# DELAWARE

## 2021-2025 Strategic Highway Safety Plan: Towards Zero Deaths

# 2023 Vulnerable Road User Safety Assessment

*An Addendum to Delaware's 2021-2025 Strategic Highway Safety Plan*

# Executive Summary

The Delaware Department of Transportation (DelDOT) has developed the 2023 Vulnerable Road User (VRU) Safety Assessment as required by the Federal Highway Administration. Contained within this document is the following:

- VRU Safety Performance Assessment which reviews VRU crash and demographic statistics including crash location, age and gender of persons involved, and crash circumstances. Maps are provided for pedestrian and bicycle crashes overlaid with data such as average income levels, functional classification of roadways, speed limits, and traffic volumes.
- Determination of high-risk areas for vulnerable road users. The data from the VRU Safety Performance Assessment was used to identify high-risk areas of the state for VRUs including roadway type, vulnerable populations, and roadway lighting conditions.
- Selection of strategies or projects to address VRU safety. DelDOT selected a series of strategies that can be incorporated into current and future projects to improve VRU safety. These strategies are consistent with the Safe System Approach and are also consistent with the 2021-2025 Delaware Strategic Highway Safety Plan.

# Governor's Approval

***On behalf of the Delaware Department of Transportation and through the authority delegated to me by Governor John Carney, I hereby approve the 2023 Vulnerable Road User Safety Assessment contained herein.***

***Nicole Majeski***
***Secretary of Transportation, State of Delaware***

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## 2023 Vulnerable Road User Safety Assessment

# Background

# Vulnerable Road User Defined

## ***Federal Definition:***

A Vulnerable Road User (VRU) is a *non-motorist with a Fatality Analysis Reporting System (FARS) person attribute code for pedestrian, bicyclist, other cyclist, and person on personal conveyance or an injured person that is, or is equivalent to, a pedestrian or pedalcyclist as defined in the ANSI D16.1-2007 (see 23 U.S.C. 148(a)(15) and 23 CFR 490.205)*

- A VRU may include people walking, biking, or rolling
- Includes a highway worker on foot in a work zone, given they are considered a pedestrian
- **Does not include a motorcyclist**

*Delaware Vulnerable Road User Law per (Title 21 §4176E):*

- *Pedestrian*
- *Highway worker*
- *Person riding an animal or animal-drawn carriage (includes passengers)*
- *Person operating or passenger of a farm tractor, skateboard, roller skates, in-line skates, scooter, moped, bicycle, motorcycle, wheelchair, or electric personal mobility device*

***For the purposes of the Vulnerable Road User Safety Assessment, the Federal definition will be used***

# Enabling Legislation

23 U.S.C. 148(l), as amended by the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL) requires ***all states to develop a Vulnerable Road User Safety Assessment as part of their Highway Safety Improvement Program (HSIP).***

- The initial VRU Safety Assessment is due by November 15, 2023.
- The initial VRU Safety Assessment should be included in the state's SHSP as an appendix or may be included as a separate document (e.g., an addendum) from the existing SHSP.

***Delaware is preparing this initial VRU Safety Assessment as an addendum to the 2021-2025 Delaware Strategic Highway Safety Plan***

- The VRU Safety Assessment is approved by the Governor or a responsible State agency official that is delegated by the Governor.
- The VRU Safety Assessment will be posted to the State's website.

# VRU Assessment Requirements

- Data Driven Process
  - ✓ The State shall use a data-driven process to identify areas of high-risk for vulnerable road users.
  - ✓ To assess the safety performance with respect to vulnerable road users, the State must perform a quantitative analysis of vulnerable road user fatalities and serious injuries.
  - ✓ The quantitative analysis of vulnerable road user fatalities and serious injuries shall also consider the demographics of the locations of fatalities and serious injuries, including race, ethnicity, income, and age.
  - ✓ Each State will identify high-risk areas based on the results of their quantitative analysis using the required data and demographics information, as well as consideration of the Safe Systems Approach. A high-risk area may be a geographic region, specific facility type, specific location, or other priority area.
- Consultation
  - ✓ States are required to consult with local governments, MPOs, and regional transportation planning organizations that represent a high-risk area.
- Program of Projects or Strategies
  - ✓ The VRU Safety Assessment shall include a program of projects or strategies to reduce safety risks to vulnerable road users in areas identified as high-risk. In developing the programs of projects or strategies, the State shall take into consideration:
    - ✓ The input from the consultation process
    - ✓ The Safe Systems Approach
    - ✓ The Complete Streets Design Model
    - ✓ Americans with Disabilities Act (ADA) transition plans

# Incorporating the Safe System Approach

- Safe System Approach
  - Paradigm shift
    - Improve safety culture
    - Accommodating human mistakes
    - Keeping impacts on the human body at tolerable levels


**Separating users in space**

**Separating users in time**

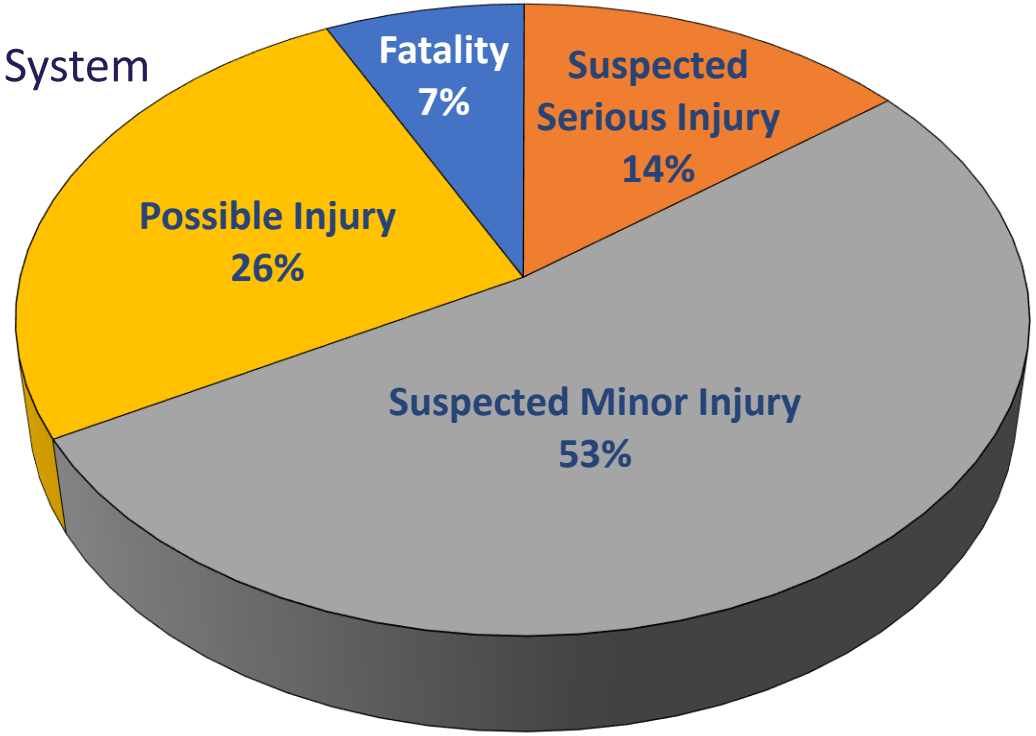
**Increasing attentiveness and awareness**

2023 Vulnerable Road User Safety Assessment

# VRU Safety Performance Assessment

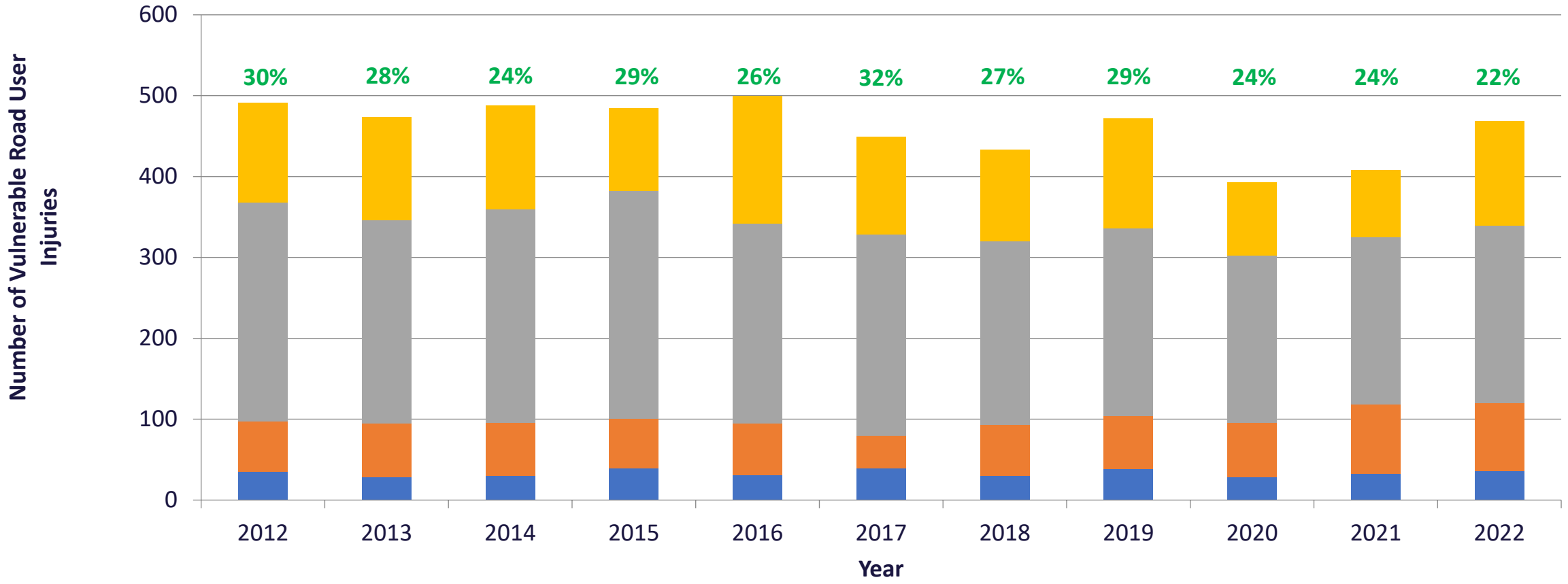
# VRU Safety Performance Assessment

- Crash data: 2012 – 2022
  - 11 years of data
    - Source: DelDOT's Crash Analysis Reporting System
  - All injury severities
    - Fatalities
    - Suspected Serious Injuries
    - Suspected Minor Injuries
    - Possible Injuries
  - Person types
    - Pedestrians
    - Other pedestrian (wheelchair, skater, personal conveyance, etc.)
    - Bicyclists
    - Other cyclist
    - Occupant of a Non-Motor Vehicle Transportation Device
    - Unknown Type of Non-Motorist



# VRU Safety Performance Assessment

## Vulnerable Road User Injuries by Year

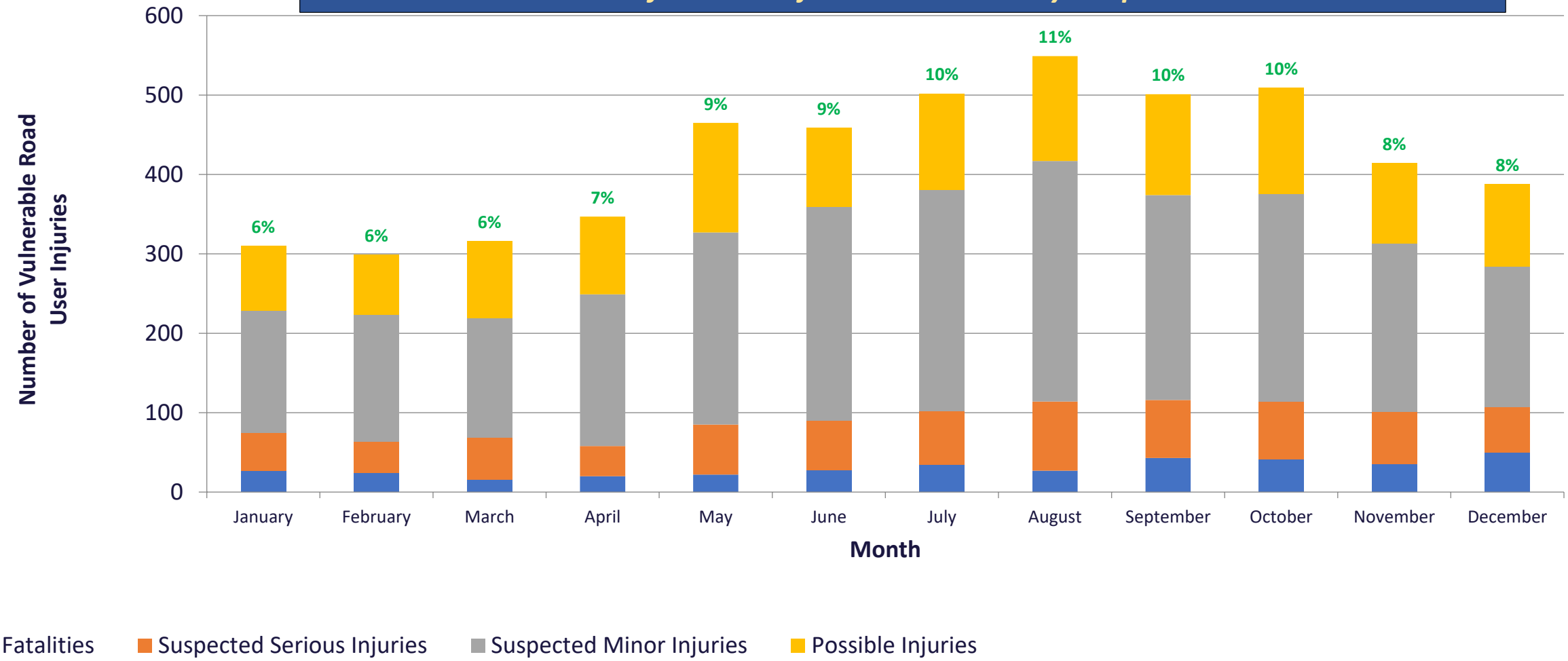



**XX%: % of total statewide fatalities involving a Vulnerable Road User**

# VRU Safety Performance Assessment

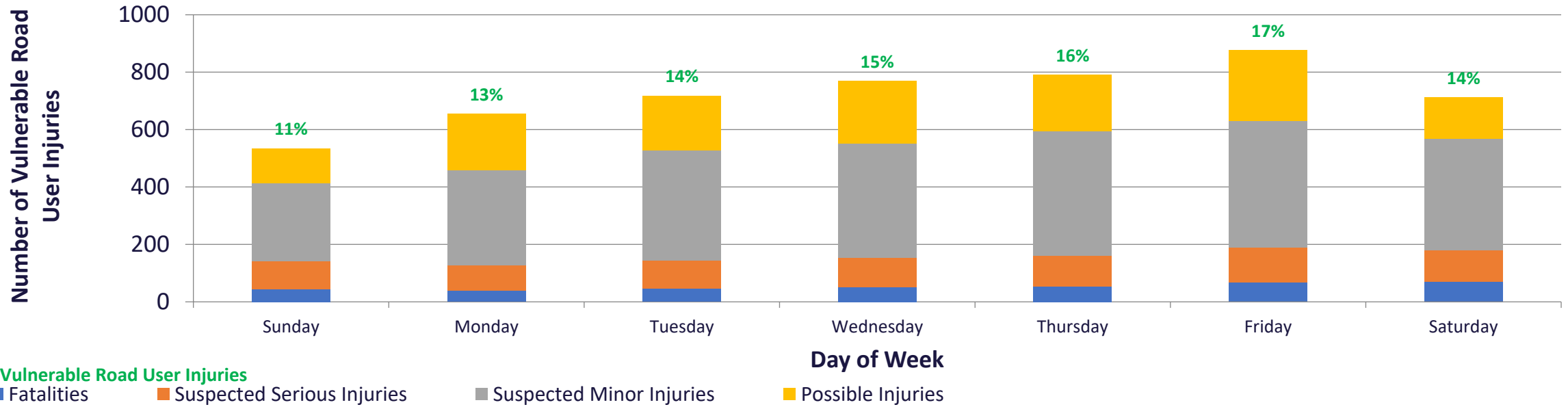
## Vulnerable Road User Injuries by Month

***46% of VRU fatalities and 37% of VRU serious injuries occurred September – December***
***49% of all VRU injuries occurred May - September***



# VRU Safety Performance Assessment

## Vulnerable Road User Injuries by Day of Week

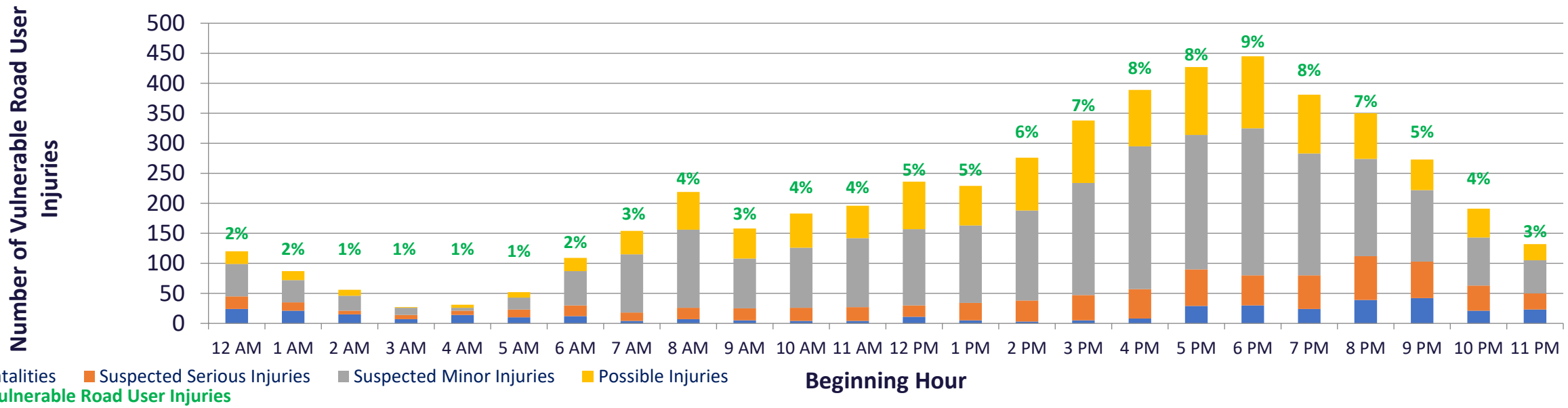



| | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sunday | 27 | 31 | 30 | 36 | 56 | 56 | 53 | 65 | 61 | 55 | 41 | 24 | **535** |
| Monday | 49 | 47 | 41 | 46 | 56 | 56 | 66 | 73 | 44 | 56 | 62 | 60 | **656** |
| Tuesday | 49 | 48 | 44 | 55 | 64 | 66 | 62 | 75 | 81 | 65 | 58 | 51 | **718** |
| Wednesday | 46 | 56 | 47 | 50 | 69 | 66 | 83 | 83 | 72 | 73 | 70 | 55 | **770** |
| Thursday | 57 | 28 | 52 | 60 | 72 | 62 | 73 | 81 | 76 | 89 | 68 | 72 | **790** |
| Friday | 49 | 49 | 57 | 61 | 77 | 82 | 71 | 98 | 103 | 98 | 61 | 71 | **877** |
| Saturday | 33 | 40 | 45 | 39 | 71 | 71 | 94 | 74 | 64 | 73 | 54 | 55 | **713** |
| **Total** | **310** | **299** | **316** | **347** | **465** | **459** | **502** | **549** | **501** | **509** | **414** | **388** | 5059 |

***Lower Frequency*** ***Higher Frequency***

# VRU Safety Performance Assessment

## Vulnerable Road User Injuries by Time of Day

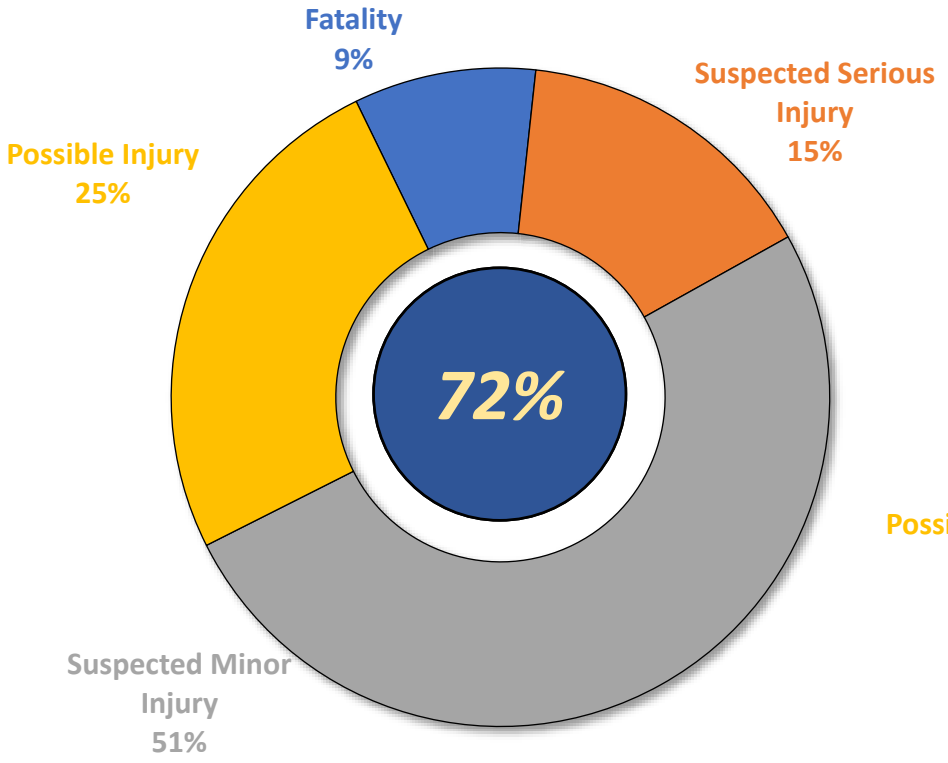



| | 12A | 1A | 2A | 3A | 4A | 5A | 6A | 7A | 8A | 9A | 10A | 11A | 12P | 1P | 2P | 3P | 4P | 5P | 6P | 7P | 8P | 9P | 10P | 11P | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sunday | 23 | 42 | 15 | 5 | 5 | 4 | 4 | 7 | 7 | 16 | 25 | 29 | 20 | 21 | 24 | 20 | 30 | 46 | 54 | 43 | 39 | 26 | 19 | 11 | **535** |
| Monday | 10 | 6 | 2 | 5 | 6 | 9 | 15 | 25 | 40 | 21 | 22 | 21 | 25 | 37 | 42 | 43 | 54 | 68 | 54 | 52 | 39 | 33 | 20 | 7 | **656** |
| Tuesday | 17 | 10 | 3 | 2 | 1 | 6 | 16 | 29 | 31 | 18 | 32 | 30 | 33 | 32 | 35 | 56 | 65 | 70 | 67 | 42 | 55 | 32 | 20 | 16 | **718** |
| Wednesday | 8 | 1 | 9 | 5 | 9 | 8 | 24 | 26 | 44 | 26 | 14 | 29 | 30 | 44 | 36 | 59 | 67 | 69 | 66 | 54 | 53 | 38 | 31 | 20 | **770** |
| Thursday | 15 | 6 | 6 | 1 | 7 | 8 | 21 | 40 | 47 | 23 | 35 | 32 | 43 | 24 | 58 | 49 | 60 | 59 | 67 | 63 | 47 | 35 | 29 | 15 | **790** |
| Friday | 18 | 4 | 7 | 3 | 1 | 10 | 22 | 16 | 34 | 37 | 31 | 22 | 46 | 39 | 43 | 69 | 67 | 65 | 83 | 63 | 64 | 56 | 38 | 39 | **877** |
| Saturday | 29 | 18 | 14 | 6 | 2 | 7 | 7 | 11 | 16 | 17 | 24 | 33 | 39 | 32 | 38 | 42 | 46 | 50 | 54 | 64 | 53 | 53 | 34 | 24 | **713** |
| **Total** | **120** | **87** | **56** | **27** | **31** | **52** | **109** | **154** | **219** | **158** | **183** | **196** | **236** | **229** | **276** | **338** | **389** | **427** | **445** | **381** | **350** | **273** | **191** | **132** | 5059 |

***Lower Frequency*** ***Higher Frequency***

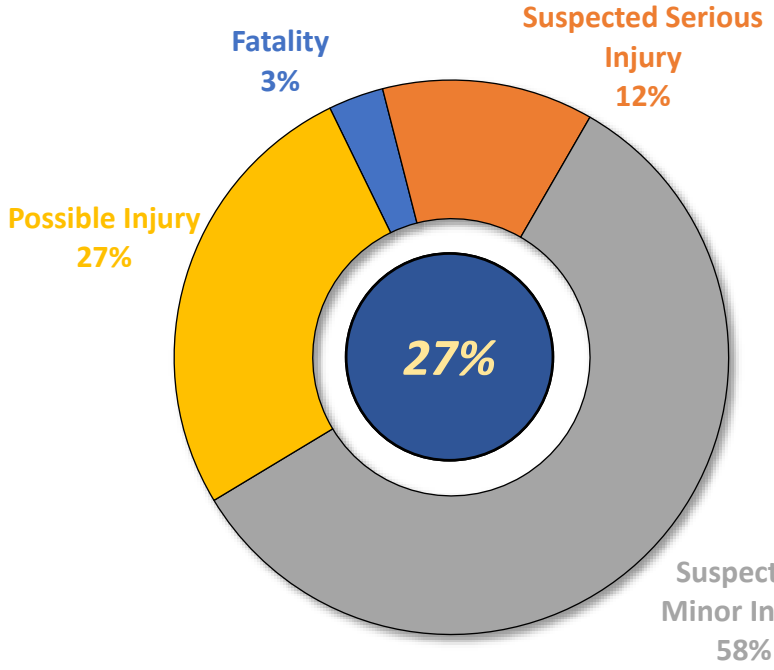
# VRU Safety Performance Assessment
## Non-Motorist Person Type

### Pedestrians[1]



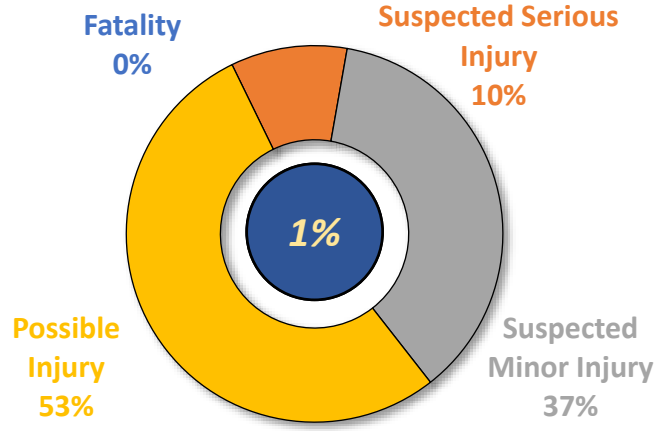

[1]*Includes "Other Pedestrian", person type code 3 which includes persons on a wheelchair, skaters, persons on a personal conveyance, etc.*

### Bicyclists[2]




[2]*Includes "Other Cyclist", person type code 5*

### Other VRUs[3]



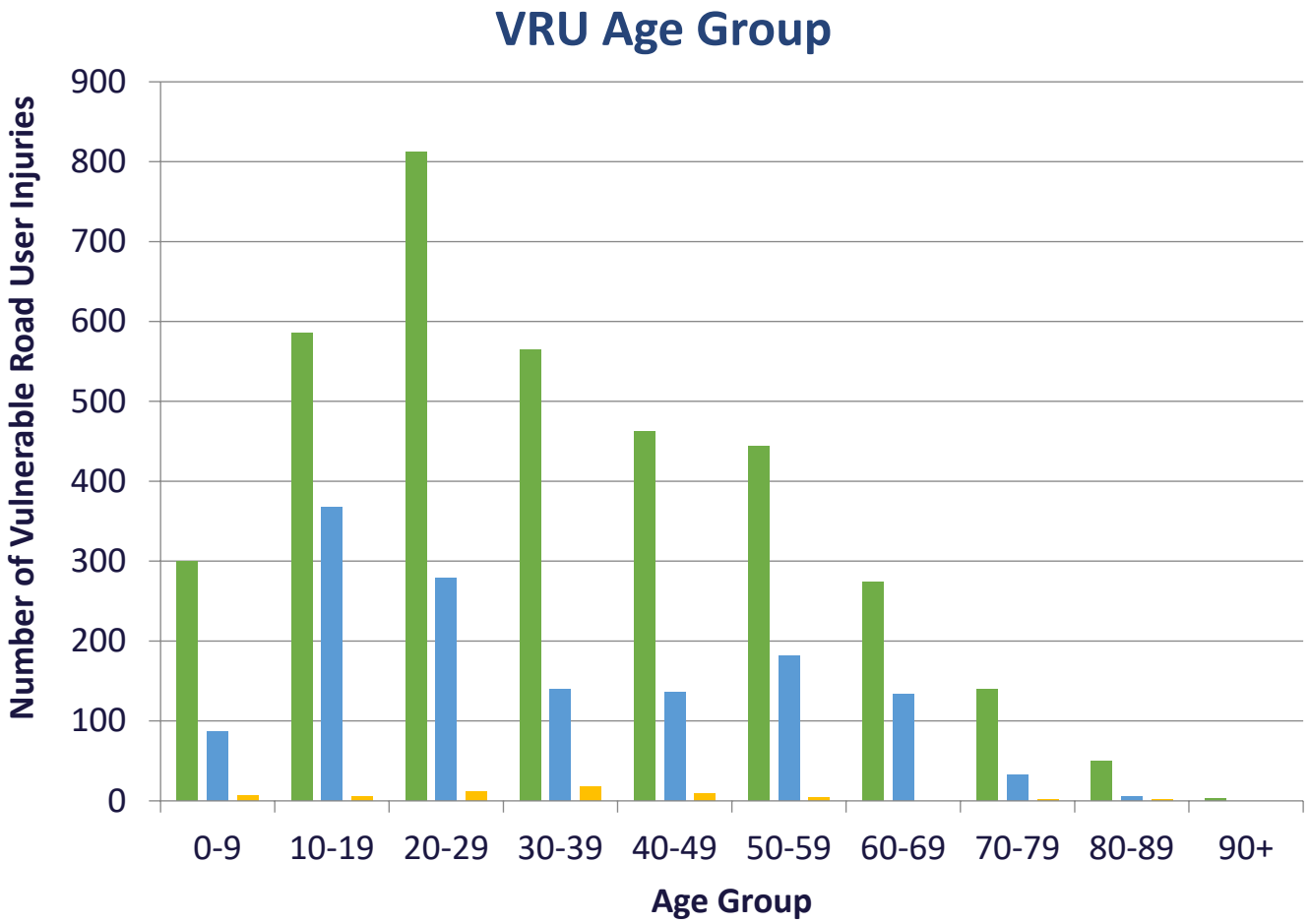

[3]*Other VRUs include Occupants of a Non-Motor Vehicle Transportation Device and Unknown Type of Non-Motorists*

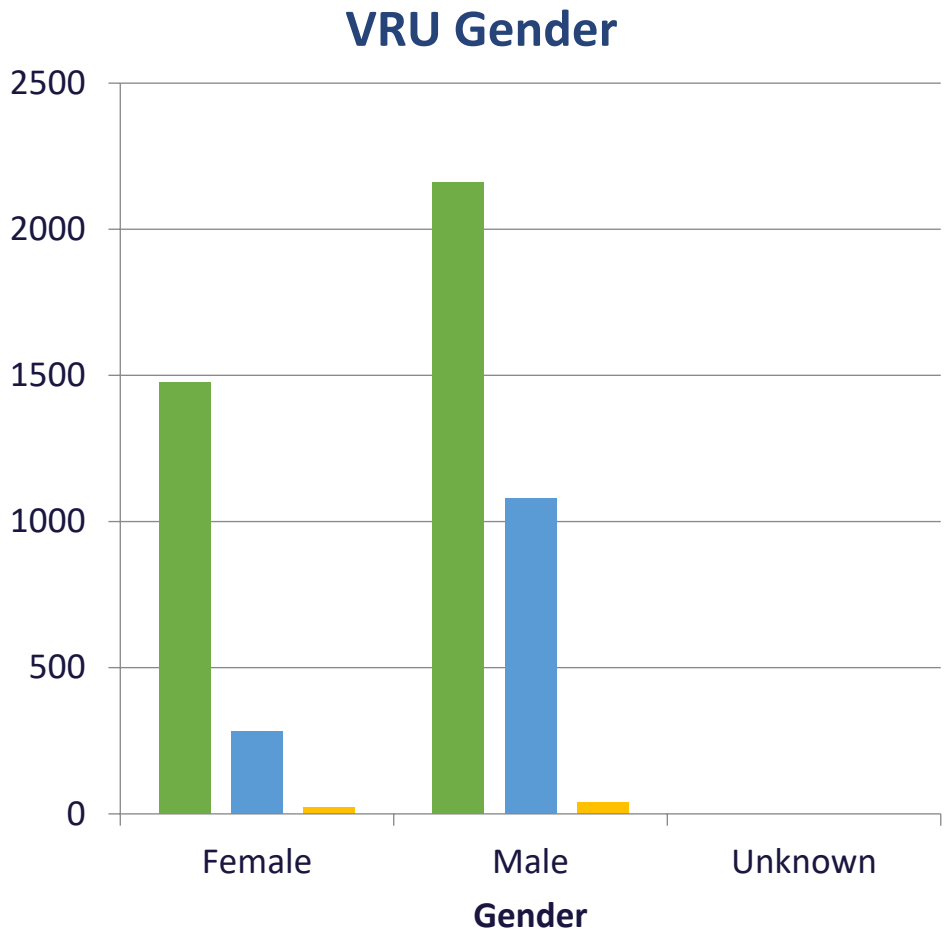
***Based on this data analysis and the data presented in slides 16-19, determination of high-risk areas and further detailed crash analysis will be based on Pedestrians and Bicyclists***

