



Transportation Commission Meeting

November 15, 2023

7:00PM

**City Council Workroom - City Hall
301 King Street**

AGENDA

1. Public Comment (Not to exceed 10 min)
2. Minutes of the October 18, 2023 meeting
3. **Discussion Item:** Smart Mobility
4. **Public Hearing and Action Item:** CMAQ/RSTP Grant Application
5. Commissioner Updates
6. Items for Consent
 - A. AlexWest Small Area Plan Update
 - B. Rainbow Crosswalks
 - C. Stop for Pedestrians City Code
 - D. WMATA Budget
 - E. SRTS Walk Audits Update
 - F. AlexMoves Survey
 - G. FY 2025 Budget Letter
 - H. Eisenhower Avenue Study Update
7. Other Business
 - A. December Meeting

Public hearing items are so noted on the agenda. The Commission may receive public comments on other agenda items at its discretion.

Next Meeting: December 20, 2023



The November 15 meeting of the Transportation Commission is being held at 7:00 p.m in the City Council Workroom on the second floor of City Hall (301 King Street) and electronically. Members of Transportation Commission and staff are participating either in-person or from a remote location through video conference call on Zoom. The meeting can be accessed in person or via Zoom by registering at the following link:

https://zoom.us/webinar/register/WN_hLQfjHtST_ihXZP6eTF8XA

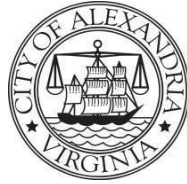
Or by phone: 301 715 8592

Meeting ID: 916 4868 8918

Passcode: 068073

Public comment will be received at the meeting. There will be a public comment period at the beginning of the meeting and written testimony can be provided until 3PM on 11/15/2023 to christopher.ziemann@alexandriava.gov.

The City of Alexandria complies with the terms of ADA. An individual with a disability who wishes to request an accommodation may contact the Department of Transportation and Environmental Services at 703-746-4083 or TTY/TTD 703-838-5056.



City of Alexandria
Transportation Commission

Regular Meeting

October 18, 2023
7:00 p.m.

MINUTES

Commissioners Present: Chair Melissa McMahon, Vice Chair Matthew McManus, Commissioner James Maslanka, Commissioner Casey Kane, Commissioner Murat Omay, Commissioner Leslie Catherwood, Commissioner Tim Lovain,

Staff Present: Adriana Castaneda – Director, Christopher Ziemann – Transportation Planning Division Chief, Megan Oleynik – Transportation Planning Division, Alex Carroll – Transportation Planning Division.

Chair McMahon called the Transportation Commission meeting at 7:05 p.m.

1. Public Comment Period

1. Zack DesJardins – Mr. DesJardins asked that the Commission support an East-West Bikeway in their budget feedback to the city manager. He stated that a bike route along the Eisenhower corridor and completion of the route along Prince/King/Braddock with connections to the Potomac Yard Trail would be very beneficial to the City's bike network. He urged that the City hire a planner/engineer to help execute these projects more quickly and that seed money be allocated for design that would set the City up for applying for grants or creating CIP projects for implementation.
2. Ken Notis – Mr. Notis spoke in support of the comments of Mr. DesJardins. He also asked the City to consider reducing speed limits on arterial roads to 25 miles per hour (mph), or to pursue a Citywide speed limit of 25 mph.

Commissioner Kane mentioned the written comments received from Mr. Daniel Ciatti inquiring as to why Safe Routes to Schools audits have not been done at private schools. He commended staff on their response.

Motion to close public hearing: Commissioner Maslanka

Second: Commissioner Kane

Motion carries unanimously.

2. September Minutes

DISCUSSION: Commissioner Kane inquired as to why the minutes were less detailed than usual. Staff noted that this was the result of staffing constraints.

Motion to approve the minutes: Commissioner Catherwood

Second: Commissioner Omay

Motion carries unanimously.

3. DISCUSSION ITEM: Complete Streets, Vision Zero, and Safe Routes to School Annual Update
ISSUE:

Alex Carroll, Complete Streets Program Manager, presented on work accomplished in FY23 in the Complete Streets, Vision Zero, and Safe Routes to Schools Programs and discussed goals in the current fiscal year.

Commissioner Omay asked if the breakdown of crash types included bicycle crashes. Staff clarified that based on the coding in the crash reports, bicycle crashes are captured within the set of types of crashes, but not separated out.

Commissioner Catherwood asked for clarification on whether “No Right Turn on Red” signs provided safety improvements for both pedestrians and drivers. Staff confirmed that the signs reduce both pedestrian and vehicular crashes.

Commissioner Kane pointed out that the current progress to reduce speed limits in the City is too slow to address all roads by the 2028 Vision Zero goal. He suggested that staff revisit a Citywide 25 mph speed limit. Staff provided insight that these speed limit reductions do require significant resources, especially to retune signals along a corridor for the new speeds. Staff also noted that further research was needed on whether a Citywide speed limit would have the effect of causing more drivers to use neighborhood roads or to not be as mindful of low speed limits on neighborhood roads. Commissioner Kane asked that staff reflect some of these challenges on the appropriate webpages. Commissioner Kane also noted that he has experienced several pedestrian facility closures for construction without reasonable detours. He has received mixed messages from staff and developers on where these issues stem from.

Commissioner Omay asked if staff have seen success in reducing speed limits without other significant changes to the roadway or enforcement. Staff indicated that data collection has shown some decrease in speeds just from speed limit changes.

Motion for staff to investigate pedestrian facility closures, particularly around the Landmark Mall/West End development: Commissioner McManus

Second: Commissioner Kane

Motion carries unanimously.

Commissioner Lovain asked if the route between the Alexandria City High School King Street Campus and Minnie Howard would be considered for further improvements, though that area of the project map is shown as complete. Staff noted that while the speed limit reduction project on Braddock Road is complete, further improvements will be considered with Safe Routes to Schools efforts.

Commissioner Kane noted that only a third of a mile of bike lanes had been completed in the last fiscal year. Staff noted that several bike lane projects are underway and are expected to be completed in the near future. Also suggested that more of the projects in the workplan should have webpages or information on the Complete Streets webpage. Commissioner Kane asked if there was a location where staff made information about grant applications and awards public. Staff directed him to the Transportation Funding webpage at <https://www.alexandriava.gov/transportation-planning/transportation-funding>.

Commissioner Catherwood stated that she does not believe that sharrows are an appropriate replacement for dedicated bike facilities and that they do not provide the same safety or comfort benefits. Chair McMahan agreed. Commissioner Catherwood also asked how a neighborhood could pursue a neighborhood sidewalk project, as mentioned in the presentation. Staff directed her to the neighborhood sidewalk application, available online.

4. ACTION ITEM: Consideration of Endorsement of the Transit Ridership Incentive Program (TRIP) Grant Application

Chris Ziemann, Transportation Planning, Division Chief, discussed how DRPT announced a mid-cycle TRIP grant, and that the City will be applying for funding for bus shelters to be used at the WestEnd development transit center

until the permanent transit center funding is available. The shelters would be relocated to other bus stops at that time.

Motion for the Transportation Commission to provide a letter of endorsement to City Council for the TRIP grant application: Commissioner Kane

Second: Commissioner Maslanka

Commissioner Omay abstains.

Motion carries 6-0.

5. ACTION ITEM: FY 2025 City Budget Priorities

Megan Oleynik, Long Range Planner, presented on the letter from the City Manager requesting Boards and Commissions provide input on budget priorities. Ms. Oleynik presented a reminder of the FY24 budget priorities and asked the Commission to take into consideration the potential implications of the FY25 Washington Metro Area Transit Authority (WMATA) budget gap.

Commissioner Lovain stated that while he felt the WMATA budget gap needed to be addressed, that it should be a regional solution, and not be the responsibility of the City.

Commissioner Maslanka stated that he sees the WMATA budget gap as the most important budget issue that the City is facing this year and that the jurisdictions be willing to pay a fair share of increased subsidies if needed to prevent major service cuts. He also suggested that Virginia further explore taxing vehicle miles traveled to fund infrastructure, as revenues from gas taxes decrease as electric vehicles are adopted.

Commissioner Kane stated that the region needs to respond to the WMATA budget gap long term.

Commissioner Omay asked that the budget consider connectivity as a principle to align with DASH, and that the budget letter should expand on the past year's priority to improve and maintain regional transit to specifically mention WMATA and DASH.

Commissioner Catherwood asked that expanding and maintaining bike infrastructure be noted in the budget letter, including pursuing a cross-city (East-West) bike facility.

Commissioner McMahon helped synthesize the priorities of the other Commissioners, and noted that the budget letter would highlight how all of the other priorities would help achieve climate action goals. The main categories that the Commissioners highlighted in their discussion were 1) Addressing WMATA budget gap and maintaining service to the extent possible 2) Continue to maintain and improvement DASH levels of service and to implement the Alexandria Transit Vision Plan 3) Complete Streets and Vision Zero including expanding bike network, and 4) Maintaining trails at a good level of services and expanding trail network.

Motion for the Transportation Commission to provide a letter of endorsement to City Council for the FY25 VHSIP grant: Commissioner Kane

Second: Commissioner Catherwood

Motion carries unanimously.

6. Commissioner updates

Commissioner Kane – The Traffic & Parking Board will consider a proposal for bike lanes on E. Abingdon Lane at their October meeting.

Commissioner Maslanka – Attended a webinar and received information from the Eno Transportation Center on a vehicle miles traveled (VMT) fee based pilot program.

Commissioner McMahon- The Planning Commission continues to consider the Zoning for Housing, Housing for all initiative.

Commissioner McManus- At the DASH Advisory Committee, they learned that the order for electric buses funded through recent grant rewards has been made.

Commissioner Omay- DASH ridership continues to be high, and DASH is beginning considerations of their FY25 budget.

Karl Bach on behalf of Councilman McPike – Council is having a townhall on Saturday, October 21 at the Charles Houston Recreation Center.

7. Items of Consent

8. Other Business

- Long Range Planner and Staff Liaison Megan Oleynik will be moving to a new role at the City and will no longer be staffing Transportation Commission Meetings
- The Commission will consider the December meeting to avoid holiday travel.
- Commissioner McManus asked if staff would consider bringing electric vehicle (EV) experts such as Electrify American and the City's EV planner to the Commission for an educational item.

9. Adjournment

Motion to adjourn: Commissioner Catherwood

Second: Commissioner Lovain

Motion carries unanimously.

At 9:14 pm, the Transportation Commission adjourned.

*City of Alexandria,
Virginia*

MEMORANDUM

DATE: NOVEMBER 15, 2023

TO: MEMBERS OF THE TRANSPORTATION COMMISSION

FROM: HILLARY ORR, DEPUTY DIRECTOR, T&ES

SUBJECT: AGENDA ITEM #3 – SMART MOBILITY

ISSUE: The City is reporting on the growth of the Smart Mobility program, staffing, ongoing projects, and documentation efforts.

RECOMMENDATION: That the Transportation Commission receive the update on the Smart Mobility Program.

BACKGROUND: The [Smart Mobility Program](#) exists at the intersection of technology and transportation. This program brings in new technologies and organizes data to better manage citywide traffic patterns to improve trip reliability, manage congestion, and increase travel options. The program also aims to provide individual travelers with information they need to take safer and more enjoyable trips. This can look like traffic signals that respond to real-time conditions, moving buses through their routes more quickly, and understanding where pedestrians and cyclists are at a higher risk. Alexandria is committed to being a leader in this space so the City can take advantage of future transportation infrastructure advancements, such as self-driving cars and real-time traffic management.

This year, the Smart Mobility program has hired two new staff: a Program Manager and Program Analyst. These two roles are working to document the program's goals and deploy technology to improve the transportation system.

DISCUSSION: The team has published an updated version of the [Smart Mobility Framework](#), which builds on the nine work pillars laid out in the original [Smart Mobility Community Presentation](#), as well as an [FY 2024 Annual Work Plan](#). These pillars are Transit, Parking, Traffic Signals, Mobility On Demand, Infrastructure, Public Safety, Road Weather, Performance Monitoring, and Information Management. The team is in the process of deploying pilots to serve these pillars, document lessons learned, and position Alexandria at the forefront of transportation technology.

ATTACHMENTS:

Attachment 1: [Smart Mobility Program Report and Annual Work Plan](#)

Attachment 2: [Smart Mobility Community Presentation](#)

Attachment 3: Virginia Tech Transportation Institute Smart Intersection Pilot



ALEXANDRIA SMART MOBILITY



WE ARE



- City of Alexandria, VA
- Department of Transportation & Environmental Services
- Transportation Engineering Division

