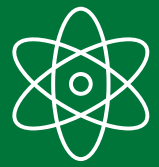
TSMO Survey

MWCOG
SPOTS Subcommittee

12/05/24

Outline

Project Overview



Survey Results

Conclusions & Next Steps

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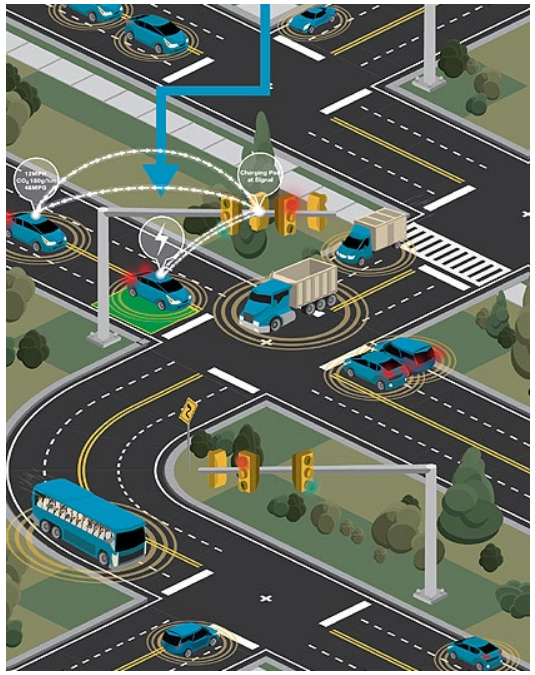
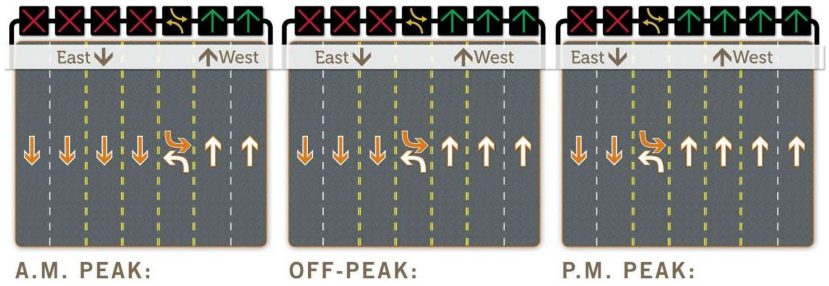
Background

Transportation Systems Management & Operations (TSMO) Technology Inventory

- Technology changes fast
- Expand on previous TPB work
- Update traffic signal information





Source for all Images: FHWA
https://ops.fhwa.dot.gov/publications/fhwahop17025/index.htm
https://www.its.dot.gov/infographs/Eco_traffic_signal_timing.htm

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Project Approach

- Determined a manageable and useful set of TSMO items and technologies to quantify at an agency level
  - Defined major service areas (categories) as the focus of the survey:
    - Active Traffic and Demand Management
    - Traffic Management Centers
    - Traffic Signal Operations
    - Integrated Corridor Management
    - Traveler Information
    - Work Zone Operations
    - Emergency Transportation Operations
    - Connected and Automated Vehicle Deployment
  - Existing technologies versus planned technologies
  - Emerging technologies that are not listed
  - Communication networks
  - GIS datasets on geolocation of assets

TSMO Survey

Word Doc Version

Active Traffic and Demand Management:

Strategy	Type of Control	Implementation Status		Available on GIS	Location
		Existing (Count)	Planned (Count)		
Ramp Metering	Pre-timed				
	Actuated				
	Adaptive				

Strategy	Type of Control	Link for more info + Additional comments
Ramp Metering	Pre-timed	
	Actuated	
	Adaptive	

Strategy	Communication	Implementation Status		Available on GIS	Location
		Existing (Locations)	Planned (Locations)		
Ramp Metering	Fiber Optic Cables				
	Radio				
	Cellular				
	Twisted Pair Cable				

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TSMO Survey

Online Version

TSMO Inventory Survey - Active Traffic and Demand Management

kamar.amine@meadhunt.com Switch account

Not shared

* Indicates required question

Active Traffic & Demand Management - Ramp Metering

Does your agency operate **Ramp Metering**? *

- ◯ Yes
- ◯ No

Active Traffic & Demand Management - Ramp Metering Signals

Does your agency own/manage **Pre-timed Ramp Metering Signals**? *

- ◯ Yes
- ◯ No

Pre-timed Ramp Metering

Ramp Metering - Type of Control: **Pre-timed** - Existing Signals: *

Enter Count:

Your answer

Ramp Metering - Type of Control: **Pre-timed** - Planned Signals: *

Enter Count: (Note: Planned means implementation is within 2 years in the future)

Your answer

Ramp Metering - Type of Control: **Pre-timed** - Available on GIS? *

- ◯ Yes
- ◯ No

Insert Link for additional information on the above (if applicable)

Your answer

Additional Comments on the above

Your answer

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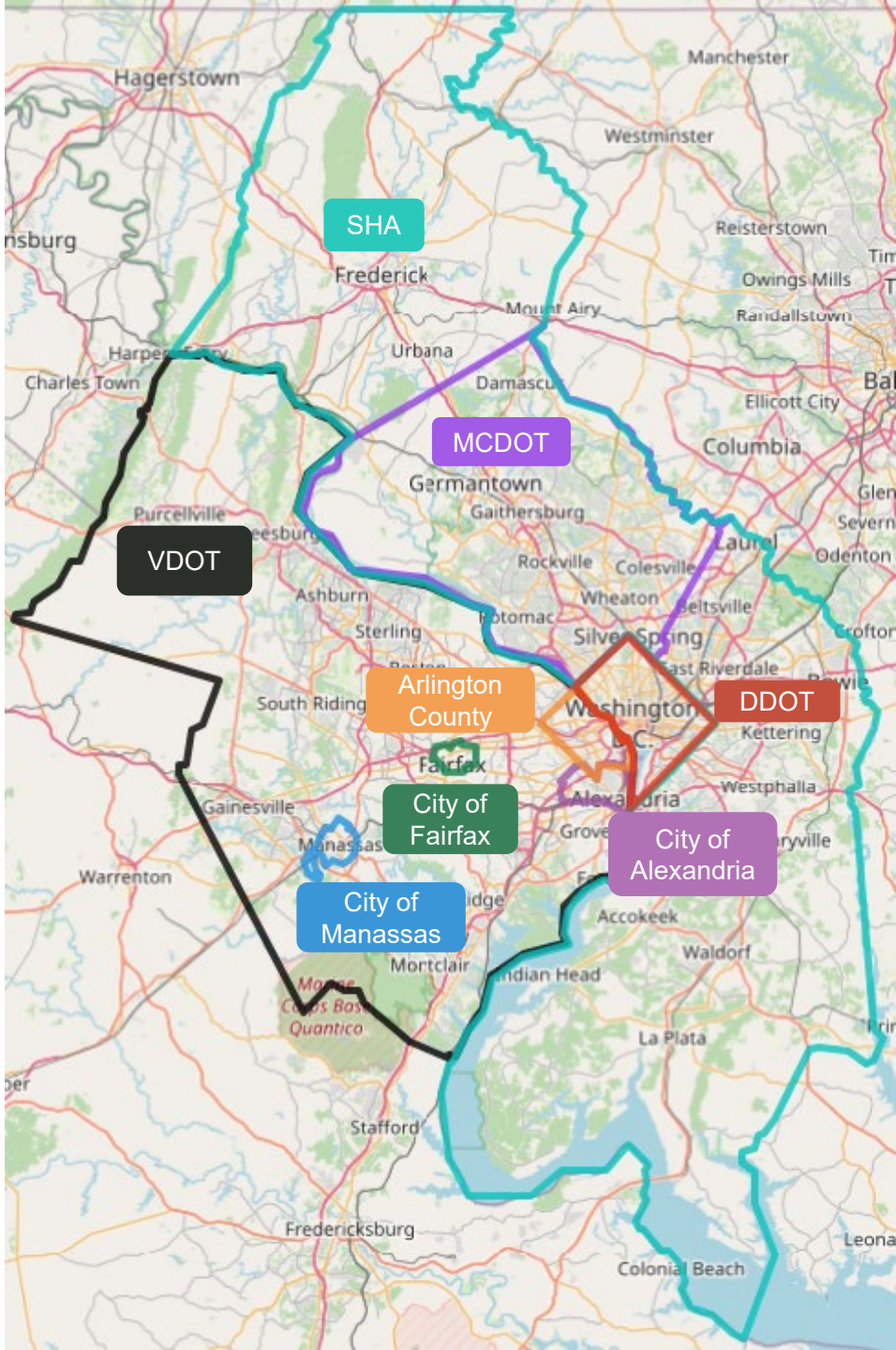
Participating Agencies

	Agency
State DOT	Maryland Department of Transportation State Highway Administration (SHA) Virginia Department of Transportation (VDOT)
County & Local Government	Arlington County City of Alexandria City of Fairfax City of Gaithersburg City of Manassas Montgomery County Department of Transportation (MCDOT) The District Department of Transportation (DDOT)



TSMO Survey Results:

Active Traffic & Demand Management

Active Traffic & Demand Management

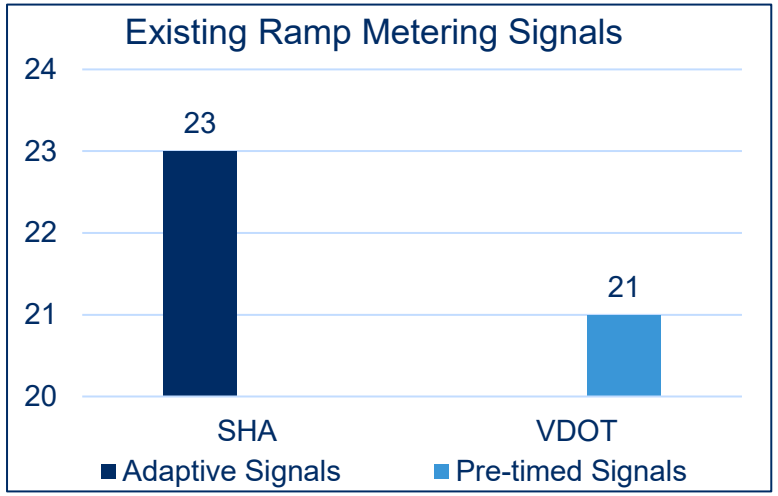
Strategies

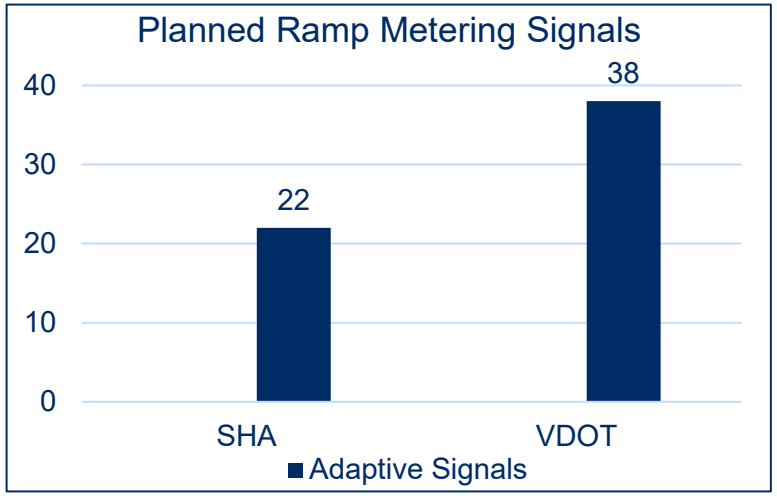
- Ramp Metering
- Managed Lanes
- Dynamic Lane Use Control
- Dynamic Junction Control
- Dynamic Speed Limit
- Variably Priced Parking Meters
- Dynamic Message Signs with Number of Available Parking Spots
- Weigh-in-motion Sensors
- Truck Restrictions
- Continuous Count Stations

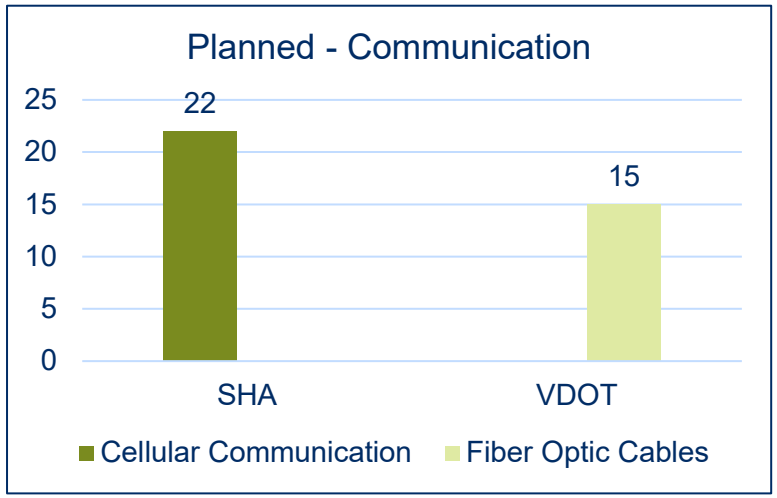
Agencies

- SHA
- VDOT
- MCDOT
- DDOT
- City of Alexandria
- City of Fairfax
- City of Manassas

Active Traffic & Demand Management – Ramp Metering







Ramp Metering Detectors:

- **SHA:**
  - 23 Locations with Existing Video Detectors, 23 Locations Existing Radar Detectors
  - 22 Locations Planned Video Detectors, 22 Locations Planned Radar Detectors

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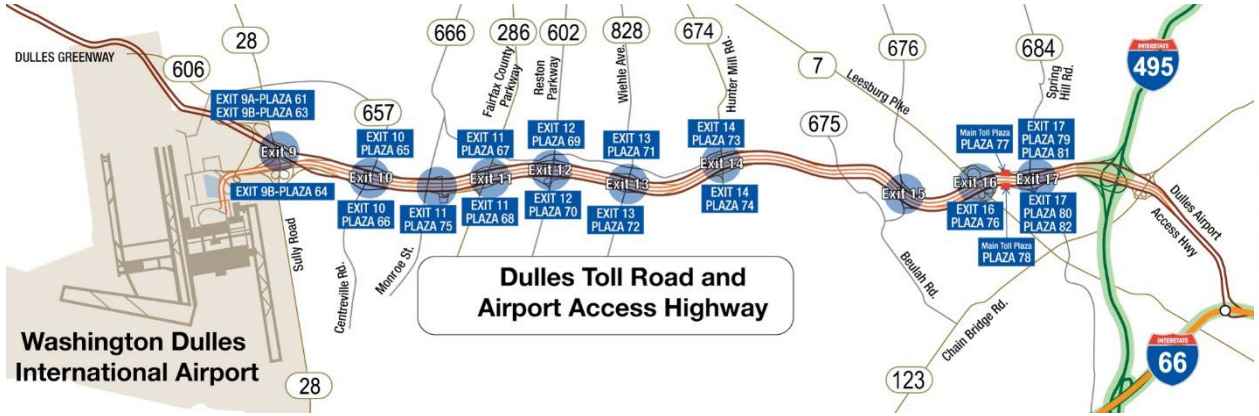
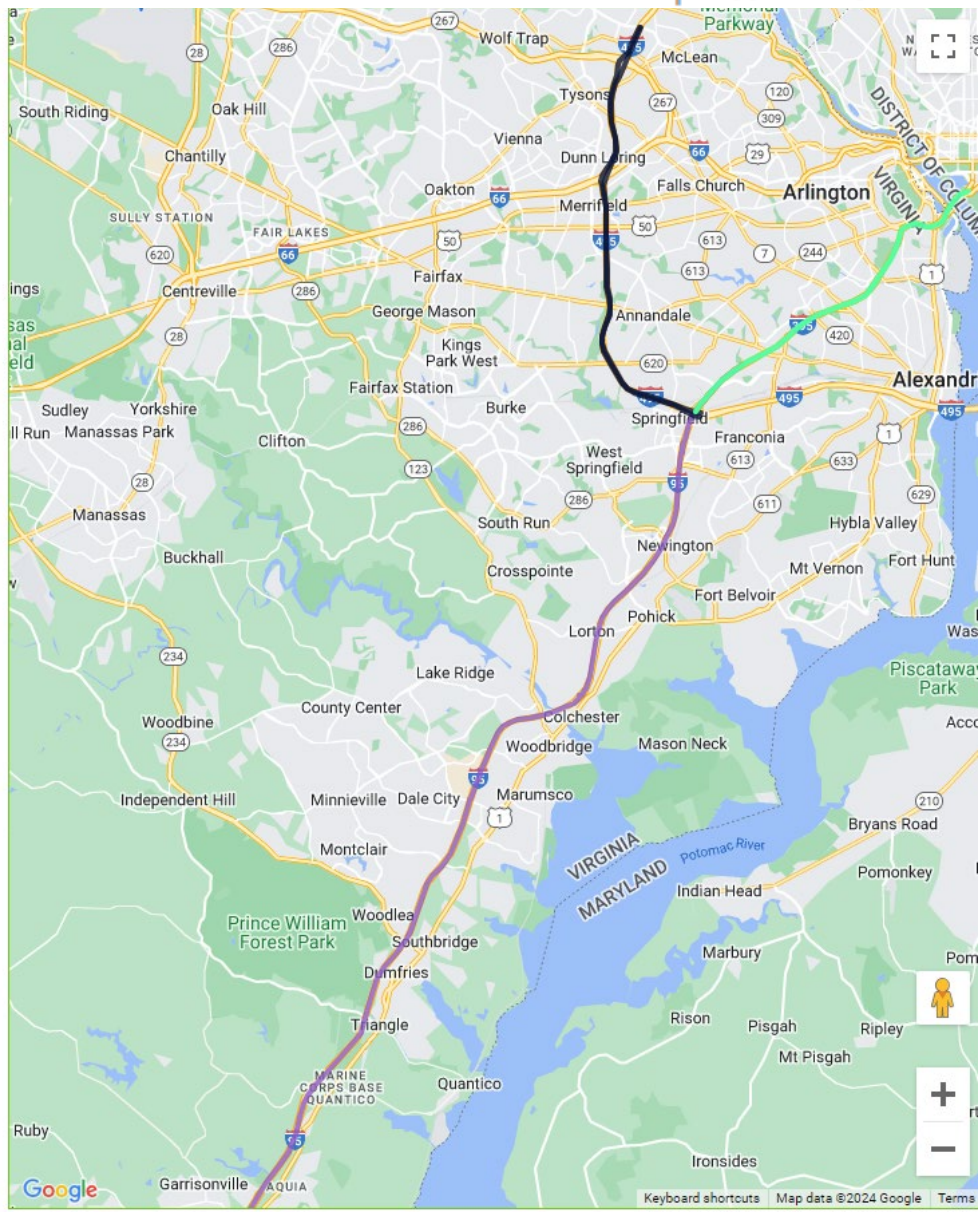
Active Traffic & Demand Management – Managed Lanes

