BICYCLE AND PEDESTRIAN SUBCOMMITTEE

June 1, 2026

Agenda

- **Welcome and Introductions**
- Public Comments
- Pedestrian Signal Considerations and Changes
- Crash Reporting and Crash Data Review of 2025
- Project Updates – see attachment
- Other Business/Announcements
- Adjournment

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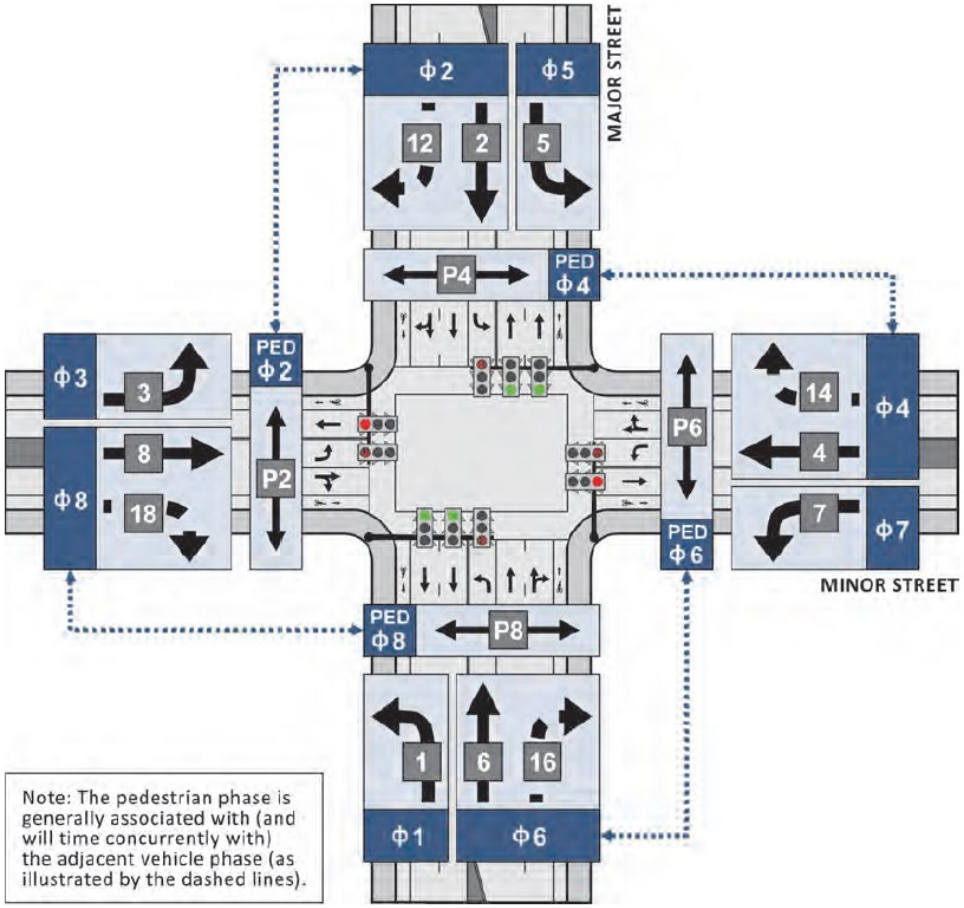
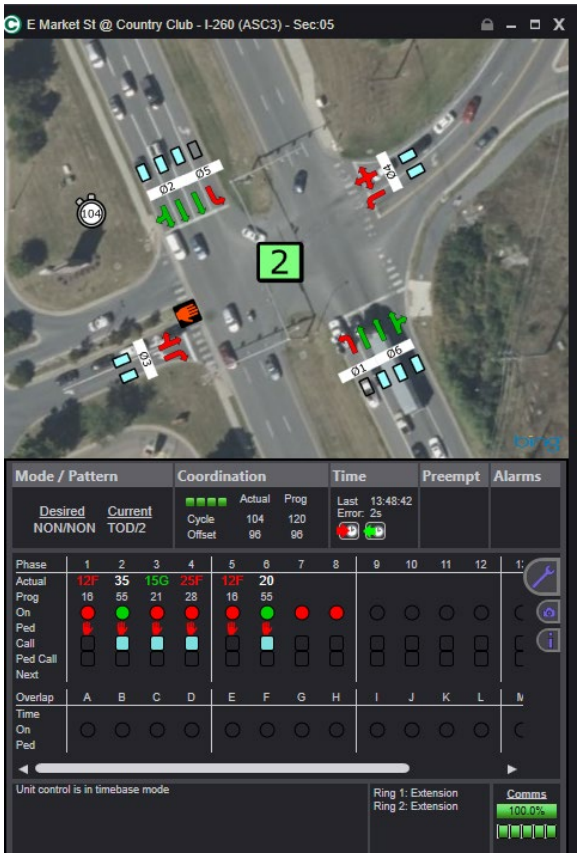
Emergency Vehicle Preemption

- Emergency vehicle preemptions occurs when the vehicle sends an infrared message to a designated receiver on the traffic signal
- When the traffic signal receives the message, it shifts phases to accommodate the passage of the vehicle
- This method is also applicable as a transit system, although city transit is not currently equipped for this feature
- When a pedestrian phase is active on a crosswalk when the message is received, it immediately begins the ped clearance countdown
- Due to upcoming changes regarding emergency vehicle preemption practices in the city, the potential for the preemption to occur during the pedestrian walk phase will increase
- Staff is reviewing existing pedestrian timing at signalized intersections to determine how best to serve all needs, as well as to best accommodate the needs of emergency vehicles

Source: FHWA

Traffic Signal – Signal Timing Process





Source: National Academies of Sciences, Engineering, and Medicine. 2015. Signal Timing Manual - Second Edition. Washington, DC: The National Academies Press. https://doi.org/10.17226/22097.

Traffic Signal – Signal Timing Process

Measures of Effectiveness

- Capacity – total vehicles that can be accommodated at the intersection
- Delay – Average wait time for users of intersection. Pedestrian time and vehicle time are considered separately in most cases. Typically represented on an A-F grading scale.
- Queue – how many vehicles are waiting for a given approach, often measured in linear feet
- Stops – Number of road users that must come stop at the intersection
- Failures – Number of road users that are delayed through multiple cycles at the same intersection

Traffic Signal – Signal Timing Process

Cycle – total amount of time allocated for each approach

- Variable cycle length – adjusts based on detected vehicles if there is a break in the vehicles, the green time allocated to the approach may end early
- Fixed cycle length – the time allocated for each approach may shift depending on vehicle detection, but total cycle length stays consistent. This approach allows for signalized intersections to have fixed times when they turn green, allowing for the "green wave".

Phase – portion of cycle pertaining to a specific allowable movement

- Multiple phases can occur simultaneously, i.e. when the northbound through / right turning movements can often occur with either the northbound left turn phase or with the southbound through / right turning movements.
- Most often, pedestrian phases occur with the concurrent through movement phase

Traffic Signal – Signal Timing Process

What factors are considered for optimization?

