



Context  
Driven

# PEDESTRIAN SAFETY ACTION PLAN







Tim Smith, PE, Administrator

May 2023

As Administrator, I am focused on the crucial mission to improve access and safety for all users of MDOT SHA's transportation system, especially those most vulnerable users traveling by foot, bicycle, and scooter and accessing transit. I am proud, today, that the MDOT SHA team is delivering another key element of MDOT SHA's Context Driven initiative, MDOT SHA's Pedestrian Safety Action Plan (PSAP), which will help MDOT SHA better deliver improved access and safety for vulnerable users.

One death is one too many. In 2019, Maryland made it a goal to realize zero motor vehicle-related fatalities or serious injuries. To do its part, MDOT SHA has been actively developing and applying its Context Driven philosophy to help make Vision Zero a reality.

In 2020, MDOT SHA published its Context Driven - Access & Mobility for All Users 1.0 guide, which recognized six unique transportation and land use contexts across Maryland. The Context Driven guide emphasizes improvements that appropriately balance access and mobility within each context. Since the beginning of 2019, MDOT SHA has implemented over 300 Context Driven improvements, including reducing speed limits, upgrading existing and adding new crosswalks, adjusting signal timing to give pedestrians a head start, and much more.

Now, the PSAP positions MDOT SHA to employ a data-driven approach to identifying specific areas of need and prioritizing those corridors where safety and access needs are most prevalent. The PSAP will allow MDOT SHA to continue cultivating its relationships with local partners and stakeholders throughout Maryland to implement both near- and long-term improvements. Ultimately, MDOT SHA cannot fully achieve its mission and vision, to safely connect Marylanders to life's opportunities, unless it can identify the locations of and deliver the types of improvements necessary to make that vision a reality. Context Driven and the PSAP put MDOT SHA and Maryland one step closer to that reality.

Sincerely,

*Tim Smith*

**Tim Smith, PE**  
Administrator



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# 01 setting the STAGE

## How do we improve pedestrian and bicycle safety?

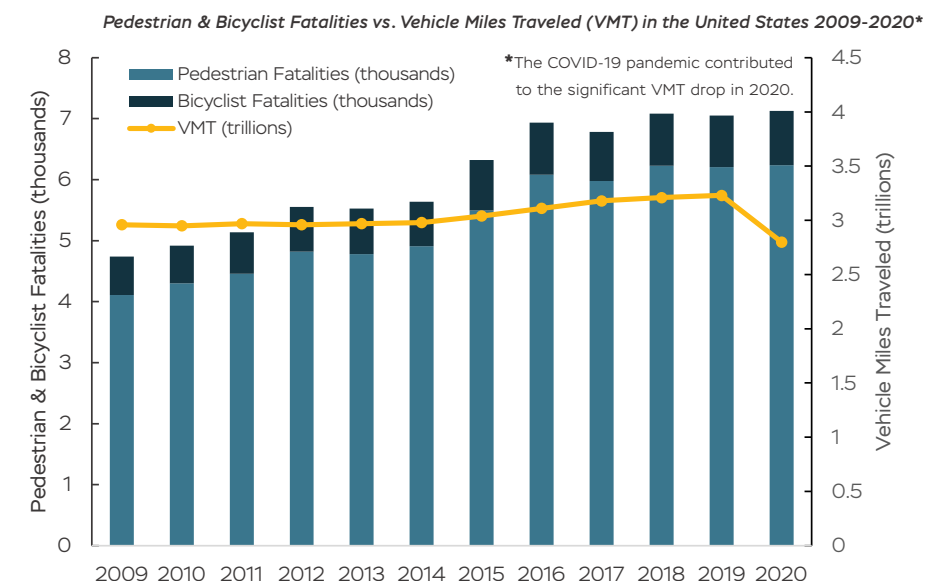


## Why IS THIS PLAN IMPORTANT

### PEDESTRIAN AND BICYCLE SAFETY is everyone's concern.

Most people in Maryland will use public sidewalks or crosswalks in a given day. Many of us walk to commute, run errands, get fresh air, or because we do not drive or have access to a vehicle. Some of us choose to use a bicycle to do these things and oftentimes, pedestrians and bicyclists are grouped together and referred to as "vulnerable road users" (VRU) because of their comparative risk in the event of a crash. VRU safety matters to us all because everyone is a VRU at some point, whether we are returning to our parked car in the City or running out to the mailbox on a rural road.

The U.S. has made progress on VRU safety, but we need to do better. Pedestrian fatalities have been increasing steadily nationwide since 2010. In fact, 2016 through 2019 were the most deadly years for pedestrians and bicyclists in the United States since 1990. This is also the case when we consider the pedestrian fatality rate when compared to the total vehicle miles traveled (VMT) in the United States. While not as high as the pedestrian fatality rate, fatal bicycle crashes have also been generally rising since 2011. The figure below illustrates these trends.<sup>1,2</sup>



1 Governor's Highway Safety Association, US Department of Energy, and Smart Growth America.

2 National Highway Traffic Safety Administration (NHTSA).



# What ARE WE DOING & Who IS INVOLVED

## The purpose of this plan

Pedestrian and bicycle safety is an urgent issue in Maryland. The purpose of this Pedestrian Safety Action Plan (PSAP) is to make our streets safer for everyone by making them safer for pedestrians and bicyclists.

This PSAP will improve pedestrian safety by providing specific actions and strategies and prioritizing corridors through a data-driven process guided by land use context and supported by community input. There is more information on the steps involved in the *What are the steps?* portion of this section

Although the PSAP focuses on pedestrian safety, it also includes safety recommendations specific for bicyclists, scooter users, and other VRUs that would benefit from these improvements as well as pedestrian safety improvements.

Through this process, this PSAP will address pedestrian and bicycle safety by recommending design improvements to meet statewide performance targets, with the ultimate goal of ensuring that nobody becomes a statistic. Maryland's existing performance targets are explained in more detail in the *How did we get here?* portion of this section.