VDOT:



Fixed Toll: 2 Lanes, 30 miles

Variable Toll



5 HOT Lanes at 137.5 miles in total

Map Source: VDOT, TSMO Inventory Survey

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Active Traffic & Demand Management – Dynamic Lane Use Control

VDOT:

- 58 miles
- 95 and 395 express lanes are reversible lanes

SHA:

- 2.75 miles

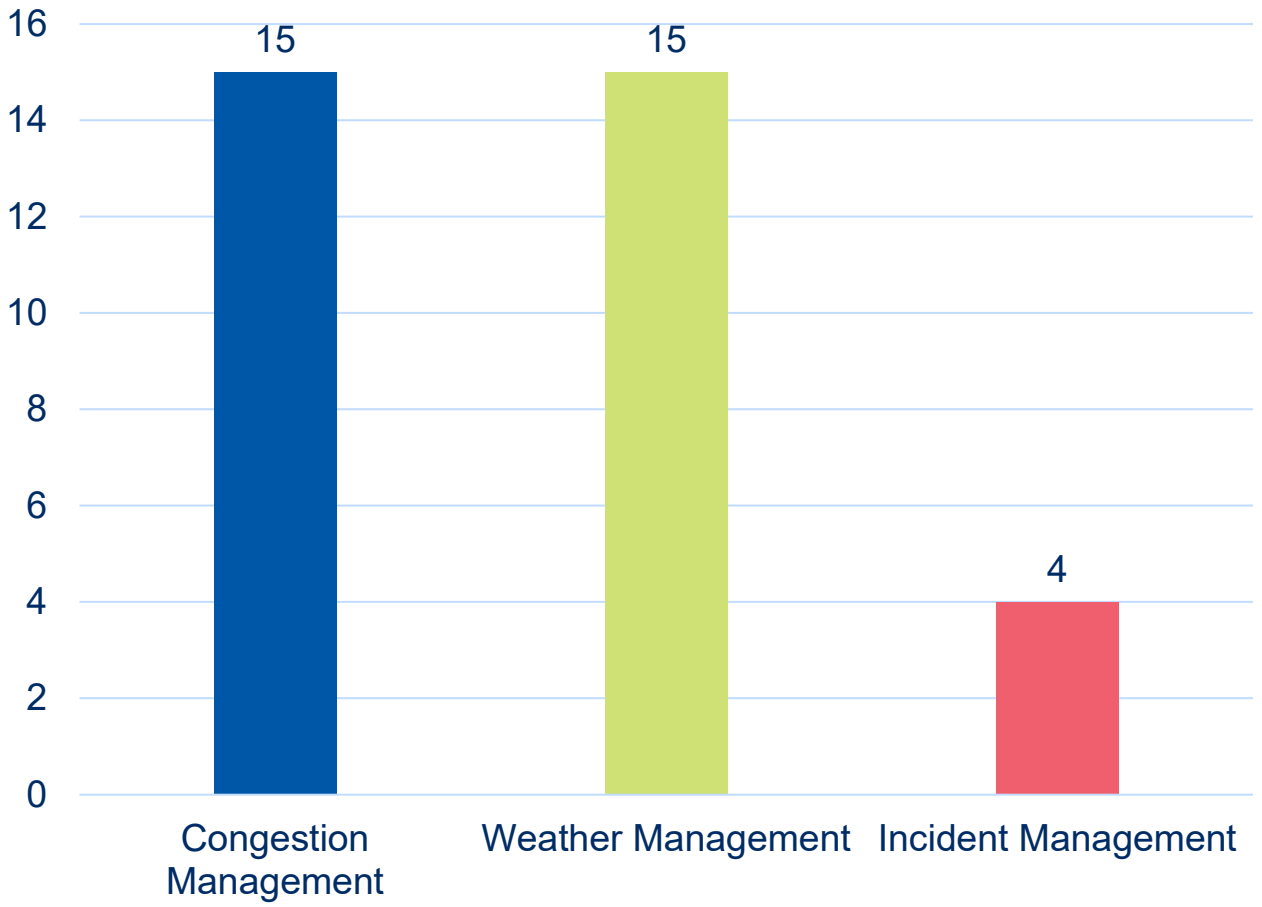
MCDOT:

- 7 miles

Active Traffic & Demand Management – Dynamic Speed Limit

VDOT

Number of Locations with Dynamic Speed Limit per Purpose



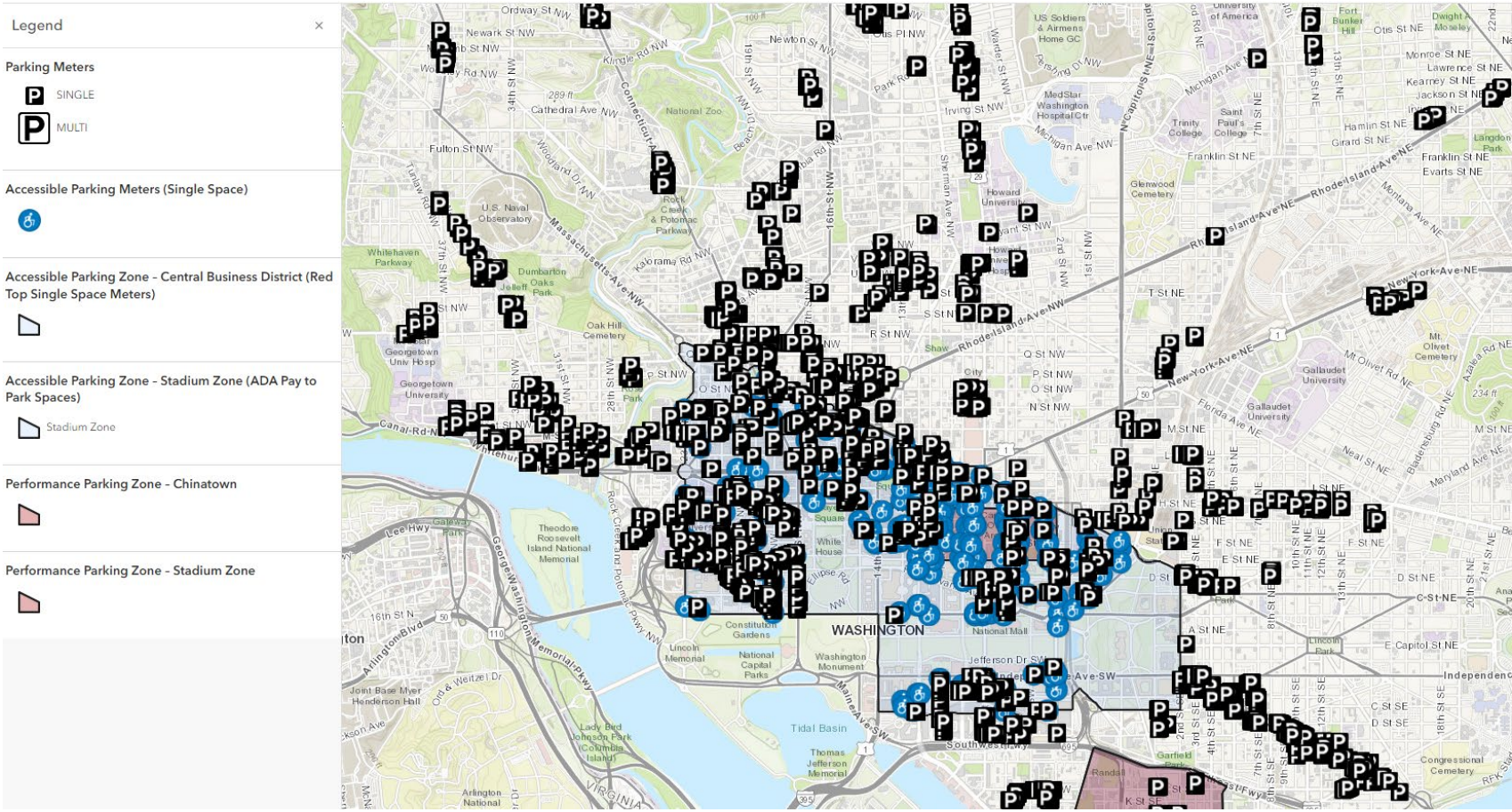
48 locations with Automated Dynamic Speed Limit Signs

Active Traffic & Demand Management – Active Parking Management

Variably Priced Parking Meters:

DDOT

- 210 Existing Parking Meters
- Planning to add 103 more parking meters



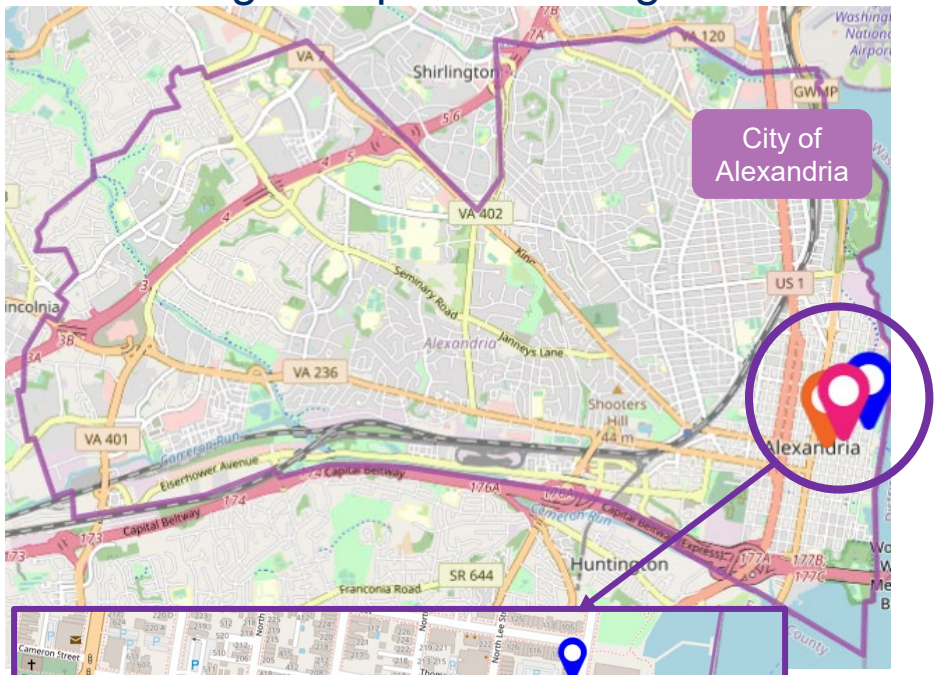
Map Source: DDOT, TSMO Inventory Survey

Active Traffic & Demand Management – Active Parking Management

Dynamic Message Signs with Number of Available Parking Spots:

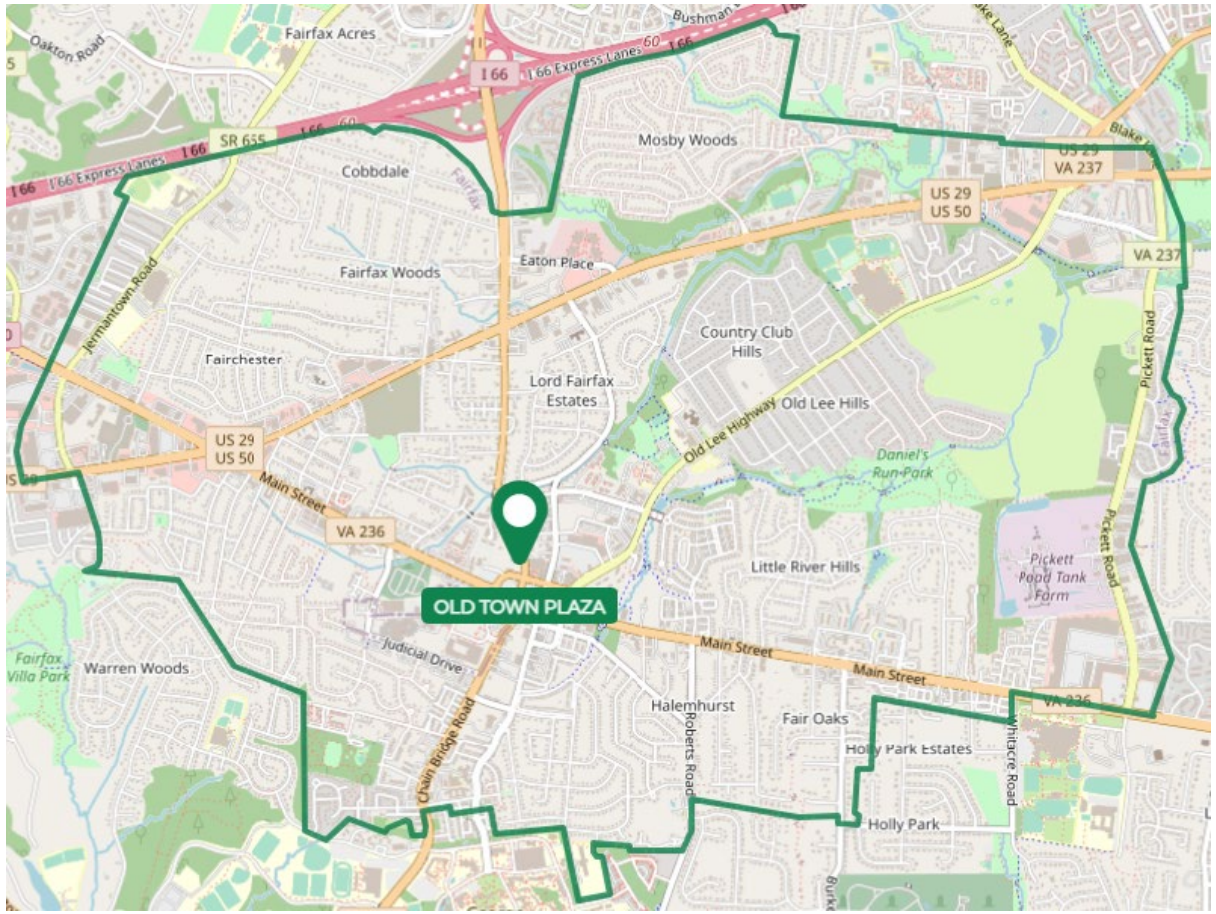
City of Alexandria:

- Planning to implement 3 signs



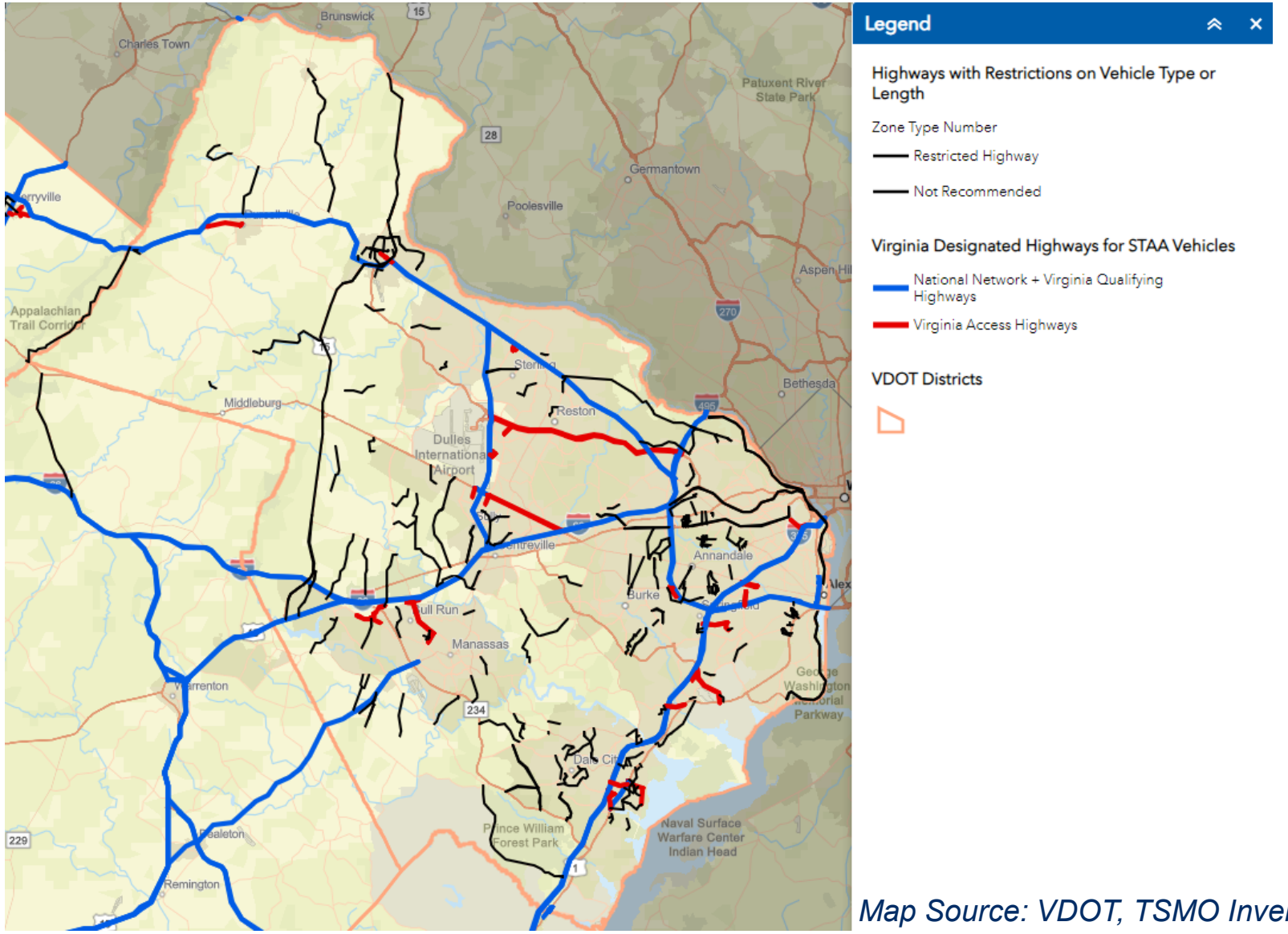
City of Fairfax:

- 1 existing garage with sensors and remote signage



Active Traffic & Demand Management – Truck Restrictions

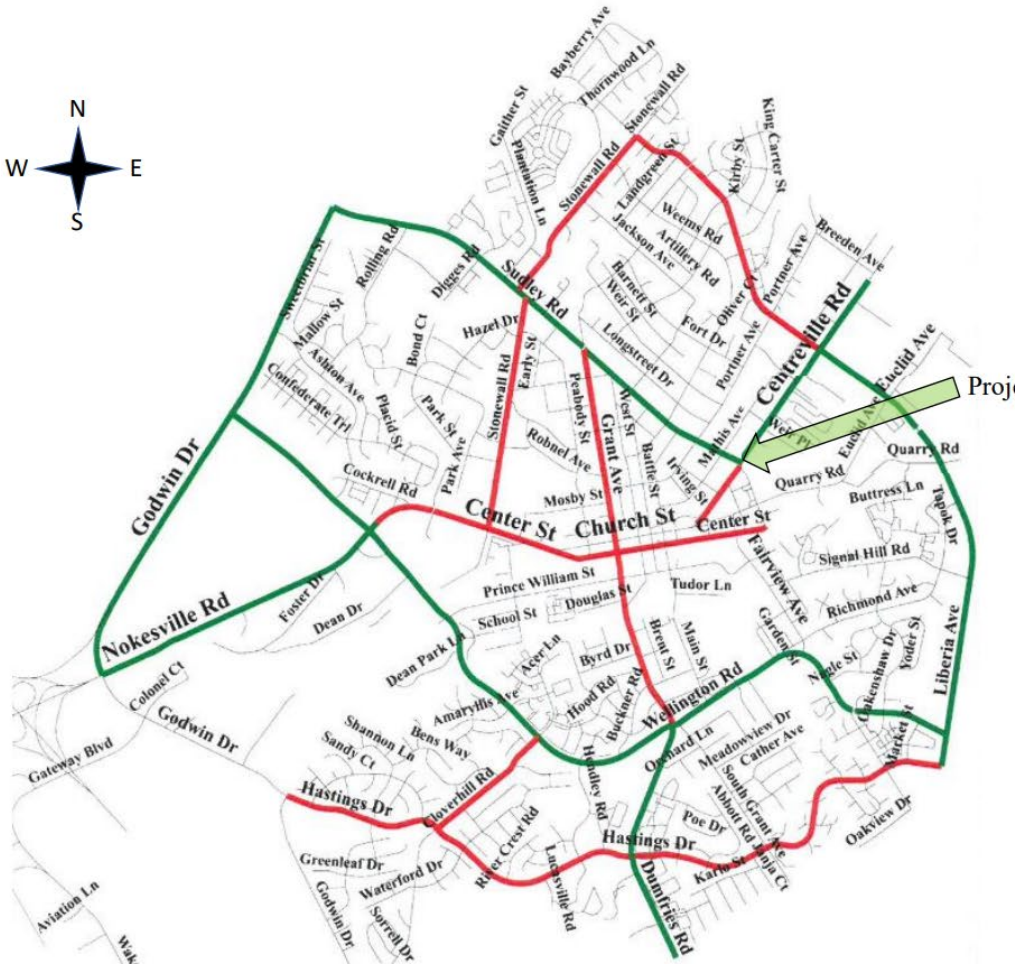
VDOT



Map Source: VDOT, TSMO Inventory Survey

Active Traffic & Demand Management – Truck Restrictions

City of Manassas



CITY OF MANASSAS

TRUCK ROUTE/RESTRICTIONS

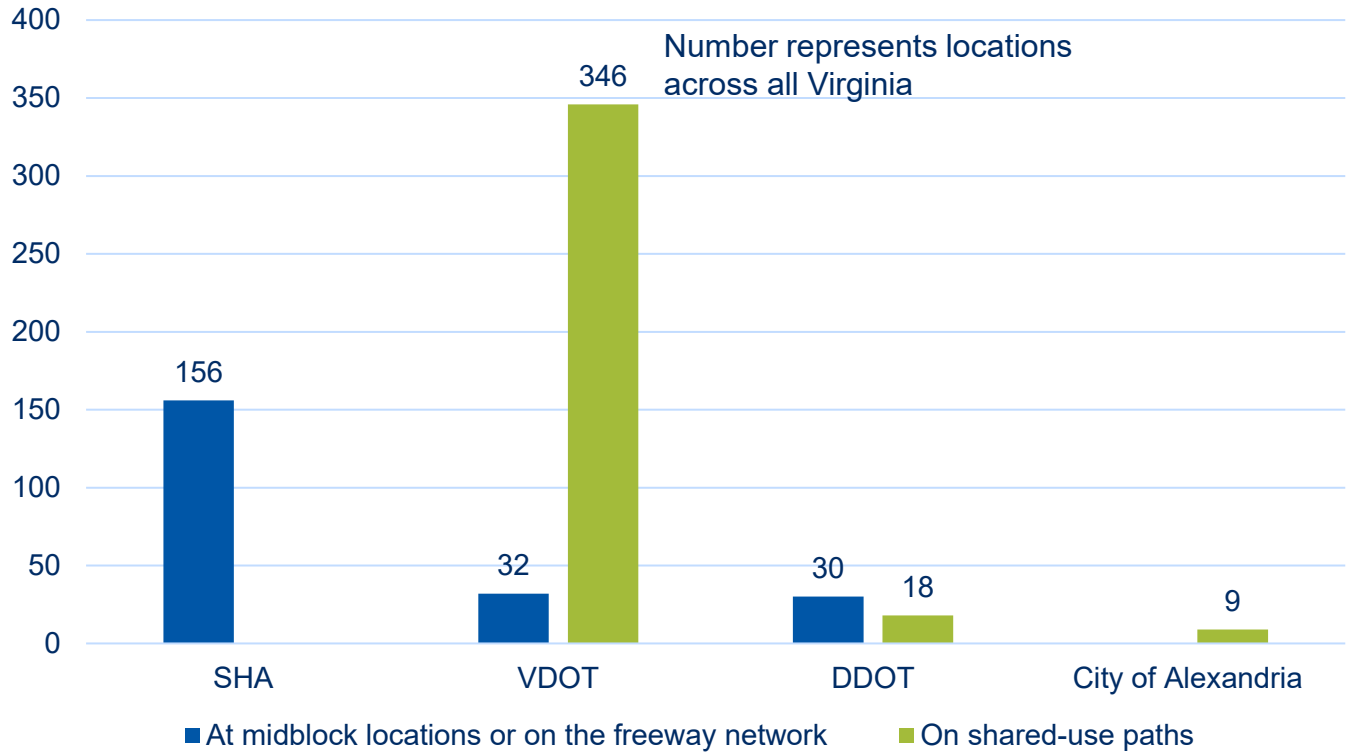
Legend
- Truck Route
- Truck Restriction
- Undesignated

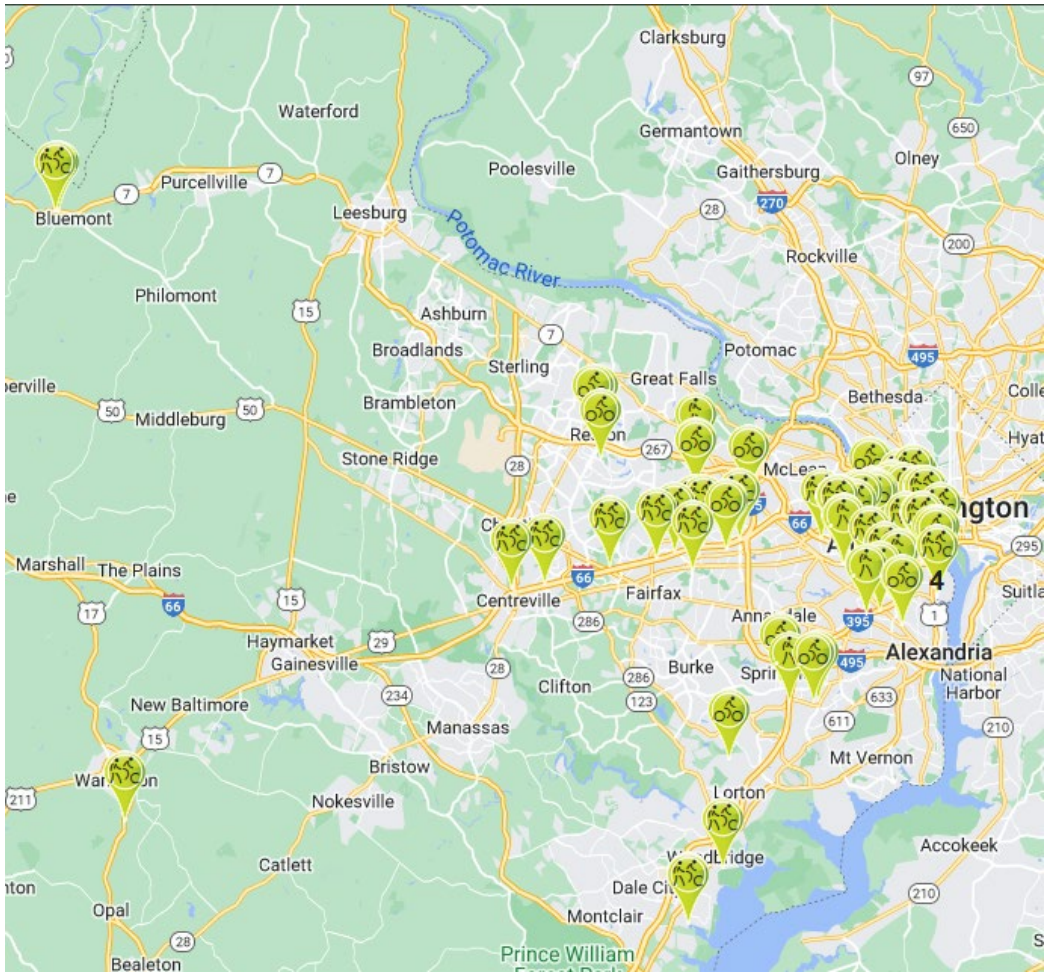
Truck Volume Percentages
(Existing % = Future %)
- Sudley Road (Rte. 234) – 2.3%
- NB Centreville Road (Rte. 28) - 3.5%
- SB Centreville Road (Rte. 28) – 2.7%
- Prescott Avenue – 2.2%

Note: City expects to add additional truck restriction signs on Quarry Road.

Map Source: City of Manassas, TSMO Inventory Survey

Active Traffic & Demand Management – Continuous Count Stations





Map Source: VDOT, TSMO Inventory Survey

TSMO Survey Results:

Traffic Signal Operations

Traffic Signal Operations

Strategies

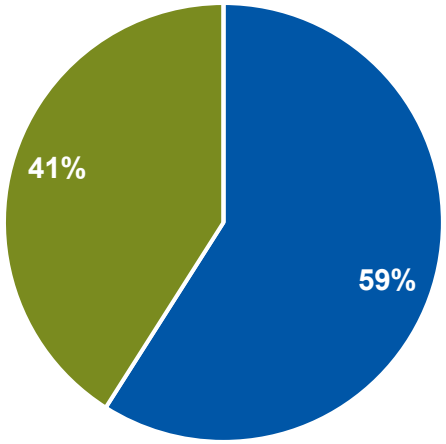
- Types of Signals
- Types of Cabinets
- Types of Controllers
- Types of Strategies at Signals
- Types of Communication
- Detectors
- Pedestrian/Bike Strategies

Agencies

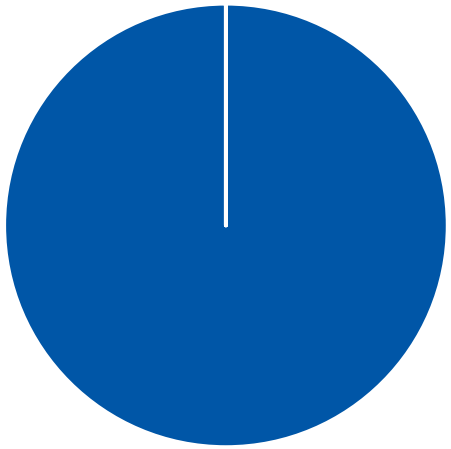
- SHA
- VDOT
- MCDOT
- DDOT
- Arlington County
- City of Alexandria
- City of Fairfax

Traffic Signal Operations – Signal Ownership

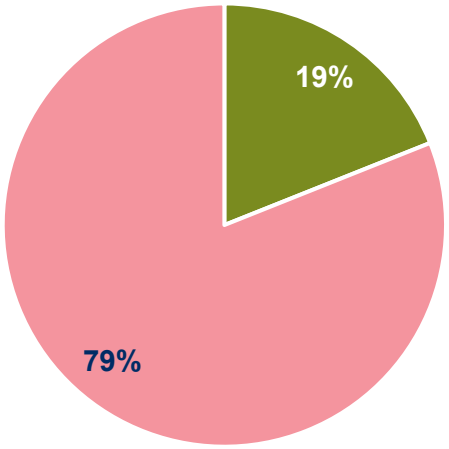
SHA



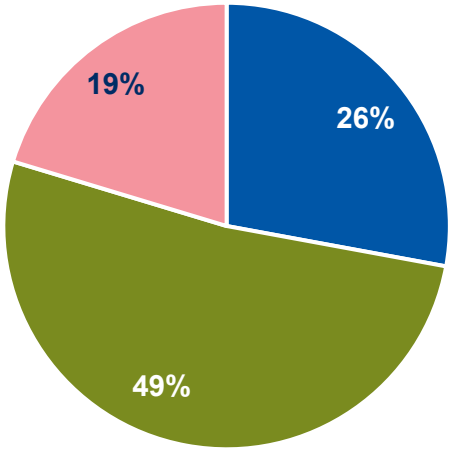
VDOT



DDOT

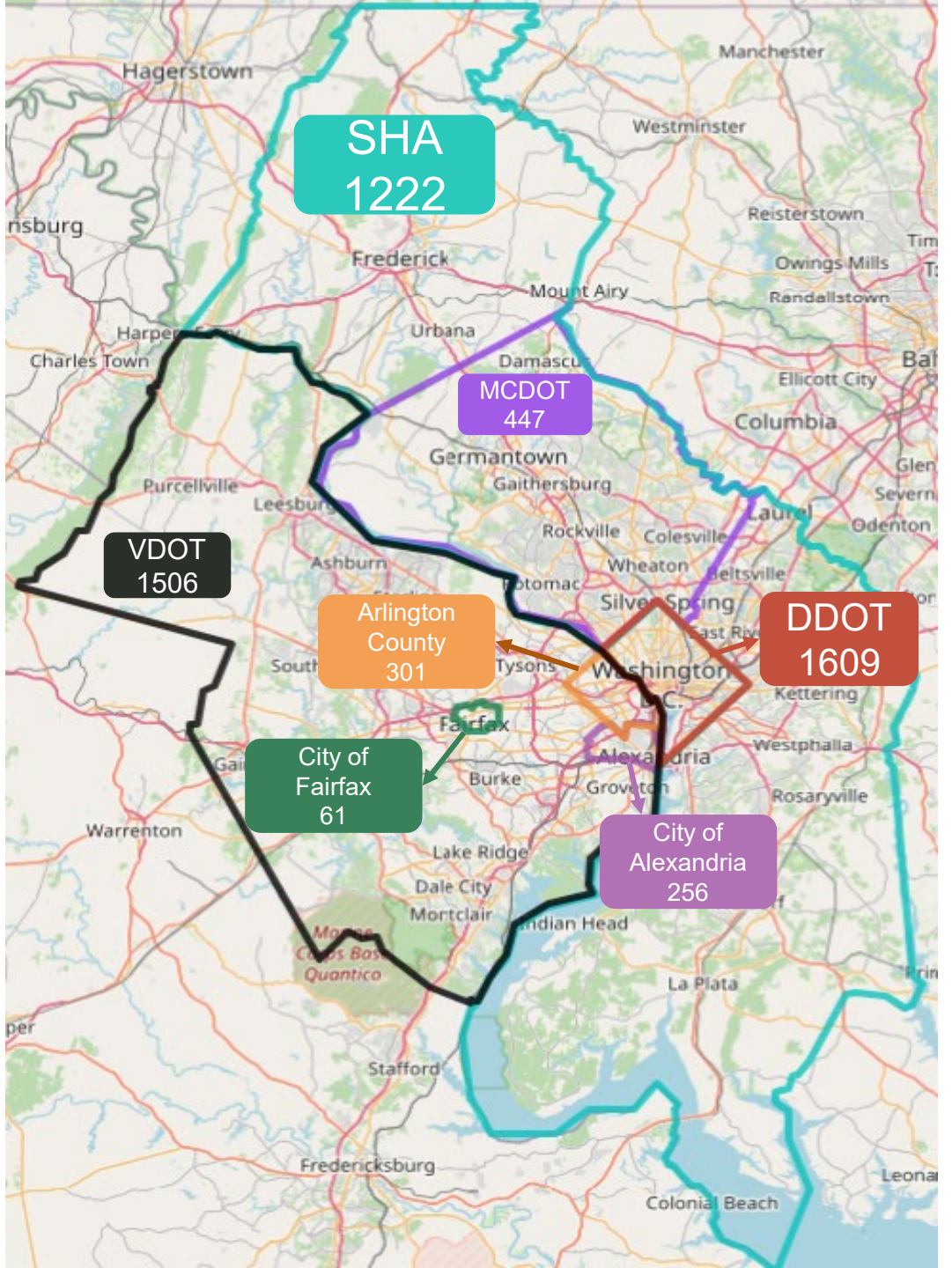


MCDOT



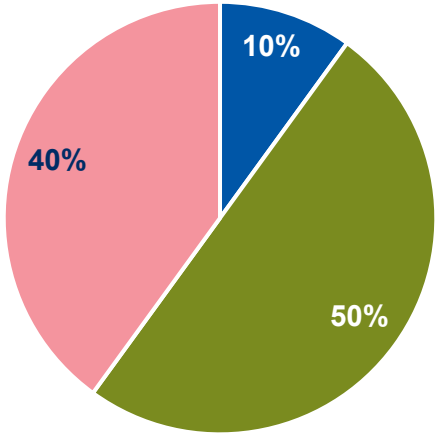
■ Fully Actuated ■ Semi-Actuated ■ Pre-timed