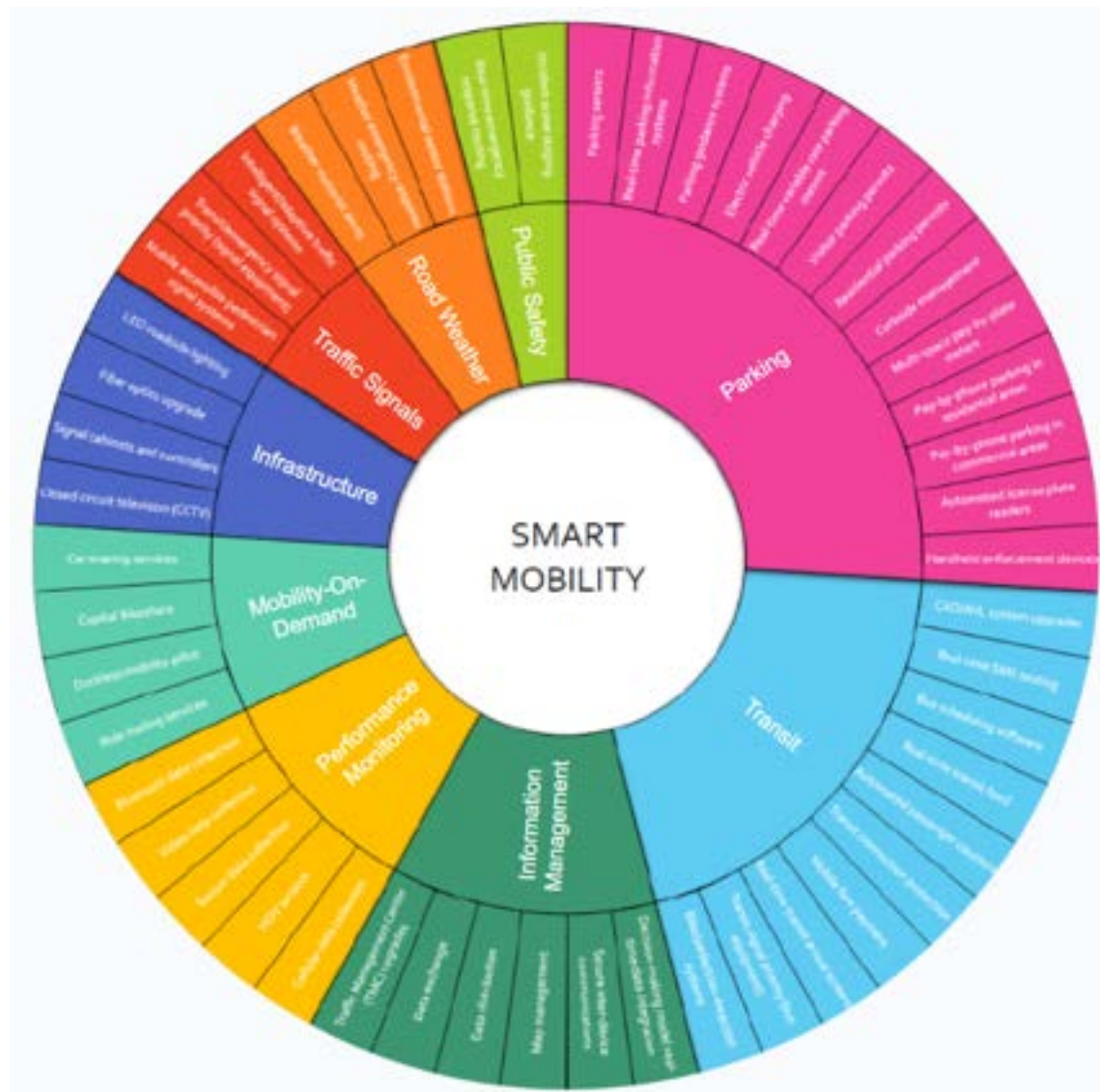


ABOUT SMART MOBILITY

Smart Mobility exists at the intersection of technology and transportation. This program brings in new technologies and organizes data to better orchestrate city-wide traffic patterns to improve trip reliability and increase travel options. It also strives to provide individual travelers with information they need to take safer and more enjoyable trips. This can look like traffic signals that respond to real-time conditions, moving buses through their routes quicker, and understanding where pedestrians and cyclists are at a higher risk. Alexandria is committed to being a leader in this space so the City can take advantage of future transportation infrastructure advancements, such as self-driving cars and real-time traffic management.

FY23 MAJOR ACCOMPLISHMENTS

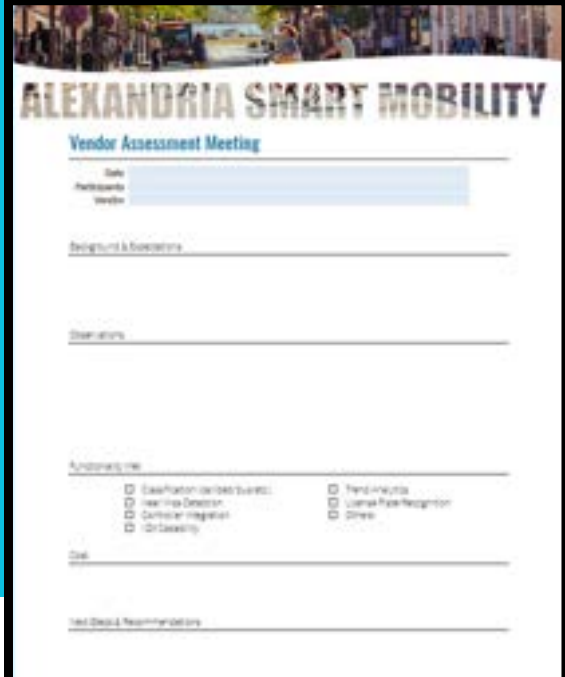
- **Standardized vendor assessment** process for consistent evaluation of functionality across tools
- **Updated public-facing maps, webpages, and reference documents** to tell the team's story
- **Designed 6 smart intersection tests**
- **Initiated asset management processes** to track our inventory of transportation technology
- Completed **design of Adaptive 1 and ITS Phase 3**



FY23 MAJOR ACCOMPLISHMENTS

Standardized Vendor Assessment

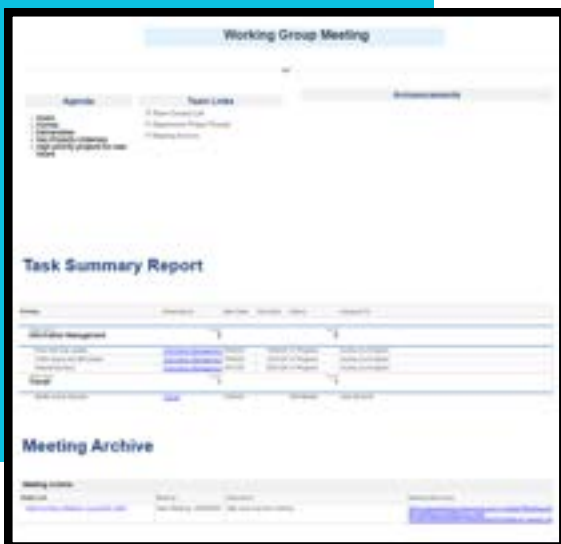
Starting with Smart Intersection technologies, we standardized a process for evaluating vendors against shared functionality. We track each interaction we have with a vendor, and log an index of which tools can solve key problem areas. This process is scalable to other program areas like parking and asset management technologies, and the Working Group will help us tailor the process to each new area.



A screenshot of a 'Vendor Assessment Meeting' form. The form is titled 'ALEXANDRIA SMART MOBILITY Vendor Assessment Meeting'. It includes fields for 'Date', 'Participants', and 'Vendor'. Below these are sections for 'Background & Context', 'Objectives', and 'Findings/Notes'. The 'Findings/Notes' section contains two columns of checkboxes: 'Capabilities/Issues/Tools' and 'Findings/Notes/Concerns/Other'. At the bottom, there are fields for 'Date' and 'Next Steps & Recommendations'.

Smart Mobility Working Group

Based on the pillars and guiding principles defined in the Smart Mobility Framework, we have organized cross-disciplinary committees to manage and standardize projects. Committees will report their progress quarterly using an easy form that feeds a central dashboard. Budget information, timelines, and standard documents like the vendor assessment will be included here.



A screenshot of a 'Working Group Meeting' dashboard. The dashboard is titled 'Working Group Meeting' and features a navigation menu with 'Agenda', 'Team Lists', and 'Documentation'. Below the menu is a 'Task Summary Report' section with a table of tasks. At the bottom, there is a 'Meeting Archive' section with a list of meeting records.

FY24 MAJOR WORK OBJECTIVES



Adaptive Signal Control

This project will install new cameras, controllers, and a management system to enable signals to handle real-time conditions and predict near term impacts. New technologies have evolved since the origin of this project, and our team is working to deliver this project faster and in a way that is easier to maintain. This year we will identify the adaptive technology that will be deployed, and advertise Phase One of the project, deploying along the Duke Street and Van Dorn Street Corridors.



Traffic Data Governance

Traffic counts, turning movement counts, and near miss counts are gathered through several different methods and stored in different formats. Our team is building processes to make all this information comparable and accessible. This year we will use a tool called DataPoint to merge historic count data with new, real-time counts that we are gathering from AI powered tools



FY24 MAJOR WORK OBJECTIVES

Smart Intersections

Modern machine learning models can differentiate between cars, buses, pedestrians, and cyclists. These tools use these classifications to detect near misses, count traffic patterns, and can actuate change based on what they observe. This year, our team is deploying 6 of these tools in partnership with the Virginia Tech Transportation Institute to understand their capabilities and leverage their insights to better engineer our intersections.



Asset Management

Maintenance of Alexandria's transportation infrastructure can be optimized if we know when a component was installed, how heavily it has been used, and any issues that have been observed. Many future technologies will also require minimum hardware or software specifications to operate. Our team is leveraging CityWorks StoreRoom this year to implement processes that track changes to our inventory, starting with our traffic signals and controllers.

FY24 MAJOR WORK OBJECTIVES

Intelligent Transportation Systems (ITS) Phase 3

Phase 3 of this project began construction in FY24 and will lay fiber and install CCTV cameras in several new intersections. Construction of this project will be completed this year, and will open the door to adaptive signal control and further improvements to the Transportation Management Center.



Autonomous Vehicle Preparedness

Autonomous Vehicles are being deployed in cities across the country, including nearby DC. The team is advocating for policy that empowers the City to permit and enforce AV operation and is collaborating at a national level on this topic. The collection of safety, incident, and trip data from AV companies is essential to integrating this new and uncertain technology into our transportation network.



Connected Vehicle Infrastructure

All vehicles built after 2020 are equipped with components that send and receive safety information. The team is working to deploy Vehicle-to-Infrastructure technology that can increase safety and improve how we manage traffic flow on our roadways.



Securing Future Funding

The City is pursuing funding for several key projects. The team applied for NVTI 70% funding to support vehicle-to-infrastructure technology that will allow for connected vehicles to exchange location and signal phasing data with traffic signals. Later this year, the team will also pursue DOT SMART funding to support automatic infrastructure quality assessments.

ONGOING PROGRAM MANAGEMENT



Smart Mobility Working Group

The Smart Mobility Working Group meets quarterly to align technology efforts across T&ES. It is comprised of committees that represent the core pillars outlined in the Smart Mobility Framework, and includes representatives from Traffic Ops, Transportation Engineering, DASH, Mobility Services, and Transportation Planning. This year, the team will expand to include staff from ITS and APD.



Transit Signal Priority

Transit Signal Priority (TSP) allows buses to receive longer green lights and shorter red lights to stay on schedule, increasing reliability and route speed. WMATA and DASH use different technologies to implement TSP, and our team is working to support both agencies in improving their services with minimal disruption to traffic flows.



Smart Parking Management

Dynamic parking pricing and transparent parking availability have a significant impact on our transportation system. Our current parking technology, Smarking, helps the city manage parking availability. Our team is working to maximize the value of Smarking and use it to plan for future technologies that improve curb management.

PROGRAM BUDGET

PROJECTS	PRIOR YEAR	FY 2024	FY 2025-2030
ITS & Broadband	\$18.7M	\$600K	\$2.4M
Transit	\$2.9M	\$630K	\$4.4M
Smart Mobility Implementation	\$2.2M	\$0	\$5.7M
Parking Technology	\$2.1M	\$0	\$0
Smart Signals	\$8.4M	\$0	\$1.1M
Future Grants (unsecured*)	---	---	\$8M

**Total Prior Year
Funding**

\$34M

**FY 2024
Funding**

\$1.2M

**FY 2025-2030
Funding**

\$22M*

KEY PARTNERSHIPS



**VIRGINIA TECH
TRANSPORTATION INSTITUTE**
VIRGINIA TECH

The City partnered with VTTI to test 5 smart intersection tools at the intersection of Potomac Ave. and East Glebe Rd. This academic partner will conduct deep analysis of the data collected by these tools, resulting in both new information about mobility behavior at the intersection and the capabilities of the vendors. This relationship also represents an opportunity to partner with VTTI on future projects in a time when civic-academic partnerships are highly valued by national funders.

Regional Multi-Modal Mobility Program



The RM3P is a collaborative and data-driven program to improve safety, reliability, and mobility for travelers in Northern Virginia. Led by VDOT, NVTA, and DRPT, the program focuses on standardizing transportation data to promote data exchange across the region. As the City tests and deploys new technologies, we are working to align reporting systems to the RM3P to maximize compatibility with nearby areas and future opportunities.



NACTO Emerging Technologies Work Group

The National Association of City Transportation Officials (NACTO) supports an autonomous future that enhances all aspects of cities' transportation systems, from improving safety for all road users, re-balancing the use of the right-of-way, and expanding mobility for all. The City participate on their work group to stay abreast of emerging topics.

KEY RESOURCES

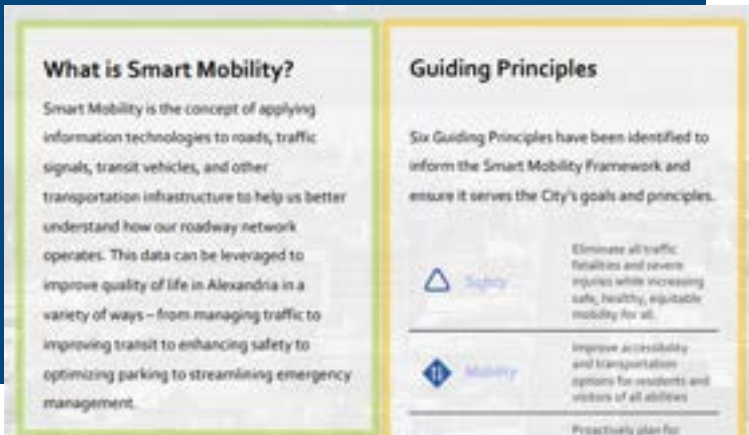
[Smart Mobility Home Page](#)

This is the landing page for all Smart Mobility efforts. Come here for information on existing and planned projects, maps tracking current work, and high level vision documents like the Smart Mobility Framework



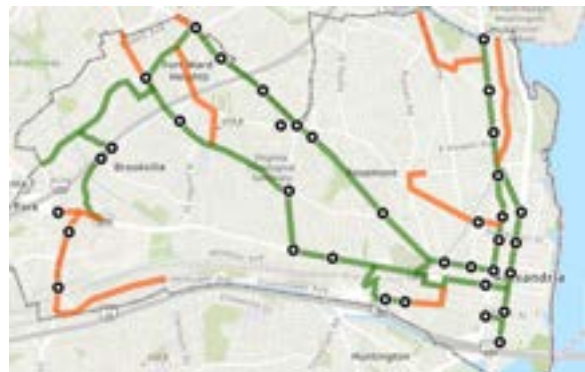
[Smart Mobility Framework](#)

This annually published document tracks updates to our major projects and outlines the nine pillars under which we organize our work.



[Smart Mobility Viewer](#)

This GIS map tracks our ongoing efforts, including fiber deployment, TSP intersections, and pedestrian safety measures.





City of Alexandria

Smart Mobility Framework

What is Smart Mobility?

- Applying Information Technology (IT) to the transportation system
- Improving how we travel by supporting more affordable and sustainable mobility choices
- Using advancements in IT to collect, analyze, and apply data to optimize the transportation network

Strategy

- Proactive, innovative approach
- Organizing existing and planned efforts under one umbrella
- Interdepartmental team of City staff
- Implementable solutions to immediate problems
- Laying the groundwork for emerging and future technologies

Guiding Principles



Safety

Eliminate all traffic fatalities and severe injuries while increasing safe, healthy, equitable mobility for all.