## This plan focuses on state highways

Roads in Maryland are owned and maintained by either the Maryland Department of Transportation (MDOT) or local agencies, depending on their location and classification. The MDOT State Highway Administration (SHA) is responsible for all numbered, non-tolled highways and interstates that are owned and operated by the State of Maryland. This includes major routes like Interstate 695, US Route 1, and Maryland Route 32, but also encompasses many lower-volume roadways.

While this PSAP is for roads owned and operated by MDOT SHA, a multitude of state, local, and regional agencies are involved in the overall effort to improve pedestrian and bicycle safety. Reducing traffic deaths to zero will require the continued safety efforts of every jurisdiction and agency that has a role in keeping our infrastructure safe. MDOT SHA will coordinate with cities, counties, and others associated with our roadways. Such coordination will ensure that everyone can act upon the findings and recommendations in this plan. More information on how MDOT SHA will coordinate with other jurisdictions through this plan is presented in *What will this plan achieve?*

# How DID WE GET HERE

## Context Driven

Context Driven is an MDOT SHA initiative that stems from strategies outlined in the 2021-2025 *Maryland Strategic Highway Safety Plan* (SHSP). It approaches traffic safety by considering how land use interacts with our transportation systems, with particular emphasis on the tradeoff between access and mobility. **This PSAP is a crucial component of the Context Driven initiative.**

- 1.....DEFINE the context.**  
The **Context Driven Guide** details each land use context that MDOT SHA has identified for Maryland.
- 2.....IDENTIFY the issues, plan our actions.**  
Where are the greatest safety challenges for pedestrians and bicyclists in Maryland? How do we address those challenges, meet our safety targets, and move towards zero deaths on our roadways? This **Pedestrian Safety Action Plan** uses data analysis and community feedback to help answer these questions and provide a set of context-driven actions and strategies.
- 3.....PROVIDE the tools for change.**  
Knowing where to focus our efforts and what kinds of changes we need is important, but what changes would be most effective? The **Context Driven Toolkit** provides specific safety-enhancing designs for our streets and roadways that would be most appropriate for each land use context.
- 4.....SHOW where these strategies have worked.**  
Before making big changes to our streets, we want to make sure that the solutions identified in the Context Driven Toolkit have worked elsewhere. **Case studies** give us confidence that changes to our roadways will have a positive effect on safety.
- 5.....INVEST in people.**  
It takes people to implement a plan. Investing in **training** for MDOT SHA employees and partners will help make the projects identified through the Context Driven process a reality and ultimately make our roadways safer.



To learn more about Context Driven, the SHSP, and other Maryland Department of Transportation safety initiatives, be sure to visit us online at [b.link/vmakz4](https://b.link/vmakz4)

# What ARE THE STEPS



## Data Collection & Analysis

**Data collection and analysis** focuses on understanding patterns in Maryland's pedestrian and bicycle crash data that illustrate existing conditions and help identify areas of need.



## Existing Conditions

Documenting **existing conditions** involves visualizing VRU crash patterns as well as identifying where and how pedestrian and bicycle crashes are occurring throughout Maryland to inform subsequent work.

Beyond crash data, existing conditions also show what programs, policies, and initiatives are already in place to combat Maryland's pedestrian and bicycle safety challenges.



Survey Map & Virtual Public Meetings



## Areas of Need

**Areas of need** are determined by mapping and layering crash density, public input, equity analysis, and Short Trip Opportunity Areas (STOAs) to reveal areas in highest need of pedestrian and bicycle improvements.



## Prioritization

**Prioritization** identifies priority corridors within the identified areas of need. This requires an effective methodology, which is shaped by various data sources and public input.



Survey Map & Virtual Public Meetings



## Actions & Strategies

**Actions and strategies** puts the areas of need and prioritization stages to work by recommending pedestrian and bicycle safety countermeasures. The Context Driven Toolkit will be a major component of the recommendations in this section.

# What WILL THIS PLAN ACHIEVE

## Measurable Progress

The Pedestrian Safety Action Plan's recommendations will be implemented and monitored in accordance with the goals listed below and through the actions and strategies in Section 5.



one

Support agency partner and peer pedestrian and bicycle safety programs



two

Direct investment to and implement countermeasures in places with known pedestrian and bicycle safety challenges



three

Ensure road improvements deliver context driven objectives



four

Leverage innovation and technology to improve pedestrian and bicycle safety



A full list of goals and potential performance metrics can also be found online at [b.link/cwqk5i](https://b.link/cwqk5i)

# 02 existing CONDITIONS

## What is the status?

### Safety TRENDS IN MARYLAND 2010-2020

#### Pedestrian and bicycle fatalities are rising

Similar to the national pattern described in the previous section, Maryland's pedestrian fatalities have been steadily rising since 2010. Although the number has occasionally decreased, the state has experienced about a 35% increase in pedestrian traffic fatalities from 2010 to 2020, rising from 102 to 138. When comparing available 5-year averages (2011-2015 vs. 2016-2020), the pedestrian traffic fatality increase for Maryland is about 21%. This is similar to the national trend, which saw pedestrian traffic fatalities jump by about 37% between 2010 and 2020, and from 4,280 in 2010 to 6,236 in 2020. Similarly, available 5-year averages at the national level (2011-2015 vs. 2016-2020) show an increase of about 23%.

Maryland has also experienced an increase in bicyclist fatalities since 2010. The trend for bicyclist traffic fatalities has been more erratic from year to year. However, the 5-year average (2011-2015 vs. 2016-2020) has seen bicyclist traffic fatalities increase by about 76% in Maryland and about 13% nationally.