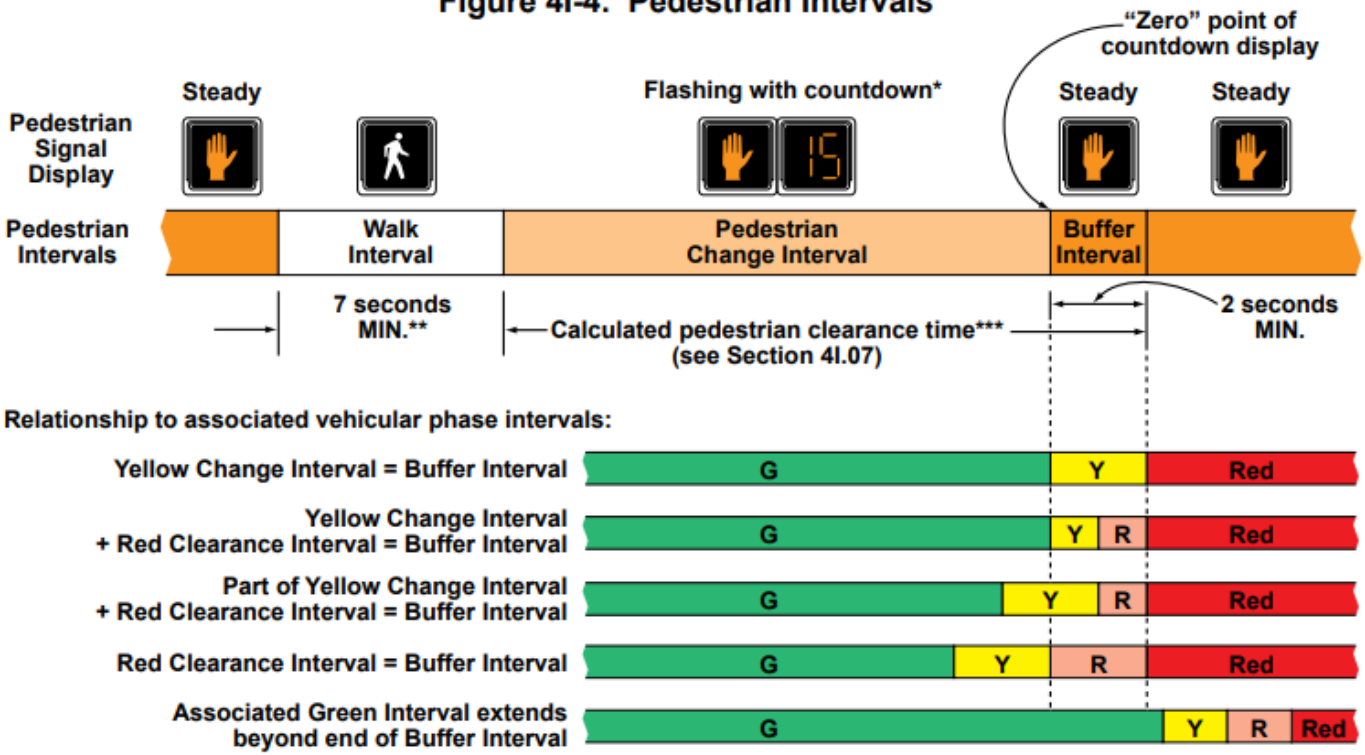
- Coordination – Lessens starting and stopping, lessen delay for main line traffic, allow for pedestrian phase "recall" on main line
- Cycle Length – Longer cycles provide more capacity, but generally increase delay and queueing
- Allocation – Deciding what percentage of green time each phase receives, ensuring mainline traffic flow vs. delay for side streets
- Sequencing – Determining the order in which phases are served, determining where "spare" green time is reallocated

Traffic Signal – Signal Timing Process

Ped Crossing time

- Determined by crossing distance.

Figure 4I-4. Pedestrian Intervals



Source: Manual on Uniform Traffic Control Devices

Pedestrian Delay at Signalized Intersections

Table 1. Ranking of Control Strategies

Control Strategy	Pedestrian Delay Ranking	Vehicle Delay Ranking
Free operation	1	4
Short cycle lengths	2	3
Leading pedestrian intervals	3	5
Actuated coordination	4	2
Coordination	5	1
Barnes dance	6	6

Note: 1 is least amount of delay and 6 is the most, all other things being equal.

Source: ITE Journal May 2018 pg. 38, Sobie, et al

Pedestrian Delay at Signalized Intersections

Free operation – No set cycle length operates based on detection (*used on off-hours at most intersections and at isolated or low volume intersections*)

Short cycle lengths – no official length which constitutes a "short cycle" however the number of unique phases can be evaluated, e. g. the least number of things which must occur independently, the quicker the phase could cycle through (*Downtown, residential roads, etc.*)

Leading pedestrian intervals – allows an amount of time which the concurrent through / right turning movement is held back (5-10 seconds) in which the pedestrian movement is given a head start. (*This method is used at many different intersections, although not for all phases. See Bike-Ped Meeting presentation 12-2024 for details*)

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Actuated coordination – while remaining in a set cycle length, allocated green time has the capacity to shift between phases as needed (most busy intersections)

- The main vehicle phase(s) will end early if it does not detect traffic and give that time back to the minor phase(s)
- The minor vehicle phases share a total amount of allocated green time, so if a one phase does not detect vehicles and another phase does, the remaining time from the first phase will be allocated to the other minor phase(s)

Coordination – the main phase(s) receives all unused green time from the minor phase(s) (most busy corridors use this strategy)

Barnes dance (ped scramble) – there is one pedestrian phase at the intersection during which all vehicle phases are held and all pedestrians use the crossing simultaneously (this is only used on or adjacent to JMU)

Pedestrian Options at Signalized Intersections

On-demand – the pedestrian phase is activated through detection or by push button, the next time a concurrent vehicle phase would have a chance to go, the pedestrian phase is activated. The walk time (5-10s) is activated, followed by the clearance interval (countdown)

Recall – the walk time for a given vehicle phase is always called regardless of whether a button was pushed or a pedestrian was detected, can be assigned for specific times of today or permanent

Rest in Walk – the walk time will remain active for as long as the concurrent vehicle phase is calculated to be active, then the clearance interval occurs

Reservice – When a pedestrian is detected or the button for the crossing is pushed, the signal controller determines if there is sufficient time remaining in the phase to immediately activate the pedestrian phase, otherwise it operates the same as the on-demand

Leading pedestrian interval – when the pedestrian phase is activated, the conflicting vehicles phases will be held for 5-10 seconds

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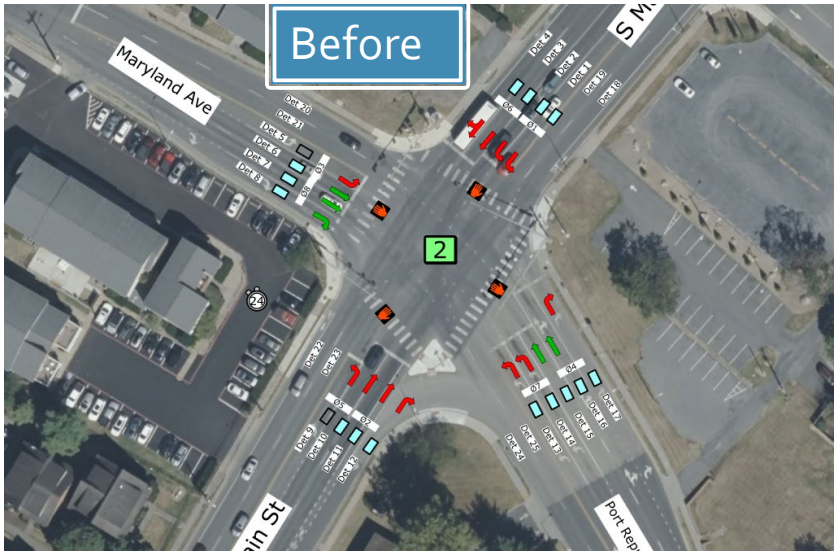
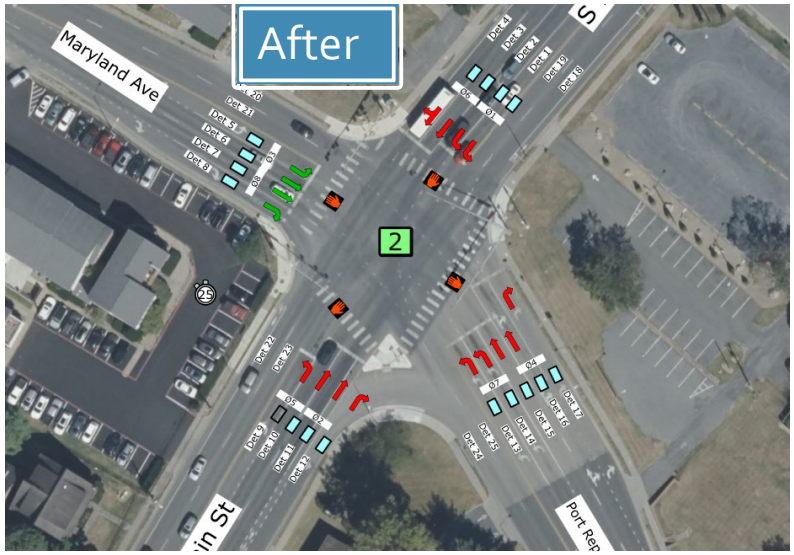
Potential changes with update to emergency vehicle preemption