Mobility

Improve accessibility and transportation options for residents and visitors of all abilities.



Forward-looking

Proactively plan for emerging and future transportation technologies.



Sustainability

Improve environmental quality and resiliency.












Traffic Management

Optimize traffic flow on City streets, improving travel times and reducing congestion.



Transparency

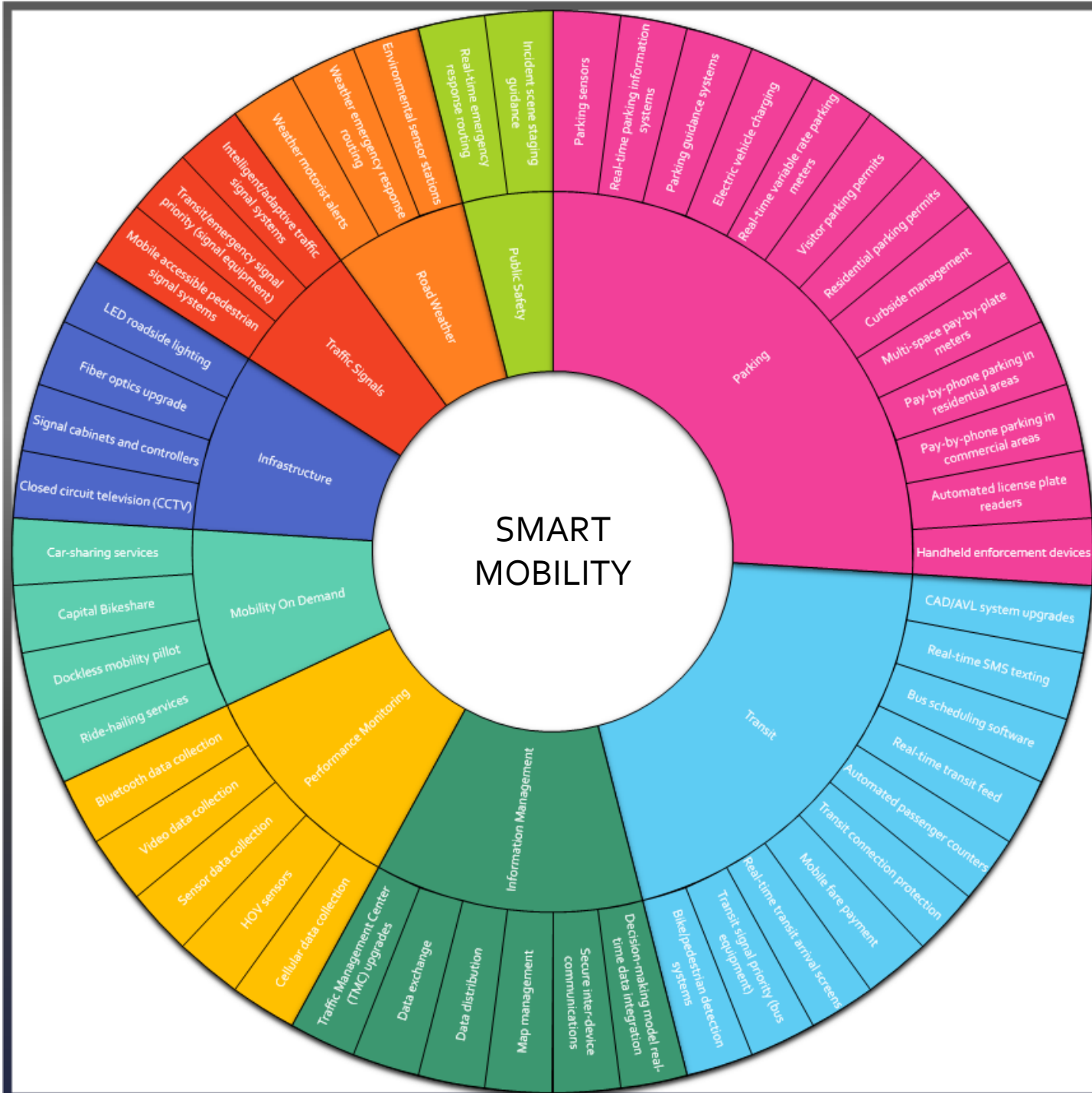
Use data and analytics to improve decision-making and City services while broadening public access to information.

CURRENT PROGRAMS	PLANNED PROGRAMS	PROGRAMS UNDER CONSIDERATION	SMART MOBILITY
<p>Real-time arrival screens</p> <p>Fiber optics</p> <p>Signal cabinets & controllers</p> <p>CCTV</p> <p>Weather stations</p> <p>Intelligent traffic signals</p> <p>Car-sharing</p> <p>Capital Bikeshare</p> <p>Ride-hailing</p> <p>Parking enforcement devices</p> <p>Automated plate readers</p> <p>Pay-by-phone parking</p> <p>Data exchange</p> <p>Data distribution</p> <p>Secure communications</p> <p>Automated interactive maps</p>	<p>Transit signal priority</p> <p>Mobile fare payment</p> <p>Automated passenger counts</p> <p>Real-time transit feed</p> <p>Bus scheduling software</p> <p>Real-time transit stop texting</p> <p>Bus CAD/AVL</p> <p>Emergency vehicle preemption</p> <p>Dockless mobility pilot</p> <p>Pay-by-plate parking</p> <p>Curbside management</p> <p>Streamlined parking permits</p> <p>Bluetooth data collection</p> <p>Video data collection</p> <p>Sensor data collection</p> <p>Cellular data collection</p> <p>TMC upgrades</p> <p>Decision-making model</p>	<p>Ped/bike detection systems</p> <p>Transit connection protection</p> <p>LED roadside lighting</p> <p>Emergency response routing</p> <p>Weather motorist alerts</p> <p>Incident scene staging</p> <p>Accessible ped systems</p> <p>Variable rate parking meters</p> <p>EV charging stations</p> <p>Parking guidance systems</p> <p>Real-time parking info systems</p> <p>Parking sensors</p> <p>HOV sensors</p>	<p>The City of Alexandria’s Smart Mobility Framework includes nine interconnected categories of programs:</p> <ul style="list-style-type: none">  TRANSIT  PARKING  PUBLIC SAFETY  ROAD WEATHER  MOBILITY ON DEMAND  TRAFFIC SIGNALS  PERFORMANCE MONITORING  INFRASTRUCTURE  INFORMATION MANAGEMENT

SMART MOBILITY

The City of Alexandria's Smart Mobility Framework includes nine interconnected categories of programs:

-  **TRANSIT**
-  **PARKING**
-  **PUBLIC SAFETY**
-  **ROAD WEATHER**
-  **MOBILITY ON DEMAND**
-  **TRAFFIC SIGNALS**
-  **PERFORMANCE MONITORING**
-  **INFRASTRUCTURE**
-  **INFORMATION MANAGEMENT**



TRANSIT

WHAT WE'RE DOING

Transit signal priority, mobile fare payment, real-time arrival screens, real-time transit feed

WHAT IT MEANS FOR YOU

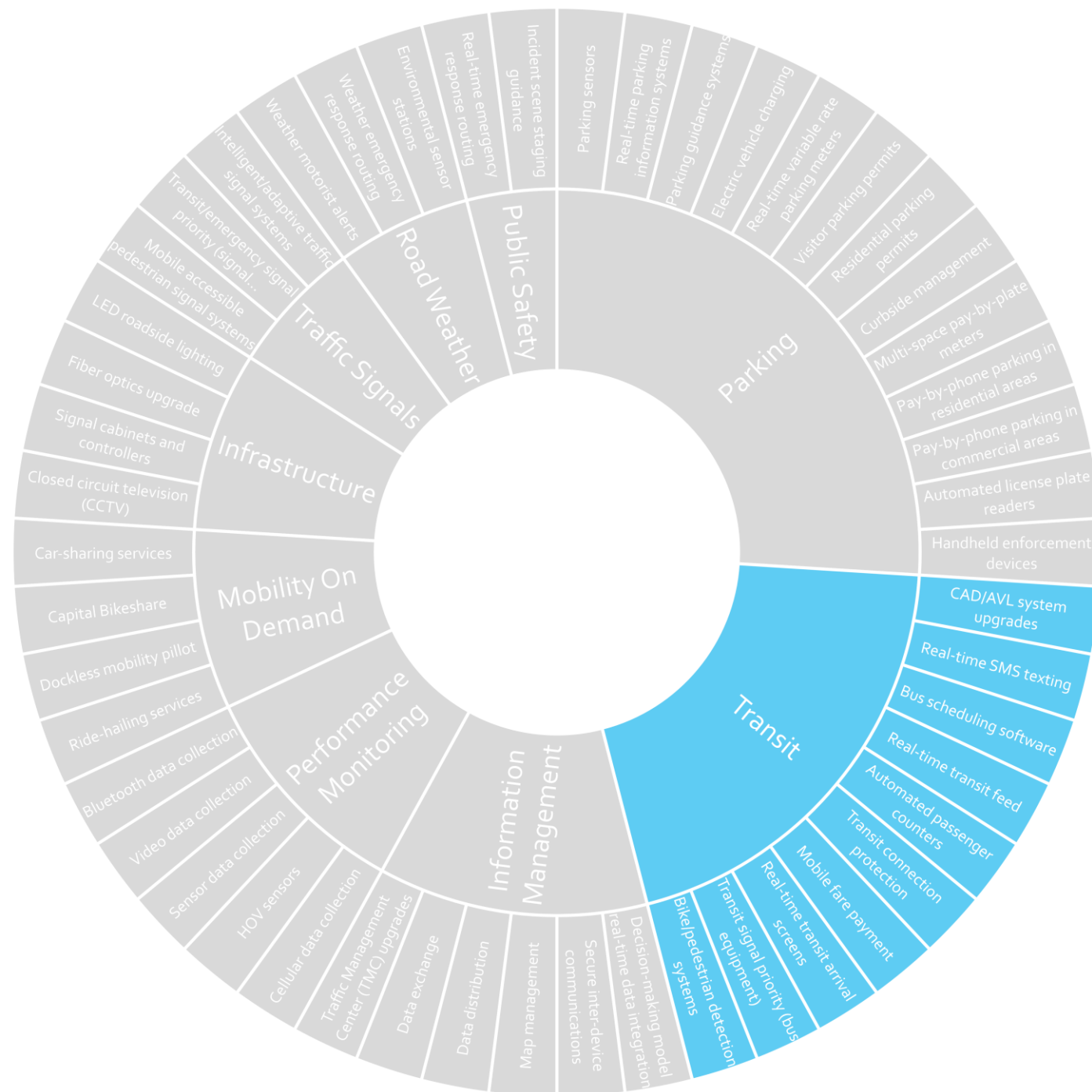
Faster bus service



Easier trip planning



Easier trip payment



P PARKING

WHAT WE'RE DOING

Streamlined enforcement, pay-by-phone parking, variable rate meters, curbside management