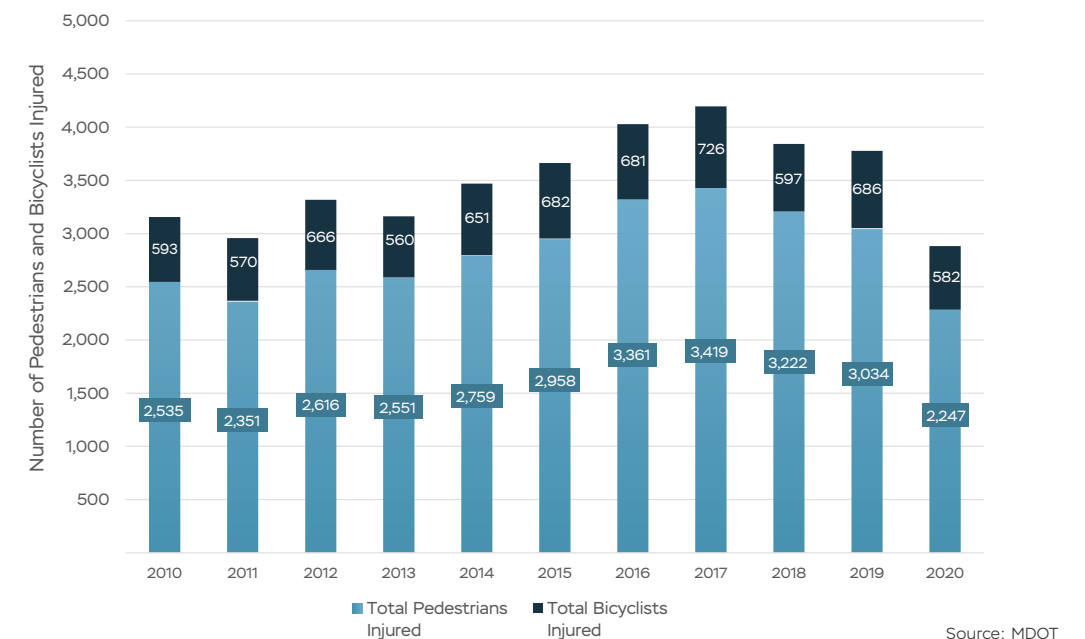
#### Pedestrian and bicyclist traffic injuries have declined

The number of non-fatal pedestrian and bicyclist traffic injuries has been decreasing in Maryland since 2017, reaching its lowest combined rate in 2020. When comparing available 5-year averages (2011-2015 vs. 2016-2020), pedestrian and bicycle injuries in Maryland have increased by about 13%.

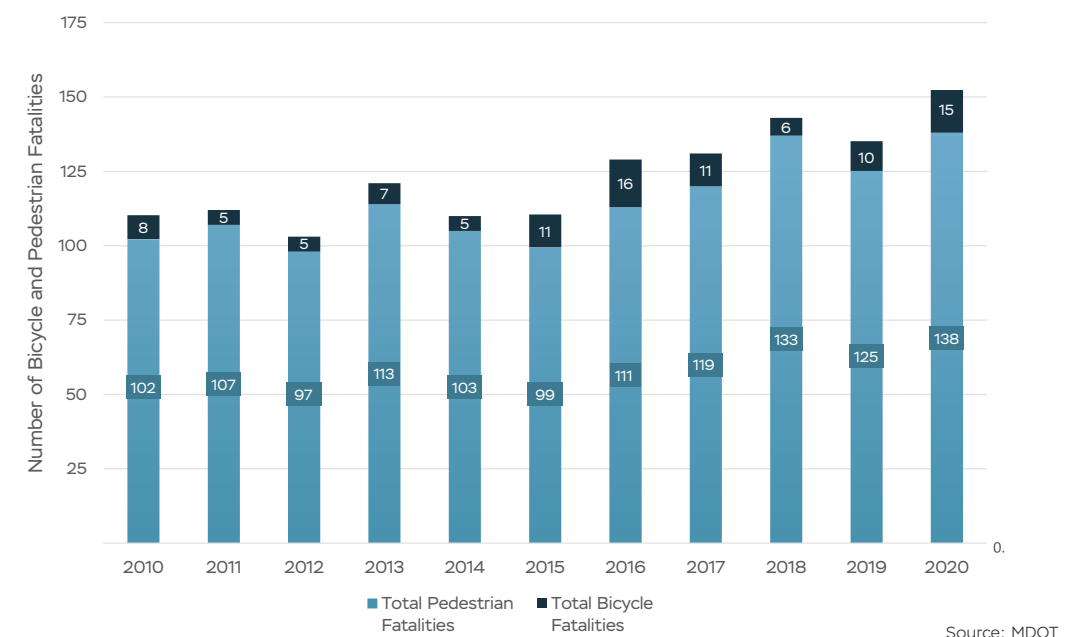
Considered alongside fatality data, the injury data suggests that pedestrians and bicyclists involved in crashes are more likely to result in fatalities. This despite the decreasing number of VRUs reported injured since 2017.



Bicycle and Pedestrian Injuries in Maryland 2010-2020



Bicycle and Pedestrian Fatalities in Maryland 2010-2020




# Crash CIRCUMSTANCES

## What contributes to pedestrian and bicycle crashes?

- » **Driver Action:** what the driver of the vehicle was doing at the time of the crash.
- » **Crash Location:** the part of the roadway where the crash occurred.
- » **Weather:** what the weather conditions were at the time of the crash.
- » **Lighting:** what the lighting conditions were at the time of the crash.
- » **Non-Motorist Location:** the location of the pedestrian or bicyclist on the roadway at the time of the crash.
- » **Non-Motorist Action:** what the pedestrian or bicyclist was doing at the time of the crash.