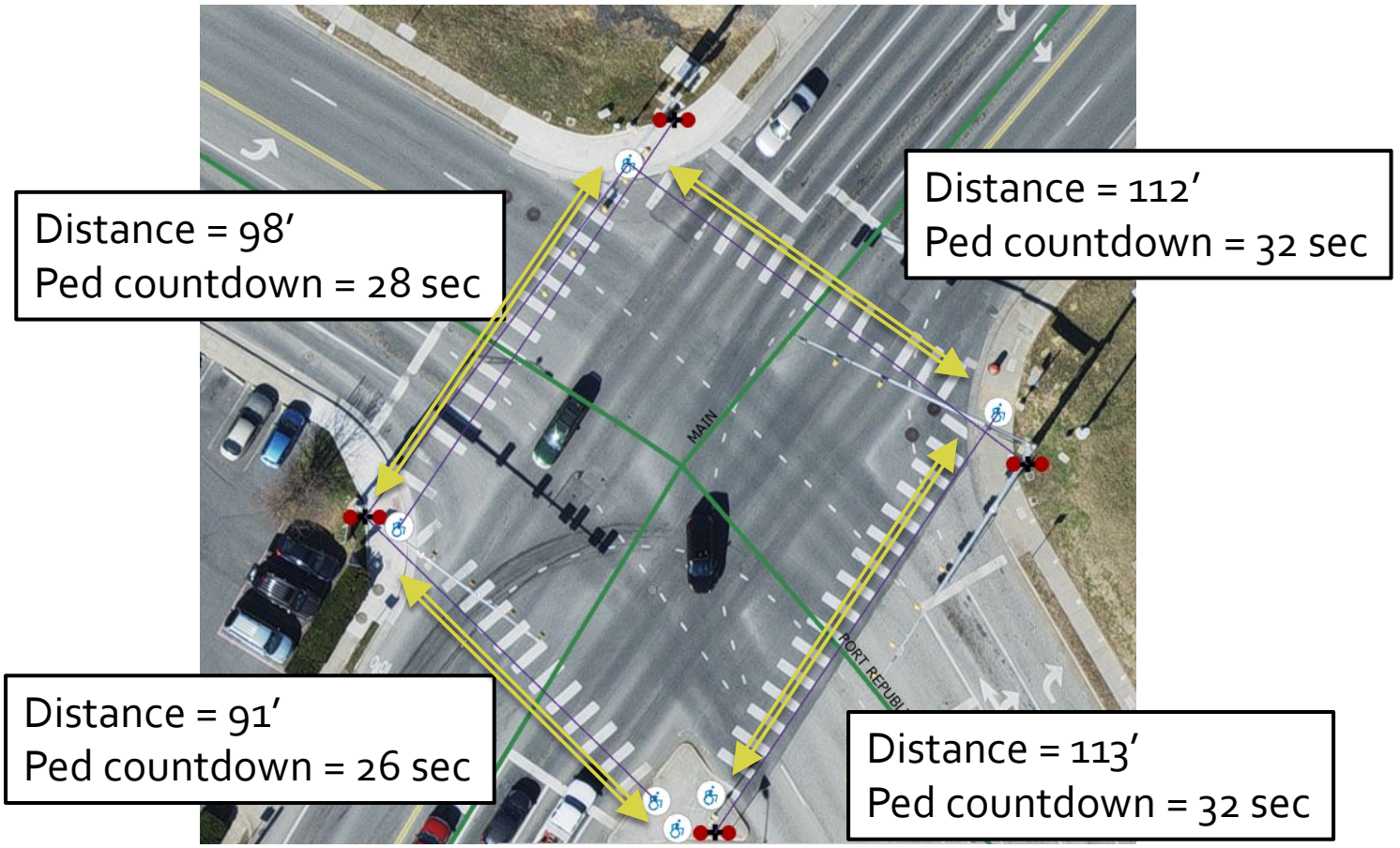
Public Works will implement changes to which phases will be active during preemption

- Currently, the emergency vehicle will call the through movements for the road which they are traveling. The change will set the preemption to stop traffic for all directions except the direction which the call is coming from.
- Because the pedestrian phase cannot be shortened once activated, the pedestrian must be cleared out prior to the vehicle phases to move to end and the signal to match what the emergency vehicle called





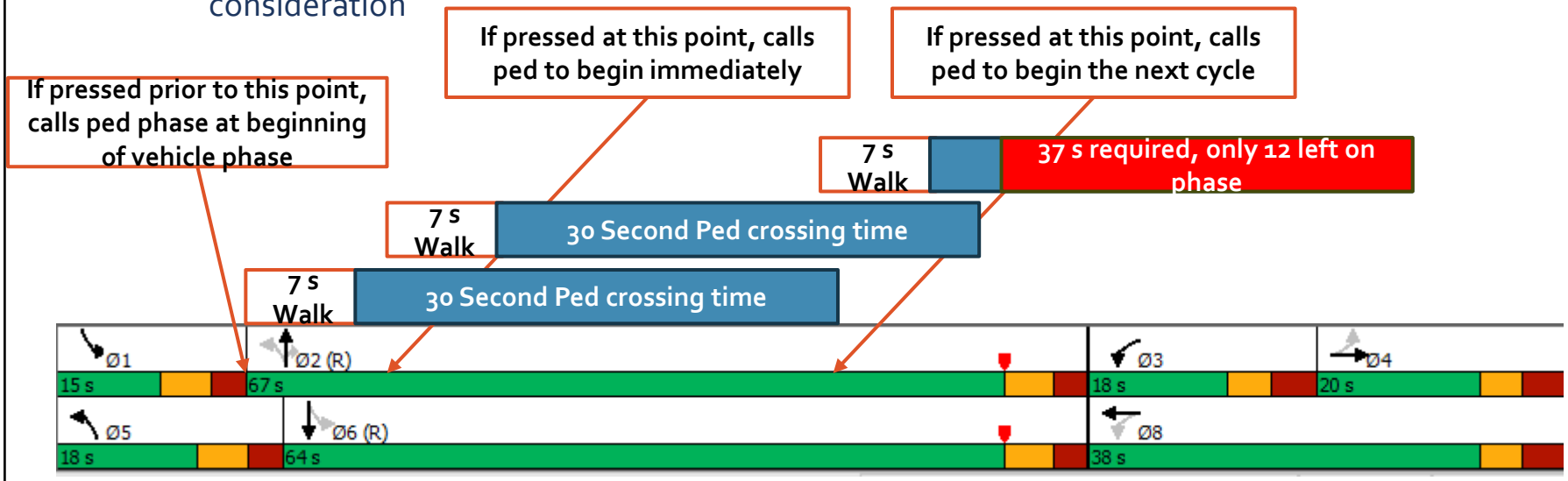
Traffic Signal – Signal Timing Process



Potential changes with update to emergency vehicle preemption

Public Works is evaluating taking some pedestrian phases out of "recall" in order to shorten the transition time between the signal receiving the preemption message and having the appropriate phases activated for the preemption

- The evaluation has included the current amount of pedestrian activity at the signal, average number of preemption calls at the signal, and length of the pedestrian phase which would need to be cleared
- The potential of changing signals from "recall" and "reservice" is also under consideration



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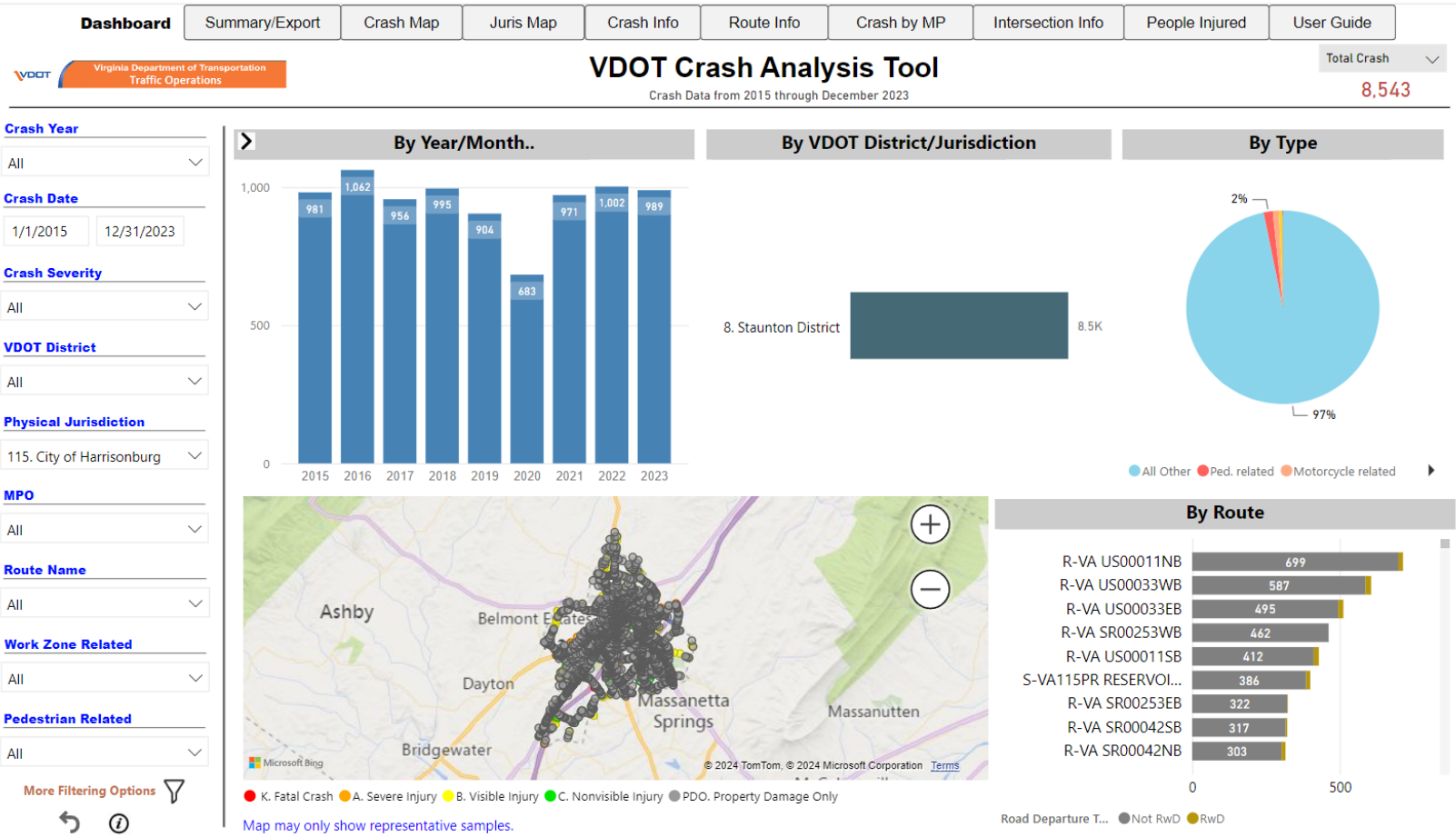
Crash Data