Total Number of Signals **Owned** by Agencies = 6,907
Total Number of Signals **Maintained** by Agencies = 7,132

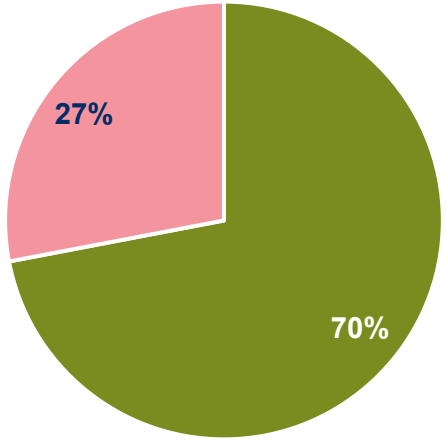


Traffic Signal Operations – Signal Ownership

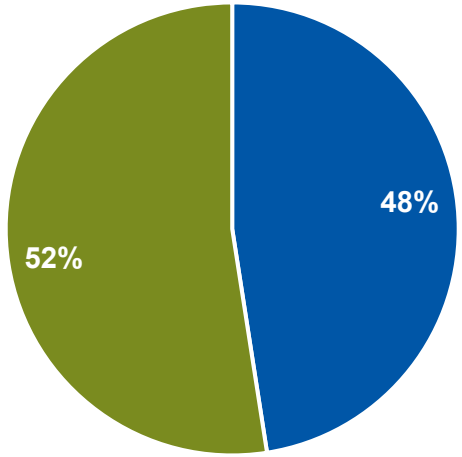
Arlington County



City of Alexandria

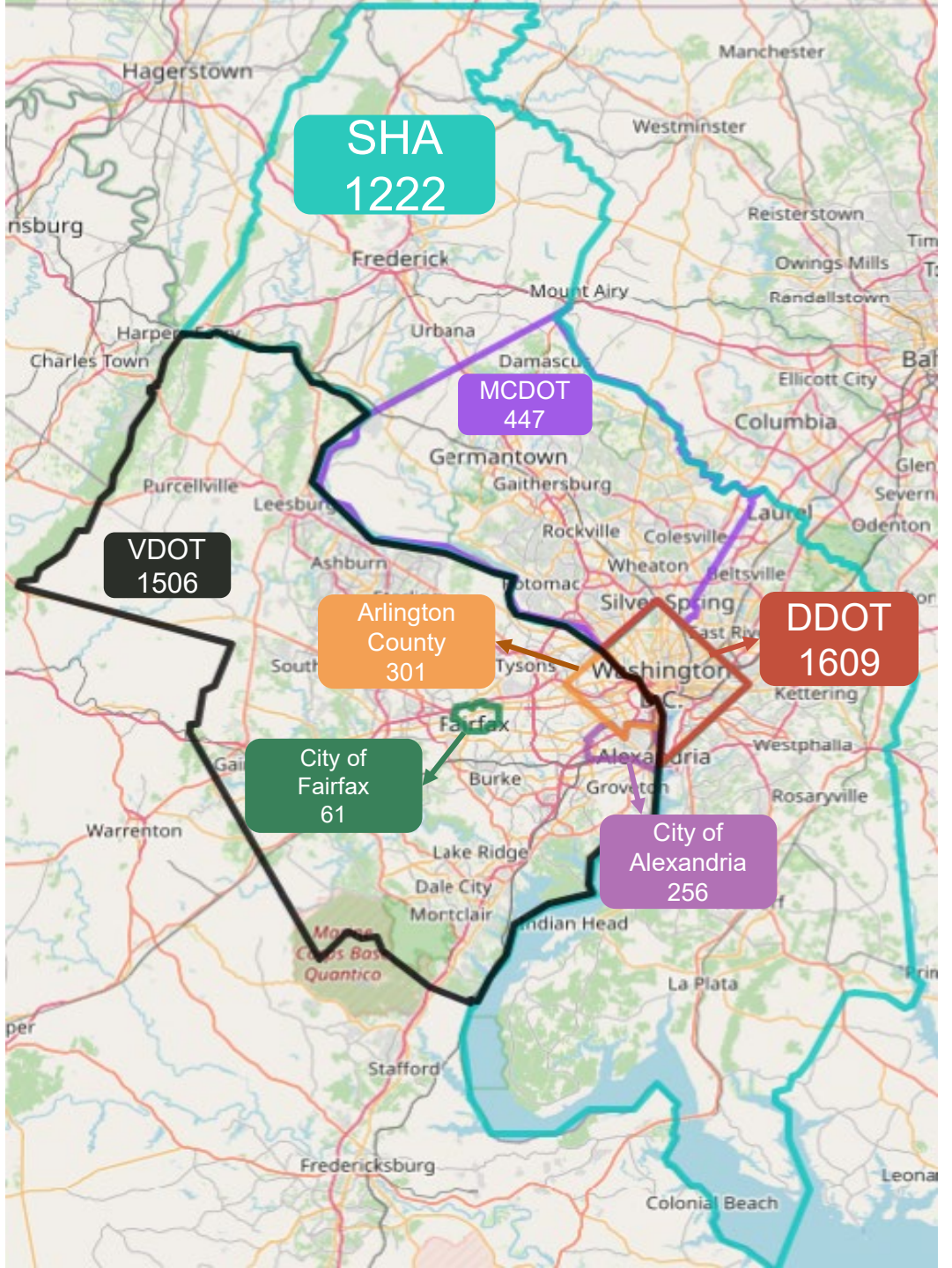


City of Fairfax

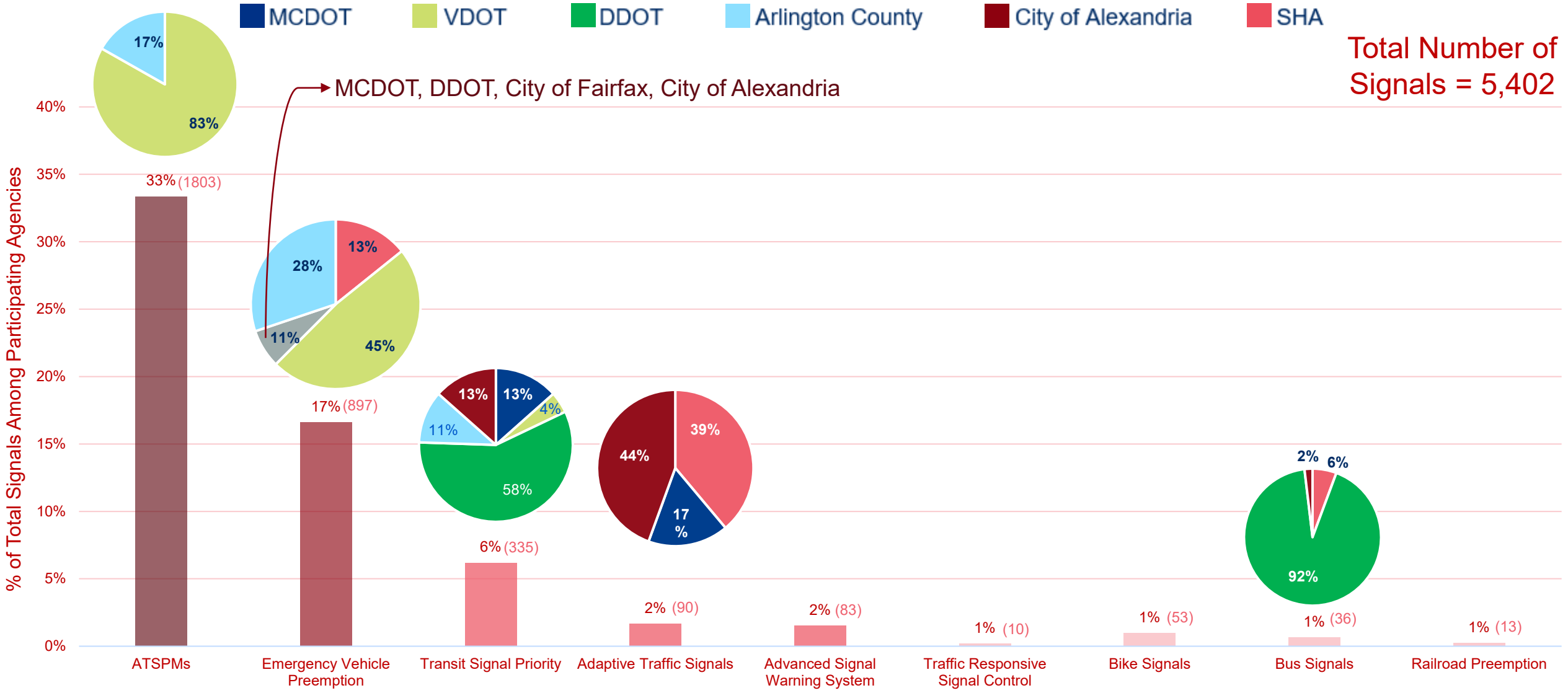


■ Fully Actuated ■ Semi-Actuated ■ Pre-timed

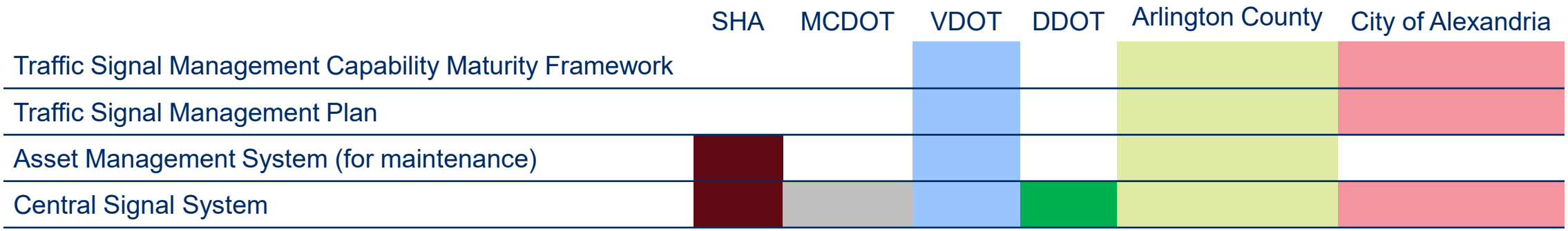
Total Number of Signals **Owned** by Agencies = 5,402
Total Number of Signals **Maintained** by Agencies = 5,464