To see the full set of pedestrian and bicycle crash statistics, visit [b.link/a9dx1a](https://b.link/a9dx1a)

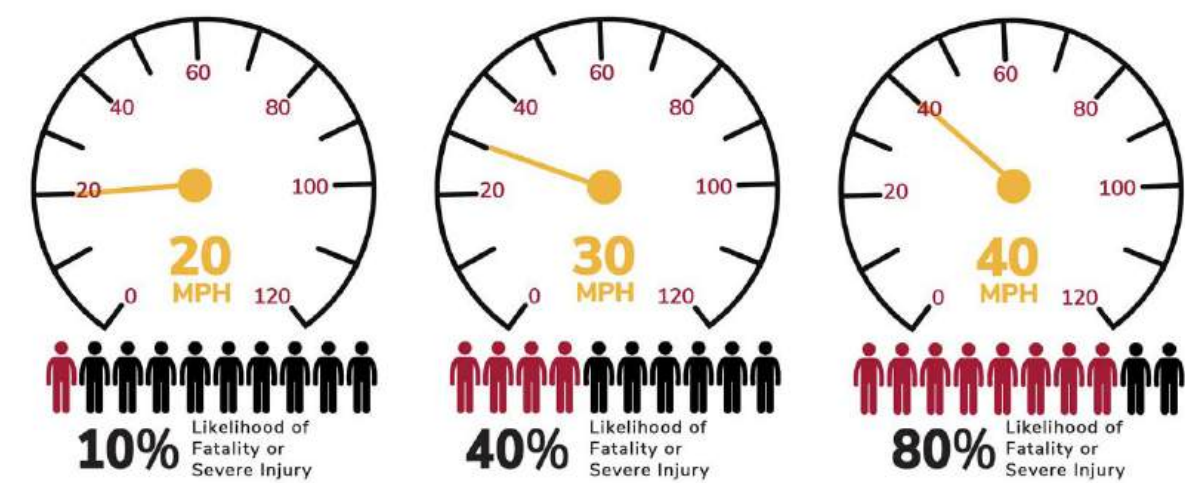


# Speed MATTERS

Numerous studies have shown that the chances of a pedestrian fatality or serious injury increase with the speed of the vehicle. While this may seem obvious, it is important to recognize that the risk of serious or fatal injuries increases greatly at speeds that some might consider relatively low.

According to MDOT SHA crash data from 2016 to 2019, a pedestrian or bicyclist in Maryland is more than twice as likely to die

or be seriously injured on a road with a posted speed limit of 30-40mph than a roadway with a speed limit of 25mph or less. They are also almost four times as likely to die or be seriously injured on a roadway with a speed limit of 45-50mph.



Visualization of Speed vs. Crash Severity (Image Credit: Zero Deaths Maryland)

# Current SAFETY INITIATIVES

## Existing pedestrian and bicycle safety initiatives at MDOT SHA

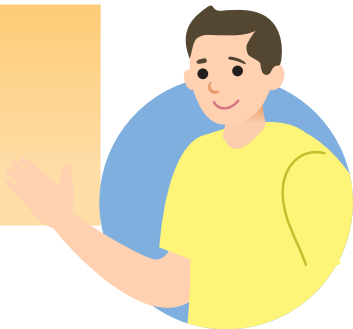
This PSAP will help guide future investments in pedestrian and bicycle safety by identifying actions and priorities. These measures will complement many existing and ongoing safety initiatives across the state. A few of these existing initiatives are included below, and this PSAP takes some of these efforts into account as part of its data-driven

analysis. The data-driven areas of need and prioritization processes are described in Sections 3 and 4 of this document.

In addition to the MDOT SHA initiatives highlighted below, other transportation business units at MDOT are working on other aspects of pedestrian and bicycle safety. These parallel efforts include programs that focus on education, enforcement, and emergency medical services.

SAFETY INITIATIVE	DESCRIPTION
Context Guide and Cost-Effective Context Driven Safety Improvements	The Context Guide is a planning and design tool that establishes six contexts in the state of Maryland and is a framework for identifying and understanding the needs of communities across the state.
Maryland Highway Safety Improvement Program (HSIP)	This is a core Federal-aid Highway Program that aims to reduce fatalities and serious injuries along public roads for all modes.
Speed Management Action Plan	MDOT SHA is developing the Speed Management Action Plan, which is a shared plan developed among several transportation agencies and partners.
Pedestrian Road Safety Audit (PRSA)	MDOT SHA conducts PRSAs across Maryland to examine potential pedestrian safety risks and identify opportunities for improvements.
Pedestrian and Bicycle Dedicated Programs	MDOT SHA manages various programs that dedicate funds for design and construction of pedestrian and bicycle improvements, including the New Sidewalk Construction and Reconstruction for Pedestrian Access Programs and the Bicycle Retrofit Program.
Bicycle and Pedestrian Priority Areas (BPPA)	BPPAs are areas where the enhancement of pedestrian and bicycle traffic is a priority.
"Be Street Wise" Campaign	MDOT SHA manages the "Be Street Wise" campaign, which reminds all roadway users to follow traffic laws and the rules of the road, with the goal of making Maryland's roadways safer.

You can find all of these documents and more here: [b.link/cmzelz](https://b.link/cmzelz)

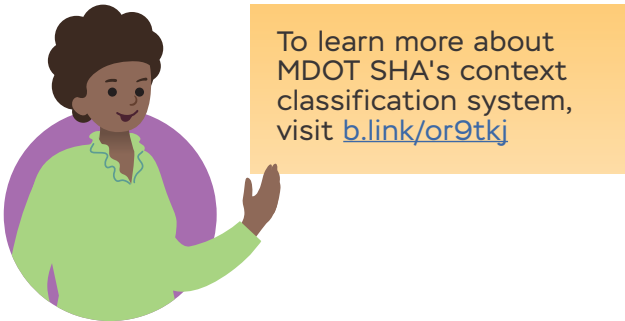




# LAND USE & Context IN MARYLAND

## Context informs solutions

Cities and neighborhoods vary widely, and MDOT SHA has recognized this by defining six contexts based on land use, from Urban Core (highest density) to Rural (lowest density). The unique needs of each context will help inform MDOT's roadway designs and treatments.