- Harrisonburg Public Works and Police Departments review crash data to inform enforcement and engineering responses to improve safety
- The two primary public data sources are created by VDOT with data from the Virginia DMV
  - Crash Analysis Tool – link
  - Crash Map – link
- These data sources only include "reportable crashes"
- Categorization varies by location/situation
  - E-scooters (and skateboards, etc.) can be bike or ped
  - Person walking bike classified as pedestrian

Crash Analysis Tool



Crash Analysis Tool

Dashboard | Summary/Export | Crash Map | Juris Map | Crash Info | Route Info | Crash by MP | Intersection Info | People Injured | User Guide

When

Crash Year: All

Crash Date: 1/1/2015 – 12/31/2021

Time Slicing: All

Where

VDOT District: All

Physical Jurisdiction: 115. City of Harrisonburg

Functional Class: All

Facility Type: All

System: All

Area Type: All

MPO: All

Ownership: All

Va State Police Division: All

Planning District: All

Mainline/Ramp: All

Intersection Analysis: All

Route Name: All

Intersection Node: All

Start MP - End MP: 0.00 – 510.28

Node Offset (ft): 0 – 74,511

What

Crash Severity: All

Collision Type: All

Document Number: All

Vehicle Number Involved: All

Weather Condition: All

Light Condition: All

Road Departure Type: All

Roadway Alignment: All

Roadway Surface Condition: All

Guardrail: All

Animal (including Deer): All

First Harmful Event of Entire Crash: All

Work Zone Related: All

School Zone: All

Location of first Harmful Event: All

Users

Pedestrian Involved: All

Bicycle Involved: All

Motorcycle Involved: All

Large Vehicle Involved: All

Senior (65+) Driver: All

Young (15-20) Driver: All

Behaviors

Alcohol Related: All

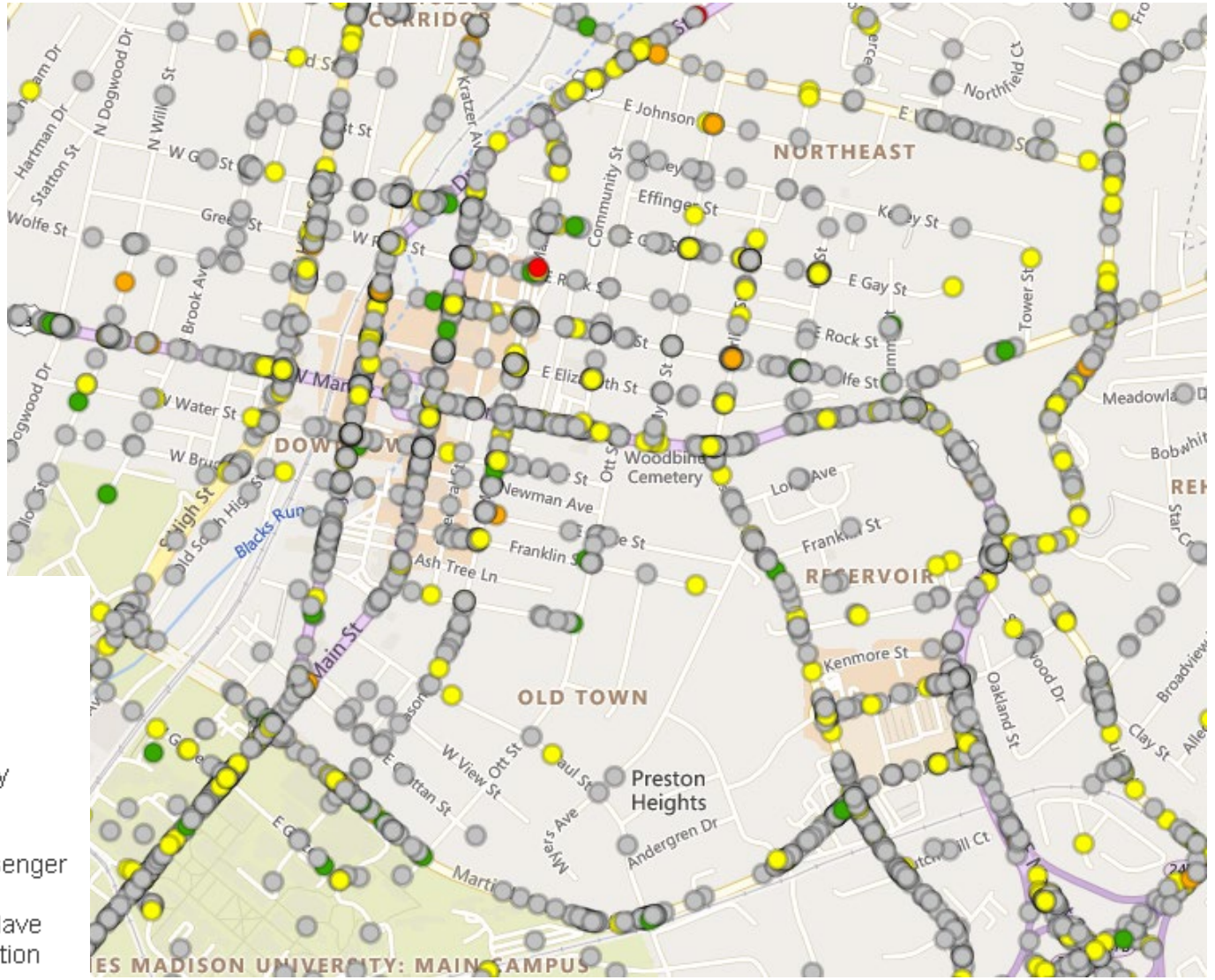
Speed Related: All

Unrestrained Related: All

Distraction Related: All

7,236

VDOT Crash Map Website

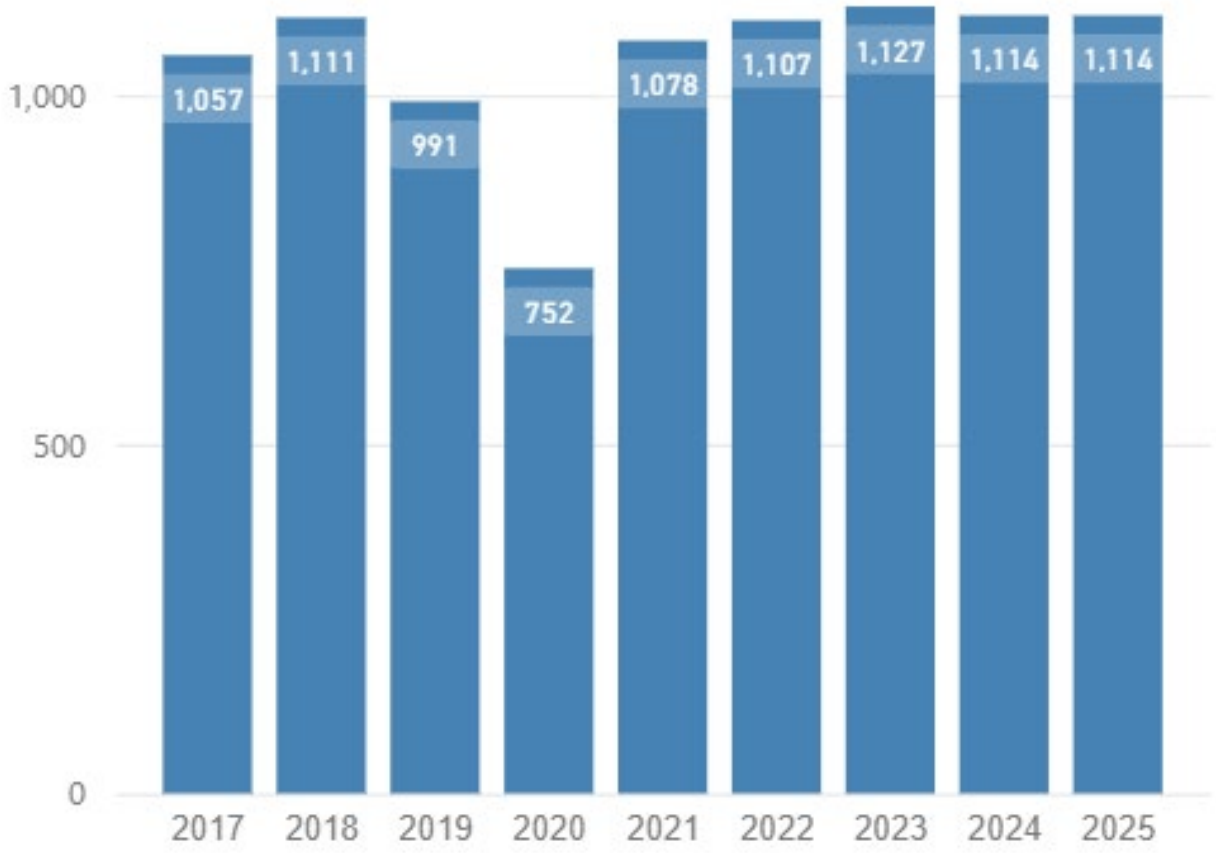


For each crash (example)

When
Date: 3/18/2017
Military Time: 2327

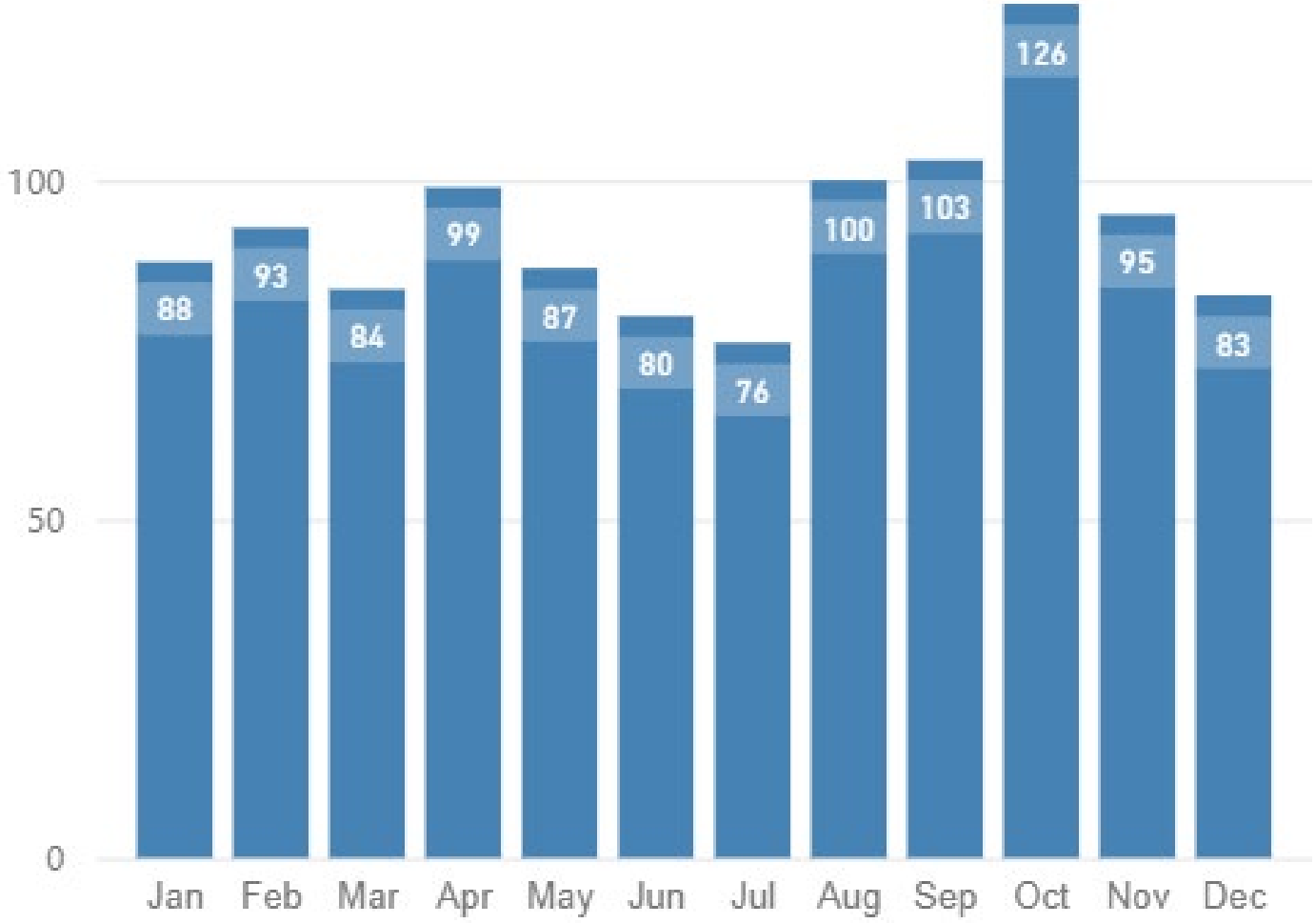
What
Crash Severity: B.Visible Injury
Collision Type:
Vehicle Number: 1;2
Vehicle(s) Body Type: 1. Passenger car;1. Passenger car
Driver(s) Action: 11. Did Not Have Right-of-Way;1. No Improper Action