*XX% of all VRUs*

# VRU Safety Performance Assessment

## Age and Gender of Vulnerable Road Users

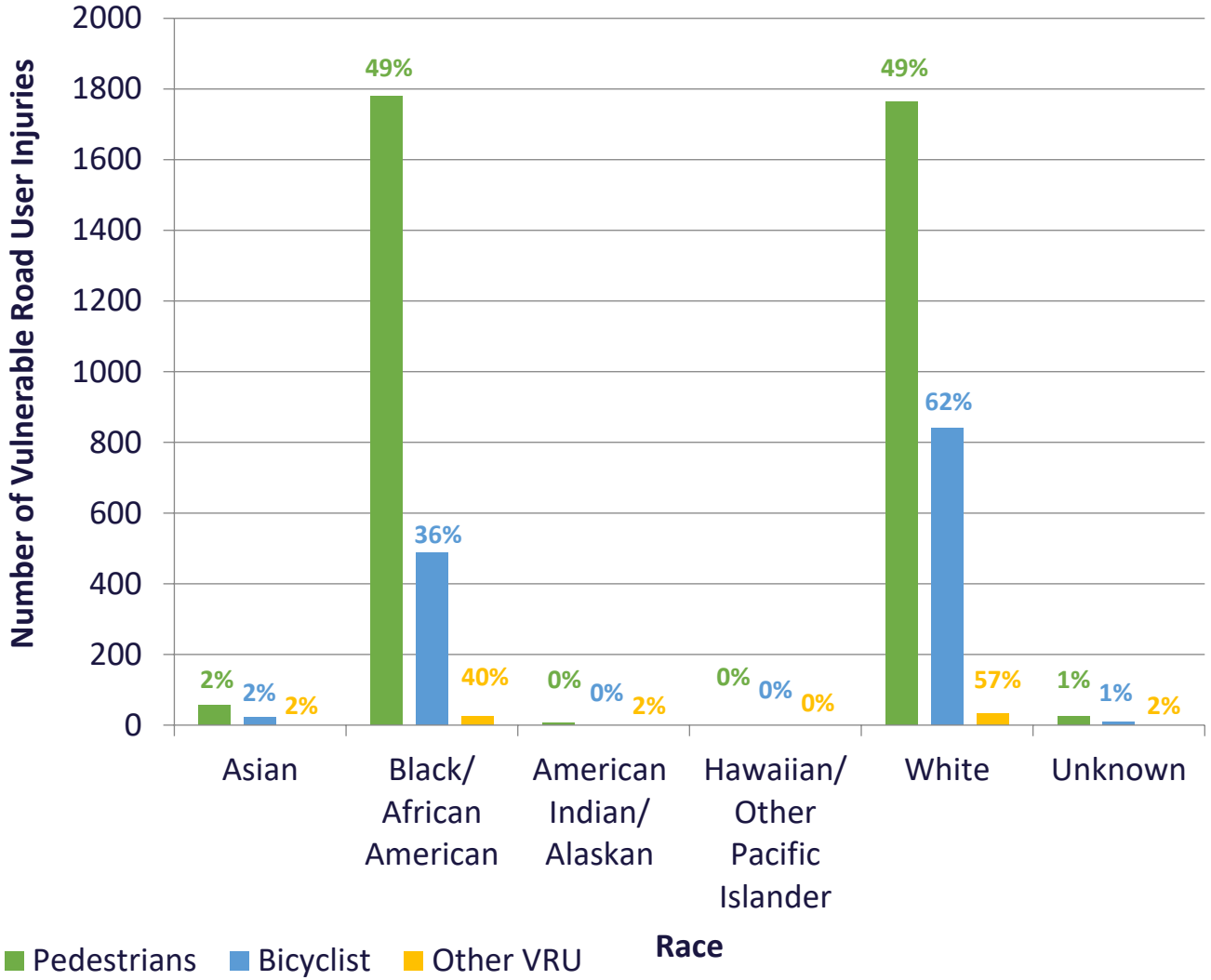


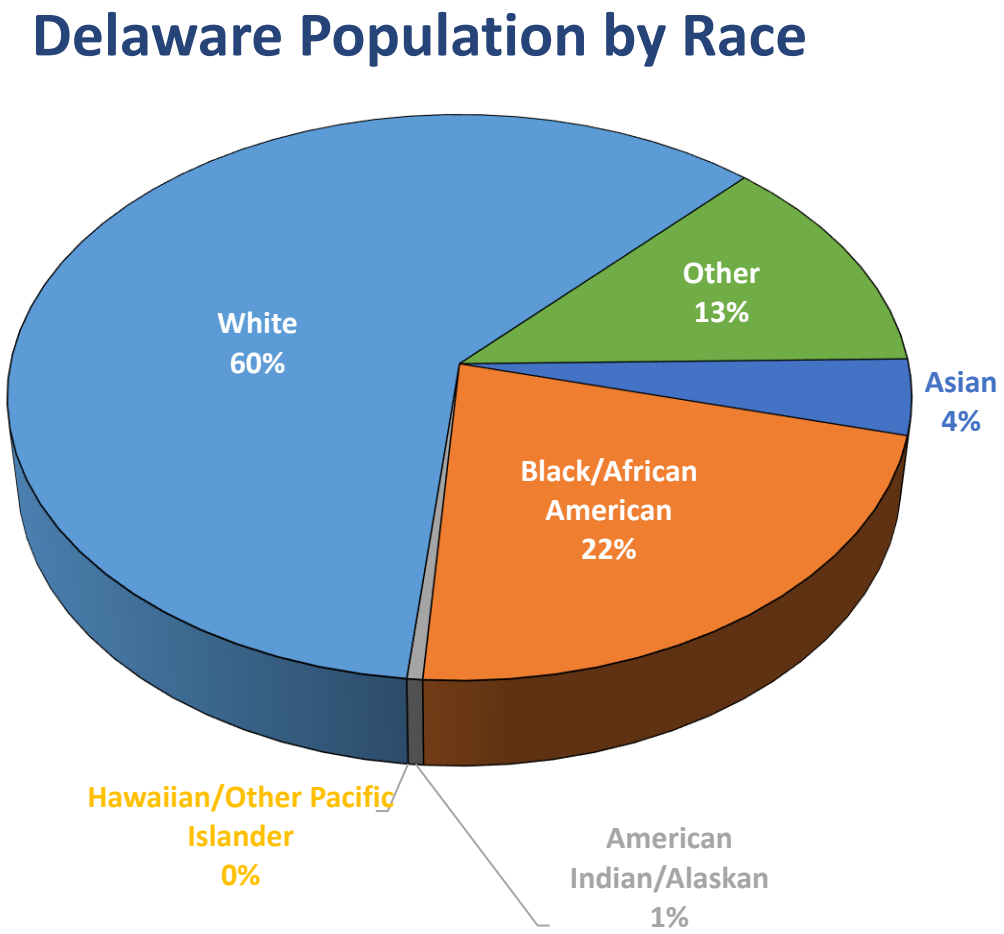

***9% of Vulnerable Road Users involved in crashes were impaired by alcohol or drugs***

# VRU Safety Performance Assessment

## Race and Ethnicity Demographics of Vulnerable Road Users



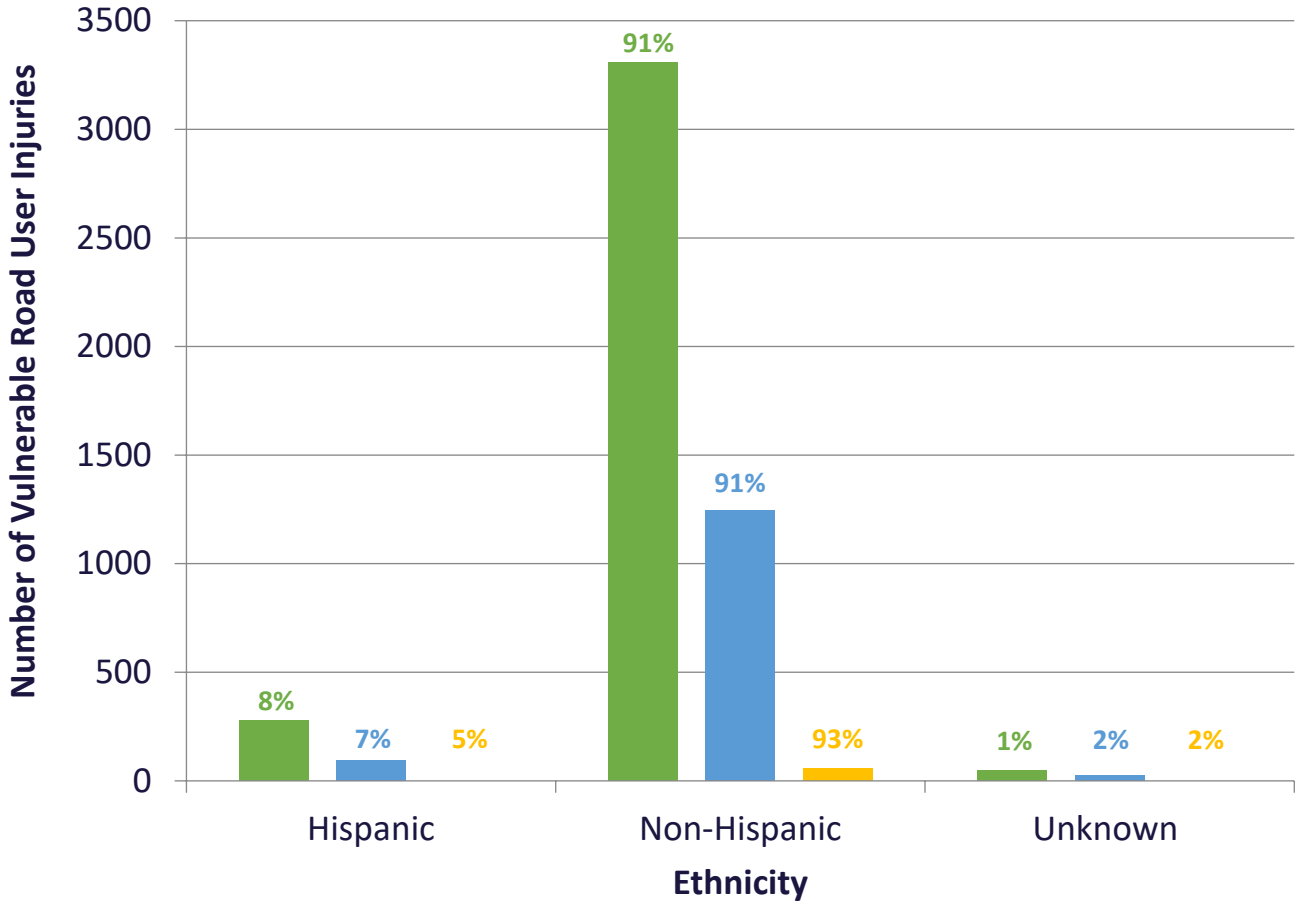

X%: Percentage of VRU type in race category




*Source of Delaware Population Data: 2020 Census, www.census.gov*

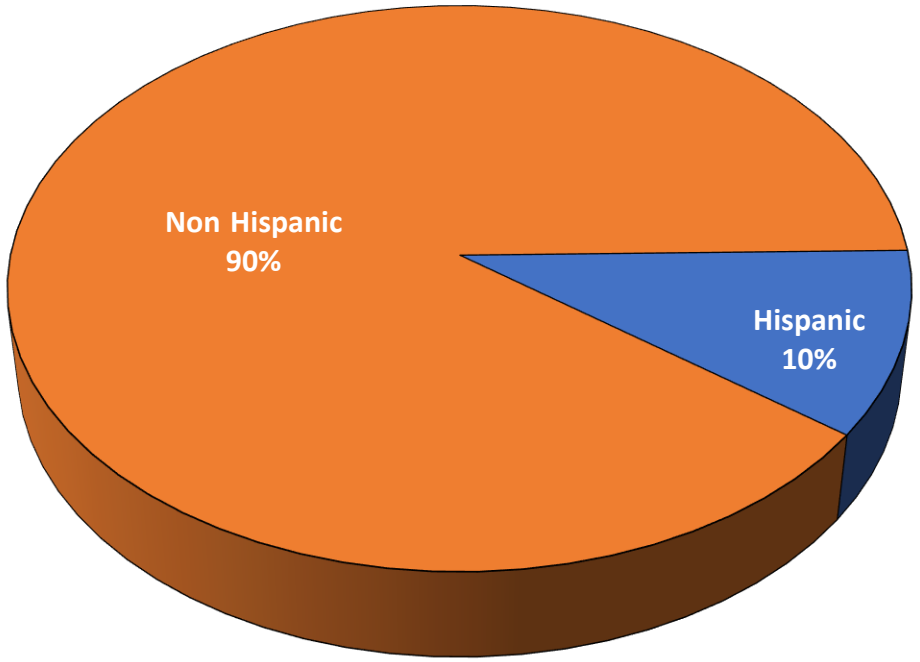
# VRU Safety Performance Assessment

## Race and Ethnicity Demographics of Vulnerable Road Users




X%: Percentage of VRU type in ethnicity category

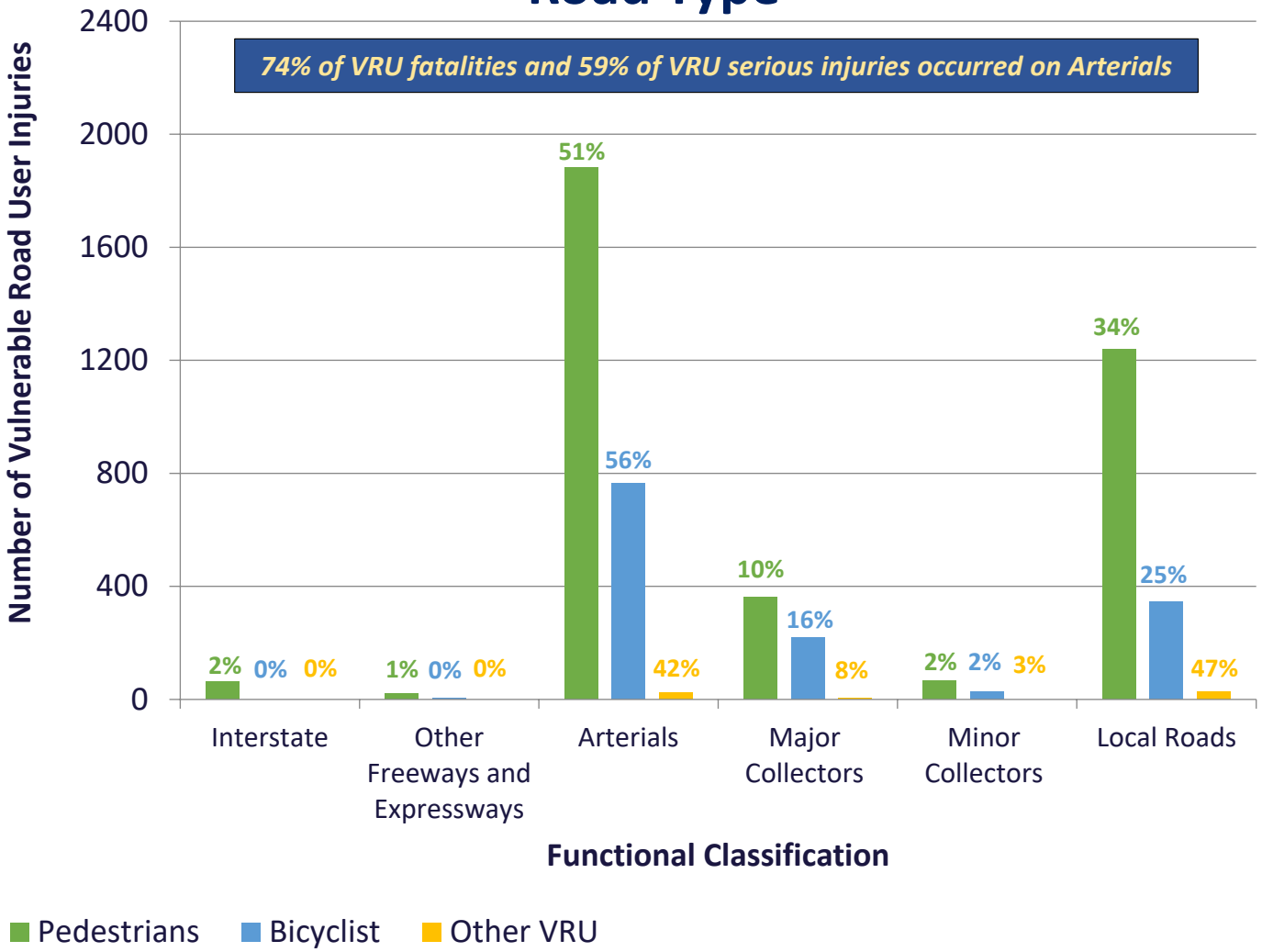
### Delaware Population by Ethnicity




*Source of Delaware Population Data: 2020 Census, www.census.gov*

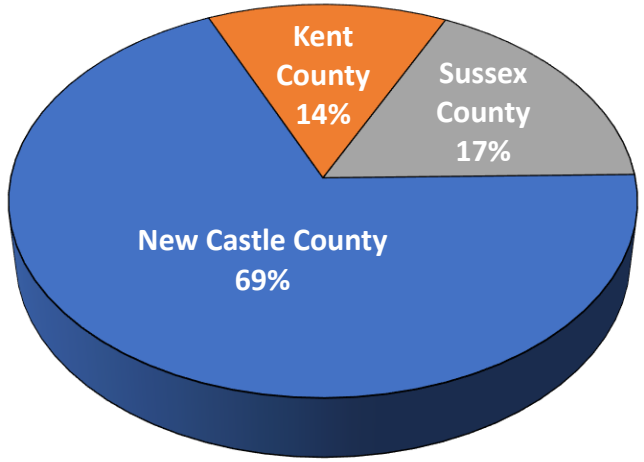
# VRU Safety Performance Assessment
## Location of Vulnerable Road User Crashes

### Road Type

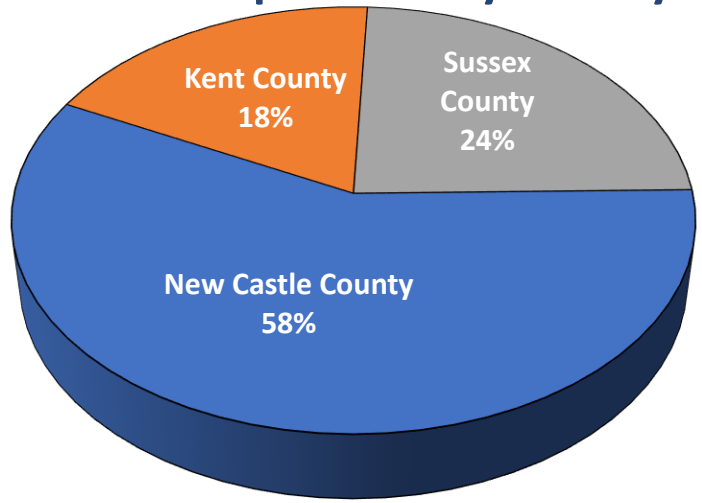



X%: Percentage of VRU type for roadway functional classification

### VRU Crashes by County




### Delaware Population by County

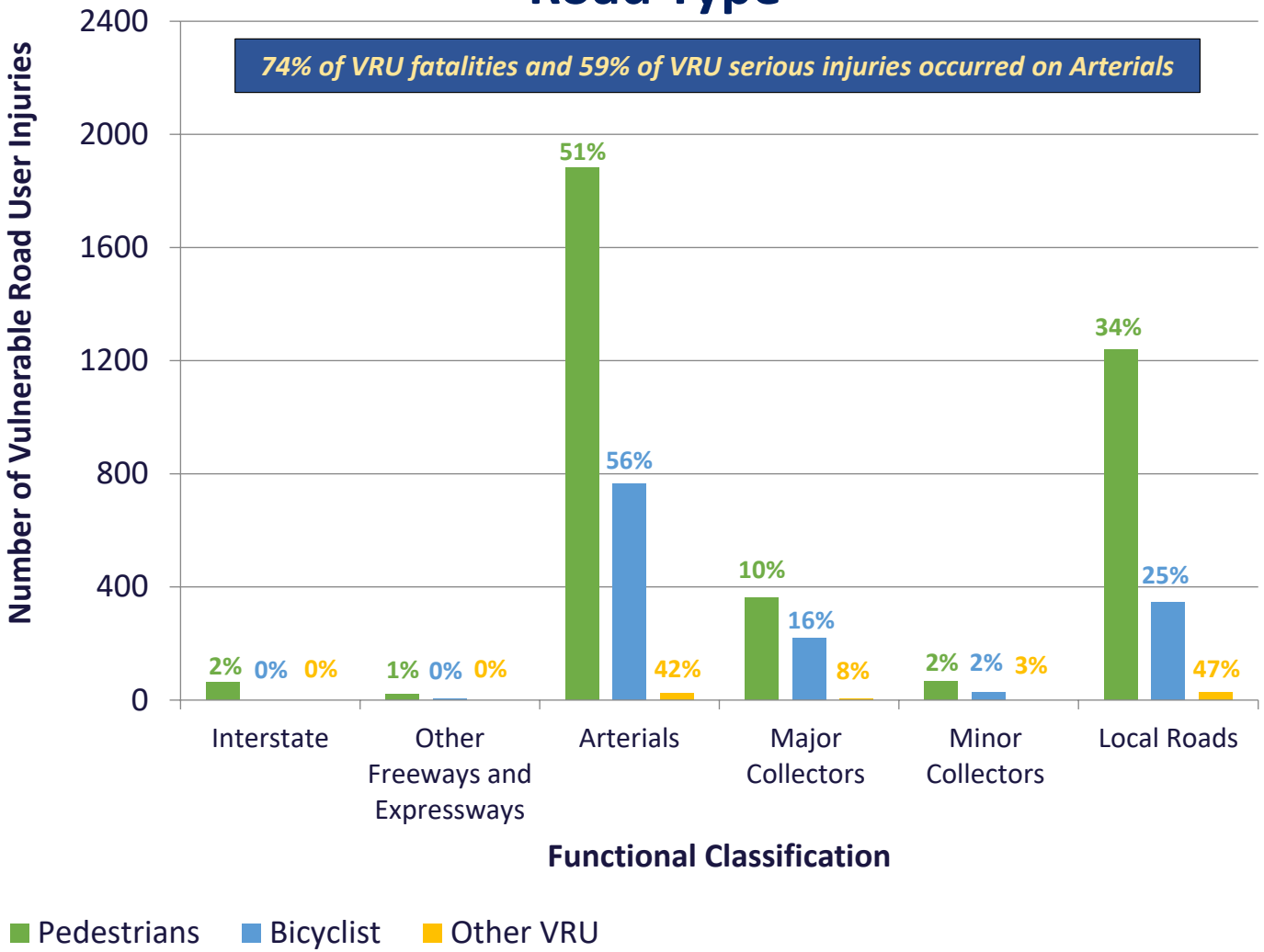





*Note: Crash data presented represents Vulnerable Road Users injured in crashes*
*Source of Delaware Population Data: 2020 Census, www.census.gov*

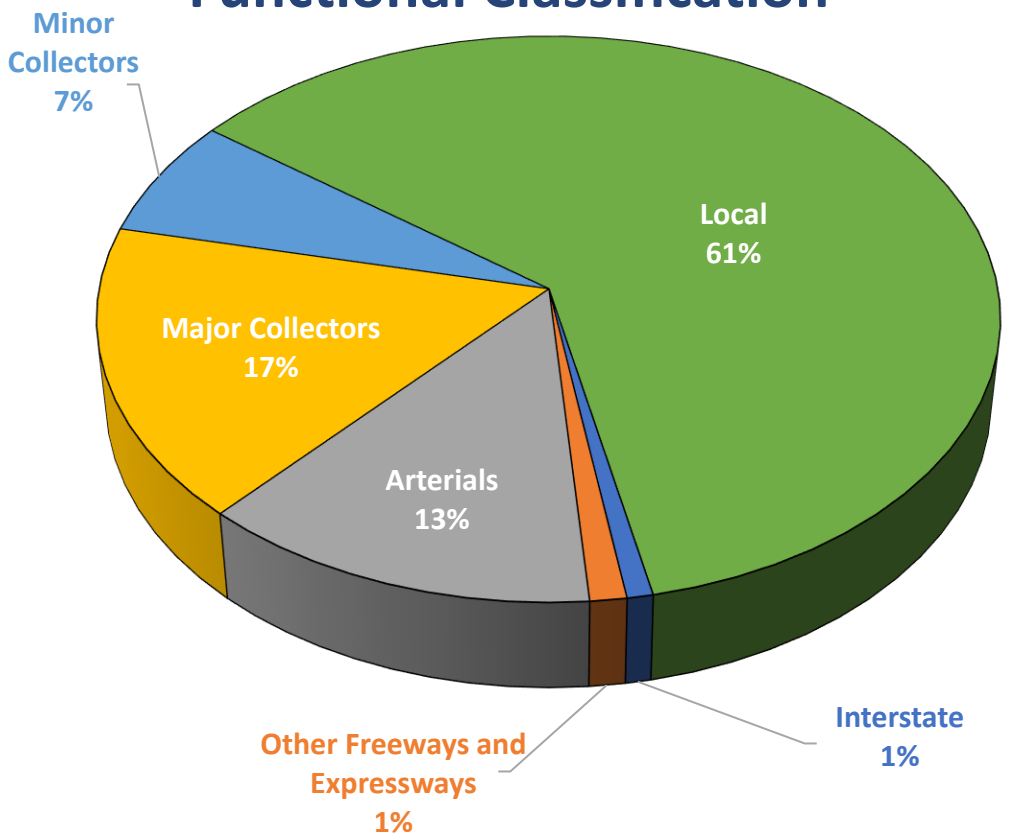
# VRU Safety Performance Assessment
## Location of Vulnerable Road User Crashes

### Road Type




X%: Percentage of VRU type for roadway functional classification

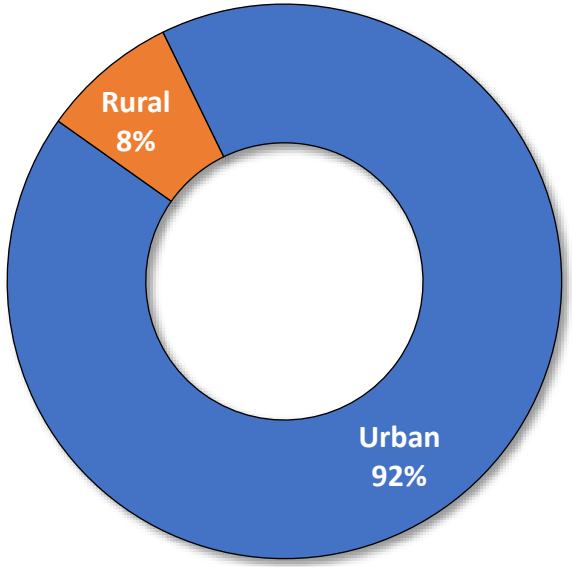
### Statewide Centerline Miles by Functional Classification




*Source of Statewide Centerline Mileage: 2022 Highway Performance Monitoring System*

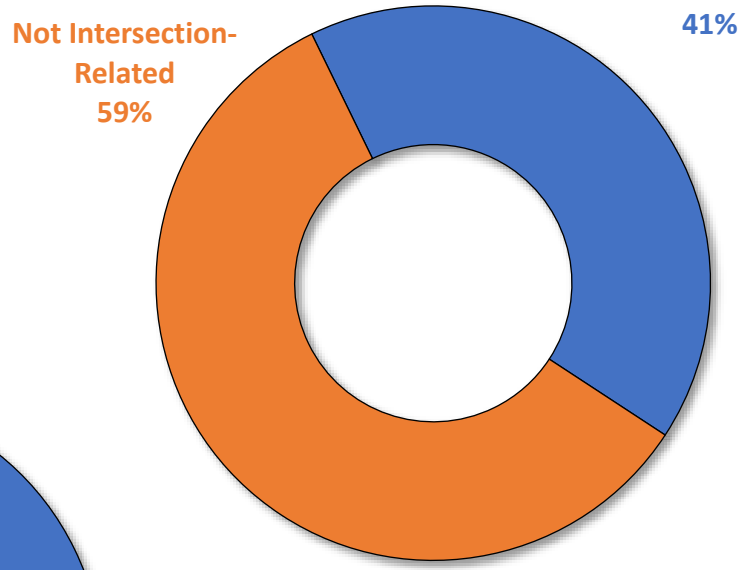
# VRU Safety Performance Assessment
## Location of Vulnerable Road User Crashes

### Area Type



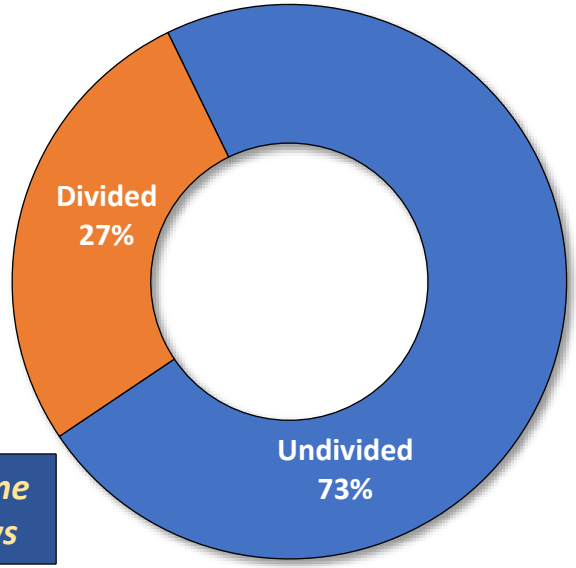

*64% of Delaware's centerline miles are in urban areas*

### Intersection Related



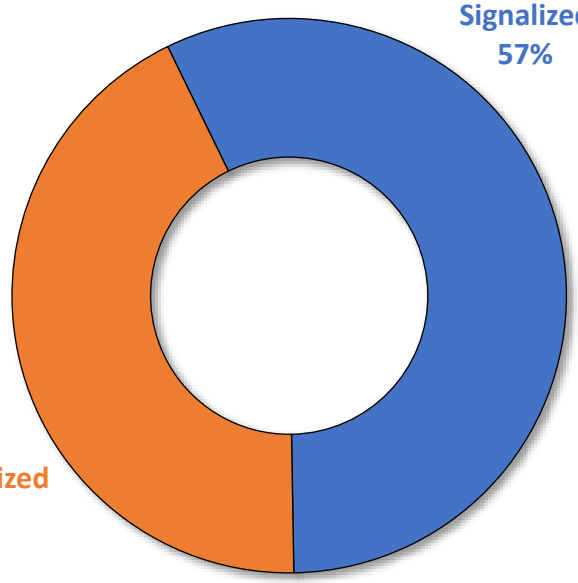

*There are over 22,000 intersections on the state's road network*
- *5% of those are signalized intersections*

### Median Type

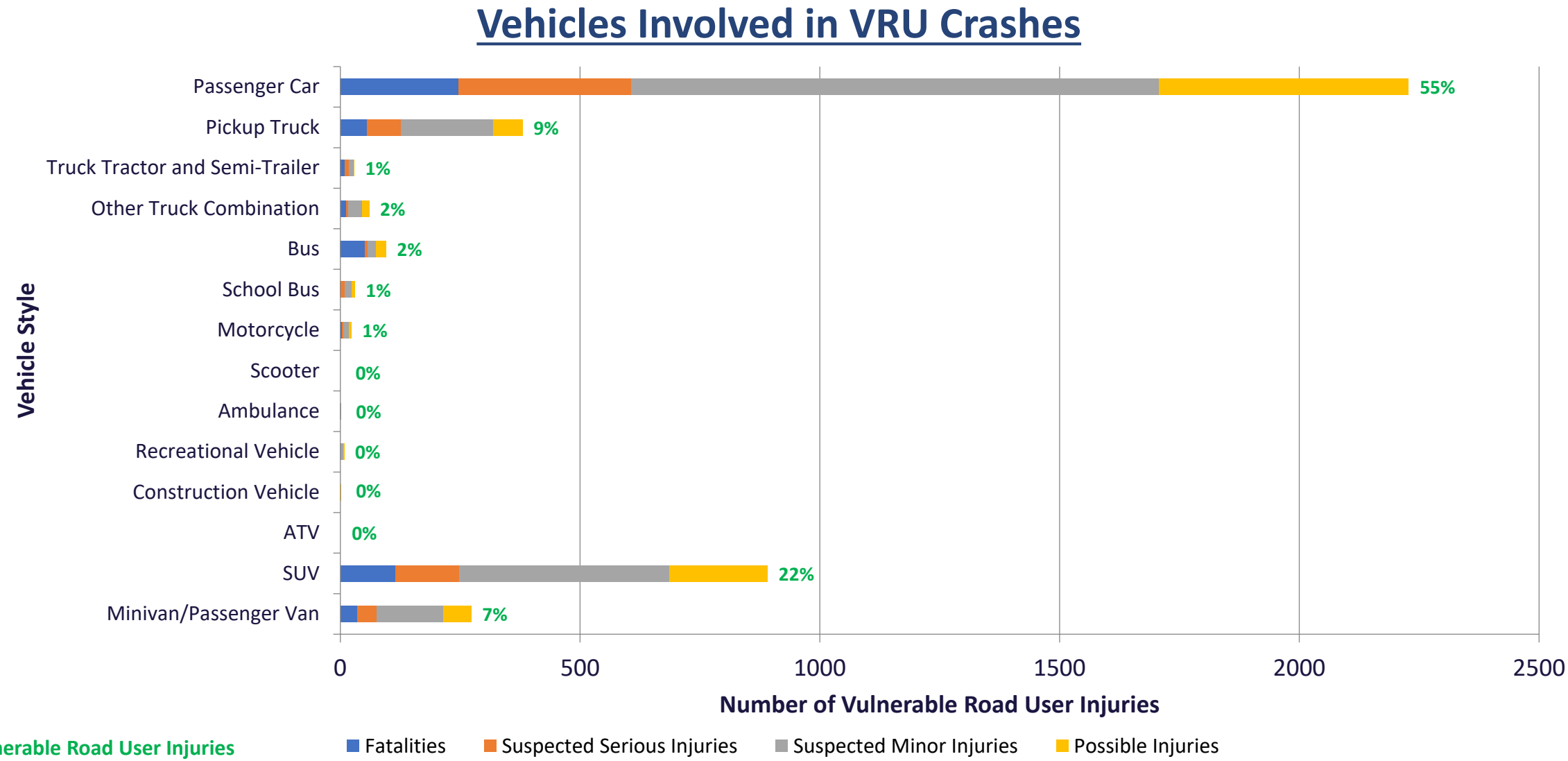



*11% of Delaware's centerline miles are divided roadways*

### Intersection Type



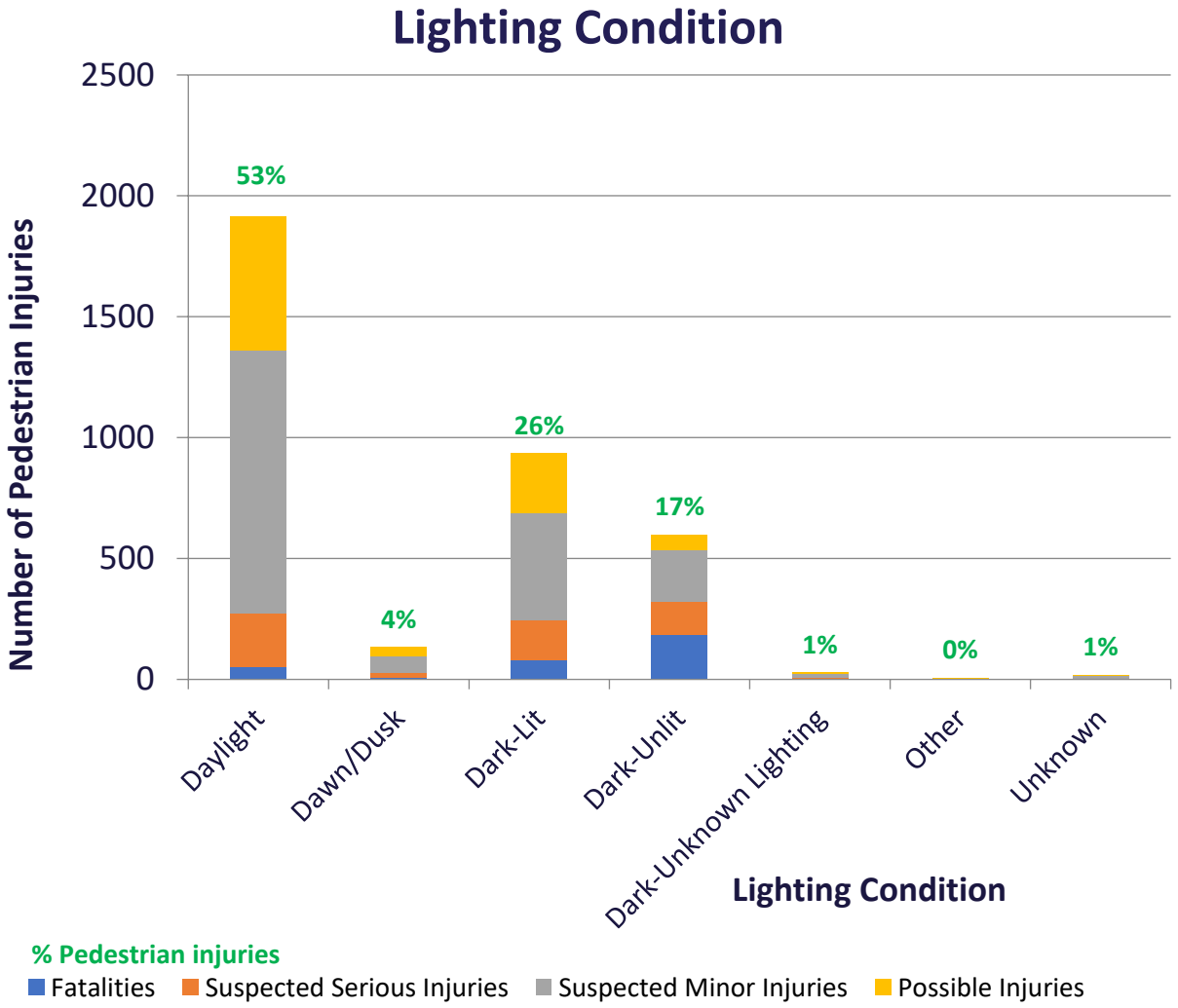
# VRU Safety Performance Assessment
## Vehicles involved in VRU Crashes