### Urban Core

Considered the typical downtown or central business district area, this context is defined by a high diversity of uses, including multi-family residential, office, retail, entertainment, civic, and cultural facilities. *Example: Baltimore City*



### Urban Center

Similar to Urban Core, this context is characterized by a high diversity of uses, while having a moderately high density of development. *Example: Annapolis*



### Traditional Town Center

While smaller and less dense than either of the urban contexts, this context is defined by a high diversity of use types that were typically laid out before the advent of the automobile. *Example: Easton*



### Suburban Activity Center

Located outside of the major Urban Centers, the Suburban Activity Center is typically found along or at the intersection of major arterials. *Example: Hyattsville*



### Suburban

With a moderate to low diversity of uses, the Suburban context typically contains primarily single-family residential developments. *Example: Fallston*



### Rural

Rural areas are primarily a mix of agricultural uses and green space, with some scattered development in large-lot residential clusters. *Example: Vienna*

# Crashes BY CONTEXT

## More crashes are happening in denser contexts

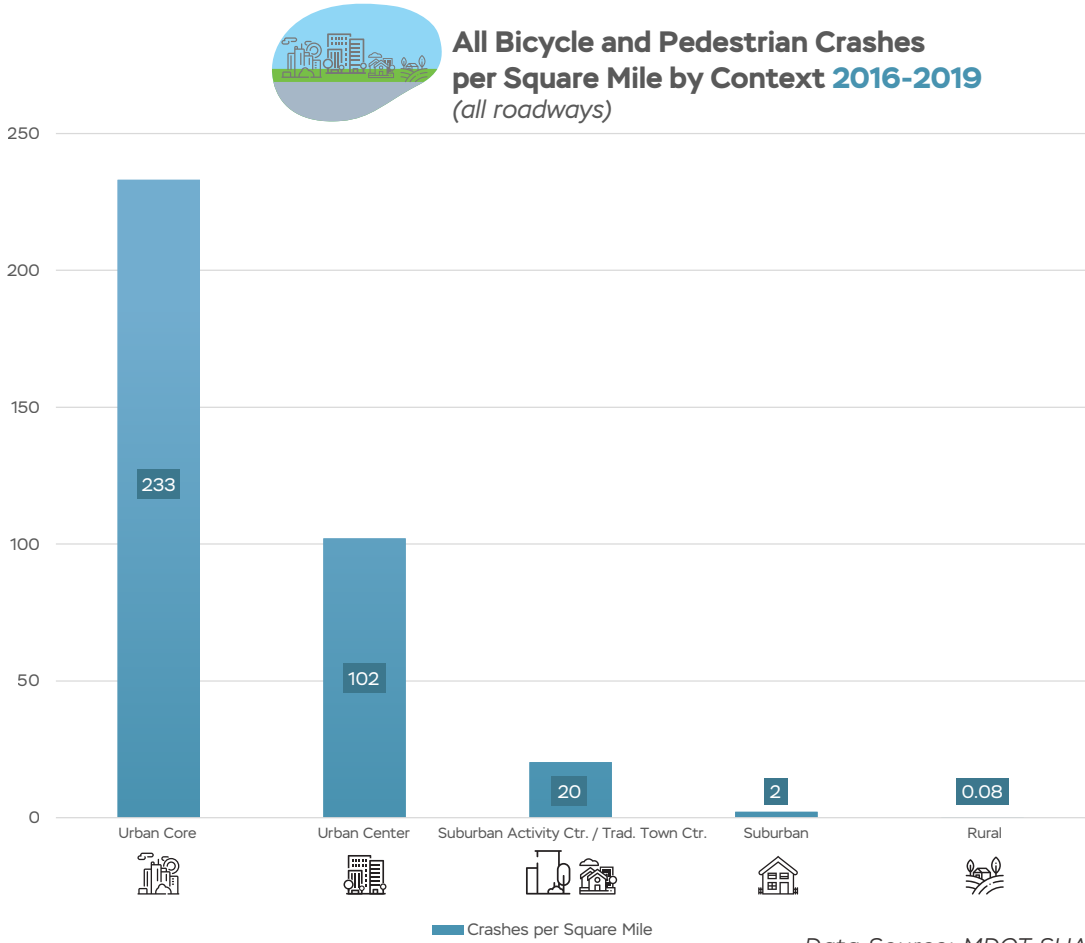
More pedestrian and bicycle crashes are occurring within a smaller land area in the denser contexts.

The approximate breakdown is as follows:

- » **Urban Core:** Less than 0.1% of land area and 9% of crashes.
- » **Urban Center:** Less than 0.1% of land area and 18% of crashes.

- » **Suburban:** About 21% of land area and 25% of crashes.
- » **Suburban Activity Center/Traditional Town Center:** About 3% of land area and 45% of crashes.
- » **Rural:** About 76% of land area and 3% of crashes.

The figure below highlights this breakdown by showing how many pedestrian and bicycle crashes occurred per square mile in each context from 2016 through 2019.





# 03

## areas OF NEED

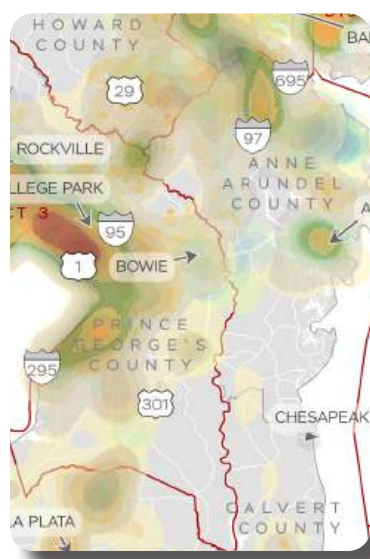
### Where do we focus?

- 1 Data inputs were **mapped** to reveal statewide patterns in crash data and demographic data that were most relevant to pedestrian and bicycle safety. This data is referenced in the flowchart below.
- 2 After being mapped, the results were **layered** to show where the data inputs overlapped the most. Areas with the most significant overlap in data were considered in higher need of pedestrian and bicycle safety improvements. All inputs were weighted equally.