WHAT IT MEANS FOR YOU

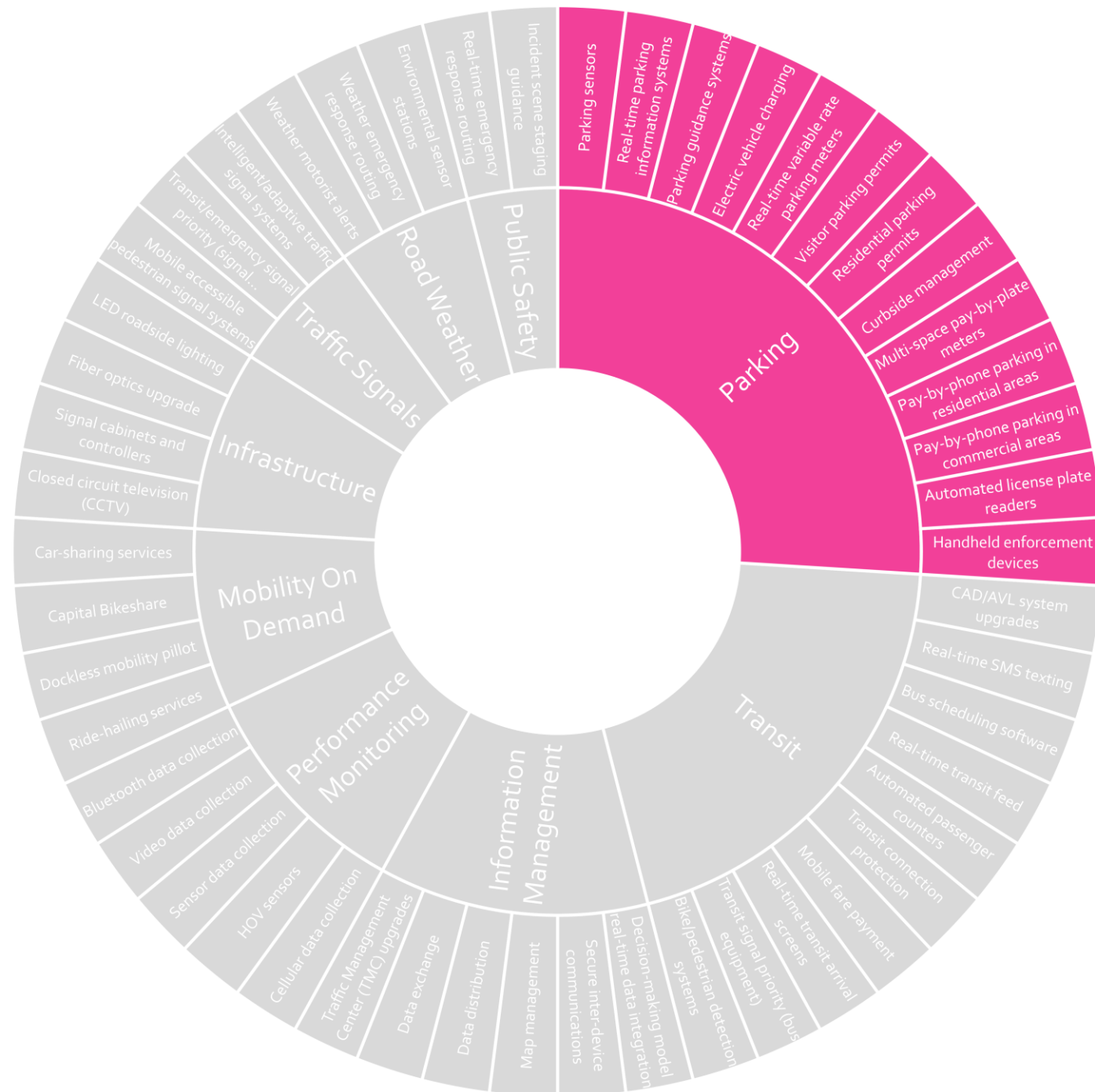
Less illegal parking



Easier parking payment



Less time searching for parking




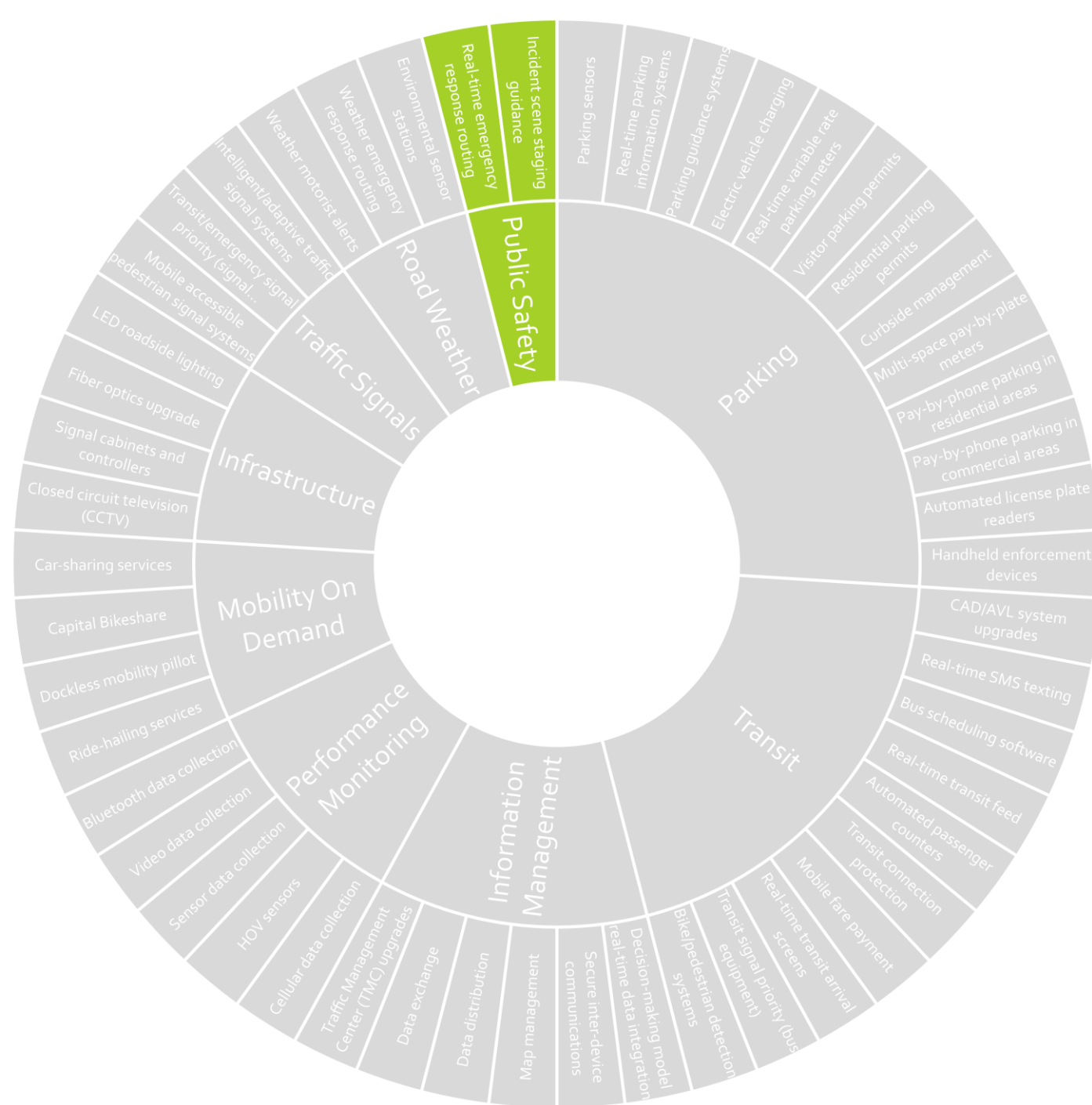
PUBLIC SAFETY

WHAT WE'RE DOING

Emergency routing support, emergency vehicle preemption

WHAT IT MEANS FOR YOU

Faster emergency response times 




ROAD WEATHER



WHAT WE'RE DOING

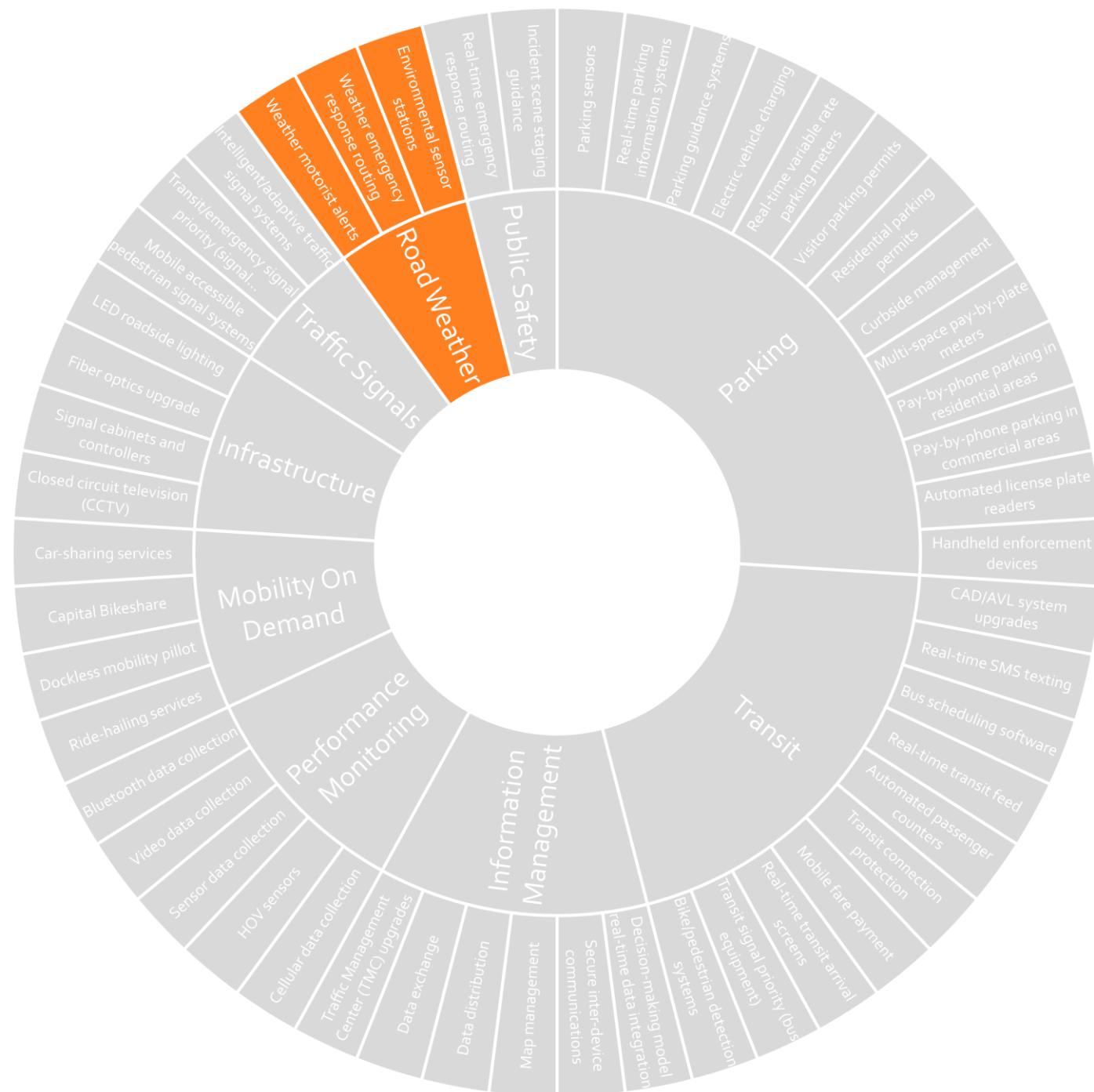
Flood sensors, weather stations, weather-informed emergency routing support

WHAT IT MEANS FOR YOU

Faster emergency response times 

More accurate road weather info   

Preemptive flooding prediction  





MOBILITY ON DEMAND

WHAT WE'RE DOING

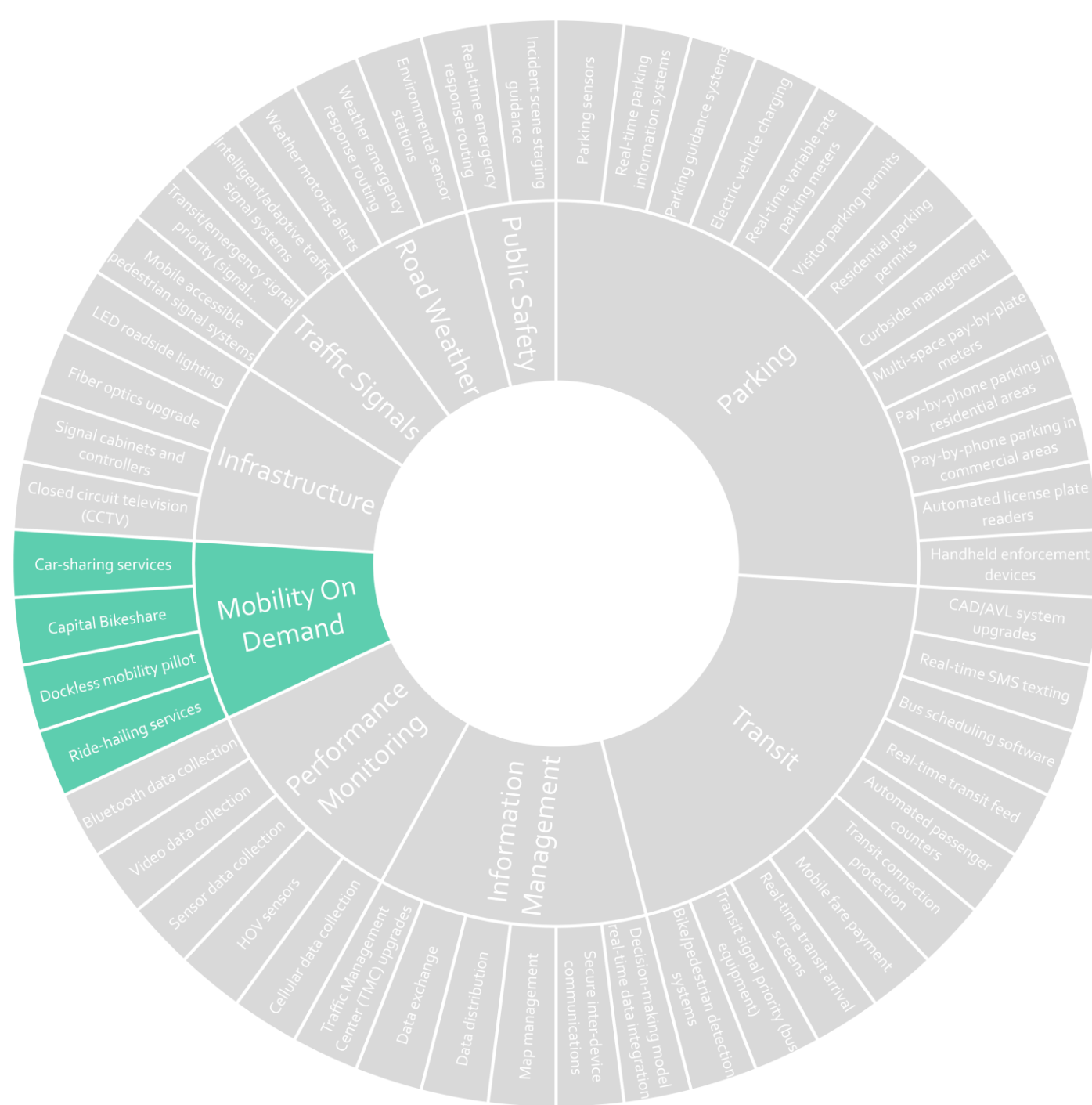
Dockless mobility pilot, Capital Bikeshare expansion, continued car-sharing and ride-hailing

