25	21.54	26	0	13	0.00	13	-
JCC	MONTICELLO AVE/JOHN TYLER HWY	JOHN TYLER HWY	5	25	53.41	16	2	1	21.36	1	-
JCC	DEPUE DR/LONGHILL RD	LONGHILL RD	3	27	11.03	27	0	13	0.00	13	-
JCC	IRONBOUND RD	STRAWBERRY PLAINS RD	2	28	9.50	28	1	4	4.75	4	-

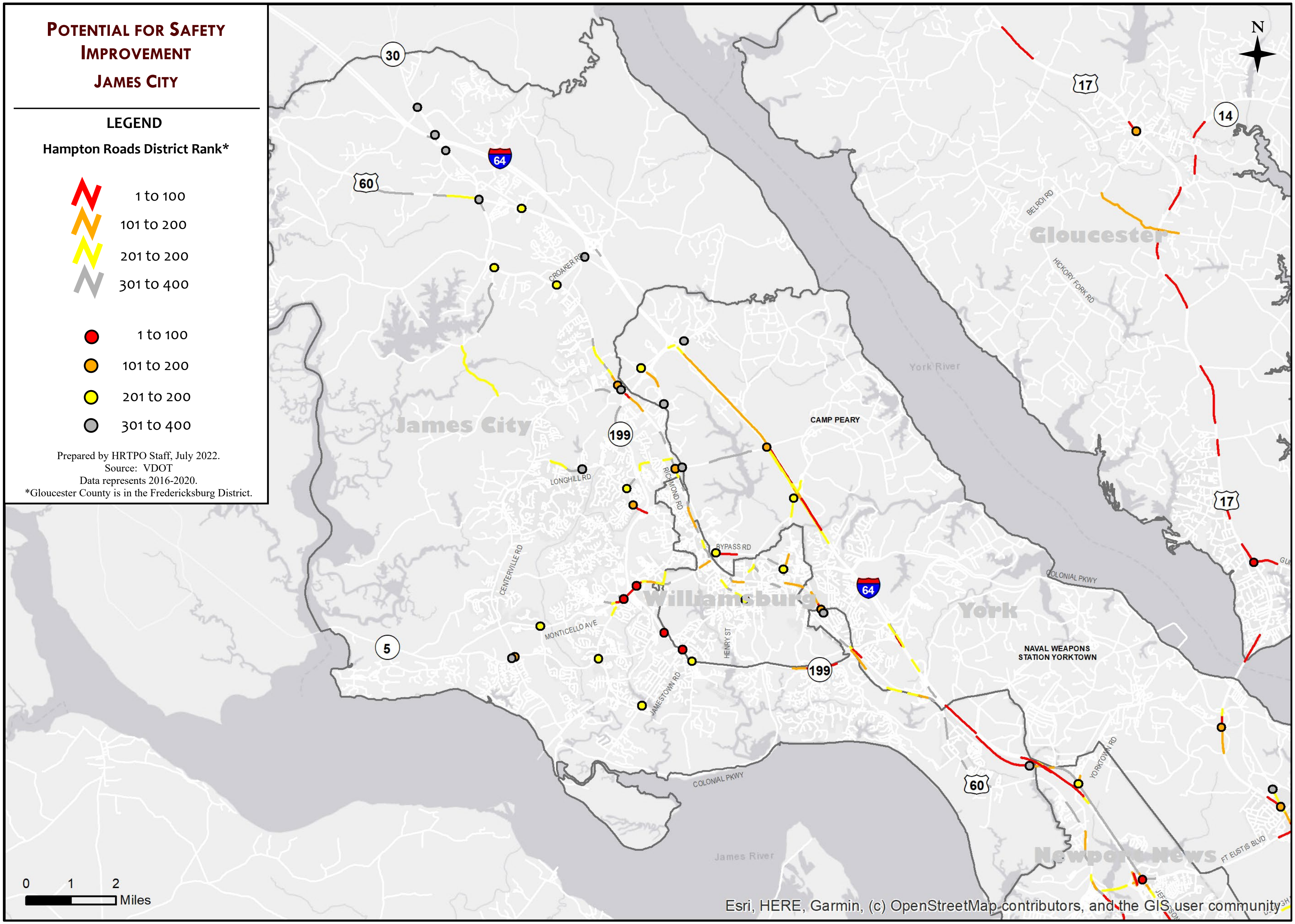
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

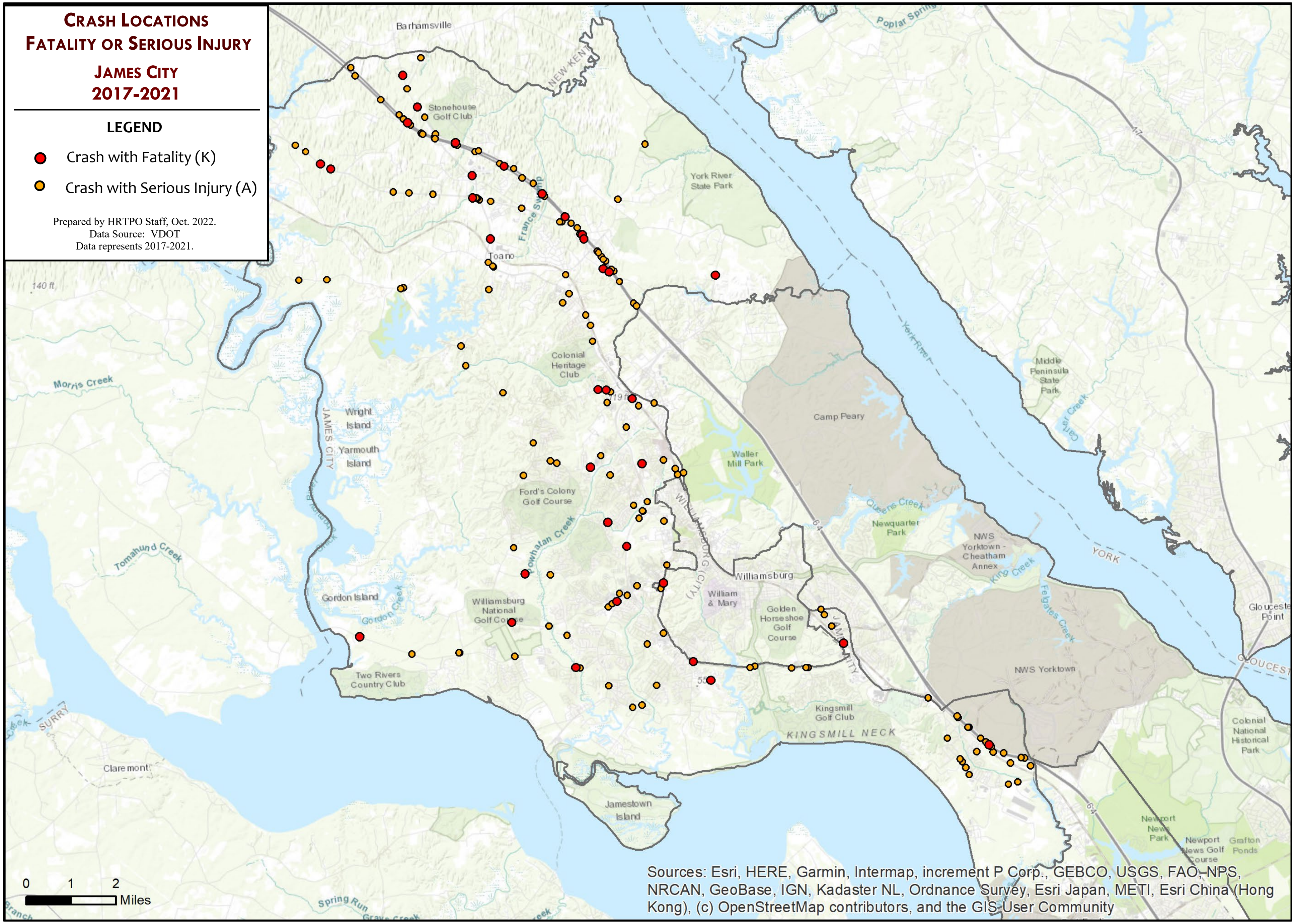

AVERAGE ANNUAL NUMBER OF CRASHES
JAMES CITY
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
30
64
60
199
5
17
3
14
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COLONIAL PKWY
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
N
0 0.75 1.5 3 4.5
Miles


CRASH RATES
JAMES CITY
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COLONIAL PKWY
LONGHILL RD
MONTICELLO AVE
CENTERVILLE RD
N
0 0.75 1.5 3 4.5
Miles
30
64
60
199
5
17
3
14


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
JAMES CITY
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
30
64
60
17
3
14
199
5
CAMP PEARY
NAVAL SUPPLY CENTER
CHEATHAM ANNEX
NAVAL WEAPONS
STATION YORKTOWN
COLONIAL PKWY
0 0.75 1.5 3 4.5
Miles


FATAL AND SERIOUS INJURY CRASH RATES
JAMES CITY
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COLONIAL PKWY
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
30
60
64
199
5
17
3
14
N
0 0.75 1.5 3 4.5
Miles


POTENTIAL FOR SAFETY IMPROVEMENT
JAMES CITY
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
N
0 1 2
Miles
James City
Williamsburg
York
Gloucester
Newport News
CAMP PEARY
NAVAL WEAPONS STATION YORKTOWN
York River
James River
CROAKER RD
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
RICHMOND RD
BYPASS RD
HENRY ST
JAMESTOWN RD
COLONIAL PKWY
YORKTOWN RD
BELROI RD
HICKORY FORK RD
FT EUSTIS BLVD
30
64
60
199
5
17
14
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community


CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
JAMES CITY
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Barhamsville
Stonehouse Golf Club
York River State Park
Toano
Colonial Heritage Club
Camp Peary
Waller Mill Park
Wright Island
Yarmouth Island
Ford's Colony Golf Course
Morris Creek
Tomahund Creek
Powhatan Creek
Newquarter Park
NWS Yorktown - Cheatham Annex
Middle Peninsula State Park
Williamsburg
William & Mary
Golden Horseshoe Golf Course
Gordon Island
Williamsburg National Golf Course
Two Rivers Country Club
Kingsmill Golf Club
KINGSMILL NECK
NWS Yorktown
Gloucester Point
Colonial National Historical Park
Claremont
Jamestown Island
Newport News Park
Newport News Golf Course
Grafton Ponds
0 1 2 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

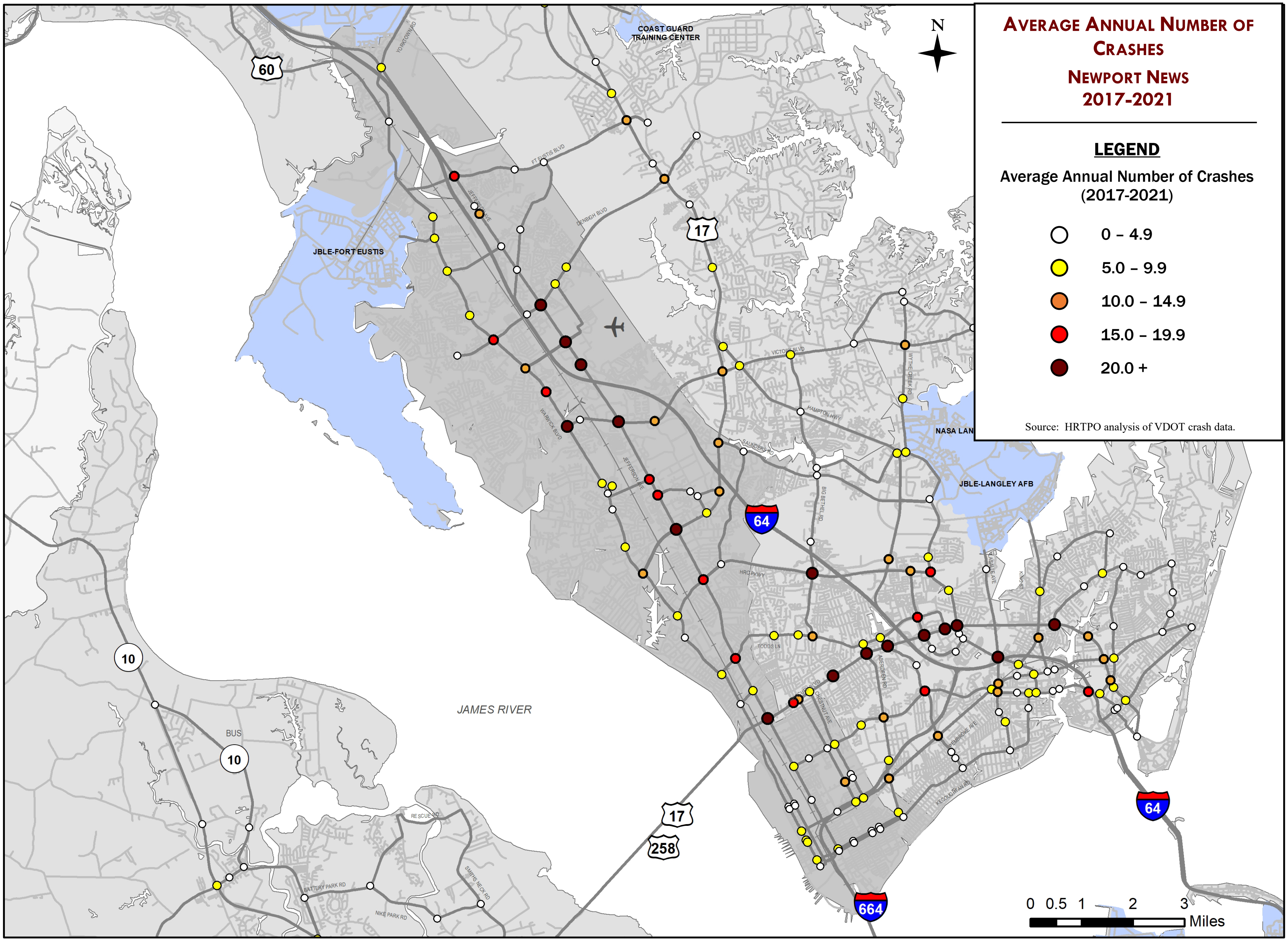
Newport News

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
NN	JEFFERSON AVE	J CLYDE MORRIS BLVD	195	1	127.35	12	6	6	3.92	35	2
NN	JEFFERSON AVE	OYSTER POINT RD	178	2	110.33	17	9	1	5.58	24	1
NN	JEFFERSON AVE	BLAND BLVD	141	3	87.40	29	4	9	2.48	46	4
NN	JEFFERSON AVE	BRICK KILN BLVD	137	4	72.52	44	3	15	1.59	51	-
NN	JEFFERSON AVE	DENBIGH BLVD	128	5	103.60	19	7	4	5.67	22	5
NN	MERCURY BLVD	JEFFERSON AVE	122	6	96.88	22	3	15	2.38	48	6
NN	WARWICK BLVD	OYSTER POINT RD	103	7	96.81	23	1	42	0.94	57	3
NN	JEFFERSON AVE	THIMBLE SHOALS BLVD	95	8	91.97	28	8	2	7.74	13	8
NN	JEFFERSON AVE	FORT EUSTIS BLVD	93	9	128.46	11	3	15	4.14	32	7
NN	JEFFERSON AVE	CITY CENTER BLVD	90	10	76.70	39	8	2	6.82	18	12
NN	JEFFERSON AVE	HARPERSVILLE RD	84	11	76.75	38	7	4	6.40	19	10
NN	WARWICK BLVD	DENBIGH BLVD	83	12	82.84	33	5	7	4.99	26	14
NN	WARWICK BLVD	COLONY RD	77	13	96.57	24	5	7	6.27	20	9
NN	JEFFERSON AVE	MAIN ST	76	14	83.06	31	1	42	1.09	54	13
NN	J CLYDE MORRIS BLVD	DILIGENCE DR	71	15	82.95	32	0	58	0.00	58	16
NN	WARWICK BLVD	J CLYDE MORRIS BLVD	68	16	69.91	45	2	27	2.06	49	21
NN	OYSTER POINT RD	CANON BLVD	65	17	67.33	48	1	42	1.04	55	22
NN	J CLYDE MORRIS BLVD	HARPERSVILLE RD/OLD OYSTER POINT RD	61	18	74.69	41	2	27	2.45	47	15
NN	JEFFERSON AVE	INDUSTRIAL PARK DR	59	19	92.77	27	1	42	1.57	52	-
NN	WARWICK BLVD	BLAND BLVD	57	20	56.08	53	1	42	0.98	56	-
NN	ROANOKE AVE	48TH ST	53	21	488.91	1	2	27	18.45	3	17
NN	WARWICK BLVD	HARPERSVILLE RD	47	22	83.16	30	4	9	7.08	17	26
NN	J CLYDE MORRIS BLVD	THIMBLE SHOALS BLVD	43	23	56.26	52	3	15	3.93	34	41
NN	JEFFERSON AVE	26TH ST	43	23	200.35	2	3	15	13.98	6	25
NN	WARWICK BLVD	BEECHMONT DR	43	23	60.84	49	2	27	2.83	44	29
NN	CHESTNUT AVE	39TH ST	40	26	152.00	6	4	9	15.20	5	-
NN	DENBIGH BLVD	MCMANUS BLVD	40	26	74.86	40	4	9	7.49	14	18
NN	JEFFERSON AVE	BRIARFIELD RD	38	28	74.66	42	3	15	5.89	21	24
NN	CITY CENTER BLVD	NETTLES DR	37	29	79.82	37	2	27	4.31	31	-
NN	WARWICK BLVD	ATKINSON BLVD	36	30	56.54	51	3	15	4.71	27	-
NN	JEFFERSON AVE	CENTER AVE	35	31	45.25	58	3	15	3.88	36	-
NN	ROANOKE AVE	39TH ST	34	32	165.16	3	4	9	19.43	2	19
NN	HUNTINGTON AVE	34TH ST	33	33	123.18	14	2	27	7.47	15	30
NN	27TH ST	BUXTON AVE	32	34	148.34	7	3	15	13.91	7	20
NN	WARWICK BLVD	MAIN ST	32	34	57.68	50	4	9	7.21	16	-
NN	HUNTINGTON AVE	35TH ST	31	36	144.69	9	1	42	4.67	29	-
NN	JEFFERSON AVE	YORKTOWN RD	31	36	72.68	43	2	27	4.69	28	27
NN	HUNTINGTON AVE	26TH ST	29	38	165.01	4	0	58	0.00	58	39
NN	CHESTNUT AVE	BRIARFIELD RD	28	39	106.69	18	1	42	3.81	37	23
NN	DENBIGH BLVD	OLD DENBIGH RD	27	40	50.89	54	2	27	3.77	38	-
NN	HUNTINGTON AVE	39TH ST	27	40	114.86	16	0	58	0.00	58	-
NN	WARWICK BLVD	ASHTON GREEN BLVD/SHELLABARGER DR	27	40	41.91	63	0	58	0.00	58	-
NN	WARWICK BLVD	INDUSTRIAL PARK DR	27	40	44.43	60	2	27	3.29	41	-
NN	WARWICK BLVD	CITY CENTER BLVD	25	44	30.09	70	1	42	1.20	53	-
NN	WARWICK BLVD	HIDEN BLVD	25	44	35.65	66	2	27	2.85	43	-
NN	HUNTINGTON AVE	50TH ST	24	46	123.23	13	1	42	5.13	25	-
NN	OYSTER POINT RD	NETTLES DR	24	46	36.17	65	0	58	0.00	58	-
NN	HRC PKWY/HARPERSVILLE RD	HARPERSVILLE RD/TERRACE DR	23	48	44.82	59	0	58	0.00	58	-
NN	WARWICK BLVD	CENTER AVE	22	49	45.28	57	2	27	4.12	33	-
NN	BRIARFIELD RD	MARSHALL AVE	19	50	80.64	36	3	15	12.73	8	33

Newport News (continued)

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
NN	39TH ST	MARSHALL AVE	18	51	81.38	35	2	27	9.04	11	-
NN	DENBIGH BLVD	RICHNECK RD	17	52	37.22	64	0	58	0.00	58	-
NN	THIMBLE SHOALS BLVD	DILIGENCE DR	17	52	46.34	56	1	42	2.73	45	-
NN	WARWICK BLVD	50TH ST	17	52	68.24	46	0	58	0.00	58	-
NN	25TH ST	BUXTON AVE	16	55	93.97	26	3	15	17.62	4	-
NN	26TH ST	MARSHALL AVE	15	56	147.30	8	1	42	9.82	10	-
NN	BRIARFIELD RD	ROANOKE AVE	15	56	82.44	34	0	58	0.00	58	40
NN	JEFFERSON AVE	25TH ST	15	56	67.54	47	1	42	4.50	30	31
NN	JEFFERSON AVE	ATKINSON BLVD	15	56	28.94	73	1	42	1.93	50	-
NN	JEFFERSON AVE	RICHNECK RD	15	56	23.89	76	0	58	0.00	58	-
NN	WARWICK BLVD	CEDAR LN	15	56	31.55	68	0	58	0.00	58	-
NN	25TH ST	CHESTNUT AVE	14	62	143.39	10	2	27	20.48	1	-
NN	25TH ST	MARSHALL AVE	13	63	117.35	15	0	58	0.00	58	34
NN	JEFFERSON AVE	48TH ST	13	63	31.74	67	0	58	0.00	58	-
NN	JEFFERSON AVE	SHIELDS RD	13	63	24.33	75	3	15	5.61	23	-
NN	WARWICK BLVD	YORKTOWN RD	13	63	48.52	55	1	42	3.73	40	-
NN	26TH ST	CHESTNUT AVE	12	67	102.52	20	0	58	0.00	58	-
NN	HUNTINGTON AVE	23RD ST	12	67	96.41	25	0	58	0.00	58	42
NN	WARWICK BLVD	49TH ST	12	67	42.70	61	0	58	0.00	58	-
NN	WARWICK BLVD	NETTLES DR	11	70	17.42	78	2	27	3.17	42	-
NN	26TH ST	ROANOKE AVE	10	71	156.56	5	0	58	0.00	58	-
NN	FORT EUSTIS BLVD	WOODSIDE LN	10	71	29.86	71	0	58	0.00	58	-
NN	HUNTINGTON AVE	49TH ST	10	71	42.67	62	2	27	8.53	12	-
NN	THIMBLE SHOALS BLVD	CANON BLVD	9	74	21.82	77	0	58	0.00	58	-
NN	WARWICK BLVD	DEEP CREEK RD	9	74	13.65	80	0	58	0.00	58	-
NN	25TH ST	ROANOKE AVE	8	76	101.47	21	1	42	12.68	9	-
NN	DENBIGH BLVD	LUCAS CREEK RD	8	76	30.34	69	0	58	0.00	58	-
NN	CHESTNUT AVE	48TH ST	5	78	29.07	72	0	58	0.00	58	-
NN	SAUNDERS RD/HARPERSVILLE RD	HARPERSVILLE RD	4	79	15.04	79	1	42	3.76	39	-
NN	RICHNECK RD	SHIELDS RD	3	80	26.95	74	0	58	0.00	58	-
NN	CHESTNUT AVE	ALUMINUM AVE	2	81	12.89	81	0	58	0.00	58	-
NN	FORT EUSTIS BLVD	RICHNECK RD	2	81	6.42	82	0	58	0.00	58	-

Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.



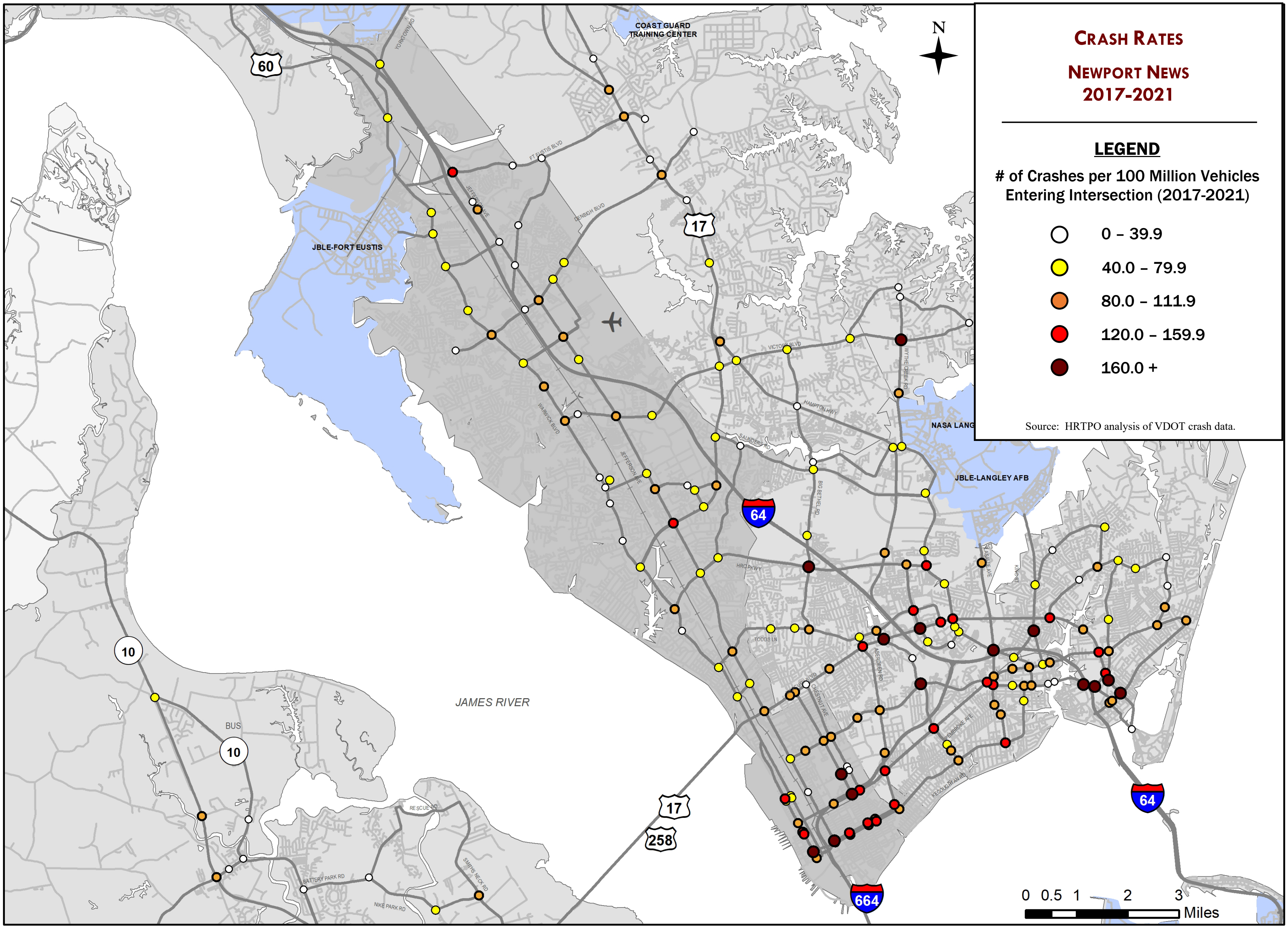
Average Annual Number of Crashes
Newport News
2017-2021

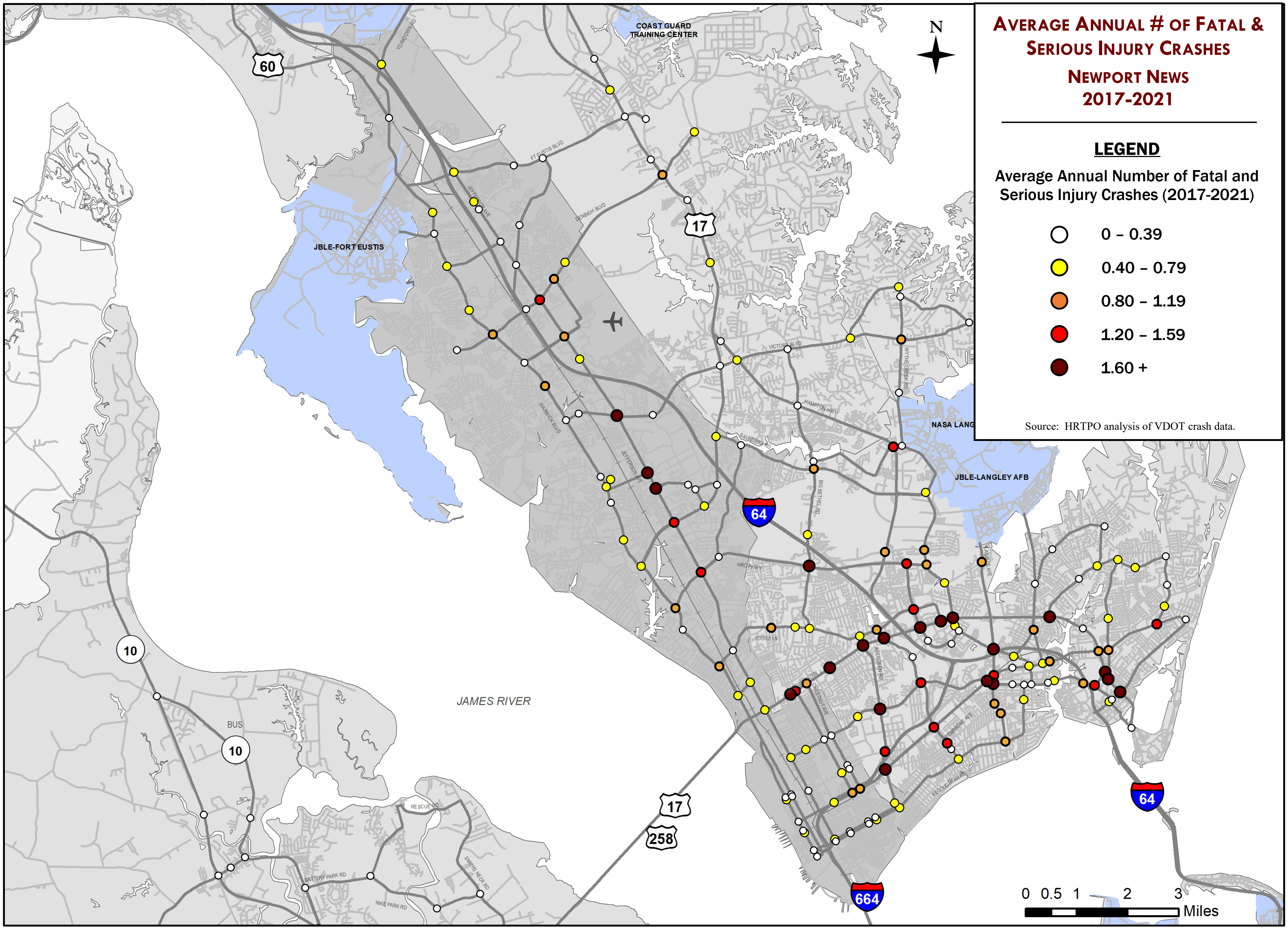
LEGEND

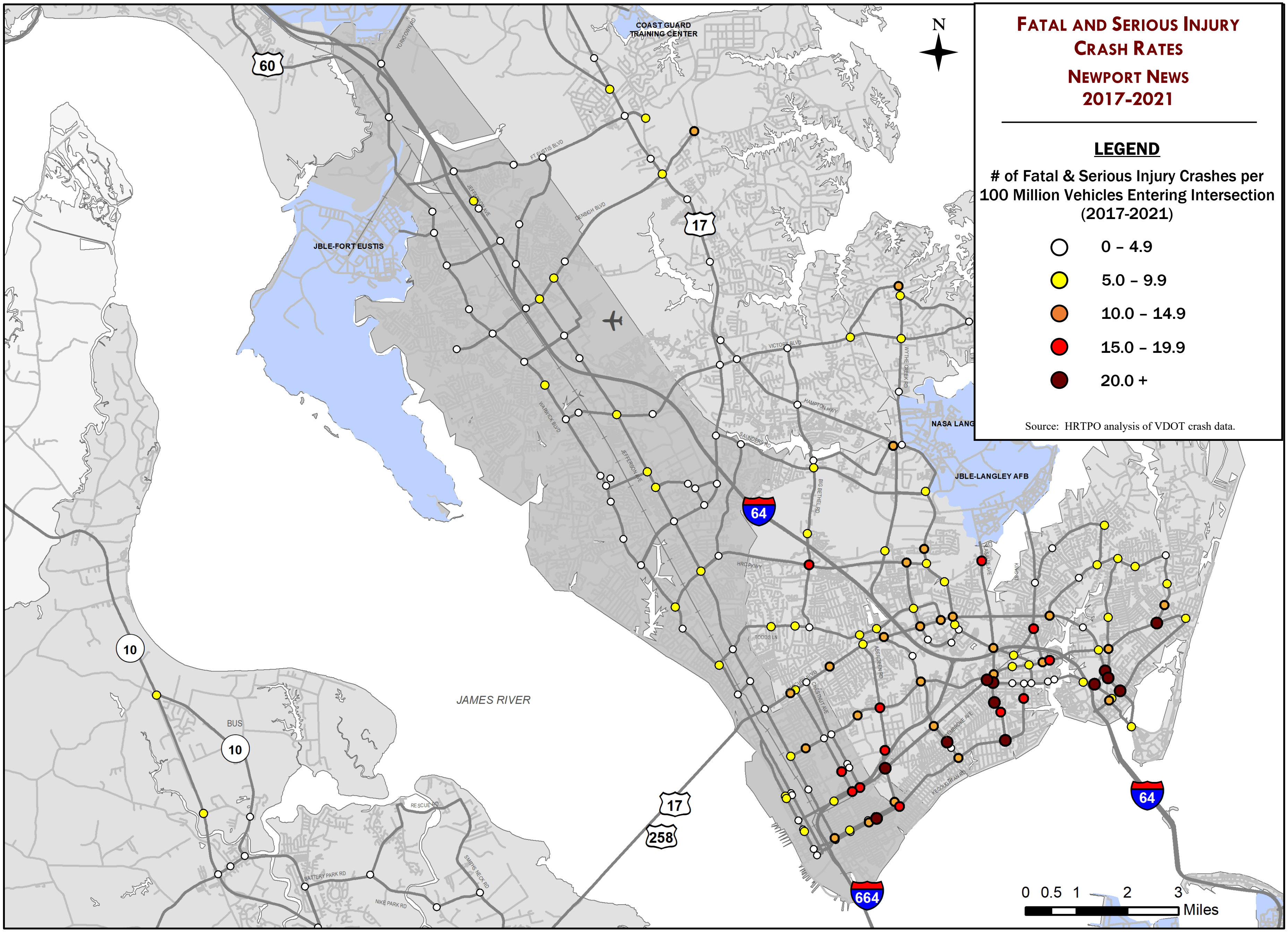
Average Annual Number of Crashes (2017-2021)

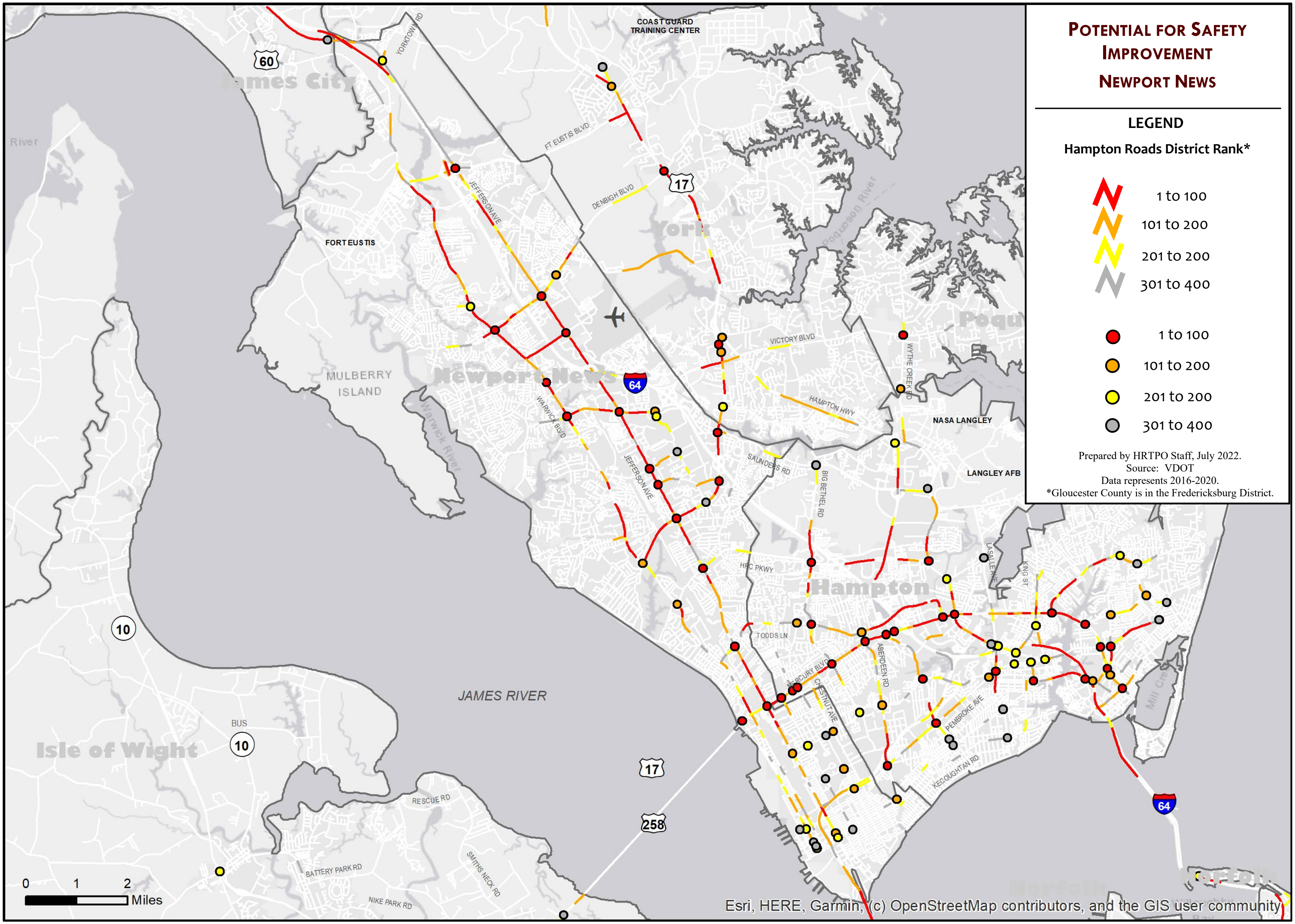
- 0 – 4.9
- 5.0 – 9.9
- 10.0 – 14.9
- 15.0 – 19.9
- 20.0 +

Source: HRTPO analysis of VDOT crash data.


Crash Rates
Newport News
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANG
JBLE-LANGLEY AFB
JAMES RIVER
60
17
64
10
BUS
10
17
258
664
0 0.5 1 2 3
Miles


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
NEWPORT NEWS
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
JBLE-LANGLEY AFB
JAMES RIVER
60
17
64
664
258
10
BUS
0 0.5 1 2 3
Miles


FATAL AND SERIOUS INJURY CRASH RATES
NEWPORT NEWS
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
JBLE-LANGLEY AFB
JAMES RIVER
60
17
64
664
10
BUS
258
0 0.5 1 2 3
Miles



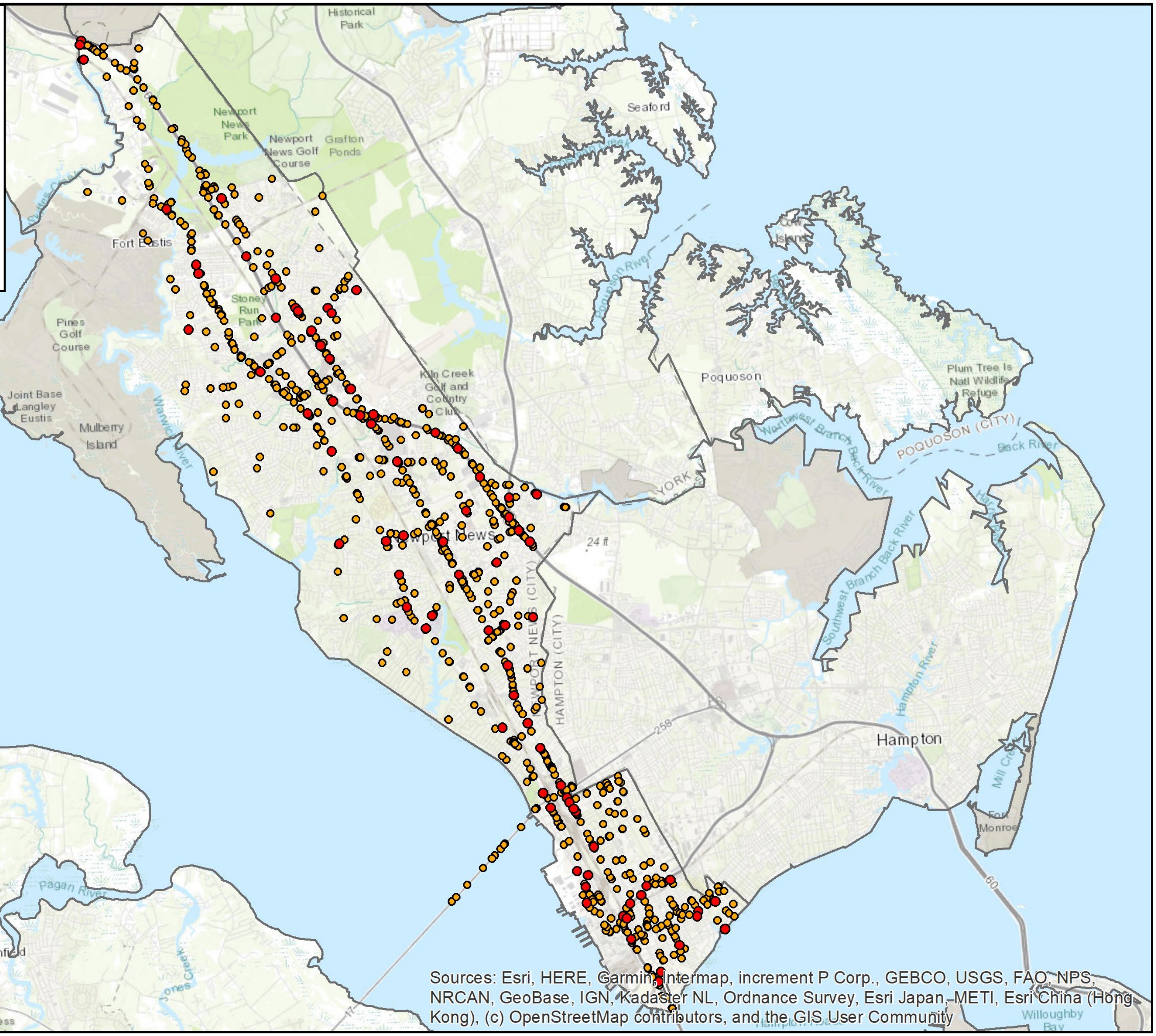
POTENTIAL FOR SAFETY IMPROVEMENT
NEWPORT NEWS
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
COAST GUARD TRAINING CENTER
James City
York
Newport News
Hampton
Isle of Wight
FORT EUSTIS
MULBERRY ISLAND
NASA LANGLEY
LANGLEY AFB
JAMES RIVER
YORKTOWN RD
FT EUSTIS BLVD
DENBIGH BLVD
JEFFERSON AVE
WARWICK BLVD
VICTORY BLVD
HAMPTON HWY
SAUNDERS RD
BIG BETHEL RD
WYTHE CREEK RD
HRC PKWY
TODDS LN
MERCURY BLVD
CHESTNUT AVE
ABERDEEN RD
PEMBROKE AVE
KECOUGHTAN RD
LASALLE AVE
KING ST
RESCUE RD
BATTERY PARK RD
SMITHS NECK RD
NIKE PARK RD
60
17
64
10
BUS 10
258
0 1 2 Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Crash Locations Fatality or Serious Injury Newport News 2017-2021

LEGEND

- Crash with Fatality (K)
- Crash with Serious Injury (A)

Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.