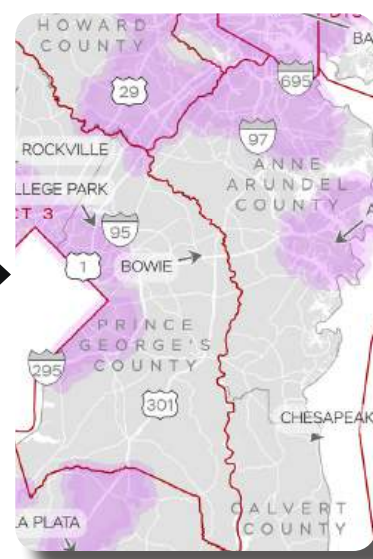
#### 1 Map Data Inputs

- a Non-Fatal, Non-Serious Injury Crash Density
- b Serious Injury & Fatal Crash Density
- c Public Comment Density
- d Equity Analysis
- e Short Trip Opportunity Areas

#### 2 Layer Results



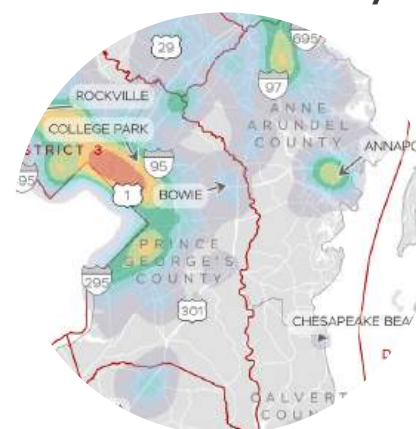
#### 3 Draw Boundaries to Define Areas of Need



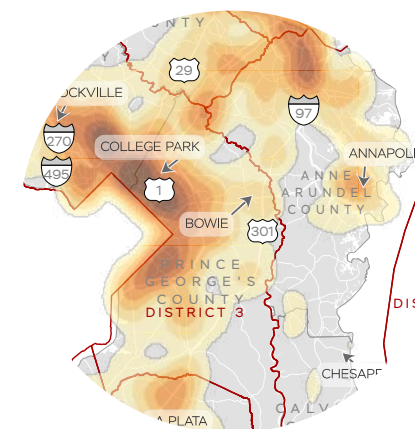
- 3 Areas of Need were **defined** by drawing boundaries around the areas where the data inputs overlapped the most in each MDOT SHA District. Bordering Census Block Groups were used as rough boundaries.

Five Areas of Need were defined within each MDOT SHA District to ensure that all Districts received equal consideration.

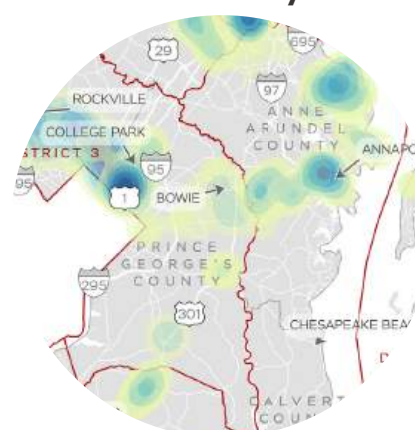
#### a Non-Fatal, Non-Serious Crash Density



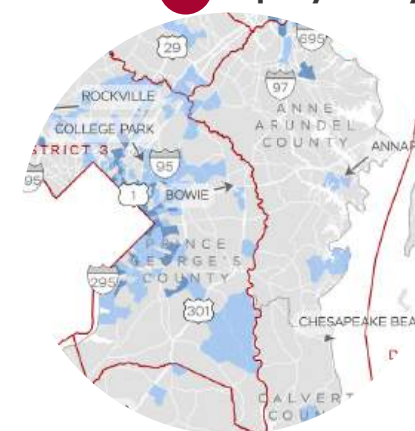
#### b Serious Injury & Fatal Crash Density