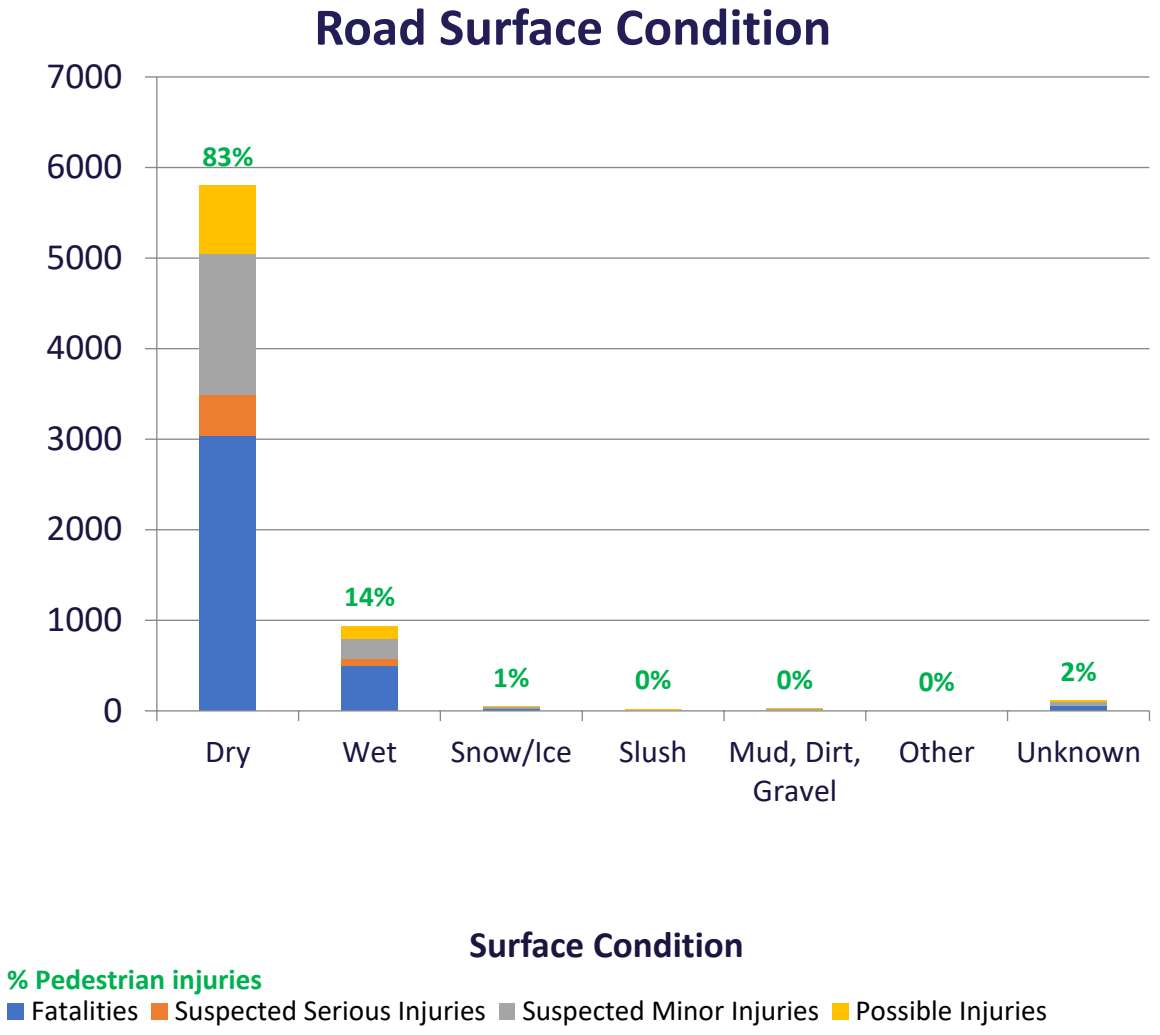


VRU Safety Performance Assessment

# Pedestrians

# VRU Safety Performance Assessment
## Pedestrian-Related Crashes

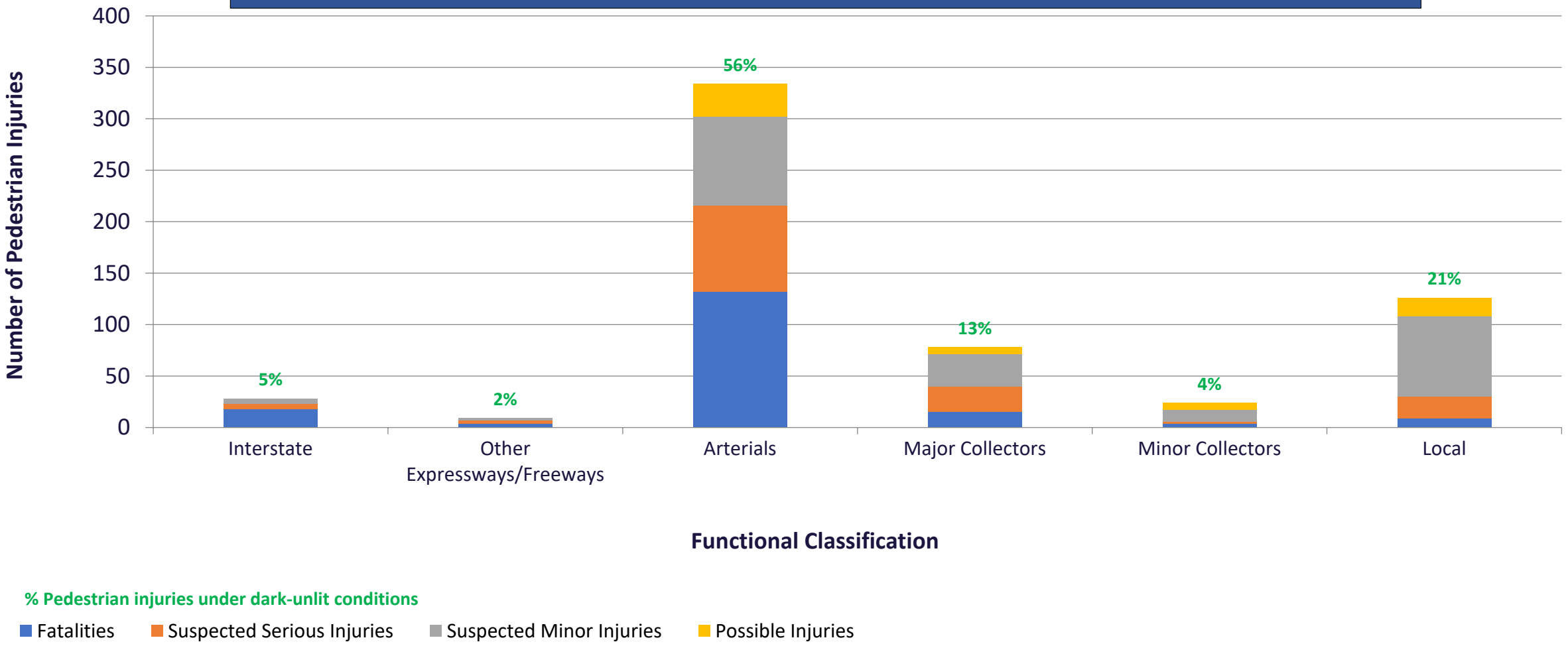


# VRU Safety Performance Assessment
## Pedestrian-Related Crashes

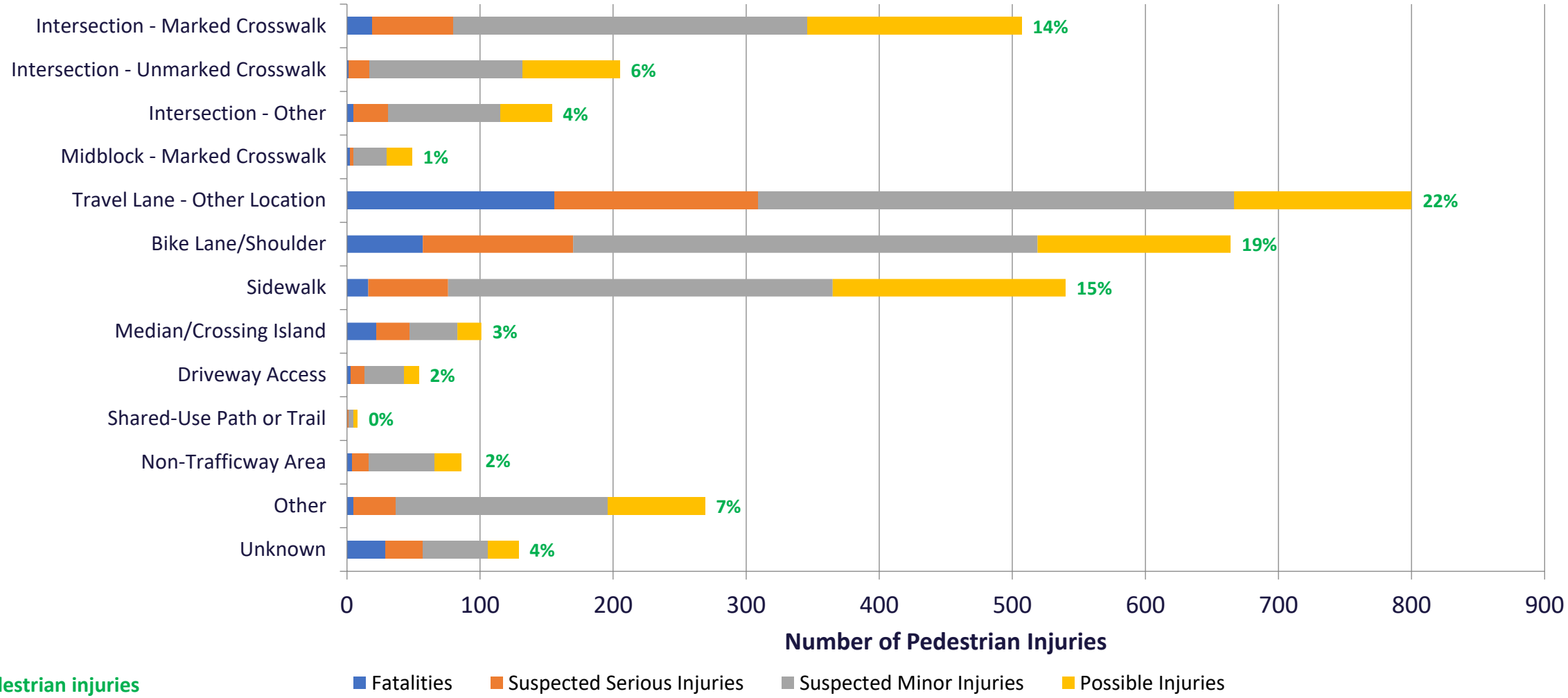
### Pedestrian Injuries under Dark-Unlit Conditions by Road Type

***74% of pedestrian fatalities and 59% of pedestrian serious injuries occurred on arterials***



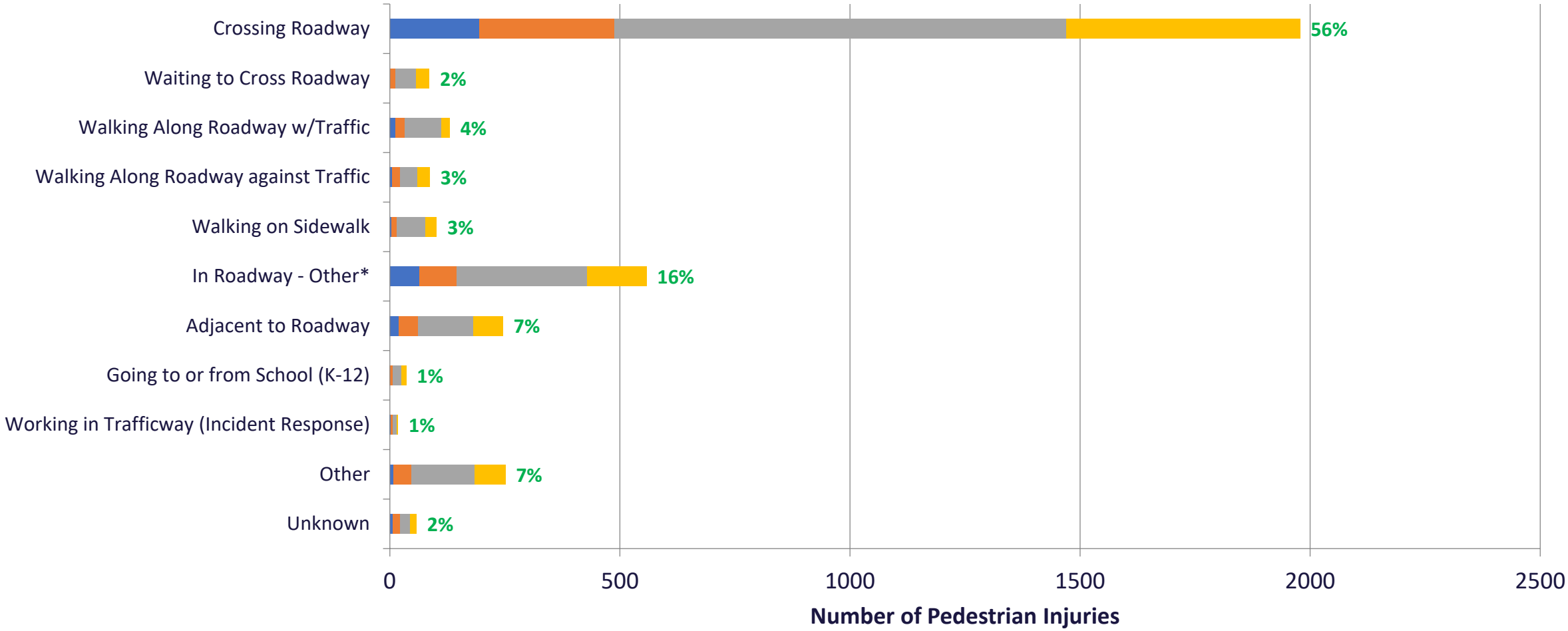
# VRU Safety Performance Assessment
## Pedestrian-Related Crashes

### Pedestrian Location Prior to Crash



# VRU Safety Performance Assessment
## Pedestrian-Related Crashes

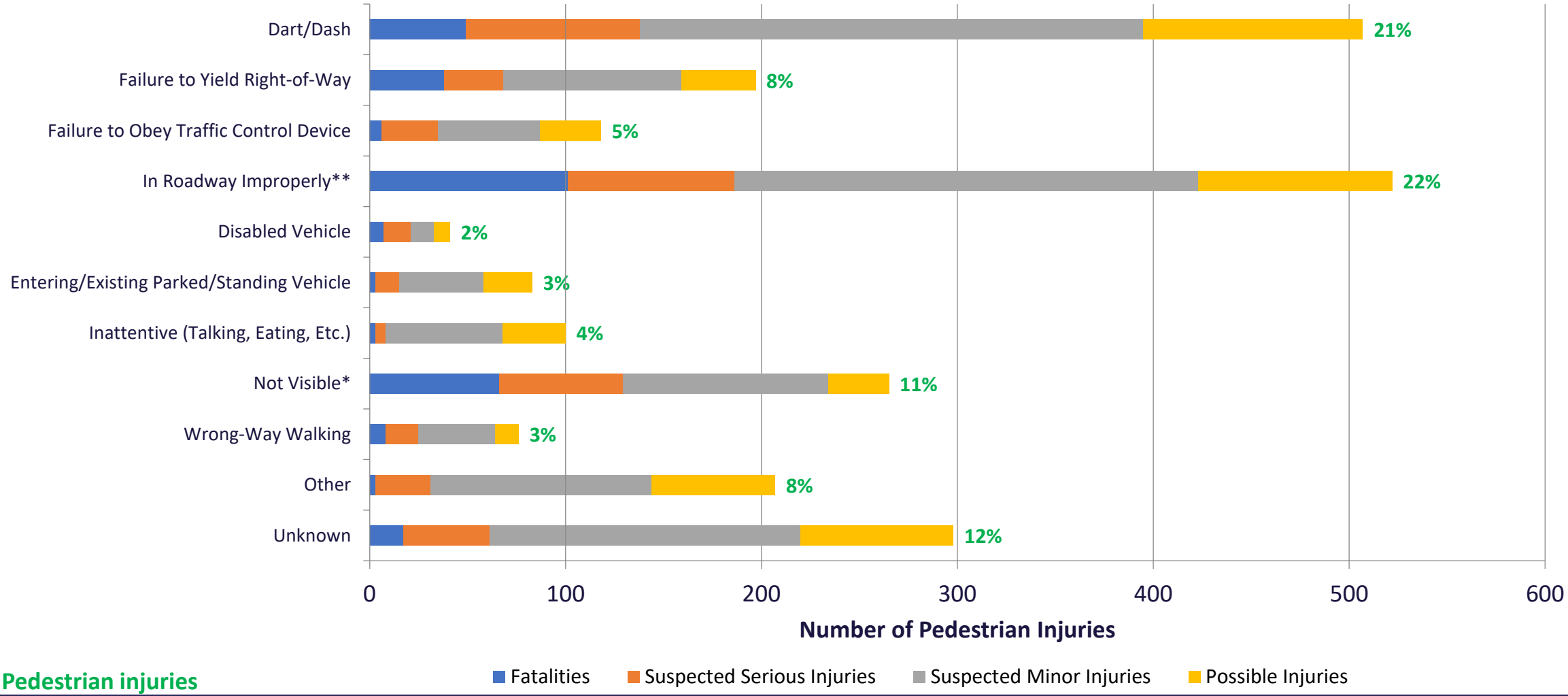
### Pedestrian Action Prior to Crash




**% Pedestrian injuries** **Working, Playing, etc.*

# VRU Safety Performance Assessment
## Pedestrian-Related Crashes

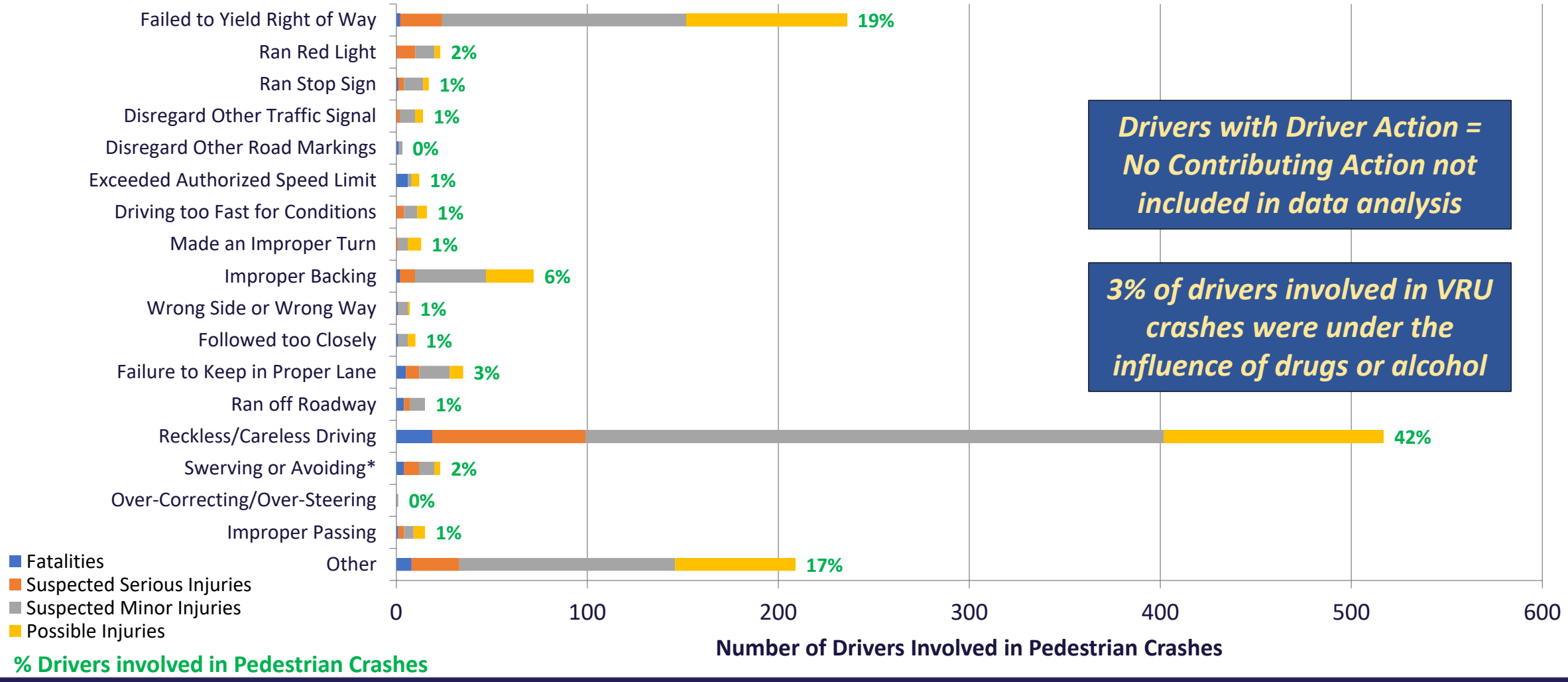
### Pedestrian Action at Time of Crash




*Dark Clothing, No Lighting, etc.
**Standing, Lying, Working, Playing

# VRU Safety Performance Assessment
## Pedestrian-Related Crashes

### Reported Driver Action in Pedestrian Crashes



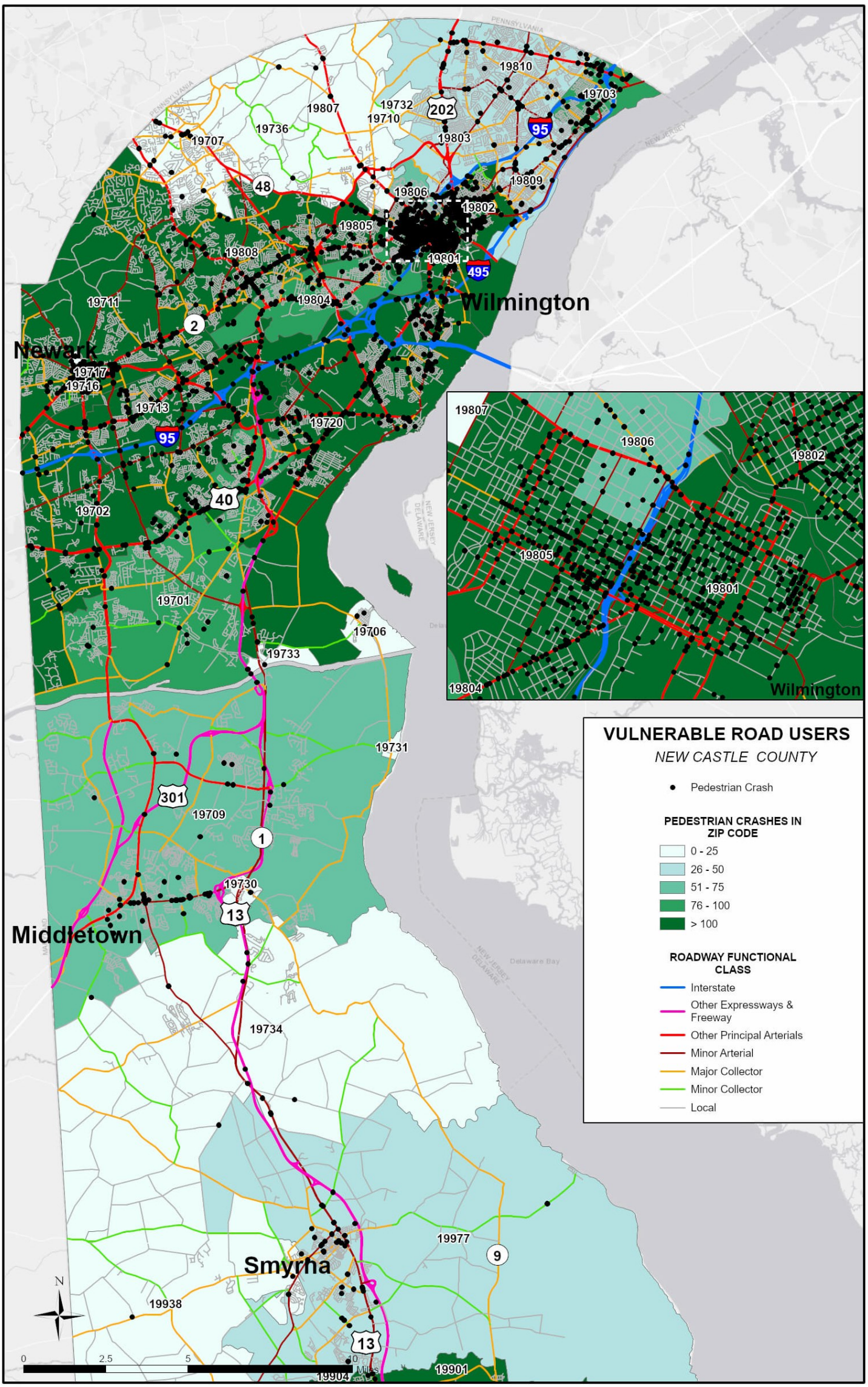

***Drivers with Driver Action = No Contributing Action not included in data analysis***

***3% of drivers involved in VRU crashes were under the influence of drugs or alcohol***

**Swerving or avoiding due to wind, slippery surface, vehicle, object, non motorist in roadway, etc.*

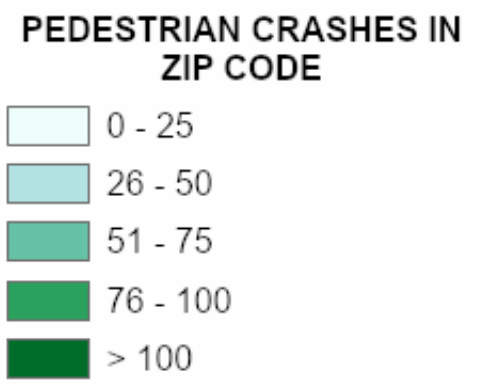
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes by Zip Code



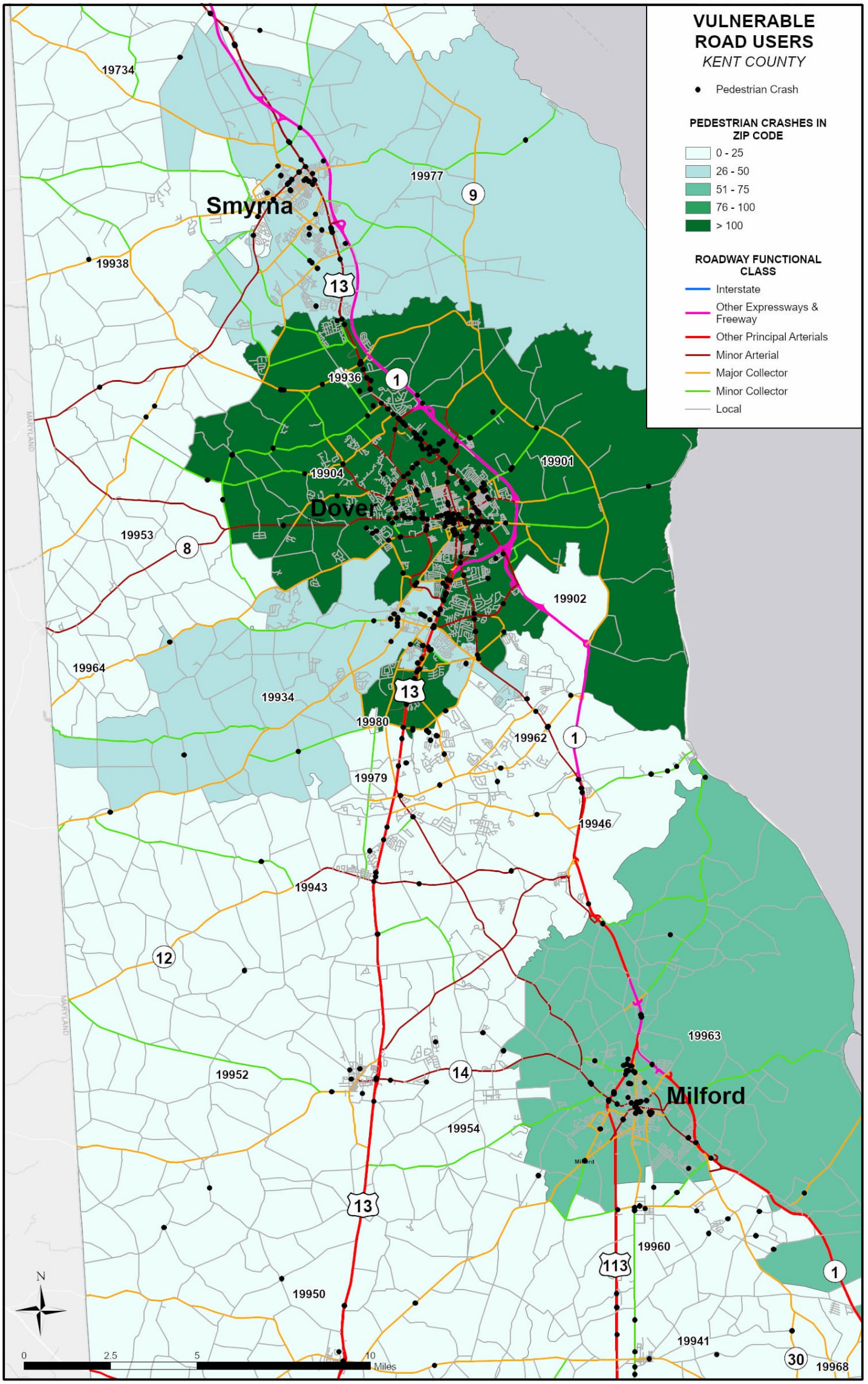
# New Castle County

| Zip Code | City/Area | # Ped Crashes | Population |
|---|---|---|---|
| 19710 | Montchanin | 0 | 108 |
| 19731 | Port Penn | 0 | 329 |
| 19732 | Rockland | 0 | 223 |
| 19736 | Yorklyn | 0 | 34 |
| 19717 | Newark | 2 | 6,201 |
| 19730 | Odessa | 2 | 472 |
| 19733 | Saint Georges | 2 | 320 |
| 19706 | Delaware City | 5 | 1,938 |
| 19734 | Townsend | 12 | 14,116 |
| 19716 | Newark | 14 | 42 |
| 19807 | Wilmington | 14 | 8,089 |
| 19707 | Hockessin | 19 | 17,274 |
| 19803 | Wilmington | 30 | 21,886 |
| 19809 | Wilmington | 45 | 14,658 |
| 19810 | Wilmington | 45 | 25,270 |
| 19709 | Middletown | 58 | 49,599 |
| 19806 | Wilmington | 67 | 10,083 |
| 19703 | Claymont | 77 | 16,175 |
| 19804 | Wilmington | 79 | 18,292 |
| 19701 | Bear | 94 | 42,717 |
| 19808 | Wilmington | 114 | 39,285 |
| 19713 | Newark | 118 | 31,867 |
| 19702 | Newark | 136 | 55,653 |
| 19711 | Newark | 187 | 48,477 |
| 19720 | New Castle | 310 | 61,043 |
| 19802 | Wilmington | 345 | 26,189 |
| 19805 | Wilmington | 433 | 39,985 |
| 19801 | Wilmington | 554 | 16,219 |



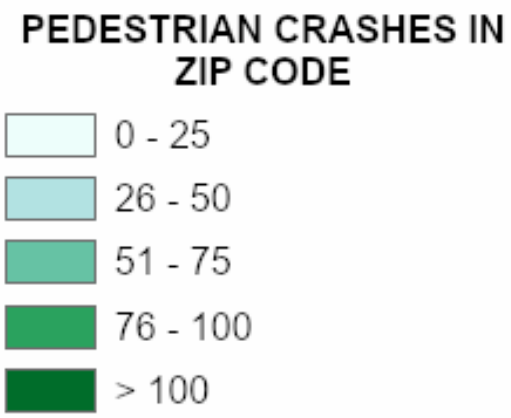
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes by Zip Code