NORFOLK

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
NOR	NORTHAMPTON BLVD	WESLEYAN DR	106	1	69.35	35	5	4	3.27	49	-
NOR	TIDEWATER DR	LAFAYETTE BLVD	102	2	118.92	6	6	3	7.00	13	3
NOR	MONTICELLO AVE	26TH ST	83	3	171.75	1	4	8	8.28	9	2
NOR	CHESAPEAKE BLVD	NORVIEW AVE	82	4	119.21	5	7	2	10.18	4	11
NOR	MILITARY HWY	POPLAR HALL DR	80	5	68.30	36	5	4	4.27	35	13
NOR	MILITARY HWY	NORTHAMPTON BLVD/PRINCESS ANNE RD	78	6	70.76	33	1	55	0.91	105	1
NOR	LITTLE CREEK RD	CHESAPEAKE BLVD	77	7	83.22	22	9	1	9.73	7	4
NOR	VIRGINIA BEACH BLVD	NEWTOWN RD	68	8	57.15	49	1	55	0.84	106	5
NOR	TIDEWATER DR	PRINCESS ANNE RD	66	9	77.94	26	4	8	4.72	29	10
NOR	LITTLE CREEK RD	MILITARY HWY	61	10	80.16	23	3	12	3.94	40	-
NOR	TIDEWATER DR	THOLE ST/I-64 RAMP	57	11	77.95	25	5	4	6.84	15	15
NOR	BRAMBLETON AVE	TIDEWATER DR	56	12	49.81	66	0	107	0.00	107	32
NOR	BRAMBLETON AVE	ST PAULS BLVD	55	13	57.84	48	0	107	0.00	107	-
NOR	BRAMBLETON AVE	MONTICELLO AVE	51	14	98.54	14	1	55	1.93	87	31
NOR	COLLEY AVE	26TH ST	50	15	171.66	2	2	19	6.87	14	7
NOR	CHESAPEAKE BLVD	BAYVIEW BLVD	49	16	108.18	11	2	19	4.42	34	8
NOR	HAMPTON BLVD	38TH ST	49	16	86.72	20	1	55	1.77	89	-
NOR	COLLEY AVE	27TH ST	47	18	117.97	7	4	8	10.04	5	21
NOR	HAMPTON BLVD	26TH ST	47	18	88.50	19	3	12	5.65	21	18
NOR	MILITARY HWY	NORVIEW AVE	46	20	62.01	44	1	55	1.35	99	-
NOR	BRAMBLETON AVE	PARK AVE	45	21	53.60	57	3	12	3.57	44	-
NOR	MILITARY HWY	LOWERY RD	45	21	51.30	64	1	55	1.14	103	-
NOR	TIDEWATER DR	BAYVIEW BLVD	44	23	103.56	13	2	19	4.71	30	17
NOR	CHURCH ST	VA BEACH BLVD	43	24	77.25	28	2	19	3.59	43	14
NOR	MILITARY HWY	AZALEA GARDEN RD	43	24	76.01	29	1	55	1.77	90	-
NOR	HAMPTON BLVD	LITTLE CREEK RD	41	26	63.24	40	2	19	3.08	54	-
NOR	HAMPTON BLVD	PRINCESS ANNE RD	41	26	60.38	45	2	19	2.95	61	-
NOR	LITTLE CREEK RD	DIVEN ST	40	28	130.15	4	0	107	0.00	107	6
NOR	MILITARY HWY	JOHNSTONS RD	40	28	65.48	39	4	8	6.55	16	27
NOR	TERMINAL BLVD	DIVEN ST	40	28	84.23	21	2	19	4.21	36	9
NOR	TIDEWATER DR	VA BEACH BLVD	40	28	46.73	78	1	55	1.17	102	-
NOR	LITTLE CREEK RD	AZALEA GARDEN RD	39	32	77.27	27	3	12	5.94	19	48
NOR	MILITARY HWY	ROBIN HOOD RD	39	32	52.97	60	2	19	2.72	69	29
NOR	PRINCESS ANNE RD	BALLENTINE BLVD	39	32	72.34	32	0	107	0.00	107	-
NOR	LITTLE CREEK RD	HALPRIN DR	38	35	74.98	30	1	55	1.97	86	43
NOR	TIDEWATER DR	WILLOW WOOD DR	38	35	49.19	71	2	19	2.59	73	-
NOR	CHURCH ST	27TH ST	37	37	91.49	17	2	19	4.95	26	23
NOR	TIDEWATER DR	NORVIEW AVE	37	37	47.88	72	1	55	1.29	101	-
NOR	BRAMBLETON AVE	CHURCH ST	36	39	52.52	62	2	19	2.92	62	-
NOR	CHURCH ST	PRINCESS ANNE RD	36	39	65.64	37	2	19	3.65	42	37
NOR	TIDEWATER DR	CROMWELL DR	36	39	46.25	80	2	19	2.57	74	26
NOR	27TH ST	GRANBY ST	35	42	112.55	9	1	55	3.22	50	20
NOR	26TH ST	GRANBY ST	34	43	106.70	12	1	55	3.14	51	25
NOR	PRINCESS ANNE RD	AZALEA GARDEN RD	33	44	56.60	50	2	19	3.43	48	-
NOR	ST PAULS BLVD	MARKET ST/I-264 RAMP	33	44	49.36	70	0	107	0.00	107	-
NOR	SHORE DR	LITTLE CREEK RD	32	46	47.07	77	0	107	0.00	107	-
NOR	ST PAULS BLVD	CHARLOTTE ST	32	46	45.02	84	2	19	2.81	65	-
NOR	MONTICELLO AVE	PRINCESS ANNE RD	31	48	59.50	46	2	19	3.84	41	-
NOR	26TH ST	COLONIAL AVE	30	49	168.77	3	0	107	0.00	107	41
NOR	CHESAPEAKE BLVD	CROMWELL DR	30	49	53.37	58	1	55	1.78	88	33

NORFOLK (CONTINUED)

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
NOR	GRANBY ST	THOLE ST	29	51	44.18	86	1	55	1.52	95	-
NOR	HAMPTON BLVD	TERMINAL BLVD	29	51	42.77	89	1	55	1.47	96	-
NOR	TIDEWATER DR	LINDENWOOD AVE	29	51	46.72	79	3	12	4.83	28	-
NOR	26TH ST	LLEWELLYN AVE	28	54	96.37	16	0	107	0.00	107	24
NOR	CHESAPEAKE BLVD	FISHERMANS RD	28	54	62.46	43	2	19	4.46	32	39
NOR	VIRGINIA BEACH BLVD	BALLENTINE BLVD	28	54	39.54	98	2	19	2.82	64	-
NOR	VIRGINIA BEACH BLVD	RABY RD	28	54	42.03	91	0	107	0.00	107	-
NOR	CAMPOSTELLA RD	KIMBALL TERR	27	58	31.13	129	2	19	2.31	79	-
NOR	HAMPTON BLVD	43RD ST	27	58	41.30	93	2	19	3.06	56	-
NOR	GRANBY ST	DELAWARE AVE	26	60	51.84	63	2	19	3.99	39	-
NOR	GRANBY ST	LITTLE CREEK RD	26	60	31.11	130	0	107	0.00	107	-
NOR	GRANBY ST	WILLOW WOOD DR	26	60	36.41	106	2	19	2.80	66	-
NOR	SEWELLS POINT RD	ROBIN HOOD RD	26	60	78.19	24	0	107	0.00	107	-
NOR	VIRGINIA BEACH BLVD	GRANBY ST	26	60	109.09	10	1	55	4.20	37	49
NOR	CAMPOSTELLA RD	INDIAN RIVER RD	25	65	39.82	95	5	4	7.96	10	-
NOR	ST PAULS BLVD	CITY HALL AVE	25	65	25.70	148	1	55	1.03	104	-
NOR	27TH ST	COLONIAL AVE	24	67	97.70	15	0	107	0.00	107	30
NOR	BRAMBLETON AVE	BOUSH ST	24	67	31.45	124	1	55	1.31	100	-
NOR	COLLEY AVE	43RD ST	24	67	73.84	31	1	55	3.08	55	-
NOR	NORTHAMPTON BLVD	KEMPSVILLE RD/USAA DR	24	67	33.18	118	2	19	2.77	67	-
NOR	PRINCESS ANNE RD	INGLESIDE RD	24	67	37.47	101	1	55	1.56	92	-
NOR	OCEAN VIEW AVE	CHESAPEAKE BLVD	23	72	65.50	38	1	55	2.85	63	40
NOR	27TH ST	LLEWELLYN AVE	22	73	46.19	81	1	55	2.10	83	22
NOR	BRAMBLETON AVE	DUKE ST	22	73	34.32	112	1	55	1.56	93	-
NOR	GRANBY ST	BAY AVE	22	73	55.65	53	1	55	2.53	77	-
NOR	VIRGINIA BEACH BLVD	KEMPSVILLE RD	22	73	28.18	138	2	19	2.56	75	-
NOR	CHURCH ST	26TH ST	21	77	41.18	94	0	107	0.00	107	-
NOR	COLLEY AVE	21ST ST	21	77	55.89	51	1	55	2.66	71	-
NOR	HAMPTON BLVD	AZALEA CT	21	77	31.20	128	0	107	0.00	107	-
NOR	LITTLE CREEK RD	SEWELLS POINT RD	21	77	43.18	88	0	107	0.00	107	-
NOR	VIRGINIA BEACH BLVD	PARK AVE	21	77	42.63	90	1	55	2.03	85	-
NOR	CHESAPEAKE BLVD	JOHNSTONS RD	20	82	34.14	113	0	107	0.00	107	-
NOR	CHESAPEAKE BLVD	SHEPPARD AVE	20	82	47.42	74	0	107	0.00	107	45
NOR	GRANBY ST	BAYVIEW BLVD	20	82	52.92	61	0	107	0.00	107	-
NOR	VIRGINIA BEACH BLVD	AZALEA GARDEN RD	20	82	31.84	121	1	55	1.59	91	-
NOR	VIRGINIA BEACH BLVD	INGLESIDE RD	20	82	29.72	133	2	19	2.97	59	-
NOR	GRANBY ST	KINGSLEY LN	19	87	26.80	144	1	55	1.41	98	-
NOR	KEMPSVILLE RD/PRINCESS ANNE RD	NEWTOWN RD	19	87	27.56	142	0	107	0.00	107	-
NOR	MONTICELLO AVE	18TH ST	19	87	47.54	73	0	107	0.00	107	-
NOR	VIRGINIA BEACH BLVD	GLENROCK RD	19	87	29.70	134	2	19	3.13	52	-
NOR	21ST ST	GRANBY ST	18	91	62.66	42	0	107	0.00	107	42
NOR	CHESAPEAKE BLVD	LAFAYETTE BLVD/BALLENTINE BLVD	18	91	49.41	69	0	107	0.00	107	-
NOR	INDIAN RIVER RD	WILSON RD	18	91	53.37	58	1	55	2.97	60	-
NOR	LAFAYETTE BLVD	LINDENWOOD AVE	18	91	53.96	55	2	19	6.00	18	-
NOR	PRINCESS ANNE RD	COLLEY AVE	18	91	54.73	54	1	55	3.04	57	-
NOR	ADMIRAL TAUSSIG BLVD	HAMPTON BLVD	17	96	27.64	141	0	107	0.00	107	-
NOR	COLLEY AVE	38TH ST	17	96	47.28	76	0	107	0.00	107	-
NOR	HAMPTON BLVD	35TH ST	17	96	34.47	109	2	19	4.06	38	-
NOR	HAMPTON BLVD	BOLLING AVE	17	96	29.25	135	2	19	3.44	47	-
NOR	BRAMBLETON AVE	COLLEY AVE	16	100	22.86	150	1	55	1.43	97	-

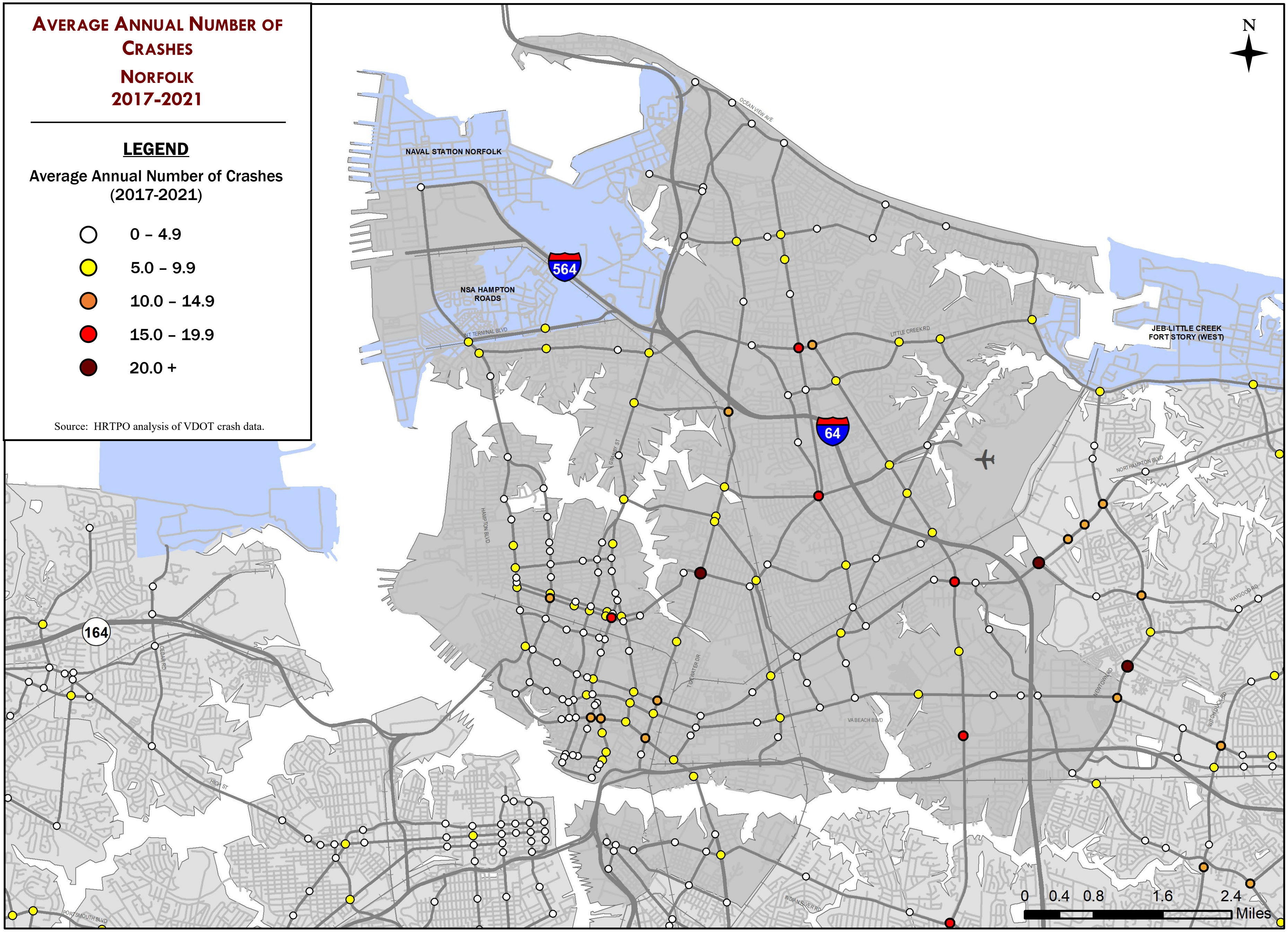
NORFOLK (CONTINUED)

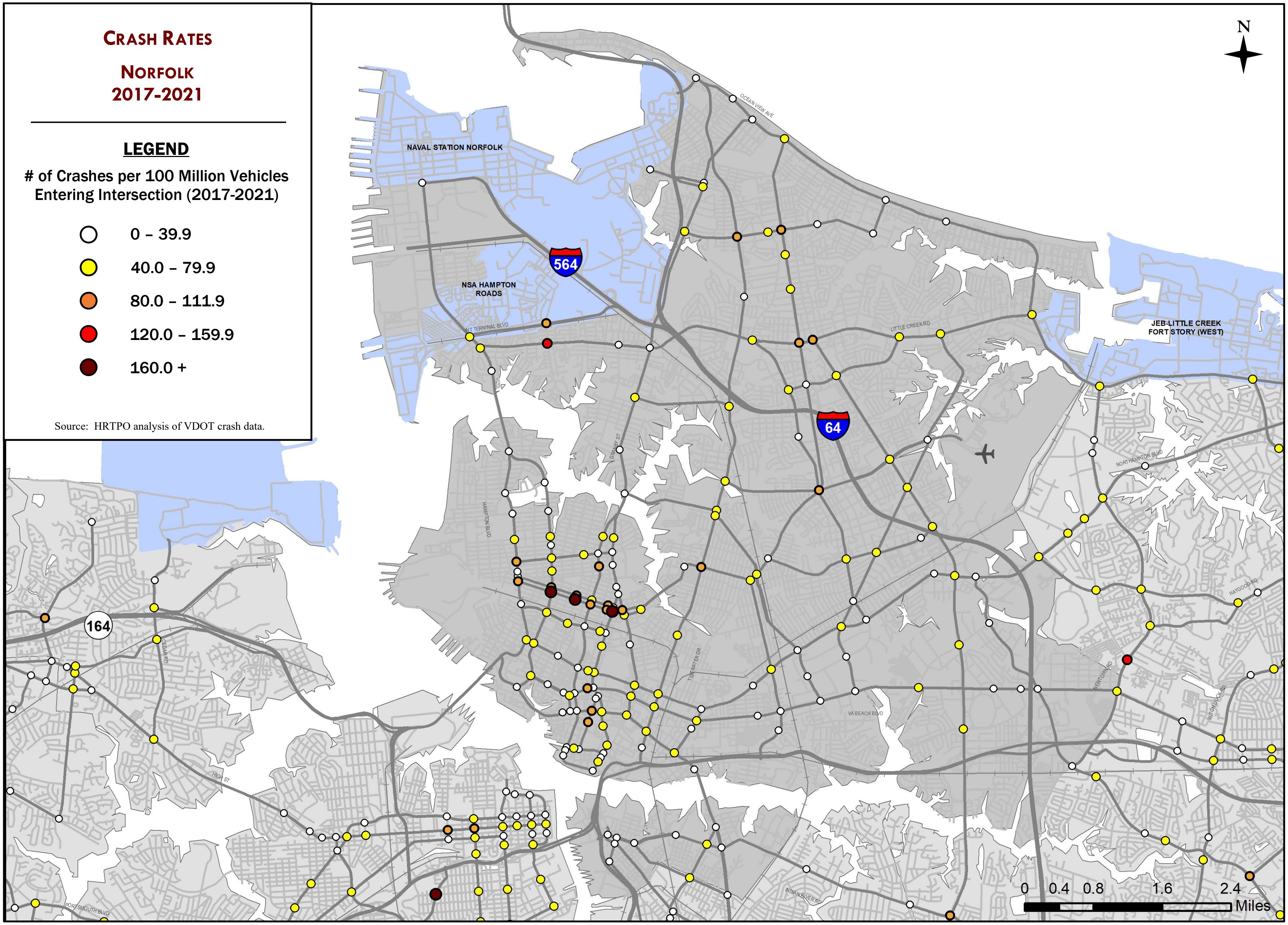
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
NOR	CHURCH ST	18TH ST	16	100	37.76	100	0	107	0.00	107	-
NOR	COLLEY AVE	35TH ST	16	100	59.28	47	3	12	11.11	2	-
NOR	COLLEY AVE	OLNEY RD	16	100	45.76	82	2	19	5.72	20	-
NOR	GRANBY ST	38TH ST	16	100	32.54	119	1	55	2.03	84	-
NOR	HAMPTON BLVD	49TH ST	16	100	27.74	140	0	107	0.00	107	-
NOR	LLEWELLYN AVE	35TH ST	16	100	91.42	18	2	19	11.43	1	-
NOR	NORVIEW AVE	AZALEA GARDEN RD	16	100	34.79	108	0	107	0.00	107	-
NOR	BERKLEY AVE	STATE ST	15	108	37.43	102	0	107	0.00	107	-
NOR	DUKE ST/VIRGINIA BEACH BLVD	OLNEY RD	15	108	69.36	34	1	55	4.62	31	-
NOR	MONTICELLO AVE	27TH ST	15	108	31.54	123	1	55	2.10	82	12
NOR	PRINCESS ANNE RD	GRANBY ST	15	108	49.57	68	0	107	0.00	107	-
NOR	21ST ST	COLONIAL AVE	14	112	45.12	83	0	107	0.00	107	-
NOR	MONTICELLO AVE	21ST ST	14	112	33.96	114	1	55	2.43	78	-
NOR	OCEAN VIEW AVE	FIRST VIEW ST	14	112	36.55	103	2	19	5.22	23	-
NOR	PRINCESS ANNE RD	PARK AVE/LEAD ST	14	112	34.42	110	3	12	7.37	11	-
NOR	ST PAULS BLVD	MONTICELLO AVE	14	112	31.75	122	0	107	0.00	107	-
NOR	CHURCH ST	GRANBY ST	13	117	33.30	117	1	55	2.56	75	-
NOR	SEWELLS POINT RD	JOHNSTONS RD	13	117	63.04	41	1	55	4.85	27	-
NOR	TIDEWATER DR	CHARLOTTE ST	13	117	29.18	137	1	55	2.24	80	-
NOR	LLEWELLYN AVE	DELAWARE AVE	12	120	44.34	85	0	107	0.00	107	-
NOR	OCEAN VIEW AVE	CAPE VIEW AVE	12	120	36.45	104	1	55	3.04	58	-
NOR	PRINCESS ANNE RD	MERRIMAC AVE	12	120	36.42	105	0	107	0.00	107	47
NOR	ST PAULS BLVD	MAIN ST	12	120	55.82	52	0	107	0.00	107	-
NOR	VIRGINIA BEACH BLVD	POPLAR HALL DR	12	120	19.09	156	0	107	0.00	107	-
NOR	WATERSIDE DR	ST PAULS BLVD/WATER ST	12	120	25.76	147	0	107	0.00	107	-
NOR	21ST ST	LLEWELLYN AVE	11	126	35.88	107	0	107	0.00	107	-
NOR	AZALEA GARDEN RD	SEWELLS POINT RD	11	126	39.71	97	2	19	7.22	12	-
NOR	BAYVIEW BLVD	OLD OCEAN VIEW RD	11	126	50.07	65	0	107	0.00	107	-
NOR	BERKLEY AVE	SOUTH MAIN ST	11	126	43.68	87	0	107	0.00	107	-
NOR	CHESAPEAKE BLVD	ROBIN HOOD RD	11	126	29.96	132	1	55	2.72	68	-
NOR	HAMPTON BLVD	NORTH SHORE RD	11	126	19.48	155	0	107	0.00	107	-
NOR	LITTLE CREEK RD	NEWPORT AVE	11	126	27.83	139	2	19	5.06	24	-
NOR	LLEWELLYN AVE	38TH ST	11	126	39.81	96	0	107	0.00	107	-
NOR	MONTICELLO AVE	CHARLOTTE ST	11	126	115.69	8	1	55	10.52	3	-
NOR	AZALEA GARDEN RD	ROBIN HOOD RD	10	135	41.51	92	0	107	0.00	107	-
NOR	AZALEA GARDEN RD	VILLAGE AVE	10	135	39.42	99	0	107	0.00	107	-
NOR	CAMPOSTELLA RD	WILSON RD	10	135	14.02	167	0	107	0.00	107	-
NOR	CITY HALL AVE	GRANBY ST	10	135	53.72	56	1	55	5.37	22	-
NOR	LAFAYETTE BLVD	NORWAY PL	10	135	31.40	126	0	107	0.00	107	-
NOR	WILSON RD/22ND ST	BERKLEY AVE EXT	10	135	49.77	67	1	55	4.98	25	
NOR	38TH ST	COLONIAL AVE	9	141	47.33	75	0	107	0.00	107	-
NOR	BALLENTINE BLVD	CORPREW AVE	9	141	20.19	154	1	55	2.24	81	-
NOR	KEMPSVILLE RD	LOWERY RD	9	141	33.73	116	0	107	0.00	107	-
NOR	OCEAN VIEW AVE	FOURTH VIEW ST	9	141	31.43	125	1	55	3.49	46	-
NOR	COLLEY AVE	41ST ST	8	145	33.81	115	0	107	0.00	107	-
NOR	HAMPTON BLVD	JAMESTOWN CRESCENT	8	145	13.02	169	0	107	0.00	107	-
NOR	MONTICELLO AVE	VA BEACH BLVD	8	145	13.99	168	0	107	0.00	107	-
NOR	COLLEY AVE	49TH ST	7	148	26.93	143	0	107	0.00	107	-
NOR	HAMPTON BLVD	27TH ST	7	148	10.87	171	1	55	1.55	94	-
NOR	INGLESIDE RD	VILLAGE AVE	7	148	22.97	149	0	107	0.00	107	-

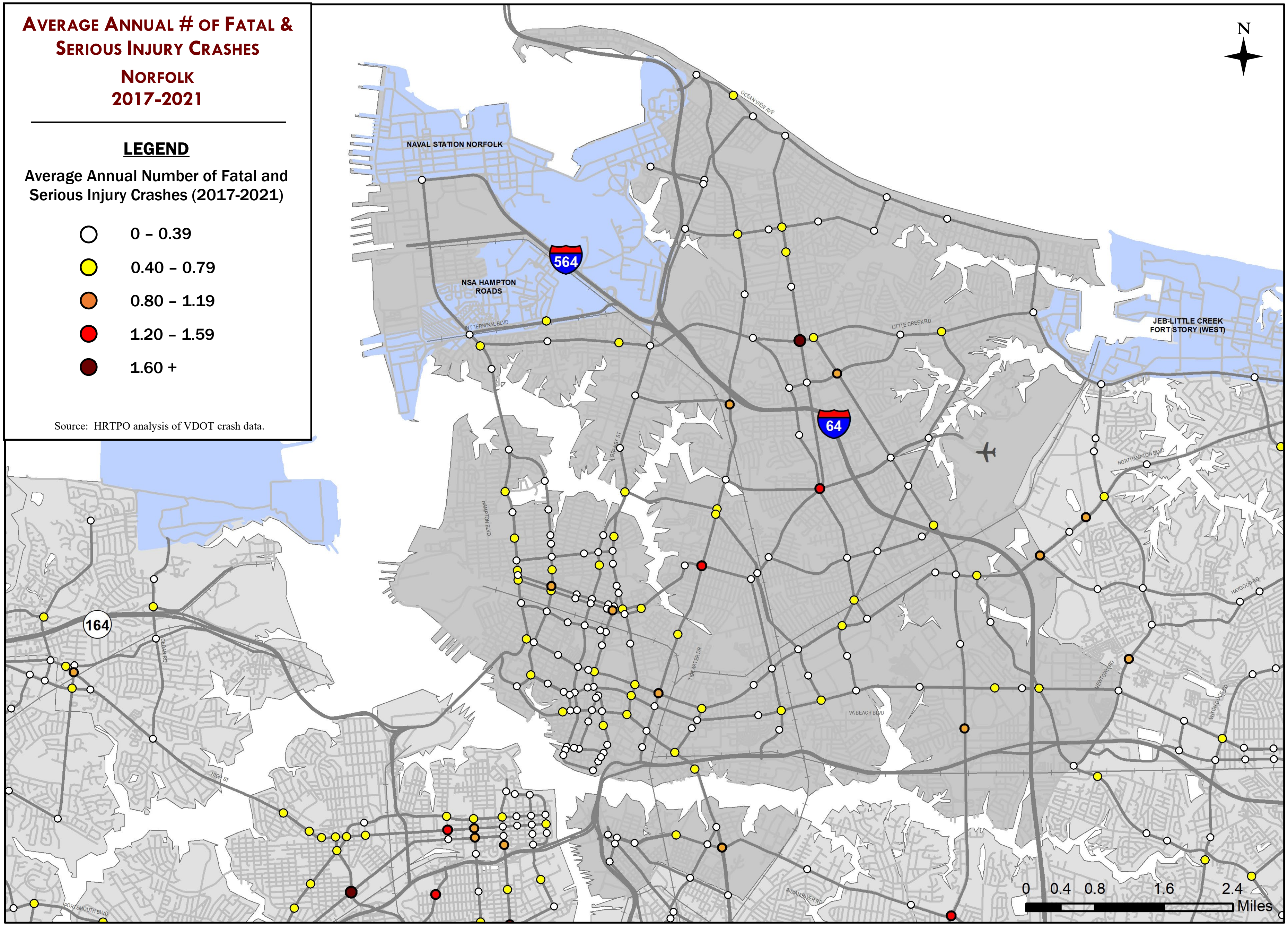
NORFOLK (CONTINUED)

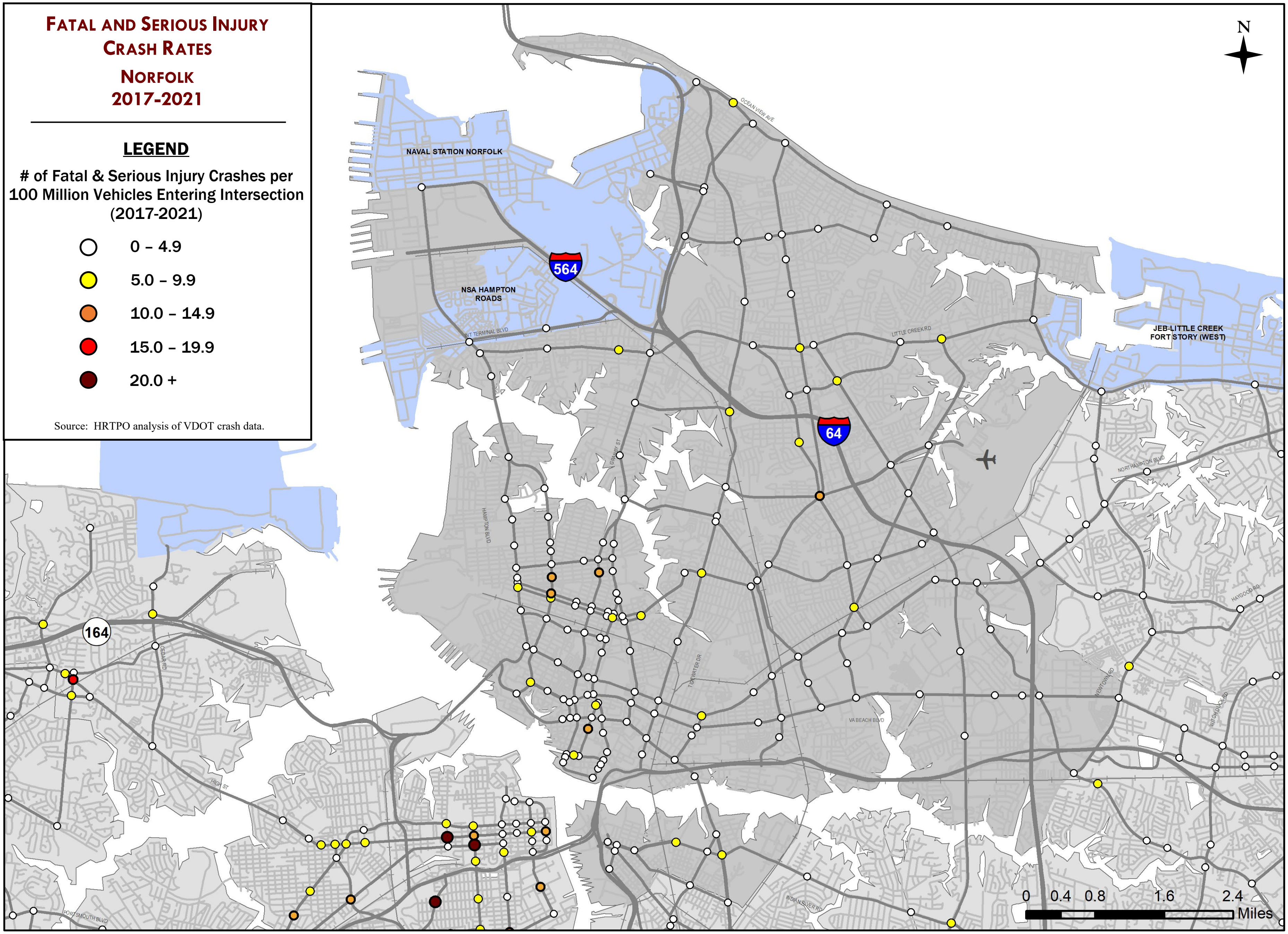
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
NOR	OCEAN VIEW AVE	GRANBY ST	7	148	17.94	160	0	107	0.00	107	-
NOR	PRINCESS ANNE RD	KILMER LN	7	148	19.00	157	1	55	2.71	70	-
NOR	PRINCESS ANNE RD	SEWELLS POINT RD	7	148	14.37	166	0	107	0.00	107	-
NOR	ST PAULS BLVD	PLUME ST	6	154	32.23	120	0	107	0.00	107	-
NOR	VIRGINIA BEACH BLVD	MERRIMAC AVE	6	154	18.57	158	0	107	0.00	107	-
NOR	BAY AVE	FIRST VIEW ST	5	156	17.46	162	0	107	0.00	107	-
NOR	BRAMBLETON AVE	YARMOUTH ST	5	156	8.81	177	2	19	3.52	45	-
NOR	GRANBY ST	35TH ST	5	156	10.76	172	0	107	0.00	107	-
NOR	LLEWELLYN AVE	PRINCESS ANNE RD	5	156	15.59	164	0	107	0.00	107	-
NOR	OLNEY RD	COLONIAL AVE	5	156	22.24	152	1	55	4.45	33	-
NOR	PRINCESS ANNE RD	COLONIAL AVE	5	156	18.26	159	0	107	0.00	107	-
NOR	ROBIN HOOD RD	KILMER LN	5	156	22.77	151	0	107	0.00	107	-
NOR	S MAIN ST	LIBERTY ST	5	156	31.20	127	0	107	0.00	107	-
NOR	TIDEWATER DR	SHEPPARD AVE	5	156	15.27	165	0	107	0.00	107	-
NOR	BAYVIEW BLVD	STURGIS RD	4	165	34.41	111	0	107	0.00	107	-
NOR	BERKLEY AVE/INDIAN RIVER RD	INDIAN RIVER RD/MARSH ST	4	165	17.70	161	2	19	8.85	8	-
NOR	BOUSH ST	MAIN ST	4	165	9.46	175	0	107	0.00	107	-
NOR	BOUSH ST	PLUME ST	4	165	10.42	173	1	55	2.60	72	-
NOR	BOUSH ST/LLEWELLYN AVE	VA BEACH BLVD	4	165	15.86	163	0	107	0.00	107	-
NOR	CHURCH ST	MONTICELLO AVE	4	165	11.24	170	0	107	0.00	107	-
NOR	CITY HALL AVE	MONTICELLO AVE	4	165	26.60	145	0	107	0.00	107	-
NOR	S MAIN ST	BAINBRIDGE BLVD	4	165	30.74	131	0	107	0.00	107	-
NOR	SEWELLS POINT RD	PHILPOTTS RD	4	165	26.15	146	1	55	6.54	17	-
NOR	COLLEY AVE	BOLLING AVE	3	174	20.32	153	0	107	0.00	107	-
NOR	GRANBY ST	OCEAN AVE	3	174	7.72	179	0	107	0.00	107	-
NOR	MONTICELLO AVE	OLNEY RD	3	174	29.22	136	1	55	9.74	6	-
NOR	OCEAN VIEW AVE	SIXTH BAY ST	3	174	9.27	176	1	55	3.09	53	-
NOR	BERKLEY AVE	BERKLEY AVE EXT/FAUQUIER ST	2	178	8.56	178	0	107	0.00	107	-
NOR	BOUSH ST	CITY HALL AVE	2	178	4.89	182	0	107	0.00	107	-
NOR	PARK AVE	CORPREW AVE	2	178	7.20	180	0	107	0.00	107	-
NOR	BAYVIEW BLVD	CAPE VIEW AVE	1	181	10.39	174	0	107	0.00	107	-
NOR	OLNEY RD	MOWBRAY ARCH	1	181	5.82	181	0	107	0.00	107	-

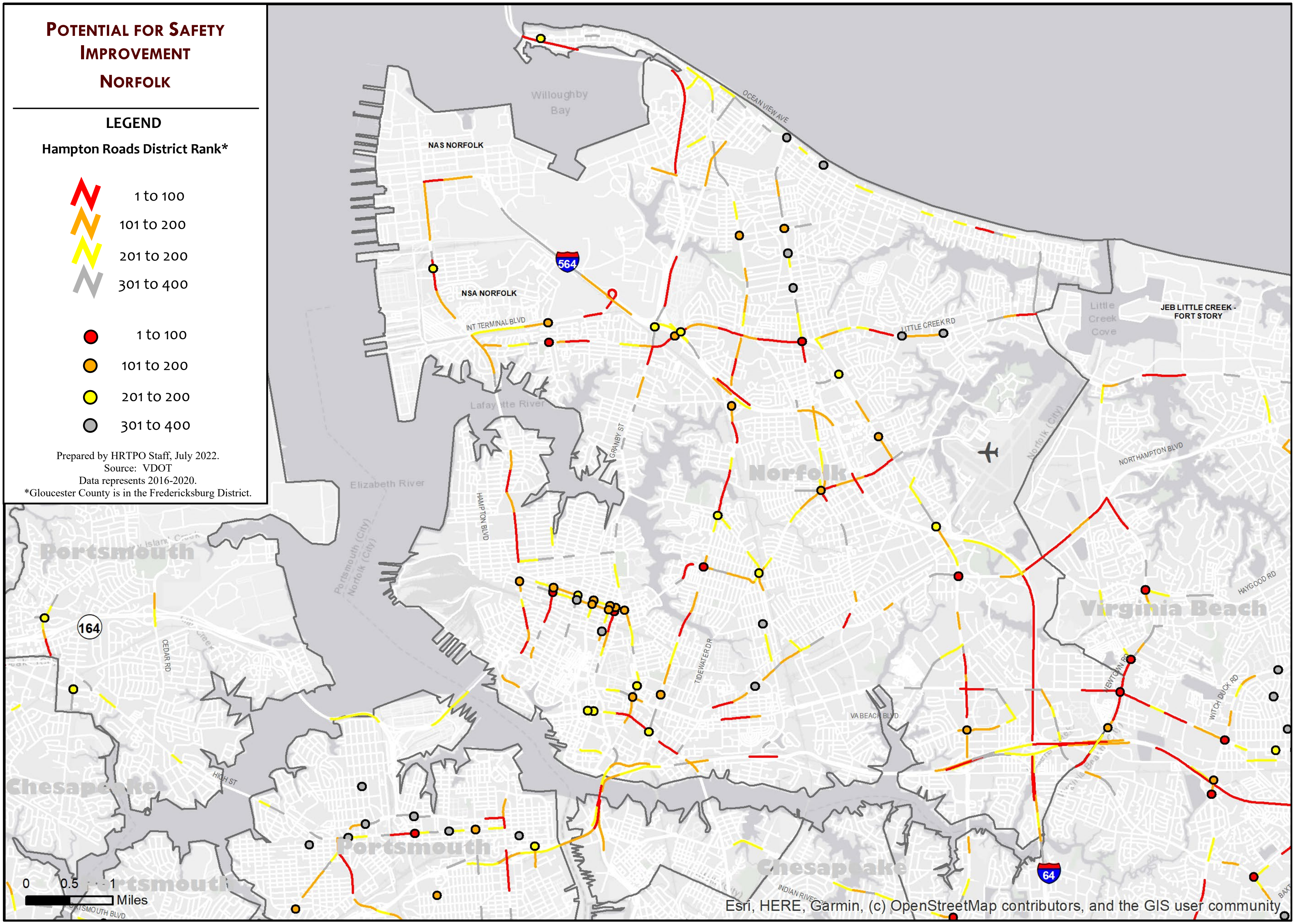
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

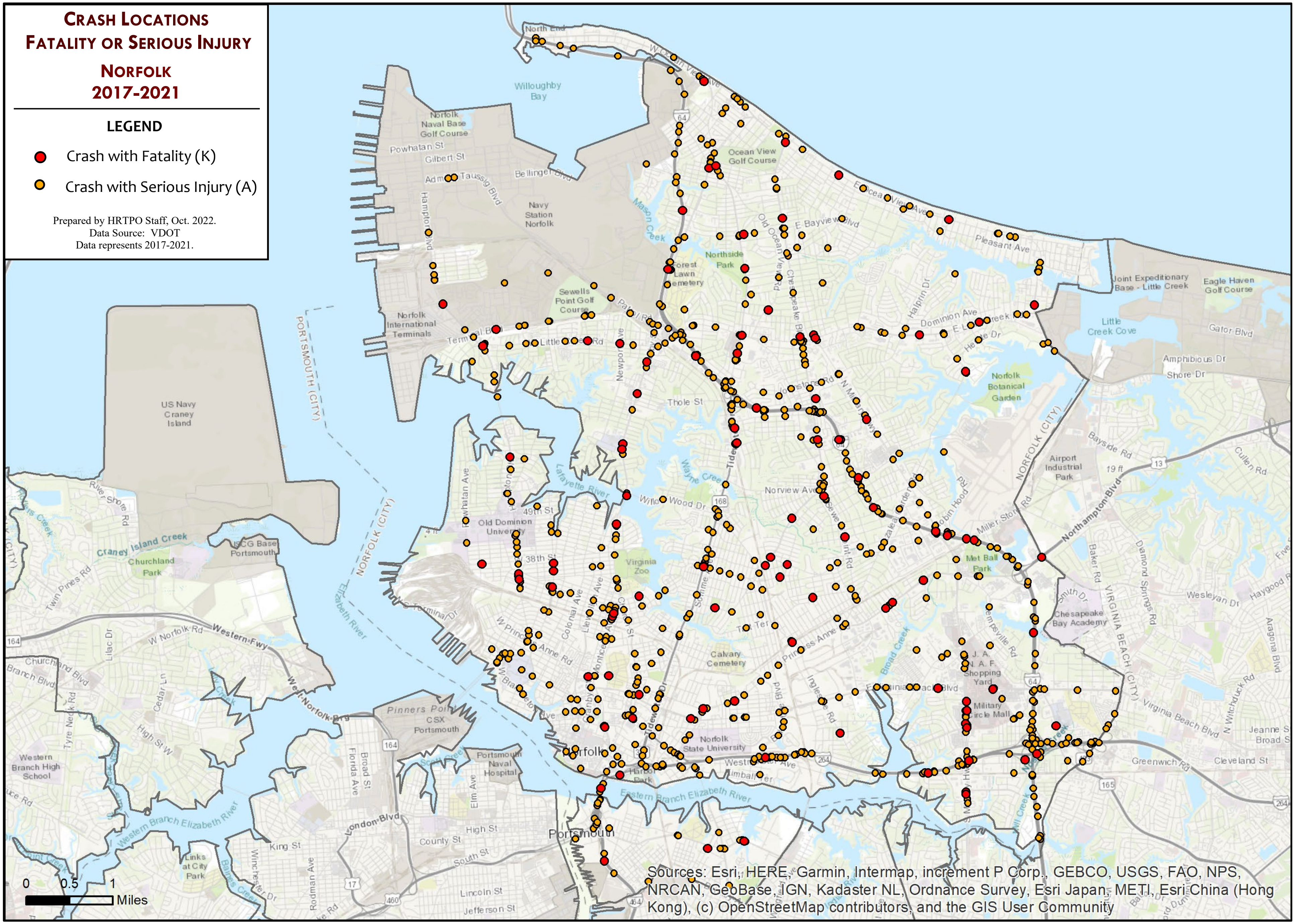

AVERAGE ANNUAL NUMBER OF CRASHES
NORFOLK
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
NAVAL STATION NORFOLK
NSA HAMPTON ROADS
JEB-LITTLE CREEK FORT STORY (WEST)
564
64
164
N
0 0.4 0.8 1.6 2.4 Miles