All Crash Data – Citywide



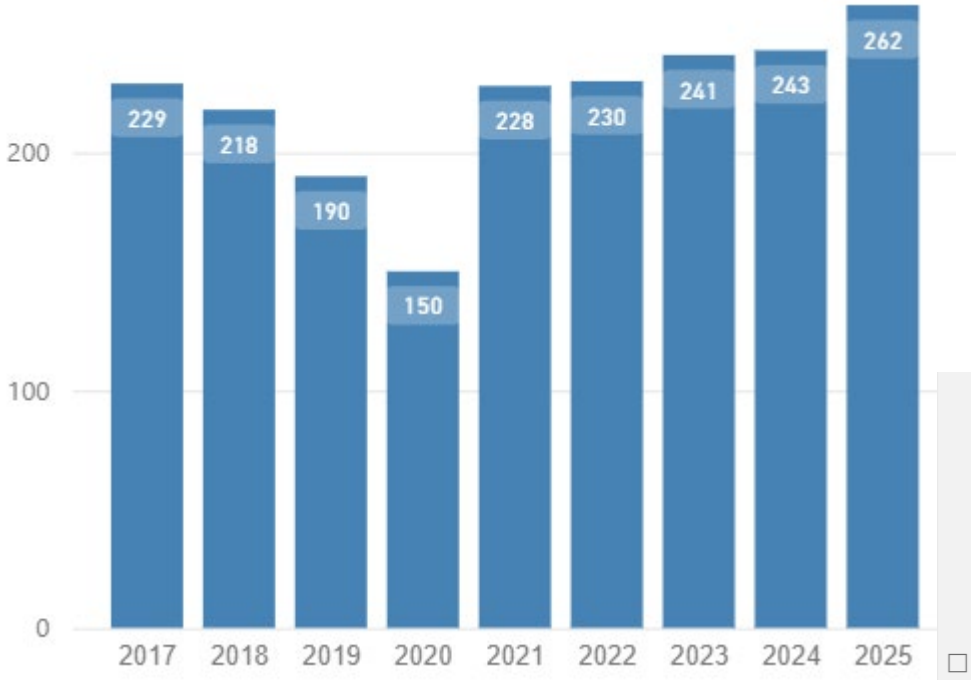
Note: includes crashes on I-81

Crash Data – By Month

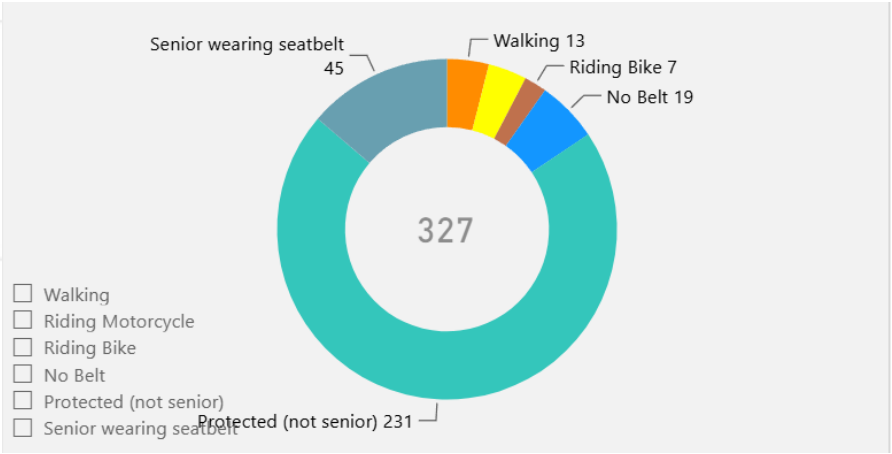


Note: includes crashes on I-81

Crash Data – Injury Crashes



2025 Injured Persons



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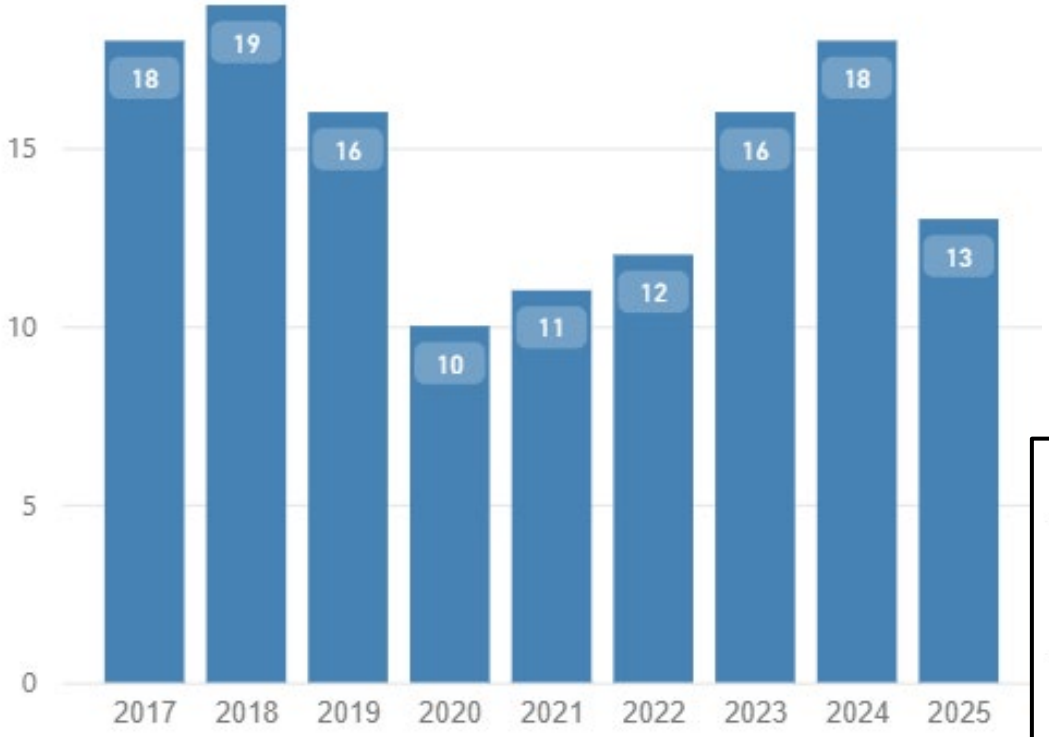
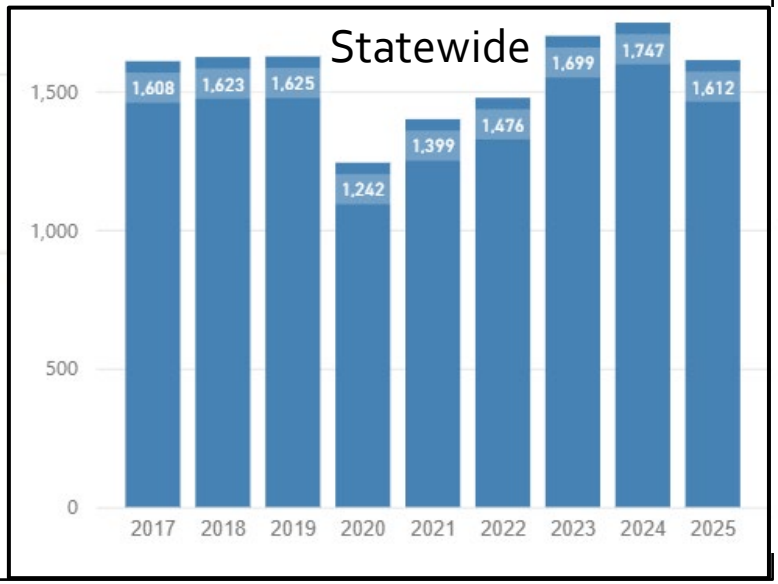
Crash Data – Pedestrian related