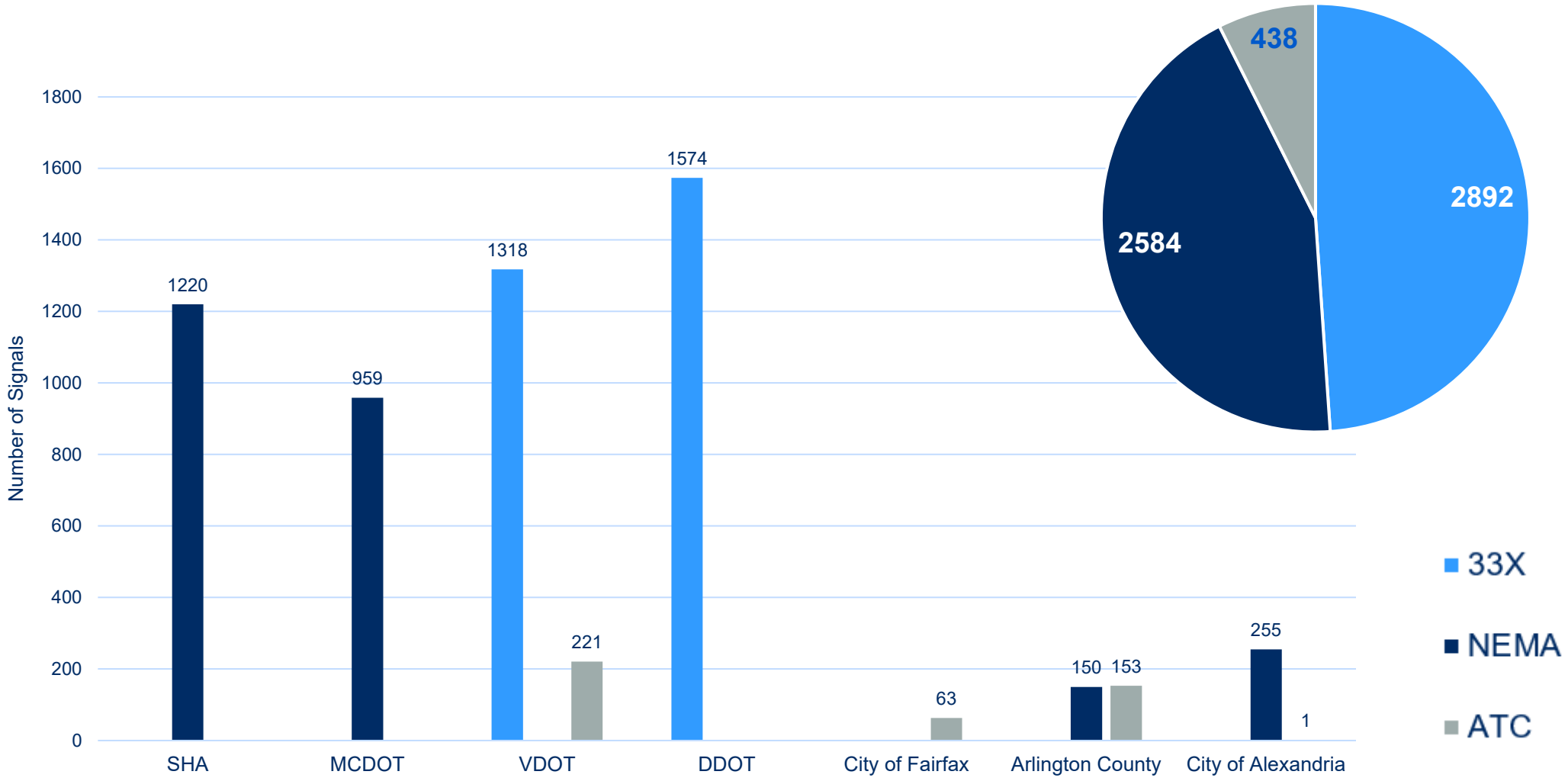
Traffic Signal Operations - Strategies



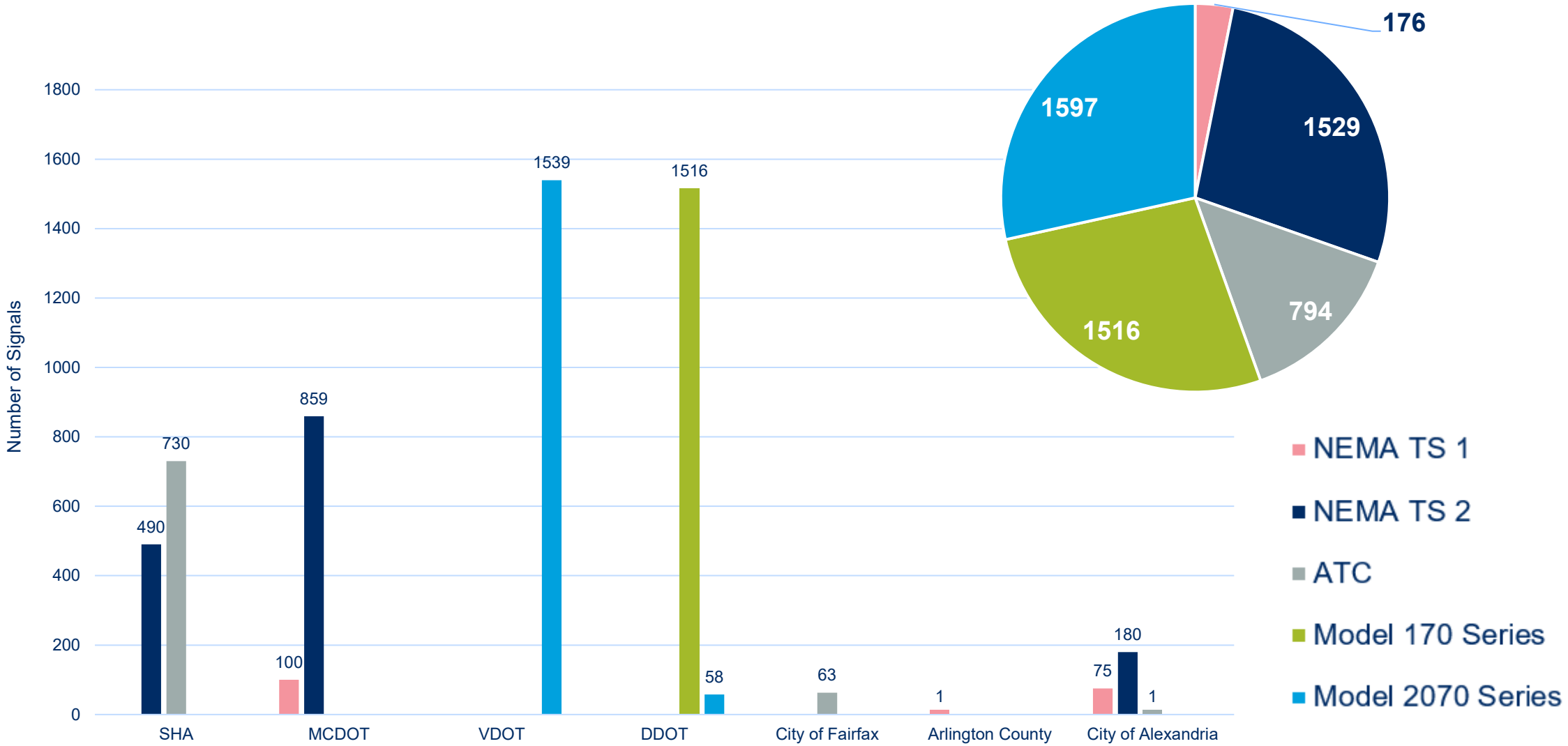
Traffic Signal Operations - Strategies



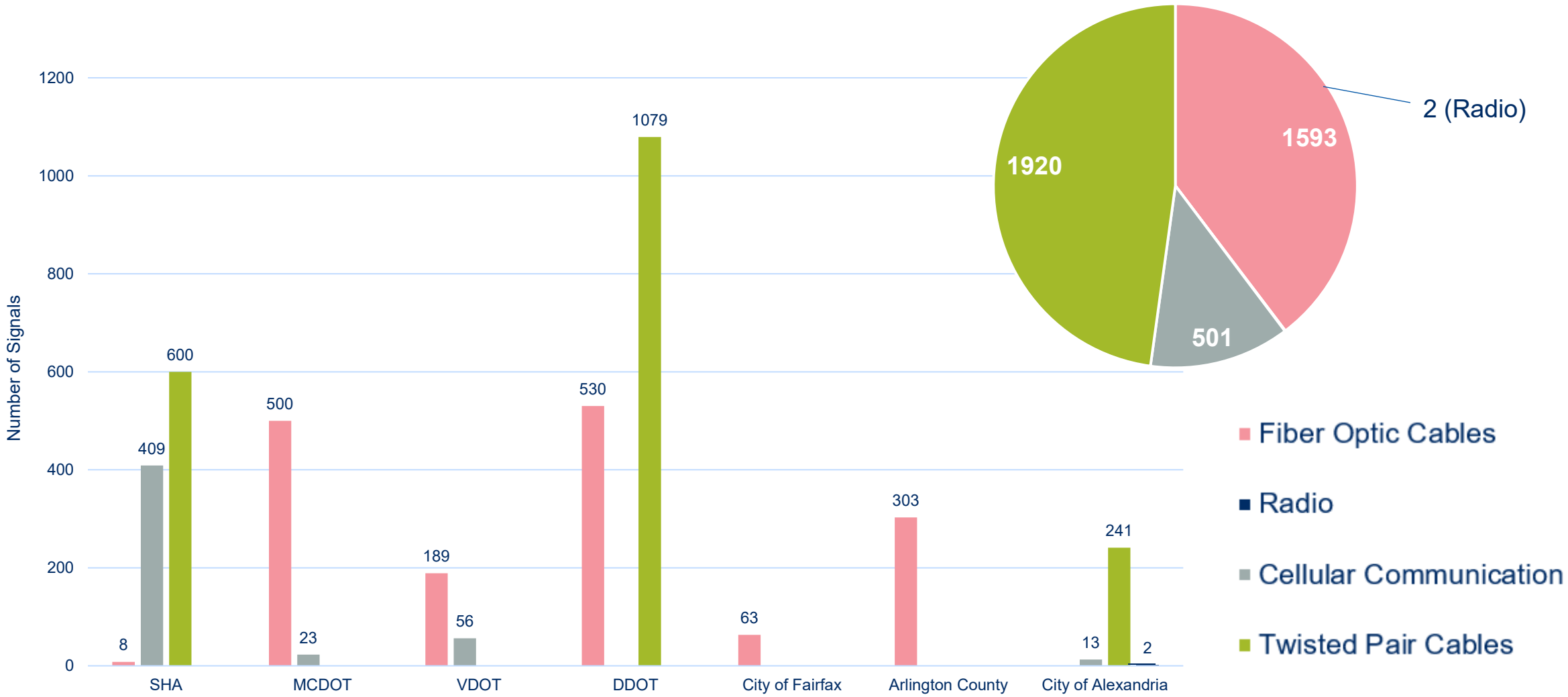
Traffic Signal Operations - Cabinets



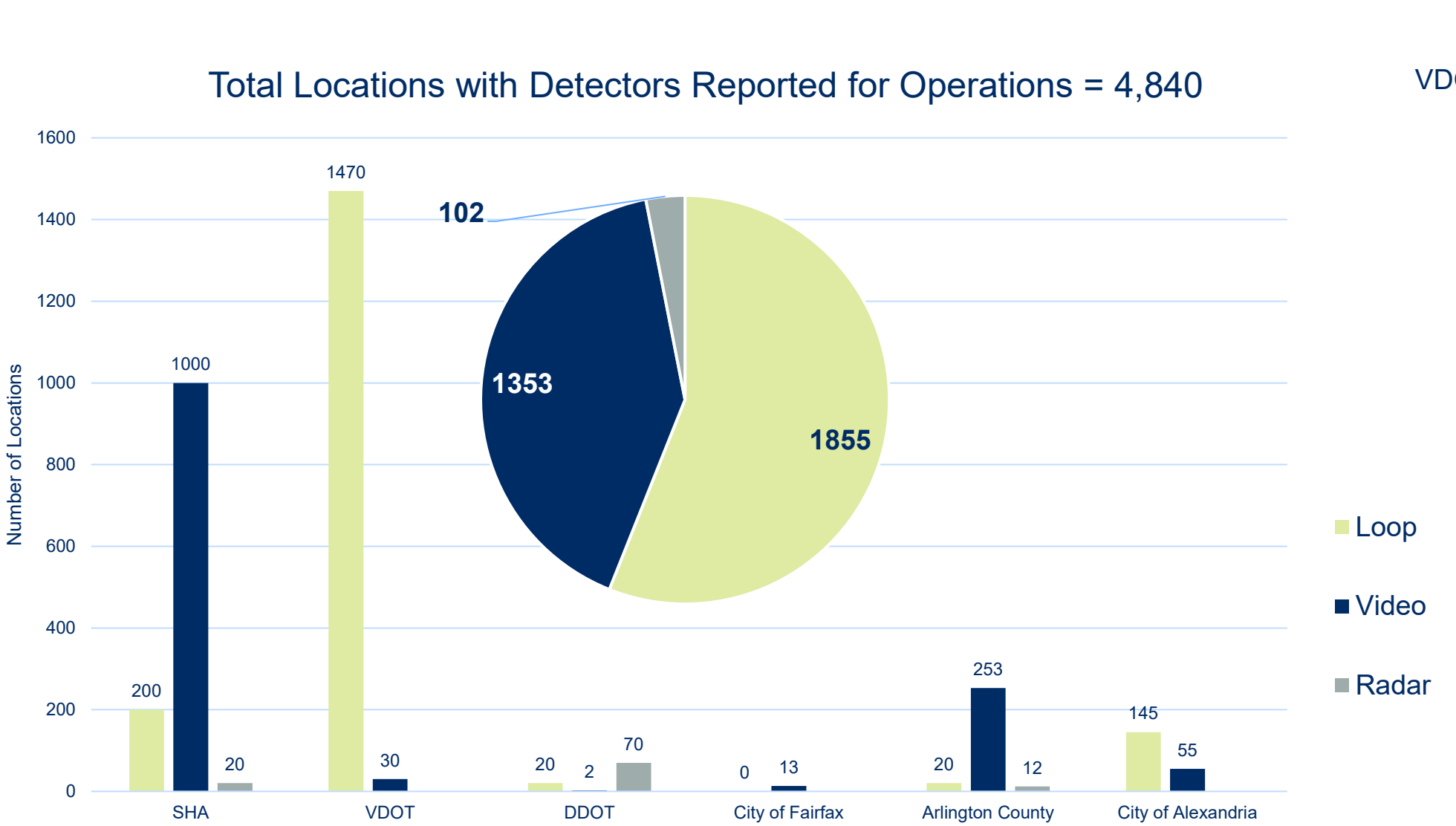
Traffic Signal Operations - Controllers

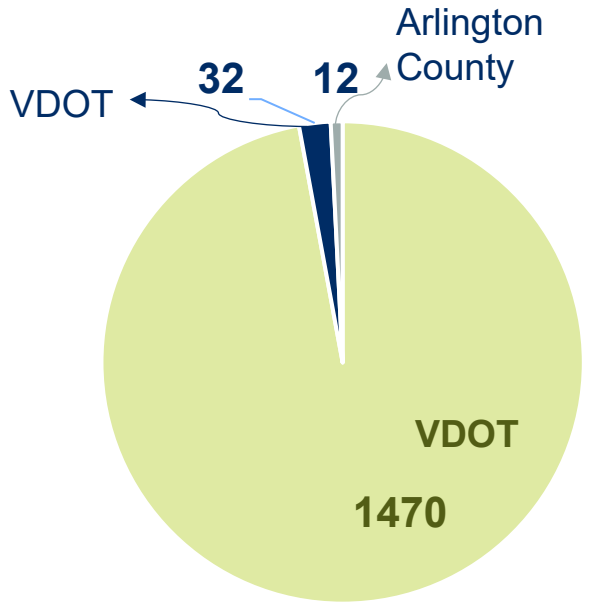


Traffic Signal Operations – Communication



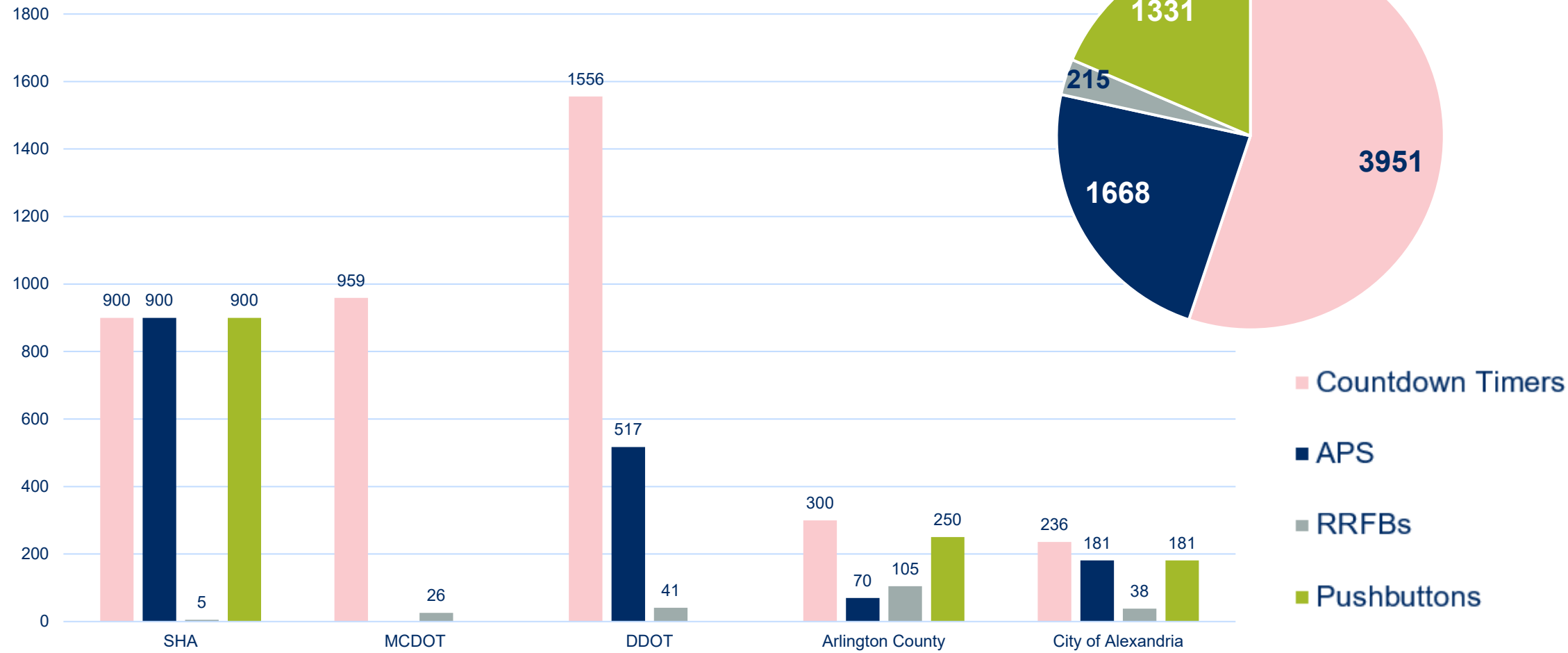
Traffic Signal Operations – Detectors





Total Locations with Detectors Reported for Data Collection = 1,514

Traffic Signal Operations – Pedestrian/Bike



TSMO Survey Results:

Connected and Automated Vehicle (CAV) Deployment

Connected and Automated Vehicle (CAV) Deployment

Strategies

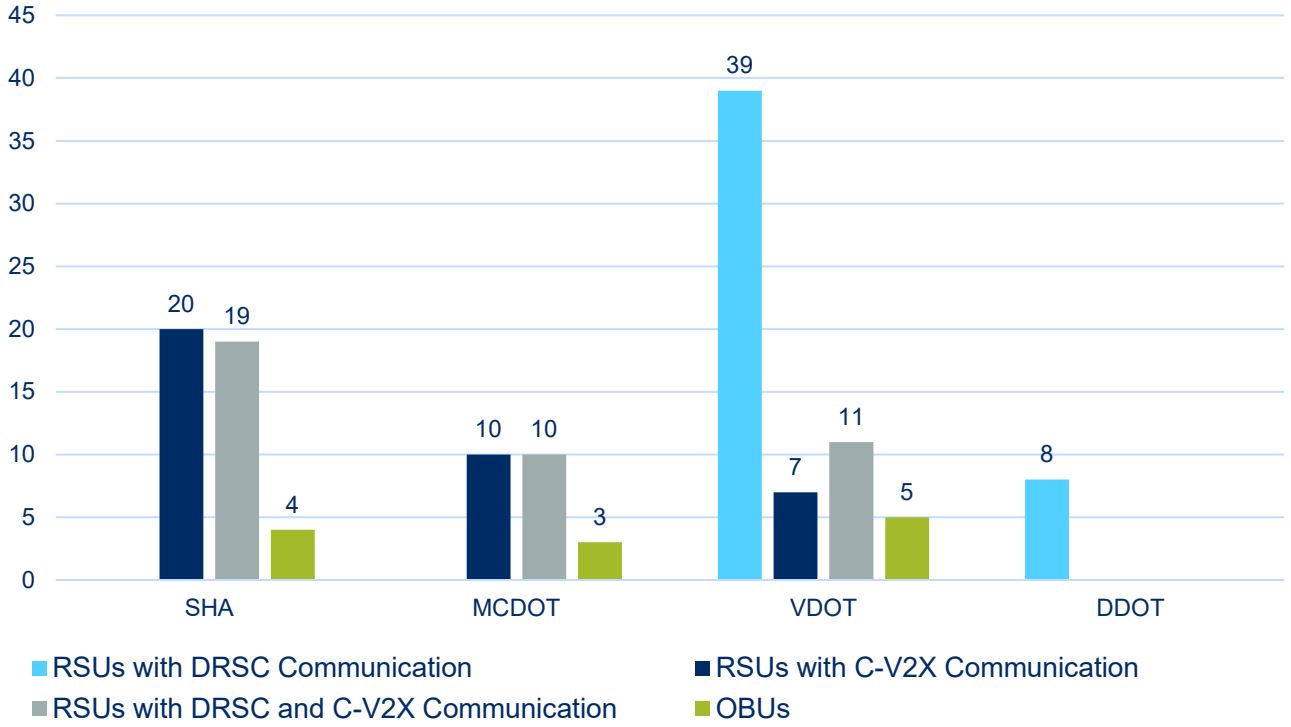
- Safety Applications
- Mobility/Environmental Applications
- Traffic Advisories and Warnings Applications