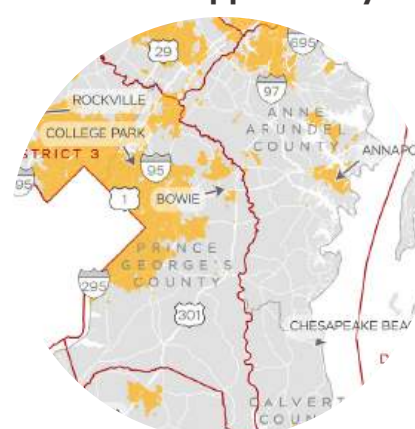
#### c Public Comment Density



#### d Equity Analysis



#### e Short Trip Opportunity Areas

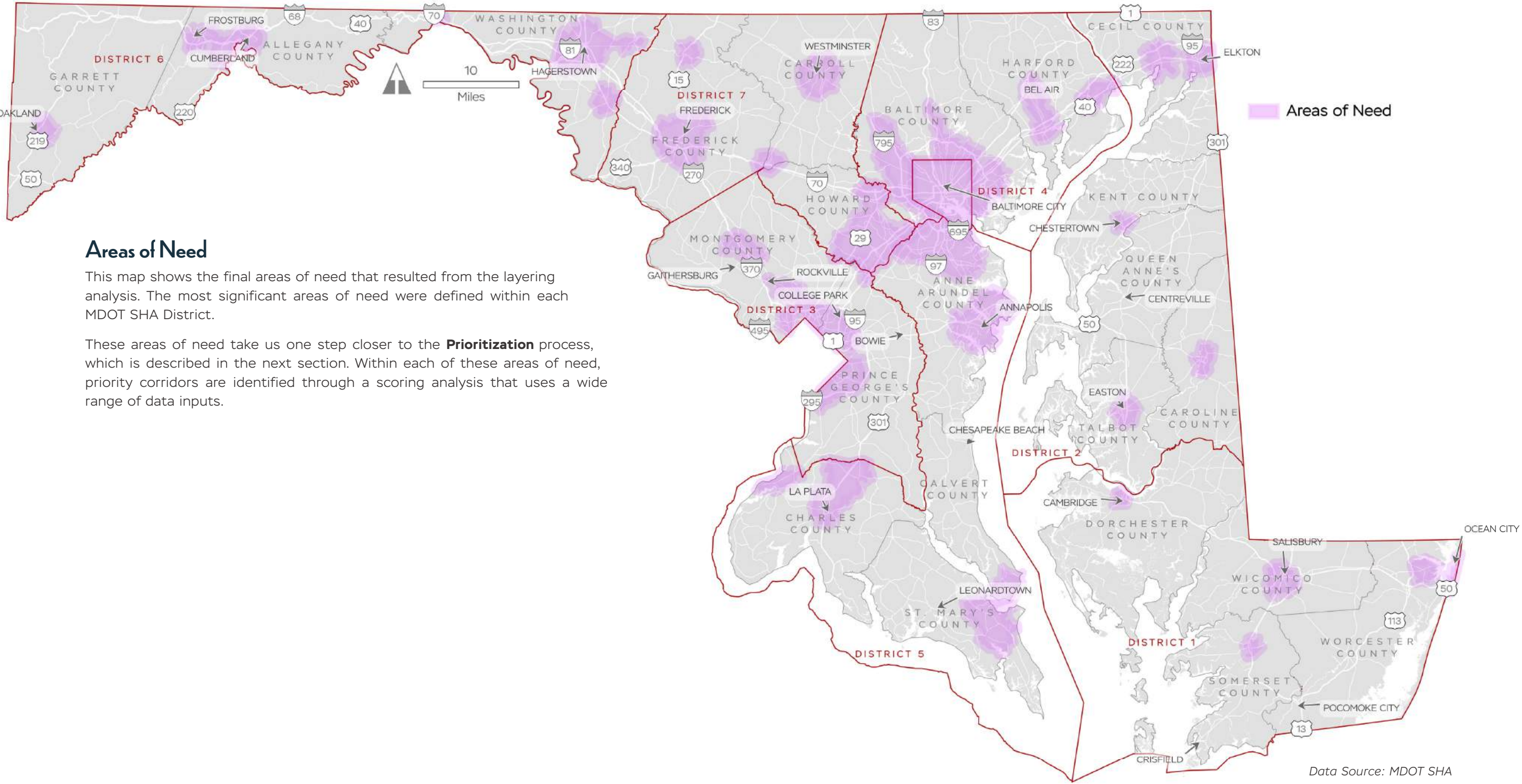


To view each of these maps in full, visit <https://b.link/acfswd>





# Areas of Need RESULTS



## Areas of Need

This map shows the final areas of need that resulted from the layering analysis. The most significant areas of need were defined within each MDOT SHA District.

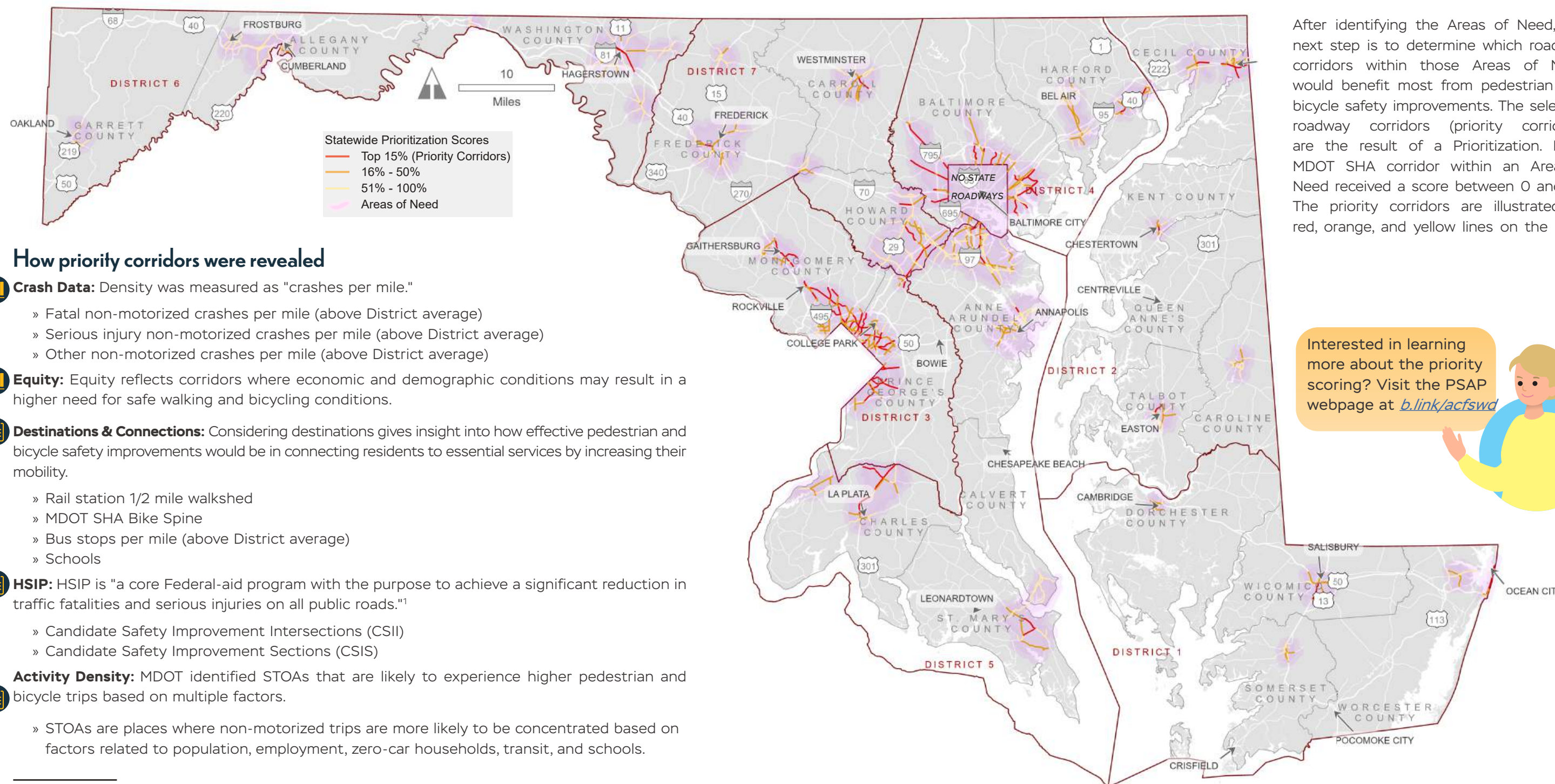
These areas of need take us one step closer to the **Prioritization** process, which is described in the next section. Within each of these areas of need, priority corridors are identified through a scoring analysis that uses a wide range of data inputs.