CRASH RATES
NORFOLK
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
NAVAL STATION NORFOLK
NSA HAMPTON ROADS
JEB-LITTLE CREEK FORT STORY (WEST)
564
64
164
N
0 0.4 0.8 1.6 2.4 Miles


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
NORFOLK
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
NAVAL STATION NORFOLK
NSA HAMPTON ROADS
JEB-LITTLE CREEK FORT STORY (WEST)
564
64
164
OCEAN VIEW AVE
LITTLE CREEK RD
NORTHAMPTON BLVD
VA BEACH BLVD
0 0.4 0.8 1.6 2.4 Miles


FATAL AND SERIOUS INJURY CRASH RATES
NORFOLK
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
NAVAL STATION NORFOLK
NSA HAMPTON ROADS
JEB-LITTLE CREEK FORT STORY (WEST)
564
64
164
0 0.4 0.8 1.6 2.4 Miles

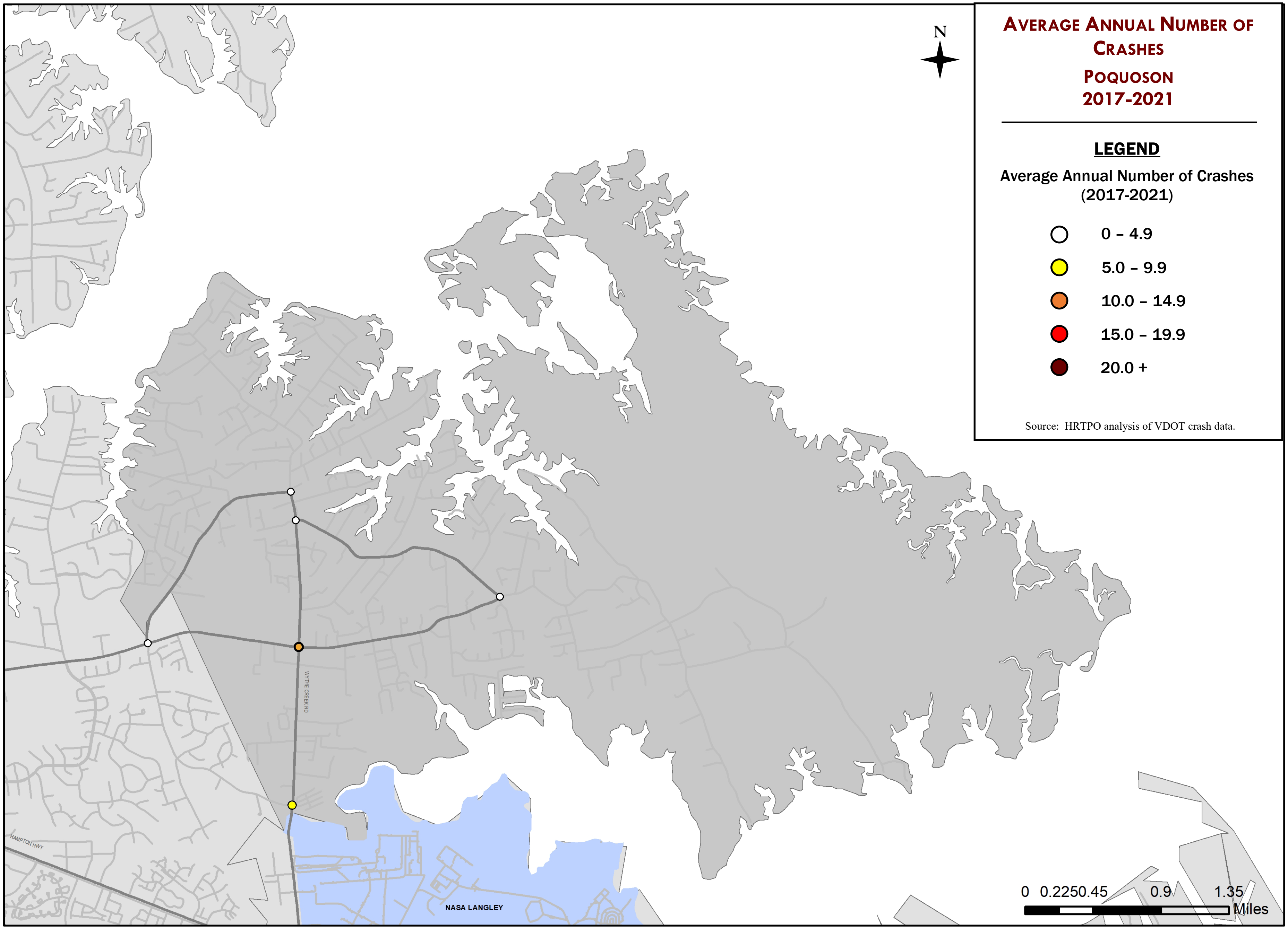

Potential for Safety Improvement
Norfolk
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
Willoughby Bay
NAS NORFOLK
NSA NORFOLK
OCEAN VIEW AVE
564
INT TERMINAL BLVD
LITTLE CREEK RD
Little Creek Cove
JEB LITTLE CREEK - FORT STORY
Lafayette River
Elizabeth River
GRANBY ST
HAMPTON BLVD
Norfolk
NORTHAMPTON BLVD
HAYGOOD RD
Virginia Beach
Portsmouth
164
CEDAR RD
TIDEWATER DR
VA BEACH BLVD
WITCH DUCK RD
HIGH ST
Chesapeake
Portsmouth
Chesapeake
64
INDIAN RIVER RD
0 0.5 1
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

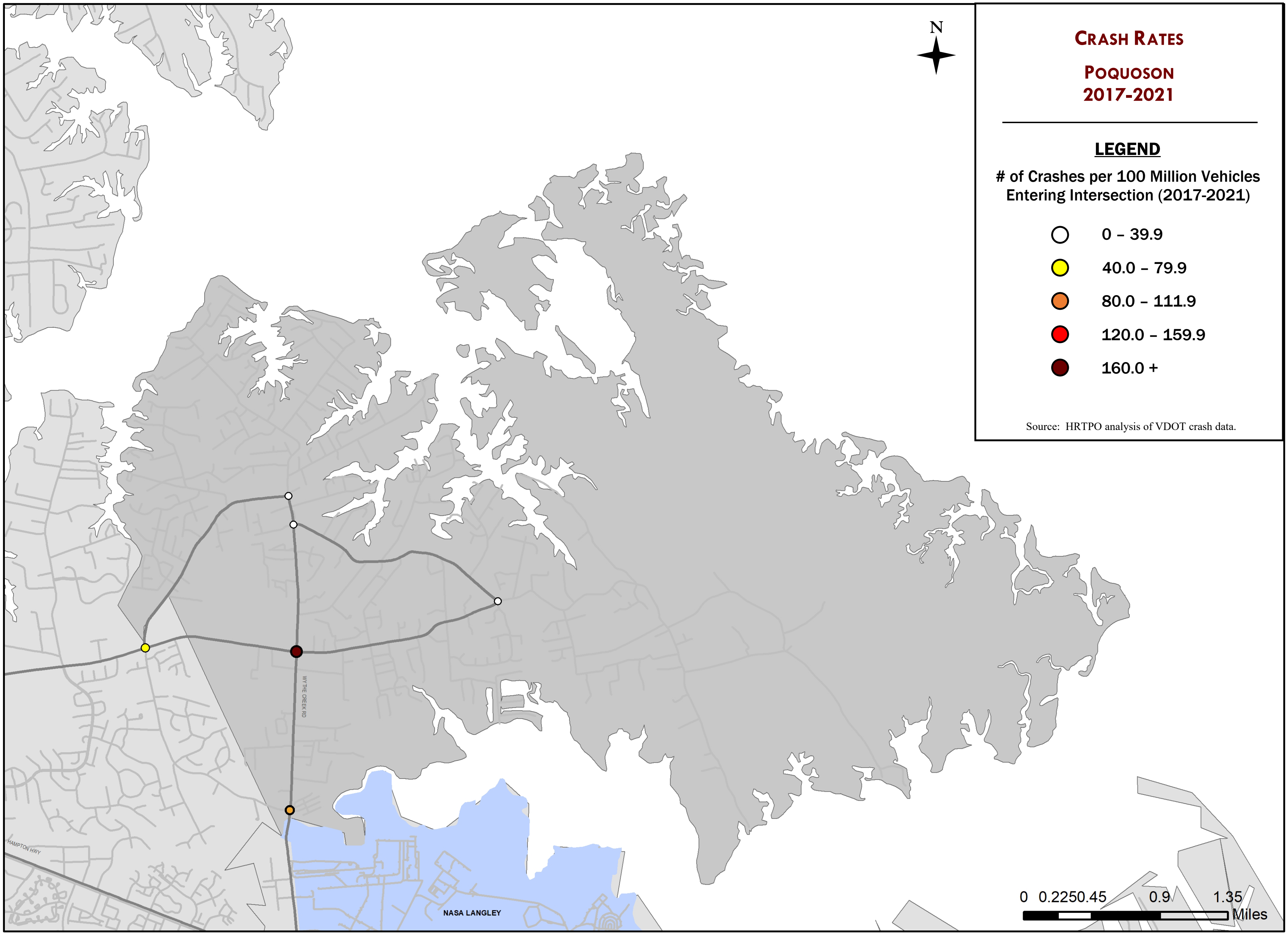

CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
NORFOLK
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
0 0.5 1 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

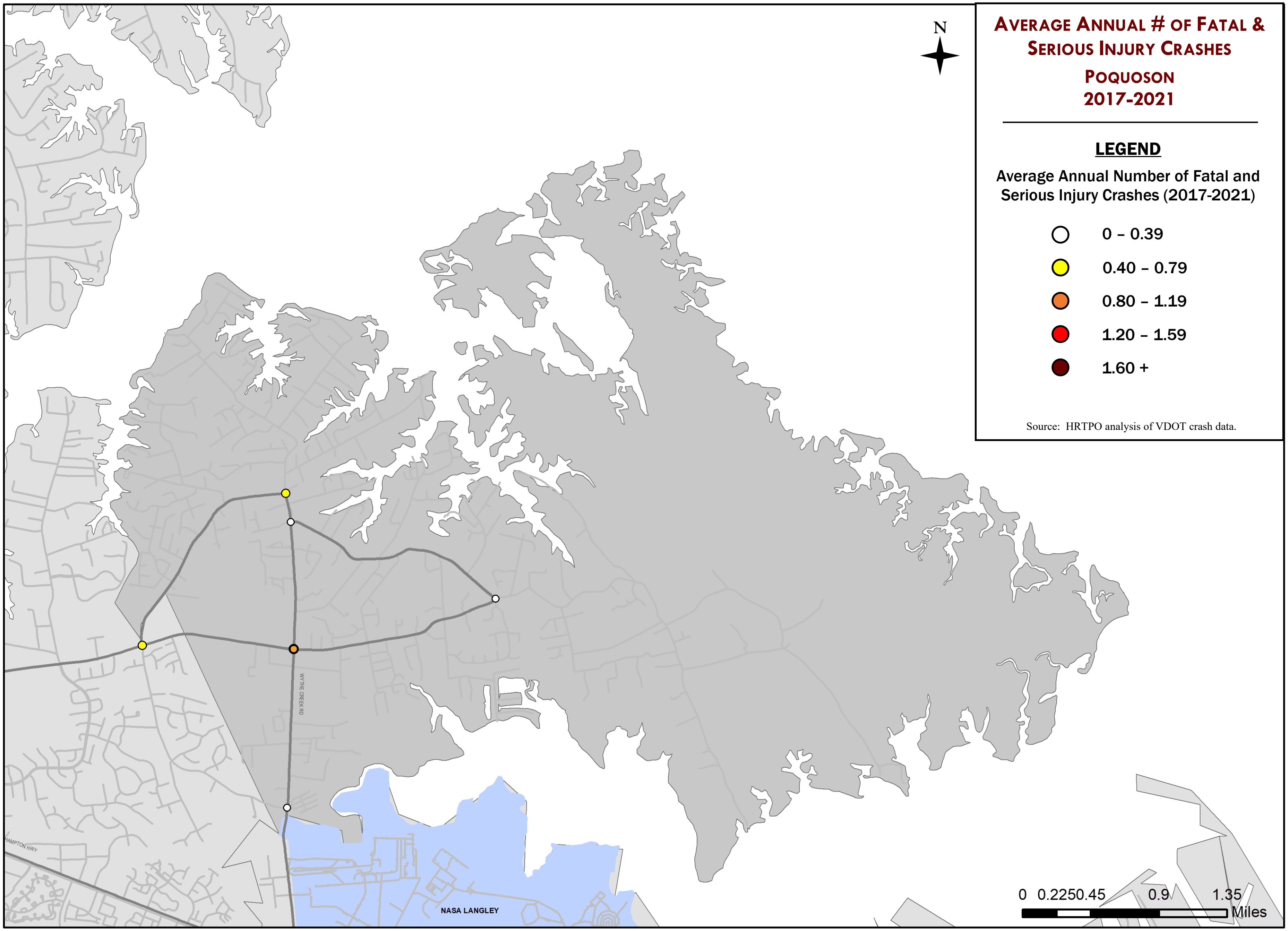
Poquoson

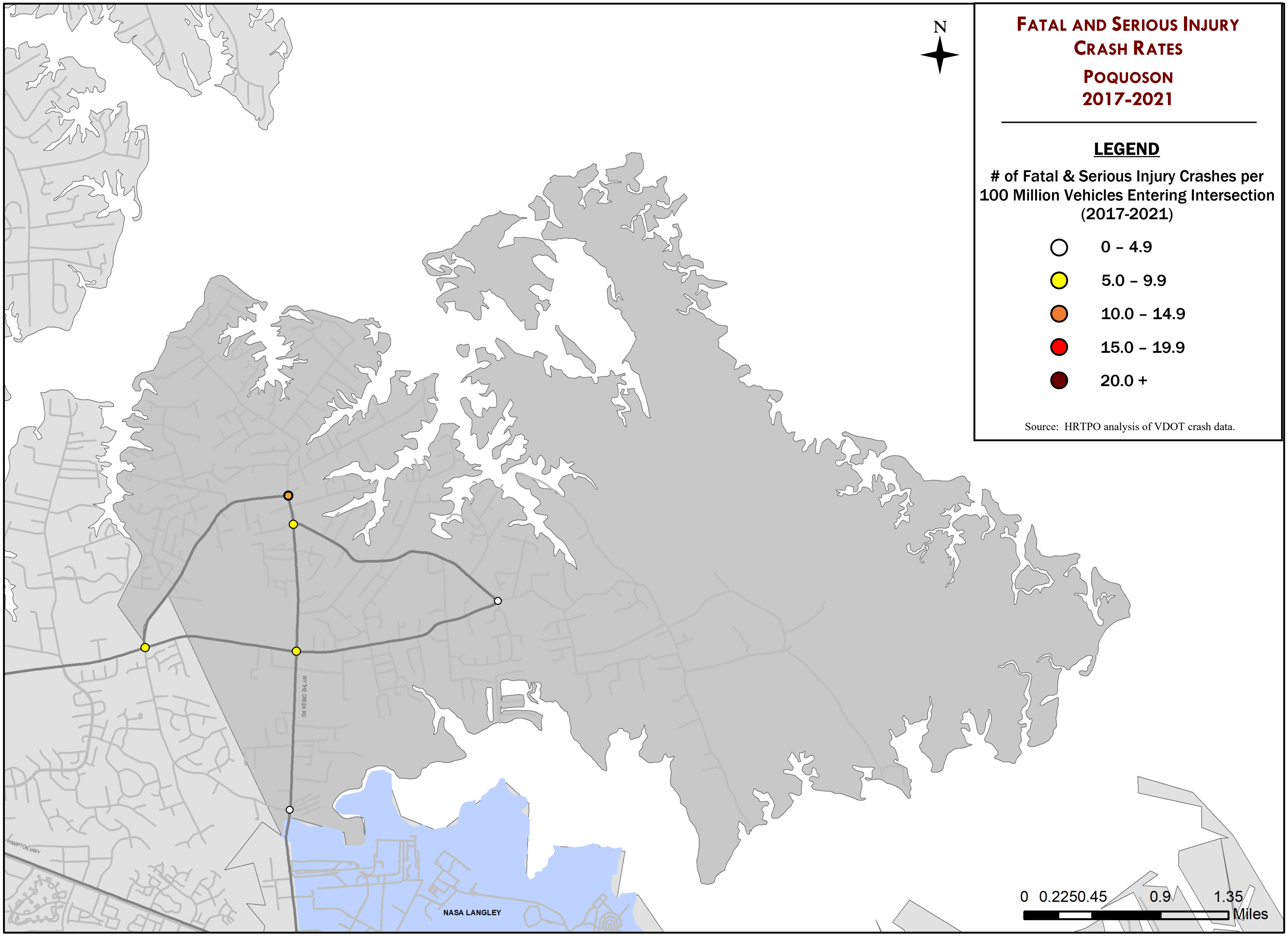
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
POQ	WYTHE CREEK RD	VICTORY BLVD/LITTLE FLORIDA RD	71	1	169.22	1	4	1	9.53	2	1
POQ	WYTHE CREEK RD	CARYS CHAPEL RD	26	2	101.25	2	1	3	3.89	4	2
POQ	HUNT'S NECK RD/EAST YORKTOWN RD	EAST YORKTOWN RD	6	3	38.59	3	2	2	12.86	1	-
POQ	EAST YORKTOWN RD/WYTHE CREEK RD	POQUOSON AVE/KELSOR DR	5	4	31.80	4	1	3	6.36	3	-
POQ	LITTLE FLORIDA RD	POQUOSON AVE	3	5	19.48	5	0	5	0.00	5	-

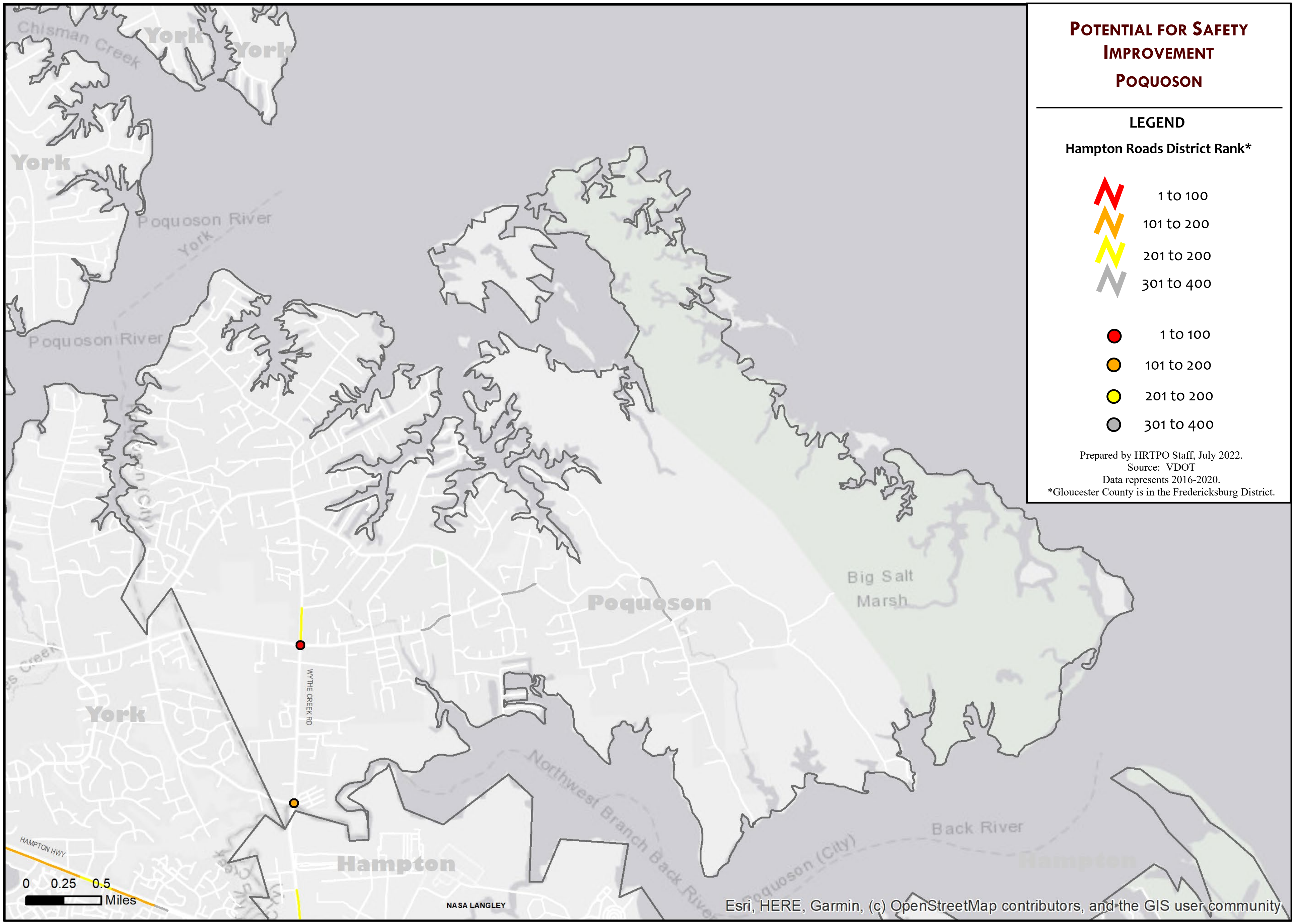
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

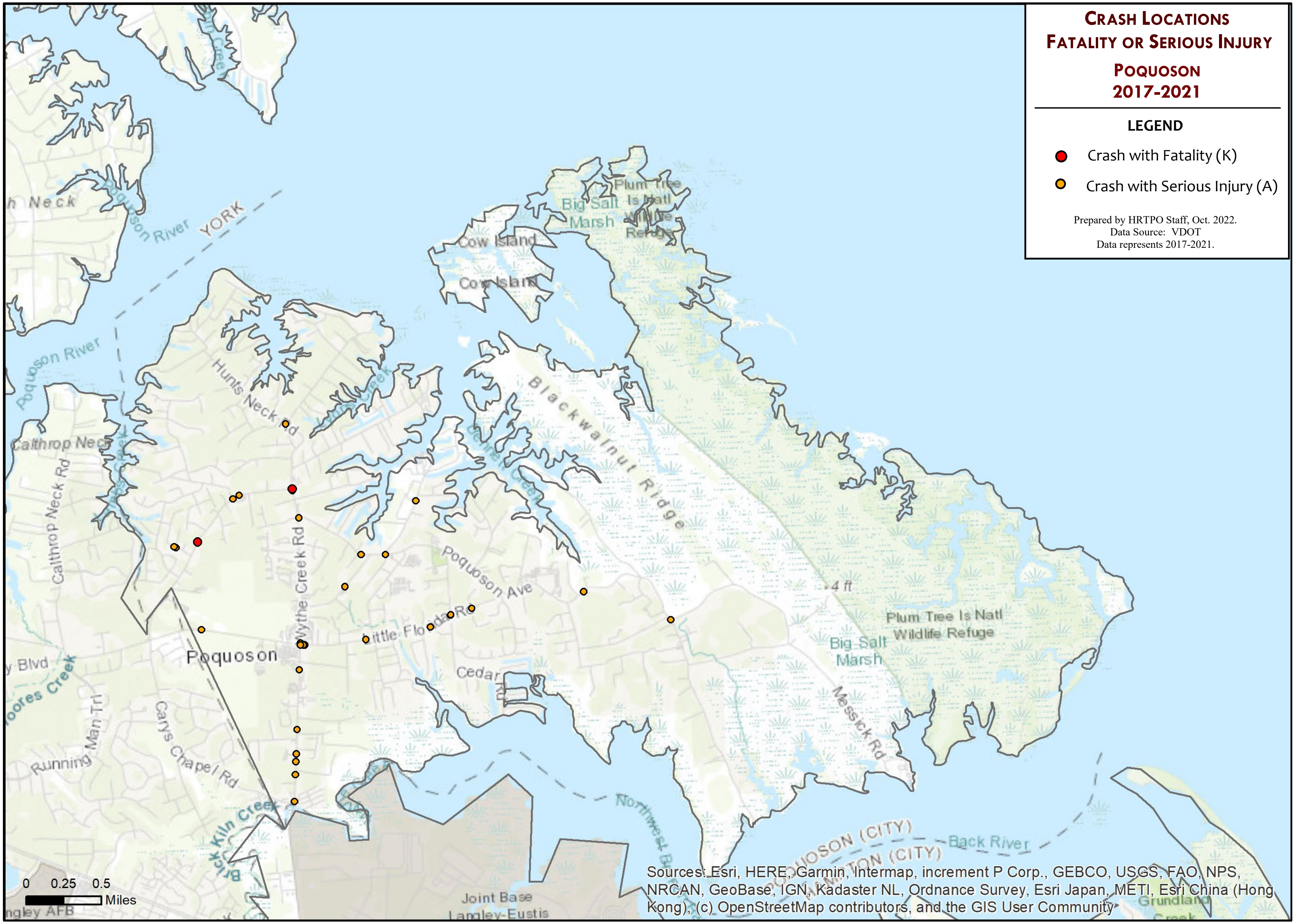

N
AVERAGE ANNUAL NUMBER OF CRASHES
POQUOSON
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
WYTHE CREEK RD
HAMPTON HWY
NASA LANGLEY
0 0.2250.45 0.9 1.35 Miles


N
CRASH RATES
POQUOSON
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
NASA LANGLEY
0 0.2250.45 0.9 1.35
Miles


Average Annual # of Fatal & Serious Injury Crashes
Poquoson
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
NASA LANGLEY
0 0.2250.45 0.9 1.35
Miles


Fatal and Serious Injury
Crash Rates
Poquoson
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
WYTHE CREEK RD
HAMPTON HWY
NASA LANGLEY
0 0.2250.45 0.9 1.35
Miles


POTENTIAL FOR SAFETY IMPROVEMENT
POQUOSON
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
Chisman Creek
York
Poquoson River
Poquoson
Big Salt
Marsh
WYTHE CREEK RD
Hampton
Northwest Branch Back River
Back River
Poquoson (City)
NASA LANGLEY
HAMPTON HWY
0 0.25 0.5
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community



CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
POQUOSON
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
YORK
Poquoson River
Cow Island
Big Salt Marsh
Plum Tree Is Natl Wildlife Refuge
Hunts Neck Rd
Wythe Creek Rd
Blackwalnut Ridge
Poquoson Ave
Little Florida Rd
Cedar Rd
Messick Rd
Calthrop Neck Rd
Carys Chapel Rd
Running Man Trl
Brick Kiln Creek
Poquoson
Back River
Joint Base Langley-Eustis
0 0.25 0.5
Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

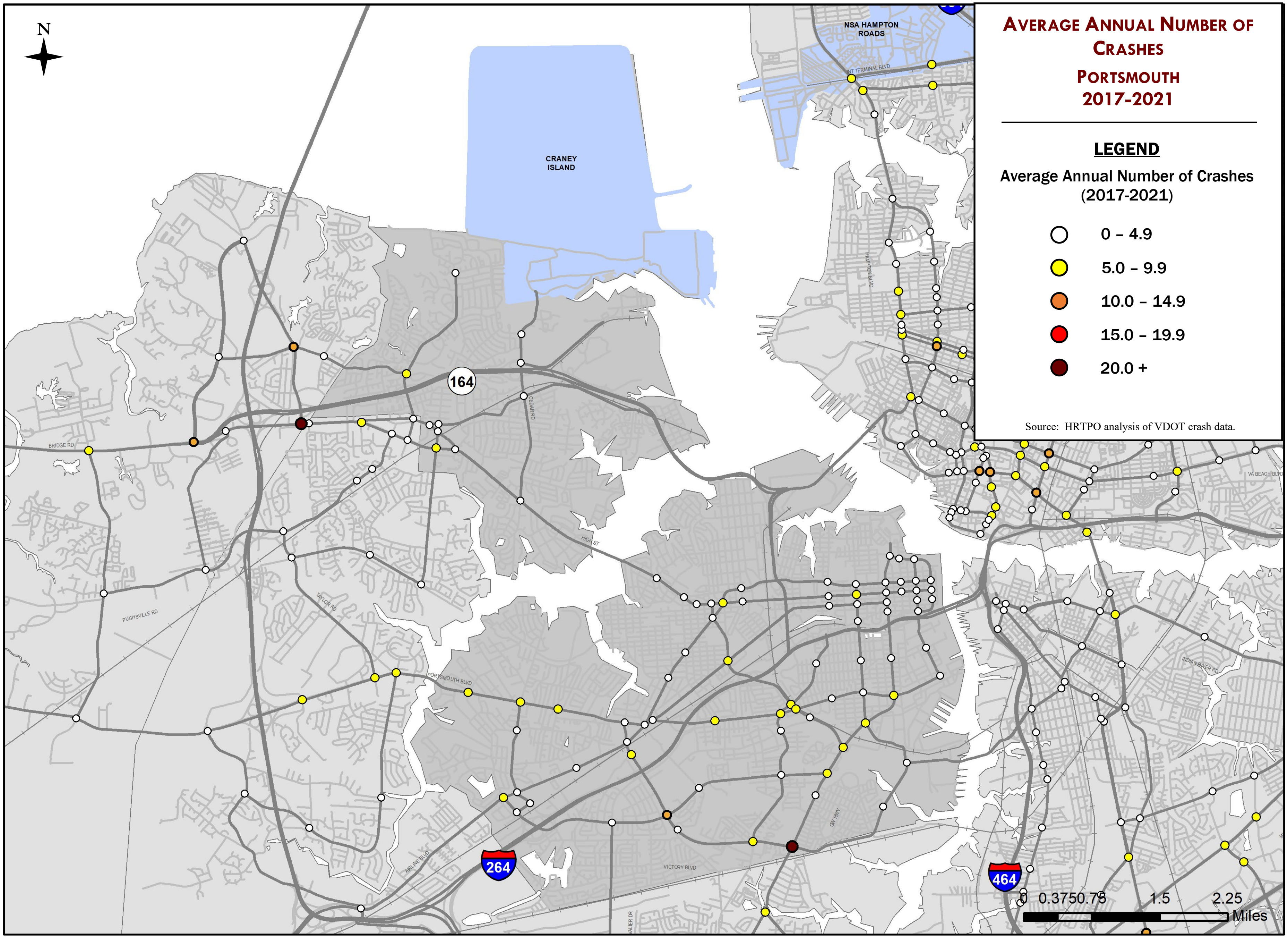
PORTSMOUTH

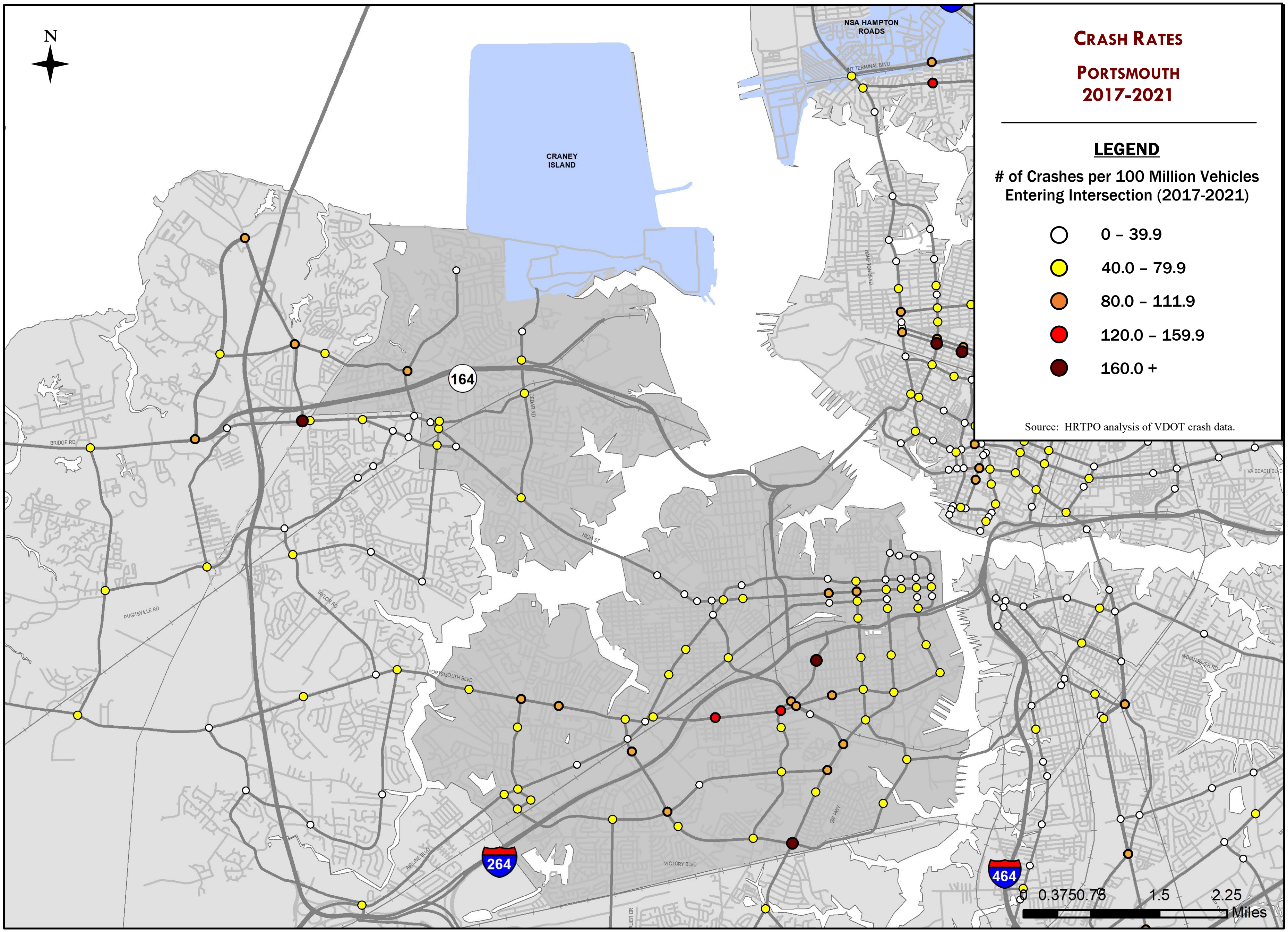
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
PORT	GEORGE WASHINGTON HWY	VICTORY BLVD	142	1	191.69	1	15	1	20.25	6	1
PORT	VICTORY BLVD	GREENWOOD DR	57	2	118.62	5	4	15	8.32	32	2
PORT	FREDERICK BLVD	DEEP CREEK BLVD	49	3	107.35	7	6	7	13.15	15	19
PORT	GEORGE WASHINGTON HWY	GREENWOOD DR	48	4	104.62	9	7	4	15.26	10	5
PORT	VICTORY BLVD	ELMHURST LN	46	5	90.15	12	1	52	1.96	63	9
PORT	GEORGE WASHINGTON HWY	FREDERICK BLVD	45	6	88.06	13	5	10	9.78	25	-
PORT	PORTSMOUTH BLVD	DEEP CREEK BLVD	44	7	140.83	3	3	22	9.60	26	6
PORT	TWIN PINES RD/TOWNE POINT RD	TOWNE POINT RD/CENTENARY DR	43	8	109.28	6	3	22	7.62	35	15
PORT	FREDERICK BLVD	PORTSMOUTH BLVD	41	9	101.47	10	5	10	12.37	16	7
PORT	PORTSMOUTH BLVD	ELMHURST LN	40	10	86.53	14	5	10	10.82	24	16
PORT	PORTSMOUTH BLVD	RODMAN AVE	38	11	135.56	4	11	2	39.24	2	10
PORT	AIRLINE BLVD	HIGH ST	36	12	69.85	26	3	22	5.82	43	24
PORT	EFFINGHAM ST/GW HWY	PORTSMOUTH BLVD	33	13	77.91	17	6	7	14.16	13	-
PORT	AIRLINE BLVD	GREENWOOD DR/HODGES FERRY RD	32	14	77.35	18	5	10	12.09	19	21
PORT	PORTSMOUTH BLVD	CITY PARK AVE	32	14	80.91	16	7	4	17.70	7	11
PORT	GEORGE WASHINGTON HWY	ELM AVE	31	16	75.36	19	3	22	7.29	36	-
PORT	HIGH ST	ELM AVE	30	17	106.74	8	4	15	14.23	12	13
PORT	FREDERICK BLVD	TURNPIKE RD	29	18	50.43	45	8	3	13.91	14	-
PORT	VICTORY BLVD	DEEP CREEK BLVD	29	18	68.52	27	3	22	7.09	38	-
PORT	HIGH ST	TYRE NECK RD	28	20	70.90	25	2	35	5.06	51	17
PORT	PORTSMOUTH BLVD	HODGES FERRY RD	27	21	53.76	40	2	35	3.98	56	27
PORT	GEORGE WASHINGTON HWY	AFTON PKWY	24	22	54.75	37	4	15	9.12	27	-
PORT	GREENWOOD DR	GARWOOD AVE	24	22	72.26	23	3	22	9.03	28	18
PORT	CEDAR LN	COAST GUARD BLVD/RTE 164 RAMP	23	24	66.86	29	3	22	8.72	29	-
PORT	EFFINGHAM ST	SOUTH ST	23	24	47.99	48	4	15	8.35	31	-
PORT	GREENWOOD DR	CAVALIER BLVD	22	26	53.46	41	0	64	0.00	64	28
PORT	PORTSMOUTH BLVD	VICTORY BLVD/CALIFORNIA AVE	22	26	58.78	34	2	35	5.34	48	-
PORT	AIRLINE BLVD	ELMHURST LN	21	28	75.16	20	0	64	0.00	64	22
PORT	DEEP CREEK BLVD	LINCOLN ST	21	28	162.99	2	6	7	46.57	1	14
PORT	EFFINGHAM ST	HIGH ST	21	28	43.18	53	0	64	0.00	64	-
PORT	EFFINGHAM ST	LINCOLN ST	21	28	44.10	51	2	35	4.20	55	-
PORT	HIGH ST	CEDAR LN/STERLING POINT DR	20	32	42.04	55	0	64	0.00	64	-
PORT	LONDON BLVD	ELM AVE	20	32	42.23	54	3	22	6.33	41	-
PORT	AIRLINE BLVD	RODMAN AVE	19	34	54.03	39	2	35	5.69	44	-
PORT	FREDERICK BLVD	AIRLINE BLVD	19	34	32.47	66	2	35	3.42	58	-
PORT	LONDON BLVD	PENINSULA AVE	19	34	39.65	60	3	22	6.26	42	-
PORT	EFFINGHAM ST	LONDON BLVD	18	37	34.68	62	2	35	3.85	57	-
PORT	PORTSMOUTH BLVD	ELM AVE	18	37	73.11	22	2	35	8.12	33	-
PORT	AIRLINE BLVD	PORTSMOUTH BLVD/MCLEAN ST	17	39	33.70	64	1	52	1.98	62	-
PORT	HIGH ST	MOUNT VERNON AVE	17	39	71.00	24	2	35	8.35	30	-
PORT	HIGH ST	PENINSULA AVE	17	39	81.92	15	7	4	33.73	3	26
PORT	CEDAR LN	W NORFOLK RD	16	42	52.72	43	1	52	3.29	59	-
PORT	COURT ST	BART ST	16	42	73.61	21	1	52	4.60	53	20
PORT	VICTORY BLVD	GUST LN	16	42	44.28	50	4	15	11.07	22	-
PORT	CHURCHLAND BLVD	TYRE NECK RD	15	45	62.27	32	4	15	16.60	8	-
PORT	HIGH ST	HARTFORD ST	15	45	31.83	68	2	35	4.24	54	-
PORT	PORTSMOUTH BLVD	DES MOINES AVE	15	45	91.58	11	4	15	24.42	4	-
PORT	HIGH ST	CHURCHLAND BLVD	14	48	36.39	61	1	52	2.60	61	-
PORT	ELM AVE	SOUTH ST	12	49	64.28	31	1	52	5.36	47	-
PORT	TURNPIKE RD/PORTSMOUTH BLVD	PORTSMOUTH BLVD	12	49	48.45	46	3	22	12.11	18	-