WHAT IT MEANS FOR YOU

More ways to get around









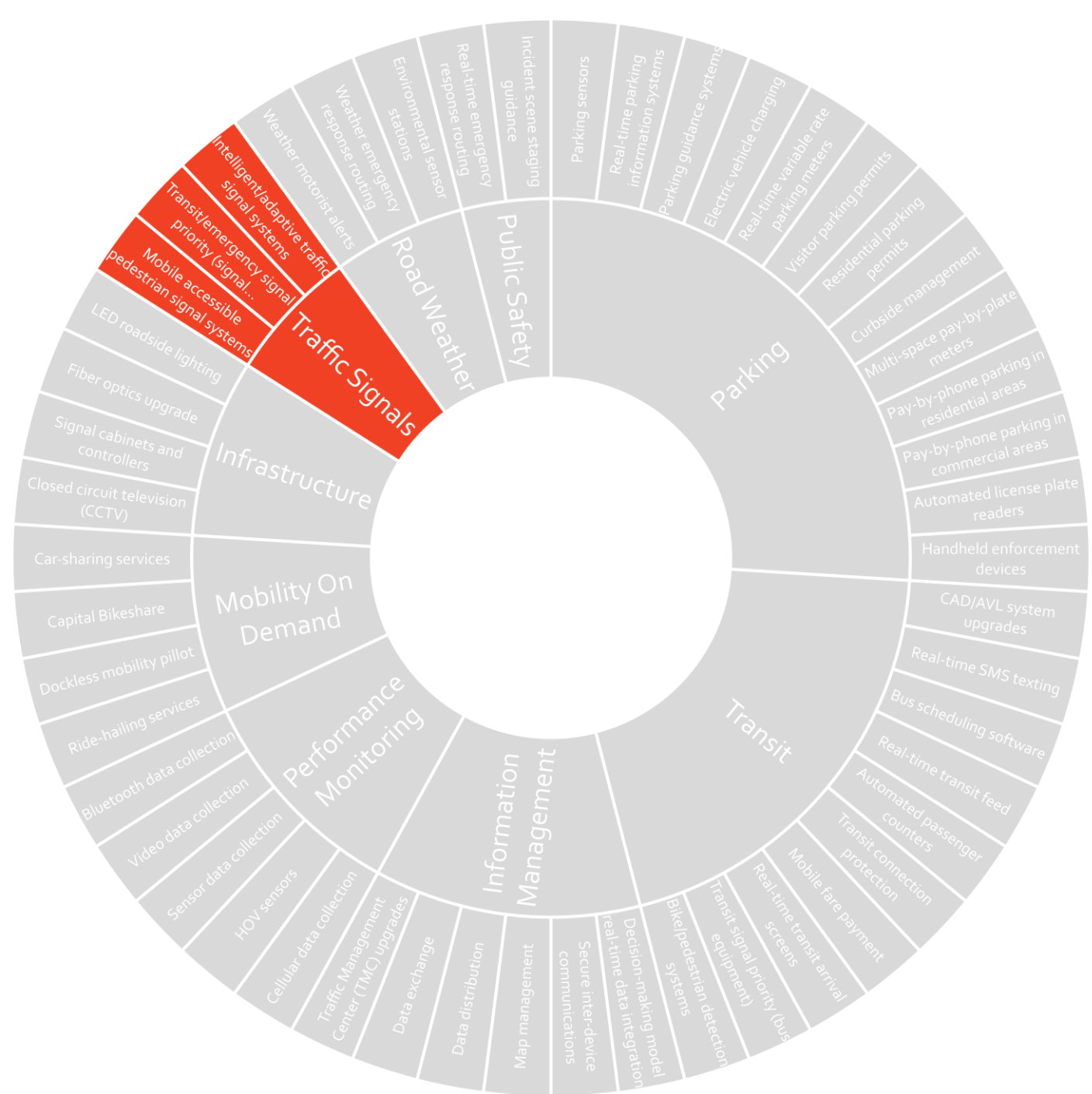
Less demand for parking



? TRAFFIC SIGNALS

WHAT WE'RE DOING
Intelligent/adaptive signal systems, transit signal priority, emergency vehicle preemption

- WHAT IT MEANS FOR YOU**
- Better-managed traffic flow   
 - Faster bus service  
 - Faster emergency response times 



PERFORMANCE MONITORING

WHAT WE'RE DOING

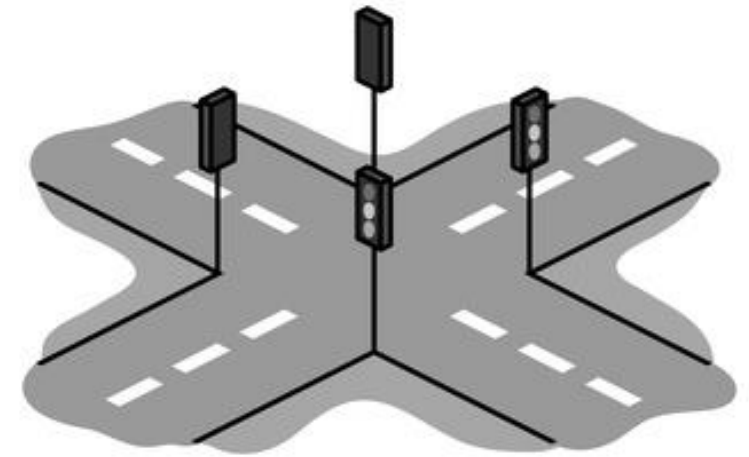
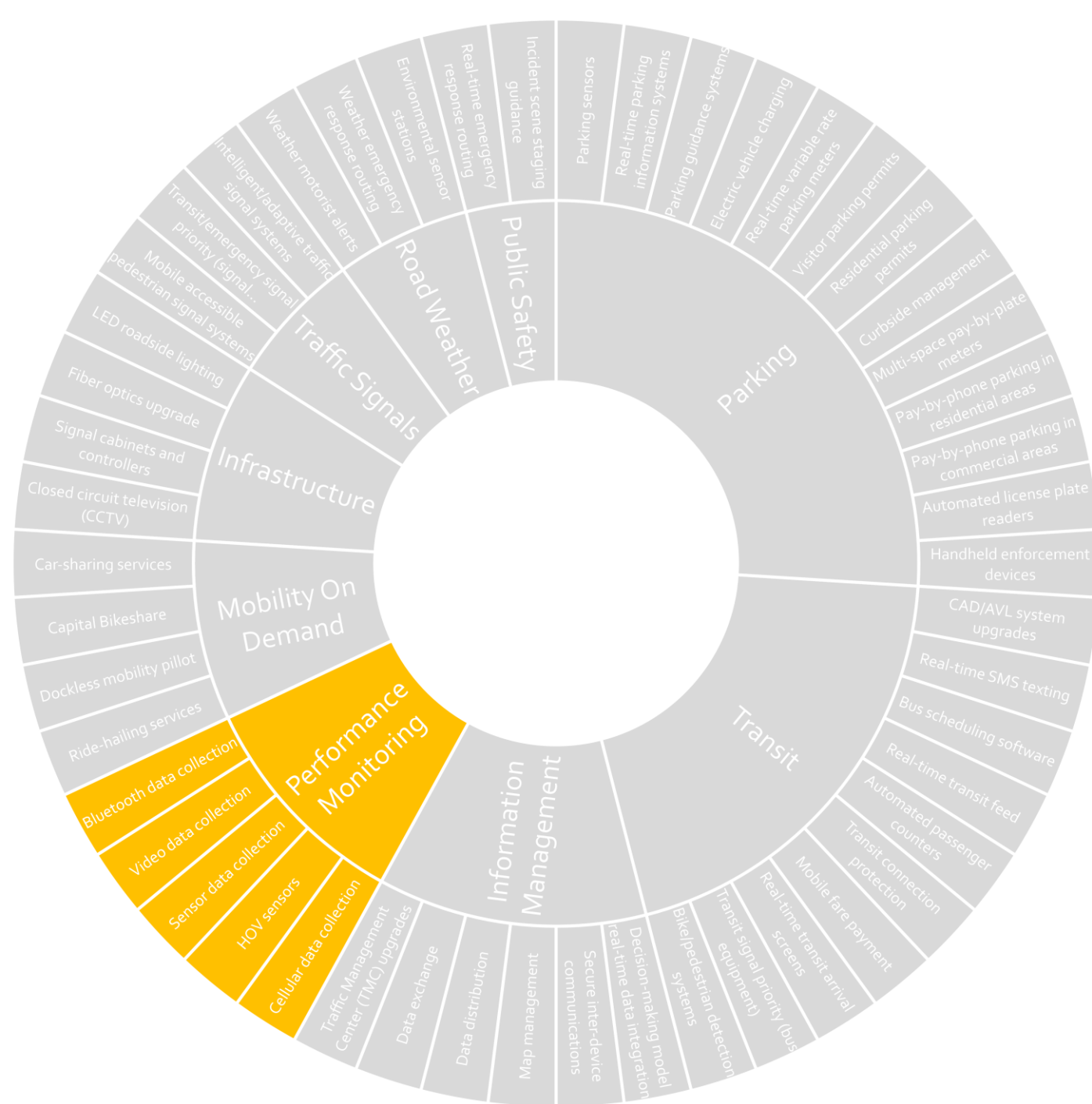
Expand bluetooth and sensor data collection, research HOV sensors and video and cellular data collection

WHAT IT MEANS FOR YOU

Results-based road management



Better-managed traffic flow



WHAT WE'RE DOING

Expand fiber optics, upgrade traffic signals, expand CCTV, research LED roadside lighting

WHAT IT MEANS FOR YOU

Optimized transportation network



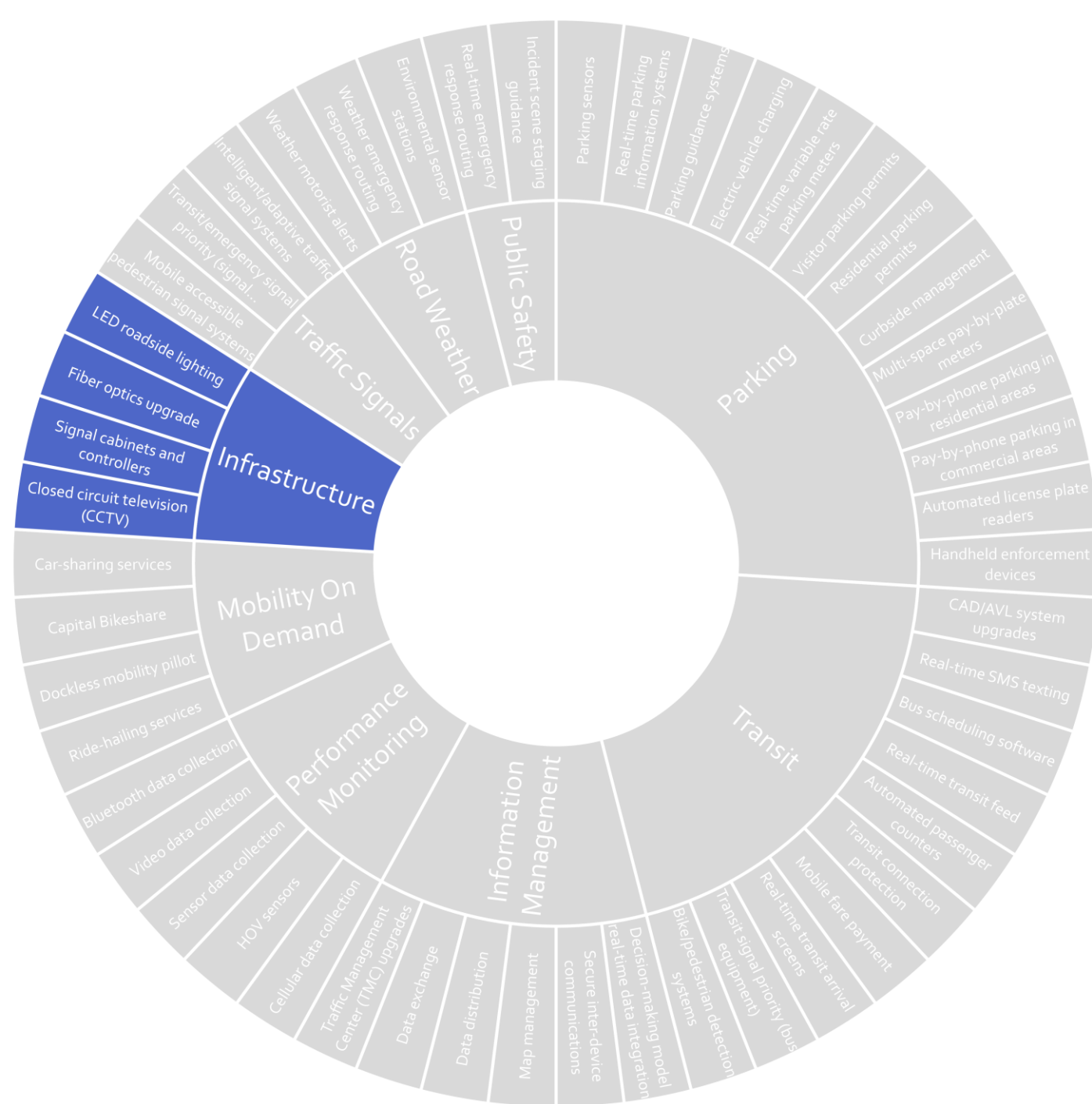
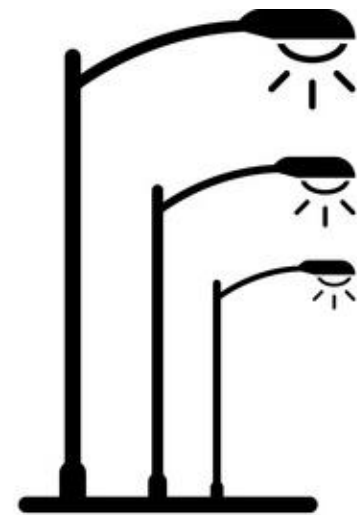
Better-managed traffic flow