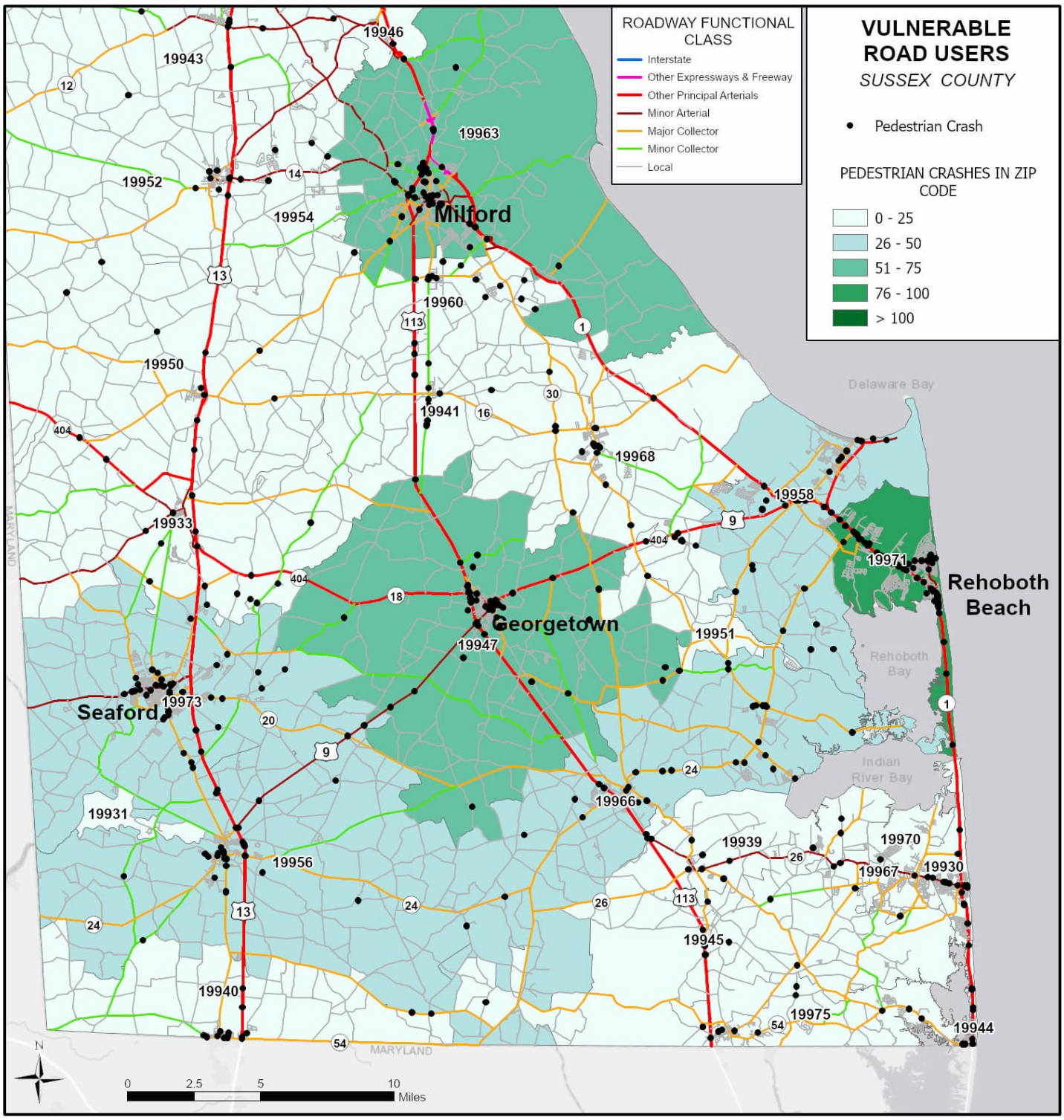
# Kent County

| Zip Code | City/Area | # Ped Crashes | Population |
|---|---|---|---|
| 19902 | Dover AFB | 0 | 108 |
| 19964 | Marydel | 0 | 1,298 |
| 19979 | Viola | 0 | 722 |
| 19980 | Woodside | 0 | 235 |
| 19936 | Cheswold | 1 | 329 |
| 19953 | Hartly | 1 | 4,500 |
| 19954 | Houston | 1 | 1,629 |
| 19938 | Clayton | 6 | 10,131 |
| 19946 | Frederica | 9 | 4,932 |
| 19952 | Harrington | 15 | 10,621 |
| 19962 | Magnolia | 19 | 13,692 |
| 19943 | Felton | 21 | 12,523 |
| 19934 | Camden Wyoming | 28 | 14,243 |
| 19977 | Smyrna | 40 | 27,505 |
| 19963 | Milford | 66 | 20,827 |
| 19904 | Dover | 129 | 36,880 |
| 19901 | Dover | 147 | 36,839 |



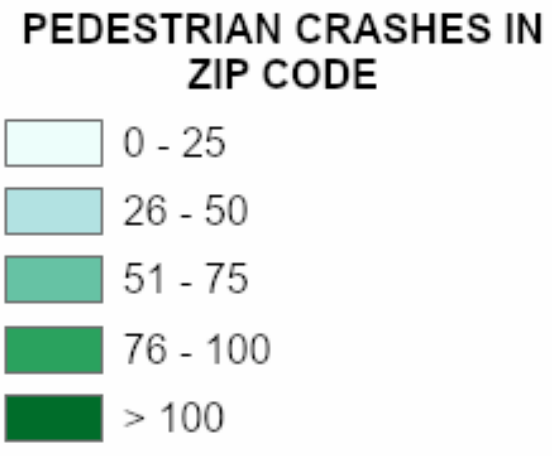
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes by Zip Code



# Sussex County

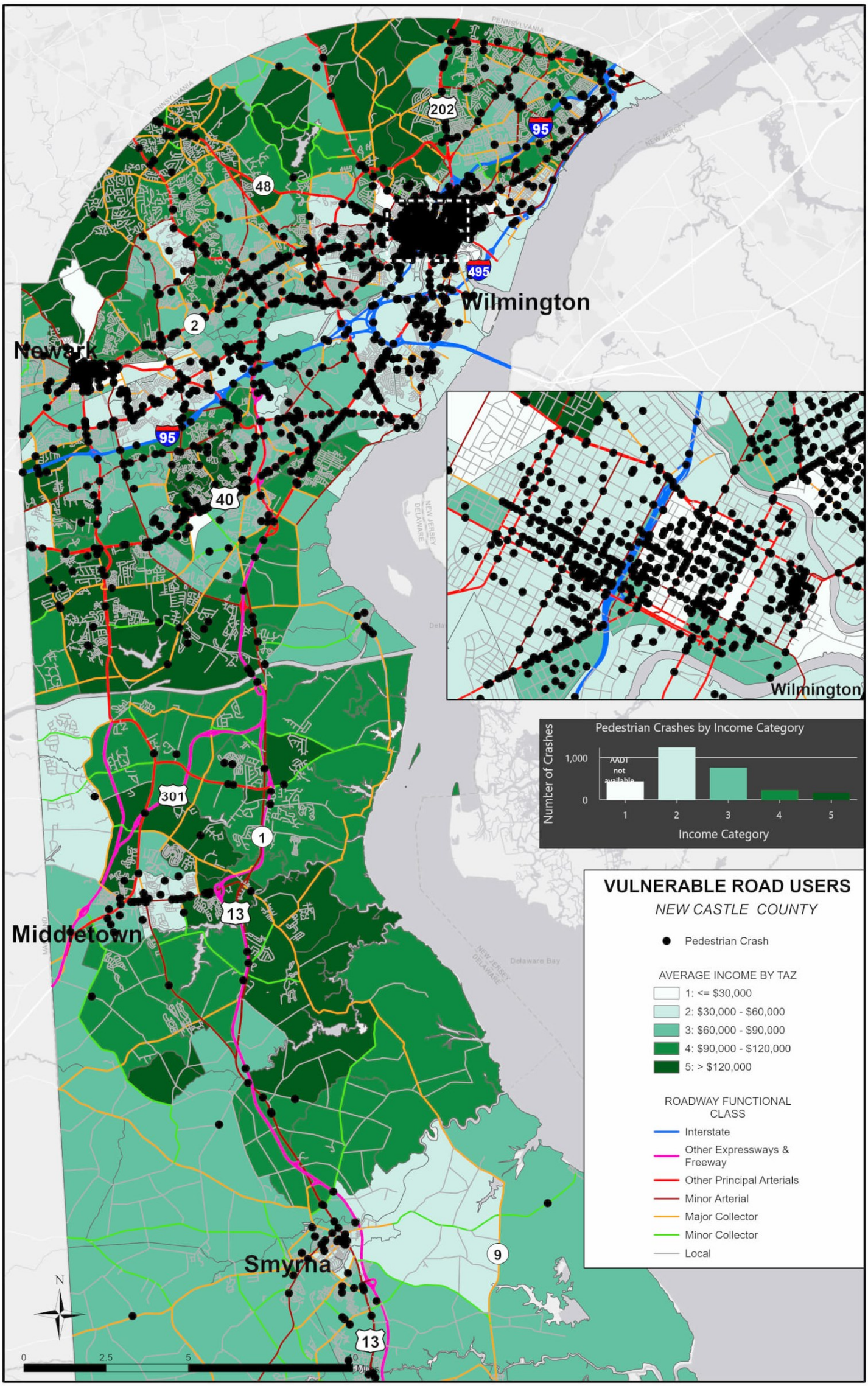
| Zip Code | City/Area | # Ped Crashes | Population |
|---|---|---|---|
| 19931 | Bethel | 0 | 258 |
| 19967 | Millville | 1 | 1,802 |
| 19951 | Harbeson | 2 | 1,986 |
| 19970 | Ocean View | 5 | 8,591 |
| 19950 | Greenwood | 9 | 7,095 |
| 19939 | Dagsboro | 12 | 7,357 |
| 19944 | Fenwick Island | 12 | 519 |
| 19945 | Frankford | 12 | 8,041 |
| 19941 | Ellendale | 13 | 2,857 |
| 19960 | Lincoln | 16 | 7,121 |
| 19975 | Selbyville | 16 | 10,476 |
| 19930 | Bethany Beach | 17 | 2,657 |
| 19940 | Delmar | 17 | 6,541 |
| 19933 | Bridgeville | 21 | 9,784 |
| 19968 | Milton | 21 | 13,800 |
| 19958 | Lewes | 33 | 27,911 |
| 19966 | Millsboro | 33 | 32,520 |
| 19956 | Laurel | 34 | 16,327 |
| 19973 | Seaford | 50 | 2,550 |
| 19947 | Georgetown | 62 | 20,964 |
| 19971* | Rehoboth Beach | 90 | 14,348 |




**Zip code 19971 includes both Rehoboth Beach and Dewey Beach. Dewey Beach does not have a separate zip code.*

# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Average Income Levels by Traffic Analysis Zone

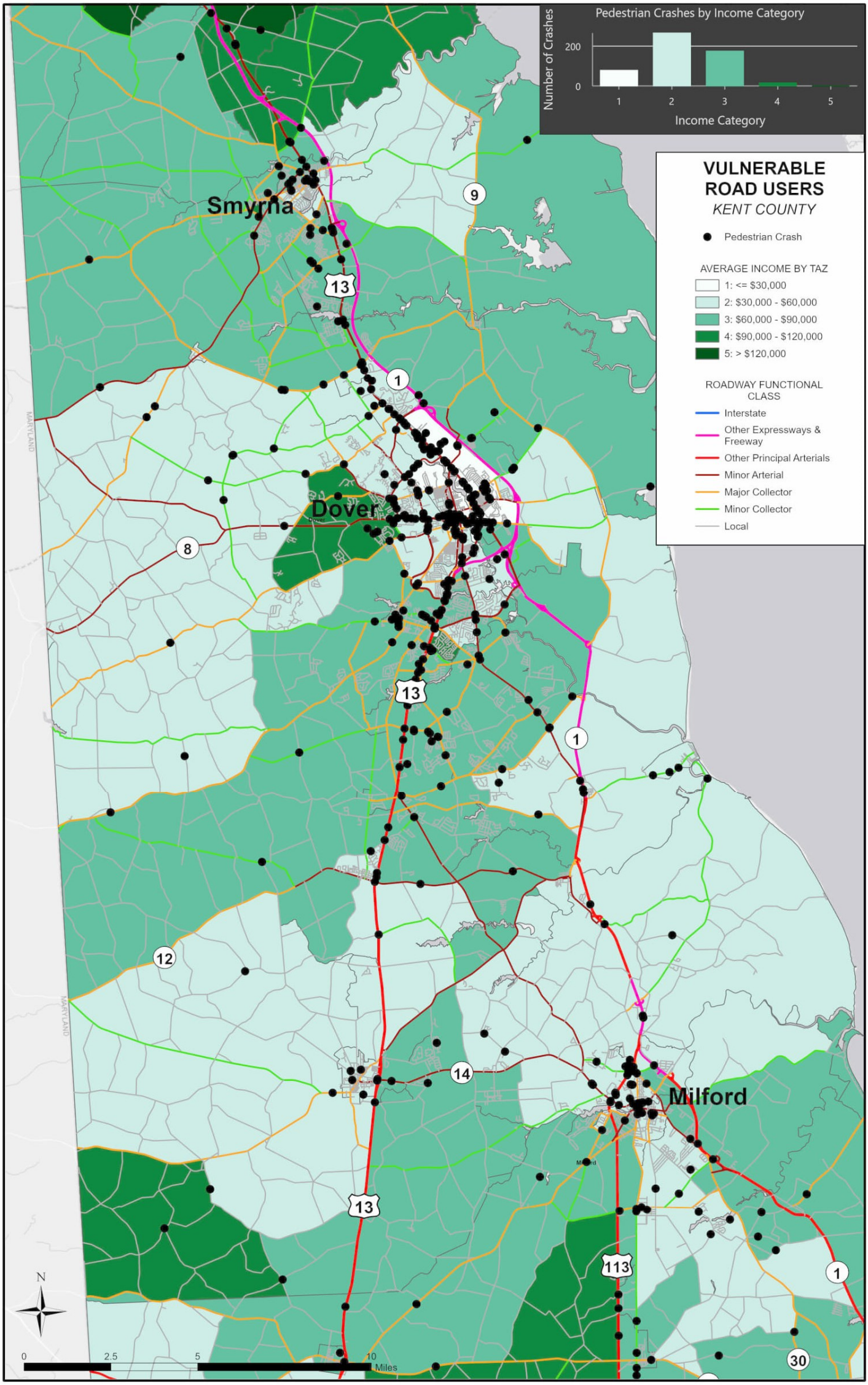





*Source of Income Data: Wilmington Area Planning Council*

# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Average Income Levels by Traffic Analysis Zone

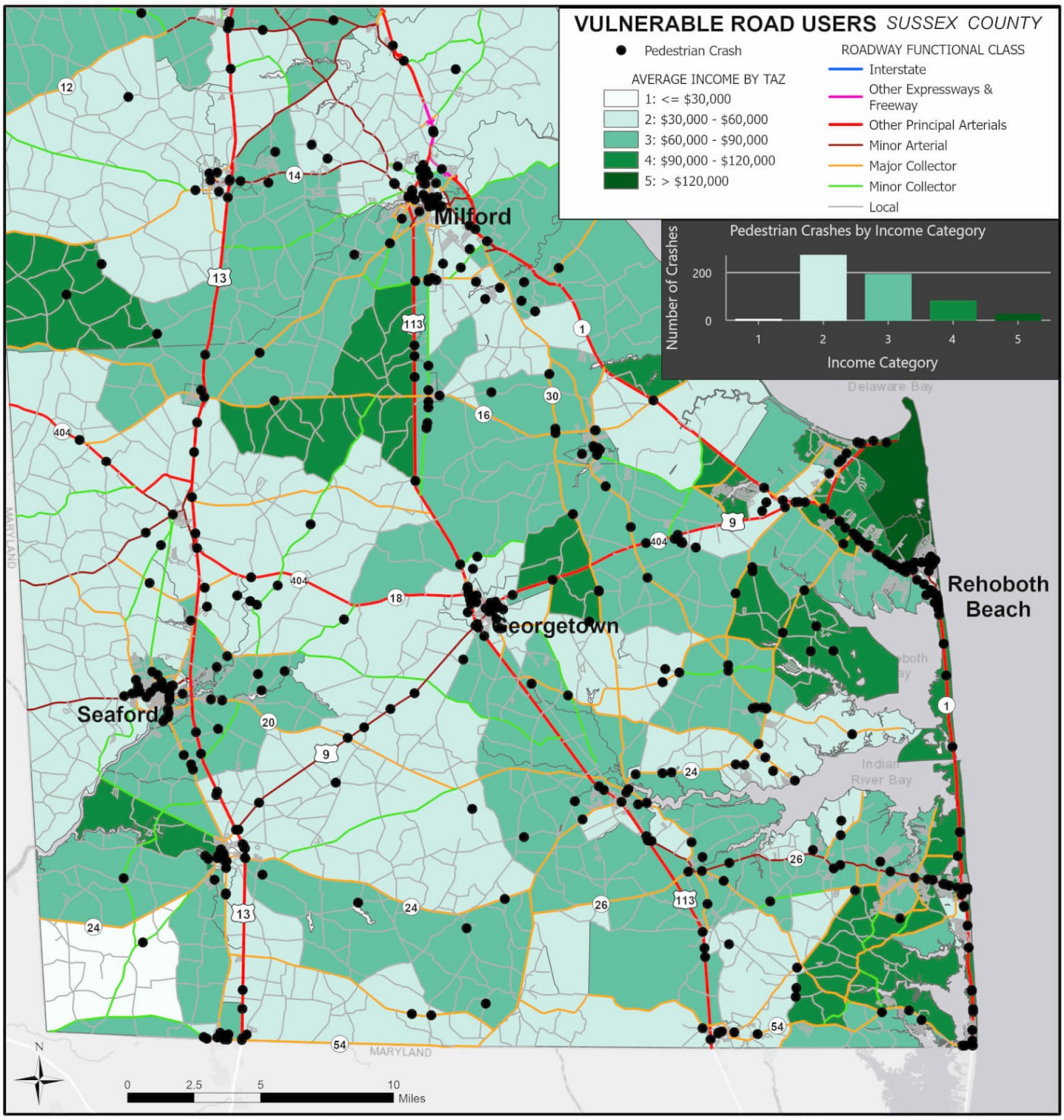





*Source of Income Data: Wilmington Area Planning Council*

# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Average Income Levels by Traffic Analysis Zone

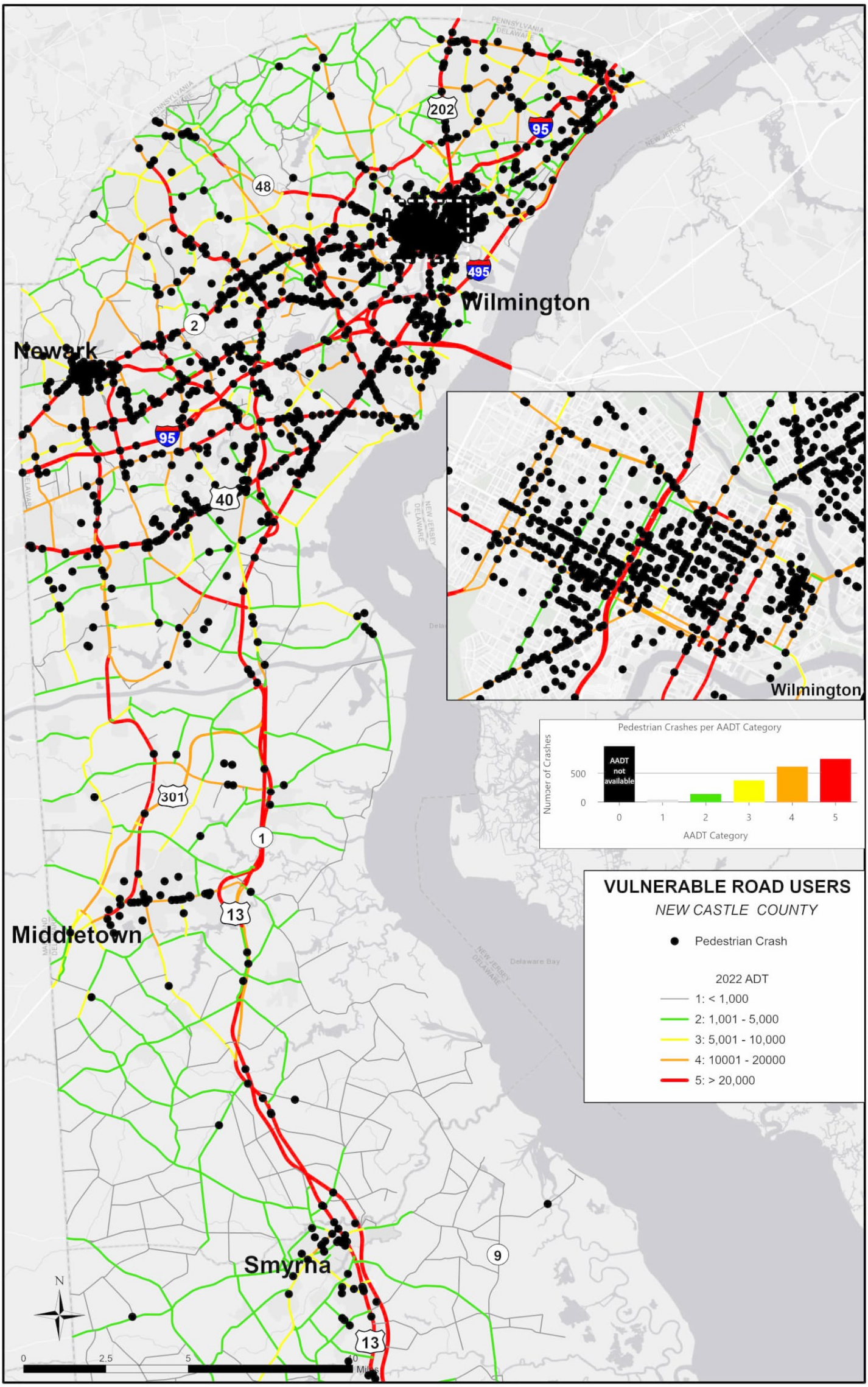





*Source of Income Data: Wilmington Area Planning Council*

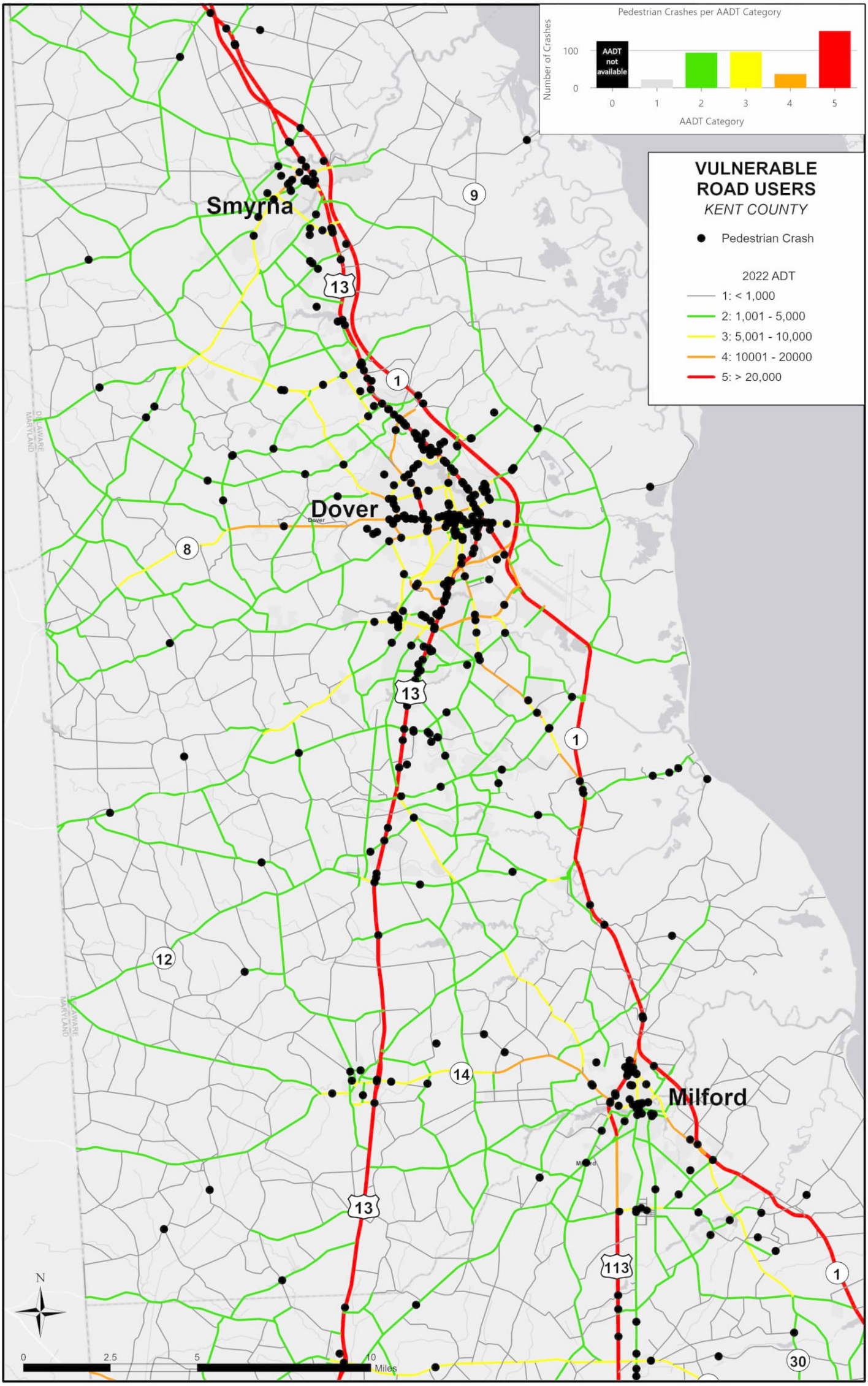
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Roadway Annual Average Daily Traffic Volume



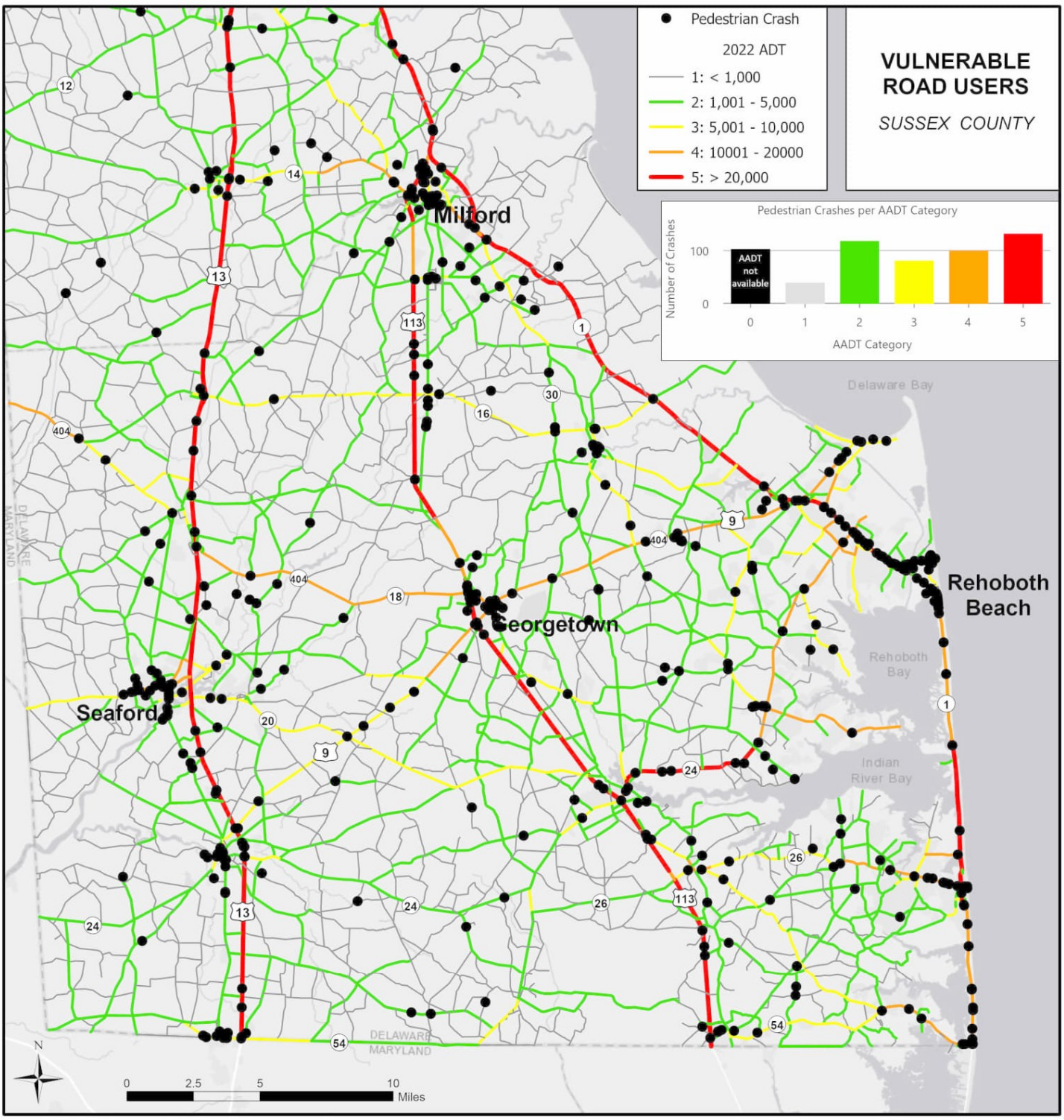
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Roadway Annual Average Daily Traffic Volume



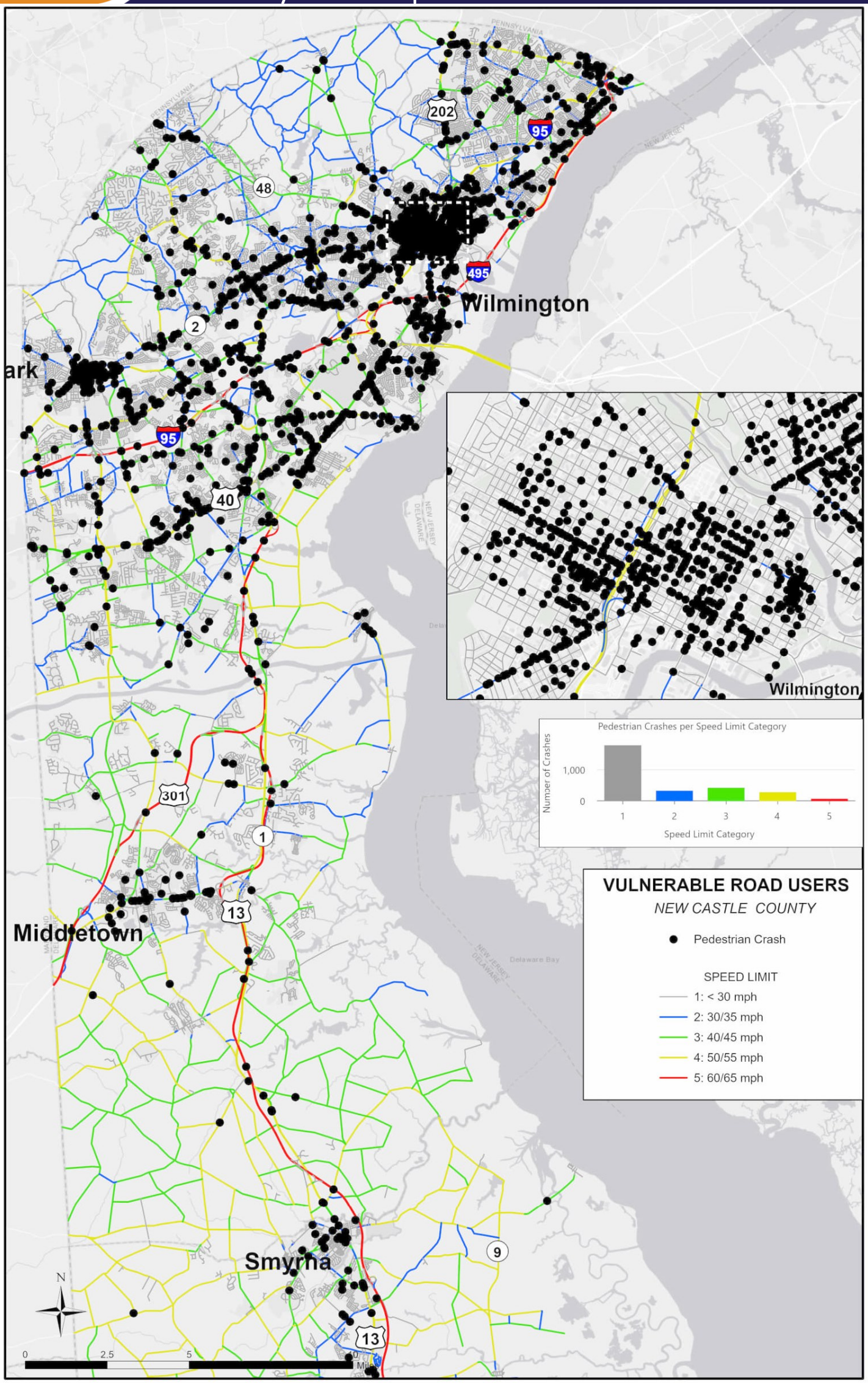
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Roadway Annual Average Daily Traffic Volume



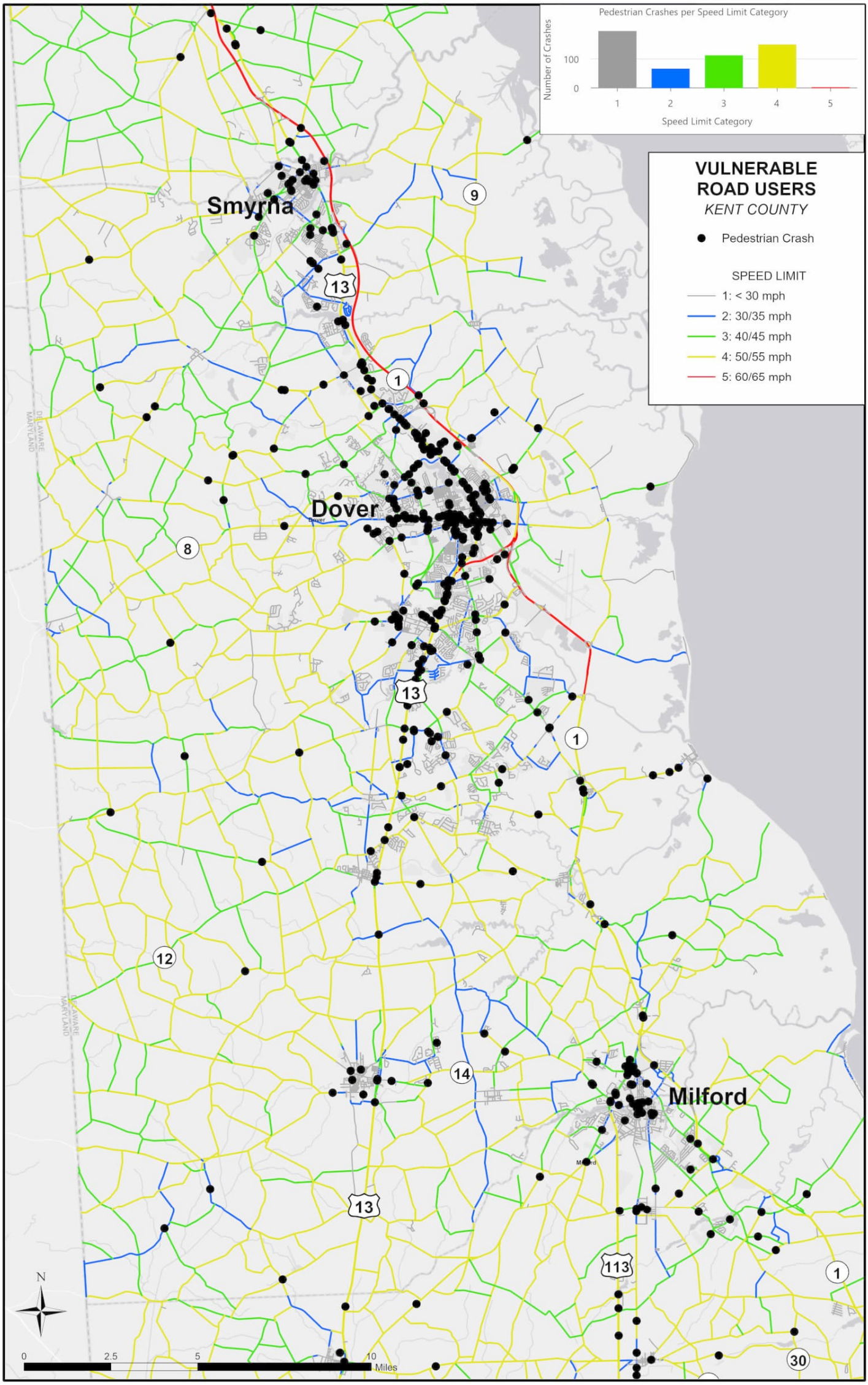
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Roadway Posted Speed Limit