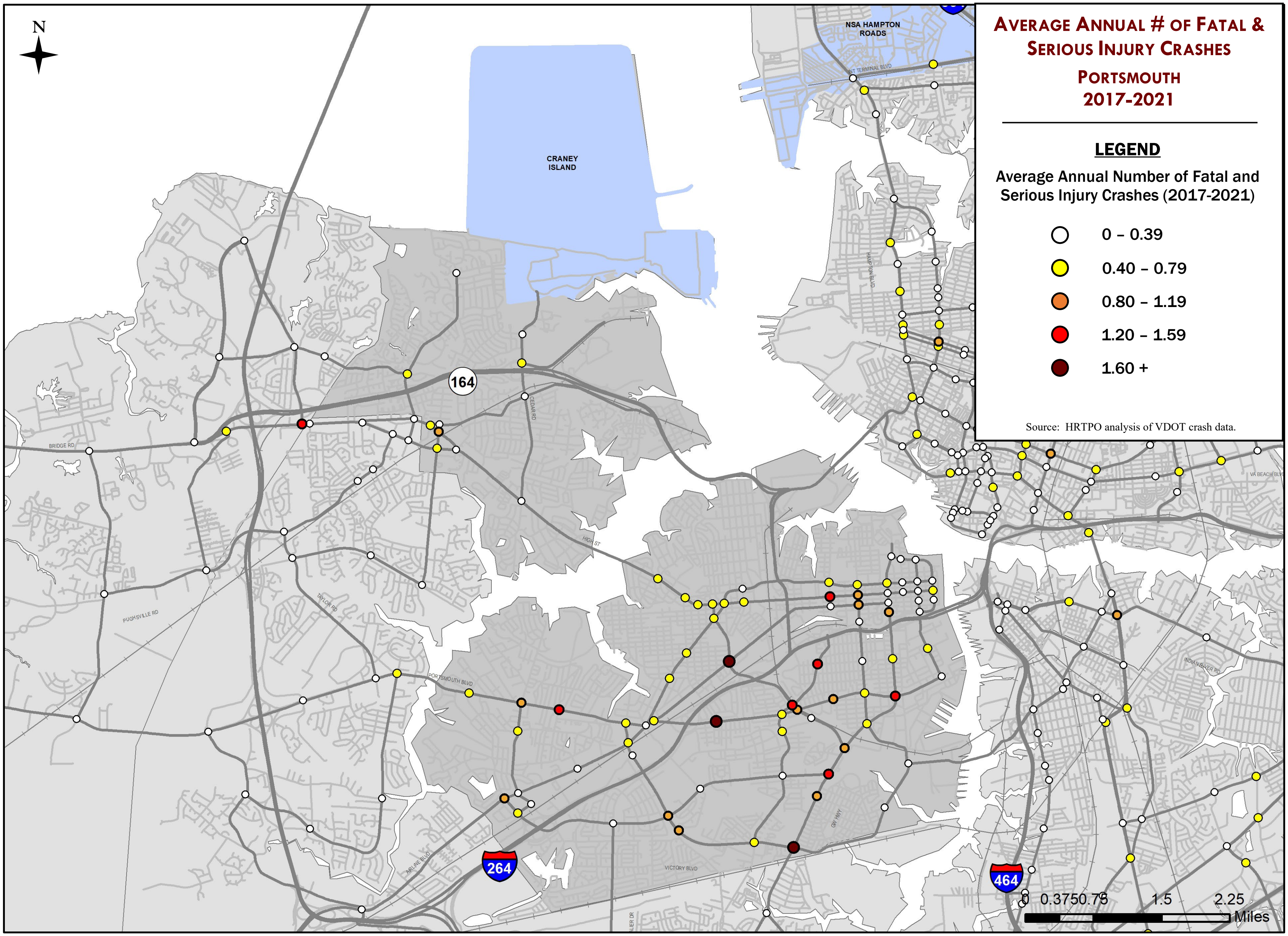
PORTSMOUTH (CONTINUED)

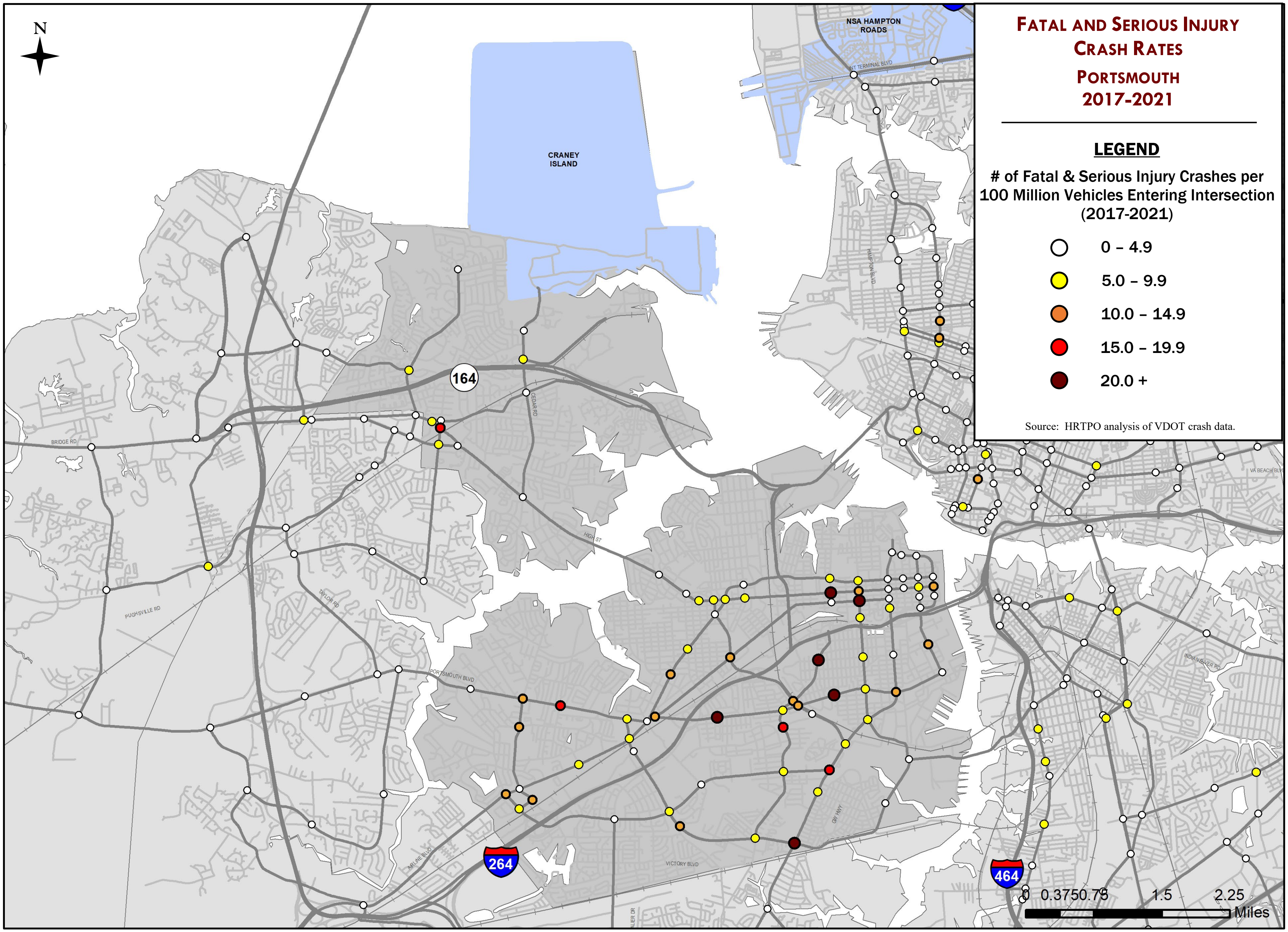
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
PORT	DEEP CREEK BLVD	GREENWOOD DR	11	51	57.79	35	1	52	5.25	49	-
PORT	EFFINGHAM ST	COUNTY ST	11	51	21.67	77	0	64	0.00	64	-
PORT	ELM AVE	COUNTY ST	11	51	48.10	47	5	10	21.87	5	-
PORT	HIGH ST	RODMAN AVE	11	51	25.50	72	2	35	4.64	52	-
PORT	AIRLINE BLVD	CAROLINE AVE	10	55	40.38	58	3	22	12.11	17	12
PORT	DEEP CREEK BLVD	ELLIOTT AVE	10	55	55.13	36	3	22	16.54	9	-
PORT	ELM AVE	LINCOLN ST	10	55	67.15	28	1	52	6.72	39	-
PORT	ELM AVE	VICTORY BLVD/WILLIAMS AVE	10	55	40.68	57	0	64	0.00	64	-
PORT	HIGH ST	FREDERICK BLVD	10	55	25.73	71	2	35	5.15	50	-
PORT	VICTORY BLVD	AIRLINE BLVD	10	55	23.89	74	3	22	7.17	37	-
PORT	HIGH ST	COURT ST	9	61	59.13	33	1	52	6.57	40	-
PORT	PORTCENTRE PKWY	LINCOLN ST	9	61	53.14	42	2	35	11.81	20	-
PORT	CHURCHLAND BLVD	W NORFOLK RD/ACADEMY AVE	8	63	32.00	67	2	35	8.00	34	-
PORT	ELMHURST LN	CHEROKEE RD	8	63	44.37	49	2	35	11.09	21	-
PORT	HIGH ST	WESTERN BRANCH BLVD	8	63	22.37	75	2	35	5.59	45	-
PORT	LONDON BLVD	MOUNT VERNON AVE	8	63	21.31	78	1	52	2.66	60	30
PORT	WEST NORFOLK RD	TYRE NECK RD	8	63	65.52	30	0	64	0.00	64	-
PORT	CRAWFORD ST	HIGH ST	7	68	51.48	44	2	35	14.71	11	-
PORT	VICTORY BLVD	AFTON PKWY	6	69	43.32	52	0	64	0.00	64	-
PORT	COURT ST	COUNTY ST	5	70	34.68	62	0	64	0.00	64	-
PORT	EFFINGHAM ST	CRAWFORD PKWY	5	70	16.87	81	0	64	0.00	64	-
PORT	ELMHURST LN	GARWOOD AVE	5	70	54.47	38	1	52	10.89	23	-
PORT	PORTCENTRE PKWY	PORTSMOUTH BLVD	5	70	40.77	56	0	64	0.00	64	-
PORT	AIRLINE BLVD	CITY PARK AVE	4	74	22.12	76	1	52	5.53	46	-
PORT	CEDAR LN	RIVER SHORE RD	4	74	24.72	73	0	64	0.00	64	-
PORT	GREENWOOD DR	MCLEAN ST	4	74	27.78	69	0	64	0.00	64	-
PORT	HIGH ST	WASHINGTON ST	4	74	40.16	59	0	64	0.00	64	-
PORT	CRAWFORD ST	LONDON BLVD	3	78	27.15	70	0	64	0.00	64	-
PORT	FREDERICK BLVD	ELLIOTT AVE	3	78	11.09	82	0	64	0.00	64	-
PORT	LONDON ST	WASHINGTON ST	2	80	18.03	79	0	64	0.00	64	-
PORT	TWIN PINES RD	HEDGEROW LN	2	80	33.11	65	0	64	0.00	64	-
PORT	COUNTY ST	PENINSULA AVE	1	82	17.17	80	0	64	0.00	64	-
PORT	CRAWFORD ST	COUNTY ST	1	82	9.43	83	0	64	0.00	64	-
PORT	LONDON BLVD	COURT ST	1	82	8.01	84	0	64	0.00	64	-
PORT	CRAWFORD PKWY	COURT ST	0	85	0.00	85	0	64	0.00	64	-
PORT	CRAWFORD PKWY	WASHINGTON ST	0	85	0.00	85	0	64	0.00	64	-

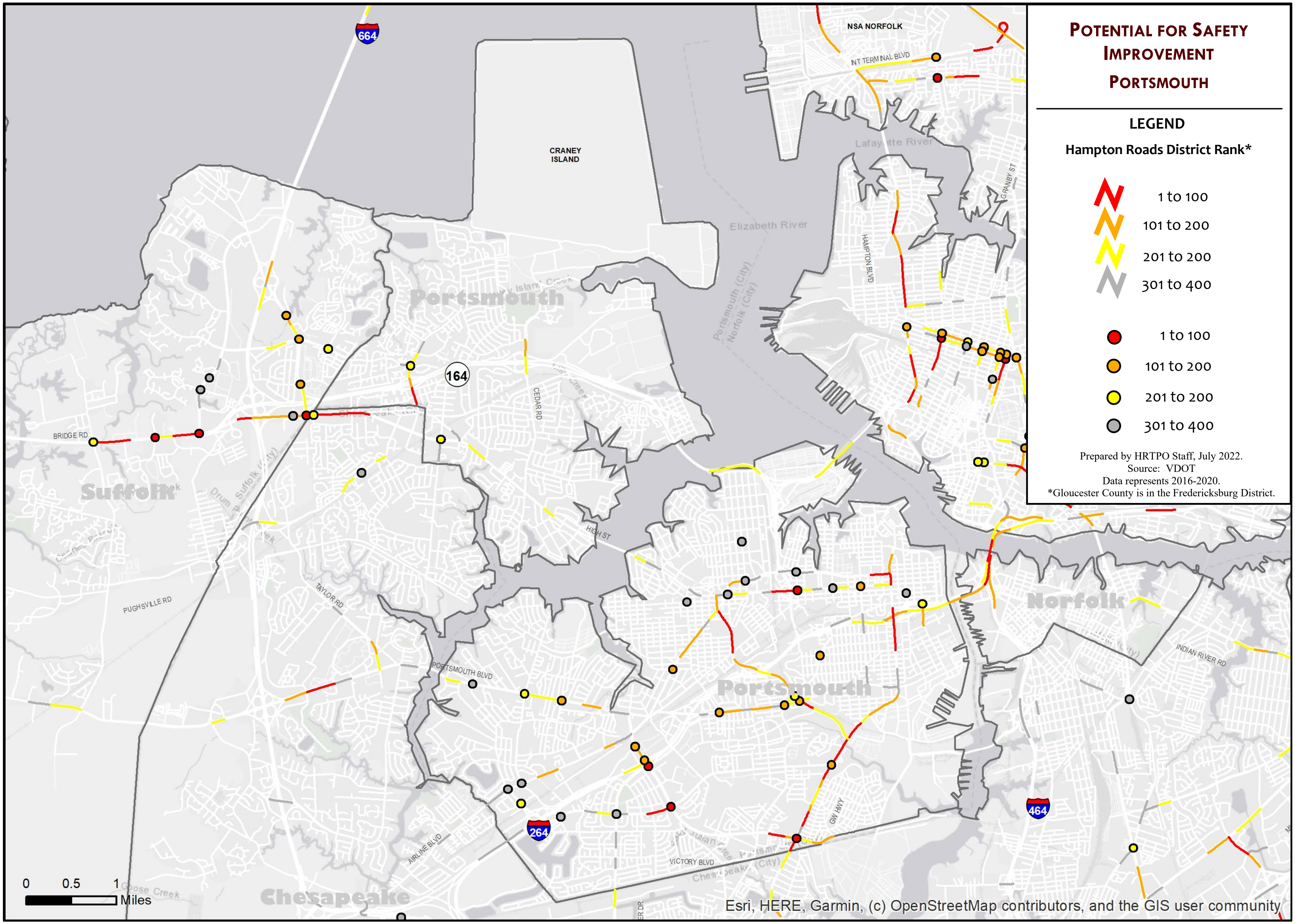
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

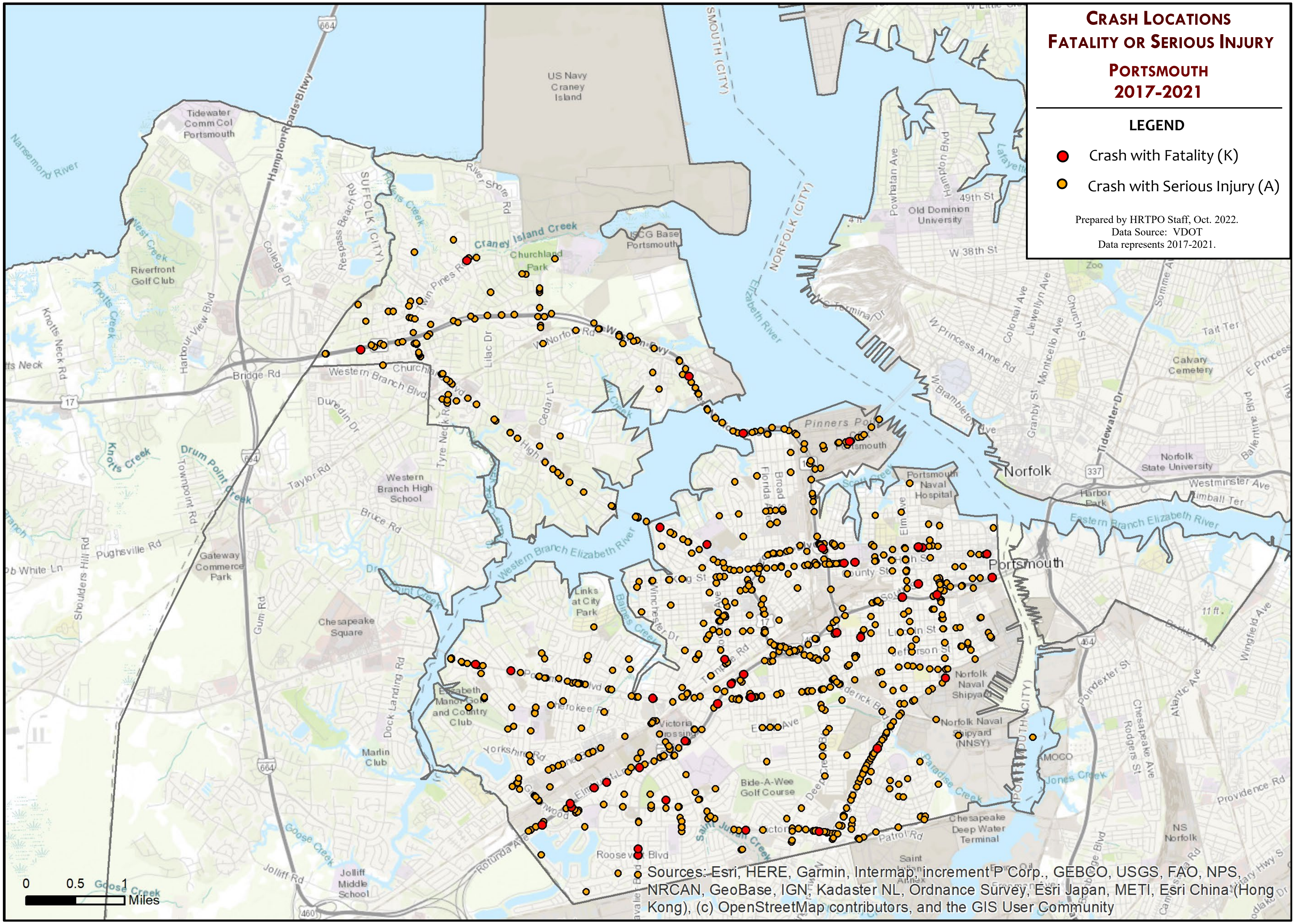

AVERAGE ANNUAL NUMBER OF CRASHES
PORTSMOUTH
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
CRANEY ISLAND
NSA HAMPTON ROADS
164
264
464
BRIDGE RD
PUGHSVILLE RD
TAYLOR RD
PORTSMOUTH BLVD
HIGH ST
CEDAR RD
AIRLINE BLVD
VICTORY BLVD
0 0.3750.75 1.5 2.25
Miles


CRASH RATES
PORTSMOUTH
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
CRANEY ISLAND
NSA HAMPTON ROADS
164
264
464
BRIDGE RD
PUGHSVILLE RD
PORTSMOUTH BLVD
HIGH ST
TAYLOR RD
VICTORY BLVD
INDIAN RIVER RD
0 0.3750.75 1.5 2.25
Miles


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
PORTSMOUTH
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
CRANEY ISLAND
NSA HAMPTON ROADS
164
264
464
BRIDGE RD
PUGHSVILLE RD
TAYLOR RD
CEDAR RD
HIGH ST
PORTSMOUTH BLVD
AIRLINE BLVD
VICTORY BLVD
HAMPTON BLVD
VA BEACH BLVD
INDIAN RIVER RD
0 0.3750.75 1.5 2.25
Miles


N
NSA HAMPTON ROADS
CRANEY ISLAND
164
BRIDGE RD
PUGHSVILLE RD
CEDAR RD
HIGH ST
TAYLOR RD
PORTSMOUTH BLVD
AIRLINE BLVD
VICTORY BLVD
HAMPTON BLVD
VA BEACH BLVD
INDIAN RIVER RD
264
464
0 0.3750.75 1.5 2.25
Miles
FATAL AND SERIOUS INJURY CRASH RATES
PORTSMOUTH
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.

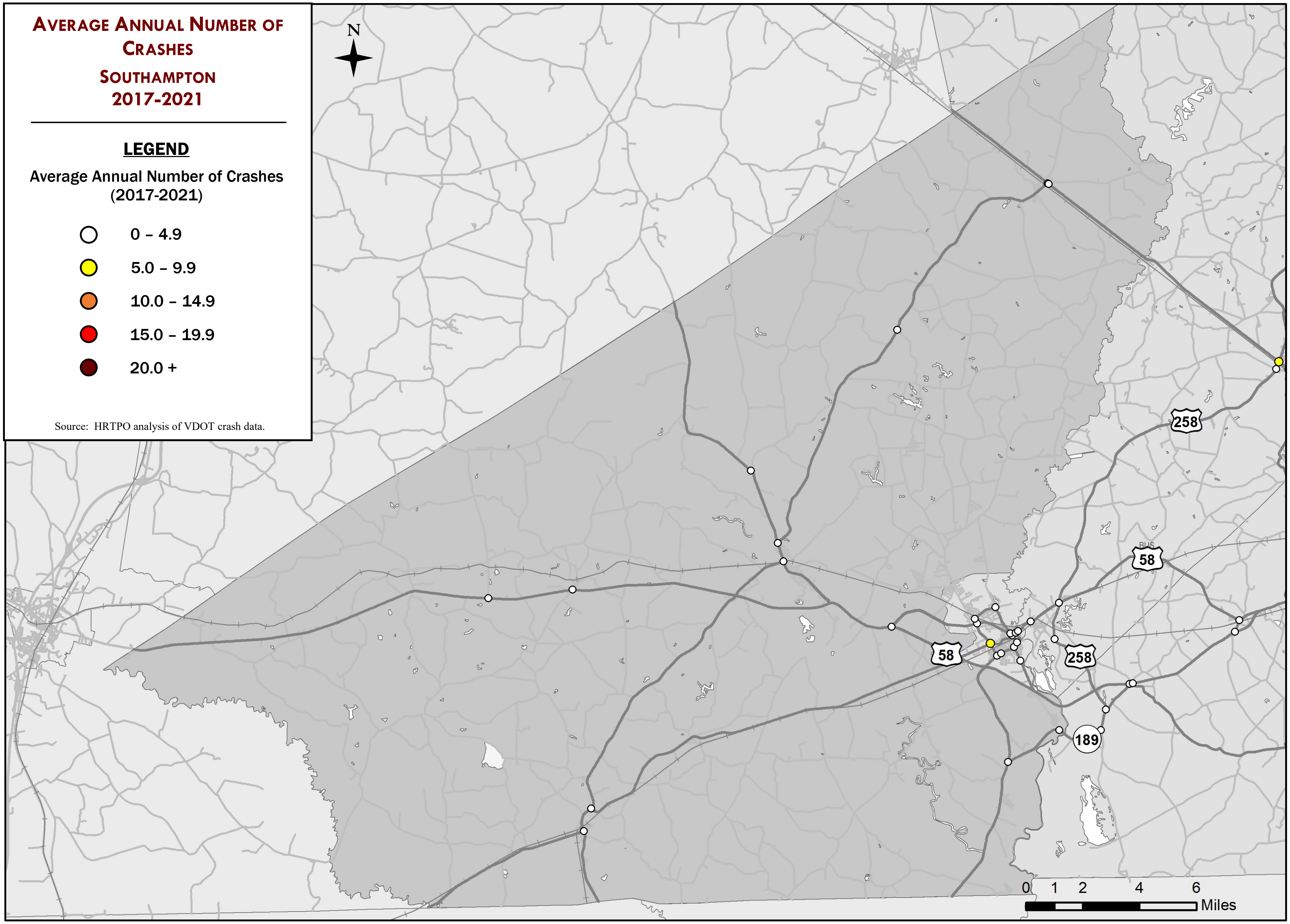

POTENTIAL FOR SAFETY IMPROVEMENT
PORTSMOUTH
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
NSA NORFOLK
CRANEY ISLAND
Elizabeth River
Lafayette River
Portsmouth
Suffolk
Norfolk
Chesapeake
BRIDGE RD
PUGHSVILLE RD
TAYLOR RD
PORTSMOUTH BLVD
CEDAR RD
HIGH ST
AIRLINE BLVD
VICTORY BLVD
GW HWY
INDIAN RIVER RD
HAMPTON BLVD
GRANBY ST
NT TERMINAL BLVD
664
164
264
464
0 0.5 1 Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

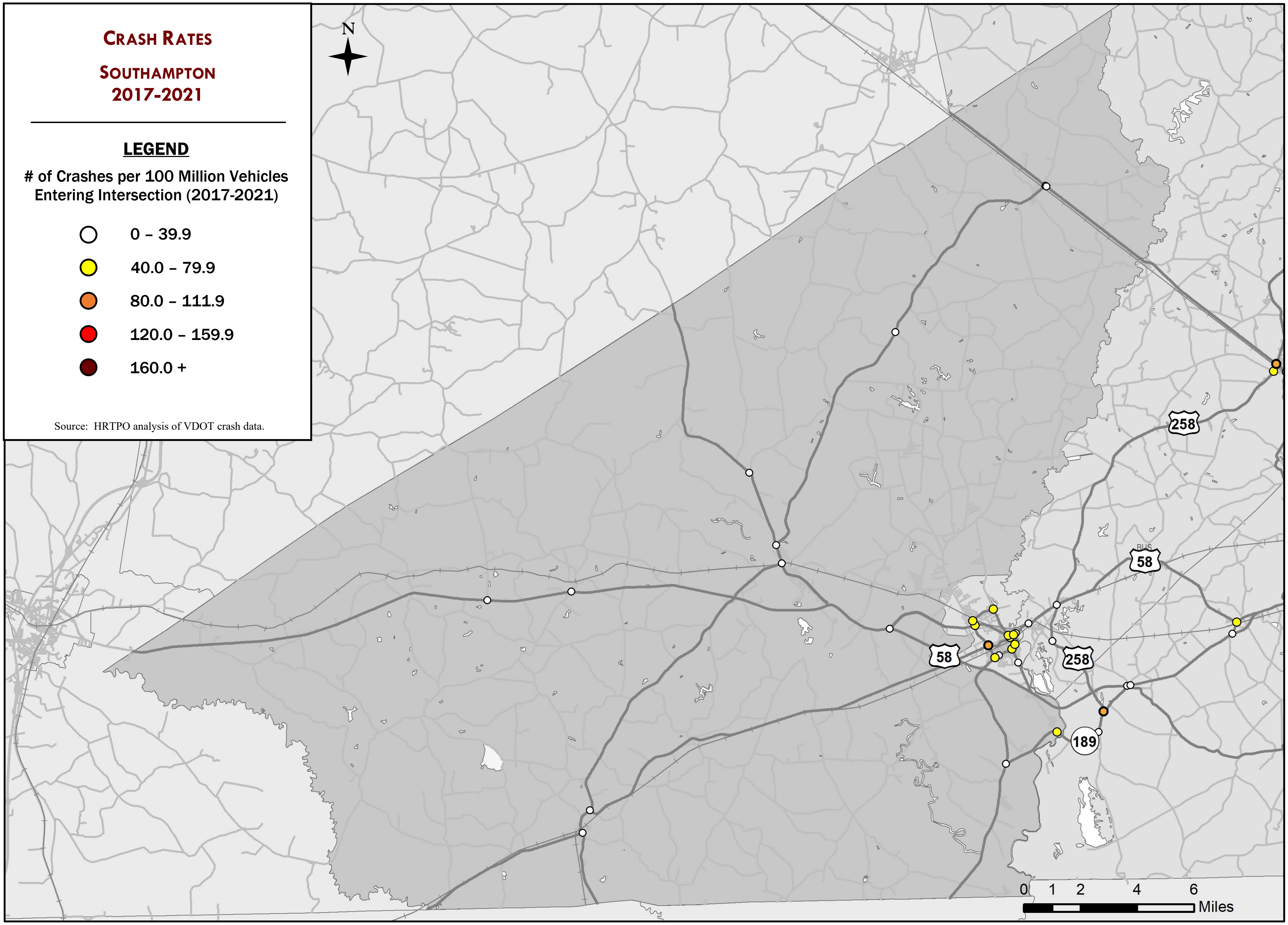

CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
PORTSMOUTH
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
0 0.5 1 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

SOUTHAMPTON

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
SH	ROUTE 58	ROUTE 308 (THREE CREEKS RD)	5	1	19.45	6	2	1	7.78	1	-
SH	ROUTE 460	ROUTE 616 (MAIN ST)	5	1	23.93	4	0	4	0.00	4	-
SH	ROUTE 189	ROUTE 714 (PRETLOW RD)	4	3	73.30	1	0	4	0.00	4	-
SH	MAIN ST (RTE 35/58 BUS)	MEHERRIN RD (RTE 35/58 BUS)	3	4	19.90	5	0	4	0.00	4	-
SH	ROUTE 35	ROUTE 628 (WAKEFIELD RD)	2	5	34.38	2	0	4	0.00	4	-
SH	ROUTE 58	BUS ROUTE 58 (CAMP PKWY)	2	5	5.19	11	1	2	2.60	3	-
SH	ROUTE 58	ROUTE 653 (PINOPOLIS RD)	2	5	7.29	10	1	2	3.65	2	-
SH	ROUTE 35	ROUTE 186	1	8	14.61	7	0	4	0.00	4	-
SH	ROUTE 35	ROUTE 616 (IVOR RD)	1	8	10.96	8	0	4	0.00	4	-
SH	ROUTE 258	ROUTE 189	1	8	9.15	9	0	4	0.00	4	-
SH	ROUTE 616 (IVOR RD)	ROUTE 641 (COTTAGE HILL RD)	1	8	31.44	3	0	4	0.00	4	-
SH	ROUTE 35	ROUTE 671 (GENERAL THOMAS HWY)	0	12	0.00	12	0	4	0.00	4	-
SH	ROUTE 460	ROUTE 620 (BROADWATER RD)	0	12	0.00	12	0	4	0.00	4	-

Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.


Average Annual Number of Crashes
Southampton
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
258
58
BUS 58
258
189
58
0 1 2 4 6
Miles


CRASH RATES
SOUTHAMPTON
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
258
BUS
58
58
258
189
0 1 2 4 6
Miles

Average Annual # of Fatal & Serious Injury Crashes

Southampton

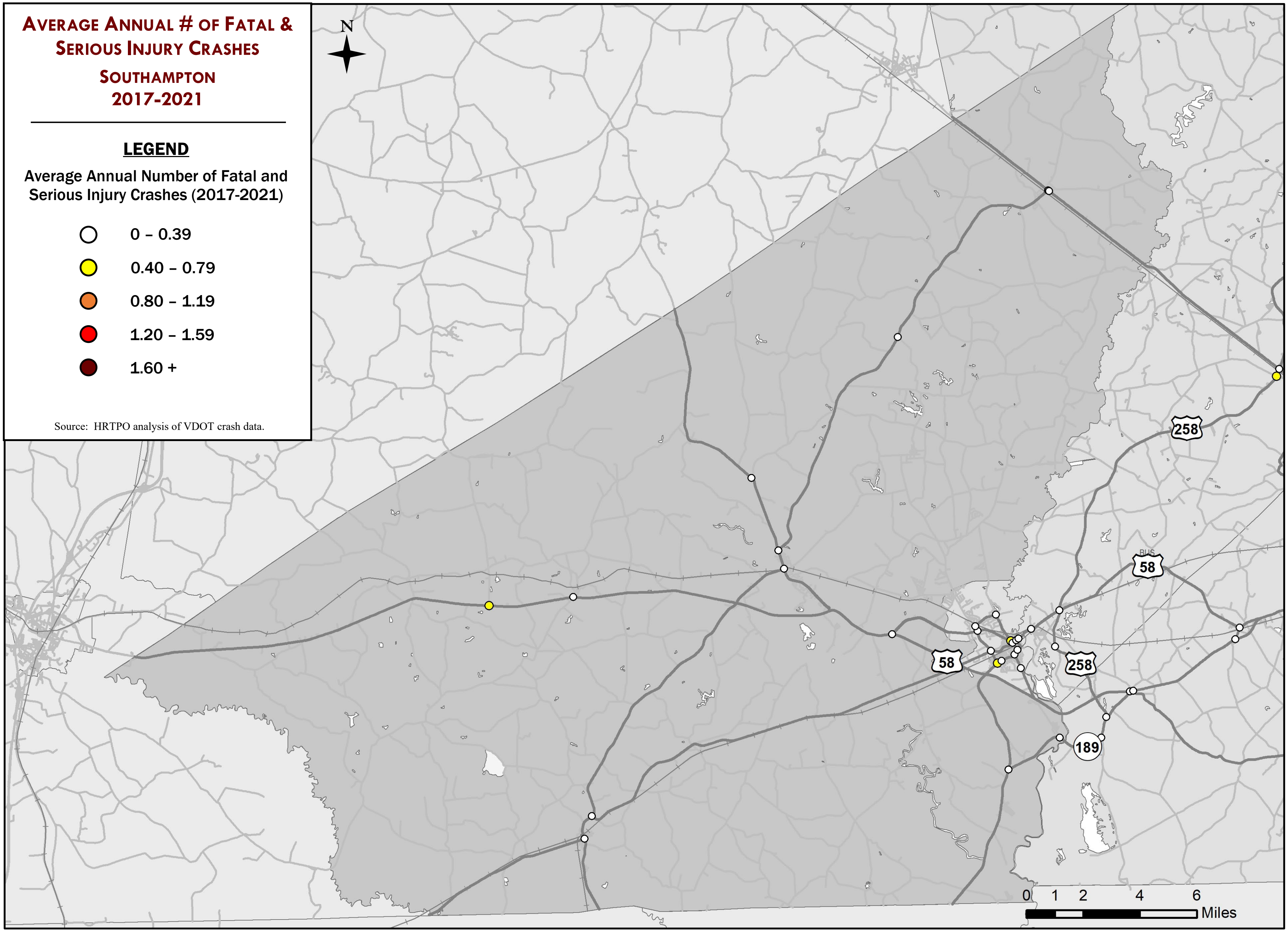
2017-2021

LEGEND

Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)

- 0 – 0.39
- 0.40 – 0.79
- 0.80 – 1.19
- 1.20 – 1.59
- 1.60 +

Source: HRTPO analysis of VDOT crash data.



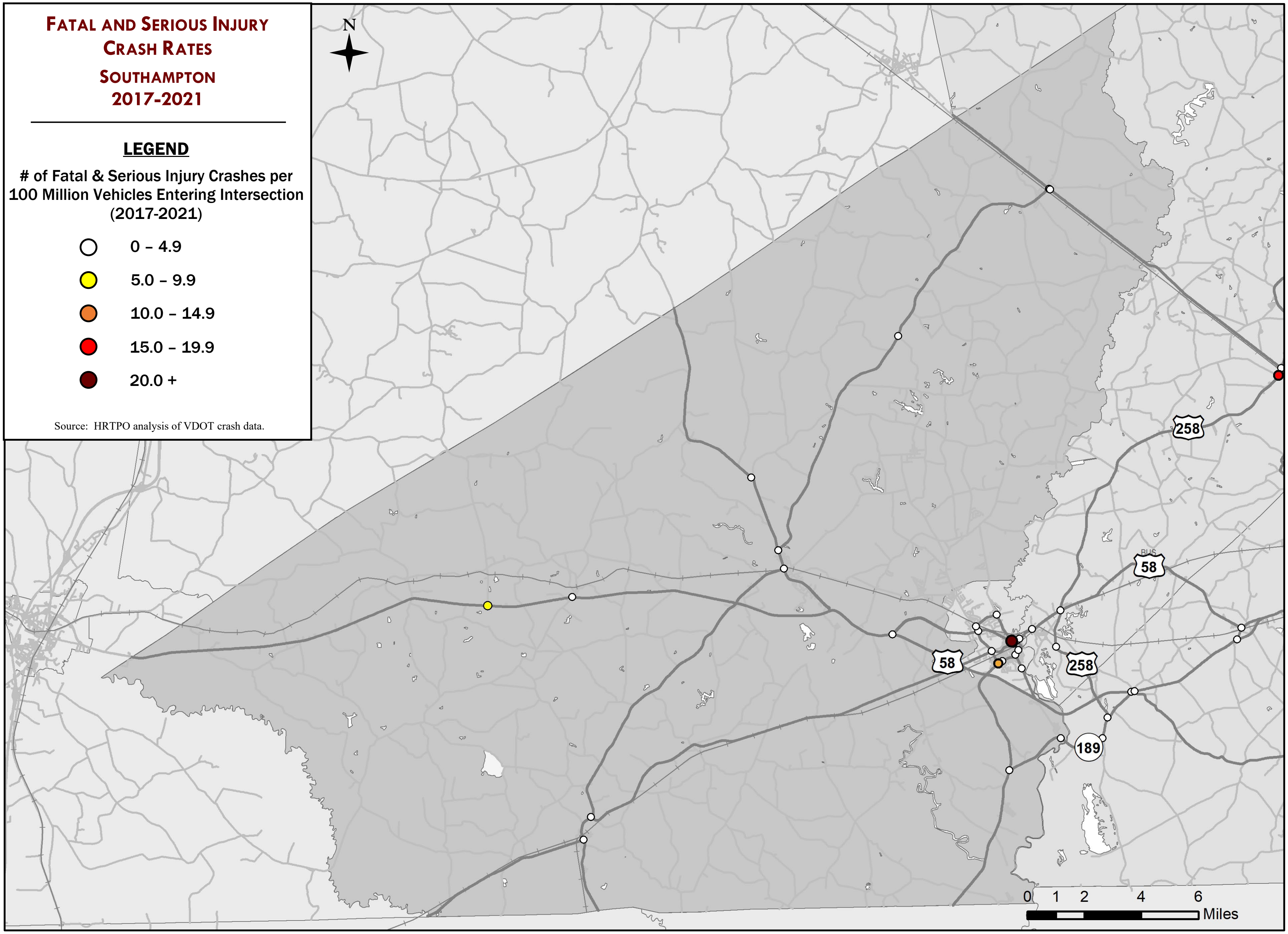
Fatal and Serious Injury Crash Rates
Southampton
2017-2021

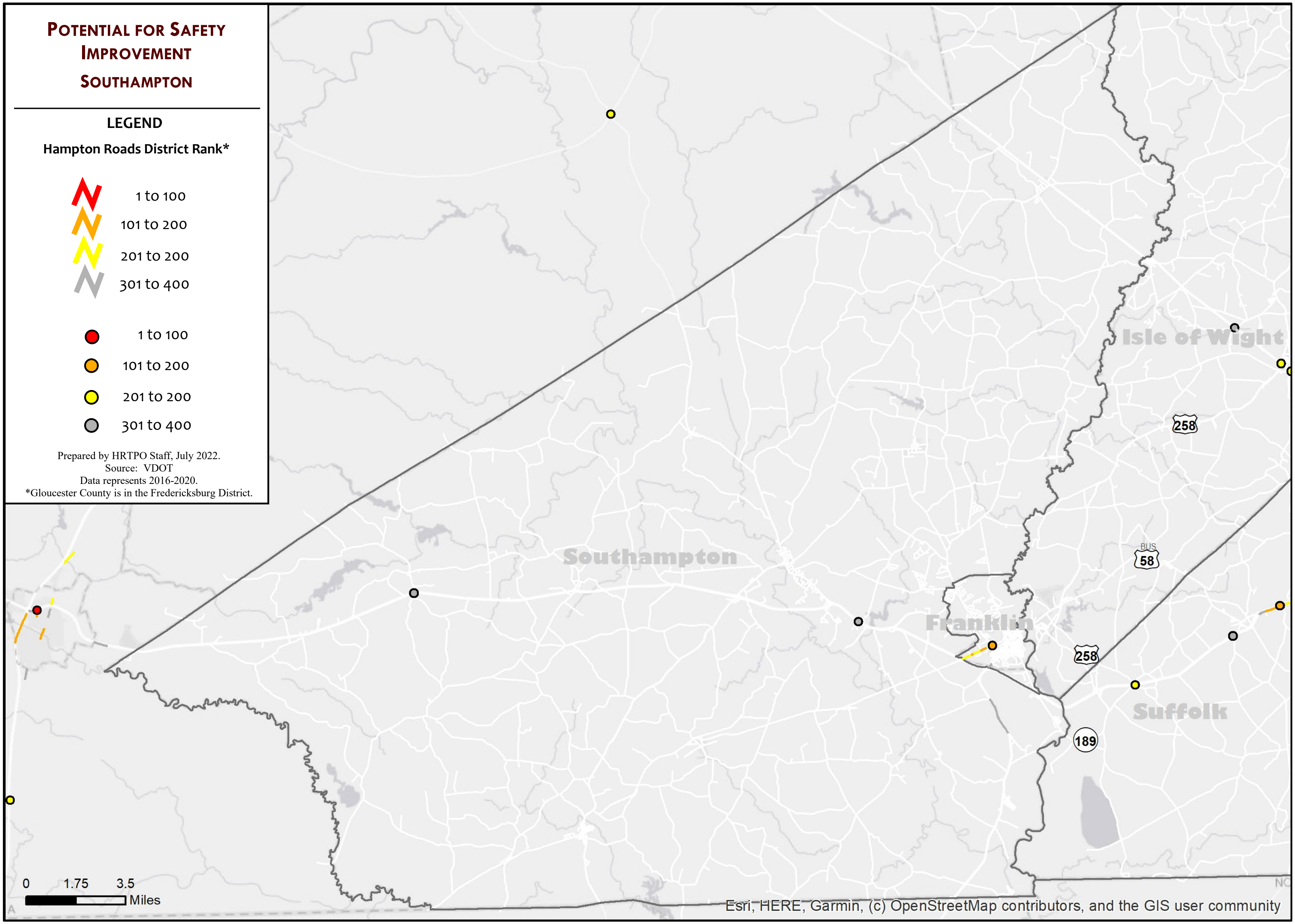
LEGEND

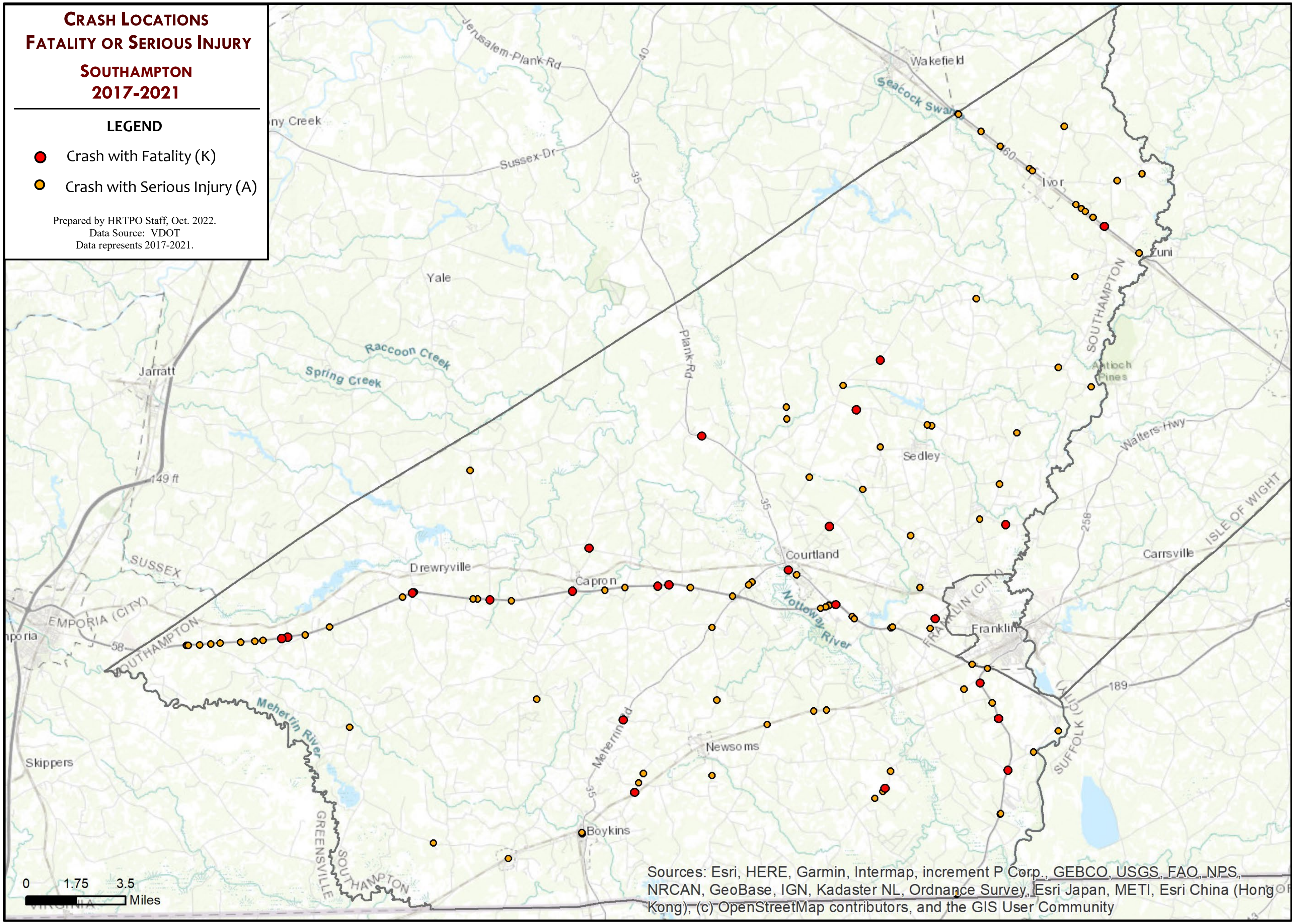
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)

- 0 – 4.9
- 5.0 – 9.9
- 10.0 – 14.9
- 15.0 – 19.9
- 20.0 +

Source: HRTPO analysis of VDOT crash data.