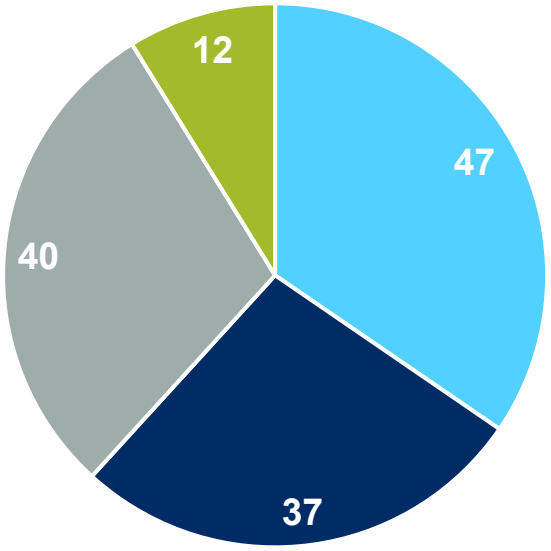
Agencies

- SHA
- VDOT
- MCDOT
- DDOT
- City of Alexandria

Connected and Automated Vehicle (CAV) Deployment

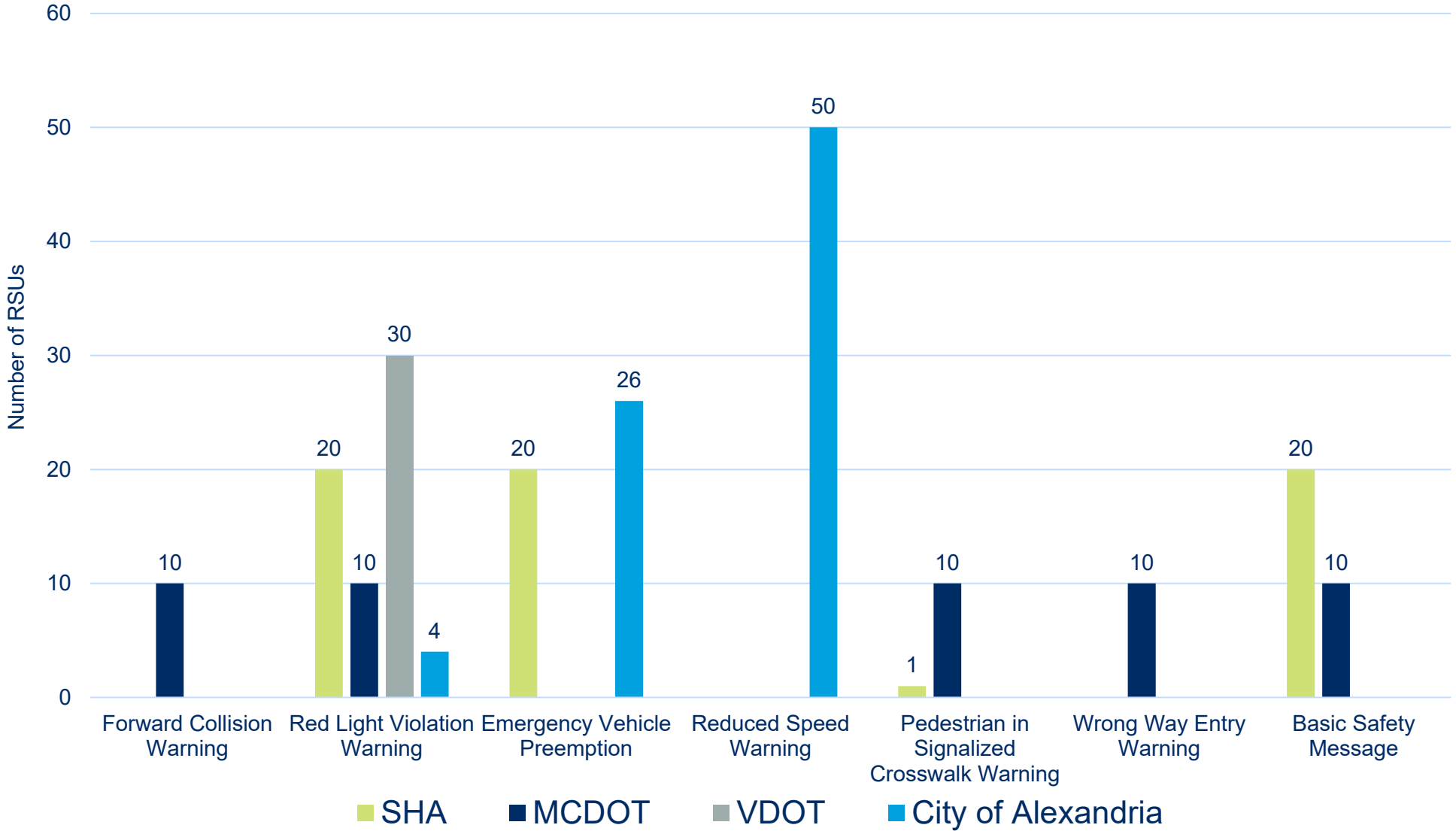
RSUs & OBUs





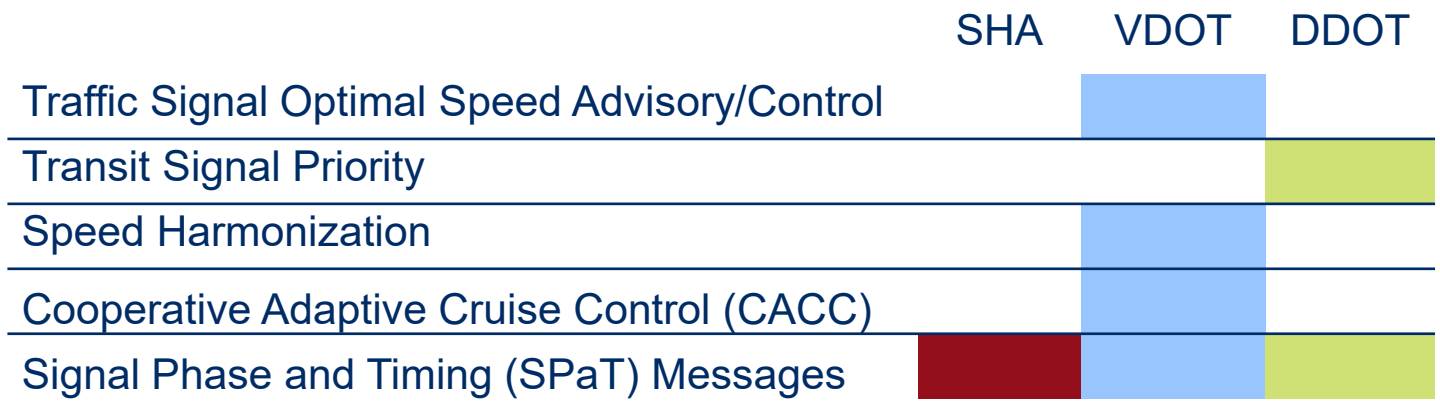
Connected and Automated Vehicle (CAV) Deployment

Safety Applications – Existing RSUs



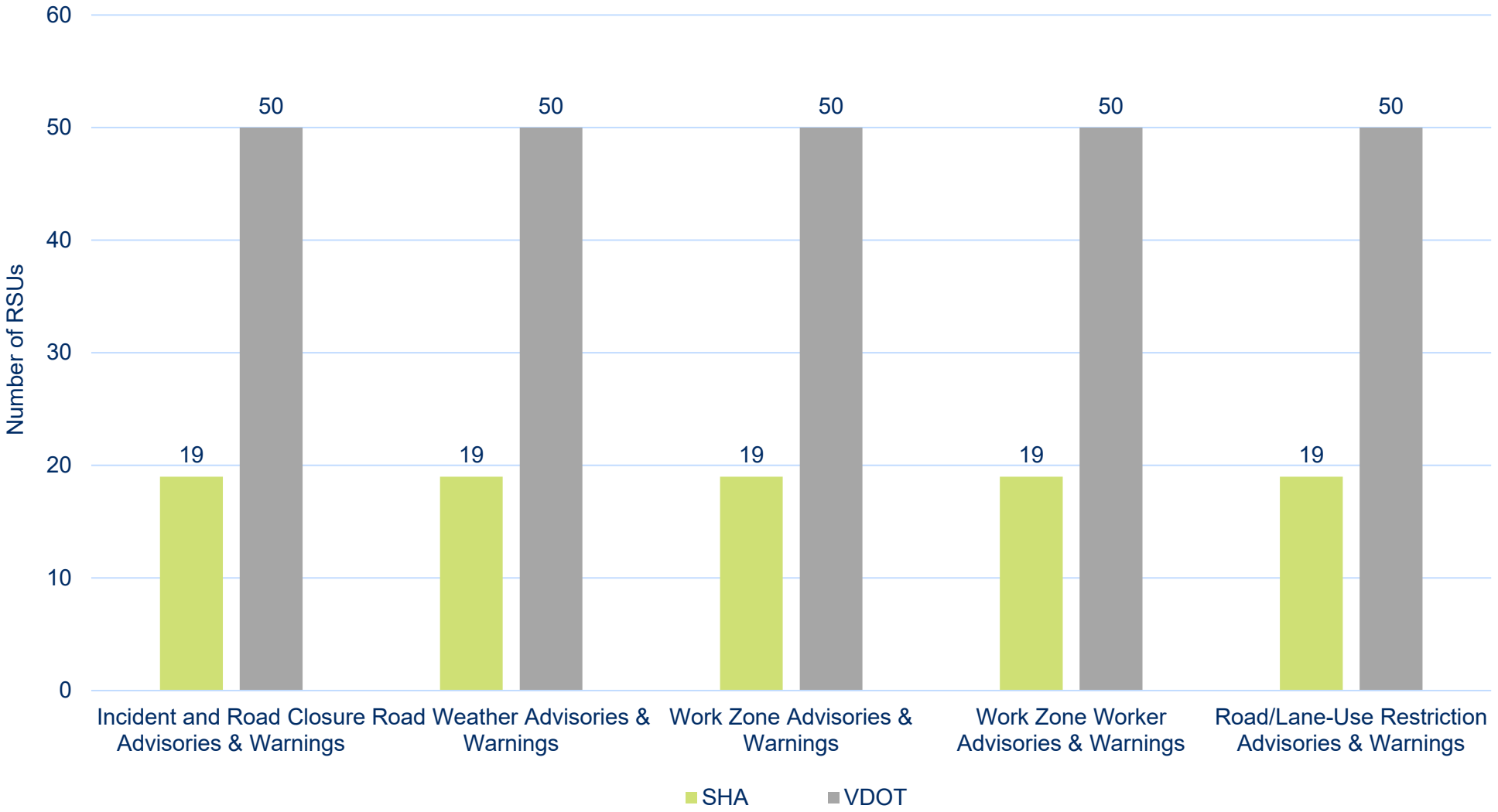
Connected and Automated Vehicle (CAV) Deployment

Mobility/Environmental Applications



Connected and Automated Vehicle (CAV) Deployment

Traffic Advisories and Warnings Applications – Planned RSUs



TSMO Survey Results:

Integrated Corridor Management (ICM)

Integrated Corridor Management (ICM)

Strategies

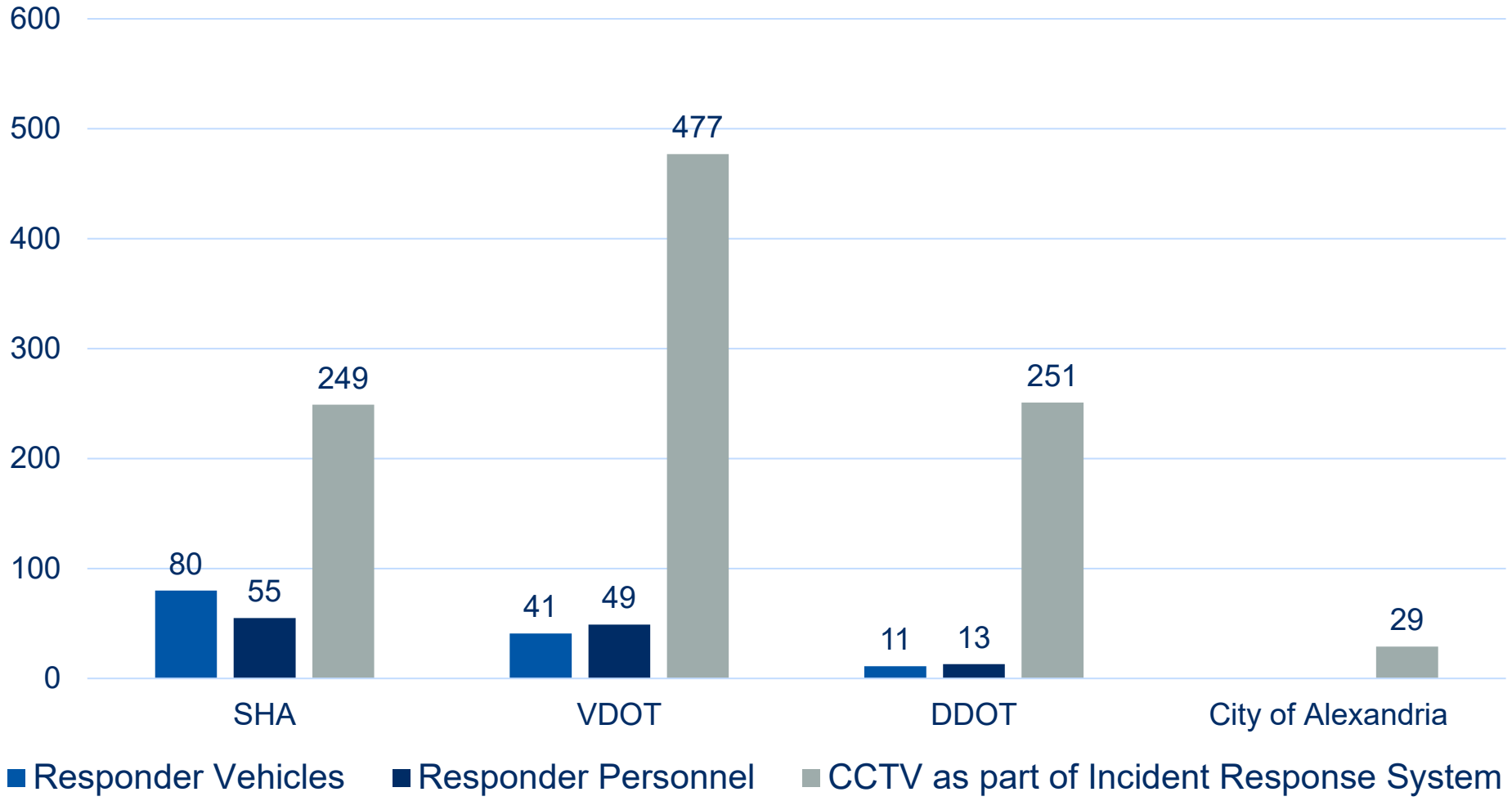
- Responder Vehicles, Personnel, CCTV cameras
- Police CAD
- Event Management Capabilities (software or personnel)
- Decision Support System for Arterial Traffic Signals
- Integrated Software, Third-Party Data Sources and Data Lakes

Agencies

- SHA
- VDOT
- MCDOT
- DDOT
- City of Alexandria

Integrated Corridor Management (ICM)

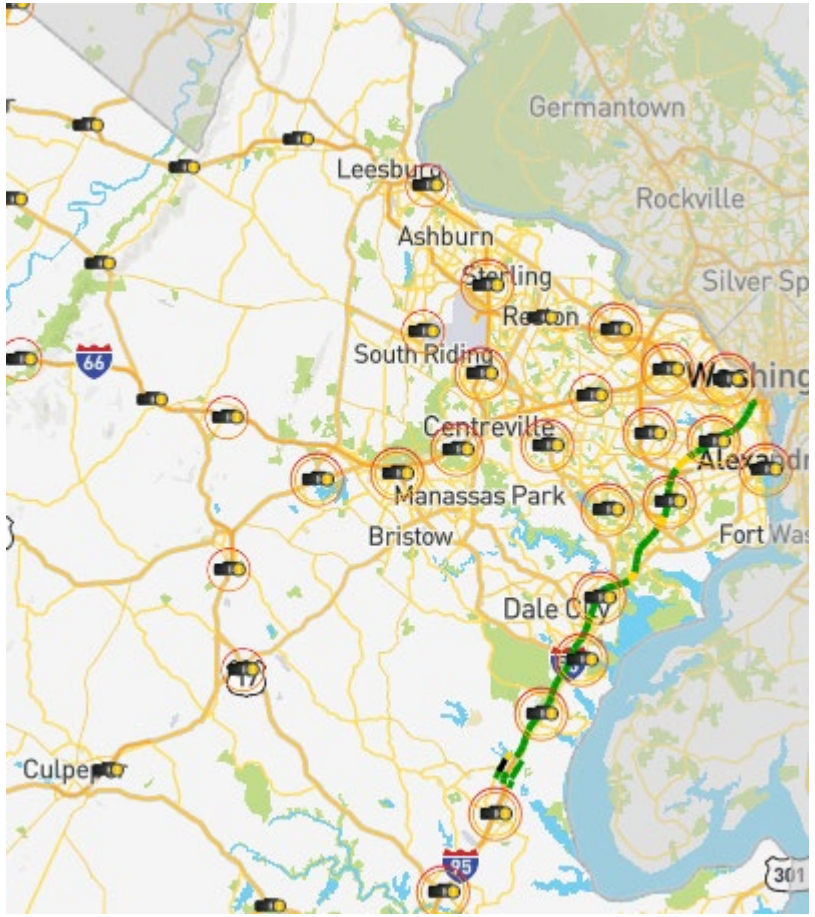
Incident Response System



Integrated Corridor Management (ICM)