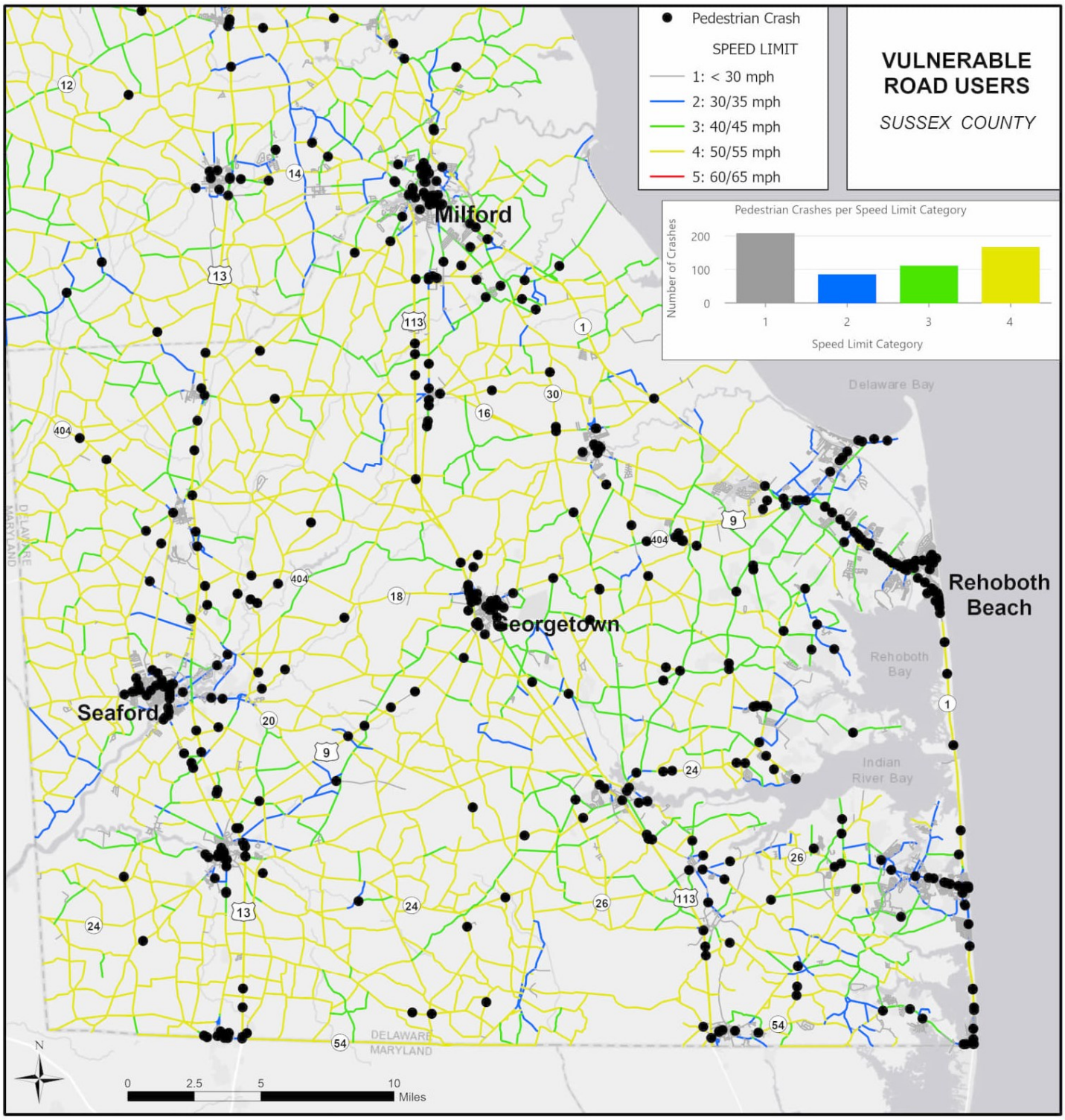
# VRU Safety Performance Assessment

## Pedestrian-Related Crashes overlaid with Roadway Posted Speed Limit



# VRU Safety Performance Assessment

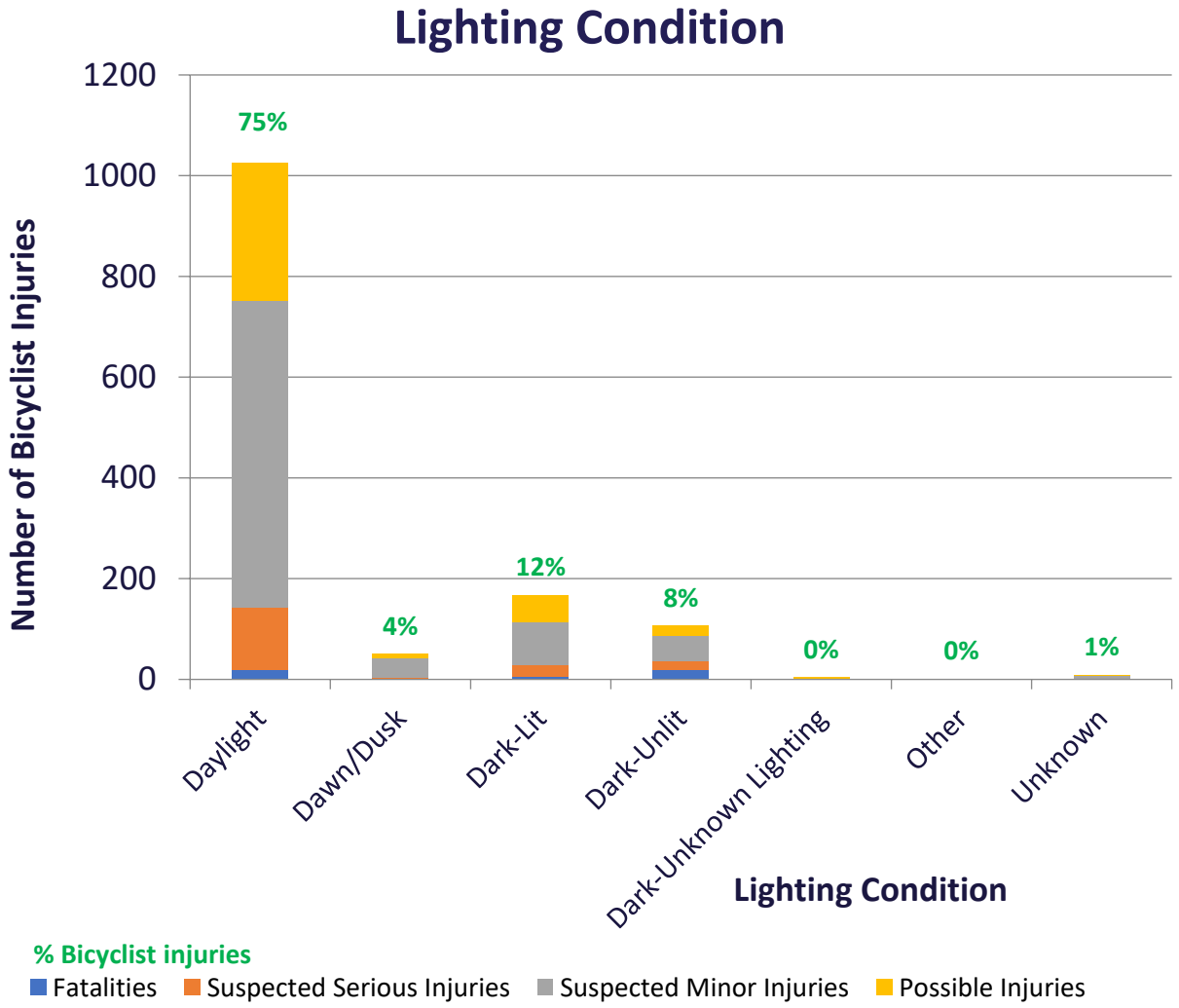
## Pedestrian-Related Crashes overlaid with Roadway Posted Speed Limit

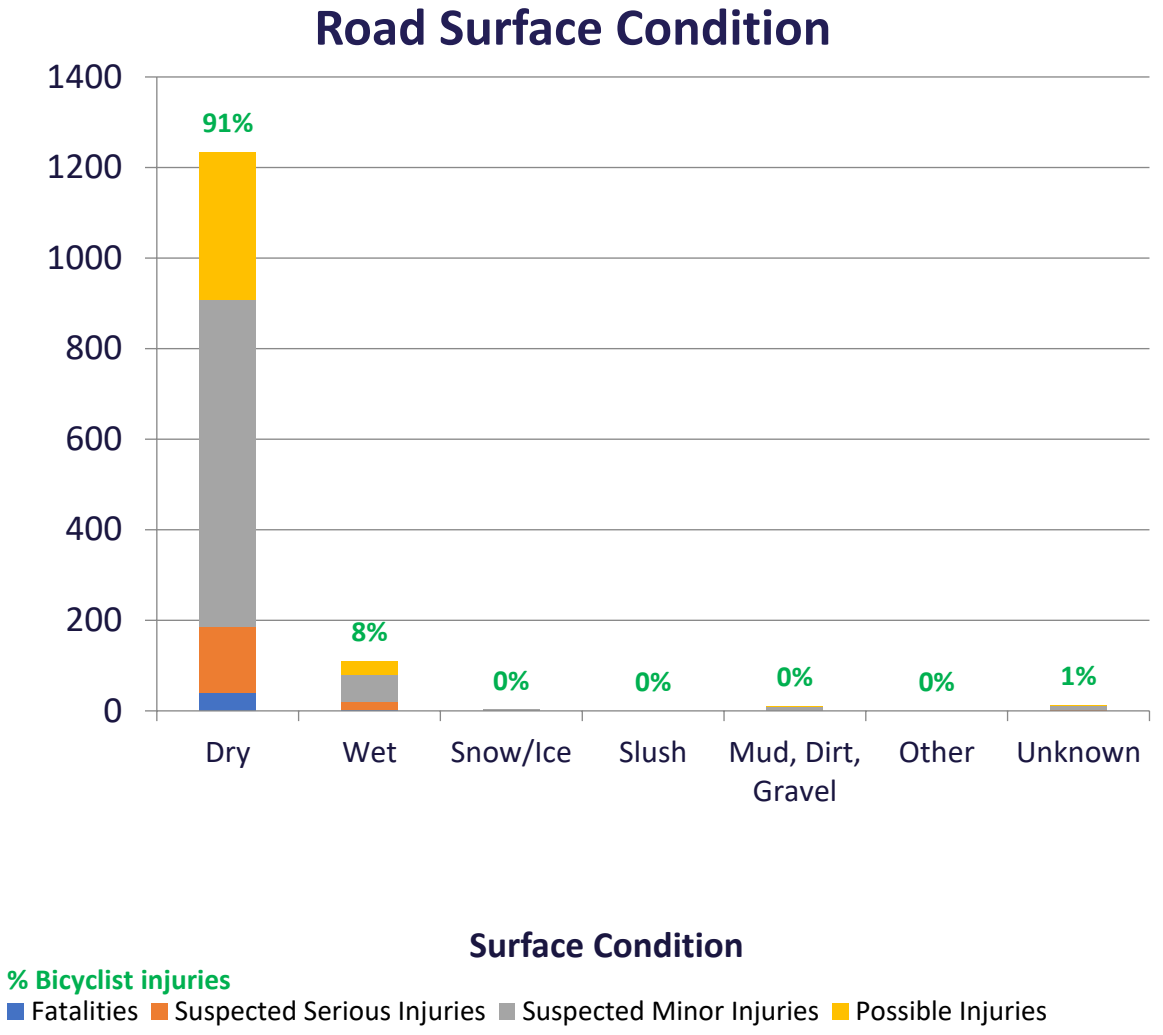


## VRU Safety Performance Assessment

# Bicycles

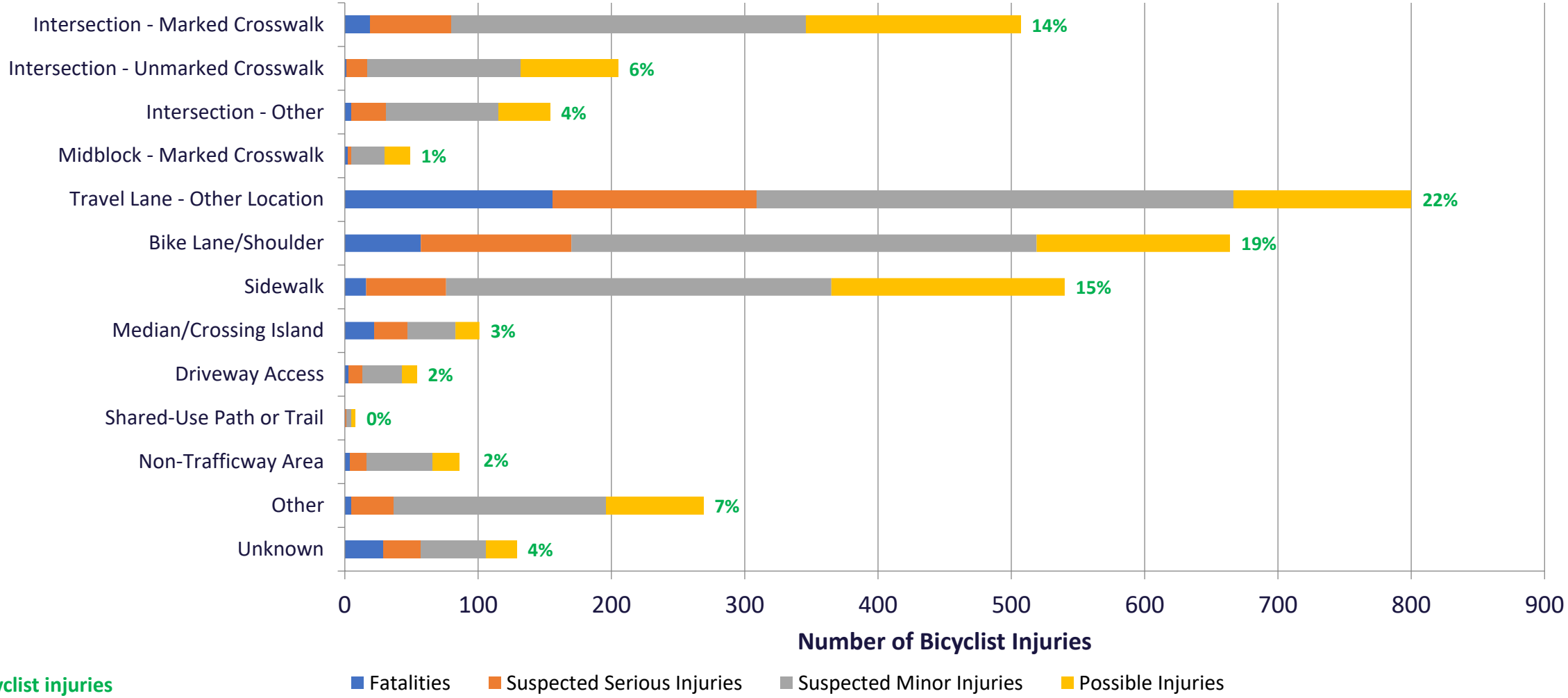
# VRU Safety Performance Assessment
## Bicycle-Related Crashes



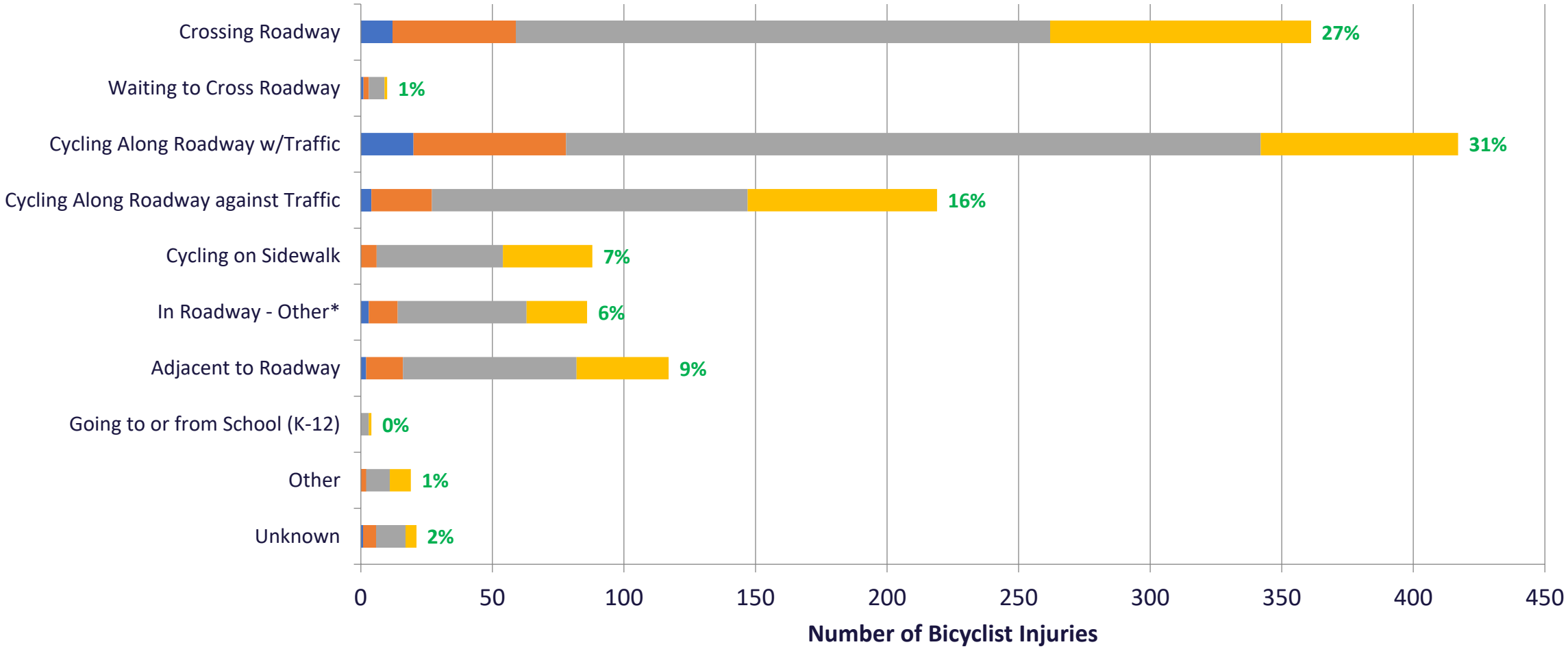
# VRU Safety Performance Assessment
## Bicycle-Related Crashes

### Bicyclist Location Prior to Crash



# VRU Safety Performance Assessment
## Bicycle-Related Crashes

### Bicyclist Action Prior to Crash

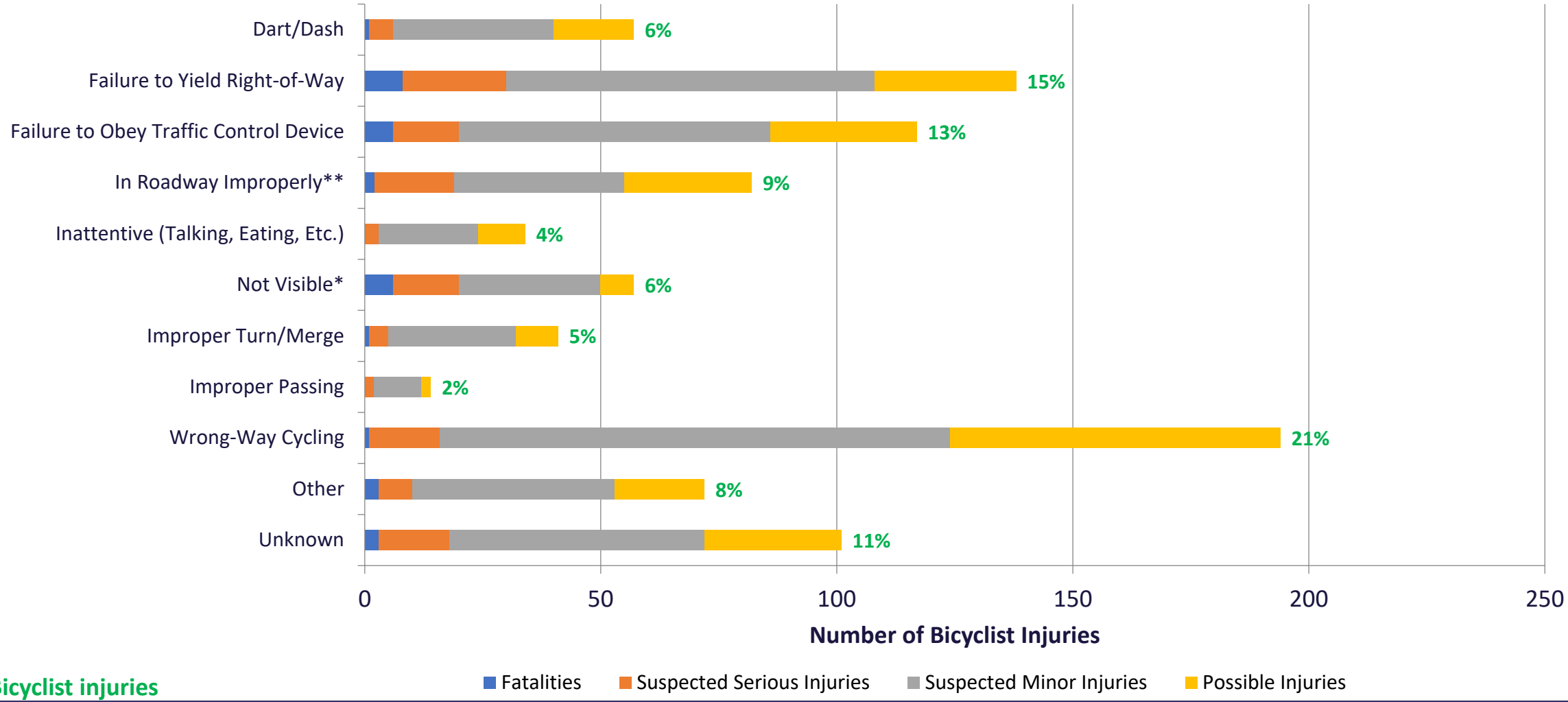



**% Bicyclist injuries**

**Working, Playing, etc.*

# VRU Safety Performance Assessment
## Bicyclist-Related Crashes

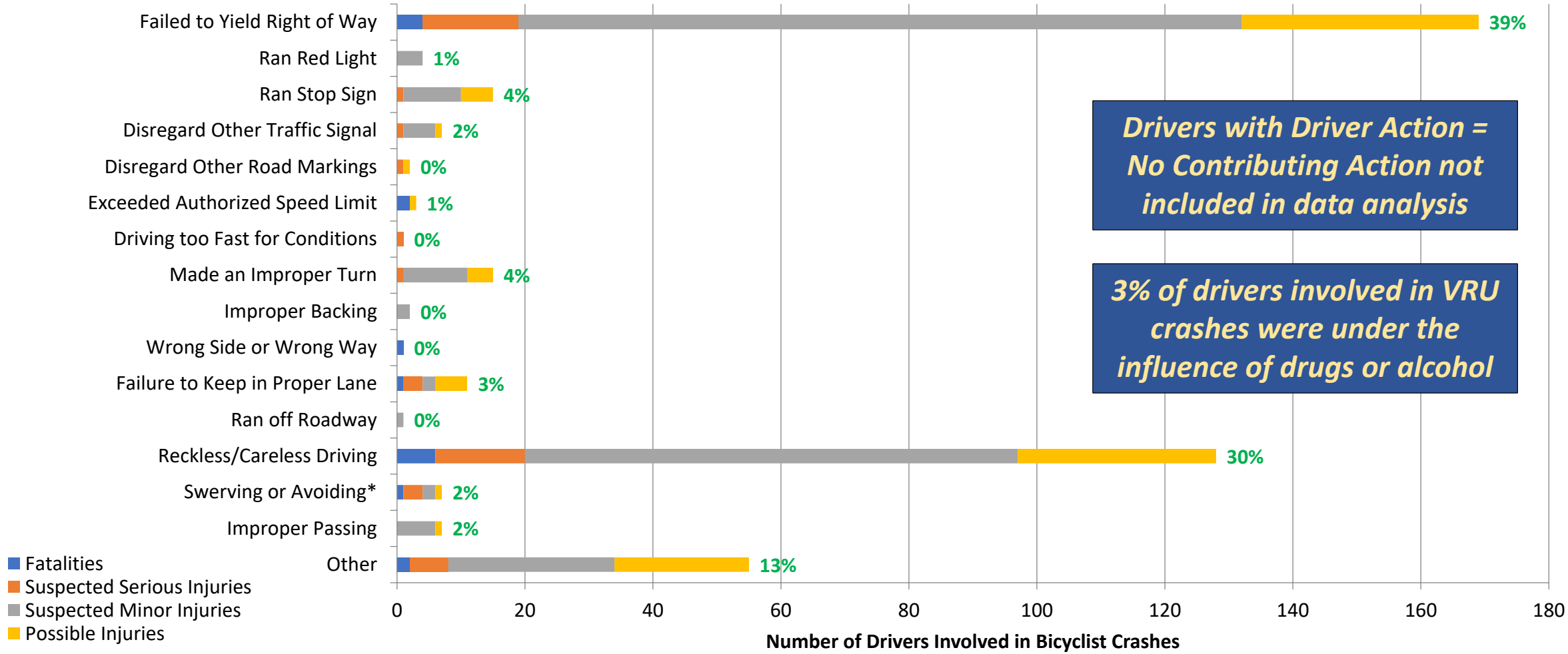
### Bicyclist Action at Time of Crash




*Dark Clothing, No Lighting, etc.
**Standing, Lying, Working, Playing

# VRU Safety Performance Assessment
## Bicycle-Related Crashes

### Reported Driver Action in Bicyclist Crashes



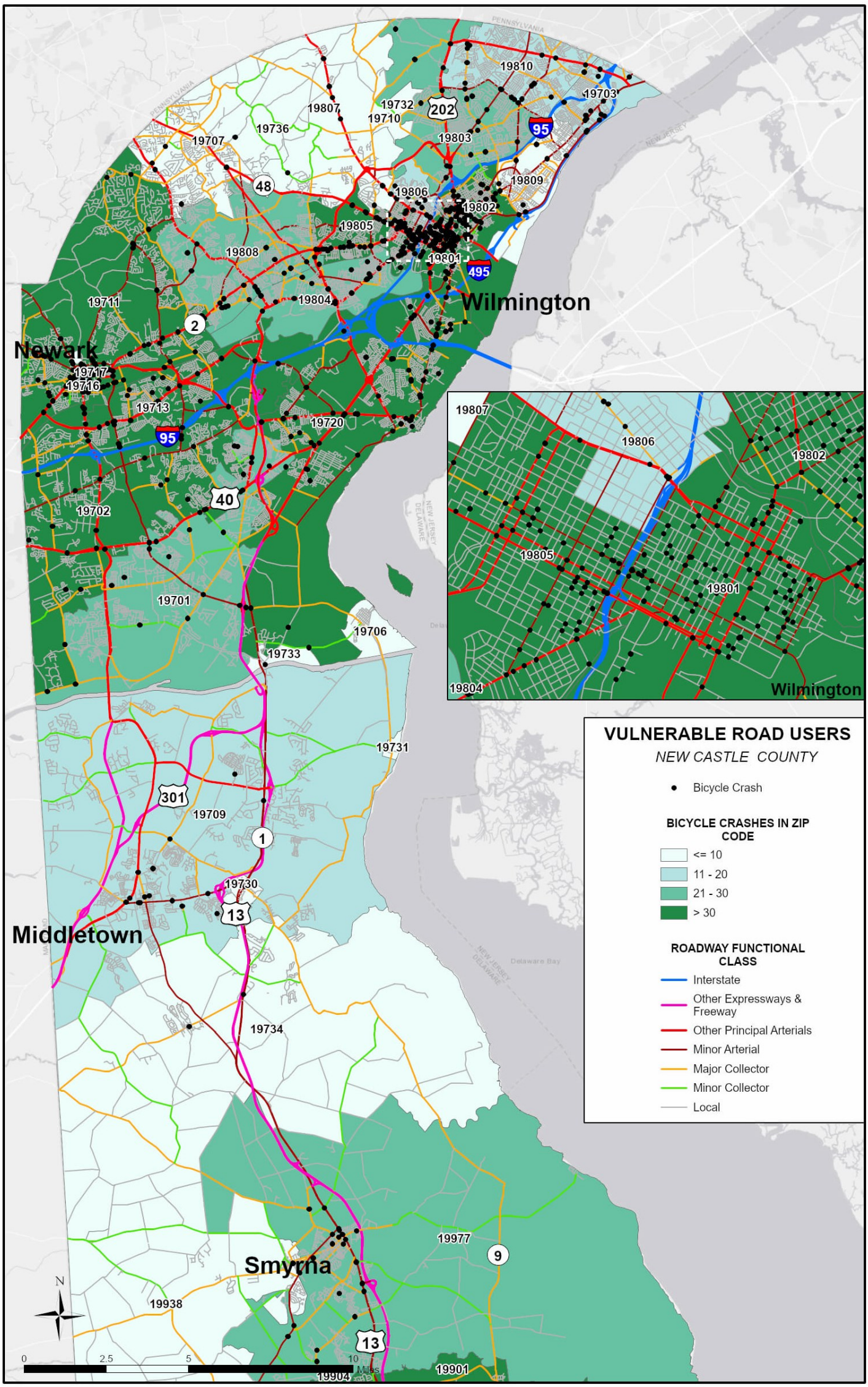

***Drivers with Driver Action = No Contributing Action not included in data analysis***

***3% of drivers involved in VRU crashes were under the influence of drugs or alcohol***

**Swerving or avoiding due to wind, slippery surface, vehicle, object, non motorist in roadway, etc.*

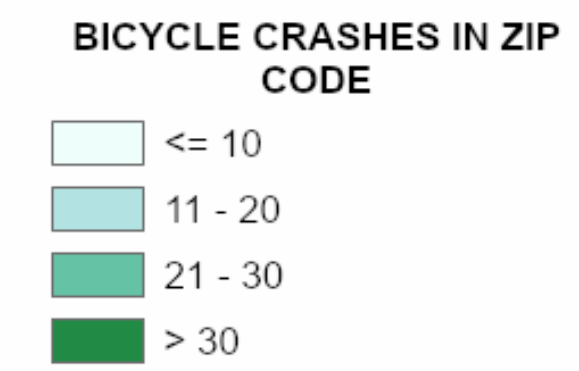
# VRU Safety Performance Assessment

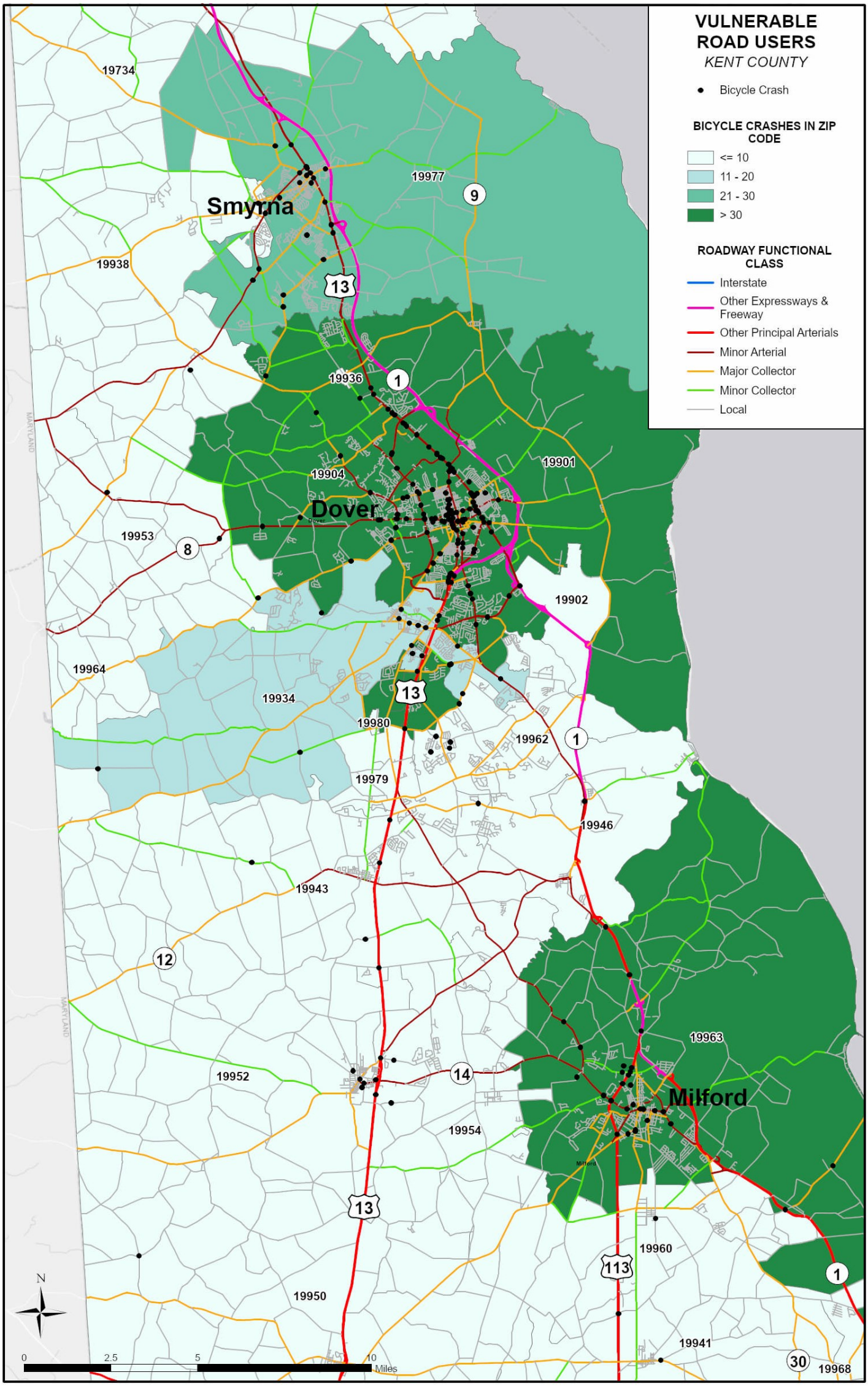
## Bicycle-Related Crashes by Zip Code



# New Castle County

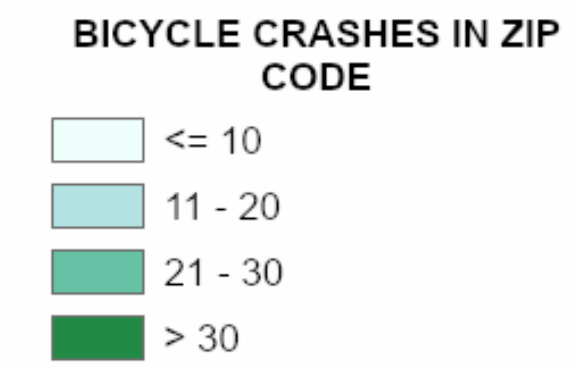
| Zip Code | City/Area | # Bike Crashes | Population |
|---|---|---|---|
| 19710 | Montchanin | 0 | 108 |
| 19731 | Port Penn | 0 | 329 |
| 19732 | Rockland | 0 | 223 |
| 19736 | Yorklyn | 0 | 34 |
| 19706 | Delaware City | 1 | 1,938 |
| 19730 | Odessa | 1 | 472 |
| 19717 | Newark | 2 | 6,201 |
| 19733 | Saint Georges | 2 | 320 |
| 19734 | Townsend | 2 | 14,116 |
| 19707 | Hockessin | 6 | 17,274 |
| 19807 | Wilmington | 9 | 8,089 |
| 19809 | Wilmington | 9 | 14,658 |
| 19806 | Wilmington | 13 | 10,083 |
| 19709 | Middletown | 16 | 49,599 |
| 19716 | Newark | 16 | 42 |
| 19703 | Claymont | 18 | 16,175 |
| 19810 | Wilmington | 19 | 25,270 |
| 19804 | Wilmington | 22 | 18,292 |
| 19701 | Bear | 23 | 42,717 |
| 19803 | Wilmington | 23 | 21,886 |
| 19808 | Wilmington | 23 | 39,285 |
| 19702 | Newark | 31 | 55,653 |
| 19713 | Newark | 33 | 31,867 |
| 19720 | New Castle | 63 | 61,043 |
| 19802 | Wilmington | 79 | 26,189 |
| 19805 | Wilmington | 99 | 39,985 |
| 19801 | Wilmington | 110 | 16,219 |
| 19711 | Newark | 122 | 48,477 |