Potential for Safety Improvement
Southampton
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
Southampton
Isle of Wight
Franklin
Suffolk
258
BUS
58
189
0
1.75
3.5
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community


CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
SOUTHAMPTON
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Wakefield
Ivor
Zuni
Yale
Jarratt
Sedley
Courtland
Drewryville
Capron
Franklin
Carrsville
Newsoms
Boykins
Skippers
Emporia
Raccoon Creek
Spring Creek
Meherrin River
Nottoway River
Sussex
Southampton
Isle of Wight
Suffolk
Greensville
0 1.75 3.5 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

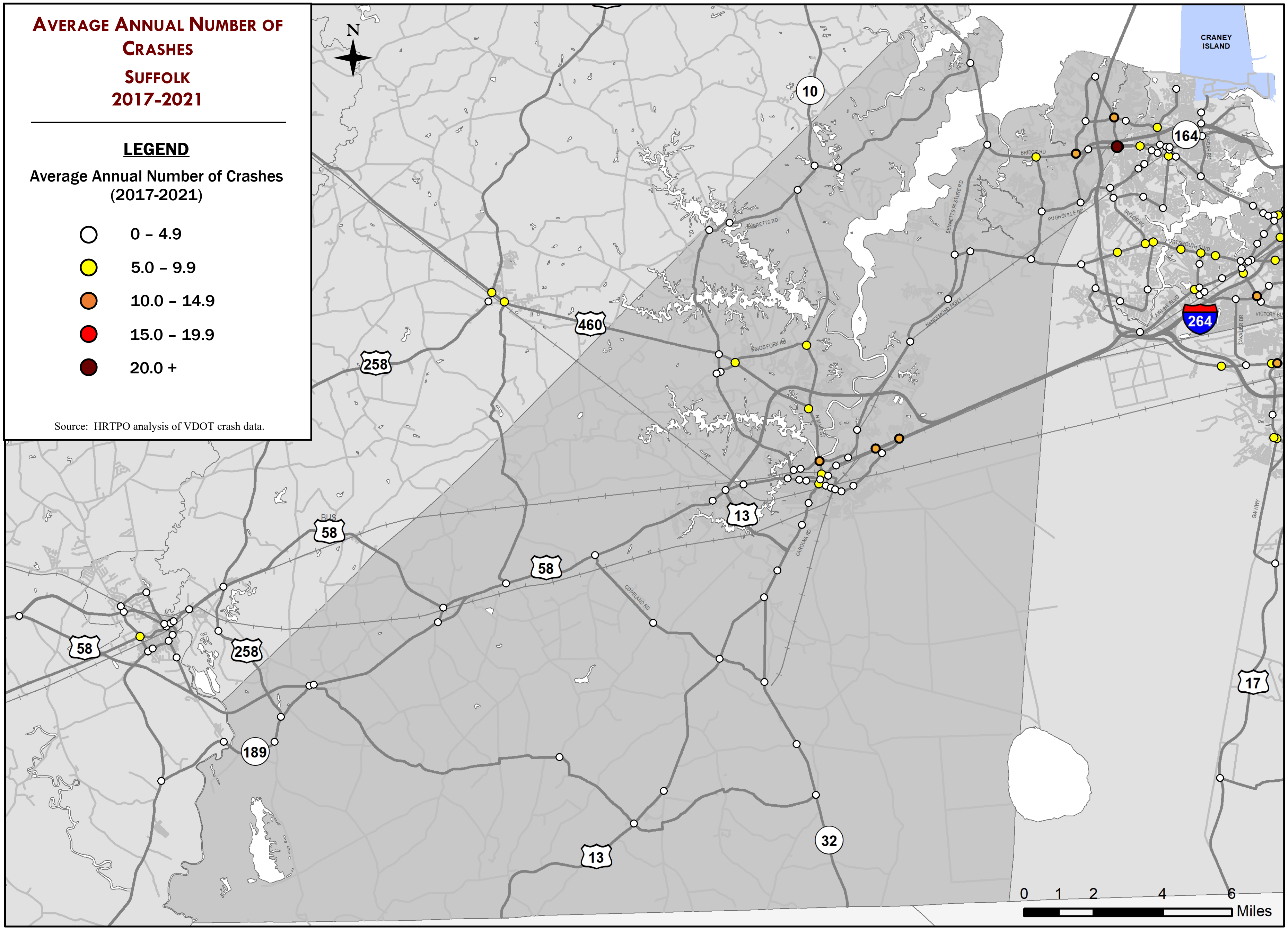
SUFFOLK

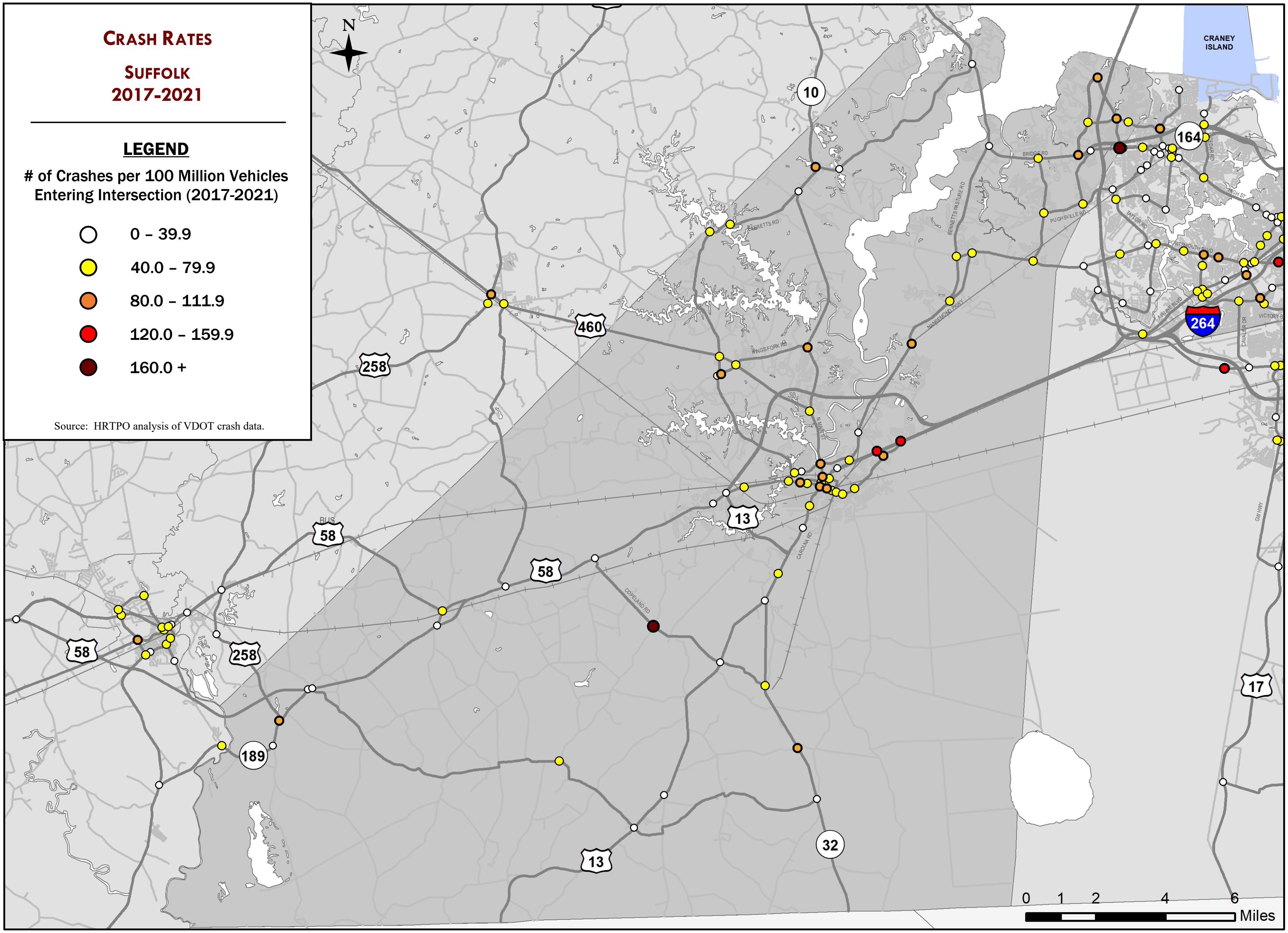
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
SUF	BRIDGE RD	COLLEGE DR	104	1	162.82	2	6	1	9.39	6	1
SUF	PORTSMOUTH BLVD	NANSEMOND PKWY/WASHINGTON ST	69	2	134.12	4	2	4	3.89	17	4
SUF	BRIDGE RD	HARBOUR VIEW BLVD	68	3	89.14	11	1	11	1.31	28	7
SUF	MAIN ST	CONSTANCE RD	58	4	90.29	9	1	11	1.56	26	5
SUF	PORTSMOUTH BLVD	SUBURBAN DR	56	5	149.32	3	6	1	16.00	3	3
SUF	COLLEGE DR	HAMPTON ROADS PKWY	50	6	84.66	16	1	11	1.69	25	8
SUF	MAIN ST	FINNEY AVE	48	7	119.39	5	2	4	4.97	12	9
SUF	BRIDGE RD	SHOULDERS HILL RD/KNOTTS NECK RD	45	8	65.40	25	1	11	1.45	27	30
SUF	MAIN ST	WASHINGTON ST	34	9	89.01	12	0	30	0.00	30	13
SUF	MAIN ST/PRUDEN BLVD	GODWIN BLVD	32	10	78.00	20	0	30	0.00	30	51
SUF	GODWIN BLVD	KINGS FORK RD	28	11	80.33	19	5	3	14.34	4	17
SUF	PRUDEN BLVD (RTE 460)	KINGS FORK RD	25	12	54.14	36	1	11	2.17	24	41
SUF	HOLLAND RD/SUFFOLK BYPASS	HOLLAND RD (BUS RTE 58)	23	13	29.67	64	1	11	1.29	29	-
SUF	MAIN ST	MARKET ST	22	14	60.27	30	0	30	0.00	30	-
SUF	NANSEMOND PKWY	SHOULDERS HILL RD/NORTHGATE COMMERCE PKWY	22	14	67.57	24	0	30	0.00	30	-
SUF	BRIDGE RD	TOWN POINT RD/WESTERN FWY RAMP	21	16	34.08	58	2	4	3.25	20	-
SUF	CONSTANCE RD	PINNER ST/WILROY RD	21	16	48.80	42	0	30	0.00	30	-
SUF	PRUDEN BLVD (RTE 460)	LAKE PRINCE DR/PROVIDENCE RD	21	16	61.37	27	0	30	0.00	30	-
SUF	WASHINGTON ST	SUBURBAN DR	21	16	90.25	10	2	4	8.60	7	16
SUF	GODWIN BLVD	KINGS HWY	20	20	83.91	18	1	11	4.20	15	25
SUF	HAMPTON ROADS PKWY	RESPASS BEACH RD	20	20	74.25	22	0	30	0.00	30	29
SUF	HARBOUR VIEW BLVD	HAMPTON ROADS PKWY/RIVER CLUB DR	20	20	59.92	31	0	30	0.00	30	-
SUF	NANSEMOND PKWY	WILROY RD	20	20	84.04	17	0	30	0.00	30	27
SUF	WASHINGTON ST	PINNER ST	20	20	84.89	15	1	11	4.24	14	-
SUF	WASHINGTON ST	MOORE AVE	18	25	62.03	26	0	30	0.00	30	50
SUF	WASHINGTON ST	WHITE MARSH RD	18	25	74.27	21	2	4	8.25	8	-
SUF	BRIDGE RD	BENNETTS PASTURE RD/BENNETTS CREEK LN	16	27	30.03	63	0	30	0.00	30	-
SUF	NANSEMOND PKWY	BENNETTS PASTURE RD	15	28	61.06	29	1	11	4.07	16	23
SUF	CAROLINA RD	TURLINGTON RD	14	29	42.36	49	1	11	3.03	21	-
SUF	ROUTE 58	HOLY NECK RD	14	29	35.77	55	1	11	2.55	23	19
SUF	SHOULDERS HILL RD	PUGHSVILLE RD/RABEY FARM RD	14	29	53.68	39	0	30	0.00	30	-
SUF	WASHINGTON ST	BROAD ST	14	29	96.40	7	0	30	0.00	30	52
SUF	NANSEMOND PKWY	KINGS HWY	13	33	57.59	33	1	11	4.43	13	48
SUF	ROUTE 58	LUMMIS RD	13	33	27.17	65	0	30	0.00	30	-
SUF	WASHINGTON ST	S SIXTH ST	13	33	48.08	43	1	11	3.70	19	-
SUF	WASHINGTON ST/HOLLAND RD	CONSTANCE RD	13	33	61.09	28	0	30	0.00	30	-
SUF	CAROLINA RD	KILBY AVE	12	37	56.95	35	0	30	0.00	30	-
SUF	COLLEGE DR	HARBOUR VIEW BLVD/ARMISTEAD RD	12	37	91.45	8	0	30	0.00	30	-
SUF	COPELAND RD	MANNING RD	12	37	400.45	1	2	4	66.74	1	46
SUF	PINNER ST	FINNEY AVE	12	37	53.20	41	0	30	0.00	30	-
SUF	BRIDGE RD	CRITTENDEN RD	11	41	31.26	61	1	11	2.84	22	-
SUF	CAROLINA RD/WHALEYVILLE BLVD	CAROLINA RD	11	41	38.84	50	0	30	0.00	30	-
SUF	ROUTE 58	MANNING RD	11	41	17.36	70	0	30	0.00	30	-
SUF	WASHINGTON ST	FACTORY ST	11	41	45.73	44	0	30	0.00	30	-
SUF	BENNETTS PASTURE RD	KINGS HWY	10	45	59.22	32	0	30	0.00	30	-
SUF	WASHINGTON ST	MARKET ST/WELLONS ST	10	45	57.50	34	1	11	5.75	11	-
SUF	CAROLINA RD	DILL RD	9	47	34.80	56	1	11	3.87	18	-
SUF	CONSTANCE RD	PITCHKETTLE RD/PRENTIS ST	9	47	43.51	48	0	30	0.00	30	-
SUF	HOLLAND RD	LAKE CAHOON RD	9	47	53.96	37	1	11	6.00	10	-
SUF	GODWIN BLVD	EVERETTS RD	8	50	33.72	59	0	30	0.00	30	-

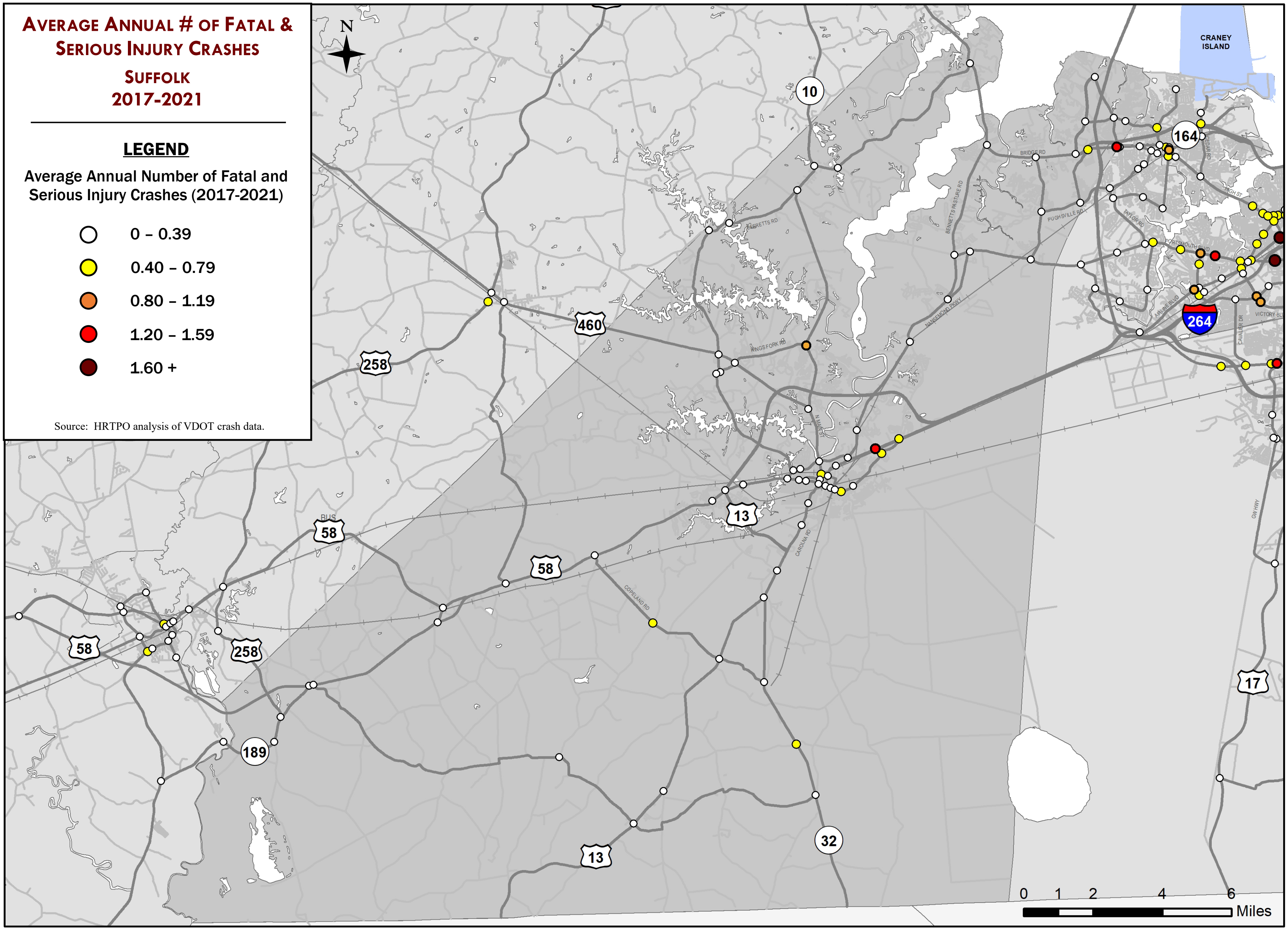
SUFFOLK (CONTINUED)

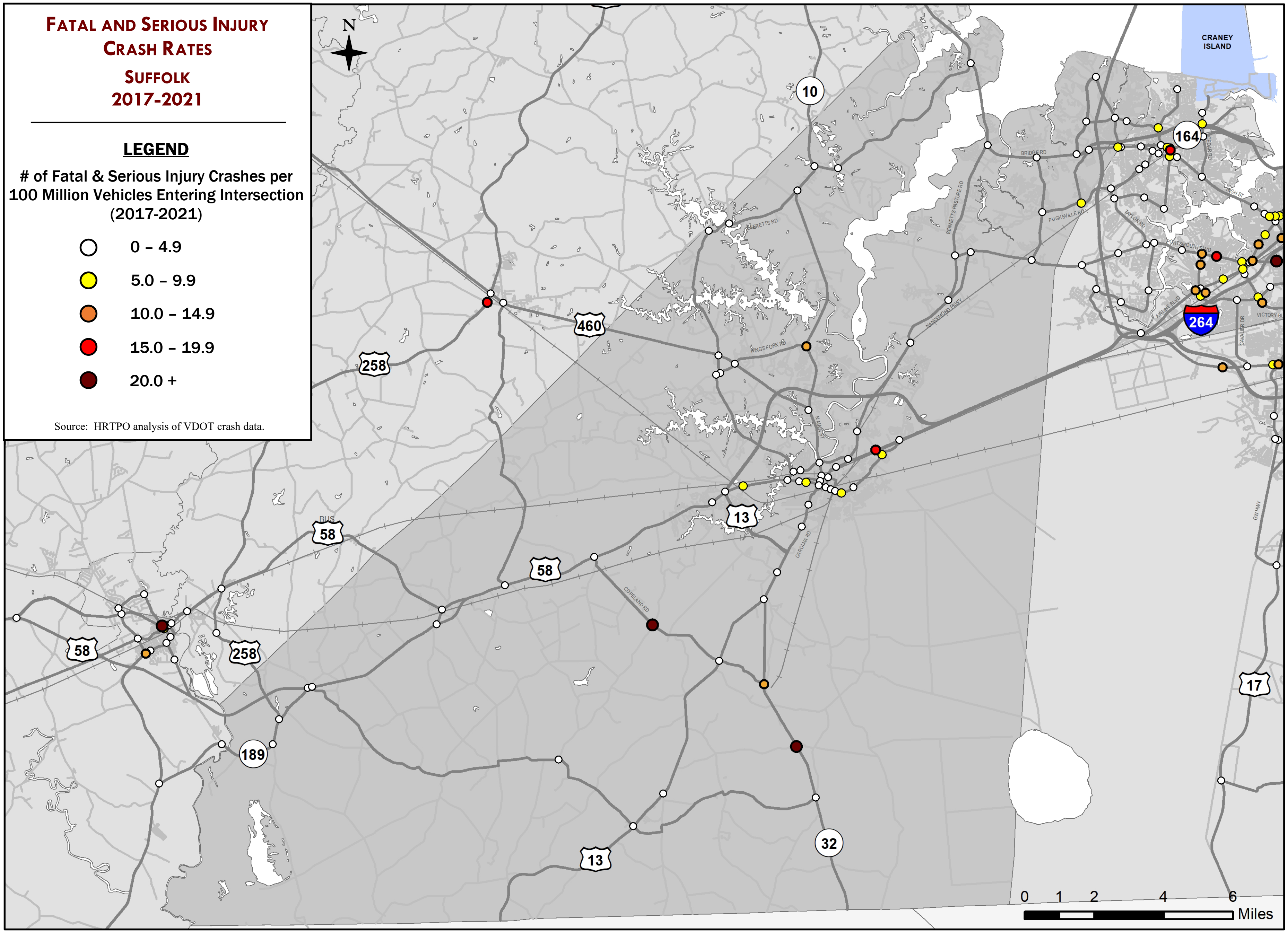
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
SUF	ROUTE 58	ROUTE 189 (HOLLAND)	8	50	20.47	69	0	30	0.00	30	-
SUF	ROUTE 58	ROUTE 272	8	50	21.08	68	0	30	0.00	30	-
SUF	CAROLINA RD	CYPRESS CHAPEL RD	7	53	87.97	13	2	4	25.14	2	-
SUF	PINNER ST	MOORE AVE	7	53	36.24	54	0	30	0.00	30	-
SUF	PUGHSVILLE RD	TOWNPOINT RD	7	53	53.80	38	1	11	7.69	9	-
SUF	ROUTE 58	BUCKHORN DR	7	53	15.27	72	0	30	0.00	30	-
SUF	KINGS FORK RD	PROVIDENCE RD	6	57	104.70	6	0	30	0.00	30	-
SUF	WHALEYVILLE BLVD	COPELAND RD	6	57	32.35	60	0	30	0.00	30	-
SUF	WHALEYVILLE BLVD	GREAT FORK RD	6	57	30.73	62	0	30	0.00	30	-
SUF	WHALEYVILLE BLVD	MINERAL SPRINGS RD	6	57	37.64	52	0	30	0.00	30	-
SUF	CONSTANCE RD	BROAD ST	5	61	26.98	66	0	30	0.00	30	-
SUF	ROUTE 189	ROUTE 272	5	61	87.81	14	0	30	0.00	30	-
SUF	WILROY RD	SUBURBAN DR	5	61	38.16	51	0	30	0.00	30	-
SUF	CAROLINA RD	COPELAND RD	4	64	45.10	45	1	11	11.27	5	-
SUF	CAROLINA RD	ROUNTREE CRESCENT	2	65	24.54	67	0	30	0.00	30	-
SUF	EVERETS RD	KIRK RD	2	65	53.22	40	0	30	0.00	30	-
SUF	EVERETTS RD	LAKE PRINCE DR	2	65	44.37	47	0	30	0.00	30	-
SUF	HOLLAND RD/S QUAY RD	RURITAN BLVD	2	65	44.88	46	0	30	0.00	30	-
SUF	KINGS HWY	CRITTENDEN RD	2	65	36.70	53	0	30	0.00	30	-
SUF	ROUTE 189	GATES RD	2	65	34.68	57	0	30	0.00	30	-
SUF	KINGS FORK RD	PITCHKETTLE RD	1	71	16.50	71	0	30	0.00	30	-
SUF	MINERAL SPRINGS RD	MANNING RD	1	71	69.54	23	0	30	0.00	30	-

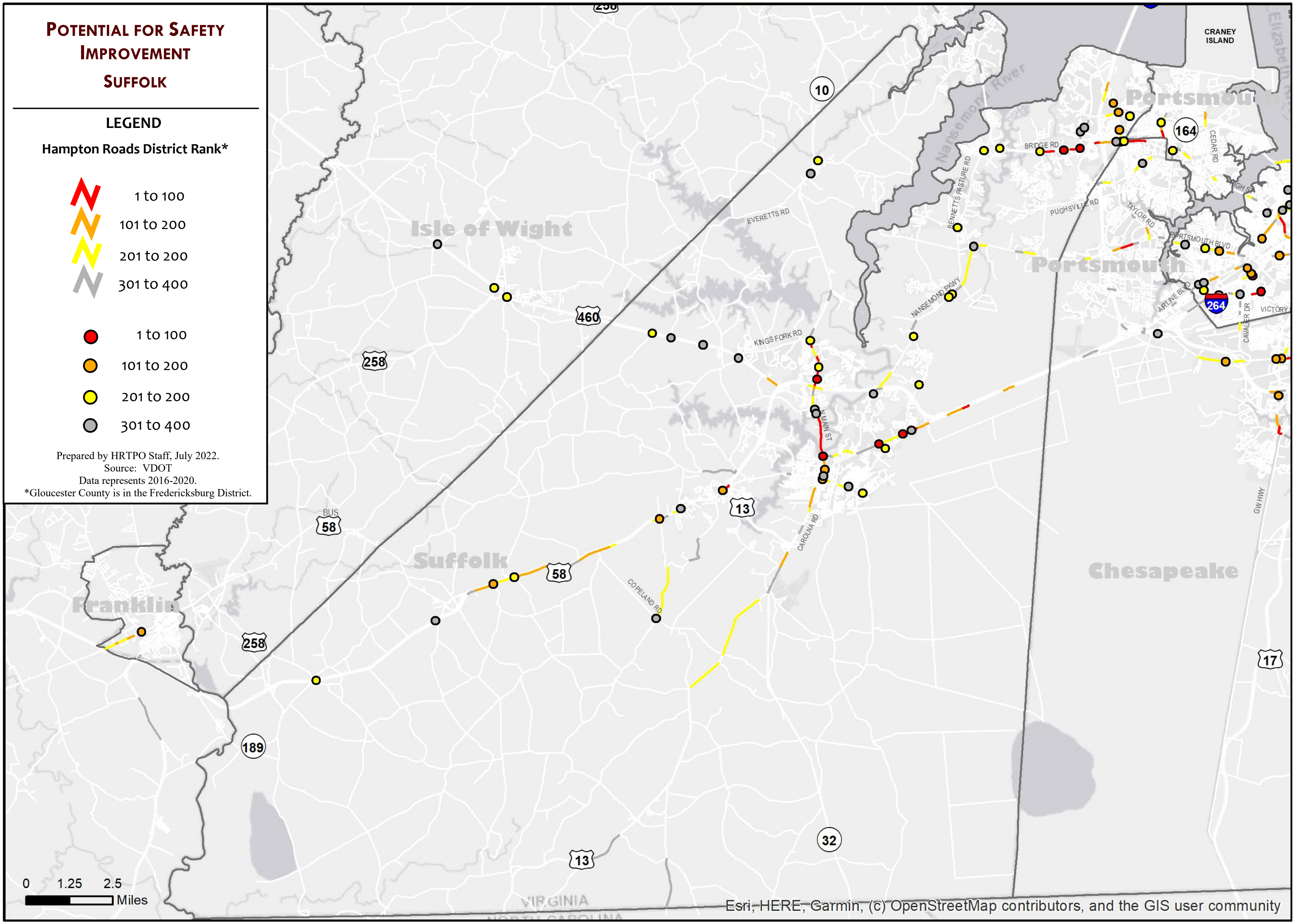
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.

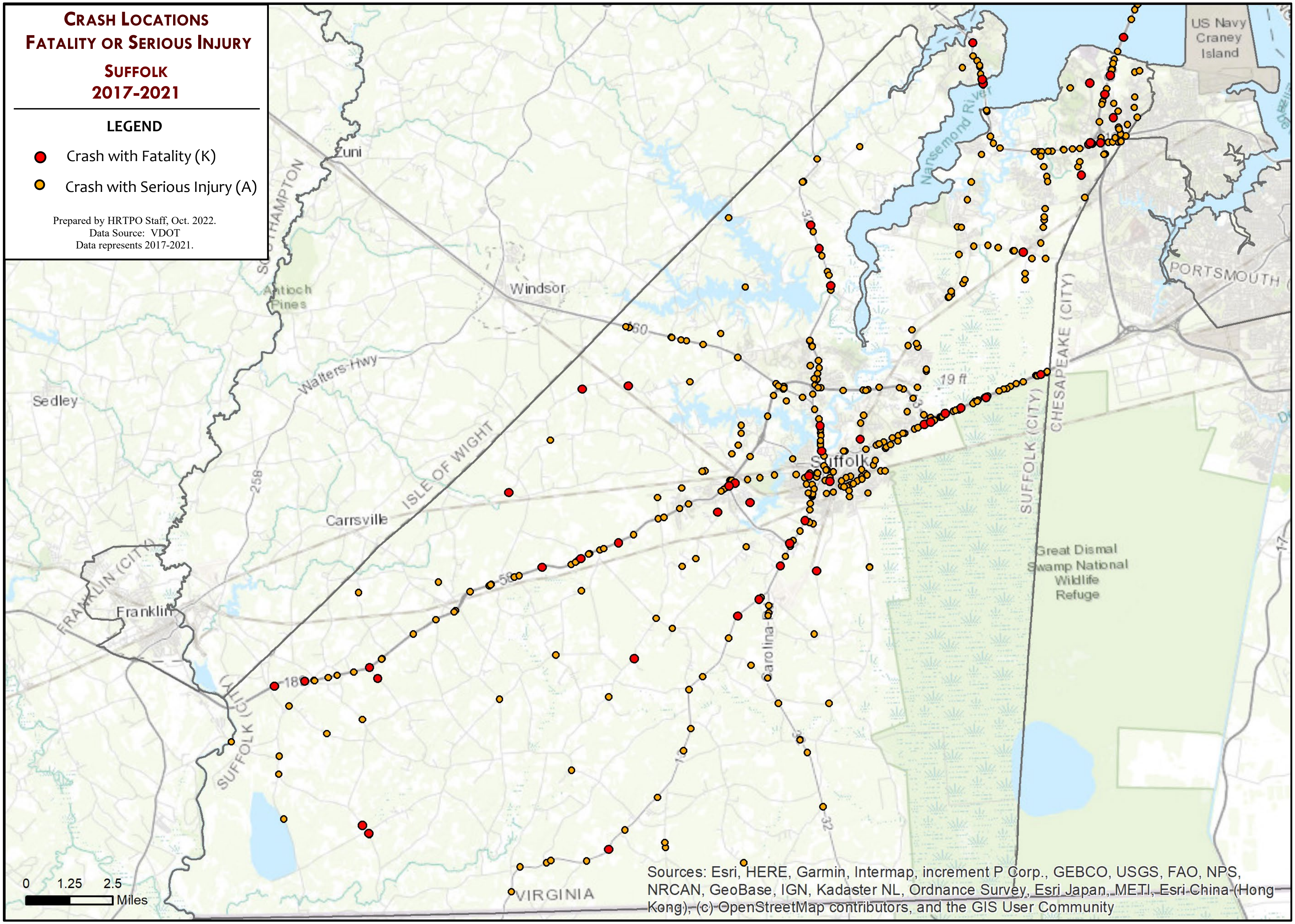

AVERAGE ANNUAL NUMBER OF CRASHES
SUFFOLK
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
CRANEY ISLAND
10
164
264
460
258
13
58
BUS 58
189
32
17
0 1 2 4 6
Miles


CRASH RATES
SUFFOLK
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
CRANEY ISLAND
10
164
264
460
258
58
13
17
189
32
0 1 2 4 6
Miles


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
SUFFOLK
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
CRANEY ISLAND
10
164
264
460
258
58
BUS 58
13
189
32
17
0 1 2 4 6
Miles


FATAL AND SERIOUS INJURY CRASH RATES
SUFFOLK
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
CRANEY ISLAND
10
164
460
258
58
13
189
32
17
264
0 1 2 4 6
Miles

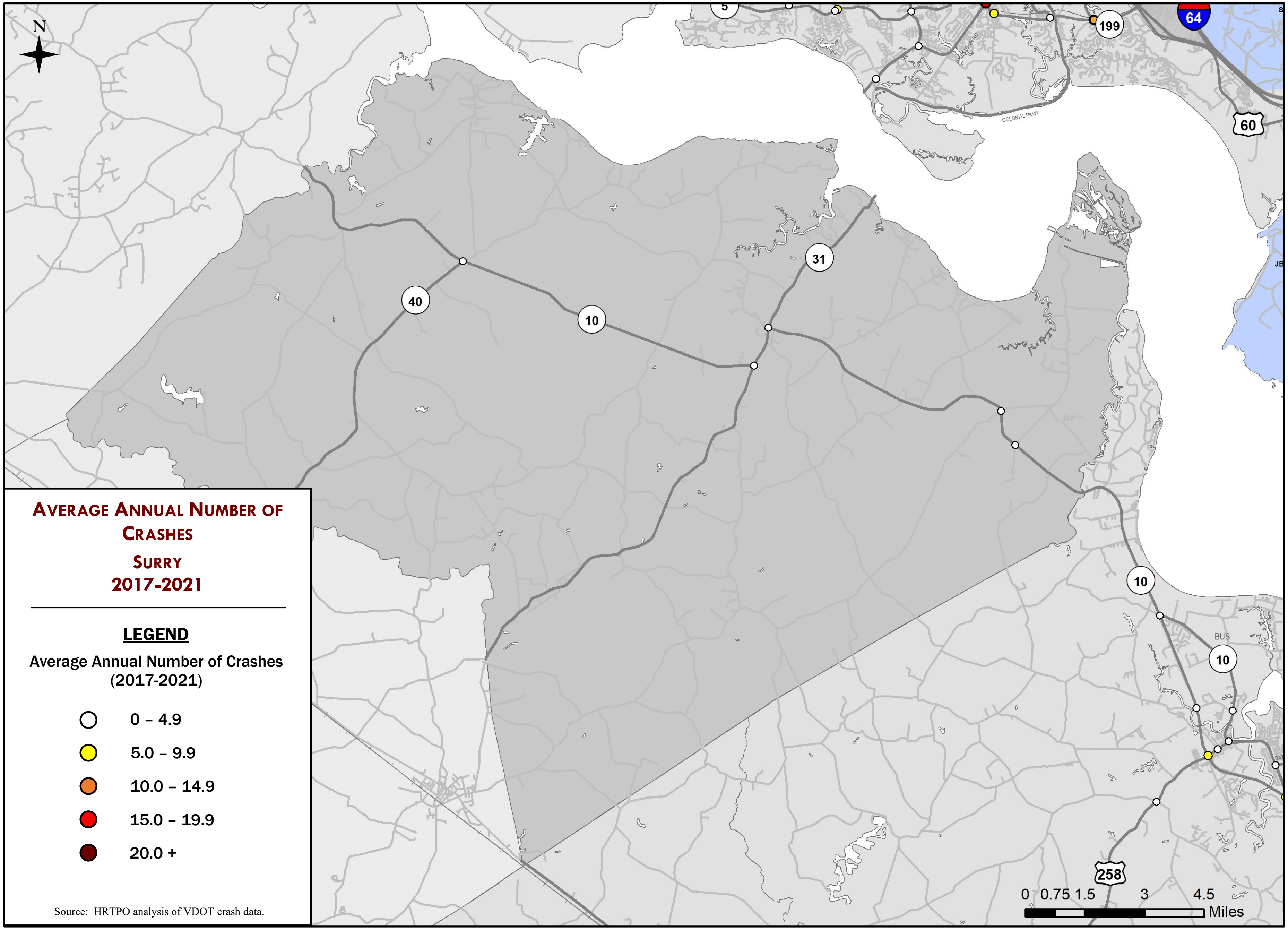

POTENTIAL FOR SAFETY IMPROVEMENT
SUFFOLK
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
Isle of Wight
Suffolk
Franklin
Portsmouth
Chesapeake
CRANEY ISLAND
Nansemond River
10
164
460
258
58
13
189
32
17
264
EVERETTS RD
KINGS FORK RD
BRIDGE RD
PUGHSVILLE RD
TAYLOR RD
BENNETTS PASTURE RD
NANSEMOND PKWY
PORTSMOUTH BLVD
AIRLINE BLVD
CEDAR RD
CAVALIER DR
VICTORY
MAIN ST
CAROLINA RD
COPELAND RD
GW HWY
VIRGINIA
0 1.25 2.5 Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

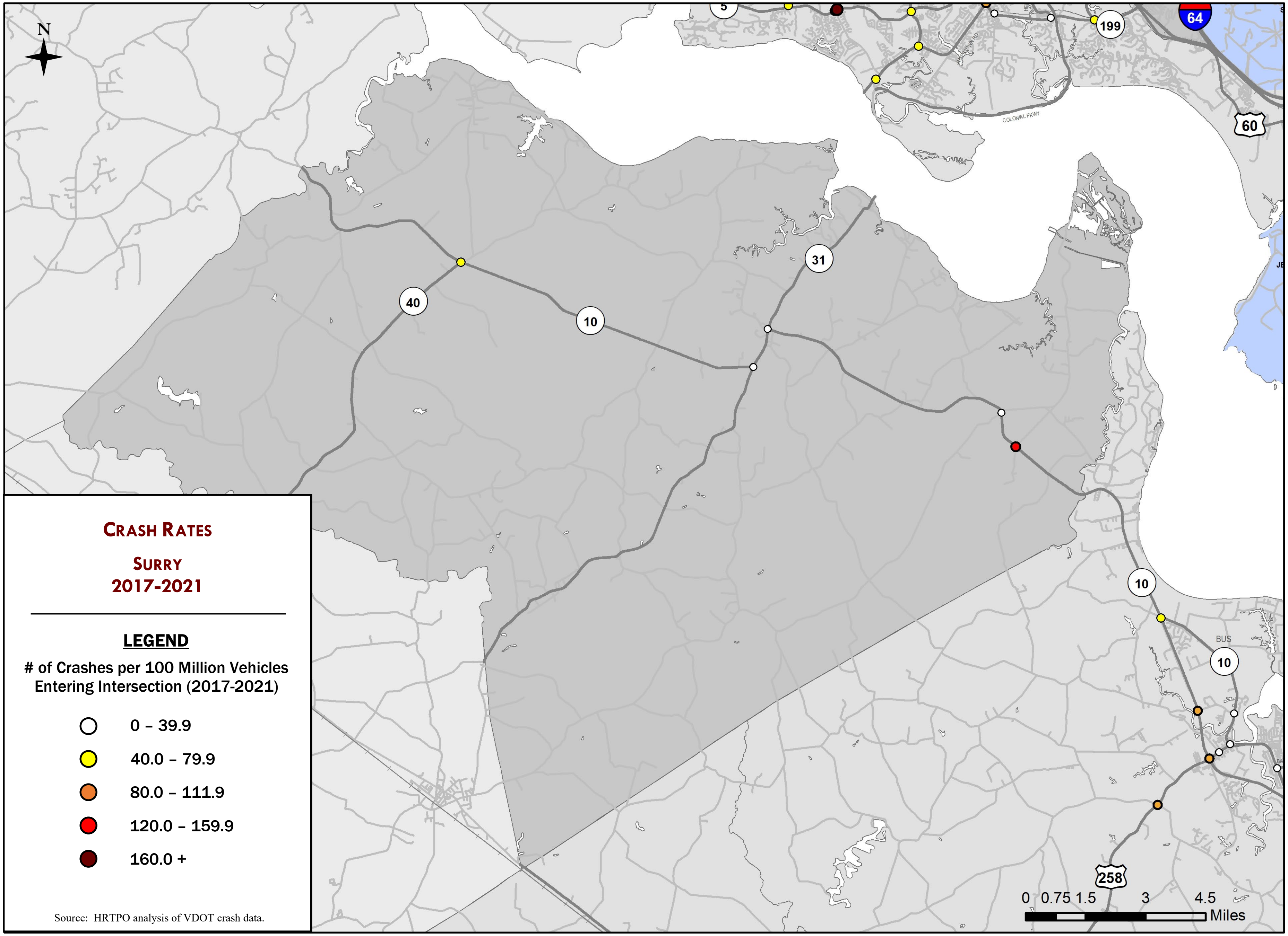

Crash Locations
Fatality or Serious Injury
Suffolk
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Zuni
Windsor
Walters Hwy
Sedley
Carrsville
Isle of Wight
Franklin
Franklin (City)
Southampton
Antioch Pines
Suffolk
Nansemond River
US Navy Craney Island
Portsmouth
Suffolk (City)
Chesapeake (City)
Great Dismal Swamp National Wildlife Refuge
Virginia
19 ft
0 1.25 2.5 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

SURRY

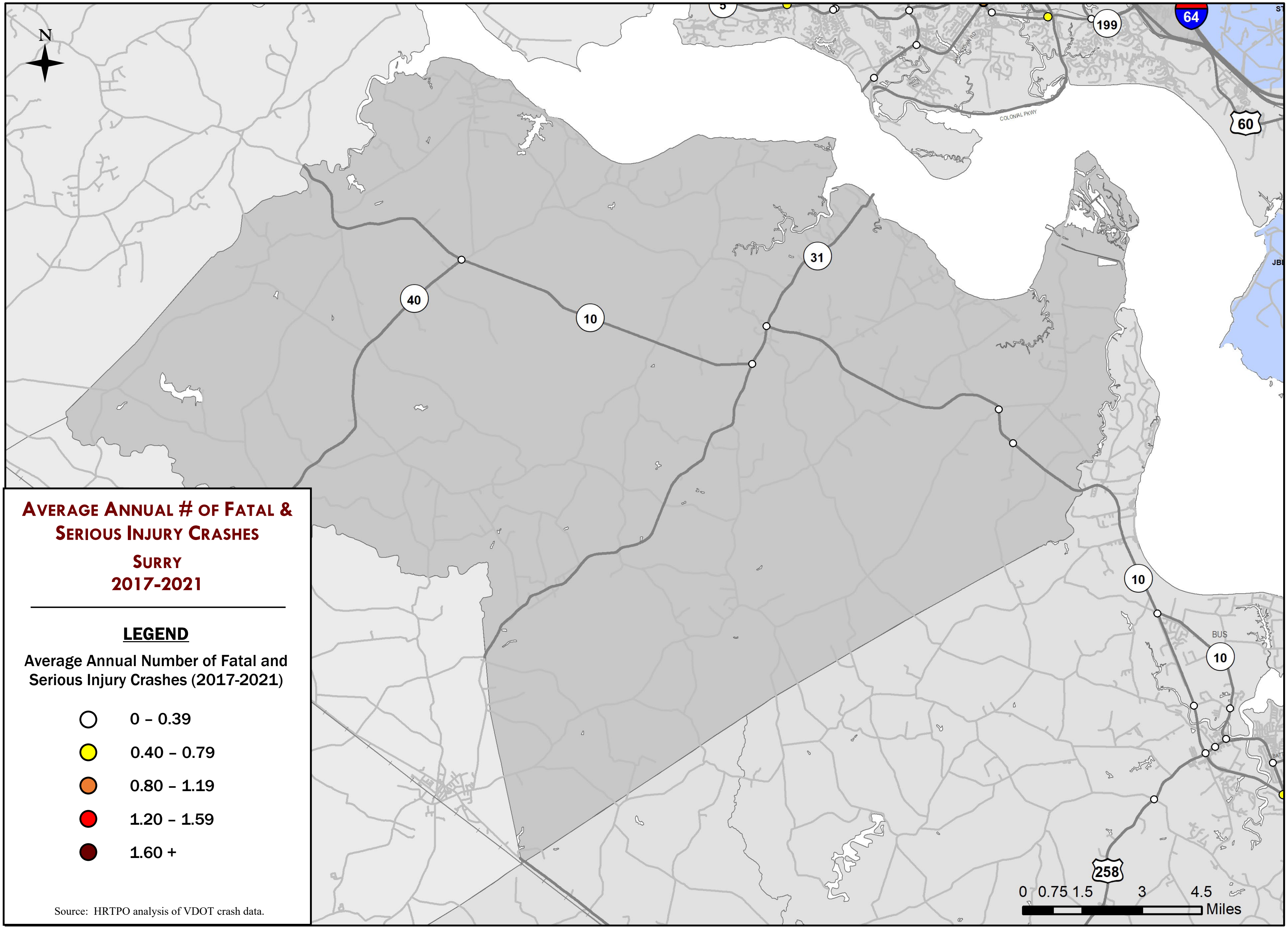
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
SUR	ROUTE 10	ROUTE 650 (HOG ISLAND RD)	12	1	126.79	1	1	1	10.57	1	1
SUR	ROUTE 10	ROUTE 31 (NORTH)	4	2	33.56	4	0	2	0.00	2	-
SUR	ROUTE 10	ROUTE 40	4	2	72.50	2	0	2	0.00	2	-
SUR	ROUTE 10	ROUTE 617 (WHITE MARSH RD)	4	2	38.14	3	0	2	0.00	2	-
SUR	ROUTE 10	ROUTE 31 (SOUTH)	2	5	23.22	5	0	2	0.00	2	-

Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.