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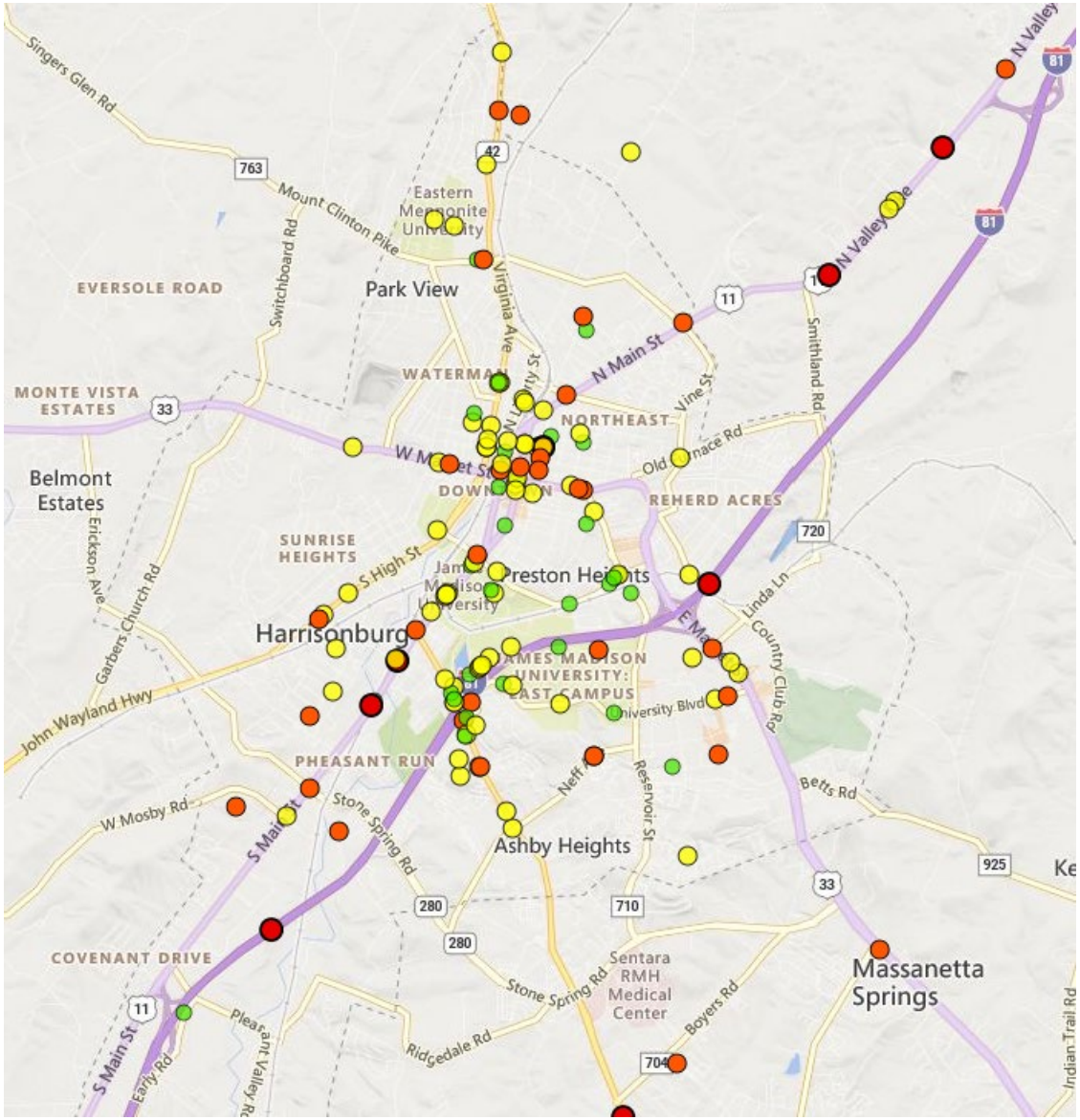
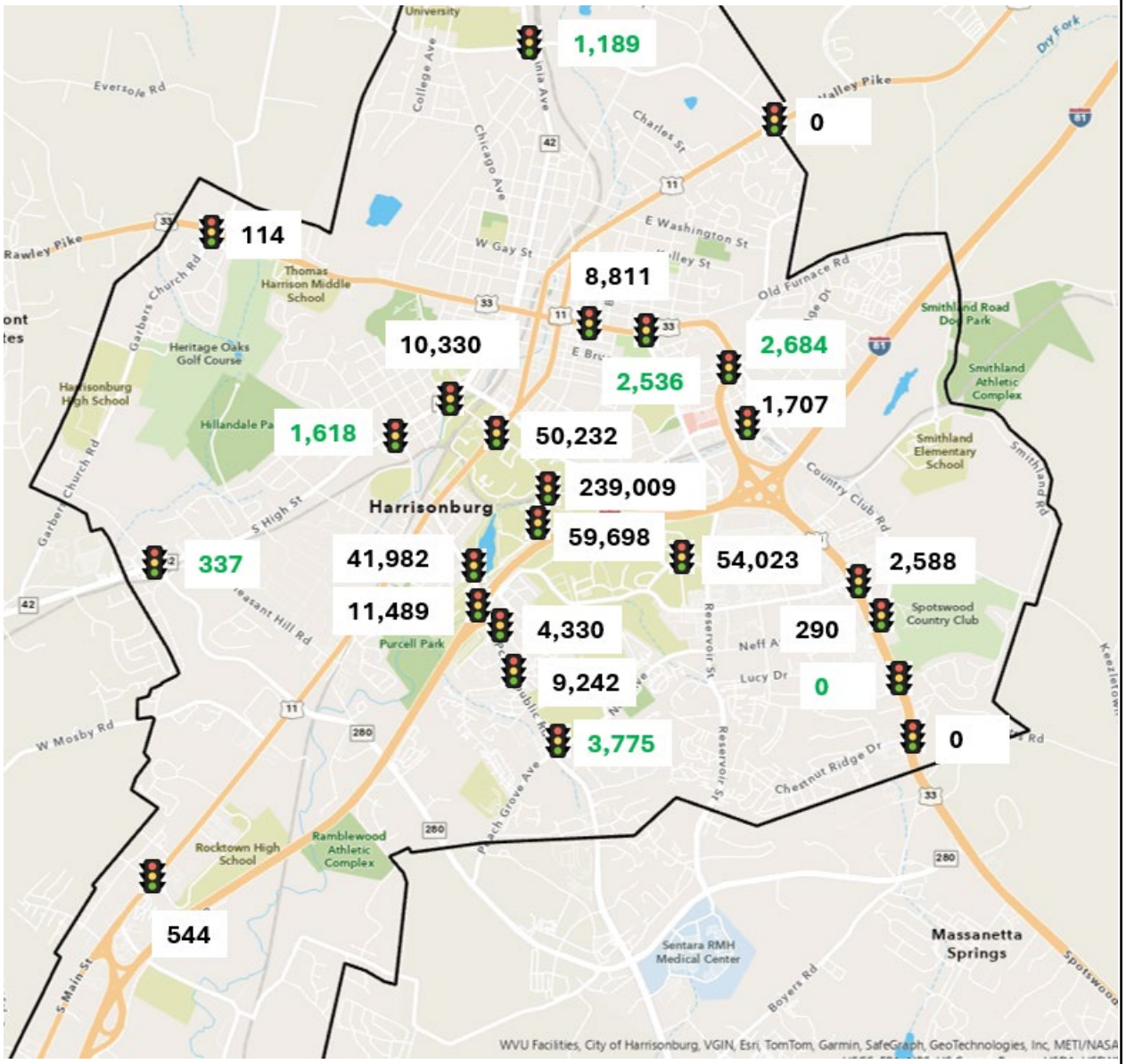
Pedestrian crash map (2017 – February 2026)



Crash Data

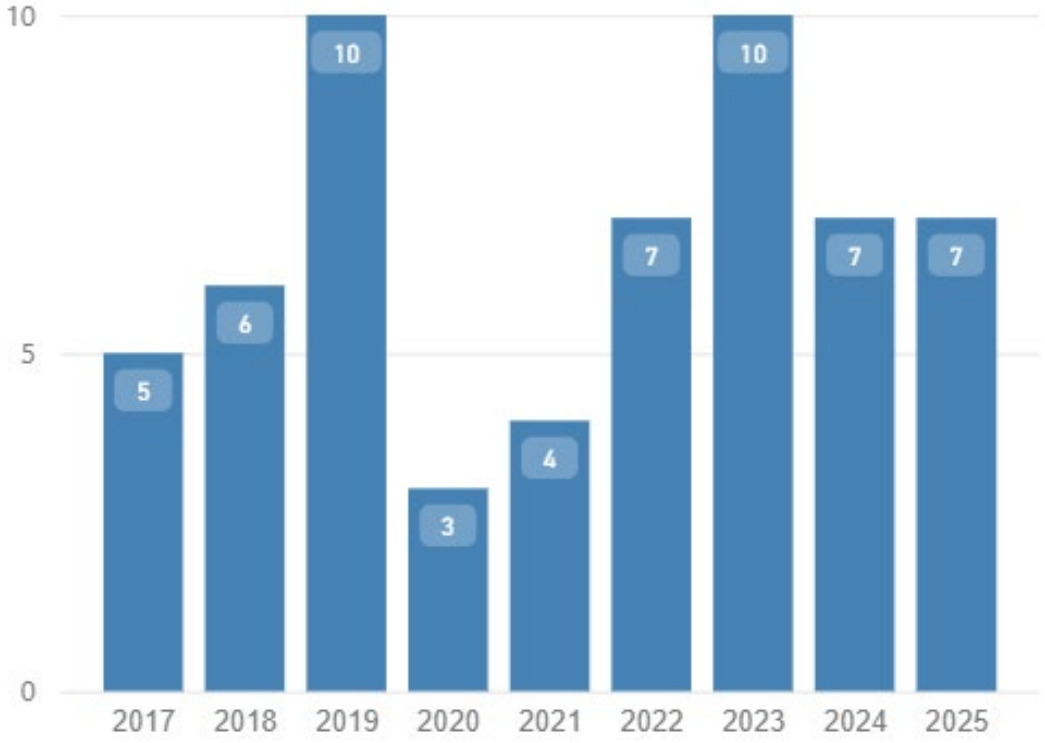
- K. Fatal Injury
- A. Severe Injury
- B. Visible Injury
- C. Nonvisible Injury
- PDO. Property Damage Only

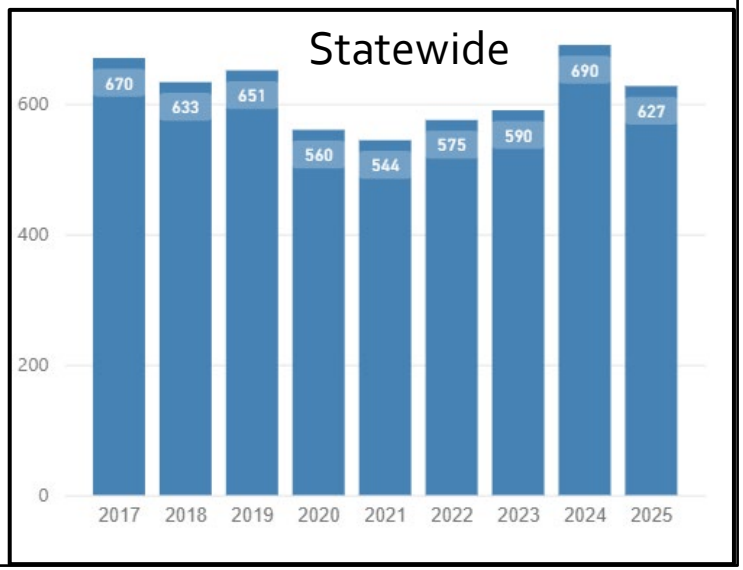
Pedestrian count data (April 2026)