VULNERABLE ROAD USERS
KENT COUNTY
Bicycle Crash
BICYCLE CRASHES IN ZIP CODE
<= 10
11 - 20
21 - 30
> 30
ROADWAY FUNCTIONAL CLASS
Interstate
Other Expressways & Freeway
Other Principal Arterials
Minor Arterial
Major Collector
Minor Collector
Local
Smyrna
Dover
Milford
19734
19977
19938
19936
19901
19904
19953
19902
19964
19934
19980
19962
19979
19946
19943
19963
19952
19954
19960
19950
19941
19968
0
2.5
5
10
Miles
N

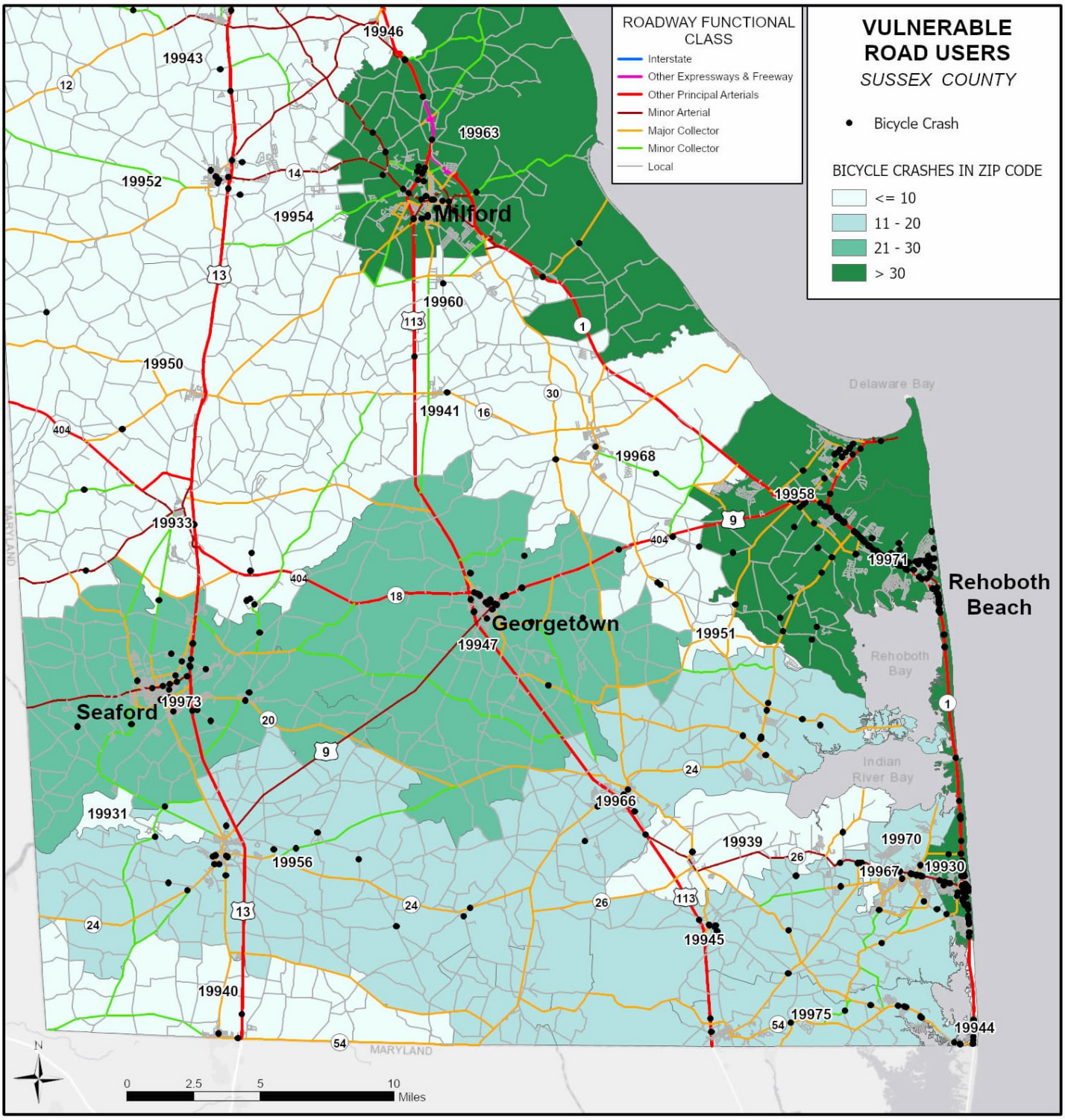
# Kent County

| Zip Code | City/Area | # Bike Crashes | Population |
|---|---|---|---|
| 19902 | Dover AFB | 0 | 108 |
| 19936 | Cheswold | 0 | 329 |
| 19954 | Houston | 0 | 1,629 |
| 19964 | Marydel | 0 | 1,298 |
| 19979 | Viola | 0 | 722 |
| 19980 | Woodside | 0 | 235 |
| 19946 | Frederica | 1 | 4,932 |
| 19938 | Clayton | 3 | 10,131 |
| 19953 | Hartly | 3 | 4,500 |
| 19962 | Magnolia | 5 | 13,692 |
| 19943 | Felton | 7 | 12,523 |
| 19952 | Harrington | 9 | 10,621 |
| 19934 | Camden Wyoming | 11 | 14,243 |
| 19977 | Smyrna | 23 | 27,505 |
| 19963 | Milford | 31 | 20,827 |
| 19901 | Dover | 73 | 36,839 |
| 19904 | Dover | 76 | 36,880 |



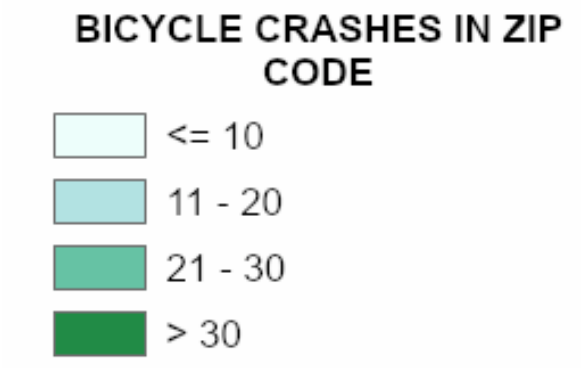
# VRU Safety Performance Assessment

## Bicycle-Related Crashes by Zip Code



# Sussex County

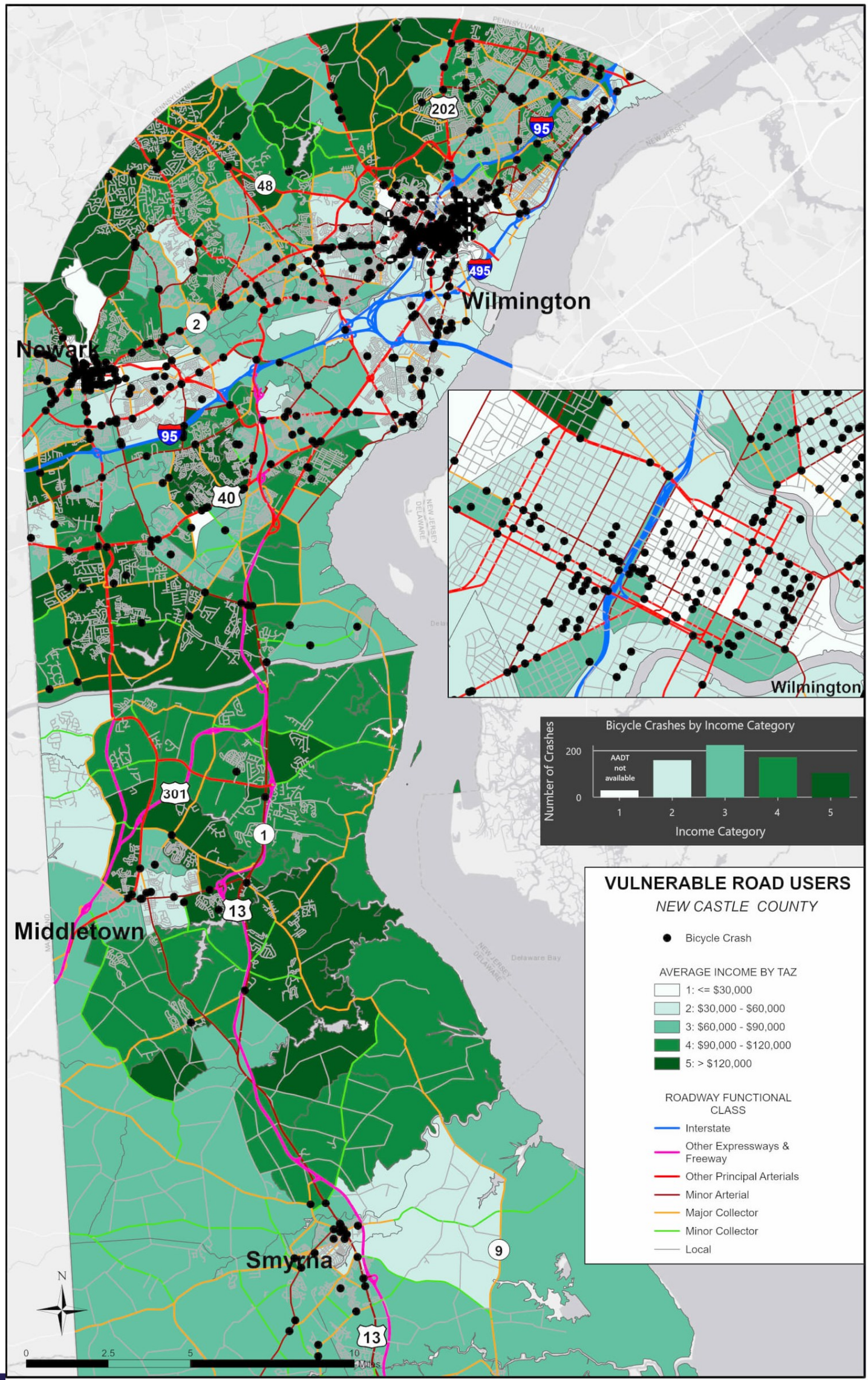
| Zip Code | City/Area | # Bike Crashes | Population |
|---|---|---|---|
| 19931 | Bethel | 0 | 258 |
| 19960 | Lincoln | 1 | 7,121 |
| 19939 | Dagsboro | 2 | 7,357 |
| 19941 | Ellendale | 2 | 2,857 |
| 19951 | Harbeson | 2 | 1,986 |
| 19940 | Delmar | 3 | 6,541 |
| 19950 | Greenwood | 3 | 7,095 |
| 19967 | Millville | 4 | 1,802 |
| 19968 | Milton | 6 | 13,800 |
| 19944 | Fenwick Island | 7 | 519 |
| 19933 | Bridgeville | 8 | 9,784 |
| 19975 | Selbyville | 11 | 10,476 |
| 19945 | Frankford | 16 | 8,041 |
| 19966 | Millsboro | 17 | 32,520 |
| 19956 | Laurel | 18 | 16,327 |
| 19970 | Ocean View | 18 | 8,591 |
| 19947 | Georgetown | 26 | 20,964 |
| 19973 | Seaford | 28 | 2,550 |
| 19958 | Lewes | 50 | 27,911 |
| 19930 | Bethany Beach | 68 | 2,657 |
| 19971* | Rehoboth Beach | 115 | 14,348 |




**Zip code 19971 includes both Rehoboth Beach and Dewey Beach. Dewey Beach does not have a separate zip code.*

# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Average Income Levels by Traffic Analysis Zone

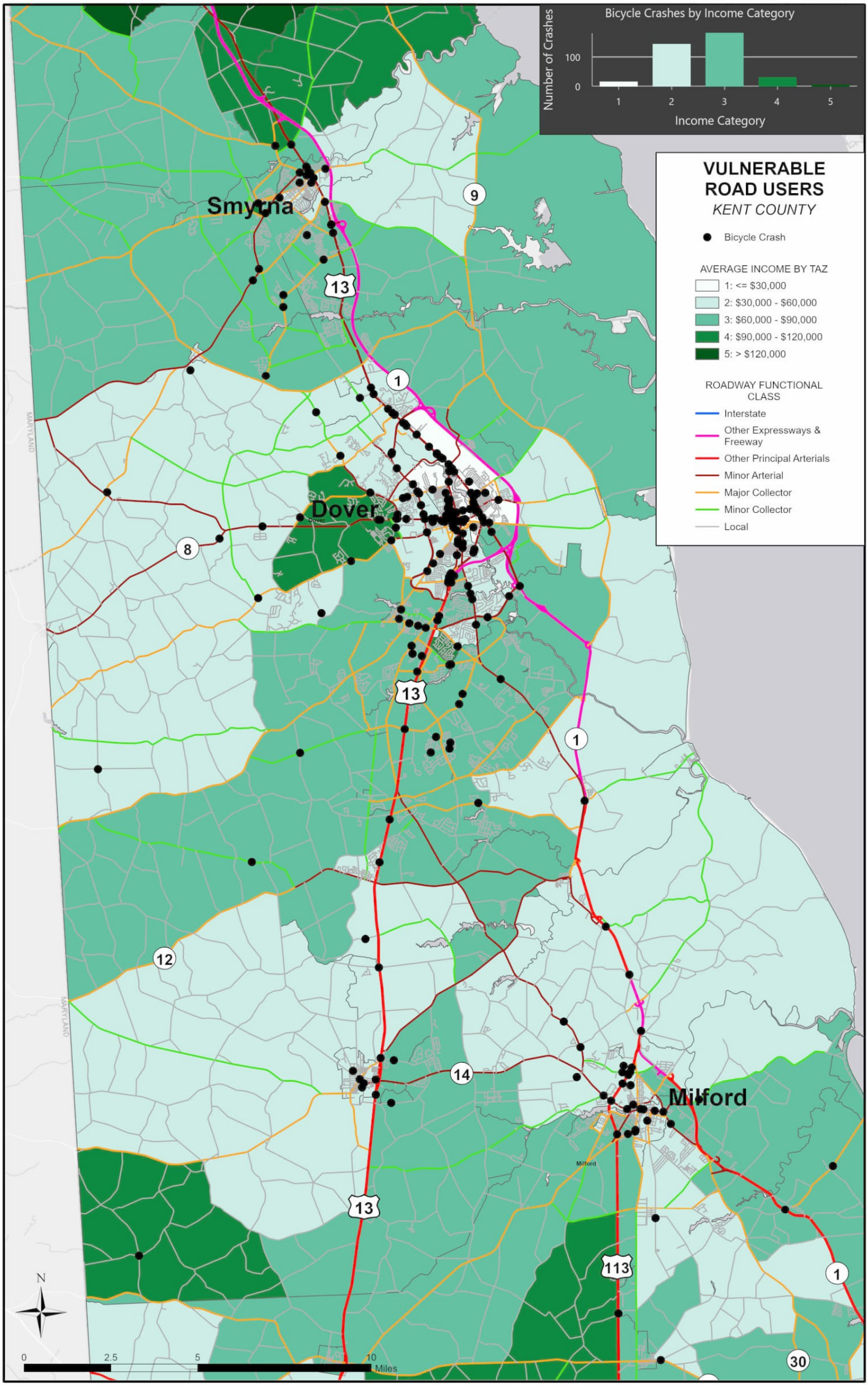





*Source of Income Data: Wilmington Area Planning Council*

# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Average Income Levels by Traffic Analysis Zone

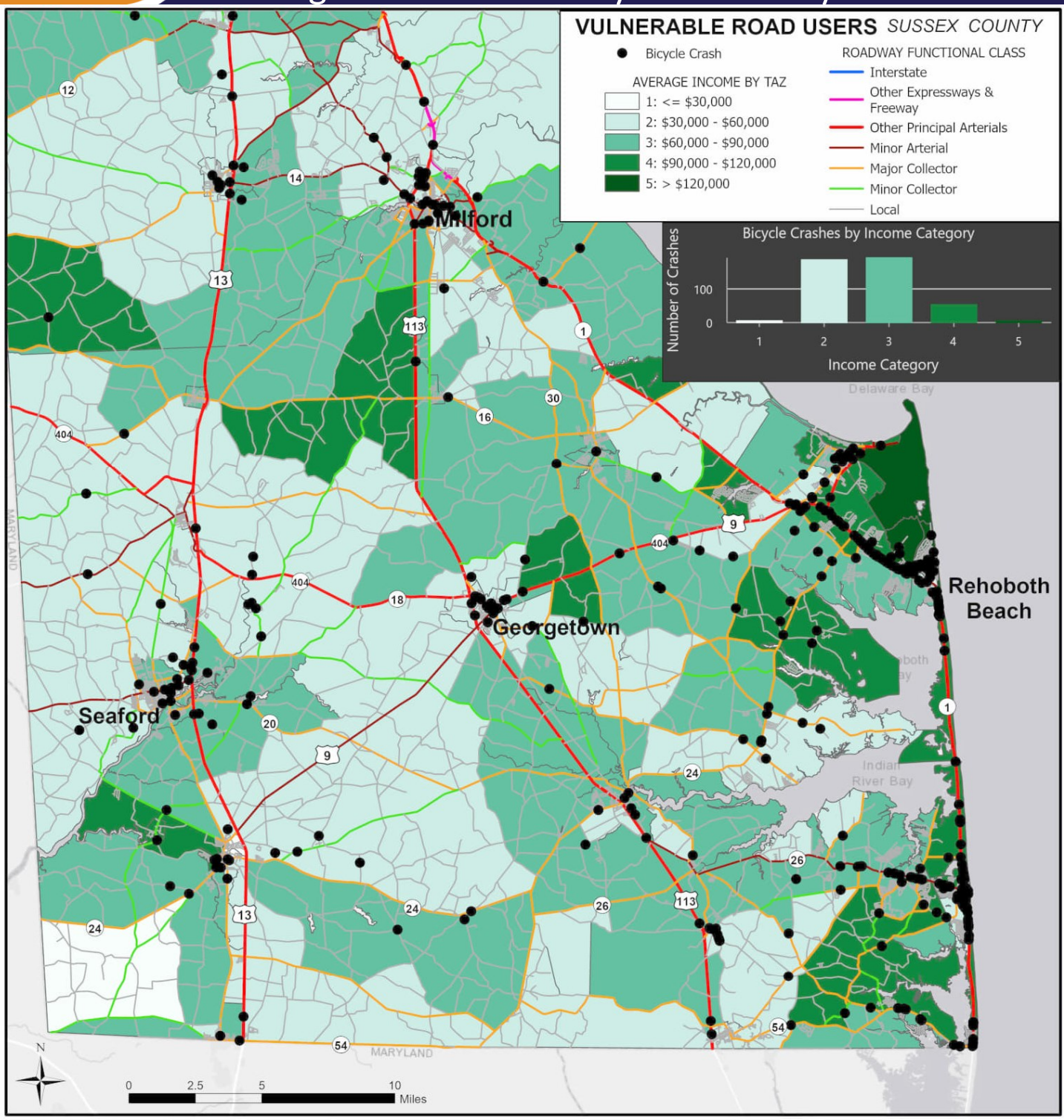





*Source of Income Data: Wilmington Area Planning Council*

# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Average Income Levels by Traffic Analysis Zone

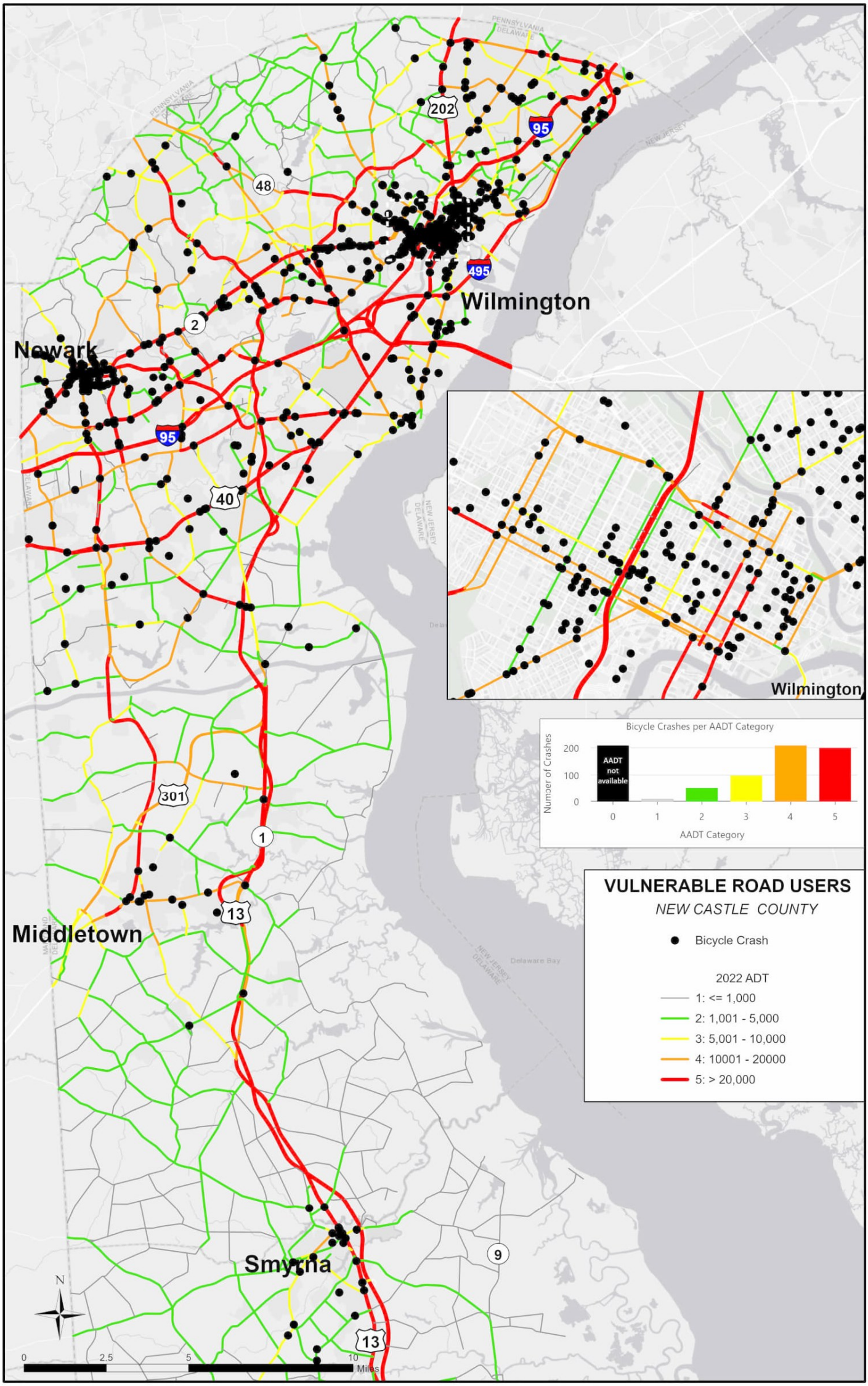





*Source of Income Data: Wilmington Area Planning Council*

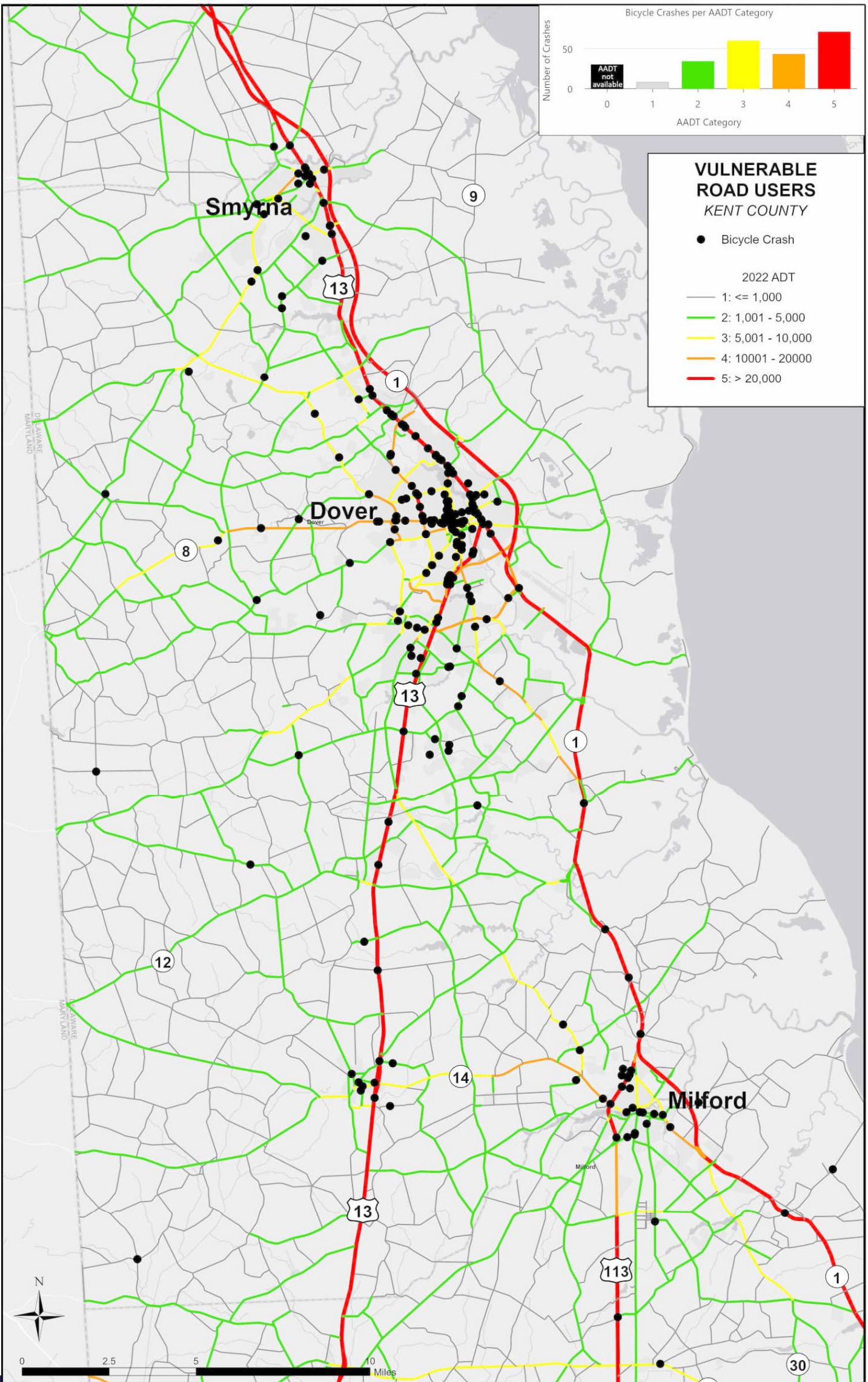
# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Roadway Annual Average Daily Traffic Volume



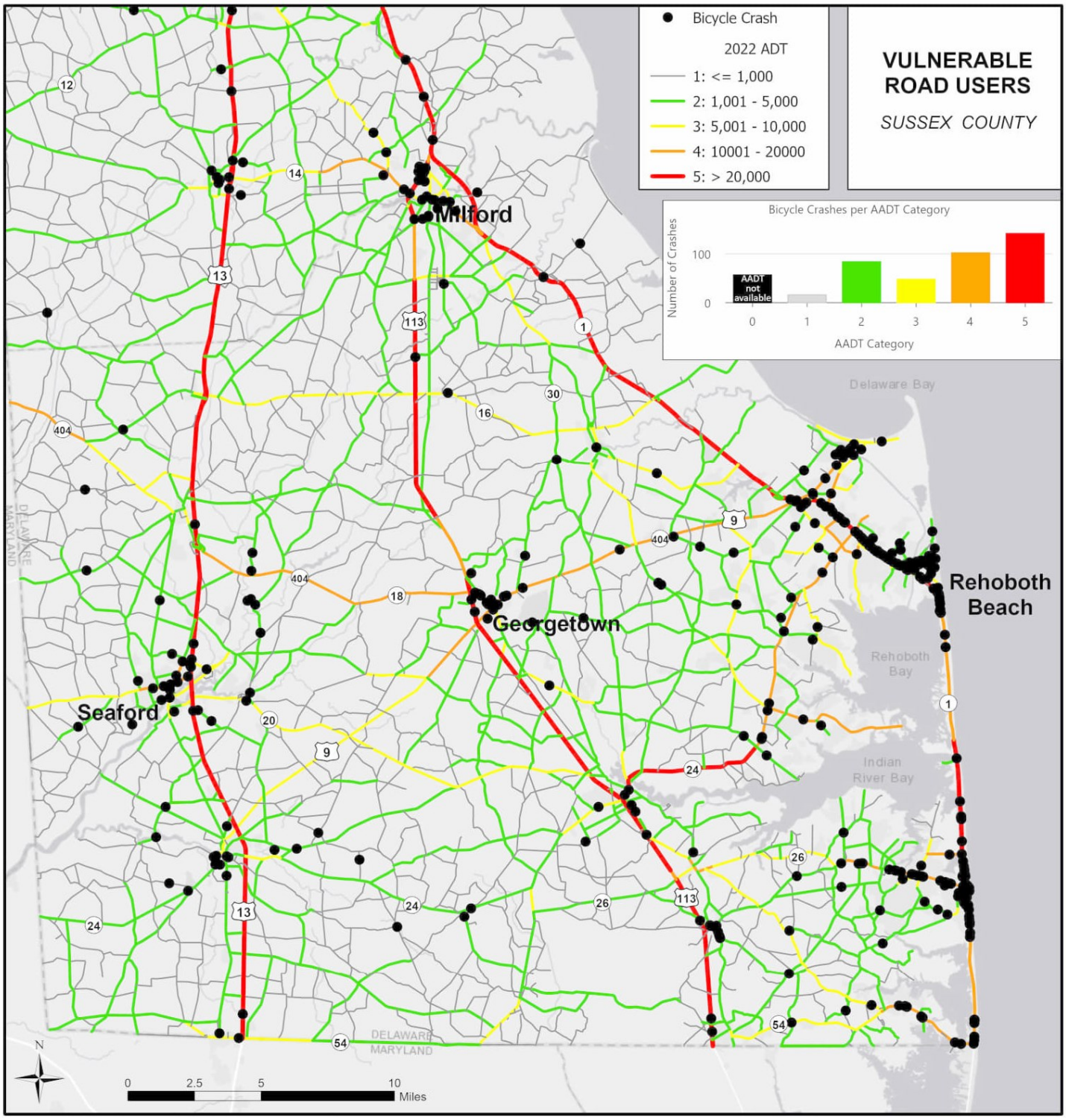
# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Roadway Annual Average Daily Traffic Volume



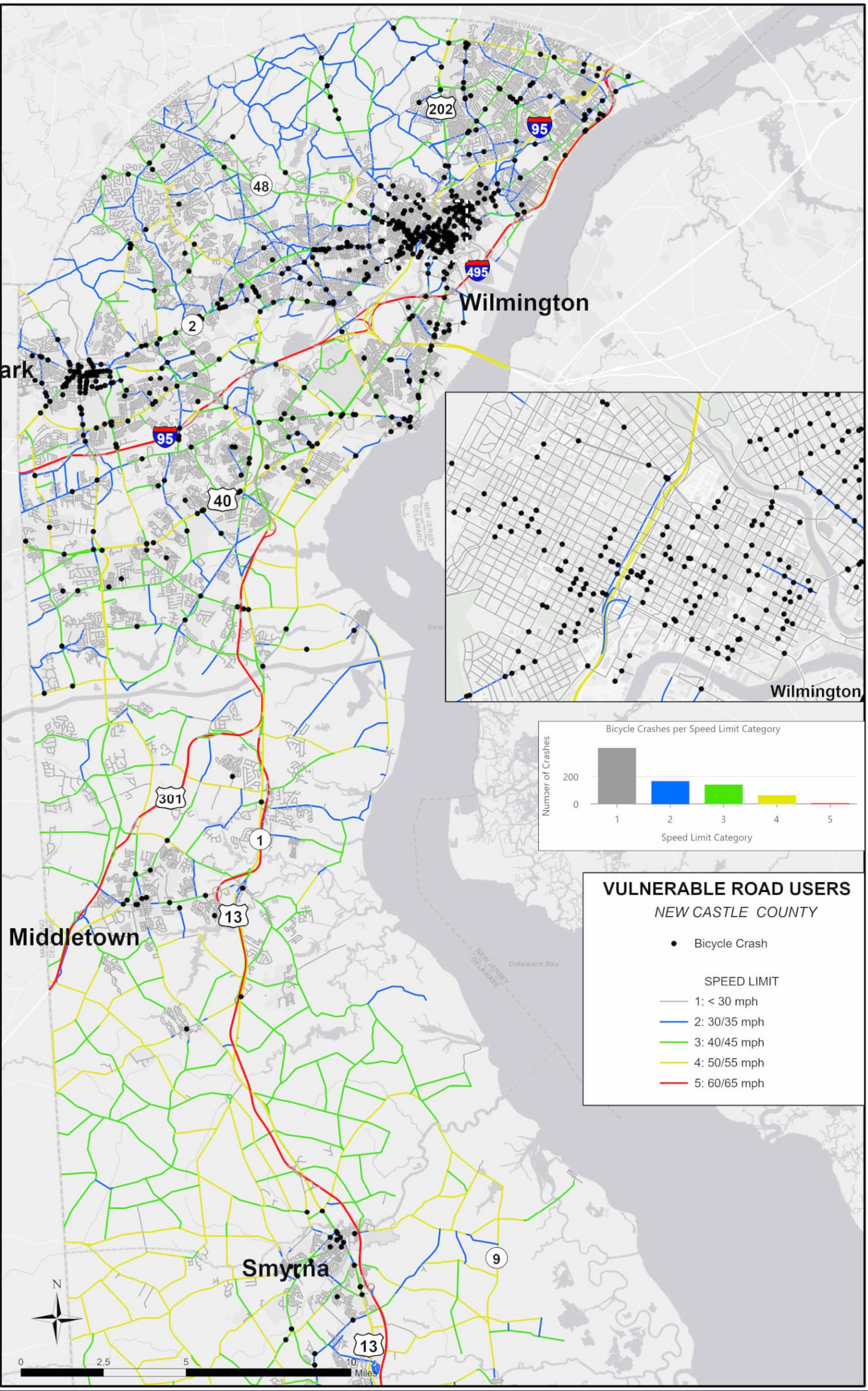
# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Roadway Annual Average Daily Traffic Volume