AVERAGE ANNUAL NUMBER OF CRASHES
SURRY
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
5
199
64
60
COLONIAL PKWY
31
40
10
10
BUS
10
258
0 0.75 1.5 3 4.5
Miles



N
Crash Rates
Surry
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
64
199
60
31
40
10
10
BUS
10
258
COLONIAL PKWY
0 0.75 1.5 3 4.5
Miles



Average Annual # of Fatal & Serious Injury Crashes

Surry

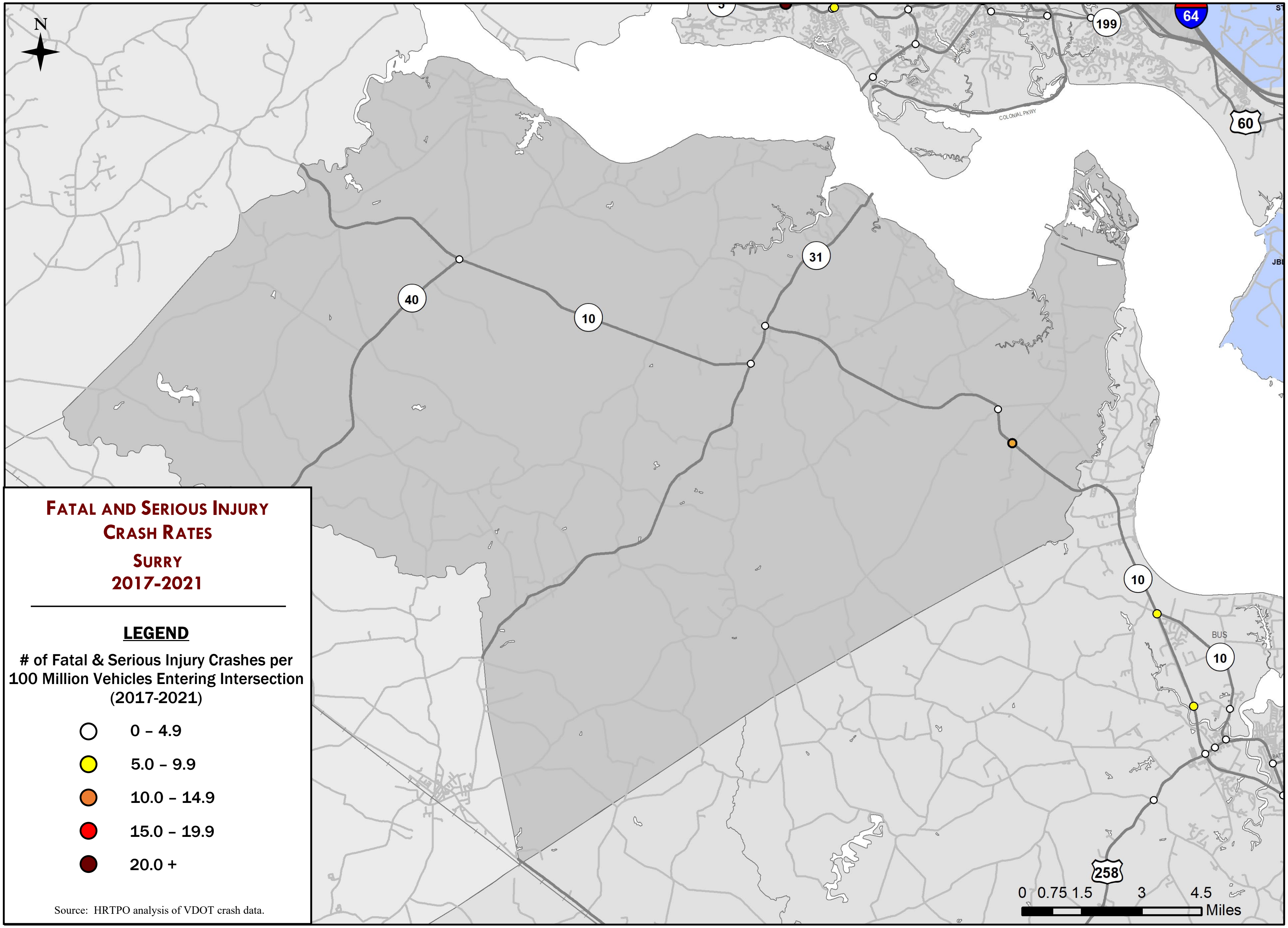
2017-2021

LEGEND

Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)

- 0 – 0.39
- 0.40 – 0.79
- 0.80 – 1.19
- 1.20 – 1.59
- 1.60 +

Source: HRTPO analysis of VDOT crash data.



Fatal and Serious Injury Crash Rates

Surry

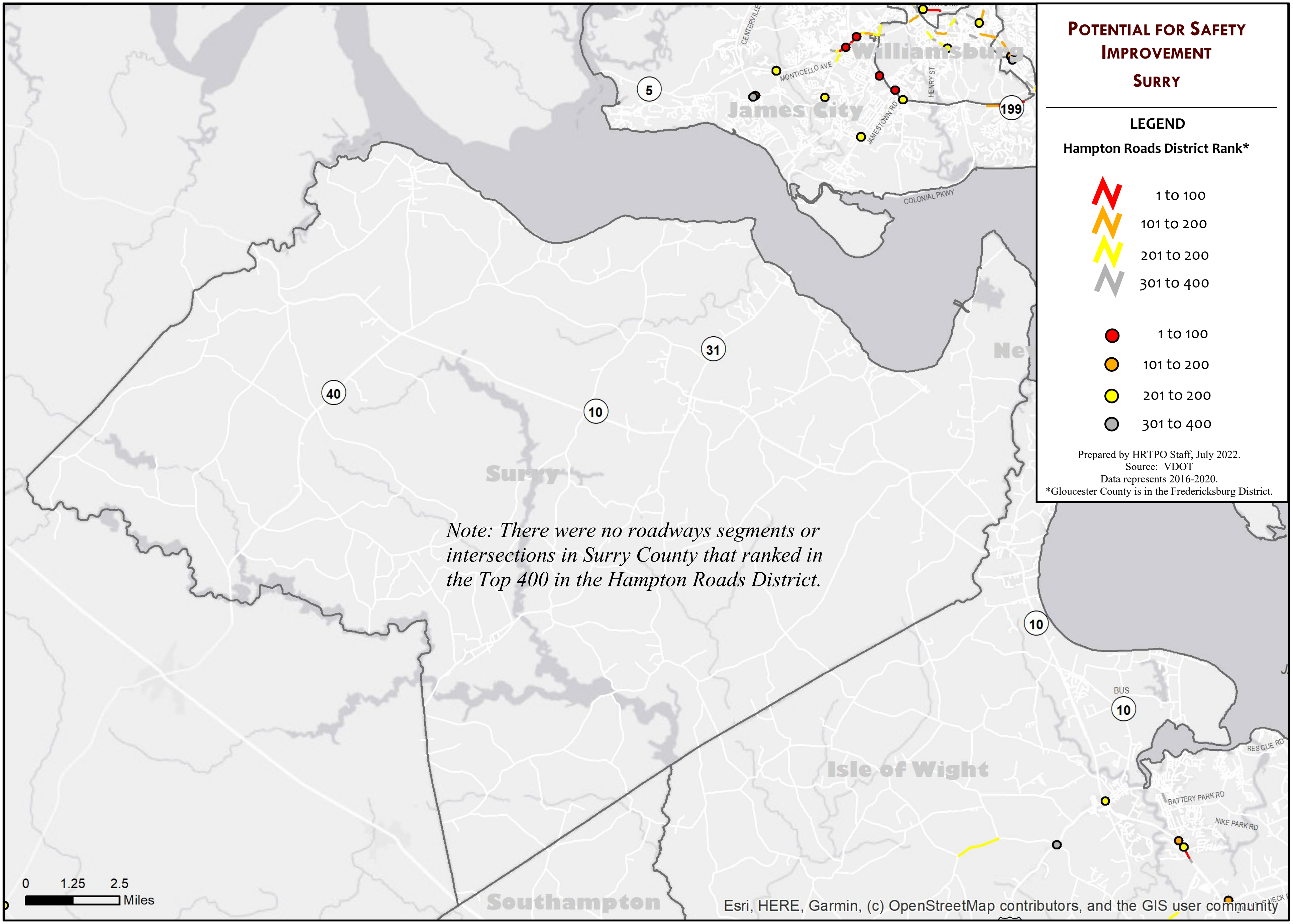
2017-2021

LEGEND

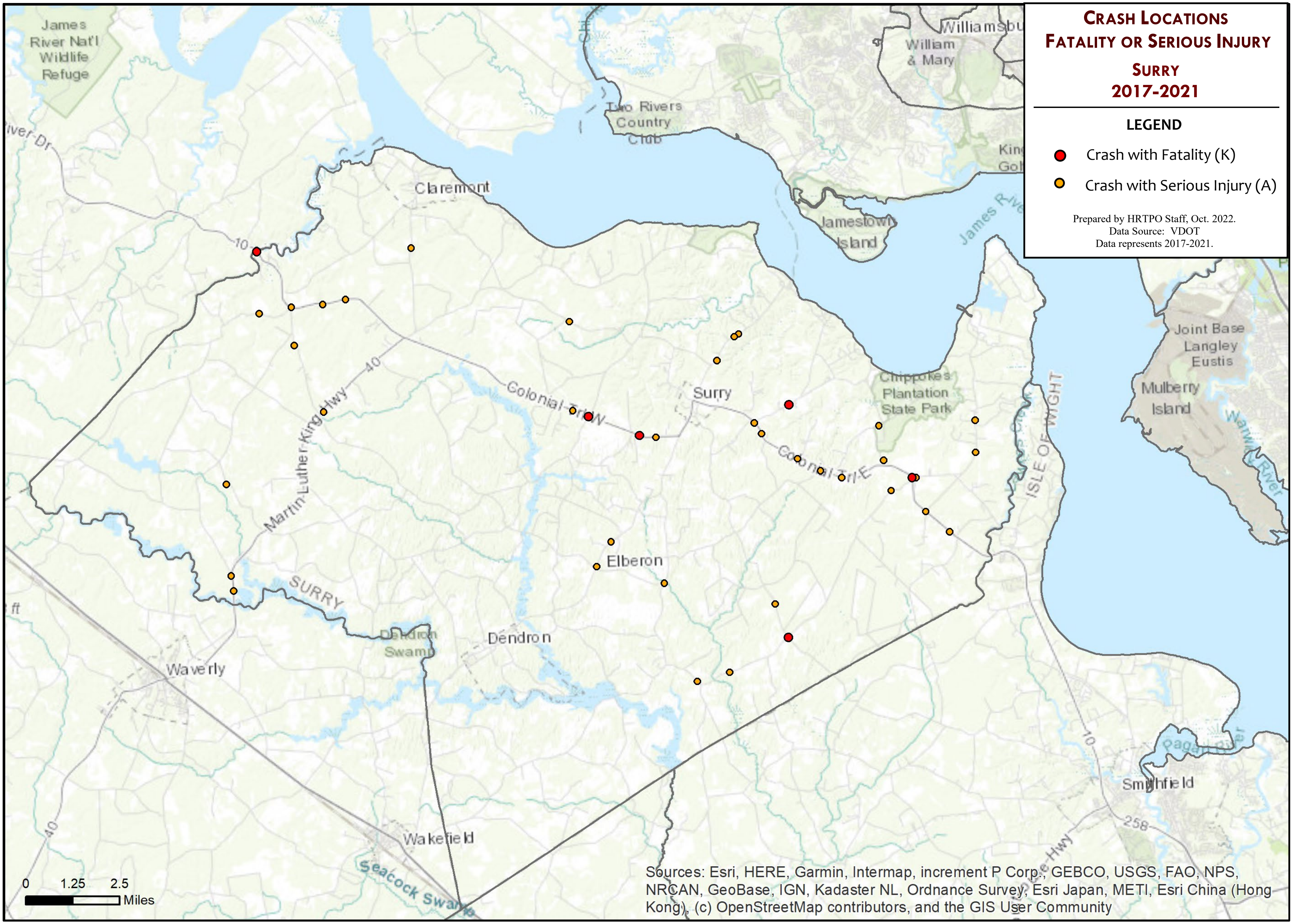
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)

- 0 – 4.9
- 5.0 – 9.9
- 10.0 – 14.9
- 15.0 – 19.9
- 20.0 +

Source: HRTPO analysis of VDOT crash data.



HAMPTON ROADS TPO


Crash Locations
Fatality or Serious Injury
Surry
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
James River Nat'l Wildlife Refuge
Two Rivers Country Club
William & Mary
Claremont
Jamestown Island
Joint Base Langley Eustis
Mulberry Island
Chippokes Plantation State Park
Surry
Colonial Trl W
Colonial Trl E
Martin Luther King Hwy
Elberon
SURRY
ISLE OF WIGHT
Dendron
Dendron Swamp
Waverly
Wakefield
Seacock Swamp
Smithfield
0 1.25 2.5 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Virginia Beach

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
VB	INDIAN RIVER RD	KEMPSVILLE RD	179	1	113.26	9	9	1	5.69	11	3
VB	FIRST COLONIAL RD	VA BEACH BLVD	160	2	164.80	1	3	10	3.09	36	1
VB	INDEPENDENCE BLVD	BONNEY RD/EUCLID RD	150	3	97.33	17	2	21	1.30	87	4
VB	HOLLAND RD	ROSEMONT RD	130	4	131.91	4	4	4	4.06	23	2
VB	PRINCESS ANNE RD	LYNNHAVEN PKWY	121	5	92.73	19	2	21	1.53	76	5
VB	GENERAL BOOTH BLVD	DAM NECK RD	111	6	106.33	12	2	21	1.92	61	8
VB	LYNNHAVEN PKWY	ROSEMONT RD	101	7	119.79	6	1	49	1.19	95	10
VB	NEWTOWN RD	BAKER RD	101	7	147.03	3	5	3	7.28	5	7
VB	MILITARY HWY	INDIAN RIVER RD	99	9	85.56	23	7	2	6.05	10	19
VB	ROSEMONT RD	BONNEY RD/I-264 RAMP	99	9	111.39	11	2	21	2.25	51	12
VB	VIRGINIA BEACH BLVD	GREAT NECK RD/LONDON BRIDGE RD	98	11	80.87	29	2	21	1.65	70	6
VB	INDEPENDENCE BLVD	BAXTER RD/SOUTH BLVD	95	12	59.19	79	2	21	1.25	90	18
VB	LYNNHAVEN PKWY	HOLLAND RD	93	13	83.40	26	1	49	0.90	101	11
VB	INDEPENDENCE BLVD	COLUMBUS ST	92	14	58.16	81	1	49	0.63	105	-
VB	INDEPENDENCE BLVD	VIRGINIA BEACH BLVD	92	14	51.33	100	4	4	2.23	52	9
VB	INDIAN RIVER RD	PROVIDENCE RD	88	16	89.96	20	3	10	3.07	37	25
VB	BIRDNECK RD	VA BEACH BLVD	86	17	152.40	2	2	21	3.54	28	14
VB	HOLLAND RD	WINDSOR OAKS BLVD	85	18	116.15	8	0	106	0.00	106	13
VB	LYNNHAVEN PKWY	INDEPENDENCE BLVD	84	19	89.55	22	1	49	1.07	97	17
VB	PRINCESS ANNE RD	DAM NECK RD	84	19	70.49	47	2	21	1.68	68	-
VB	FIRST COLONIAL RD	LASKIN RD	78	21	69.27	51	0	106	0.00	106	-
VB	GENERAL BOOTH BLVD	NIMMO PKWY	77	22	71.51	45	0	106	0.00	106	-
VB	NORTHAMPTON BLVD	BURTON STATION RD	74	23	70.29	48	0	106	0.00	106	-
VB	NORTHAMPTON BLVD	DIAMOND SPRINGS RD	74	23	58.09	82	3	10	2.36	49	-
VB	NORTHAMPTON BLVD	BAKER RD	72	25	64.42	65	4	4	3.58	27	-
VB	PRINCESS ANNE RD	BAXTER RD	72	25	105.21	14	3	10	4.38	19	29
VB	DAM NECK RD	HOLLAND RD	69	27	76.74	38	0	106	0.00	106	41
VB	NIMMO PKWY	UPTON DR	69	27	117.42	7	4	4	6.81	6	-
VB	INDEPENDENCE BLVD	EDWIN DR	68	29	46.30	119	1	49	0.68	104	-
VB	INDIAN RIVER RD	CENTERVILLE TPKE/PARKLAND LN	67	30	48.92	110	1	49	0.73	103	53
VB	DRAKESMILE RD/LONDON BRIDGE RD	SHIPPS CORNER RD/LONDON BRIDGE RD	65	31	105.66	13	1	49	1.63	72	30
VB	FERRELL PKWY	PLEASANT VALLEY RD	65	31	78.19	34	4	4	4.81	17	24
VB	LASKIN RD	BIRDNECK RD	64	33	93.02	18	1	49	1.45	79	32
VB	INDEPENDENCE BLVD	DAHLIA DR	63	34	112.74	10	3	10	5.37	15	20
VB	NORTHAMPTON BLVD	PLEASURE HOUSE RD	63	34	101.44	16	2	21	3.22	34	16
VB	VIRGINIA BEACH BLVD	WITCHDUCK RD	63	34	62.09	71	2	21	1.97	59	21
VB	PRINCESS ANNE RD	INDEPENDENCE BLVD	62	37	54.97	90	3	10	2.66	43	-
VB	PRINCESS ANNE RD	KEMPSVILLE RD/WITCHDUCK RD	62	37	61.43	74	2	21	1.98	58	-
VB	VIRGINIA BEACH BLVD	ROSEMONT RD	62	37	54.31	92	1	49	0.88	102	-
VB	LYNNHAVEN PKWY	POTTERS RD	60	40	65.17	64	0	106	0.00	106	-
VB	GENERAL BOOTH BLVD	OCEANA BLVD/PROSPERITY RD	59	41	62.11	70	0	106	0.00	106	-
VB	KEMPSVILLE RD	CENTERVILLE TPKE	59	41	76.79	37	0	106	0.00	106	-
VB	DAM NECK RD	LONDON BRIDGE RD	58	43	67.76	56	3	10	3.50	29	22
VB	LYNNHAVEN PKWY	SALEM RD	57	44	82.63	27	0	106	0.00	106	42
VB	VIRGINIA BEACH BLVD	KELLAM RD	57	44	80.04	31	0	106	0.00	106	47
VB	HOLLAND RD	SOUTH PLAZA TRAIL	56	46	71.08	46	1	49	1.27	88	54
VB	DIAMOND SPRINGS RD	WESLEYAN DR	55	47	79.94	32	0	106	0.00	106	28
VB	FERRELL PKWY	INDIAN LAKES BLVD	55	47	57.22	85	1	49	1.04	99	-
VB	KEMPSVILLE RD	PROVIDENCE RD	55	47	65.95	62	1	49	1.20	93	72
VB	DAM NECK RD	ROSEMONT RD	54	50	74.34	43	2	21	2.75	40	43

VIRGINIA BEACH (CONTINUED)

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
VB	INDIAN RIVER RD	KEMPS RIVER DR	54	50	46.09	121	0	106	0.00	106	-
VB	DAM NECK RD	DRAKESMILE RD	52	52	62.76	68	1	49	1.21	91	-
VB	LYNNHAVEN PKWY	N LYNNHAVEN RD	52	52	122.71	5	0	106	0.00	106	-
VB	INDIAN RIVER RD	LEVEL GREEN BLVD W	51	54	61.50	73	1	49	1.21	92	39
VB	INDEPENDENCE BLVD	WINDSOR OAKS BLVD	50	55	81.95	28	4	4	6.56	7	31
VB	GENERAL BOOTH BLVD	LONDON BRIDGE RD/RED MILL BLVD	49	56	67.46	58	1	49	1.38	84	-
VB	INDIAN RIVER RD	LYNNHAVEN PKWY	49	56	69.56	49	1	49	1.42	80	44
VB	LYNNHAVEN PKWY	INTERNATIONAL PKWY/MALL ENTRANCE	49	56	67.51	57	0	106	0.00	106	51
VB	GREAT NECK RD	OLD DONATION PKWY	48	59	76.21	39	1	49	1.59	74	33
VB	FIRST COLONIAL RD	WOLFSNARE RD	47	60	68.68	53	0	106	0.00	106	-
VB	GREAT NECK RD	FIRST COLONIAL RD/LAUREL COVE DR	47	60	50.35	105	0	106	0.00	106	23
VB	PRINCESS ANNE RD	PLAZA TRAIL/PROVIDENCE RD	47	60	53.76	95	0	106	0.00	106	-
VB	HOLLAND RD/INDEPENDENCE BLVD	INDEPENDENCE BLVD	46	63	35.06	160	0	106	0.00	106	-
VB	PRINCESS ANNE RD	NIMMO PKWY	46	63	50.11	107	1	49	1.09	96	-
VB	INDEPENDENCE BLVD	PLEASURE HOUSE RD	45	65	53.96	94	2	21	2.40	48	-
VB	LASKIN RD	REGENCY DR	45	65	77.39	35	1	49	1.72	65	27
VB	ROSEMONT RD	BOW CREEK BLVD	45	65	78.80	33	2	21	3.50	30	40
VB	ROSEMONT RD	SOUTH PLAZA TRAIL	45	65	65.53	63	0	106	0.00	106	62
VB	SHORE DR	INDEPENDENCE BLVD/LITTLE CREEK GATE 5	45	65	68.11	55	0	106	0.00	106	-
VB	VIRGINIA BEACH BLVD	SOUTH PLAZA TRAIL/LITTLE NECK RD	45	65	45.60	124	2	21	2.03	56	36
VB	INDEPENDENCE BLVD	SOUTH PLAZA TRAIL	43	71	51.21	101	1	49	1.19	94	-
VB	VIRGINIA BEACH BLVD	CONSTITUTION DR	43	71	49.31	109	0	106	0.00	106	26
VB	LYNNHAVEN PKWY	PLEASANT VALLEY RD	41	73	75.77	41	3	10	5.54	14	-
VB	INDEPENDENCE BLVD	JEANNE ST	40	74	40.27	138	0	106	0.00	106	-
VB	WITCHDUCK RD	CLEVELAND ST	39	75	60.47	77	0	106	0.00	106	-
VB	INDEPENDENCE BLVD	JERICHO RD	38	76	38.85	143	1	49	1.02	100	-
VB	LYNNHAVEN PKWY	ROUND HILL DR	38	76	76.83	36	1	49	2.02	57	-
VB	PRINCESS ANNE RD	CONCERT DR	38	76	36.34	155	0	106	0.00	106	-
VB	22ND ST	BALTIC AVE	37	79	105.05	15	2	21	5.68	12	48
VB	BAXTER RD	BONNEY RD	37	79	80.74	30	0	106	0.00	106	-
VB	GENERAL BOOTH BLVD/PRINCESS ANNE RD	PRINCESS ANNE RD/TUSCANY DR	37	79	66.21	60	0	106	0.00	106	-
VB	GREAT NECK RD	WOLFSNARE RD	37	79	63.51	67	0	106	0.00	106	-
VB	PACIFIC AVE	22ND ST	36	83	89.66	21	0	106	0.00	106	-
VB	SHORE DR	GREAT NECK RD	36	83	57.11	86	0	106	0.00	106	-
VB	LYNNHAVEN PKWY	S LYNNHAVEN RD	35	85	46.62	117	1	49	1.33	86	-
VB	PACIFIC AVE	VA BEACH BLVD	35	85	73.65	44	2	21	4.21	21	-
VB	PRINCESS ANNE RD	TIMBERLAKE DR	35	85	66.02	61	0	106	0.00	106	-
VB	GREAT NECK RD	MILL DAM RD	34	88	46.14	120	1	49	1.36	85	-
VB	PACIFIC AVE	21ST ST	34	88	84.30	25	2	21	4.96	16	59
VB	PRINCESS ANNE RD	EDWIN DR	34	88	61.67	72	0	106	0.00	106	77
VB	FIRST COLONIAL RD	OLD DONATION PKWY	33	91	45.08	128	0	106	0.00	106	-
VB	PRINCESS ANNE RD	SALEM RD/WINDSOR OAKS BLVD	33	91	40.79	137	3	10	3.71	26	-
VB	SHORE DR	DIAMOND SPRINGS RD	33	91	46.01	122	1	49	1.39	82	-
VB	DAM NECK RD	HARPERS RD	31	94	53.99	93	2	21	3.48	31	65
VB	INDEPENDENCE BLVD	HAYGOOD RD/WISHART RD	31	94	35.18	159	2	21	2.27	50	-
VB	SHORE DR	PLEASURE HOUSE RD	31	94	67.41	59	2	21	4.35	20	-
VB	VIRGINIA BEACH BLVD	ARAGONA BLVD	31	94	45.36	126	1	49	1.46	78	61
VB	VIRGINIA BEACH BLVD	N LYNNHAVEN RD	31	94	38.41	144	0	106	0.00	106	-
VB	HOLLAND RD	SHIPPS CORNER RD	30	99	45.59	125	0	106	0.00	106	-
VB	KEMPSVILLE RD	ALBRIGHT DR	30	99	50.88	103	1	49	1.70	66	75

VIRGINIA BEACH (CONTINUED)

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
VB	DIAMOND SPRINGS RD/NEWTOWN RD	NEWTOWN RD	29	101	59.67	78	0	106	0.00	106	-
VB	BIRDNECK RD	19TH ST	28	102	52.63	98	3	10	5.64	13	-
VB	HOLLAND RD	NIMMO PKWY	27	103	50.98	102	1	49	1.89	63	-
VB	PRINCESS ANNE RD	PARLIAMENT DR N	27	103	56.45	88	3	10	6.27	8	-
VB	WITCHDUCK RD	ARAGONA BLVD	27	103	68.15	54	0	106	0.00	106	67
VB	GENERAL BOOTH BLVD	BIRDNECK RD	26	106	53.20	97	1	49	2.05	55	-
VB	INDEPENDENCE BLVD	PEMBROKE BLVD	26	106	27.63	182	1	49	1.06	98	-
VB	INDEPENDENCE BLVD	WITCHDUCK RD	26	106	31.00	172	0	106	0.00	106	-
VB	LONDON BRIDGE RD	POTTERS RD	26	106	38.98	142	0	106	0.00	106	-
VB	SHORE DR	WEST GREAT NECK RD	26	106	37.20	152	0	106	0.00	106	-
VB	KEMPSVILLE RD	BRANDON RD	25	111	42.92	132	0	106	0.00	106	-
VB	LYNNHAVEN PKWY	MAGIC HALLOW BLVD S	25	111	37.06	153	0	106	0.00	106	-
VB	MILITARY HWY	PROVIDENCE RD	25	111	33.99	165	2	21	2.72	41	-
VB	ROSEMONT RD	SILINA DR	25	111	41.98	133	1	49	1.68	67	-
VB	DAM NECK RD	CORPORATE LANDING PKWY	24	115	46.31	118	1	49	1.93	60	-
VB	NORTH LANDING RD	WEST NECK RD	24	115	62.56	69	0	106	0.00	106	-
VB	OCEANA BLVD	HARPERS RD	24	115	38.08	148	0	106	0.00	106	-
VB	PACIFIC AVE	19TH ST	24	115	68.92	52	0	106	0.00	106	60
VB	PRINCESS ANNE RD/SANDBRIDGE RD	UPTON DR/PRINCESS ANNE RD	24	115	46.62	116	0	106	0.00	106	-
VB	VIRGINIA BEACH BLVD	LYNNHAVEN PKWY	24	115	30.09	174	1	49	1.25	89	-
VB	LONDON BRIDGE RD	INTERNATIONAL PKWY	23	121	37.49	151	0	106	0.00	106	-
VB	LYNNHAVEN PKWY	DAHLIA DR	23	121	47.34	114	0	106	0.00	106	-
VB	OCEANA BLVD	BELLS RD	22	123	35.69	157	1	49	1.62	73	-
VB	CENTERVILLE TPKE	LYNNHAVEN PKWY	21	124	43.16	130	1	49	2.06	54	34
VB	GREAT NECK RD	ADAM KEELING RD	21	124	34.92	161	1	49	1.66	69	-
VB	KEMPSVILLE RD	KEMPS RIVER DR	21	124	34.92	161	0	106	0.00	106	-
VB	WESLEYAN DR	BAKER RD	21	124	52.35	99	1	49	2.49	46	-
VB	FIRST COLONIAL RD	MILL DAM RD	20	128	27.79	181	1	49	1.39	83	-
VB	LYNNHAVEN PKWY	MAGIC HALLOW BLVD N	20	128	30.10	173	0	106	0.00	106	-
VB	PRINCESS ANNE RD	PARLIAMENT DR S	20	128	41.21	135	1	49	2.06	53	-
VB	PROVIDENCE RD	WHITEHURST LANDING RD	20	128	50.41	104	1	49	2.52	45	-
VB	SHORE DR	FIRST COURT RD	20	128	29.20	178	2	21	2.92	38	-
VB	COLUMBUS ST	KELLAM RD	19	133	75.94	40	0	106	0.00	106	74
VB	HAYGOOD RD	FERRY PLANTATION RD	19	133	56.58	87	0	106	0.00	106	63
VB	NORTH LANDING RD	INDIAN RIVER RD	19	133	60.99	76	0	106	0.00	106	-
VB	PROVIDENCE RD	INDIAN LAKES BLVD	19	133	53.33	96	0	106	0.00	106	-
VB	SALEM RD	DAM NECK RD/ELBOW RD	19	133	45.21	127	0	106	0.00	106	-
VB	WITCHDUCK RD	JERICHO RD	19	133	57.55	84	0	106	0.00	106	-
VB	WITCHDUCK RD	PEMBROKE BLVD	19	133	69.45	50	2	21	7.31	4	-
VB	FIRST COLONIAL RD	OCEANA BLVD	18	140	29.89	175	0	106	0.00	106	-
VB	KEMPSVILLE RD	WHITEHURST LANDING RD	18	140	34.12	164	1	49	1.90	62	-
VB	PACIFIC AVE	LASKIN RD	18	140	45.83	123	0	106	0.00	106	-
VB	WITCHDUCK RD	BONNEY RD	18	140	29.52	177	1	49	1.64	71	-
VB	DAM NECK RD	UPTON DR	17	144	43.63	129	0	106	0.00	106	-
VB	INDIAN RIVER RD/ELBOW RD	INDIAN RIVER RD (EAST)	17	144	54.63	91	0	106	0.00	106	-
VB	PACIFIC AVE	NORFOLK AVE	17	144	43.15	131	1	49	2.54	44	-
VB	ROSEMONT RD	DAHLIA DR	17	144	39.74	140	0	106	0.00	106	-
VB	DIAMOND SPRINGS RD	BAYSIDE RD	16	148	28.94	180	1	49	1.81	64	-
VB	SANDBRIDGE RD	NEW BRIDGE RD	16	148	84.46	24	0	106	0.00	106	76
VB	VIRGINIA BEACH BLVD	DORSET AVE	16	148	24.48	186	1	49	1.53	77	-

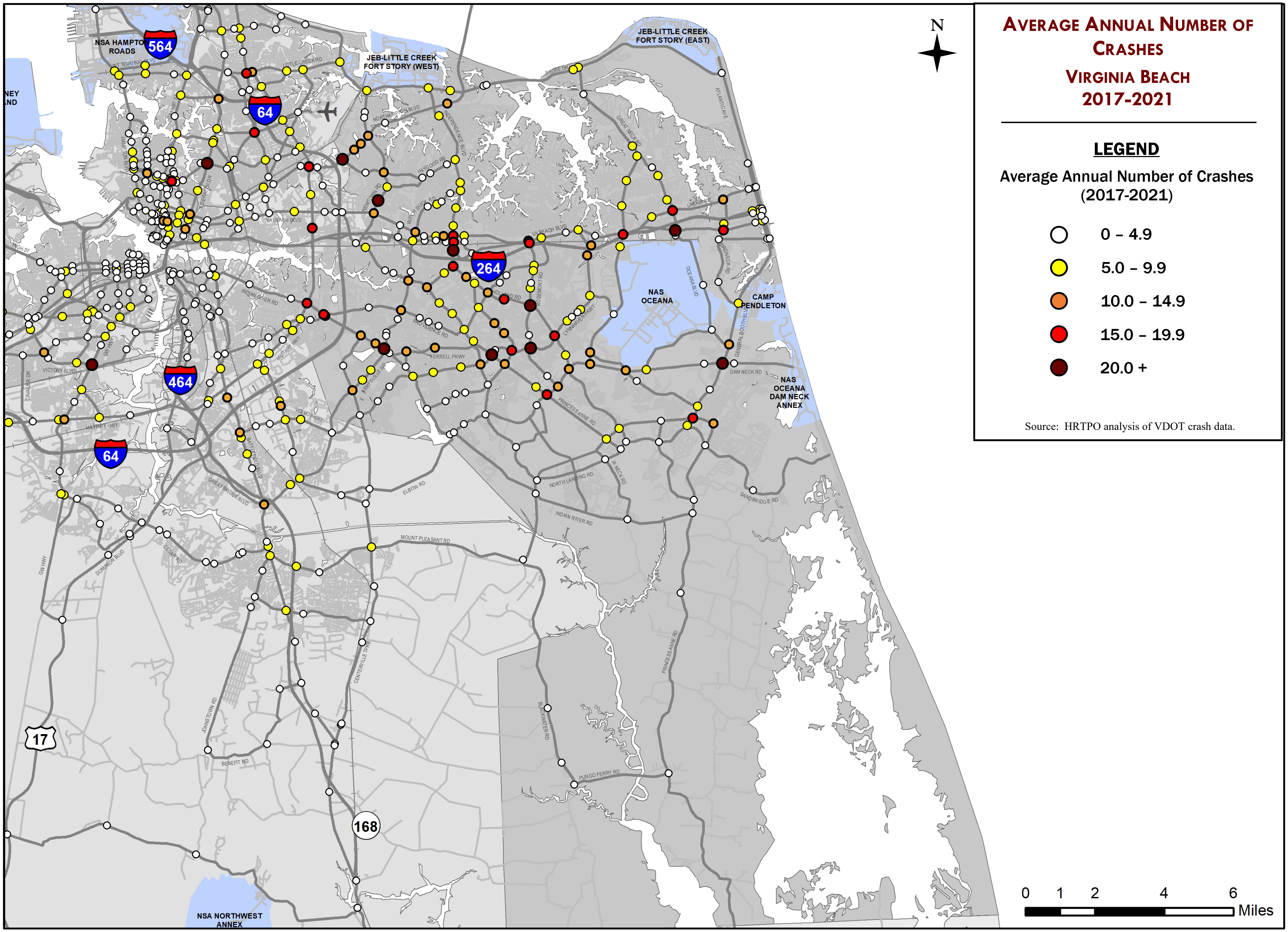
VIRGINIA BEACH (CONTINUED)