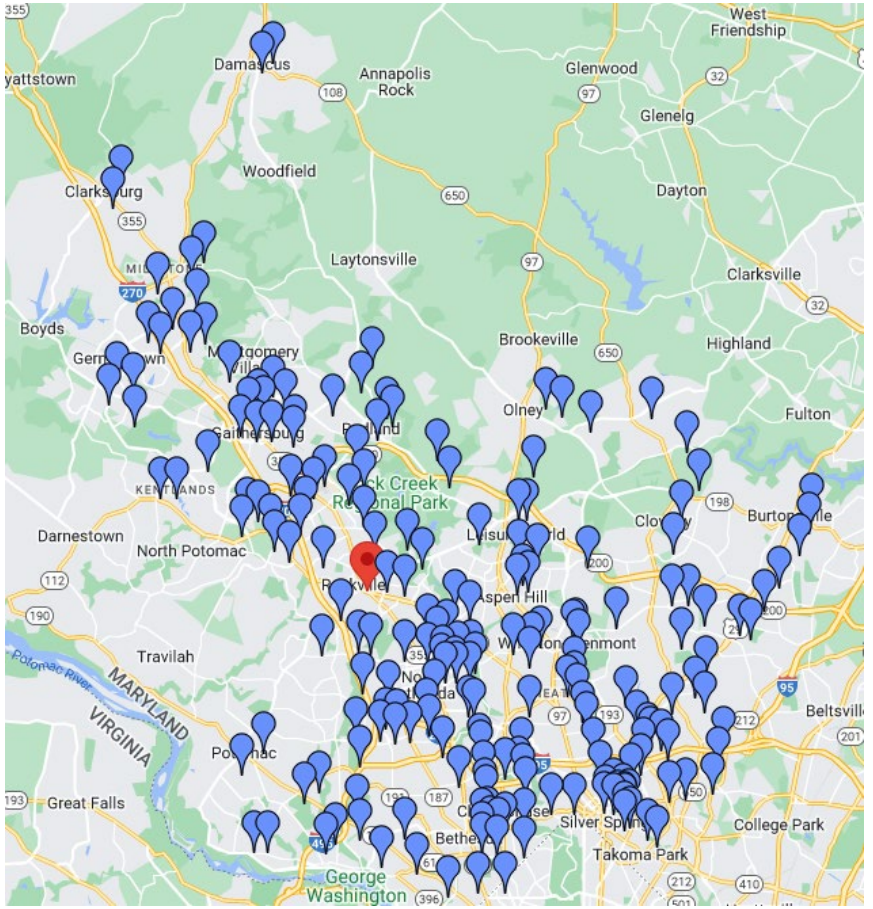
CCTV Cameras

VDOT



Map Source: VDOT, TSMO Inventory Survey

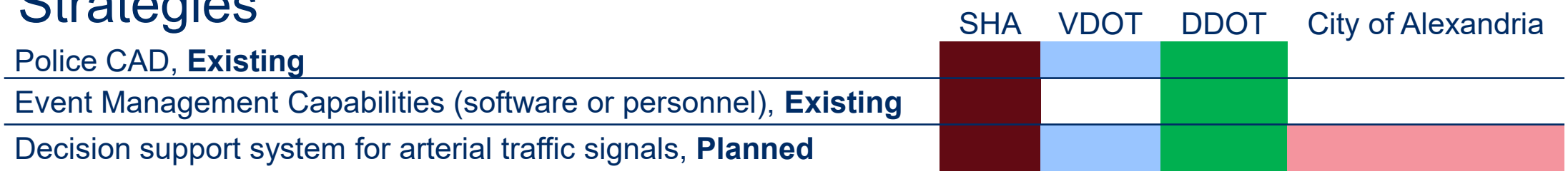
MCDOT



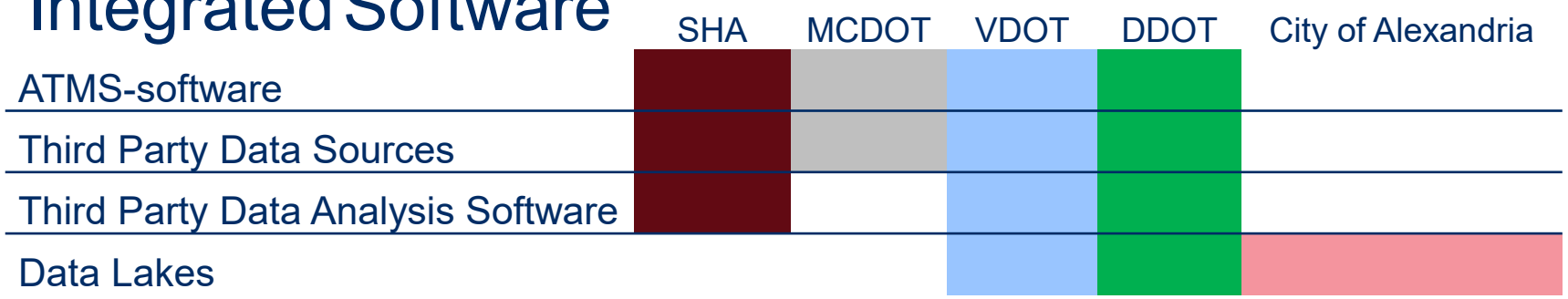
Map Source: MCDOT Website

Integrated Corridor Management (ICM)

Strategies



Integrated Software



TSMO Survey Results:

Emergency Transportation Operations

Emergency Transportation Operations

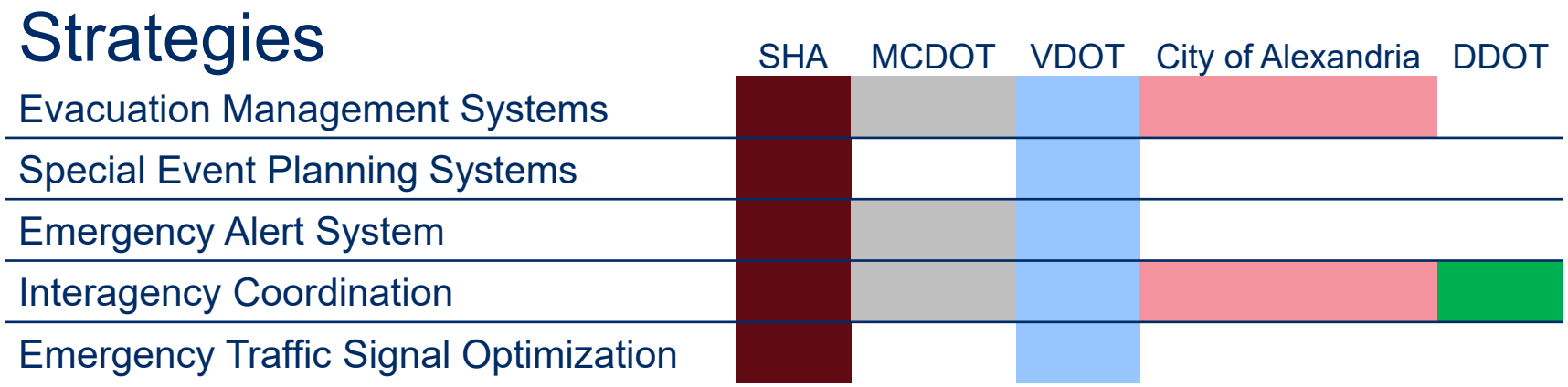
Strategies

- Evacuation Management Systems
- Special Event Planning Systems
- Emergency Alert System
- Interagency Coordination
- Emergency Traffic Signal Optimization

Agencies

- SHA
- MCDOT
- VDOT
- DDOT
- City of Alexandria

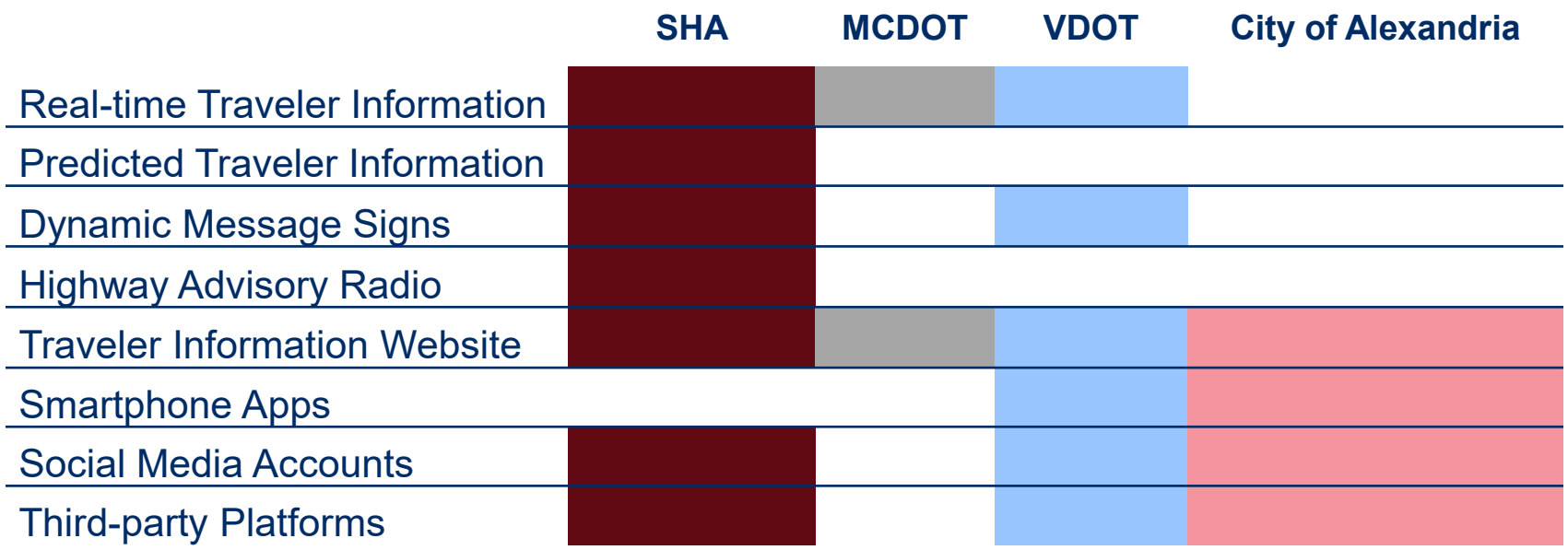
Emergency Transportation Operations



TSMO Survey Results:

Traveler Information

Traveler Information



TSMO Survey Results:

Work Zone Operations

Work Zone Operations

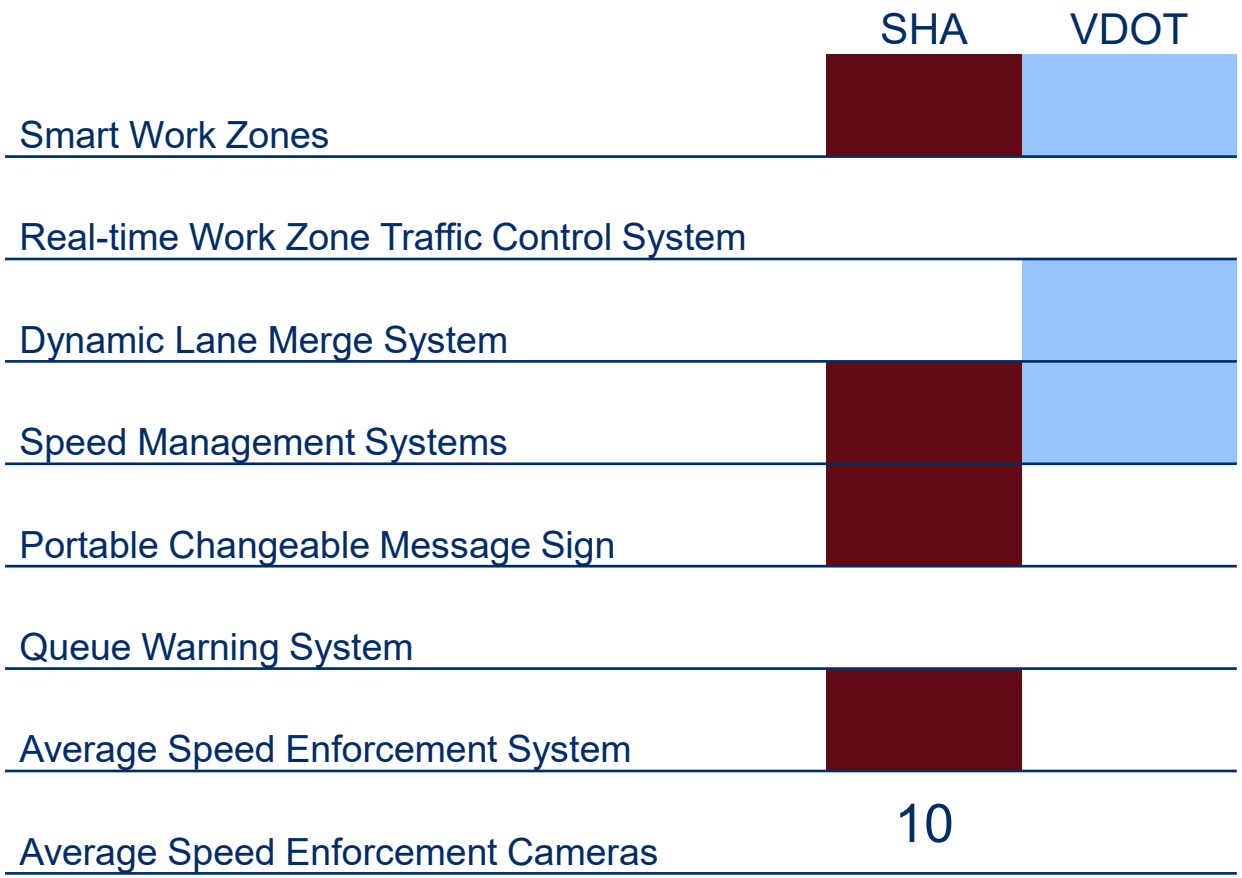
Strategies

- Smart Work Zones
- Real-time Work Zone Traffic Control System
- Dynamic Lane Merge System
- Speed Management Systems
- Portable Changeable Message Sign
- Queue Warning System
- Average Speed Enforcement System

Agencies

- SHA
- VDOT

Work Zone Operations

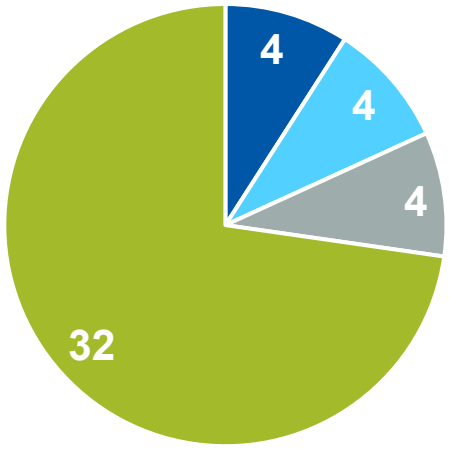


TSMO Survey Results:

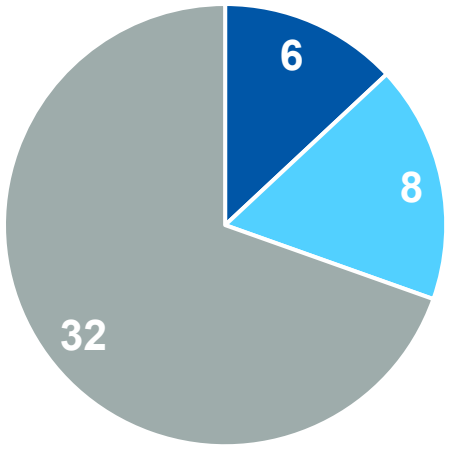
Traffic Management Centers (TMC)

Traffic Management Centers (TMC)