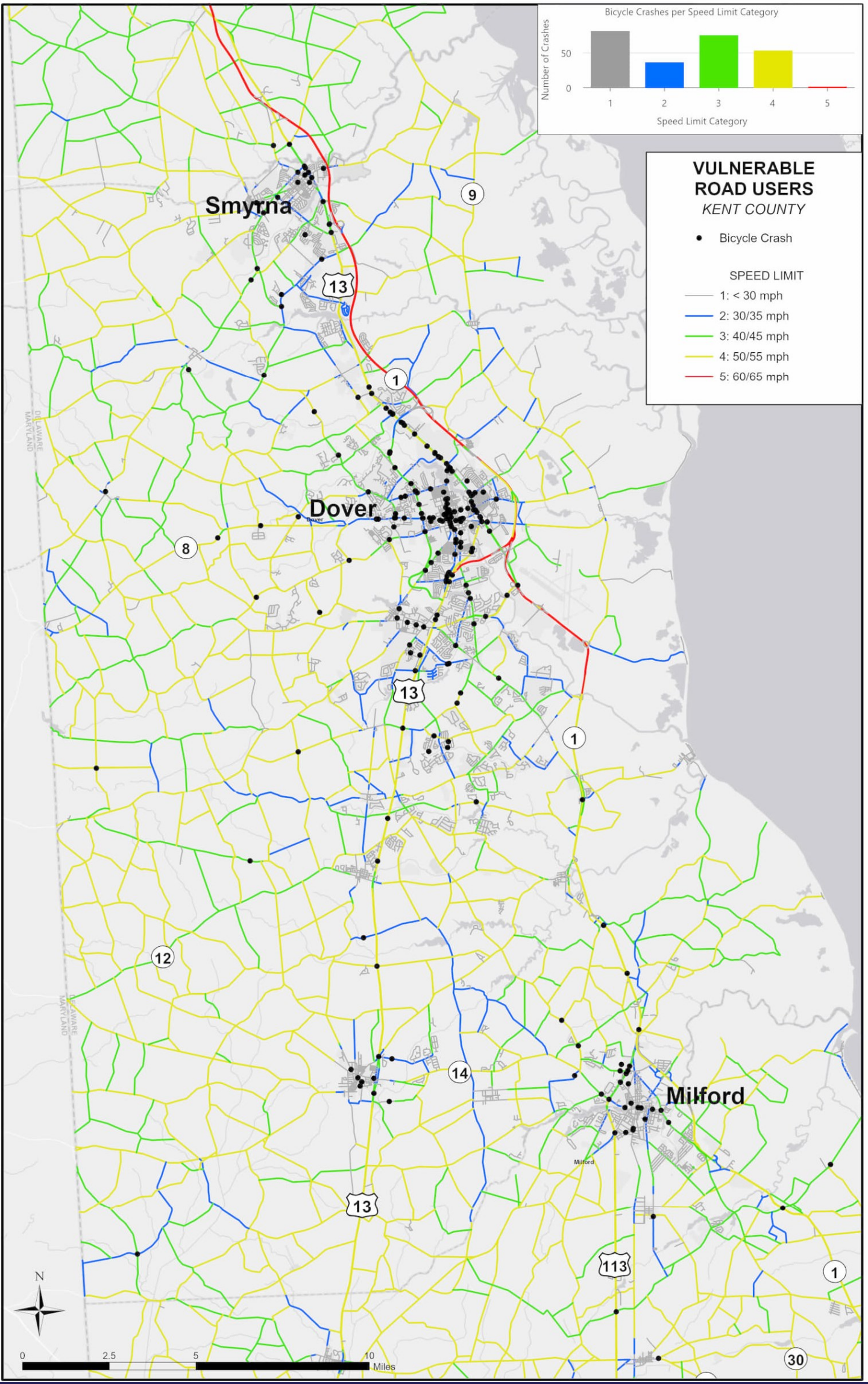
# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Roadway Posted Speed Limit



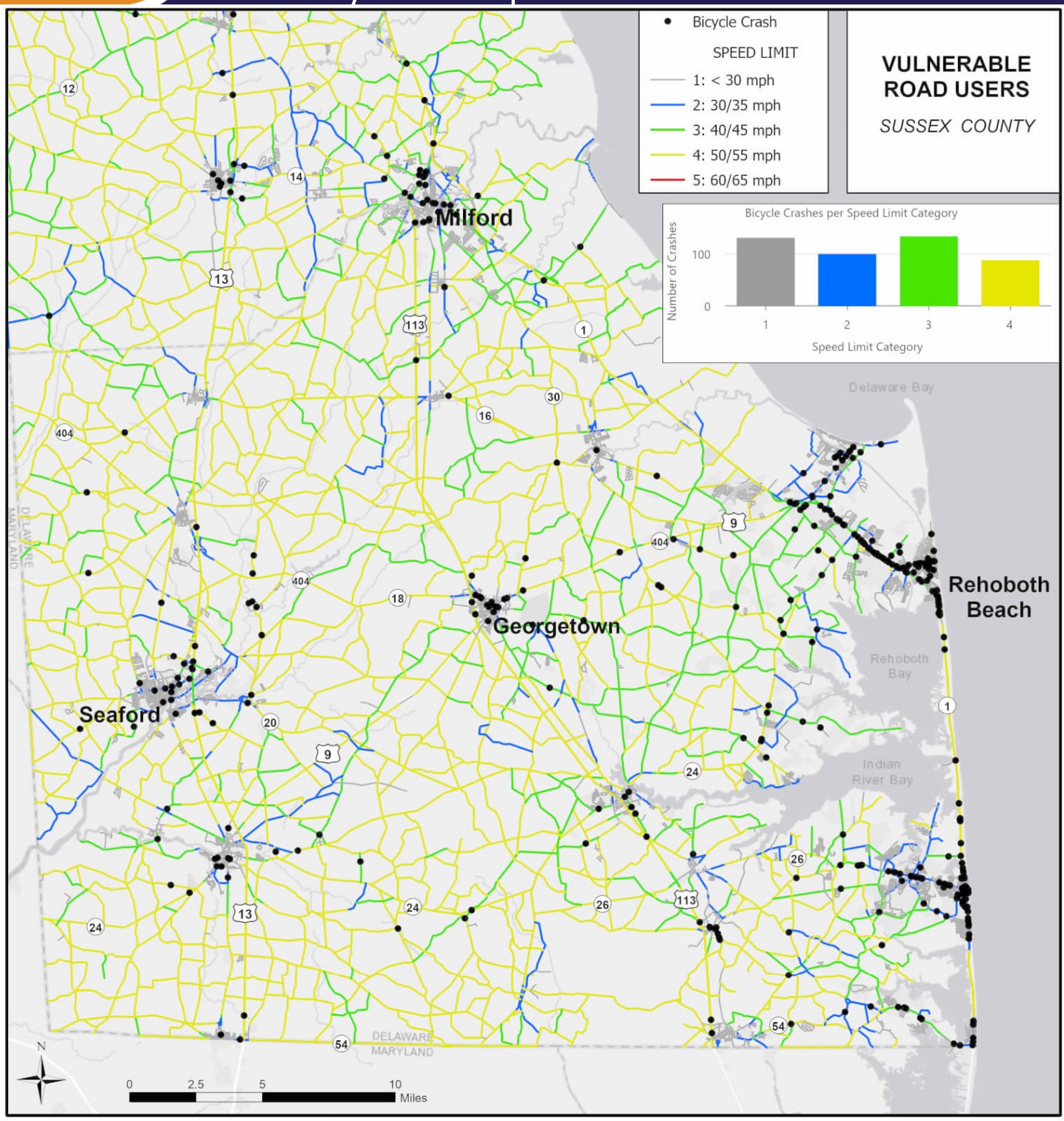
# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Roadway Posted Speed Limit



# VRU Safety Performance Assessment

## Bicycle-Related Crashes overlaid with Roadway Posted Speed Limit



2023 Vulnerable Road User Safety Assessment

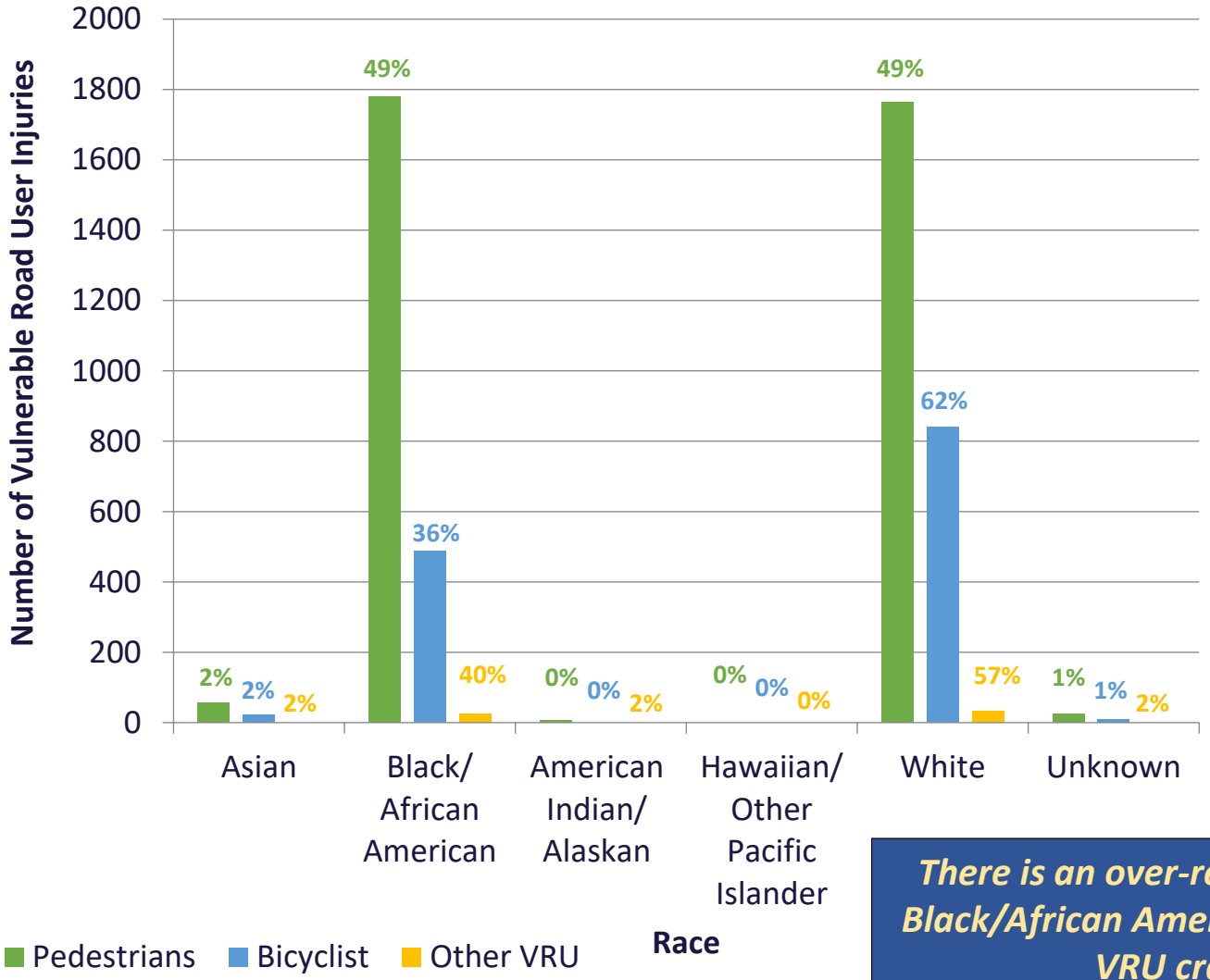
# Determination of High-Risk Areas

# Determination of High-Risk Areas

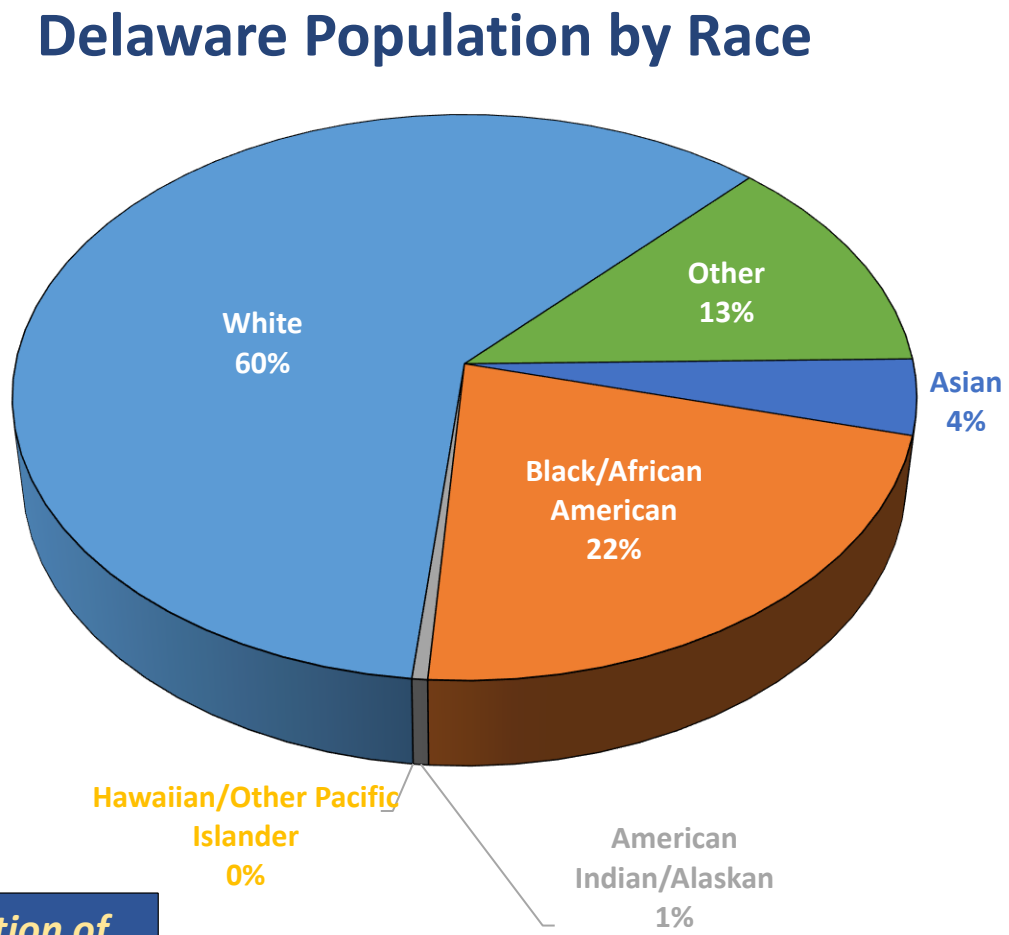
- Based on VRU Safety Performance Assessment, analysis of demographic data and the mapping analysis of pedestrian and bicycle crashes, the following considerations are made for determination of high-risk areas related to vulnerable road users
  - 99% of vulnerable road users involved in crashes were pedestrians (72%) and bicyclists (27%). *See slide 15*
  - 69% of vulnerable road users crashes occurred in New Castle County. Further analysis should determine if this is over-represented based on population.
  - Further analysis of VRU crashes by road type, demographics, and other appropriate factors should determine if certain areas are over-represented based on a comparison of statewide or countywide distribution of road type mileage

# Determination of High-Risk Areas

## Race and Ethnicity Demographics of Vulnerable Road Users




X%: Percentage of VRU type in race category




***There is an over-representation of Black/African Americans involved in VRU crashes***

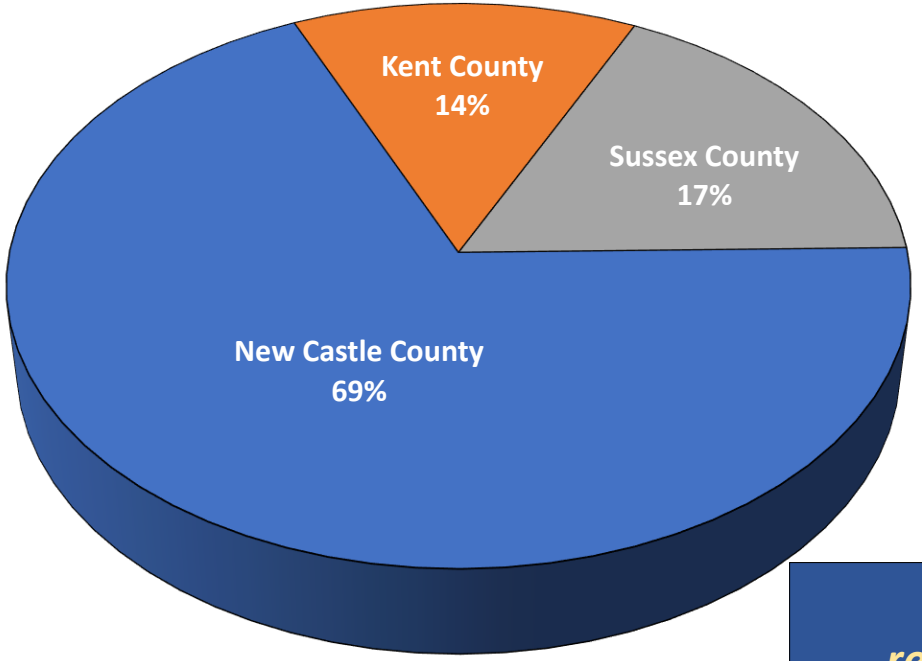
*Source of Delaware Population Data: 2020 Census, www.census.gov*



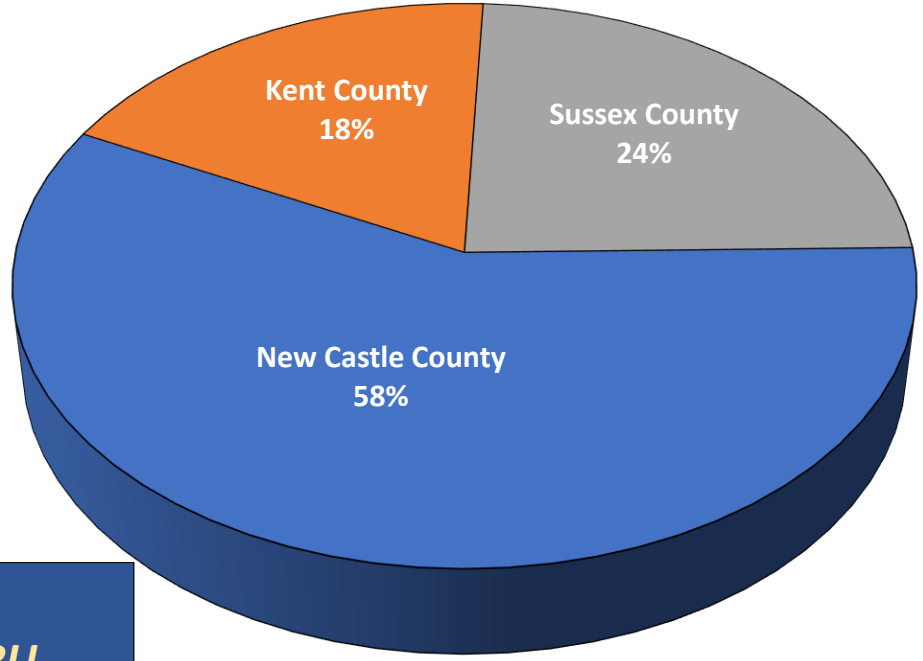
***High-Risk Population: Black/African Americans***

# Determination of High-Risk Areas
## Location of Vulnerable Road User Crashes

### VRU Crashes by County




### Delaware Population by County




***There is an over-representation of VRU crashes in New Castle County***

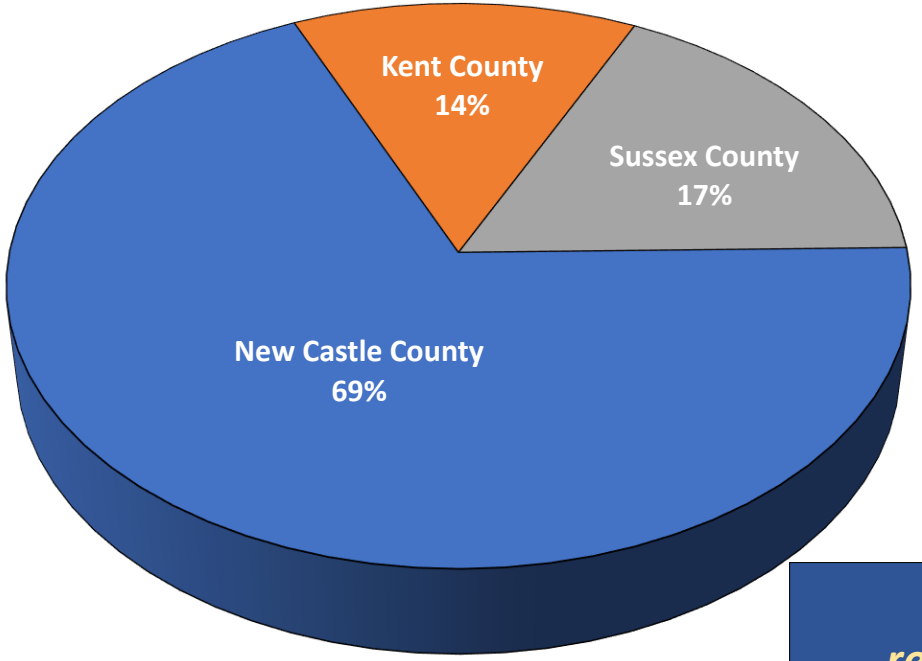
***High-Risk Factor: All locations in New Castle County***

*Note: Data presented represents Vulnerable Road Users injured in crashes*

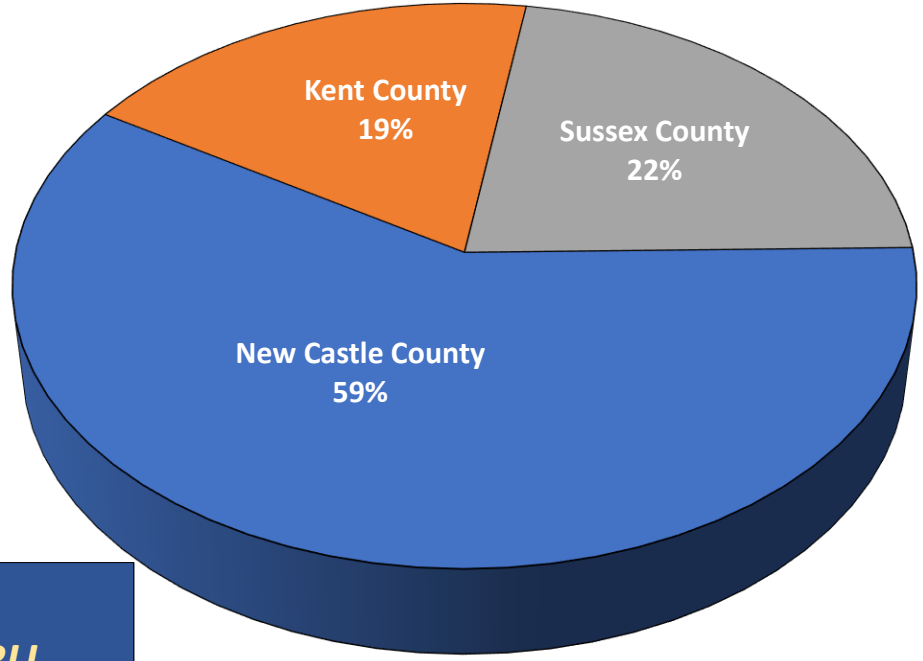
*Source of Delaware Population Data: 2020 Census, www.census.gov*

# Determination of High-Risk Areas
## Location of Vulnerable Road User Crashes

### VRU Crashes by County




### Delaware Crash-Related Injuries




***There is an over-representation of VRU crashes in New Castle County***

*The data presented on this chart includes all crash-related injuries and fatalities statewide from 2012 through 2022*

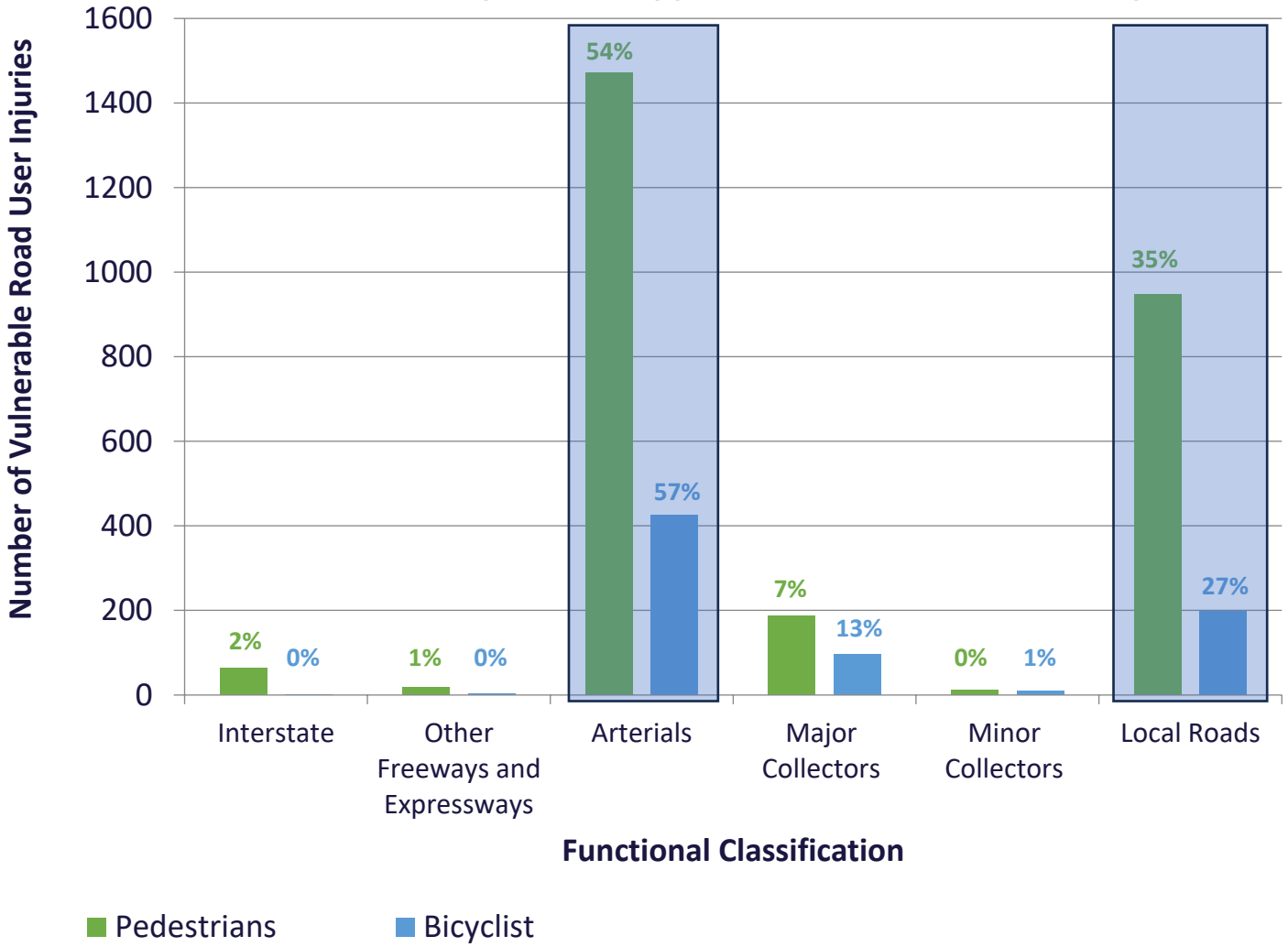
***High-Risk Factor: All locations in New Castle County***

*Note: Data presented represents Vulnerable Road Users injured in crashes*

*Source of Statewide Crash Data: Delaware State Police*

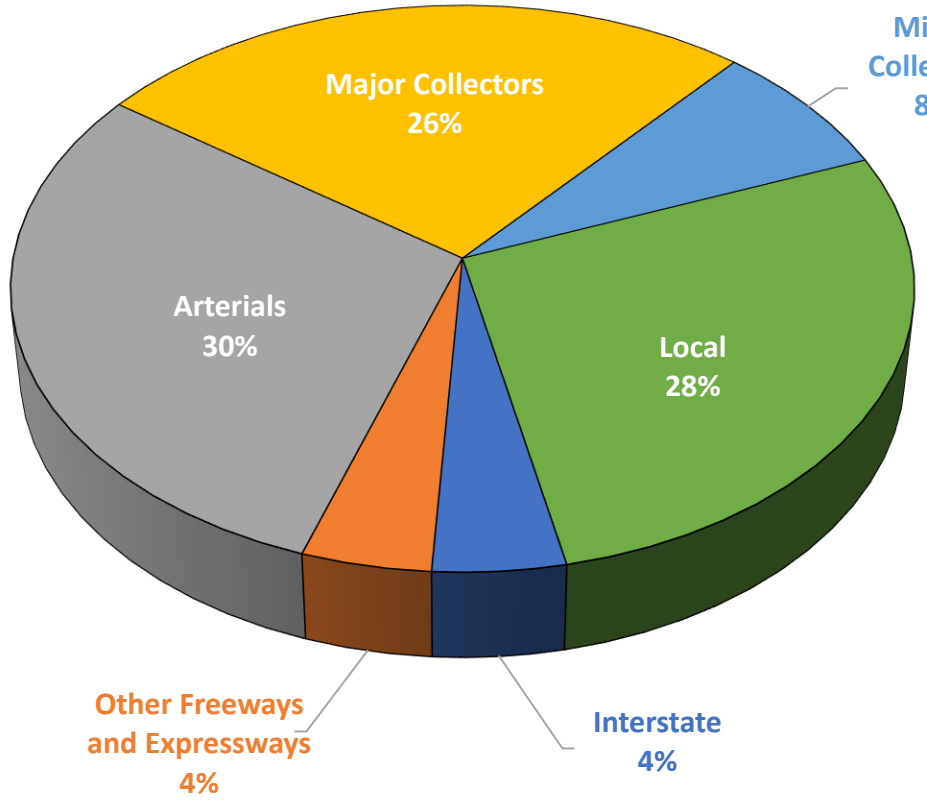
# Determination of High-Risk Areas
## Location of Vulnerable Road User Crashes – New Castle County

### VRU Crashes by Road Type – New Castle County




X%: Percentage of VRU type for roadway functional classification

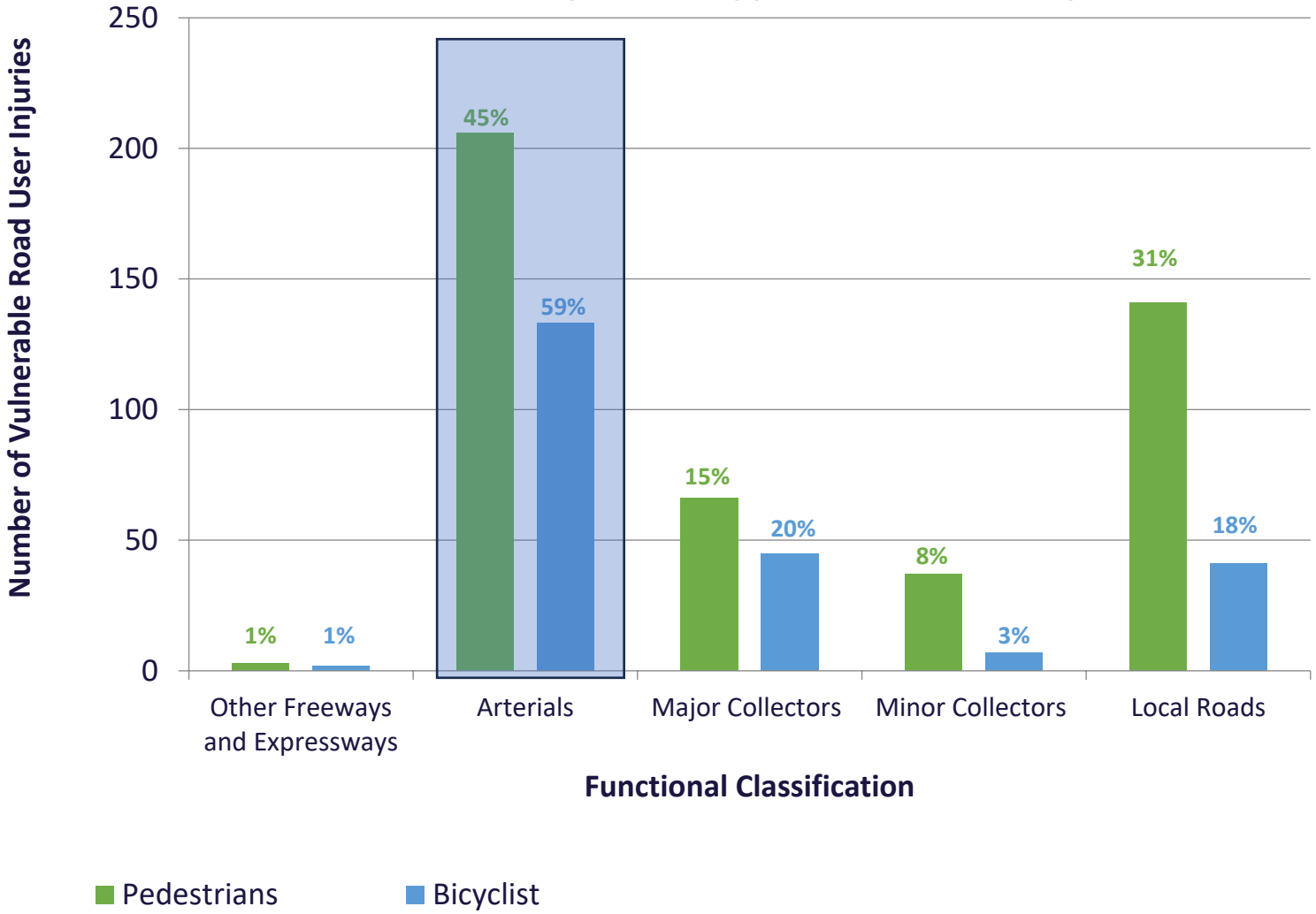
### New Castle County Centerline Miles by Functional Classification




*Source of Statewide Centerline Mileage: 2022 Highway Performance Monitoring System*