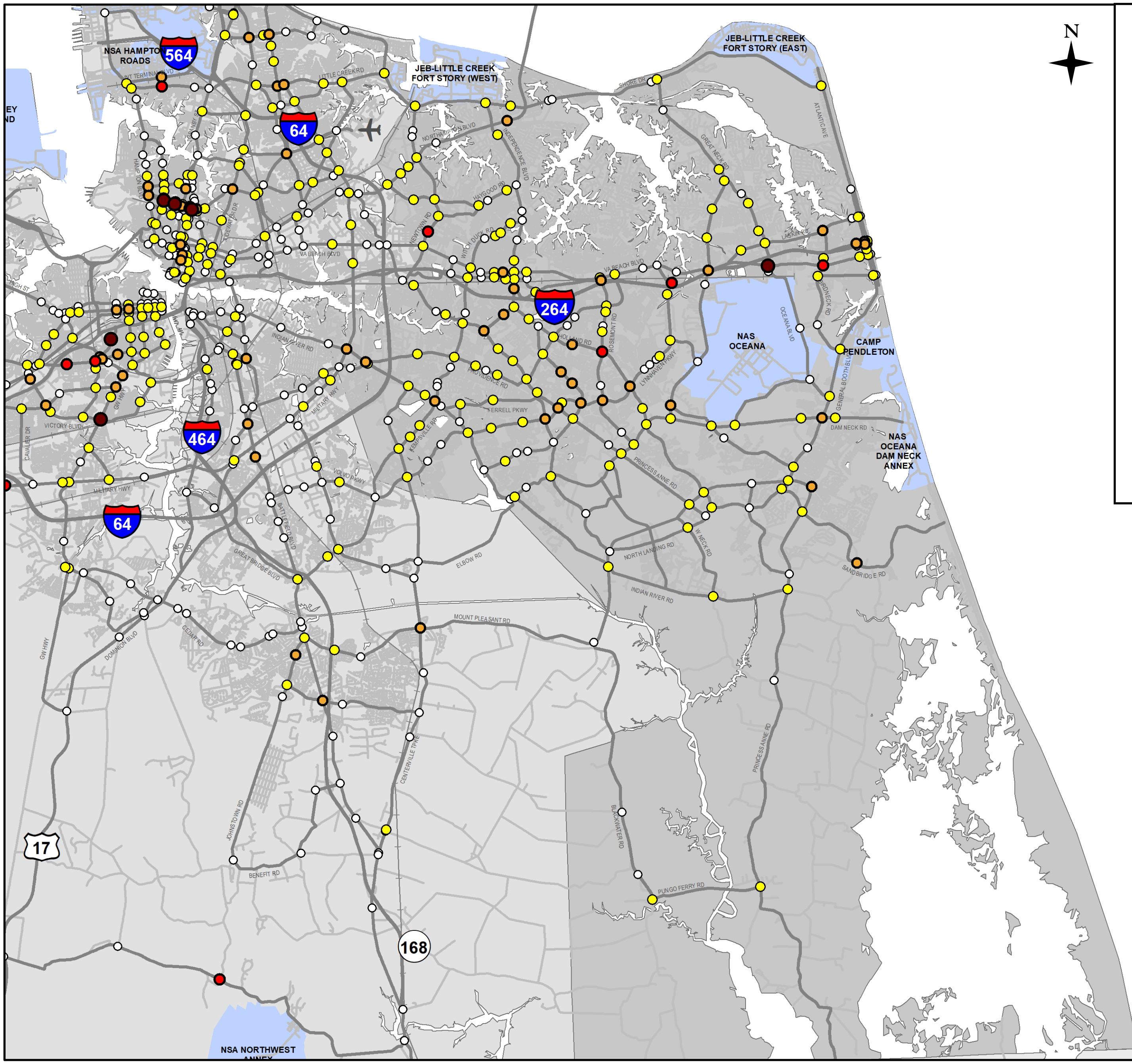
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
VB	VIRGINIA BEACH BLVD	KINGS GRANT RD	16	148	23.47	189	0	106	0.00	106	-
VB	BIRDNECK RD	NORFOLK AVE	15	152	46.73	115	2	21	6.23	9	-
VB	BONNEY RD	CONSTITUTION DR	15	152	47.79	111	1	49	3.19	35	-
VB	INDIAN RIVER RD	WEST NECK RD	15	152	75.41	42	0	106	0.00	106	70
VB	PRINCESS ANNE RD	INDIAN RIVER RD	15	152	61.38	75	1	49	4.09	22	-
VB	SHORE DRIVE/ATLANTIC AVE	ATLANTIC AVE	15	152	63.52	66	2	21	8.47	1	-
VB	DAM NECK RD	LANDSTOWN RD	14	157	41.27	134	0	106	0.00	106	-
VB	HAYGOOD RD	ARAGONA BLVD	14	157	39.44	141	0	106	0.00	106	-
VB	INDIAN RIVER RD/INDIAN LAKES BLVD	INDIAN RIVER RD/SETTLERS PARK DR	14	157	29.11	179	0	106	0.00	106	-
VB	NORTHAMPTON BLVD	BAYSIDE RD	14	157	19.75	195	1	49	1.41	81	-
VB	PRINCESS ANNE RD	HOLLAND RD	14	157	55.63	89	0	106	0.00	106	68
VB	PROVIDENCE RD	TIMBERLAKE DR	14	157	47.62	113	0	106	0.00	106	-
VB	WESLEYAN DR/HAYGOOD RD	HAYGOOD RD	14	157	40.14	139	1	49	2.87	39	-
VB	GENERAL BOOTH BLVD	CULVER LN	13	164	21.68	192	0	106	0.00	106	-
VB	SALEM RD	INDEPENDENCE BLVD	13	164	32.09	170	1	49	2.47	47	-
VB	FERRELL PKWY/INDIAN RIVER RD	INDIAN RIVER RD	12	166	10.78	207	0	106	0.00	106	-
VB	NIMMO PKWY	SEABOARD RD	12	166	24.31	188	0	106	0.00	106	-
VB	INDIAN RIVER RD (WEST)	ELBOW RD	11	168	35.58	158	1	49	3.23	33	-
VB	PRINCESS ANNE RD	SEABOARD RD (NORTH)	11	168	32.69	169	0	106	0.00	106	-
VB	PROVIDENCE RD	COLLEGE PARK BLVD	11	168	34.56	163	0	106	0.00	106	-
VB	PROVIDENCE RD	EDWIN DR	11	168	38.02	150	1	49	3.46	32	-
VB	ROSEMONT RD	OLD FORGE RD	11	168	20.98	193	0	106	0.00	106	-
VB	VIRGINIA BEACH BLVD	BALTIC AVE	11	168	50.23	106	0	106	0.00	106	-
VB	ELBOW RD	ROUND HILL DR	10	174	38.32	147	2	21	7.66	3	-
VB	INDIAN RIVER RD	INDEPENDENCE BLVD	10	174	33.74	168	0	106	0.00	106	-
VB	KEMPSVILLE RD	STRATFORD CHASE DR	10	174	19.31	196	2	21	3.86	24	-
VB	ATLANTIC AVE/PACIFIC AVE	ATLANTIC AVE	9	177	24.44	187	1	49	2.72	42	-
VB	LASKIN RD	HOLLY RD	9	177	14.82	203	0	106	0.00	106	-
VB	LYNNHAVEN PKWY	ALBRIGHT DR	9	177	26.67	184	0	106	0.00	106	-
VB	LYNNHAVEN PKWY	KINGS ARMS DR	9	177	13.60	204	0	106	0.00	106	-
VB	CLEVELAND ST	ARAGONA BLVD	8	181	47.65	112	0	106	0.00	106	-
VB	INDEPENDENCE BLVD	BELSPRING DR W	8	181	40.97	136	0	106	0.00	106	-
VB	LONDON BRIDGE RD	HARPERS RD	8	181	20.27	194	0	106	0.00	106	-
VB	NORTH LANDING RD	SALEM RD	8	181	31.97	171	0	106	0.00	106	-
VB	VIRGINIA BEACH BLVD	CLEARFIELD AVE	8	181	12.37	206	1	49	1.55	75	-
VB	21ST ST	BALTIC AVE	7	186	22.16	191	0	106	0.00	106	-
VB	ATLANTIC AVE	22ND ST	7	186	57.59	83	1	49	8.23	2	-
VB	BIRDNECK RD	BELLS RD	7	186	26.18	185	1	49	3.74	25	-
VB	CLEVELAND ST	EUCLID RD	7	186	33.91	166	0	106	0.00	106	-
VB	ROSEMONT RD	CONCERT DR	7	186	22.83	190	0	106	0.00	106	-
VB	SOUTH PLAZA TR	OLD FORGE RD	7	186	38.05	149	0	106	0.00	106	-
VB	SOUTH PLAZA TR	WINDSOR OAKS BLVD	7	186	33.88	167	0	106	0.00	106	-
VB	CENTERVILLE TPKE	BRANDON RD	6	193	17.54	199	0	106	0.00	106	-
VB	INDEPENDENCE BLVD	ROUND HILL DR	6	193	26.95	183	1	49	4.49	18	-
VB	PRINCESS ANNE RD	PUNGO FERRY RD	6	193	49.78	108	0	106	0.00	106	-
VB	PRINCESS ANNE RD	SUSQUEHANNA DR	6	193	13.33	205	0	106	0.00	106	-
VB	WITCHDUCK RD	KELLAM RD	6	193	18.91	197	0	106	0.00	106	-
VB	PRINCESS ANNE RD	WEST NECK RD	5	198	36.34	156	0	106	0.00	106	-
VB	SHORE DR	INDIAN HILL RD	5	198	7.97	209	0	106	0.00	106	-
VB	ATLANTIC AVE	17TH ST/VA BEACH BLVD	4	200	18.61	198	0	106	0.00	106	-

VIRGINIA BEACH (CONTINUED)

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
VB	ATLANTIC AVE	9TH ST/NORFOLK AVE	4	200	29.62	176	0	106	0.00	106	-
VB	BLACKWATER RD	PUNGO FERRY RD	4	200	59.08	80	0	106	0.00	106	-
VB	CONSTITUTION DR	COLUMBUS ST	4	200	15.70	202	0	106	0.00	106	-
VB	SALEM RD	LANDSTOWN RD	4	200	38.38	145	0	106	0.00	106	-
VB	ATLANTIC AVE	21ST ST	3	205	16.16	200	0	106	0.00	106	-
VB	DIAMOND SPRINGS RD	THURSTON AVE	3	205	5.63	211	0	106	0.00	106	-
VB	ATLANTIC AVE	31ST ST	2	207	15.81	201	0	106	0.00	106	-
VB	BLACKWATER RD	HEAD RIVER RD	2	207	38.38	145	0	106	0.00	106	-
VB	BLACKWATER RD	LAND OF PROMISE RD	2	207	36.90	154	0	106	0.00	106	-
VB	NORTH LANDING RD/PRINCESS ANNE RD	PRINCESS ANNE RD	2	207	4.11	212	0	106	0.00	106	-
VB	PRINCESS ANNE RD	SEABOARD RD (SOUTH)	2	207	9.20	208	0	106	0.00	106	-
VB	INDEPENDENCE BLVD	BELSPRING DR E	1	212	5.68	210	0	106	0.00	106	-
VB	CLEVELAND ST	CLEARFIELD AVE	0	213	0.00	213	0	106	0.00	106	-
VB	LYNNHAVEN PKWY	BEAUFAIN BLVD	0	213	0.00	213	0	106	0.00	106	-

Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.


AVERAGE ANNUAL NUMBER OF CRASHES
VIRGINIA BEACH
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
0 1 2 4 6 Miles
NSA HAMPTON ROADS
JEB-LITTLE CREEK FORT STORY (WEST)
JEB-LITTLE CREEK FORT STORY (EAST)
NAS OCEANA
CAMP PENDLETON
NAS OCEANA DAM NECK ANNEX
NSA NORTHWEST ANNEX
564
64
264
464
17
168



Crash Rates

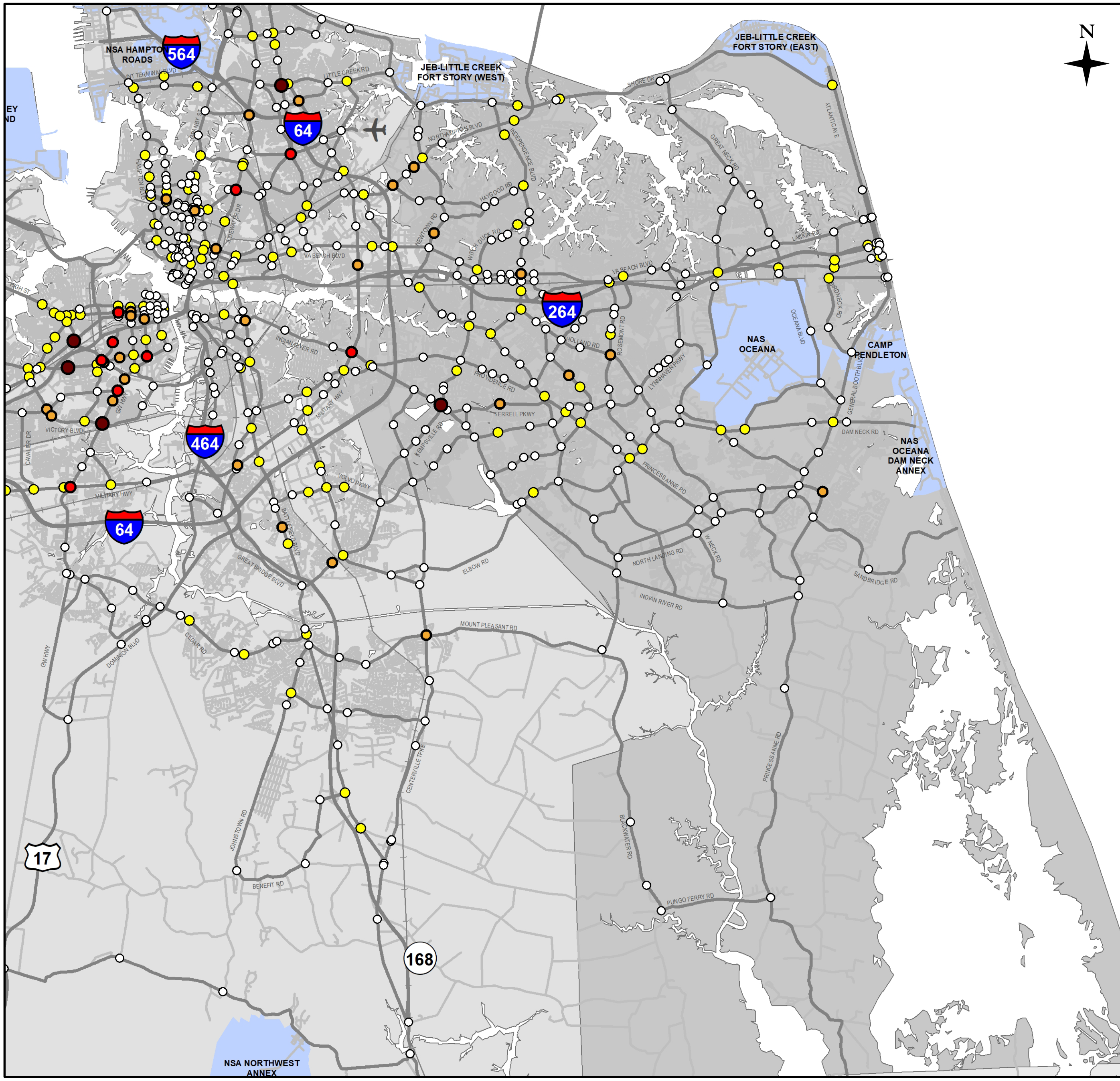
Virginia Beach 2017-2021

LEGEND

# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)

- 0 – 39.9
- 40.0 – 79.9
- 80.0 – 111.9
- 120.0 – 159.9
- 160.0 +

Source: HRTPO analysis of VDOT crash data.



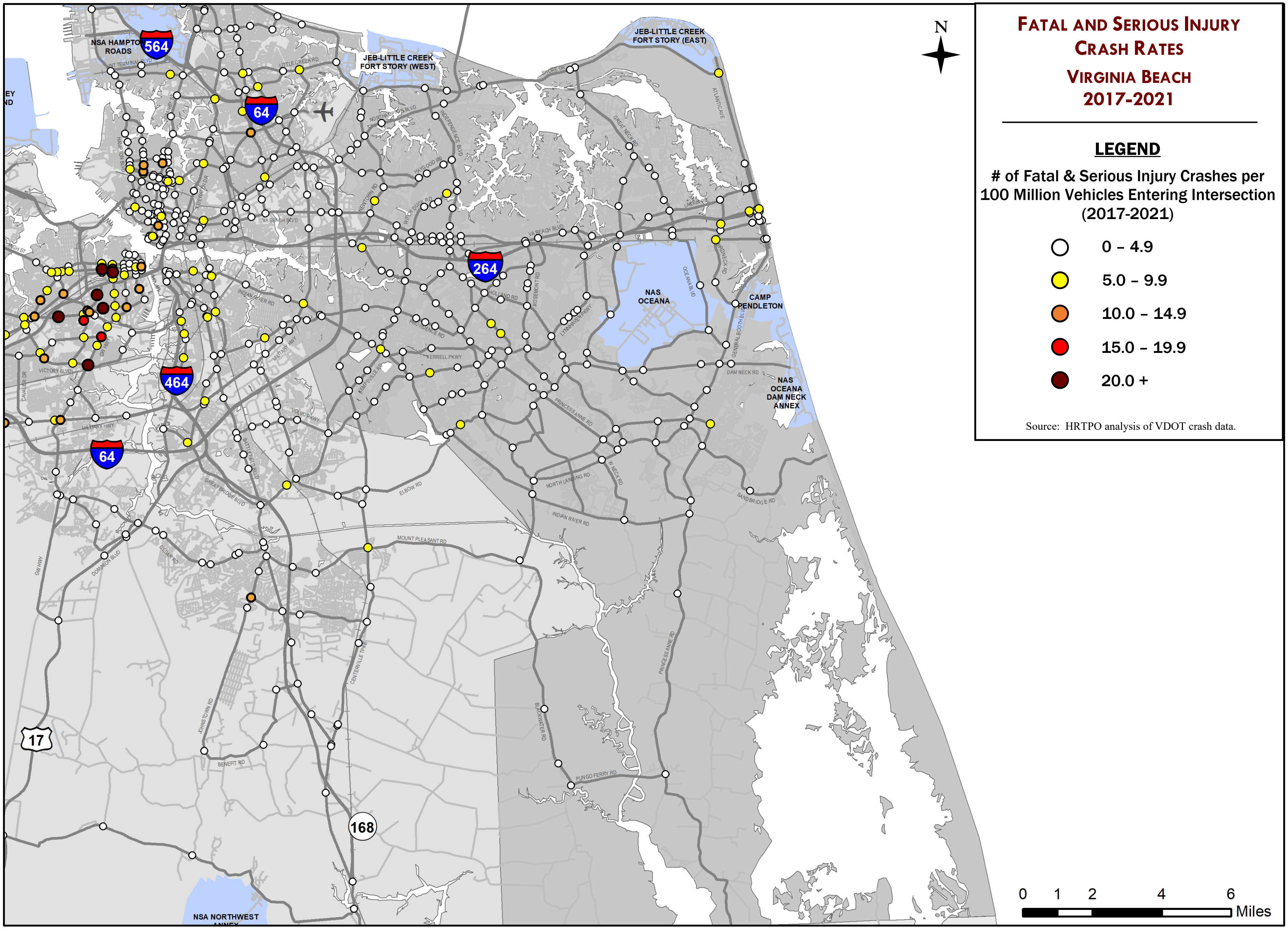
Average Annual # of Fatal & Serious Injury Crashes
Virginia Beach
2017-2021

LEGEND

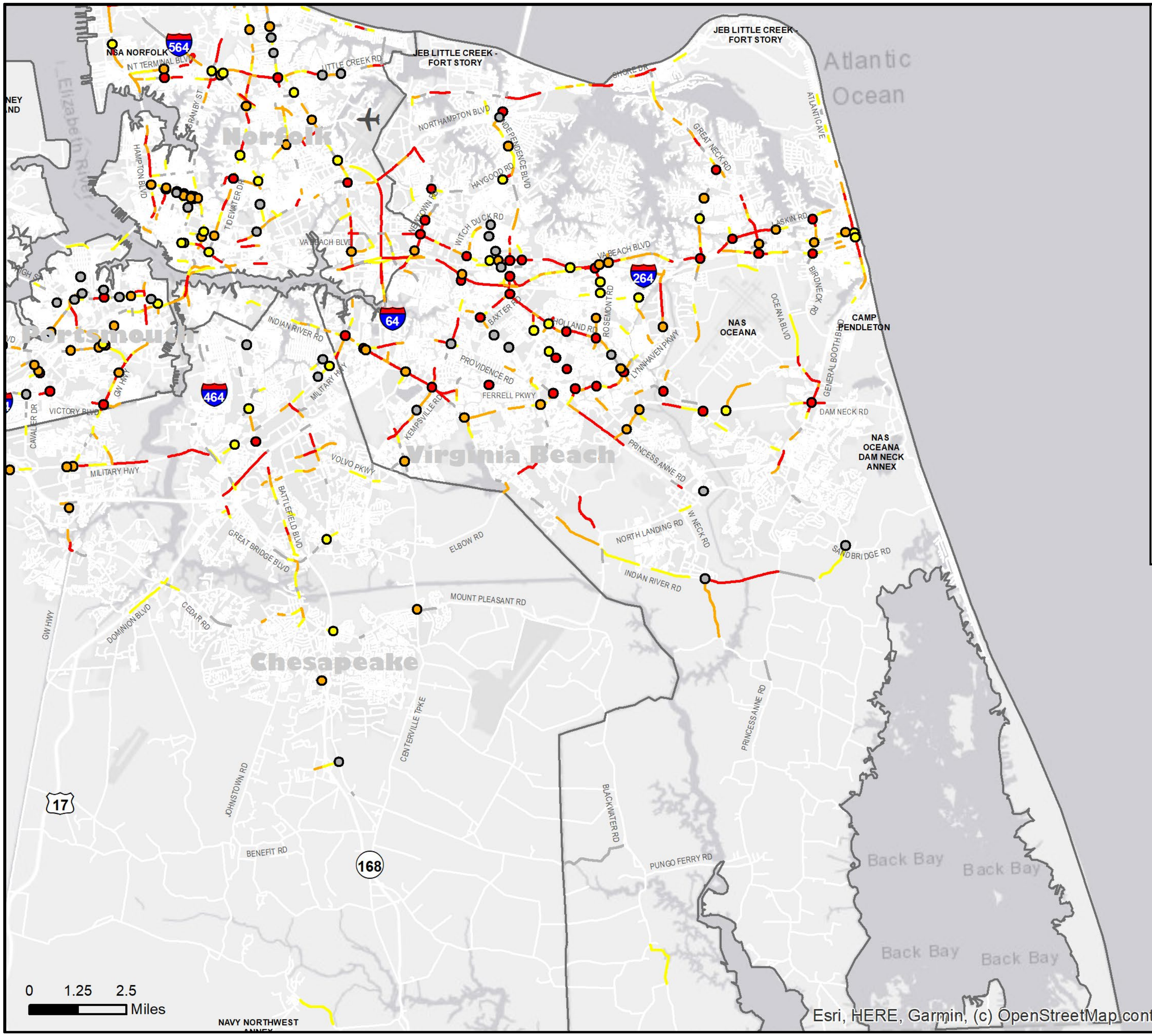
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)

- 0 – 0.39
- 0.40 – 0.79
- 0.80 – 1.19
- 1.20 – 1.59
- 1.60 +

Source: HRTPO analysis of VDOT crash data.



Fatal and Serious Injury Crash Rates
Virginia Beach
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
0 1 2 4 6 Miles
NSA HAMPTON ROADS
JEB-LITTLE CREEK FORT STORY (WEST)
JEB-LITTLE CREEK FORT STORY (EAST)
NAS OCEANA
CAMP PENDLETON
NAS OCEANA DAM NECK ANNEX
NSA NORTHWEST ANNEX
564
64
264
464
64
17
168



Potential for Safety Improvement
Virginia Beach

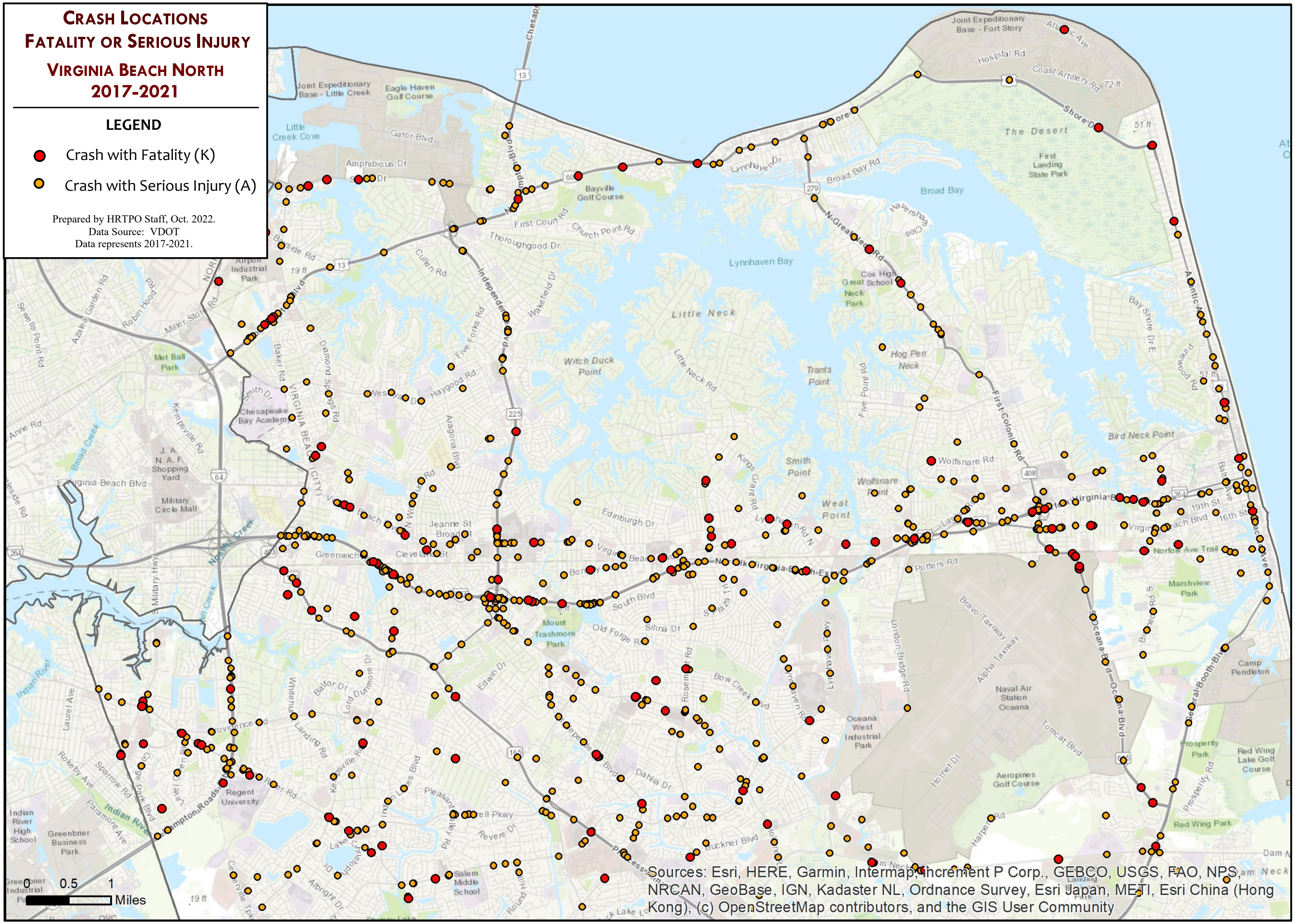
LEGEND

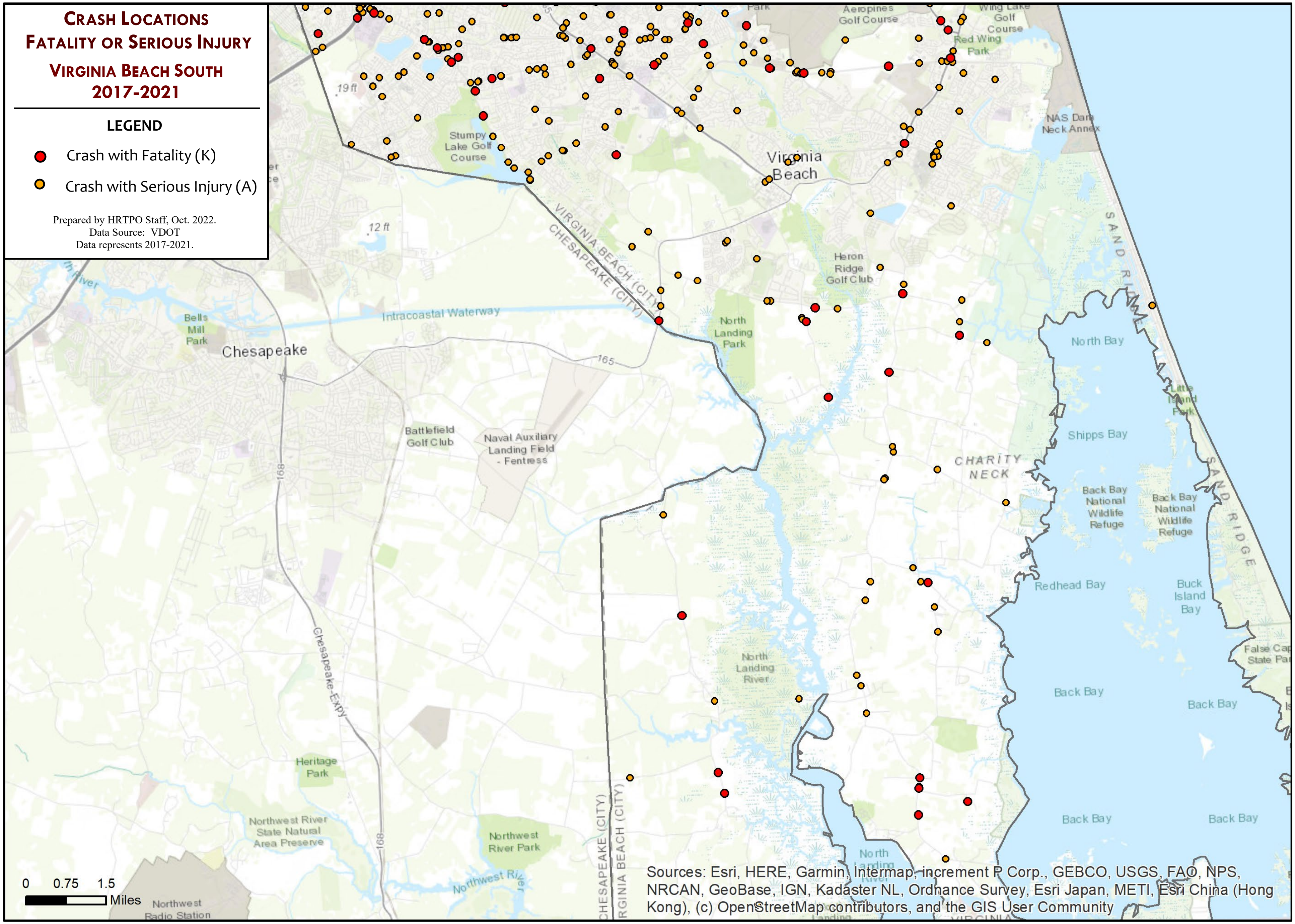
Hampton Roads District Rank*

1 to 100
101 to 200
201 to 200
301 to 400

1 to 100
101 to 200
201 to 200
301 to 400

Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.


Crash Locations
Fatality or Serious Injury
Virginia Beach North
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
0 0.5 1 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

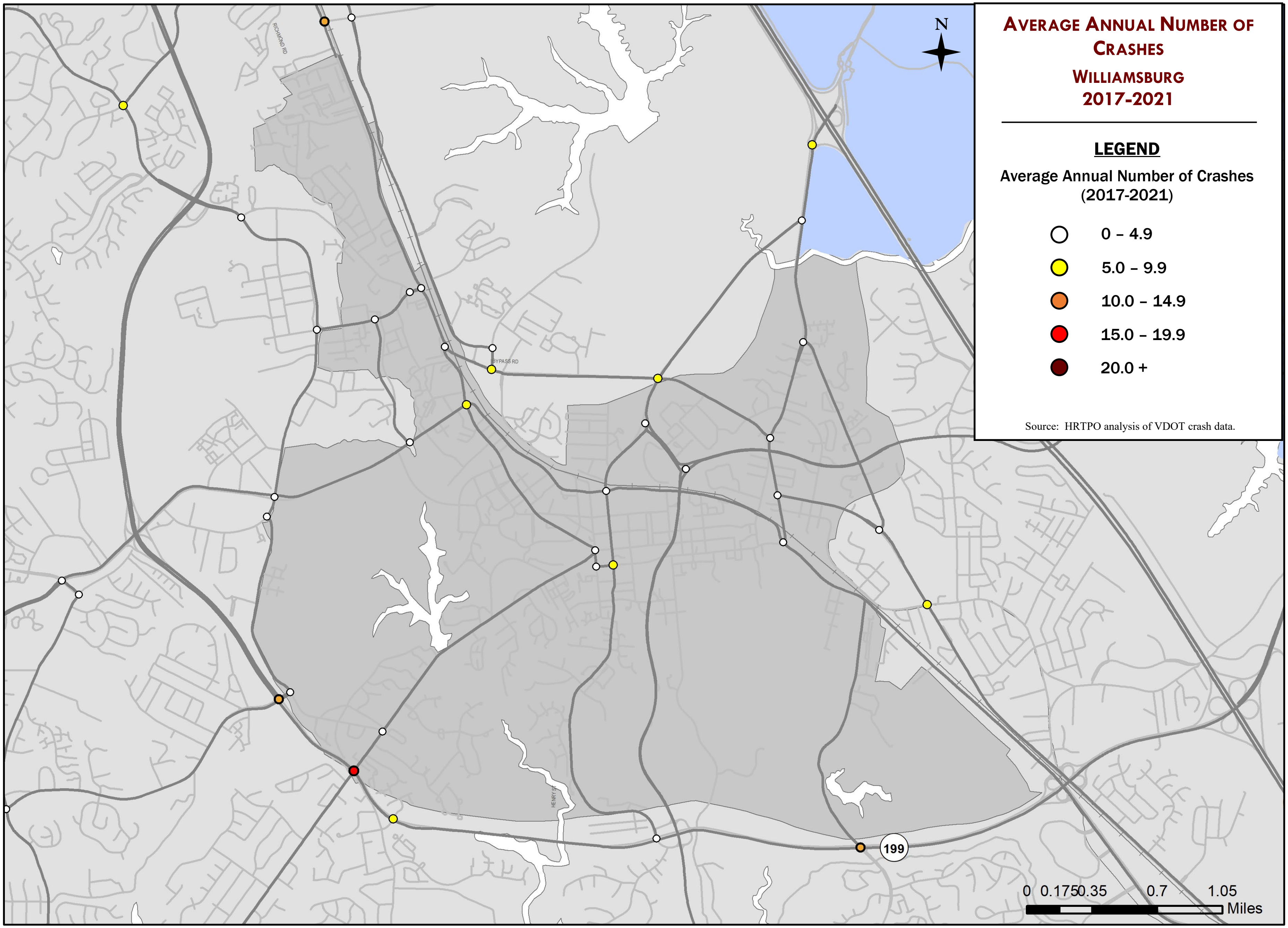


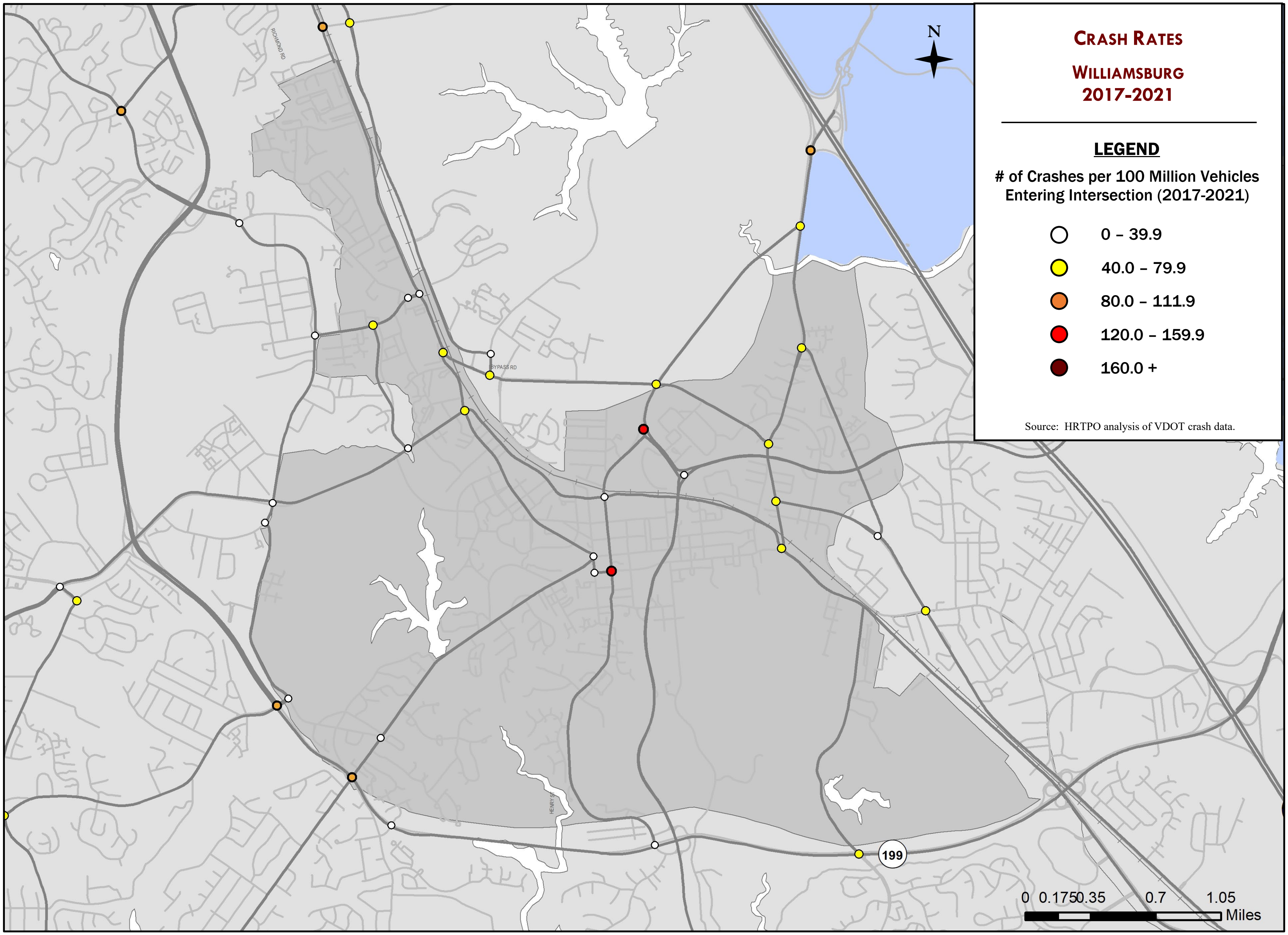
Crash Locations
Fatality or Serious Injury
Virginia Beach South
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Chesapeake
Virginia Beach
Intracoastal Waterway
Bells Mill Park
Stumpy Lake Golf Course
Aeropines Golf Course
Red Wing Park
NAS Dam Neck Annex
Heron Ridge Golf Club
North Landing Park
Battlefield Golf Club
Naval Auxiliary Landing Field - Fentress
CHARITY NECK
North Bay
Shipps Bay
Back Bay National Wildlife Refuge
Redhead Bay
Buck Island Bay
Back Bay
SAND RIDGE
North Landing River
Heritage Park
Northwest River State Natural Area Preserve
Northwest River Park
Chesapeake Expy
VIRGINIA BEACH (CITY)
CHESAPEAKE (CITY)
0 0.75 1.5 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

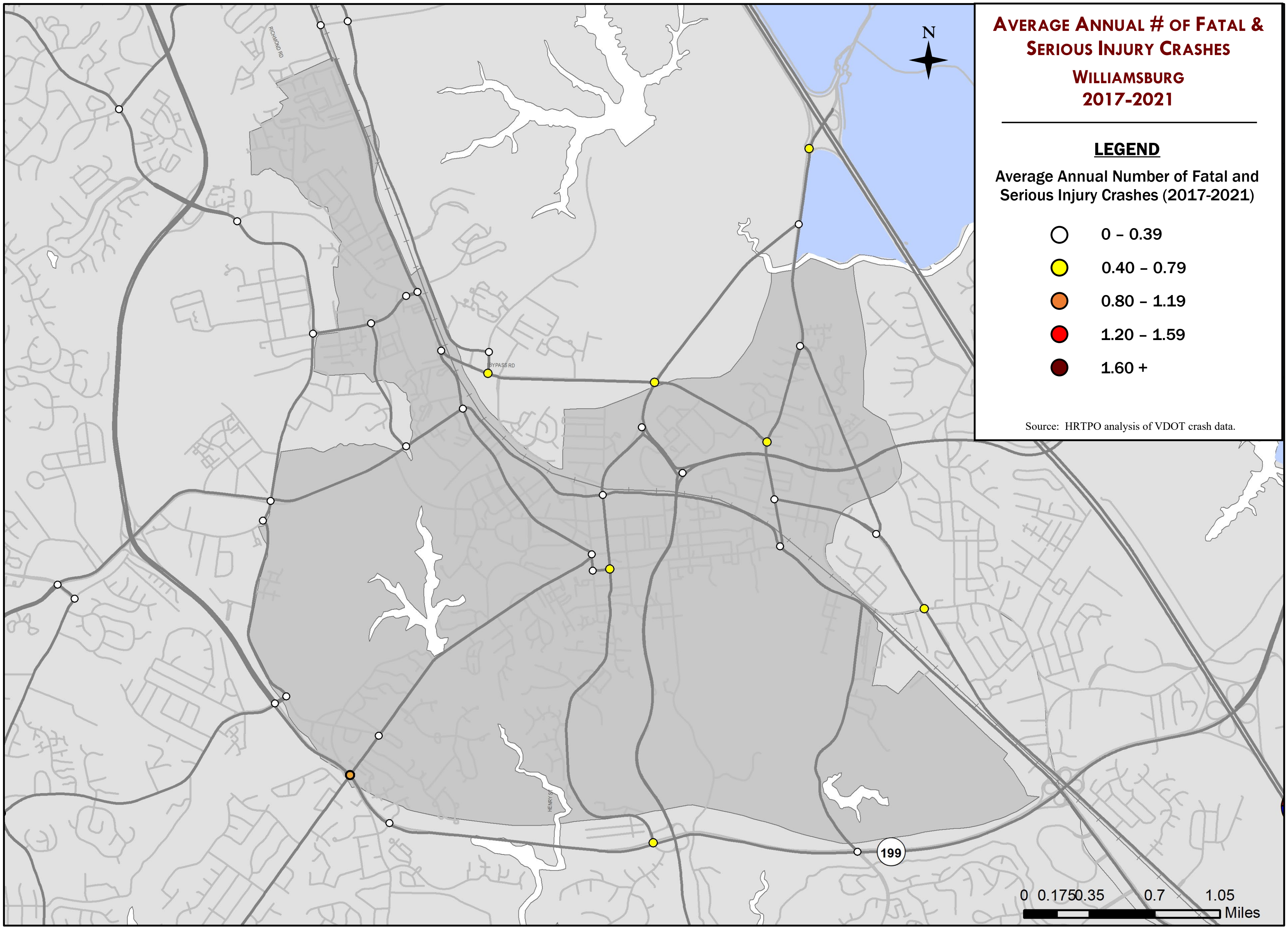
WILLIAMSBURG

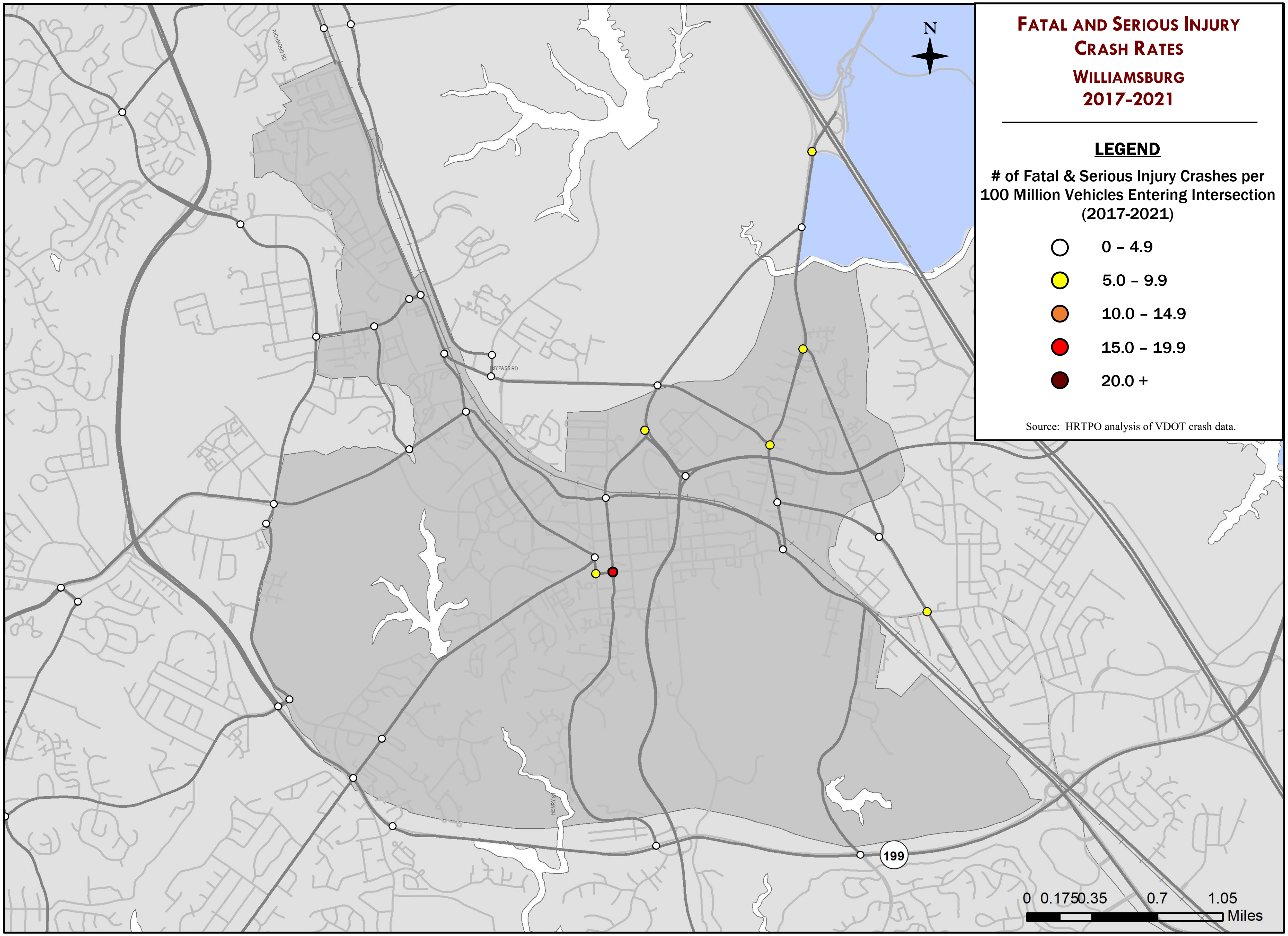
JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
WMB	ROUTE 199	JAMESTOWN RD	76	1	88.25	3	4	1	4.64	6	1
WMB	RICHMOND RD	LAFAYETTE ST/MONTICELLO AVE	27	2	59.30	6	0	10	0.00	10	-
WMB	FRANCIS ST	HENRY ST	25	3	140.79	2	3	2	16.89	1	2
WMB	RICHMOND RD	BYPASS RD	24	4	40.84	10	0	10	0.00	10	-
WMB	HENRY ST	ROUTE 132Y	22	5	143.34	1	1	4	6.52	3	-
WMB	LAFAYETTE ST/YORK ST	PAGE ST/FRANCIS ST	22	5	65.69	5	1	4	2.99	8	-
WMB	PAGE ST/CAPITOL LANDING RD	BYPASS RD	21	7	69.78	4	3	2	9.97	2	3
WMB	PAGE ST	SECOND ST	18	8	48.83	8	0	10	0.00	10	-
WMB	RICHMOND RD	IRONBOUND RD	18	8	35.61	13	1	4	1.98	9	-
WMB	CAPITOL LANDING RD/MERRIMAC TRAIL	MERRIMAC TRAIL	10	10	52.09	7	1	4	5.21	5	-
WMB	LAFAYETTE ST	HENRY ST	10	10	39.39	11	0	10	0.00	10	-
WMB	BOUNDARY ST	JAMESTOWN RD	9	12	37.79	12	1	4	4.20	7	-
WMB	IRONBOUND RD	TREYBURN DR	8	13	42.27	9	0	10	0.00	10	-
WMB	IRONBOUND RD	LONGHILL RD	4	14	17.82	15	0	10	0.00	10	-
WMB	JAMESTOWN RD	JOHN TYLER LN	4	14	21.55	14	0	10	0.00	10	-
WMB	MONTICELLO AVE	TREYBURN DR	3	16	9.37	17	0	10	0.00	10	-
WMB	BOUNDARY ST	FRANCIS ST	2	17	12.95	16	1	4	6.48	4	-
WMB	COLONIAL PKWY	ROUTE 132Y	1	18	7.47	18	0	10	0.00	10	-