Municipal broadband



More efficient roadside lighting



INFORMATION MANAGEMENT

WHAT WE'RE DOING

Upgraded traffic management center, regional data exchanges, interactive maps

WHAT IT MEANS FOR YOU

Optimized transportation network



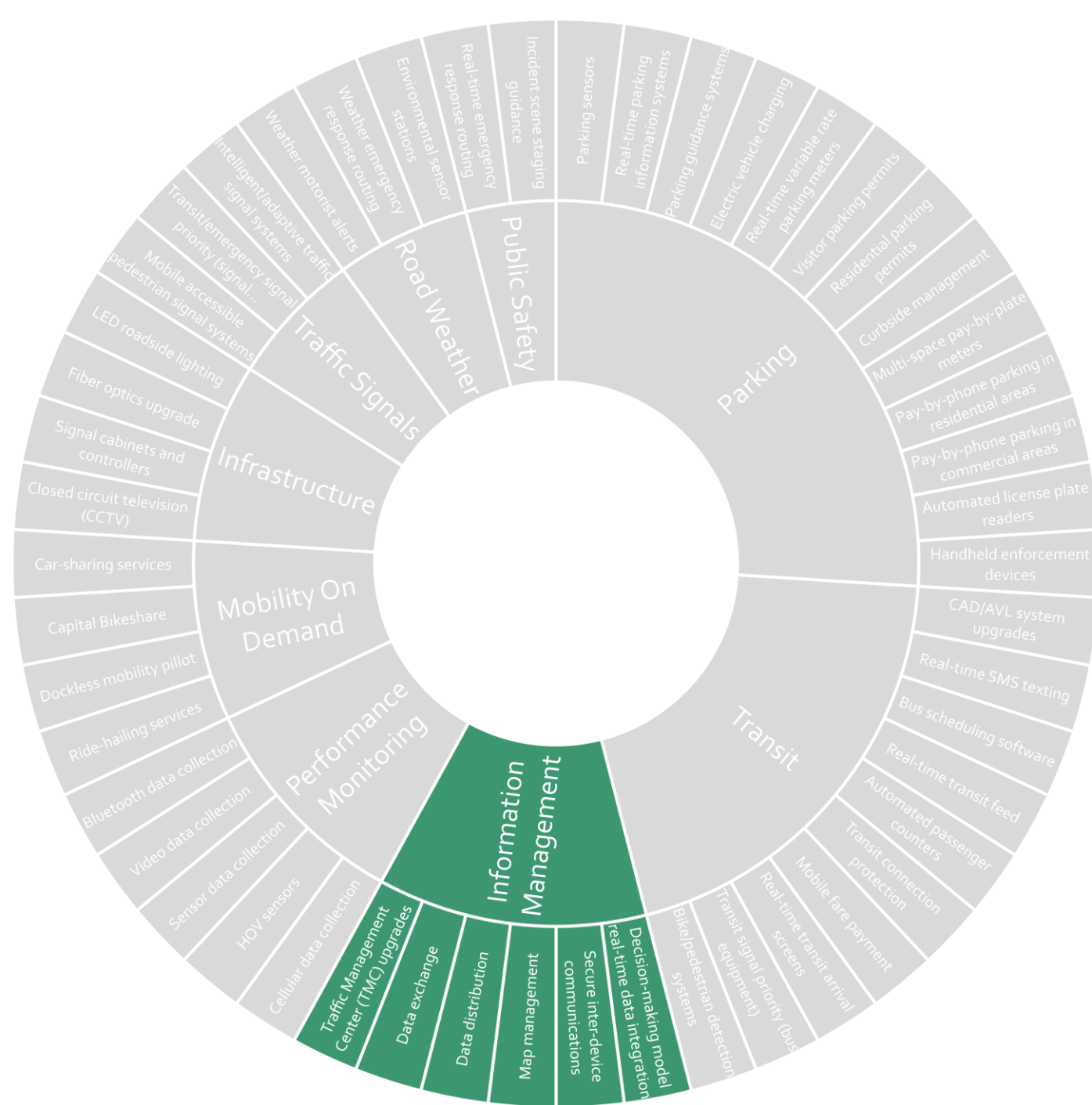
Better-managed traffic flow



More informed decision-making



Accurate data for third party apps



SMART MOBILITY TIMELINE

SHORT TERM

Real-time arrival screens
 Automated passenger counts
 Real-time transit feed
 Real-time transit stop texting
 Parking enforcement devices
 Automated plate readers
 Pay-by-phone parking
 Weather stations
 Car-sharing
 Dockless mobility pilot
 Ride-hailing
 Intelligent traffic signals
 Bluetooth data collection
 Video data collection
 Sensor data collection
 Cellular data collection
 HOV sensors
 Fiber optics
 Signal cabinets & controllers
 CCTV
 TMC upgrades
 Data exchange
 Data distribution
 Secure communications

MEDIUM TERM

Ped/bike detection systems
 Transit signal priority
 Mobile fare payment
 Transit connection protection
 Bus scheduling software
 Bus CAD/AVL
 EV charging stations
 Pay-by-plate parking
 Curbside management
 Streamlined parking permits
 Variable rate parking meters
 Parking guidance systems
 Real-time parking info systems
 Parking sensors
 Emergency vehicle preemption
 Capital Bikeshare
 Automated interactive maps

LONG TERM

Incident scene staging
 Emergency response routing
 Weather motorist alerts
 Accessible ped systems
 LED roadside lighting
 Decision-making model

CATEGORIES



TRANSIT



PARKING



PUBLIC SAFETY



ROAD WEATHER



MOBILITY ON DEMAND



TRAFFIC SIGNALS



PERFORMANCE MONITORING



INFRASTRUCTURE



INFORMATION MANAGEMENT

Smart Mobility Financing

Prior Year	FY19	FY20	FY21	FY22	FY23	FY24	FY25	City Funding	Total Grant Funding	Total Financing
\$15,742,493	\$4,066,400	\$2,596,570	\$2,205,123	\$7,716,000	\$3,910,000	\$3,015,745	\$3,250,000	\$1,812,277	\$40,636,988	\$43,072,265

Source	Funding
Prior Year (through FY 18)	\$16,312,427
NVTA	\$1,431,491
CMAQ/RSTP	\$9,619,347
SmartScale	\$14,709,000
City	\$1,000,000
Total Program Financing	\$43,072,265

Smart Mobility Video

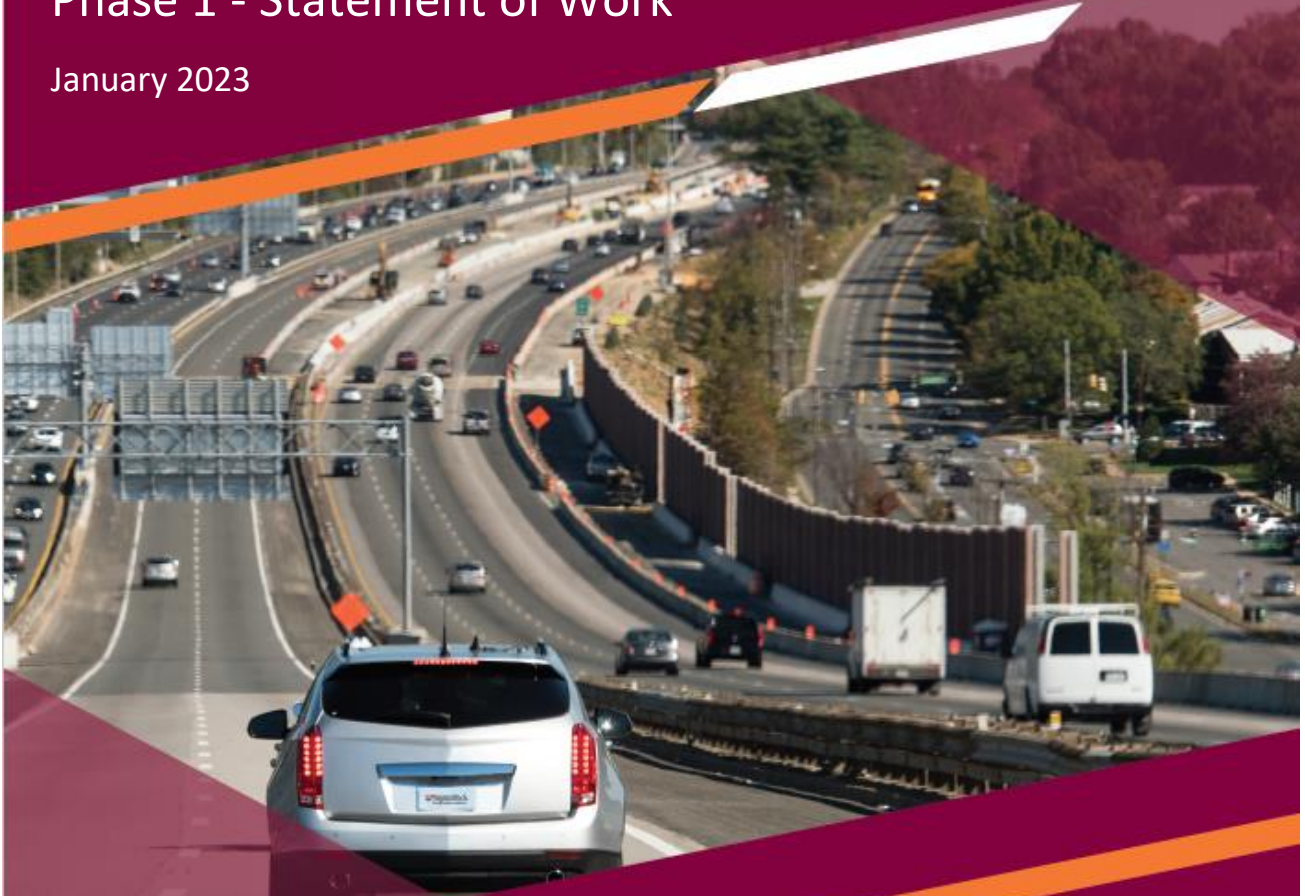




VIRGINIA TECH
TRANSPORTATION INSTITUTE

City of Alexandria
Smart Intersection Deployment
Phase 1 - Statement of Work

January 2023



Submitted By:
Virginia Tech Transportation Institute
3500 Transportation Research Plaza
Blacksburg, VA

Statement of Work (Phase 1)

Background

This statement of work (SOW) aims to build upon the Virginia Tech Transportation Institute (VTTI) Smart Intersection project, which was funded by the Virginia Department of Transportation's (VDOT) Innovation and Technology Transportation Fund (ITTF) in the City of Alexandria. As a partner in the VDOT ITTF project, the city will benefit from cost savings in engineering and research activities. Additionally, this project seeks to formalize a partnership between the City of Alexandria and VTTI to create a Smart Mobility Living Laboratory. This laboratory will focus on deploying intelligent infrastructure, particularly around the new Potomac Yard Metro Station and Virginia Tech Innovation Campus, to address the city's current and future mobility needs. The following document outlines the activities that will be conducted for the city as part of the VDOT ITTF Smart Intersection project.

Problem

In recent years, there has been an increase in the number of fatalities and serious injuries on our nation's roadways. According to the FHWA Moving to Complete Streets Design Model Report to Congress [1], the proportion of total fatal traffic crashes involving Vulnerable Road Users (VRU) or people traveling without the protection of a vehicle, such as motorcyclists, pedestrians, and bicyclists, has increased and reached a high of 34 percent in 2019. Despite fewer miles driven in 2020 due to the COVID-19 pandemic, the fatality rate spiked among drivers; pedestrian and bicycle deaths remained at historically high levels as reported by the NHTSA Early Estimates of Motor Vehicle Traffic Fatalities and Fatality Rate by Sub-Categories highlights that between 2020 and 2021, there was a 10.5% increase in traffic fatalities, 13% increase in pedestrian fatalities and a 5% increase in pedal-cyclist fatalities [2].

Within the Commonwealth of Virginia, problems with VRUs are also evident where according to the VDOT Pedestrian Safety Action Plan (PSAP) report, 14% of all roadway fatalities involve pedestrians, of those fatalities, 75% of occur in dense urban environments [3]. According to the Virginia 2022-2026 Strategic Highway Safety Plan emphasis area heat map for fatalities and serious injuries, intersections score highest in disproportionality impacting VRUs consisting of Bicyclist, Pedestrians, Motorcyclists along with Young Drivers, and Aging Road Users [4]. According to the PSAP report, it was stated that the actual number of pedestrians crashes that occurred is likely much greater due to underreporting, as assessment relies on police crash reports and may not include pedestrian crashes with non-motorized vehicles or crashes that did not result in injury or property damage [3]. This underreporting alludes to the fact that there are

gaps in our understanding of pedestrian crash risks and that there is a need to study the exposure and underlying contributing factors.

Approach

Considering that intersections disproportionately impact VRUs in the state of Virginia, there is an opportunity to deploy Smart Intersection technologies to aid in understanding the contributing factors. There are multiple new vendors that provide Smart Intersection technologies but there are no clear stand-outs as to which provides the best solutions for studying VRU safety issues under complex field conditions. VTTI proposes a 2-phased project that will support detailed selection and validation of the technologies in Phase 1 and a broader deployment of technologies intersections in Phase 2.

In this proposed Phase 1 Statement of Work, a subset of vendor technologies will be deployed under real-world field conditions and validated utilizing a VTTI ground truth system which will collect video data to enable validation tasks. The product of Phase 1 will be a performance comparison between Smart Intersection technologies and a work plan and recommendations for broader deployment in a future Phase 2 project. In Phase 2, it is expected that VTTI will develop a similar SOW where the efforts will be to manage the location selection, procurement, system deployment and integration, data analysis, and monitoring of Smart Intersection technologies on intersections with higher VRU risk.

Smart Intersection Technology Basics

A typical Smart Intersection deployment, as highlighted in the figure 1 below, consists of pole mounted sensors that observe the roadway and sidewalk approaches, a computing system installed at the edge or on the cloud that can process sensor data to classify and track vehicles and pedestrians, the intersection signal controller interfaced with the edge device to record signal phase and timing (SPaT), contextual data for analytics, and could support signal actuation for real-time counter measures, a Vehicle-to-Everything (V2X) road-side unit (RSU) to generate standardized V2X messages such as SAE J2735 Basic Safety Messages (BSM), Personal Safety Messages (PSM), and SPaT for connected V2X applications, a managed networking switch with security functionality to allow for the Smart Intersection components to report data back to a vendor's Cloud platform via the Internet to enable feature rich applications describing macro level intersection data analytics down to micro level event based object-to-object kinematic interactions.

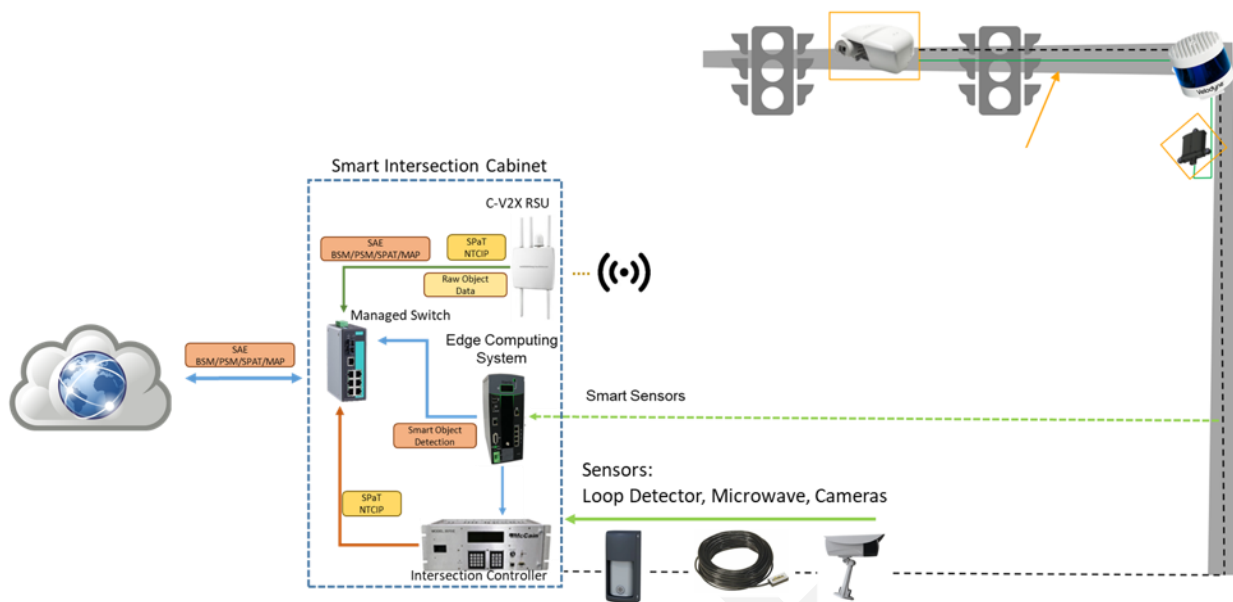


Figure 1 – High Level System Architecture

Initial Vendor Evaluation and Down-Selection

There are a number of emerging vendors that provide Smart Intersection technologies that are differentiated from each other in terms of underlying sensor technology, data processing capabilities, analytics reporting, and available external data interfaces, etc. In preparation of this SOW, VTTI evaluated several Smart Intersection vendors based on assessment of the following components and displayed in Table 1 below:

- Sensor Technology
- Compute Technology
- Machine Vision Software VRU Object Detection, Classification and Tracking Capabilities
- Intersection Controller Integration Capabilities
- V2X Integration Capabilities
- Communications & Networking Capabilities
- Web Platform
- Safety Analytics
- Intersection Operational Efficiency Analytics
- Data Interfaces
- Vendor Deployment Experience
- VDOT Assessment Recommendation

Table 1 - Smart Intersection Vendor Assessment

	Iteris- Continental Vantage Fusion	Miovision	DERQ	Bluecity.AI	NoTraffic	FLIR	Wavetronix
Sensor Technology	Camera, RADAR	Bell Camera	Camera, RTSP Stream	LiDAR	Camera, RADAR	IR Camera	RADAR
Compute Technology	Edge Compute	Edge Compute	Edge Compute, Local Server, Cloud	Edge Compute	Edge Compute	Edge Compute	Card
Object Detection Capability	Vehicles, Pedestrians	Vehicles, Pedestrians	Vehicles, VRU	Vehicles, Pedestrians	Vehicles, Pedestrians	Vehicles	Vehicles
Intersection Controller Integration	Yes	Yes	Yes	Yes	No	Yes	
V2X Integration	Yes (Custom)	Yes	Yes	No	Yes	No	No
Communications & Networking	No	Yes	Yes	Yes	Yes	No	No
Web Platform	No	Yes	Yes	Yes	Yes	No	No
Safety Analytics	Yes (Custom)	Yes	Yes	Yes	No	No	No
Operational Efficiency Analytics	No	Yes	Yes	Yes	Yes	No	No
Data Interface	Yes (Custom)	Yes	Yes	Yes	Yes	No	No
Deployment Experience	High	High	High	Medium	Medium	High	High
VDOT Recommended	Yes	Yes					Yes

From this assessment the list was narrowed down to the following recommended list of vendors in Table 2 below. VTTI recommends the deployment of their solutions at an intersection within the city using the equipment highlighted in Table 3. In summary, the vendor Miovision provides value in terms of their signal timing operating efficiency reporting, DERQ provides value in extensive road user safety interactions reporting and flexible processing platform, and Bluecity.AI provides value in both safety and operating efficiency reporting while leveraging LiDAR sensors and their inherent privacy protections.

Table 2 - Recommended Smart Intersection Vendors

Vendor	Pros	Cons
Miovision	<ul style="list-style-type: none"> • Mature operational efficiency metrics • Expansive web application and data reporting interface • Experience with controller integration 	<ul style="list-style-type: none"> • Need to develop data interface
DERQ	<ul style="list-style-type: none"> • Mature safety metrics • Flexible system configurations • Camera system agnostic • Expansive web application and data reporting interface 	<ul style="list-style-type: none"> • Need to develop data interface • New company
BlueCity.AI	<ul style="list-style-type: none"> • Inherent privacy protection • Both safety and operational efficiency metrics • Expansive web application and data reporting interface 	<ul style="list-style-type: none"> • Need to develop data interface • LiDAR maturity at intersection • New company

Table 3 - Recommended Smart Intersection Vendor Installation Components

Vendor	Component	Install Location	Qty
Miovision	Bell Camera Fixture	Extended on Signal Pole or Corner Pole	1
	Edge Compute	Cabinet	1
DERQ	Camera Agnostic	Signal Pole or Corner Pole	1
	Edge Compute	Cabinet	1
Bluecity.AI	LiDAR	Corner Pole	1
	Edge Compute	Cabinet or Corner Pole	1

An important consideration in the recommended list of vendors is the breadth of analytic features and accessibility of data provided by their platforms. Tables 4-7 below compare the vendors and the data elements they offer as part of their off-the-shelf reporting interface. Table 4 highlights macro level intersection measures with a focus on the count of safety and conflict relevant events. Table 5 provides the microlevel of detail for each of the individual safety and conflict events detected at the intersection. Table 6 provides macrolevel data related to the volume and flow of traffic at the intersection. Table 7 provides microlevel advanced traffic signal performance measure reports.

Table 4 - Vendor Safety and Conflict Analytics

Variables	DERQ	MioVision	Bluecity
Near misses	1		1
Jaywalking	1	1	
Wrong way driving	1		
Stopped Vehicles	1		
Lane Compliance	1		
Detection of red-light runners	1	1	1
Pedestrian crossing time estimation			1
Time-To-Collision Analysis	1		1
Illegal turning movement detection	1		1
Speeding			

Table 5 - Vendor Safety and Conflict Event Variables

Variables	DERQ	MioVision	Bluecity
Event ID	1		
Event Type	1		
Speed	1		1
Date	1		1
Time	1		1
Near Miss Type	1		
Post Encroachment Time (s)	1		1
Time To Collision (s)	1		1
Gap Time (s)	1		
Severity	1		
Involved Road Users	1		1
Direction	1		1
Movement	1		
Video	1		1

Table 6 - Vendor Operational Efficiency Variables

Variables	DERQ	MioVision	Bluecity
Intersection capacity utilization	1		1
Roundabout capacity utilization	1		

Occupancy	1	1	1
Traffic counts (lane-level)	1	1	1
Volumes	1	1	
Classification	1	1	1
Travel speed	1		1
Turning movement counts	1	1	1
Signal performance measures	1		1
Freeway / highway traffic counts and classification, density and travel speeds	1		

Table 7 - Vendor Traffic Signal Performance Measures

Variable	DERQ	MioVision	Bluecity
Occupancy Ratio	1	1	1
Green Allocation		1	1
Phase Interval		1	1
Split Failures		1	1
Split Trends		1	1
Simple Approach Delay		1	1
Arrival Patterns		1	1
Purdue Coordination Diagram		1	1

In this proposed Phase 1 SOW, VTTI will procure the Smart Intersection systems, coordinate installation activities with the city, and then perform data acquisition, validation, and characterization using these data elements to support comparative analysis activities. The analyses will involve vendor-to-vendor comparisons of data quality, reliability, and their characterizations of safety and operational efficiency to inform on wider Phase 2 deployment.

To assess the capabilities of the vendor systems, VTTI will develop an independent ground truth data collection system to integrate with the smart intersection vendors from edge to cloud as depicted in Figure 2 below. The data collection system consists of an industrial computer integrated with external cameras which will be installed alongside the smart intersection solutions to capture the same sensor field of view to enable independent ground truth comparison through video data reduction. Processed low bandwidth vendor formatted data will be sent through the vendor's cellular modem to their respective cloud platform to enable web application based analytical reporting and external data interface access. The data elements listed in the previous set of tables will be imported, transformed, and loaded into a VTTI smart intersection data collection platform to enable independent vendor comparison analysis activities carried out by VTTI researchers.

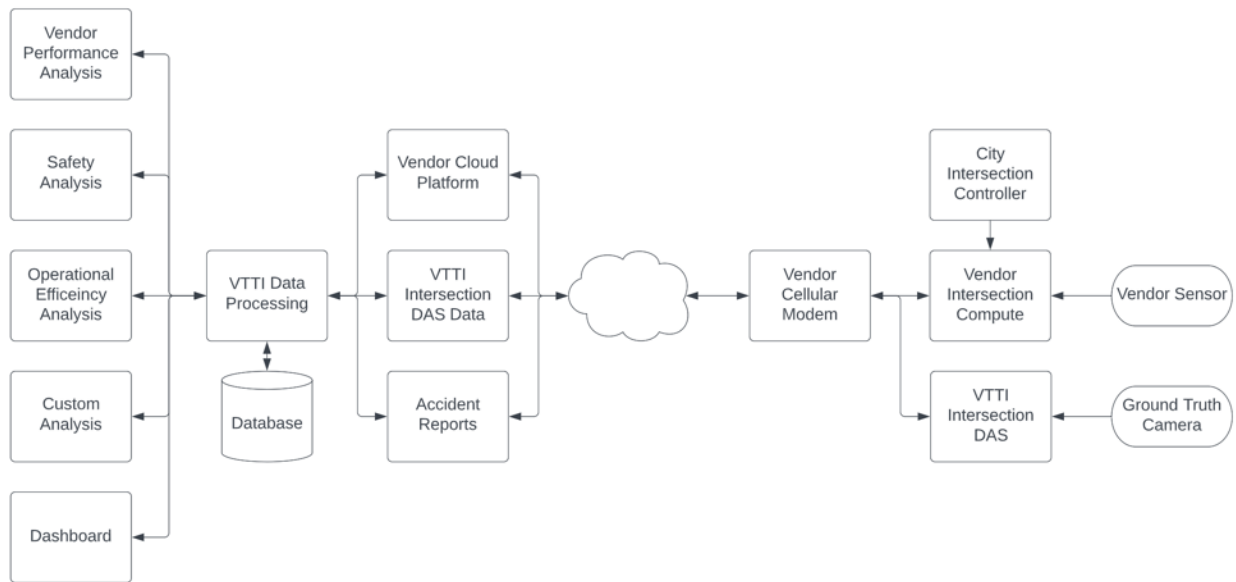


Figure 2 – Detailed System Architecture

Intersection Evaluation and Recommendation

To truly characterize performance and applicability for wider Phase 2 deployment, it is necessary to deploy these vendor systems on complex, multi-modal, multi-lane intersections that are representative of locations where VRU safety could be of concern. Table 9 below lists the intersection location recommended for Phase 1 technology validation based on discussions with the city. The recommended site is at the intersection of the new Potomac Yard Metrorail Station and adjacent to the new Virginia Tech Innovation Campus, a 3.5-acre site in a 19-acre first phase of a new mixed-use development and innovation district. This strategic location, just south of Regan National Airport, provides a unique environment that will evolve as the location densifies over time. Map images of the infrastructure of the intersection are provided in the Appendix. This intersection will be outfitted with multiple vendors so that the collected data will be aligned to observe comparable traffic levels, weather, and VRU activity.

Table 9 - Phase 1 Recommended Technology Validation Deployment Locations

Intersections	VTTI Ground Truth	DERQ	Bluecity.AI	Miovision
E. Glebe Road & Potomac Ave	X	X	X	X

Vendor Solution Analysis and Comparison

The data collected across these sites will be used to assess the performance of the vendor solutions in an independent manner while also serving as input to analysis and understanding intersection safety and operational characteristics to inform on wider Phase 2 deployment. If there are metrics that the city is interested in, and the vendor does not currently have, VTTI will develop algorithms, if possible, to expand on off-the-shelf vendor safety and operational efficiency data. Vendor web application access and VTTI vendor processed data will be provided to the city to support their initiatives. VTTI will provide support to the city in terms of training of use of the web application as well as a reporting data interface compatible with their existing systems or operational procedures. It is expected that the activities of this project undertaken by VTTI will first answer the following questions regarding the performance of the vendor system:

- What is the effective range of the system?
- What impact does traffic or pedestrian density have on accuracy and reliability of target classification and localization?
- What effect does roadway pavement markings have on accuracy and reliability?
- What effect do lighting and weather have on range and reliability?
- What is the latency of various data processing and transfer steps within the system?
- What other factors affect the performance, accuracy, and reliability of the system?
- Does the system accurately calculate kinematic based safety metrics and are there opportunities to define new metrics to quantify VRU safety and risk?
- Does the system accurately detect safety critical events? Vehicles? VRU's?
- Does the system support real-time detection of objects and events that can be used to operate the signal?

Upon assessment of the performance of the vendor system, VTTI will determine which system is performant enough to investigate answering the following questions:

- What intersection characteristics precipitate safety critical events?
- What countermeasures could be deployed to reduce safety critical events at specific intersections?
- What intersection characteristics precipitate inefficient flow of traffic?
- What countermeasures could be deployed to improve efficient flow of traffic at specific intersections?
- What is the level of effort required for the vendor solution to integrate and operate the city's standard intersection controllers?

The Phase 1 SOW detailed in the following sections describes the effort to facilitate deployment, integration, data collection, analysis, and recommendation of wider Phase 2 Smart Intersection vendors throughout the state of Virginia. This will be accomplished by deploying the recommended smart intersection technology vendors at the listed intersection to enable

analysis of collected data to determine if the vendor system is performant enough to inform on safety and operational efficiency factors at high-risk intersections. Further, the systems will be reviewed from the perspective of integration into existing city operational intersection controller systems and procedures. However, selection of such intersections can be adjusted based on feedback from the city as this selection criteria impacts operations and project budget. The SOW includes the following main tasks:

- Task 1 – General project management
- Task 2 – Data Acquisition Integration
- Task 3 – Smart Intersection Deployment
- Task 4 – Data Collection, Reduction, Analysis & Reporting

Methodology

Task 1 – Project Management

VTTI will coordinate the activities and resources required to complete the subsequent tasks. This effort includes coordination between VTTI, City of Alexandria, VDOT, and any participating third parties. Coordination and status meetings will be scheduled and led by VTTI. Specific tasks include:

- Conduct bi-weekly or weekly status meetings depending on project demand
- Prepare quarterly project status reports
- Prepare for and attend meetings for collaboration support, development planning meetings, special event requests from the city, etc.
- Manage project financials, timelines, resource allocations, etc.
- Prepare and deliver a final report for the project
- Prepare SOW for wider Phase 2 deployment

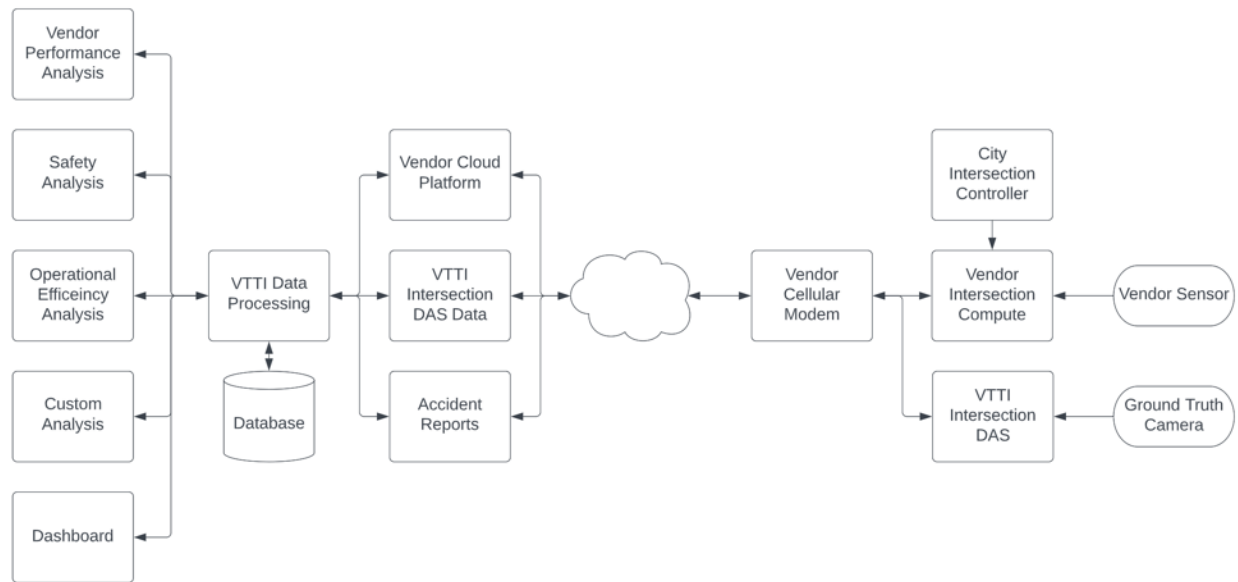
Task 1 Deliverables

- 1) Bi-weekly status meetings
- 2) Quarterly progress reports
- 3) Phase 2 SOW
- 4) Final report

Task 2 – Smart Intersection Data Acquisition

To assess the true capabilities of the vendor systems, VTTI will develop an independent ground truth data collection apparatus to integrate with multiple smart intersection vendors. The collected data will be used to assess the performance of the vendors in an independent manner while also serving as input to analysis in understanding the safety and operational

characteristics of intersections. Vendor web application access and VTTI vendor processed data will be provided to the city to support their initiatives. If there are metrics that the city is interested in, and the vendor does not currently have, VTTI will develop algorithms, if possible, to expand on baseline vendor safety and operational efficiency collected data.