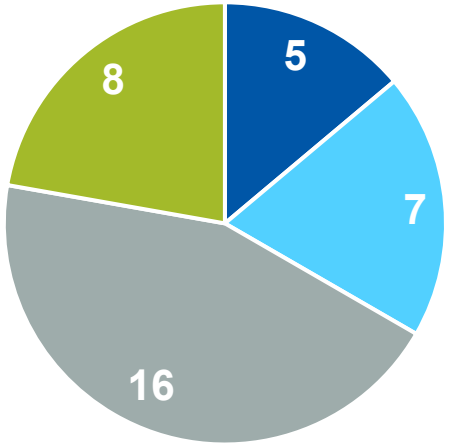
SHA



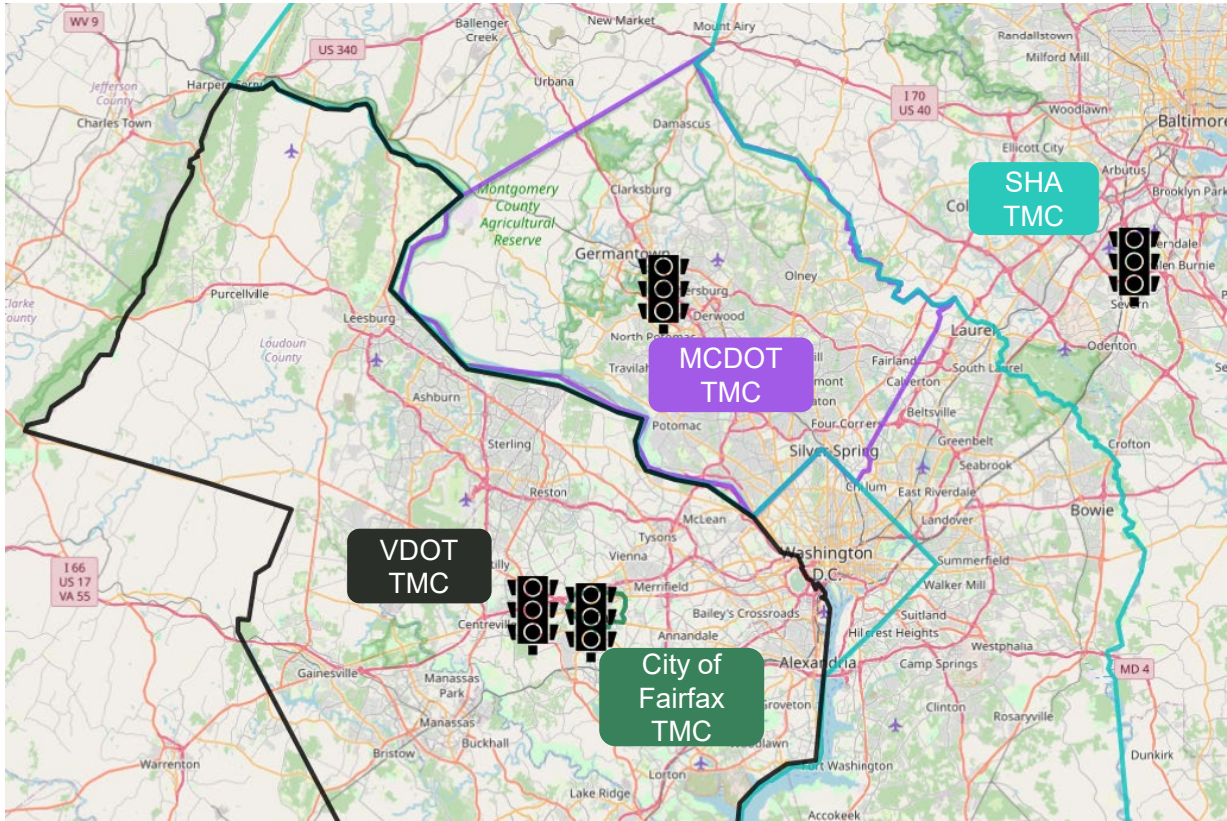
VDOT



MCDOT

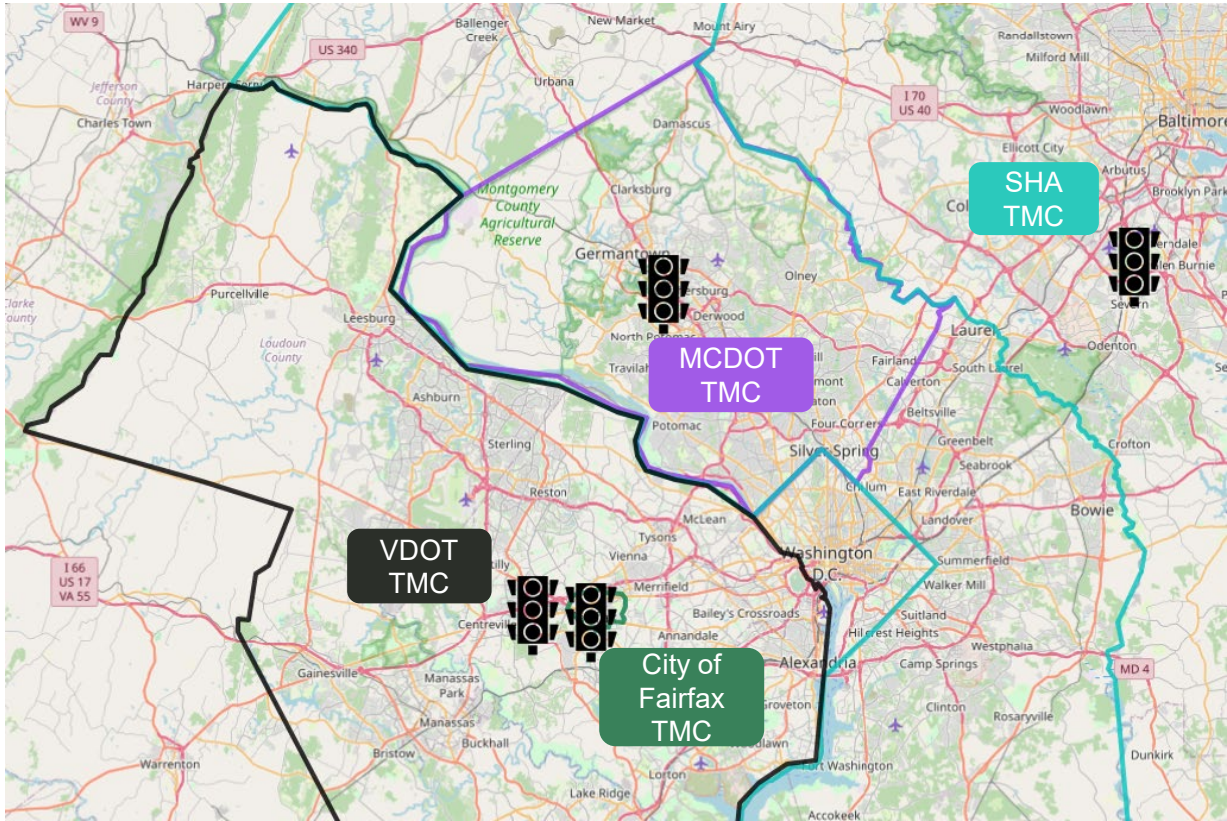


- Managers
- Traffic Engineers
- Technicians
- TMC Operator Staff



Traffic Management Centers (TMC)

	SHA	MCDOT	VDOT
24-hour operation		for a third of the year for weather events, construction, accidents, malfunctions	
Number of Shifts		4	2
SOP			
Real-time traffic management			



GIS Component

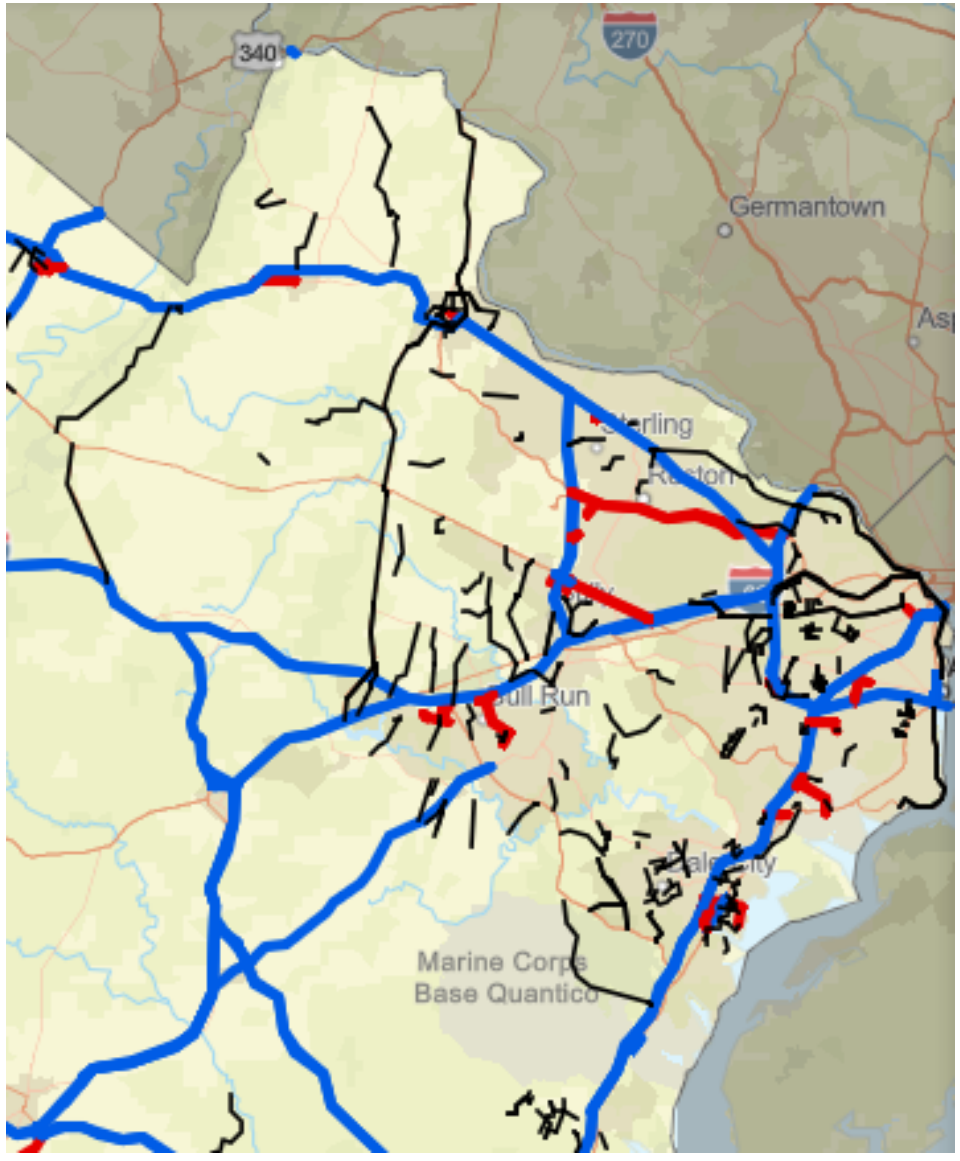
- Received the following GIS datasets:
  - DDOT Traffic Signals & Cabinets
  - VDOT truck restrictions
  - Arlington County Traffic Signals
  - City of Alexandria Traffic Signals

ICF

Mead & Hunt

GIS Component

VDOT truck restrictions



Highways with Restrictions on Vehicle Type or Length

Zone Type Number

Restricted Highway

Not Recommended

Virginia Designated Highways for STAA Vehicles

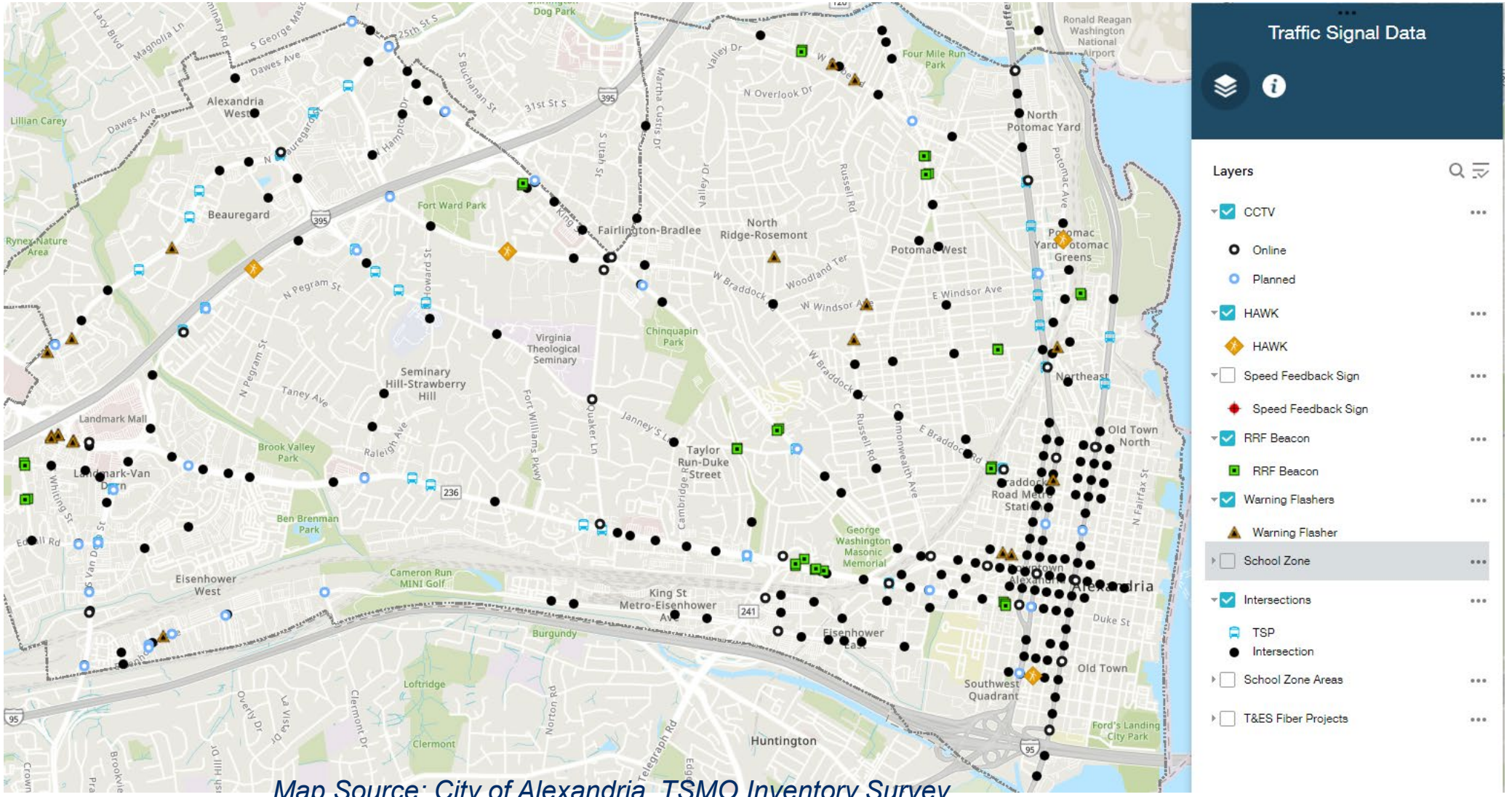
National Network + Virginia Qualifying Highways

Virginia Access Highways

Map Source: VDOT, TSMO Inventory Survey

GIS Component

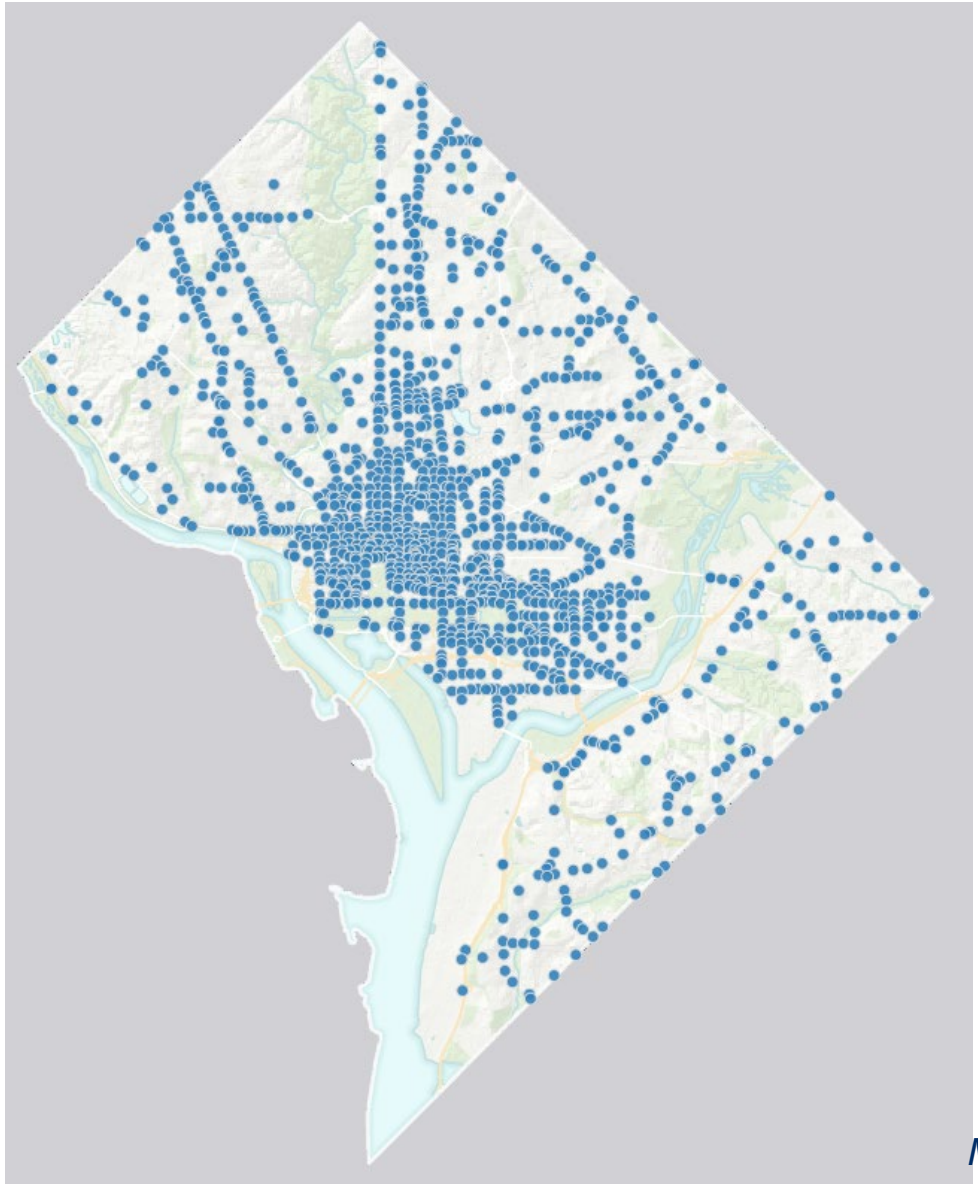
City of Alexandria Traffic Signals



Map Source: City of Alexandria, TSMO Inventory Survey

GIS Component

DDOT Traffic Signals & Cabinets



Map Source: DDOT, TSMO Inventory Survey

Conclusions & Recommended Next Steps

- Gaps:
  - Unspecified/unknown numbers
  - Contradictions in some numbers
  - Inaccuracies due to estimates
  - Missing responses from member agencies
  - Unavailable/limited GIS datasets

Conclusions & Recommended Next Steps

- Recommendations:
  - Encourage all TPB members to provide input.
  - Explore more modern asset management system strategies → opportunity to base inventory survey on documented plan sets.
  - Encourage TPB members to improve their GIS representation → opportunity for MWCOG to create regional maps of TSMO assets/programs.
  - Generate a living document/webpage where agencies can update fields in the survey and share lessons learned.
  - Support enhanced TSMO strategic planning that will help TPB agencies in their advancement of TSMO and TSMO prioritization as well as encourage collaboration → increase reliability, efficiency, mobility and safety of the transportation network

Thank You!

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