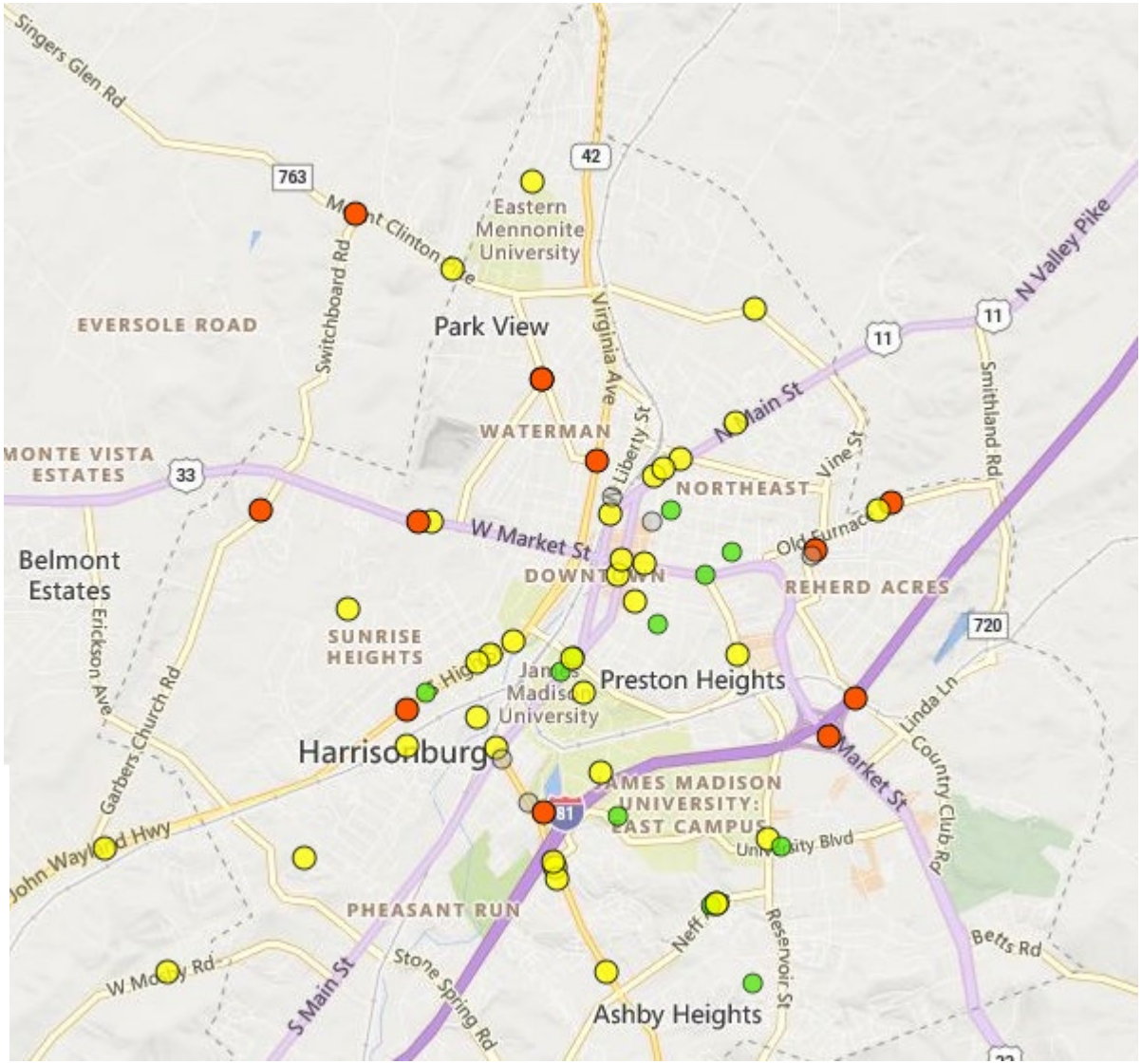
Data collected by Miovision detection cameras, accuracy has not been verified by City staff

Crash Data – Bicycle Related





Bicycle crash map (2017 – February 2026)



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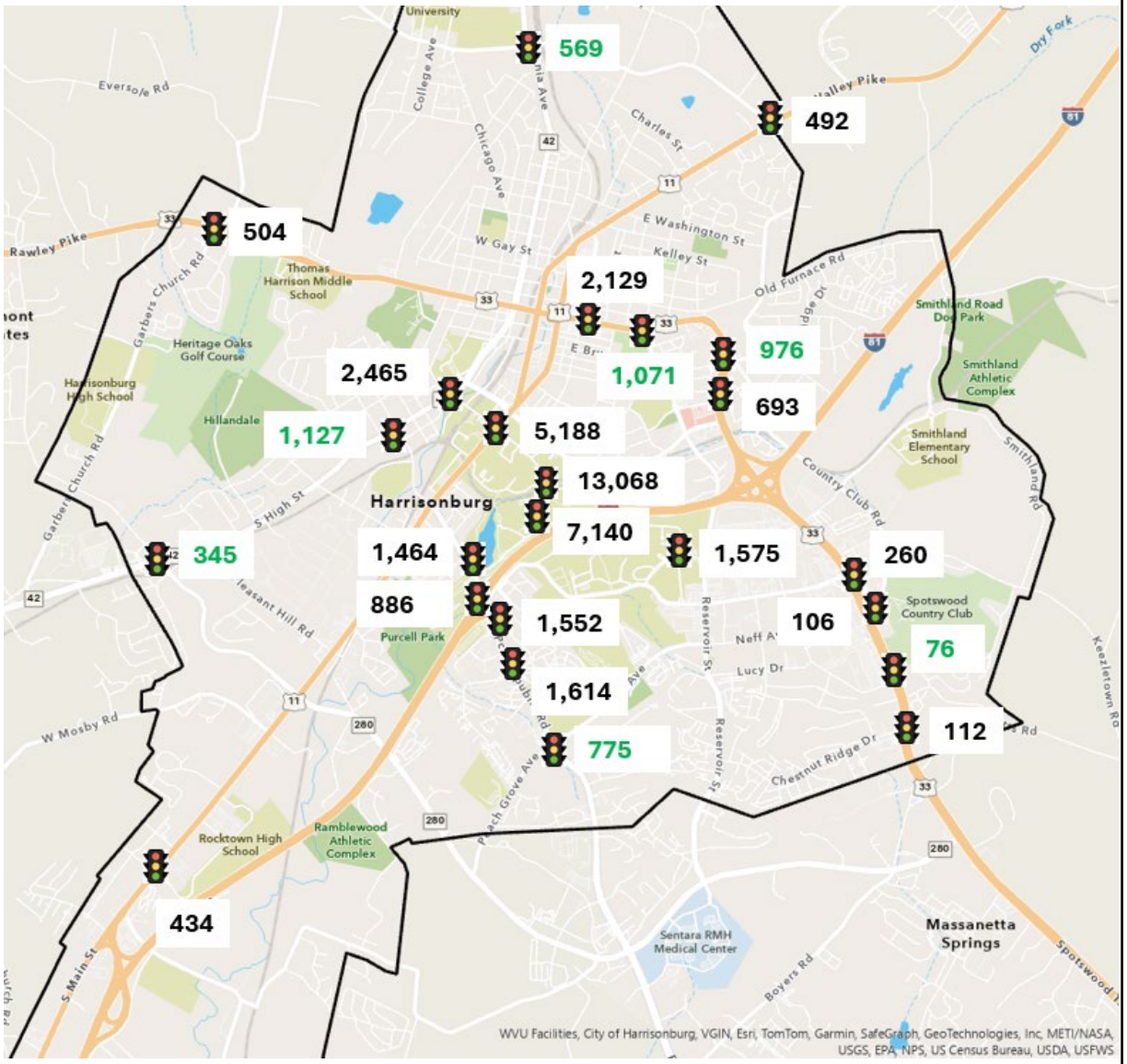

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