# 04 corridor PRIORITIZATION

## Which roadways are a priority?

## Prioritization RESULTS



<sup>1</sup> US Department of Transportation, Federal Highway Administration: Highway Safety Improvement Program. <https://safety.fhwa.dot.gov/hsip/>. Accessed on November 18, 2021.

HIGHEST PRIORITY CORRIDORS					
District	County	Location	Roadway	From	To
3	Prince George's	Hyattsville	MD 410 (East-West Highway)	MD 500 (Queens Chapel Road)	MD 212 (Riggs Road)
4	Baltimore	Randallstown	MD 26 (Liberty Road)	Washington Avenue	Owings Mills Boulevard
4	Baltimore	Owings Mills	MD 140 (Reisterstown Road)	Rosewood Lane	MD 140 (Westminster Pike)
5	Anne Arundel	Glen Burnie	MD 2 (Governor Ritchie Highway)	MD 177 (Mountain Road)	MD 648 (Baltimore Annapolis Boulevard)
3	Montgomery	Gaithersburg	MD 124 (Montgomery Village Avenue)	MD 124 (Woodfield Road)	MD 355 (North Frederick Avenue)
3	Prince George's	Hyattsville	MD 193 (University Boulevard)	Campus Drive	MD 212 (Riggs Road)
3	Montgomery	Silver Spring	MD 320 (Piney Branch Road)	MD 193 (University Boulevard East)	Flower Avenue
3	Prince George's	Oxon Hill	MD 414 (St. Barnabas Road)	Pohanka Place	Virginia Lane
3	Montgomery/Prince George's	Silver Spring	MD 650 (New Hampshire Avenue)	I-495 (Capital Beltway)	MD 193 (University Boulevard East)
4	Baltimore	Middle River	MD 150 (Eastern Boulevard)	MD 700 (Martin Boulevard)	MD 702 (Southeast Boulevard)
4	Baltimore	Middle River	MD 700 (Martin Boulevard)	MD 150 (Eastern Boulevard)	US 40 (Pulaski Highway)
3	Prince George's	Bladensburg	MD 201 (Kenilworth Avenue)	52nd Avenue	MD 410 (East-West Highway)
3	Prince George's	Riverdale Park	MD 201 (Kenilworth Avenue)	Good Luck Road	MD 410 (East-West Highway)
3	Montgomery	Gaithersburg	MD 355 (South Frederick Avenue)	MD 124 (Montgomery Village Avenue)	Central Avenue
4	Baltimore	Catonsville	US 40 (Pulaski Highway)	I-695 (Baltimore Beltway)	Nuwood Drive
4	Baltimore	Catonsville	US 40 (Pulaski Highway)	Charing Cross Road	I-695 (Baltimore Beltway)
3	Montgomery	Silver Spring	MD 193 (University Boulevard)	US 29 (Colesville Road)	MD 97 (Georgia Avenue)
3	Prince George's	Hyattsville	MD 500 (Queens Chapel Road)	MD 208 (Hamilton Street)	Eastern Avenue
5	Anne Arundel	Brooklyn Park	MD 2 (Governor Ritchie Highway)	MD 170 (Belle Grove Road)	MD 171 (Church Street)
5	Anne Arundel	Glen Burnie	MD 3 (Crain Highway)	MD 100	I-97 (Glen Burnie Bypass)
5	Anne Arundel	Linthicum Heights	MD 170 (Belle Grove Road)	I-895	MD 648 (Baltimore Annapolis Boulevard)
5	St. Mary's	California	MD 235 (Three Notch Road)	MD 246 (Great Mills Road)	MD 237 (Chancellors Run Road)
7	Howard	Laurel	US 1 (Washington Boulevard)	MD 32 (Patuxent Freeway)	Patuxent River



# 05

## actions & STRATEGIES

### How does pedestrian and bicycle safety improve?

#### The PSAP in Action

MDOT SHA will use the PSAP to improve pedestrian and bicycle safety in Maryland in two ways: by **making physical improvements to MDOT SHA roadways** that make travel safer for all users and by **addressing MDOT SHA policies and strategies** related to pedestrian and bicycle safety. The roadway improvement projects will apply relevant countermeasures from



To view the Context Driven toolkit, click here: <https://b.link/1pip0r>

the Context Driven Toolkit to all applicable corridors, beginning with those identified as high priority in the previous section. In addition to the engineering interventions that will result from the roadway improvement

projects, MDOT is committed to 10 policy actions and strategies to improve safety for pedestrians and bicyclists throughout Maryland:

**COORDINATE**   
with local agencies and jurisdictions

**INVEST**   
in communities

**MEASURE**   
outcomes to evaluate effectiveness of countermeasures

**RESEARCH and MONITOR**   
new and evolving tools, standards, and technologies

**UPDATE and REVIEW**   
data methodologies and tools

**TRAIN**   
MDOT SHA and other staff

**INNOVATE**   
to stay at the forefront of industry best practices and technology

**MAINTAIN**   
infrastructure investments

**REVIEW**   
projects and policies for pedestrian safety

**EDUCATE**   
the public

#### What's Next?

MDOT SHA will be improving roadways and undertaking new strategies but this is not the end of the story. This PSAP is intended to be a living document that will be periodically updated to make sure the most affected areas of need are being addressed in the most innovative and effective manner available. Stay tuned for updates regarding pedestrian and bicyclist safety by visiting the PSAP website or by emailing [SHAContextGuide@mdot.maryland.gov](mailto:SHAContextGuide@mdot.maryland.gov).

# PEDESTRIAN SAFETY ACTION PLAN