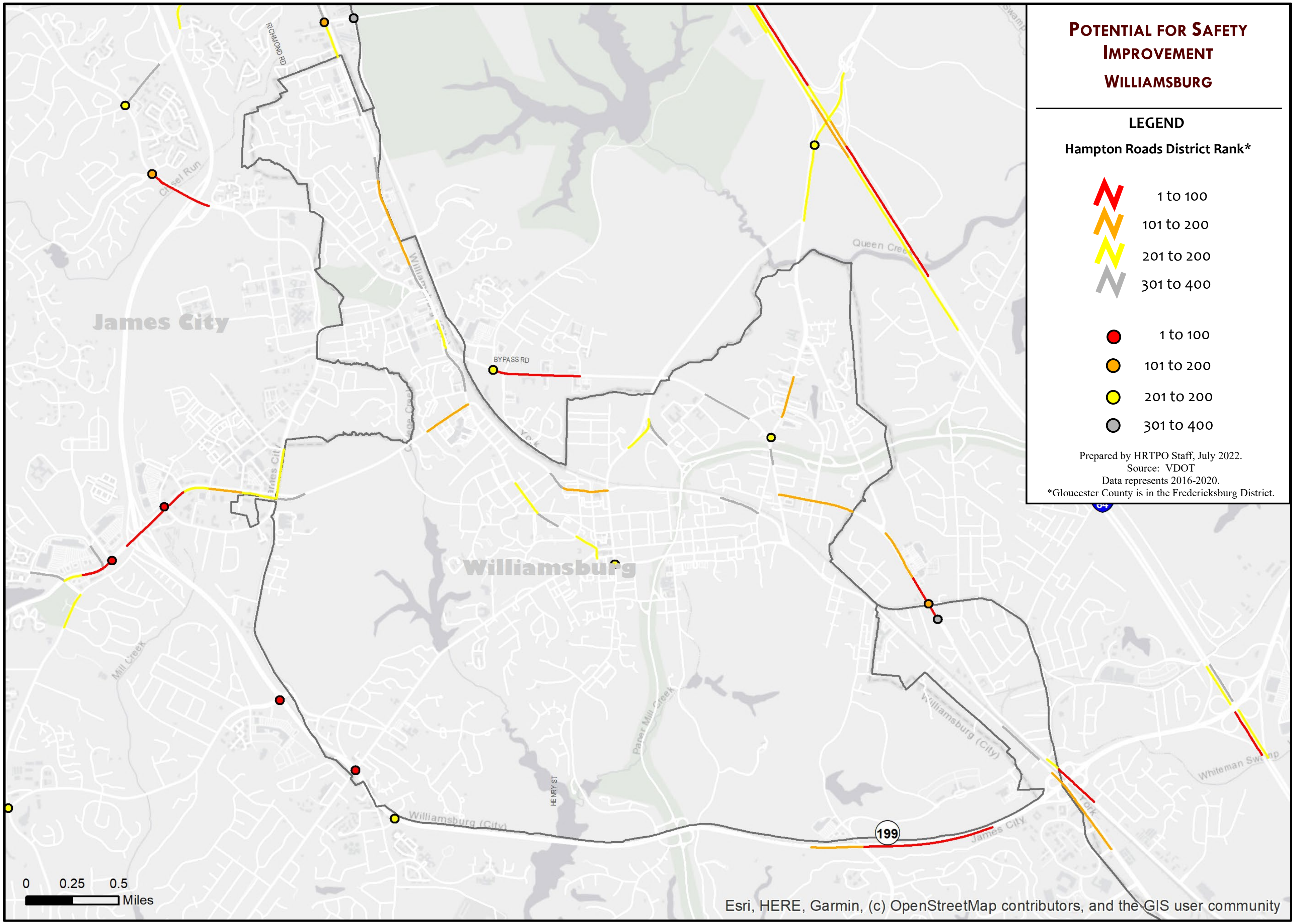
Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
F+SI Rate per 100MEV - Total number of fatal and serious injury crashes divided by the number of vehicles that enter the intersection x 100 million
Locality PSI Rank - Rank of intersection in terms of Potential for Safety Improvement (PSI). Intersection must be ranked within the top 400 intersections in the VDOT district to be included.


AVERAGE ANNUAL NUMBER OF CRASHES
WILLIAMSBURG
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
199
0 0.175 0.35 0.7 1.05
Miles

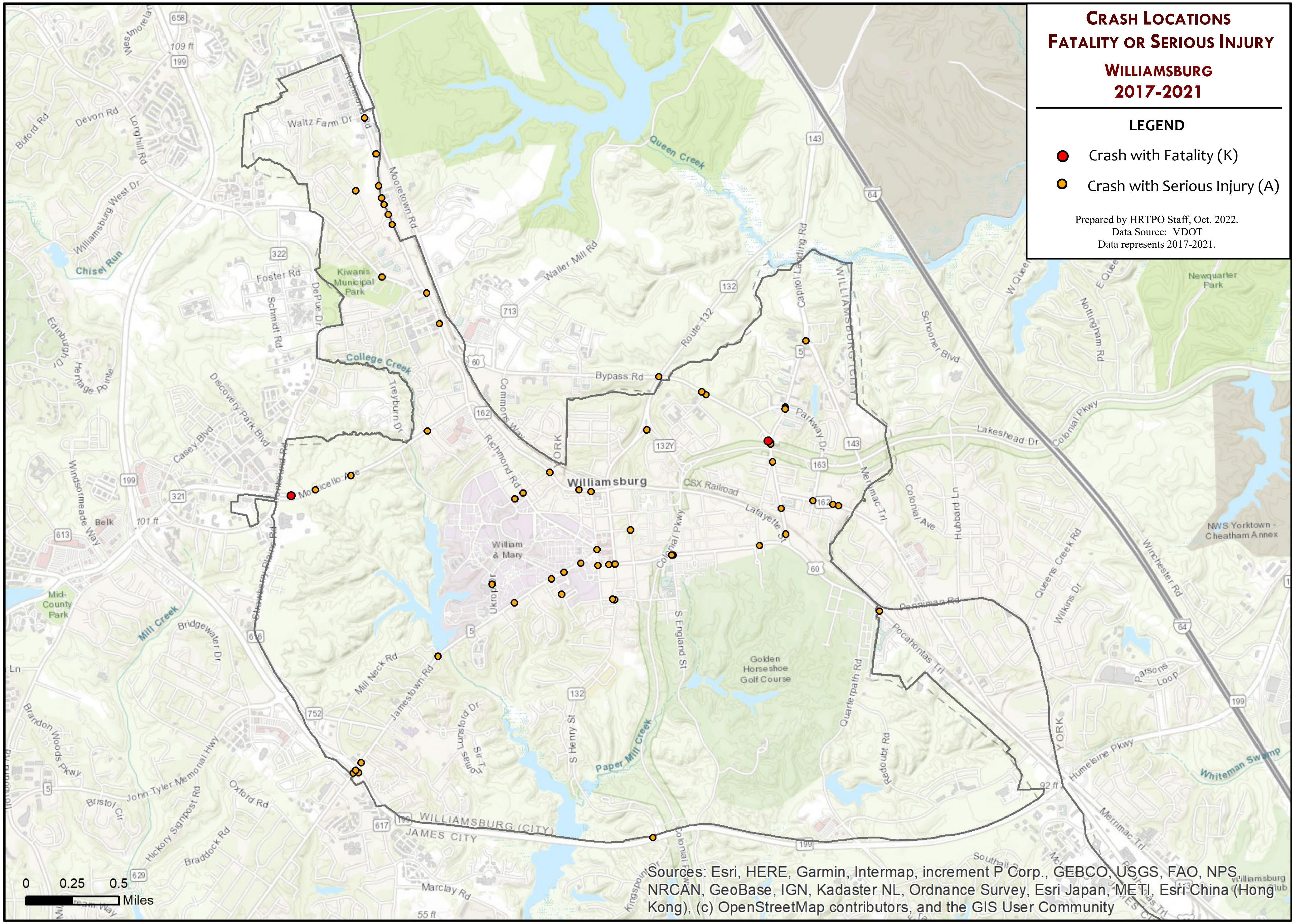

CRASH RATES
WILLIAMSBURG
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
N
199
0 0.1750.35 0.7 1.05
Miles


Average Annual # of Fatal & Serious Injury Crashes
Williamsburg
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
199
0 0.175 0.35 0.7 1.05
Miles


FATAL AND SERIOUS INJURY CRASH RATES
WILLIAMSBURG
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
199
0 0.175 0.35 0.7 1.05
Miles



HAMPTON ROADS TPO



HAMPTON ROADS TPO

YORK

JURIS-DICTION	MAJOR ROAD	MINOR ROAD	TOTAL CRASHES	LOCALITY RANK	CRASH RATE PER 100MEV	LOCALITY RANK	TOTAL F+SI CRASHES	LOCALITY RANK	F+SI RATE PER 100MEV	LOCALITY RANK	LOCALITY PSI RANK
YC	GEORGE WASHINGTON MEM HWY	VICTORY BLVD	72	1	59.78	13	1	10	0.83	19	-
YC	GEORGE WASHINGTON MEM HWY	DENBIGH BLVD/GOODWIN NECK RD	68	2	85.70	5	4	1	5.04	9	1
YC	GEORGE WASHINGTON MEM HWY	FORT EUSTIS BLVD	65	3	89.44	3	1	10	1.38	17	-
YC	GEORGE WASHINGTON MEM HWY	GOOSLEY RD	43	4	86.21	4	1	10	2.00	16	8
YC	GEORGE WASHINGTON MEM HWY	COOK RD/YORK WARWICK DR	40	5	80.11	7	3	2	6.01	8	6
YC	GEORGE WASHINGTON MEM HWY	ORIANA RD/LAKESIDE DR	40	5	43.17	19	3	2	3.24	14	-
YC	RICHMOND RD	LIGHTFOOT RD	36	7	69.90	9	0	20	0.00	20	4
YC	VICTORY BLVD	HAMPTON HWY	36	7	46.09	17	3	2	3.84	12	-
YC	HAMPTON HWY	YORKTOWN RD	33	9	115.14	1	1	10	3.49	13	3
YC	ROUTE 143	ROCHAMBEAU DR/I-64 RAMP	32	10	80.95	6	3	2	7.59	3	9
YC	BYPASS RD	ROUTE 132	27	11	57.48	14	2	7	4.26	11	-
YC	BYPASS RD	WALLER MILL RD	26	12	57.28	15	2	7	4.41	10	11
YC	VICTORY BLVD	BIG BETHEL RD	25	13	61.57	12	0	20	0.00	20	-
YC	MOORETOWN RD	ROCHAMBEAU DR	23	14	105.82	2	0	20	0.00	20	-
YC	HAMPTON HWY	BIG BETHEL RD	20	15	38.16	24	0	20	0.00	20	-
YC	VICTORY BLVD	EAST YORKTOWN RD/CARYS CHAPEL RD	19	16	45.05	18	3	2	7.11	5	-
YC	GEORGE WASHINGTON MEM HWY	DARE RD	18	17	23.56	28	1	10	1.31	18	-
YC	MOORETOWN RD	AIRPORT RD	17	18	65.88	10	0	20	0.00	20	17
YC	ROUTE 143	ROUTE 132	17	18	53.72	16	0	20	0.00	20	-
YC	GEORGE WASHINGTON MEM HWY	WOLF TRAP RD	16	20	23.18	29	0	20	0.00	20	-
YC	GEORGE WASHINGTON MEM HWY	OLD YORK-HAMPTON HWY	14	21	22.17	30	0	20	0.00	20	-
YC	OLD WILLIAMSBURG RD	GOOSLEY RD	12	22	78.18	8	1	10	6.52	7	-
YC	SECOND ST/MERRIMAC TRAIL	MERRIMAC TRAIL	11	23	31.46	26	1	10	2.86	15	-
YC	ROUTE 199	PENNIMAN RD/TRANQUILITY DR	9	24	65.32	11	1	10	7.26	4	-
YC	GOODWIN NECK RD	WOLF TRAP RD	7	25	39.67	20	2	7	11.33	1	-
YC	COOK RD	GOOSLEY RD	5	26	35.35	25	1	10	7.07	6	-
YC	COOK RD	OLD YORK-HAMPTON HWY	5	26	38.97	22	0	20	0.00	20	-
YC	BALLARD ST	COLONIAL PKWY	4	28	39.07	21	0	20	0.00	20	-
YC	OLD YORK-HAMPTON HWY	FORT EUSTIS BLVD EXT	4	28	38.59	23	1	10	9.65	2	-
YC	WALLER MILL RD	MOORETOWN RD	4	28	31.13	27	0	20	0.00	20	-
YC	BALLARD ST	COOK RD	1	31	6.64	31	0	20	0.00	20	-

Total Crashes - Total number of crashes within 250' (0.05 mi.) of the intersection from 2017-2021
Crash Rate per 100MEV - Total number of crashes divided by the number of vehicles that enter the intersection x 100 million
Total F+SI Crashes - Total number of fatal and serious injury crashes within 250' (0.05 mi.) of the intersection from 2017-2021
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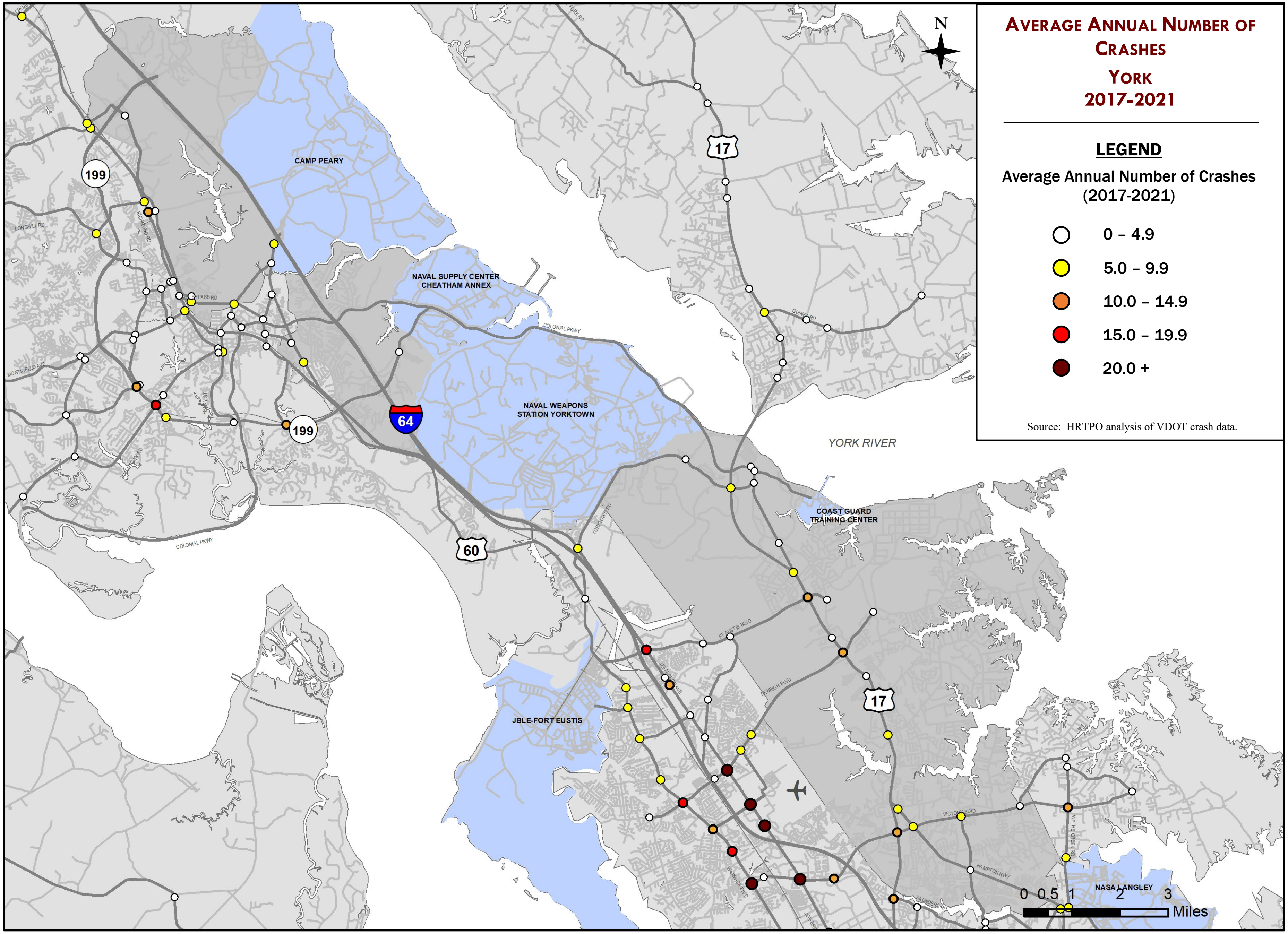
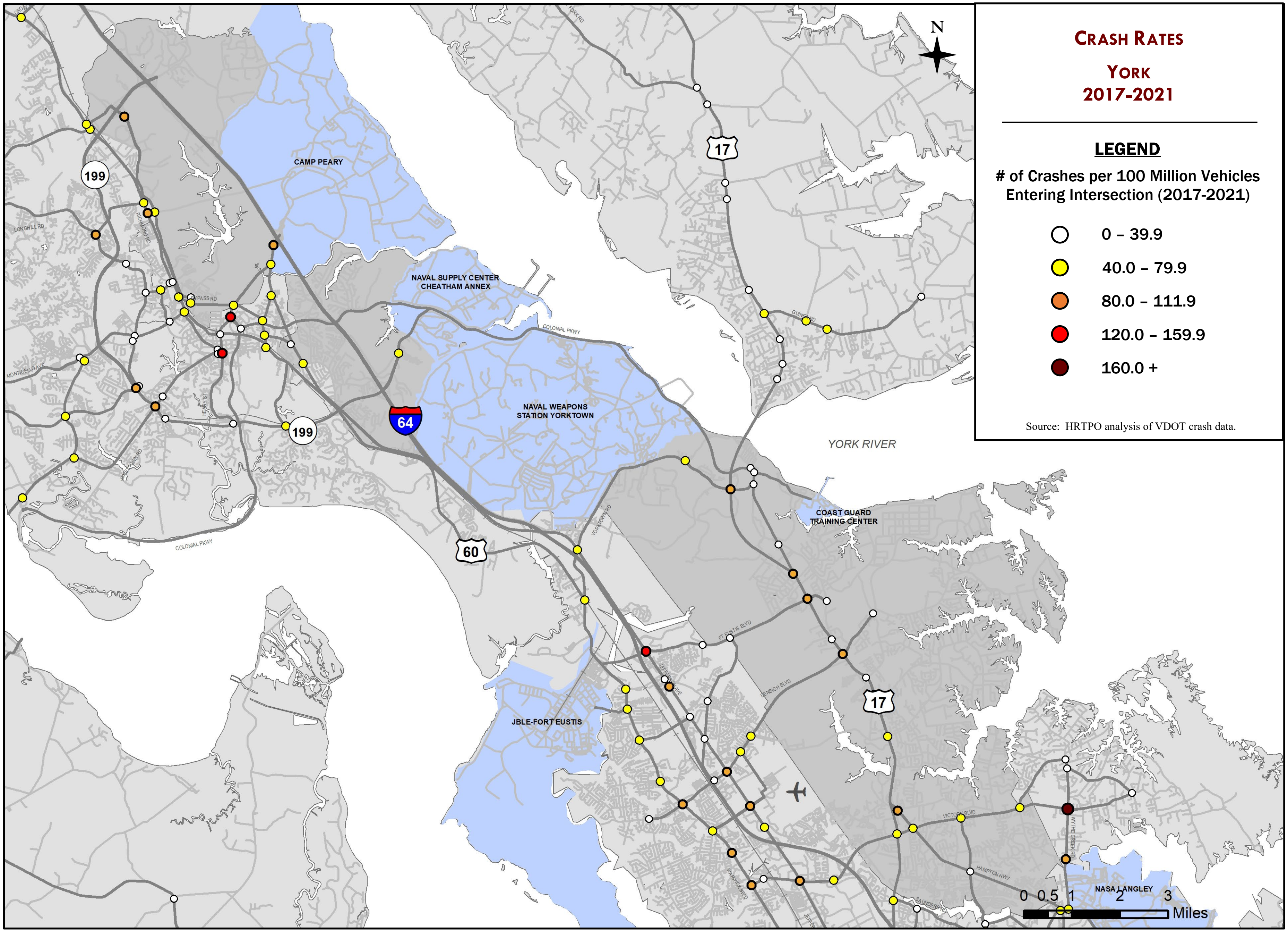
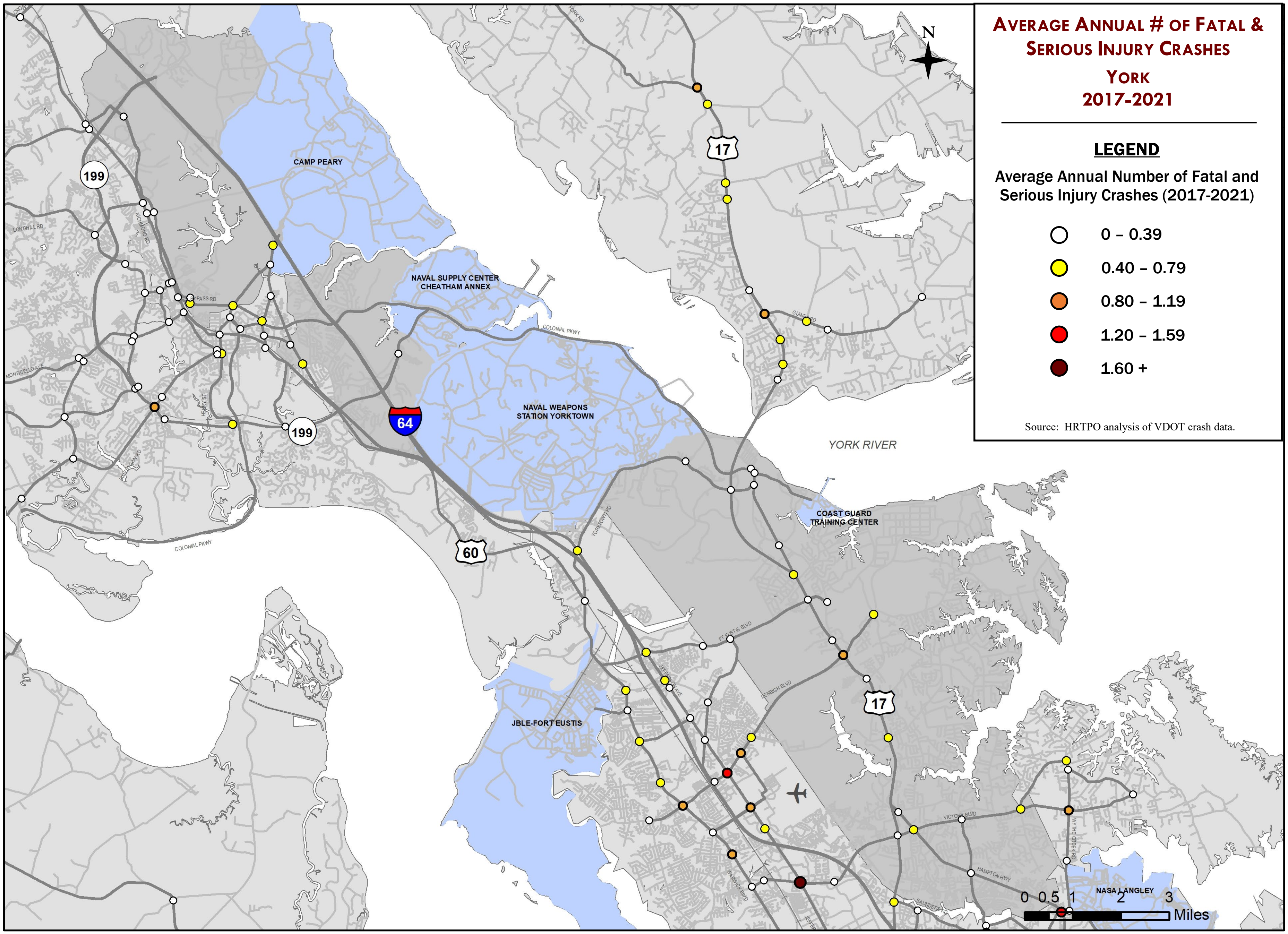
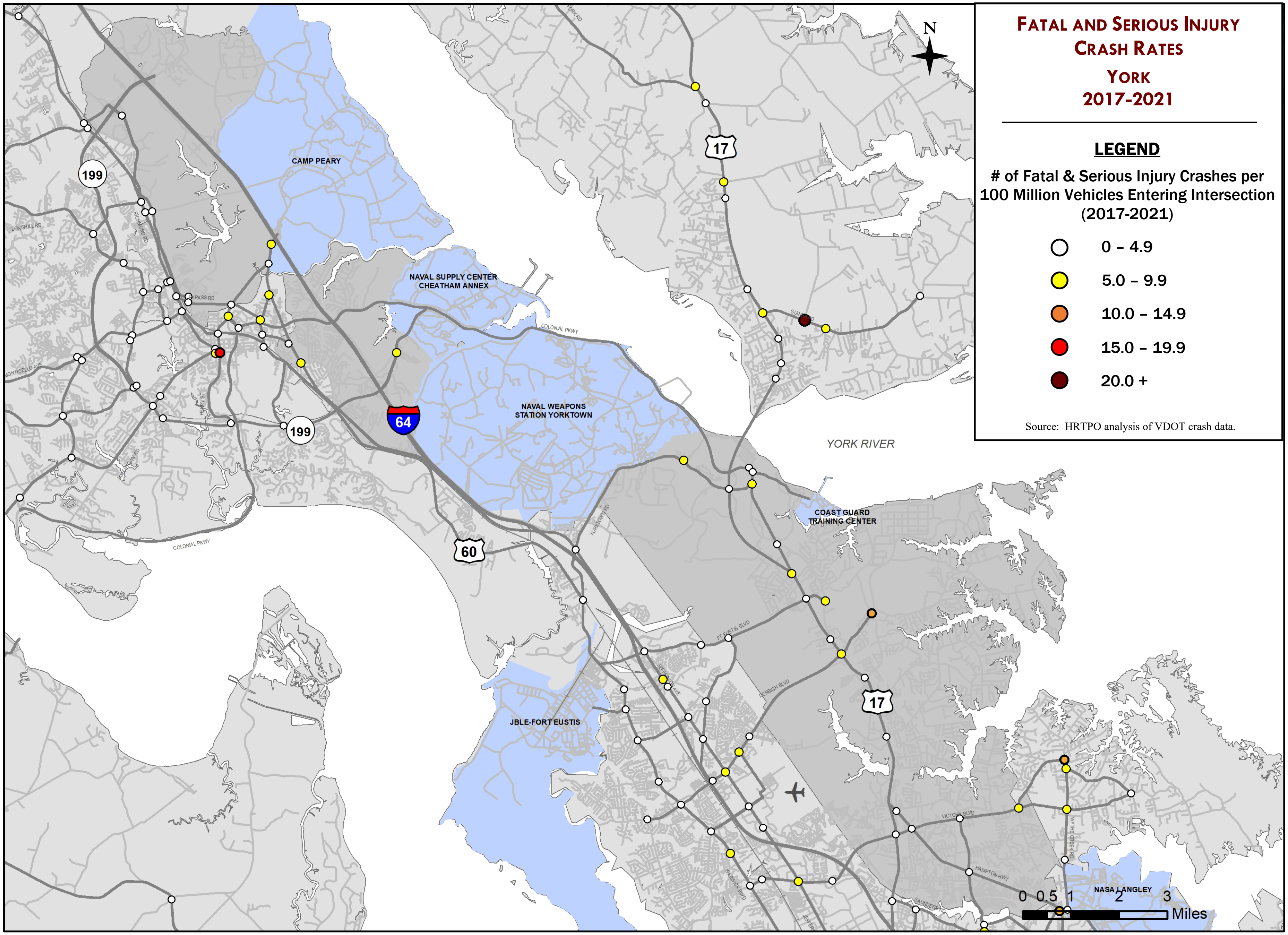
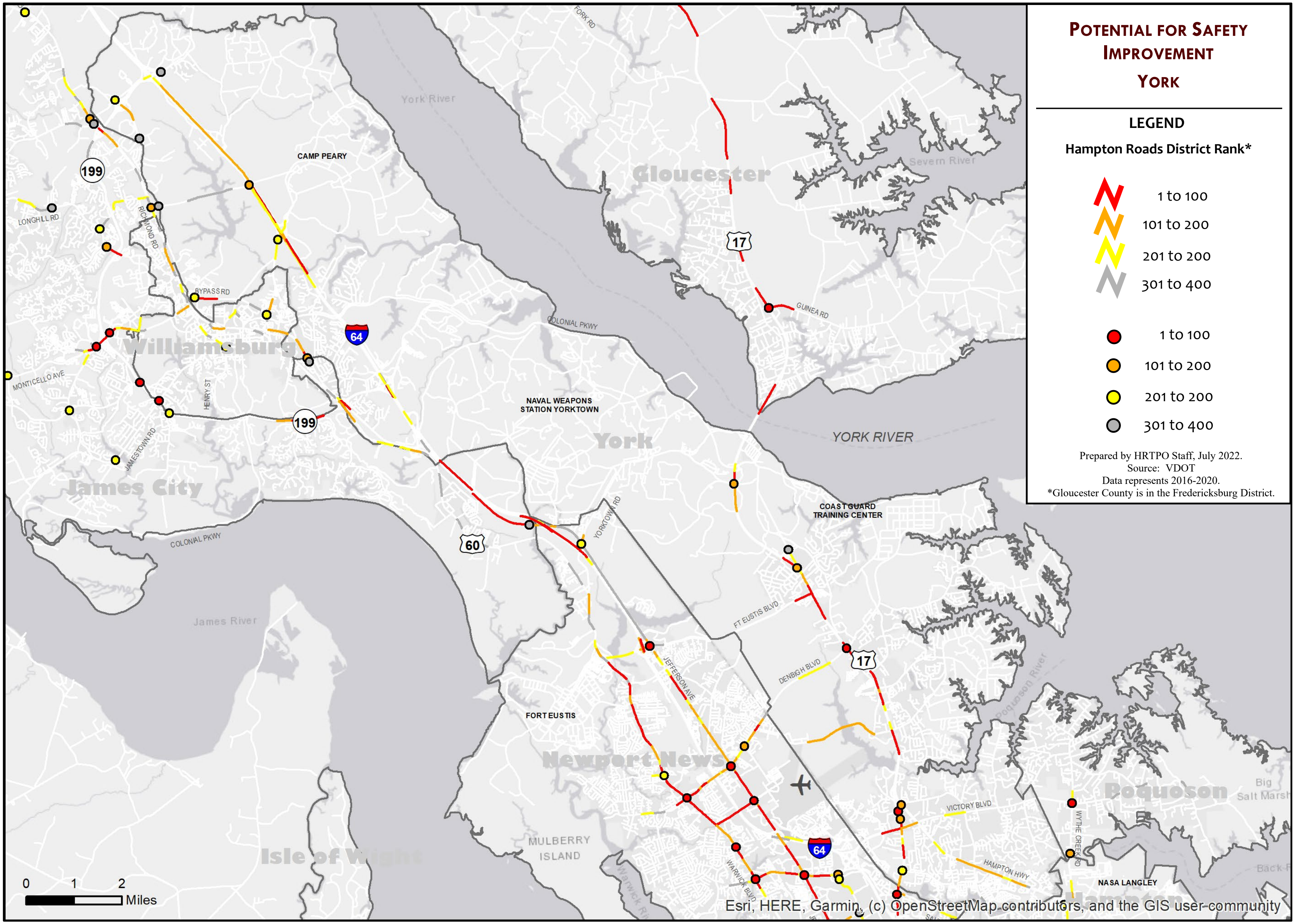
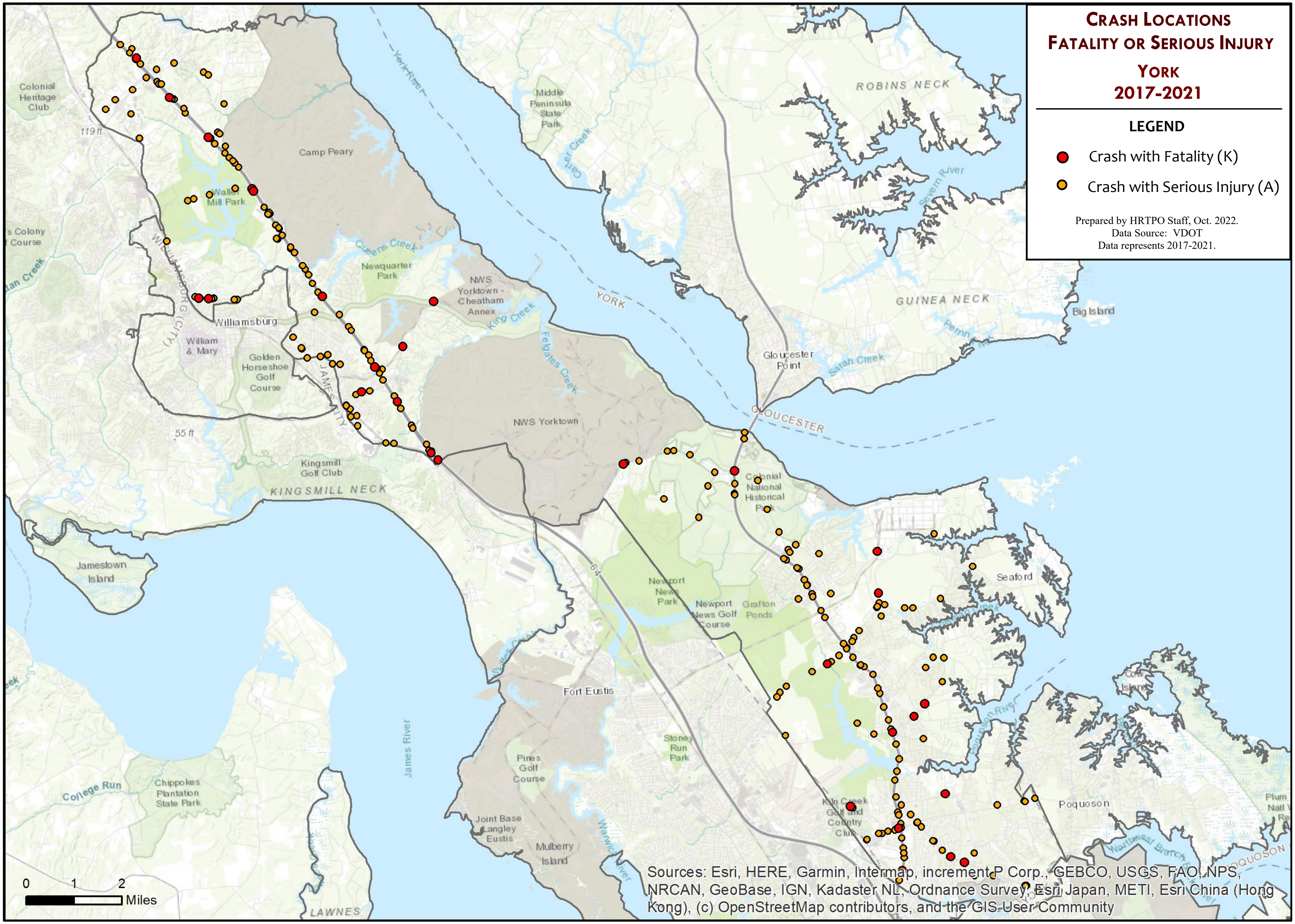

AVERAGE ANNUAL NUMBER OF CRASHES
YORK
2017-2021
LEGEND
Average Annual Number of Crashes (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
YORK RIVER
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
199
17
64
60
0 0.5 1 2 3
Miles
N


CRASH RATES
YORK
2017-2021
LEGEND
# of Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 39.9
40.0 – 79.9
80.0 – 111.9
120.0 – 159.9
160.0 +
Source: HRTPO analysis of VDOT crash data.
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
YORK RIVER
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
199
17
64
60
COLONIAL PKWY
0 0.5 1 2 3
Miles
N


AVERAGE ANNUAL # OF FATAL & SERIOUS INJURY CRASHES
YORK
2017-2021
LEGEND
Average Annual Number of Fatal and Serious Injury Crashes (2017-2021)
0 – 0.39
0.40 – 0.79
0.80 – 1.19
1.20 – 1.59
1.60 +
Source: HRTPO analysis of VDOT crash data.
N
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
YORK RIVER
COLONIAL PKWY
199
64
60
17
0 0.5 1 2 3
Miles


FATAL AND SERIOUS INJURY CRASH RATES
YORK
2017-2021
LEGEND
# of Fatal & Serious Injury Crashes per 100 Million Vehicles Entering Intersection (2017-2021)
0 – 4.9
5.0 – 9.9
10.0 – 14.9
15.0 – 19.9
20.0 +
Source: HRTPO analysis of VDOT crash data.
N
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
YORK RIVER
COLONIAL PKWY
199
17
64
60
0 0.5 1 2 3
Miles


Potential for Safety Improvement
York
LEGEND
Hampton Roads District Rank*
1 to 100
101 to 200
201 to 200
301 to 400
1 to 100
101 to 200
201 to 200
301 to 400
Prepared by HRTPO Staff, July 2022.
Source: VDOT
Data represents 2016-2020.
*Gloucester County is in the Fredericksburg District.
York River
CAMP PEARY
Gloucester
Severn River
17
GUINEA RD
COLONIAL PKWY
199
LONGHILL RD
RICHMOND RD
BYPASS RD
64
Williamsburg
MONTICELLO AVE
HENRY ST
NAVAL WEAPONS STATION YORKTOWN
York
YORK RIVER
JAMESTOWN RD
James City
COAST GUARD TRAINING CENTER
COLONIAL PKWY
60
YORKTOWN RD
FT EUSTIS BLVD
James River
JEFFERSON AVE
DENBIGH BLVD
FORT EUSTIS
Poquoson River
Newport News
Poquoson
Big Salt Marsh
VICTORY BLVD
MULBERRY ISLAND
WYTHE CREEK RD
Isle of Wight
HAMPTON HWY
WARWICK BLVD
NASA LANGLEY
0 1 2
Miles
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community


CRASH LOCATIONS
FATALITY OR SERIOUS INJURY
YORK
2017-2021
LEGEND
Crash with Fatality (K)
Crash with Serious Injury (A)
Prepared by HRTPO Staff, Oct. 2022.
Data Source: VDOT
Data represents 2017-2021.
Colonial Heritage Club
Camp Peary
Waller Mill Park
Williamsburg
William & Mary
Golden Horseshoe Golf Course
Newquarter Park
NWS Yorktown - Cheatham Annex
NWS Yorktown
Kingsmill Golf Club
KINGSMILL NECK
Jamestown Island
Middle Peninsula State Park
ROBINS NECK
GUINEA NECK
Big Island
Gloucester Point
Colonial National Historical Park
Newport News Park
Newport News Golf Course
Grafton Ponds
Seaford
Fort Eustis
Stoney Run Park
Pines Golf Course
Joint Base Langley Eustis
Mulberry Island
Kiln Creek Golf and Country Club
Poquoson
Chippokes Plantation State Park
College Run
James River
York River
YORK
GLOUCESTER
LAWNES
0 1 2 Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Appendix D – Public Review and Comment

As part of the Hampton Roads Transportation Planning Organization's (HRTPO) efforts to provide opportunities for the public and stakeholders to review and comment on this draft report prior to the final product being published, an extended 45-day public review period was conducted from March 5, 2024, through April 19, 2024. No additional public comments were received during this period.