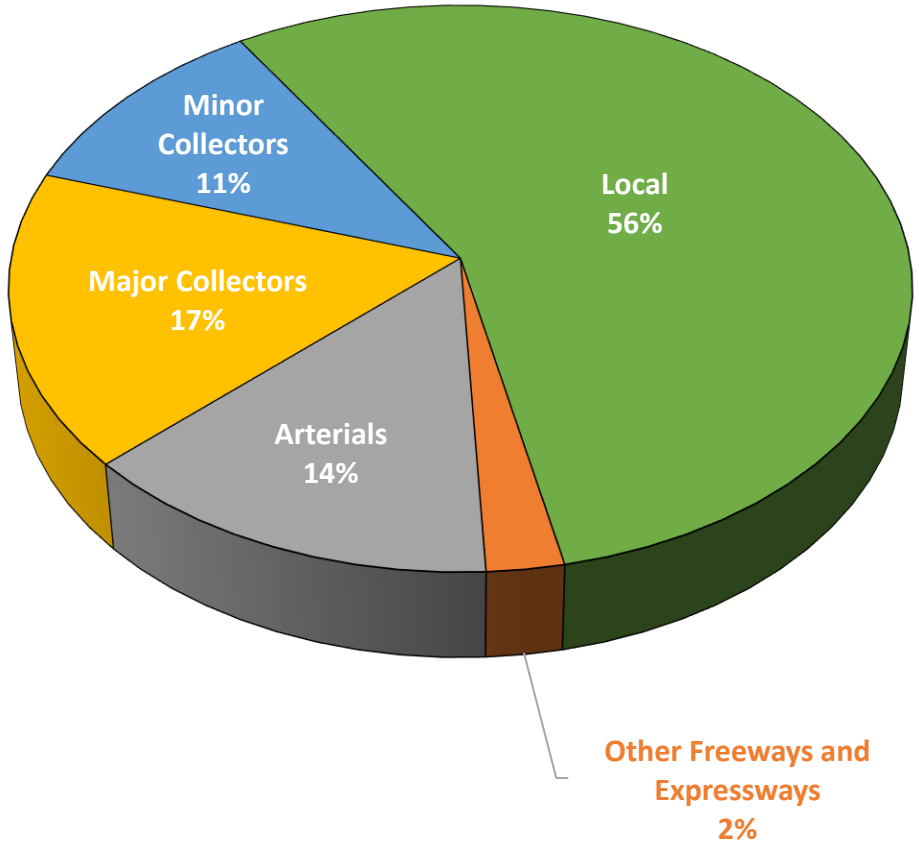
# Determination of High-Risk Areas
## Location of Vulnerable Road User Crashes – Kent County

### VRU Crashes by Road Type – Kent County



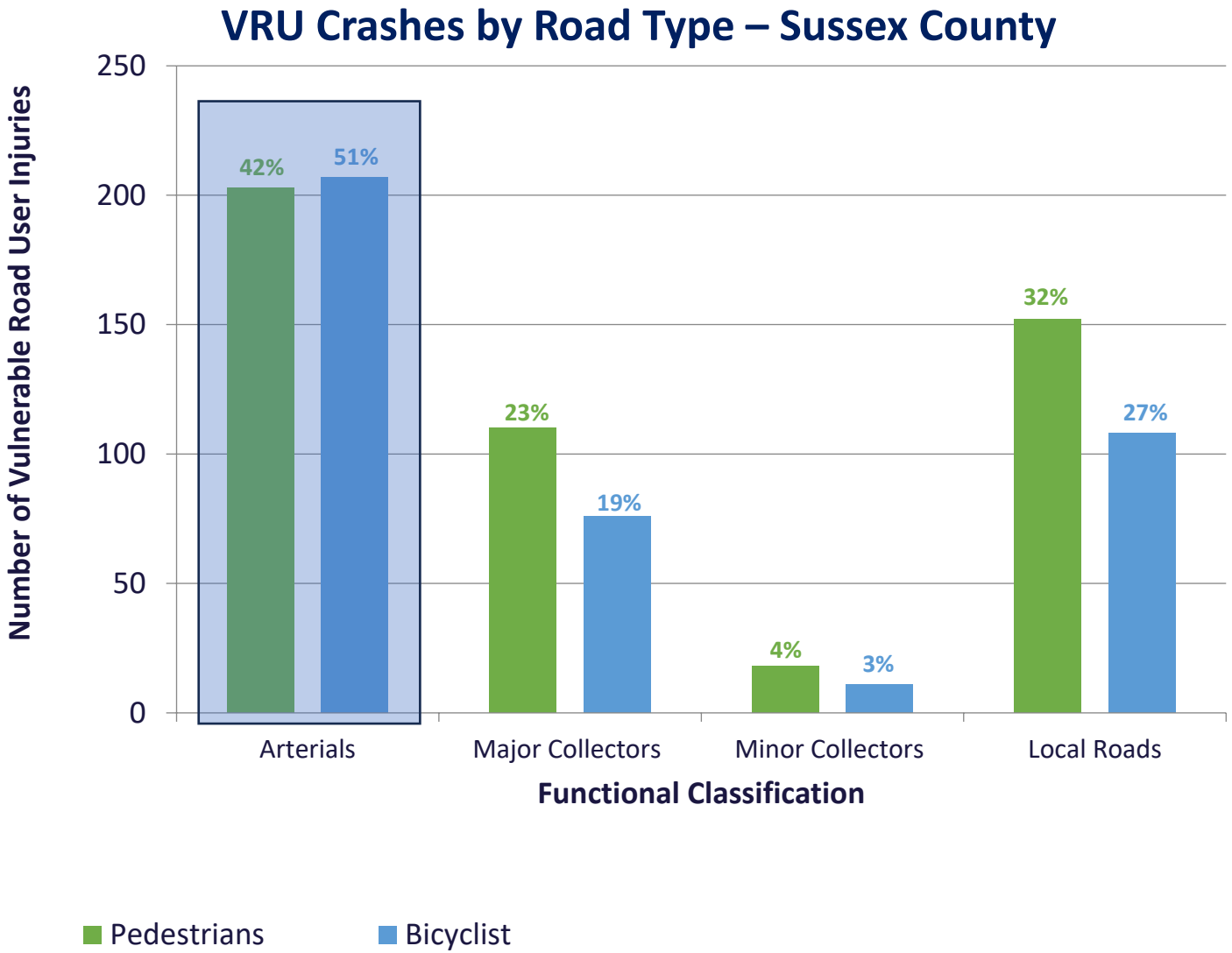

X%: Percentage of VRU type for roadway functional classification

### Kent County Centerline Miles by Functional Classification

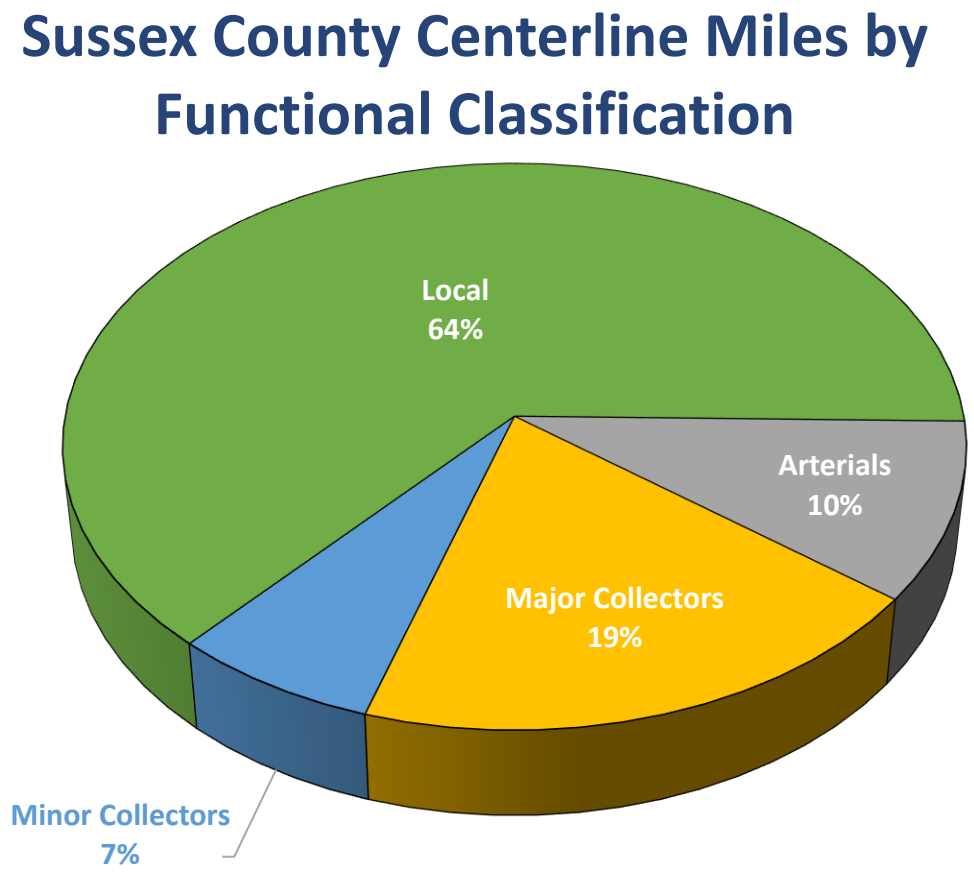



*Source of Statewide Centerline Mileage: 2022 Highway Performance Monitoring System*

# Determination of High-Risk Areas
## Location of Vulnerable Road User Crashes – Sussex County




X%: Percentage of VRU type for roadway functional classification

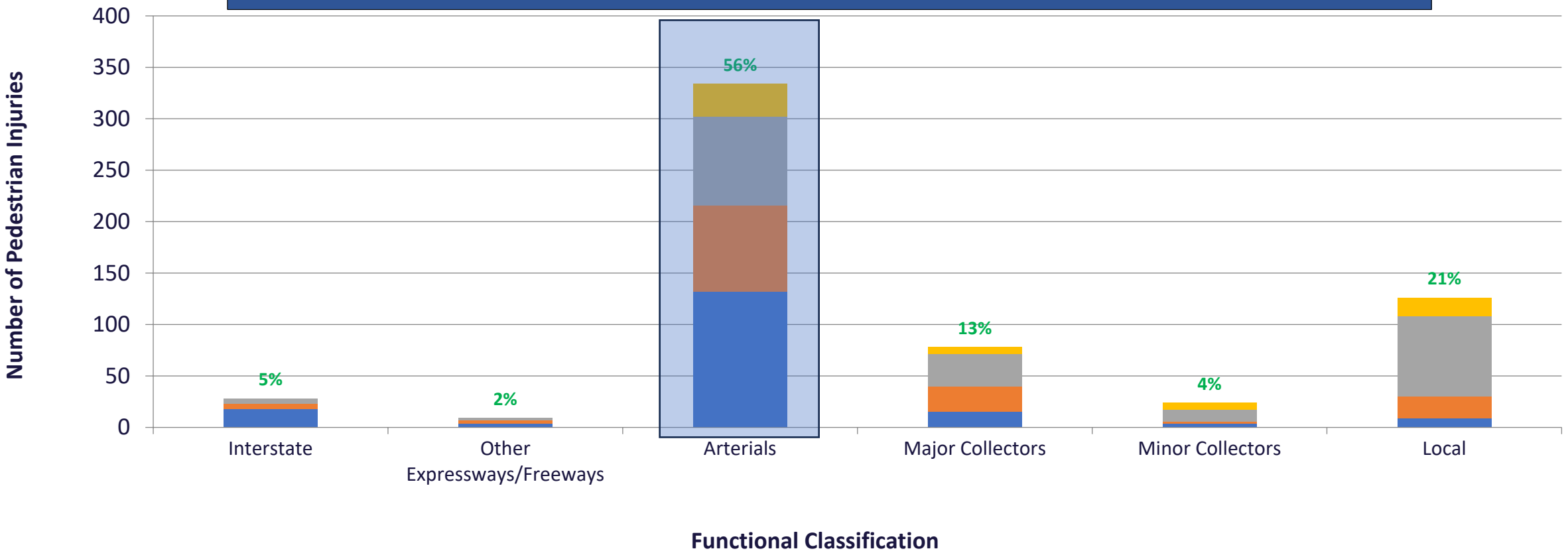



*Source of Statewide Centerline Mileage: 2022 Highway Performance Monitoring System*

# Determination of High-Risk Areas
## Location of Vulnerable Road User Crashes

### Pedestrian Injuries under Dark-Unlit Conditions by Road Type

***74% of pedestrian fatalities and 59% of pedestrian serious injuries occurred on arterials***




***High-Risk Factor: Arterials with no roadway lighting***

# Determination of High-Risk Areas
## Location of Vulnerable Road User Crashes

- Summary of VRU crash location analysis
  - 69% occurred in New Castle County
    - 57% of statewide population is in New Castle County, indicating an over-representation of VRU crashes
    - New Castle County is considered a **high-risk area**
  - VRU Crashes by Road Type
    - 51% of pedestrian-related VRU crashes occur on arterials (principal and minor)
    - 56% of bicycle-related VRU crashes occur on arterials (principal and minor)
    - Breakdown of VRU crashes by road type and county:
      - New Castle County – arterials and local roads are over-represented in the VRU crash data
        - Further indication that New Castle County is a **high-risk area**
      - Kent County – arterials are over-represented in the VRU crash data – **high-risk road type**
        - 45% pedestrians and 59% bicycles
      - Sussex County – arterials are over-represented in the VRU crash data – **high-risk road type**
        - 42% pedestrians and 51% bicycles
  - Further review of arterials indicates 56% of pedestrian-related crashes occurred in unlit areas of principal and minor arterials indicating a **high-risk factor**

# Determination of High-Risk Areas
## Summary

- The following are considered high-risk for Vulnerable Road Users
  - New Castle County
    - Includes all areas and road types within the county (see slide 67 and 71)
  - Arterial roadways – Kent and Sussex Counties
  - Arterials without roadway lighting are considered a high-risk factor statewide
  - High-risk population – 49% of pedestrians and 36% of bicyclists involved in VRU crashes were Black/African American
    - African Americans represent 22% of the statewide population, indicating an over-representation within VRU crashes

## 2023 Vulnerable Road User Safety Assessment

# Consultation

# Consultation

- Based on the determination of high-risk areas, the following stakeholders have been identified for the consultation process:

*Delaware Department of Transportation*

*Delaware Transit Corporation*

*Delaware Office of Highway Safety*

*Delaware State Police*

*Wilmington Area Planning Council*

*Dover/Kent County Metropolitan Planning Organization*

*Salisbury/Wicomico County Metropolitan Planning Organization*

*New Castle County*

*Kent County*

*Sussex County*

# Consultation Process

- Stakeholders were engaged through dissemination of the preliminary Vulnerable Road User Safety Assessment
  - Stakeholders received the preliminary Vulnerable Road User Safety Assessment and were asked to review the Assessment and provide feedback regarding the following questions
    1. **Please identify challenges that your agency faces with implementing safety improvements related to Vulnerable Road Users**
    2. **Please indicate any strategies that you would like DelDOT to consider for inclusion in this VRU Safety Assessment that your agency would like to see implemented to improve safety for Vulnerable Road Users**
    3. **As DelDOT implements the strategies identified in this VRU Safety Assessment, what community engagement efforts would you like to see employed to better reach the vulnerable road user populations?**

# Consultation Feedback and Results

- Throughout the consultation process, the stakeholders provided the following feedback:
  - All stakeholders should be working together on core unified strategies, products, and action items related to community engagement efforts. Each of the stakeholders (see page 73) have community engagement personnel that need to collaborate in a unified way rather than trying to do it independently.
  - DelDOT's Development Coordination Section is positioned to assist with implementing various safety strategies for development projects, however we're limited because it's not explicitly in the DCM [Development Coordination Manual] (the regulation).
  - Consider universal changes to the DCM that emphasize safety as the priority "driver" of the regulation, allowing us to enforce the newly adopted safety measures as they are identified (e.g., the lighting of entrances on arterials). Safety needs to be codified.
  - Addressing the safety needs of Vulnerable Road Users needs to be integrated where there is Vulnerable Road user demand.

# Consultation Feedback and Results

- Throughout the consultation process, the stakeholders provided the following feedback:
  - The following items should be considered by DelDOT to improve safety for Vulnerable Road Users:
    - Purpose and need statements to address all road users if there is vulnerable road user activity in the project area.
    - Prioritize Vulnerable Road User improvements, especially along high-risk corridors as identified in the plan
    - Understand that Vulnerable Road Users need to cross streets safely at locations that are convenient for them and not always convenient for vehicular traffic.
    - Speed matters – good design addresses speed deterring principals in urban arterial corridors or high demand VRU corridors
    - Separate modes whenever possible – higher speeds/higher volume should yield more separation
    - We need to maintain the facilities that we have
  - I recommend particular attention be paid to physical improvements in the highest risk areas while also engaging directly with the communities trying to navigate the area. I would also suggest that the improvements respect the routes pedestrians are trying to take. Pedestrians will nearly always take the most direct route and infrastructure that doesn't respect that will not resolve the problem.

2023 Vulnerable Road User Safety Assessment

# Program of Projects or Strategies

# Program of Projects or Strategies

- Program of projects or strategies is based on the high-risk areas identified previously.
- DelDOT has elected to provide a program of **strategies** as part of the 2023 VRU Safety Assessment
  - Strategies can be implemented across all project types within the Department
  - Strategies can be incorporated into standard business practices
    - Complete Streets
    - ADA Transition Plan activities
    - Development Coordination activities
    - Maintenance activities
    - All project types
- Strategies are consistent with the 2021-2025 Delaware Strategic Highway Safety Plan
- Strategies are consistent with the Safe Systems Approach

# Strategies and Actions from the 2021-2025 DE SHSP

## Emphasis Area 5: Pedestrians

| | |
|---|---|
| | **Strategy 1: Develop and distribute consistent public information messages to educate the public about pedestrian safety.** |
| 1.1 | Increase targeted public outreach, based on specific data-driven trends (e.g., impairment, visibility, etc.). |
| 1.2 | Increase awareness regarding pedestrian infrastructure improvements and incorporate educational outreach in conjunction with implementation of pedestrian improvement projects. |
| 1.3 | Develop and distribute targeted public information messages to increase public awareness regarding safety issues during vehicle breakdowns. |
| | **Strategy 2: Develop educational training programs to improve pedestrian safety awareness.** |
| 2.1 | Incorporate pedestrian (and other road user) laws and rules of the road into Drivers Education and Defensive Driving curricula. |
| 2.2 | Develop an educational outreach program for school children targeting pedestrian safety issues. |
| 2.3 | Develop and implement formal crossing guard certification requirements, similar to programs for flaggers in highway work zones. |

***Apply educational actions to appropriate areas of New Castle County***

⇦ ***In progress***

⇦ ***New Castle County has a robust program***

# Strategies and Actions from the 2021-2025 DE SHSP

## Emphasis Area 5: Pedestrians

| | Strategy 3: Strengthen pedestrian safety laws and enforcement efforts. |
|---|---|
| 3.1 | Utilize a strategic law enforcement and social services approach to address substance abuse related to pedestrian crashes and behaviors. |
| 3.2 | Conduct high-visibility enforcement campaigns targeting both pedestrians and drivers to promote pedestrian safety. |
| 3.3 | Support the expansion of legislation permitting the use of automated speed enforcement in Delaware. |
| 3.4 | Evaluate the need for a "Pedestrian Safety Behavior Modification" class and require those charged with various pedestrian safety violations to participate in the class. |

| | Strategy 4: Install effective engineering countermeasures to improve pedestrian safety. |
|---|---|
| 4.1 | Continue conducting pedestrian safety audits at high-crash locations and critical corridors and incorporate pedestrian behavioral surveys into the audits. |
| 4.2 | Install infrastructure improvements to reduce pedestrian exposure, the potential for pedestrian/vehicle conflicts, and increase pedestrian visibility. |
| 4.3 | Perform before/after studies to evaluate and identify the most effective pedestrian safety treatments. |
| 4.4 | Research, and where appropriate, implement innovative pedestrian detection at signalized intersections and at other locations along high-risk corridors where driver feedback can be provided via signs and signals. |

***Apply enforcement actions to appropriate areas of New Castle County***

***In progress***

***Engineering countermeasures can be applied to high-risk roadways as identified previously***

***DelDOT is mapping sidewalk and lighting inventory and overlaying that data with crash data for project prioritization***

# Strategies and Actions from the 2021-2025 DE SHSP

## Emphasis Area 5: Pedestrians

| | Strategy 5: Develop policies and/or guidelines to support pedestrian safety measures. |
|---|---|
| 5.1 | Consider revising DelDOT's design policies and guidelines to promote design practices that reduce vehicular speeds and promote pedestrian safety. |
| 5.2 | Revise DelDOT's Development Coordination Manual to require additional pedestrian infrastructure improvements related to new developments. |
| 5.3 | Evaluate the need for revisions to DelDOT's Complete Streets policy and implementation plan. |
| 5.4 | Initiate a Pedestrian Safety Stakeholder group with membership from appropriate state agencies, advocacy groups and the public to identify pedestrian safety and connectivity improvements, policy updates and improved collaboration between state and local agencies, consistent with the objectives of the 2021-2025 SHSP. |

***Senate Bill 50 was signed into law by Governor Carney on June 28, 2023, codifying the Advisory Council on Walkability and Pedestrian Awareness***

***Policy and guideline updates are in various stages of implementation***

# Strategies and Actions from the 2021-2025 DE SHSP

## Emphasis Area 5: Pedestrians

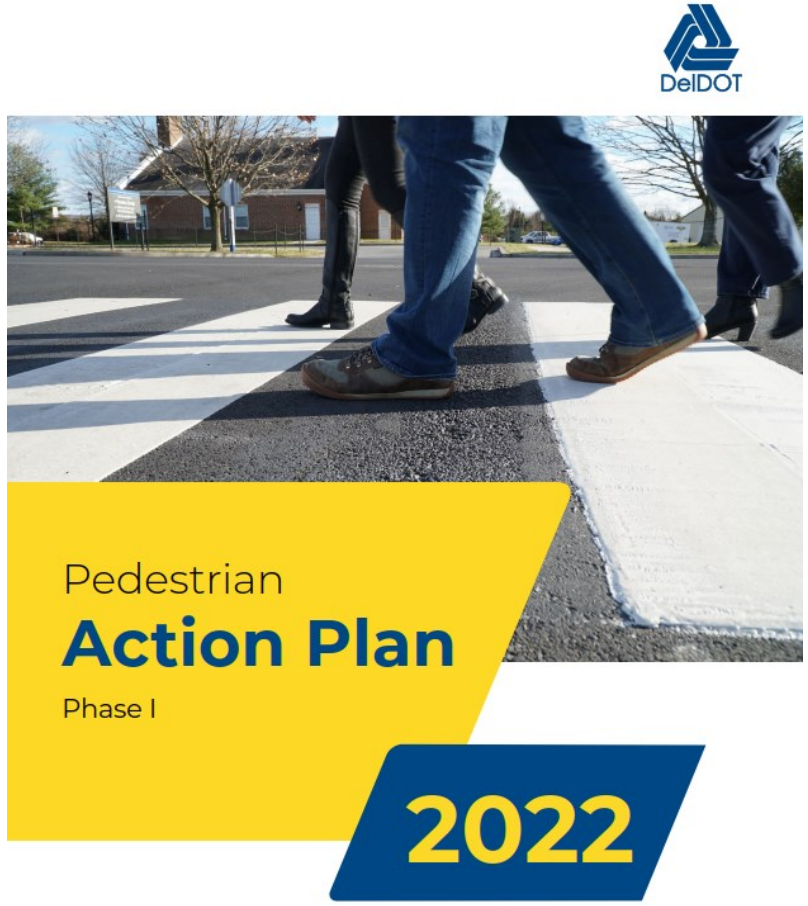
| | |
|---|---|
| | **Strategy 6: Improve data collection of pedestrian crashes and monitor trends.** |
| 6.1 | Working with the Division of Substance Abuse and Mental Health (DSAMH), share data to link mental health issues and substance abuse with traffic and pedestrian travel patterns to improve educational outreach to vulnerable populations. |
| 6.2 | Correlate pedestrian crashes with population changes associated with summer resort seasons, holiday shopping and other times that increase pedestrian activity and if necessary, identify appropriate pedestrian safety countermeasures. |
| 6.3 | Correlate pedestrian crashes to income levels and homeless populations in Delaware and if necessary, identify appropriate pedestrian safety countermeasures. |
| 6.4 | Implement best practices for the use of the new pedestrian origin-destination data to capture improved data about pedestrian travel patterns and crashes. |
| | **Strategy 7: Improve emergency services and incident management to address pedestrian safety.** |
| 7.1 | Evaluate the expansion of DelDOT's Motorist Assistance Patrol (MAP) to increase services along interstates, freeways, and expressways to reduce pedestrian exposure during vehicle breakdowns. |

***Data correlation was determined to be infeasible due to lack of appropriate pedestrian exposure data***

***DelDOT is currently evaluating placement of Emergency Notification signage along all freeway segments***

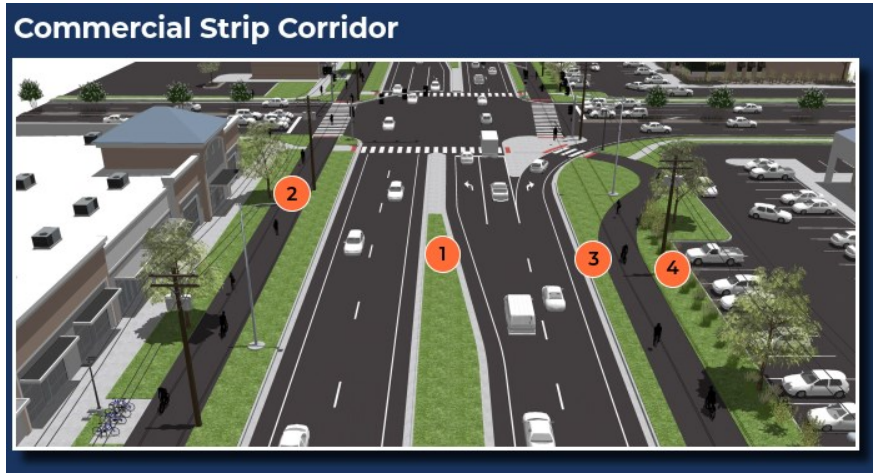
# Other Statewide Programs and Plans

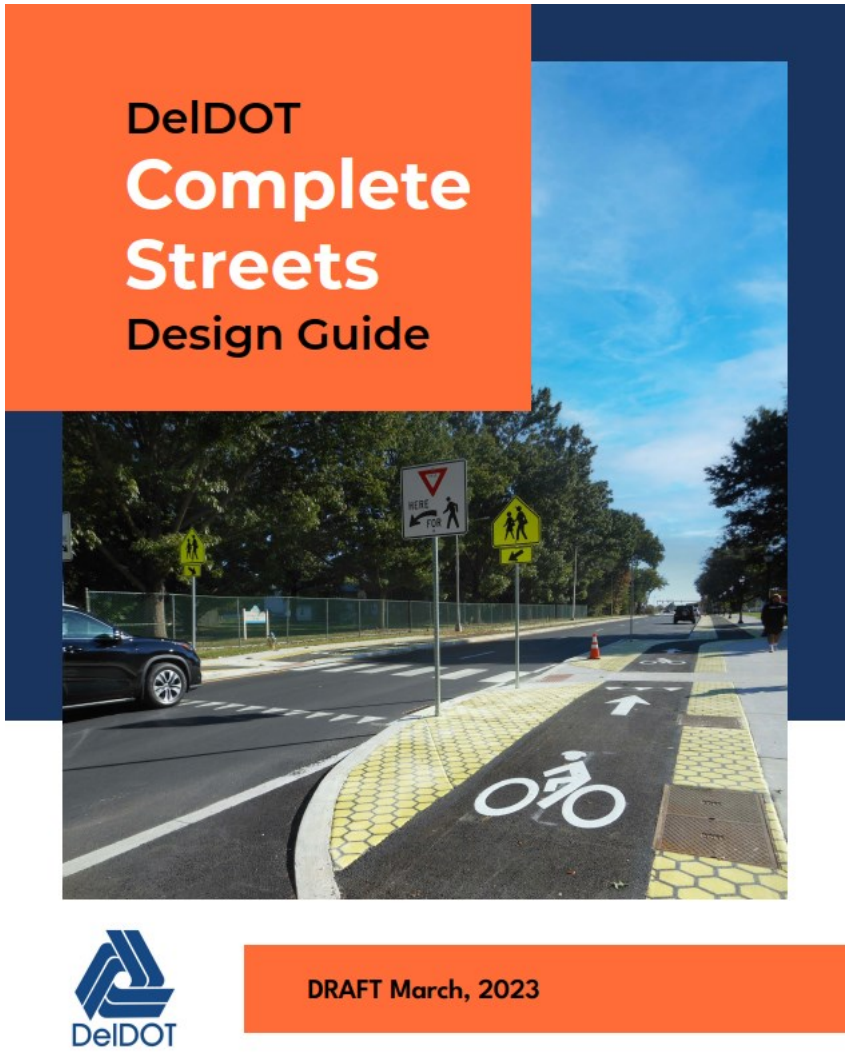
- Pedestrian Action Plan
  - Highlights the work already underway at DelDOT to improve pedestrian safety, accessibility, connectivity, and equity
  - Provides an actionable framework for DelDOT to continue working with planning partners and communities to improve pedestrian travel
  - Three phase development approach
    - Phase 1 – Review existing plans, Initial crash data analysis, public engagement - COMPLETE
    - Phase 2 – Public engagement, internal DelDOT coordination
    - Phase 3 – Additional crash data analysis, public and stakeholder engagement, implementation plan, evaluation



# Other Statewide Programs and Plans

- Complete Streets
  - Complete Streets process first formalized in April 2009 with Executive Order 6
  - DelDOT Complete Streets Policy became effective in January 2010
  - Draft Complete Streets Design Guide developed (*to be finalized end of 2023*)
  - Identifies street types and design solutions by zone



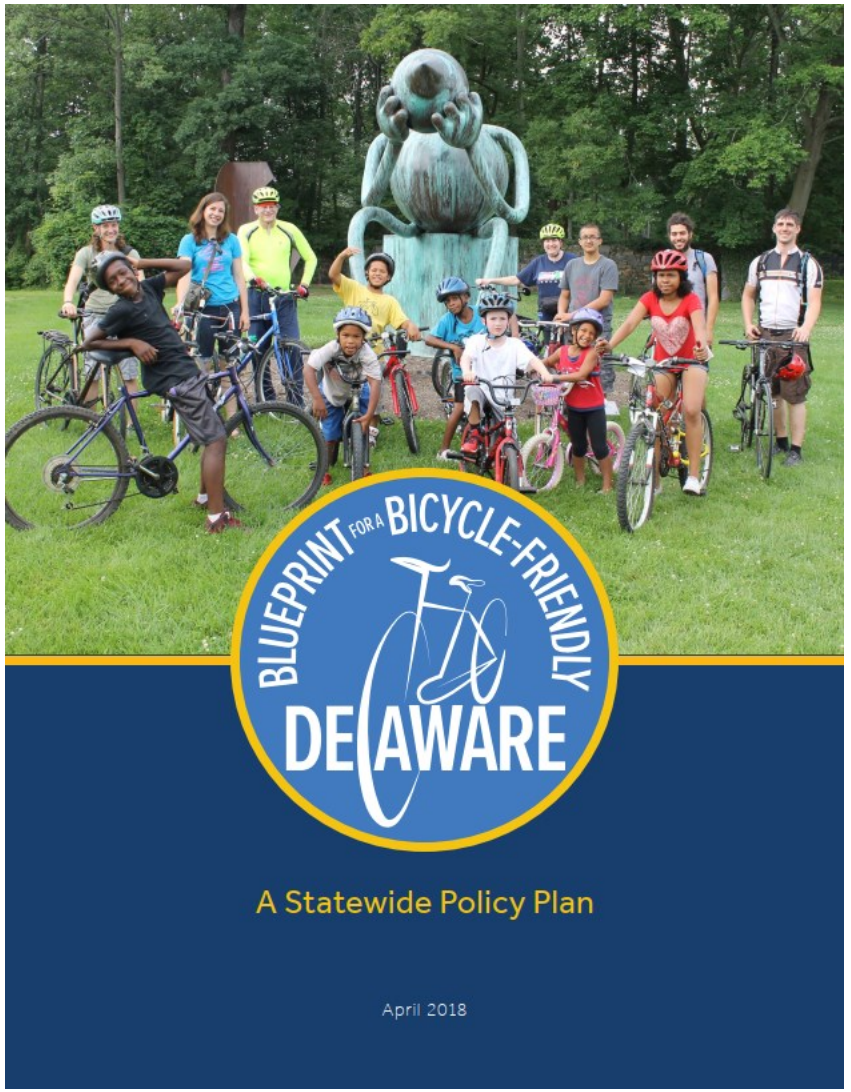



# Other Statewide Programs and Plans

- ADA Transition Plan
  - Presents DelDOT's Self Evaluation and identifies the actions that will be taken to transition the transportation system to be accessible in compliance with ADA requirements
    - DelDOT Pedestrian Access Route (PAR) program is actively addressing the Transition plan by reconstructing non-compliant sidewalks and curb ramps, making them compliant and accessible for all users.
      - The program employs a PAR Prioritization tool to pinpoint work locations based on factors such as population, demographics, land use, transit ridership, and ADA compliance data (ADA Self-Evaluation)
  - Obligations
    - Annual paving list – updated annually providing a forecasted goal for constructing and/or updating non-compliant curb ramps
    - Progress reports – annual review documenting the progress achieved toward having a fully accessible transportation system
  - ADA Transition Plan Inventory
    - Contains data regarding the pedestrian facility inventory and ADA assessment of those facilities

# Other Statewide Programs and Plans

- *Blueprint for a Bicycle-Friendly Delaware* – Delaware's Bicycle Plan
  - Provides a series of strategies for planning, design, coordination, and communication tools to continue Delaware's implementation of bicycle facilities
  - Recommendations for implementation prioritize the following:
    - **Network Development**: create local plans that identify the desired bicycle network
    - **Project Prioritization and Funding**: Identify and prioritize projects that expand the low-stress bicycle network
    - **Project Development and Design Guidance**: - Design and construct facilities that extend the bicycle network and produce a safer, more comfortable experience for bicyclists and other users



# VRU Assessment Strategies

- Continue implementing strategies and actions related to pedestrian safety as outlined in the 2021-2025 Delaware Strategic Highway Safety Plan
- Implement strategies outlined in the Pedestrian Action Plan when plan is complete
- Continue development and implementation of Road Safety Audits focusing on Vulnerable Road User Safety
- Continue development and implementation of Roadway Reconfigurations (aka Road Diets)
- Continue implementing speed management practices
- Consider implementation of design practices to support the Safe Systems for All approach

STATE OF DELAWARE
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**JOHN CARNEY**
GOVERNOR

PHONE (302) 744-4101
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November 8, 2023

The Honorable Pete Buttigieg
US Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Buttigieg:

In accordance with 23 CFR 924.9(a)(3)(iv), the Vulnerable Road User Safety Assessment is required to be approved by the Governor of the State or a responsible State agency official that is delegated by the Governor.

I, John Carney, Governor of the State of Delaware, hereby delegate approval authority of Delaware's Vulnerable Road User Safety Assessment to Nicole Majeski, Secretary of Transportation.

Sincerely,

John C. Carney
Governor