Provided in the figure above and described below is the end-to-end system architecture that needs to be implemented to enable execution of the work elements proposed. Specific work that will be addressed in this task includes:

- Development of an embedded ground truth Smart Intersection data collection system which involves:
 - Ground truth camera integration
 - Video data processing & storage
 - Video data transfer method
- Establish network connectivity from the following intersection mobile edge compute (MEC) devices to transfer data to their respective end-point utilizing a cellular modem separated from the city's network:
 - Vendor systems
 - VTTI data collection system
- To support analysis activities, automated collection of data from the following interface sources will be performed:
 - Vendor API Data
 - VTTI data collection system

- City Signal Phase and Timing Data
- Accident Reports
- Data from the various sources will be extracted, transformed, and loaded into a VTTI hosted file system. Part of this file system is loading of data into a relational database to streamline analysis activities, and support of external data output interfaces.
- From this collected data, VTTI will coordinate with the city on development of a data transfer process to provide the following:
 - Calculation of metrics not included with vendor solution
 - Selection of relevant data elements
 - Summarized data utilizing existing and custom calculated variables

Task 2 Deliverables

- 1) VTTI will integrate an intersection ground truth data acquisition system consisting of an embedded industrial computer and pole mounted camera.
- 2) VTTI will establish an input interface to extract, transform and load data from the relevant sources to streamline analysis activities.
- 3) VTTI will develop a data transfer process of relevant information to the city.

Task 3 – Smart Intersection Deployment

This task focuses on both preparation for and deployment of the recommended smart intersection technology vendors at the selected intersections to enable long term data collection. The data collection and analysis will be used to inform the city about vendor solution performance as well as safety and operational efficiency information at high-risk intersections through the VTTI analysis process. Selection of the final vendor systems to evaluate and intersections to deploy on can be adjusted based on feedback from the city prior to executing this task. However, requested adjustments may require a budget review if the scope of work to install, gain connectivity, or gain access to the infrastructure are significantly modified. VTTI will procure the Smart Intersection vendor equipment and coordinate installation activities across the stakeholders. It is assumed that city staff and/or contractors will manage physical installation and temporary traffic. Specific work that will be addressed in this task includes:

- Vendor solution procurement
- Coordination of intersection installation activities between the following stakeholders:
 - City of Alexandria
 - Vendor
 - Contractors
- Vendor solution installation support where city staff and/or contractors will perform the following activities under VTTI coordination:
 - Intersection pole sensor mounting, wiring, and cabinet mobile edge compute (MEC) installation.

- Intersection controller integration to MEC if approved by the city
- System configuration and sensor calibration
- Cellular network appliance configuration to external vendor end-point
- End-to-end MEC to Cloud data processing verification
- Ground truth data acquisition system installation support where VTTI, city/staff and/or contractors will jointly perform the following activities where applicable:
 - Intersection pole ground truth camera installation
 - Intersection cabinet data collection computer
 - System configuration and camera, vendor sensor field of view alignment
 - Cellular network appliance configuration to external VTTI end-point
 - End-to-end data processing verification
- VTTI will verify that data from the following sources are properly transferring to the cloud server data acquisition system:
 - Vendor API data
 - VTTI intersection data collection device
 - City SPaT data
 - Incident data

Task 3 Deliverables

- 1) VTTI will procure the smart intersection vendor products
- 2) VTTI will coordinate smart intersection installation activities with city staff and/or contractors
- 3) VTTI will support installation of vendor systems per intersections
- 4) VTTI will lead installation of ground truth data acquisition system per intersections
- 5) VTTI will verify end-to-end data sources per intersection

Task 4 – Data Collection, Reduction, Analysis & Reporting

Under this task each vendor solution will be independently evaluated to characterize their general performance, ability to integrate into existing operational systems, and ability to inform actions to improve intersection performance to determine applicability for wider deployment throughout the state. Specific work that will be addressed in this task includes:

- Data Collection
 - Vendor & VTTI systems will remain installed capturing and storing intersection events for a total of 6 months.
 - If reliable network access is not available for the VTTI system, physical retrieval of stored ground truth video from physical storage in the local traffic cabinet will be performed on a monthly basis
 - VTTI will generate a list of crashes that occur at or within the field of view of smart intersection deployment to inform analysis activities. Data is expected to come from local accident reports and crowdsources such as Waze.
- Assessment Protocol Development

- VTTI will lead and the city will provide feedback on a ground truth video assessment protocol based on the following factors:
 - Detection of safety critical events
 - Lighting Condition
 - Weather
 - Object Classification Counts
 - Lane Locations
 - Maneuvers
- Vendor Solution Comparison Analysis
 - Utilizing the assessment protocol developed in coordination with the city, VTTI will perform a sampled data reduction of naturalistic ground truth video to compare against vendor processed data using conditions-driven sampling strategies
- VRU Safety Metrics Development and Analysis
 - VTTI team will work with the city to develop meaningful metrics that can be used to measure VRU interactions and safety if those provided within vendor solutions are inadequate
 - VTTI will analyze the data and report results based on existing vendor solution metrics and any new metrics developed during the project
- Intersection Data Analysis
 - VTTI will leverage vendor data to study safety & operational efficiency characteristics of intersections according to assessment protocol.
- Phase 2 Recommendations
 - VTTI will recommend vendors to the city for wider Phase 2 deployment based on assessment of system performance, safety reports, operational efficiency reports, and ability to integrate with existing city operational systems.
 - VTTI will develop vendor system deployment protocols and testing plans for use in Phase 2 activities
 - VTTI will leverage the information gained under this task to inform on Phase 2 SOW development activities to be performed under Task 1 of this project

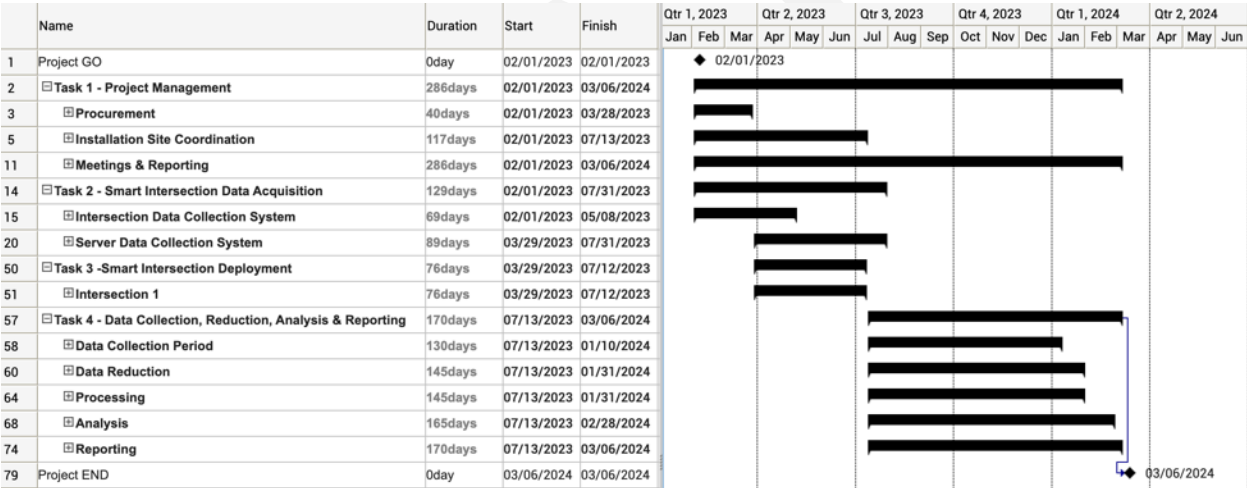
Task 4 Deliverables

- 1) VTTI will maintain end-to-end system to enable capture and storage of intersection event data from data sources for a total of 6 months.
- 2) VTTI will develop an assessment protocol with city feedback to characterize vendor performance, intersection safety metrics, and intersection operational efficiency metrics.
- 3) VTTI will perform vendor comparison, intersection safety, and intersection operational efficiency analysis according to the developed assessment protocol
- 4) VTTI will recommend vendor systems to deploy as part of wider Phase 2 deployment
- 5) VTTI will develop vendor system deployment protocols and testing plans to be executed during Phase 2
- 6) VTTI will report on the analyzed data through meetings, quarterly reports, and final reports.





Budget and Timeline

The estimated unofficial budget and timelines are provided below, subject to Virginia Tech Office of Sponsored Programs (OSP) approval.

Budget Category	Task 1	Task 2	Task 3	Task 4	Total
Salaries and Fringe	\$ 3,484.00	\$ 2,414.00	\$ 2,608.00	\$12,057.00	\$20,563.00
Equipment			\$57,443.00		\$57,443.00
Materials & Supplies		\$ 6,000.00	\$ 5,000.00		\$11,000.00
Tuition & Academic Fees				\$ 1,630.00	\$ 1,630.00
Direct Costs Subtotal	\$ 3,484.00	\$ 8,414.00	\$65,051.00	\$13,687.00	\$90,636.00
Indirect Costs	\$ 906.00	\$ 2,188.00	\$ 1,978.00	\$ 3,135.00	\$ 8,207.00
Total Project Costs	\$ 4,390.00	\$10,602.00	\$67,029.00	\$16,822.00	\$98,843.00



Appendix

Intersections	Maps
E. Glebe Rd & Potomac Ave	<p data-bbox="954 275 1024 302">Maps</p>   <p data-bbox="919 1146 1060 1173">North Bound</p>  <p data-bbox="927 1476 1052 1503">East Bound</p>  <p data-bbox="919 1856 1060 1883">South Bound</p>

References

[1]<https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-03/Complete%20Streets%20Report%20to%20Congress.pdf>

[2]
<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813298#:~:text=Overall%2C%20the%20estimated%20fatality%20rate,100%20million%20VMT%20in%202020.&text=NHTSA%20uses%20the%20Early%20Notification,vehicle%20traffic%20fatalities%20every%20month.>

[3]
https://www.viriniadot.org/business/resources/VDOT_PSAP_Report_052118_with_Appendix_A_B_C.pdf

[4]
https://www.viriniadot.org/info/resources/SHSP/FR1_VA_SHSP_2022_ACCESSIBLE_acc060622.pdf

City of Alexandria, Virginia

MEMORANDUM

DATE: NOVEMBER 15, 2023

TO: MEMBERS OF THE TRANSPORTATION COMMISSION

FROM: HILLARY ORR, DEPUTY DIRECTOR, TRANSPORTATION

SUBJECT: AGENDA ITEM #5 – CMAQ/RSTP GRANT APPLICATION

ISSUE: The City is proposing to apply for the FY 20230 CMAQ/RSTP program

RECOMMENDATION: That Transportation Commission endorse a letter to City Council in support of the FY 2030 CMAQ/RSTP funding application (Attachment 1).

BACKGROUND: Since 1993, the Commonwealth of Virginia has allocated CMAQ and RSTP funding to the Northern Virginia region. CMAQ funded projects must meet three eligibility requirements: 1) have a transportation focus, 2) reduce air emissions, and 3) be located in or benefit a nonattainment or maintenance area.

RSTP funds are flexible funds that may be used for a variety of regional transportation activities, including but not limited to pedestrian and bicycle infrastructure, transit capital projects, and transportation or transit studies.

DISCUSSION: The City of Alexandria must submit the FY 2030 CMAQ/RSTP funding request to the Northern Virginia Transportation Authority (NVTA) by January 2024. City Council will consider this submittal on December 12. A combined table showing CMAQ/RSTP funding for FY 2024-2029 as well as the FY 2030 proposed funding can be found in Attachment 2. The City's funding request for FY 2030 is \$5M and includes the following projects.

FY30 CMAQ/RSTP Proposed Program

Project Name	FY30
DASH Technology	\$1,000,000
Mt. Vernon Avenue North	\$1,000,000
Multimodal Access Study	\$500,000
Safe Routes to School	\$1,500,000
DASH Charging Equipment	\$1,000,000
TOTAL	\$5,000,000

DASH Technology

Like most transit agencies, DASH relies on a Computer-Aided Dispatch/Automated Vehicle Location (CAD/AVL) system to manage its daily fixed-route bus operations. This system allows DASH to monitor its service, communicate with drivers, analyze operational performance metrics, and provide real-time service information to its customers. DASH implemented its current CAD/AVL system in 2015 and the system is now reaching the end of its useful 10-year life span. Since an agency’s CAD/AVL system is vital to its successful daily operations, DASH is seeking to replace and upgrade to a system that incorporates the latest technologies and features.

Proposed Funding: Up to \$1,000,000

Mount Vernon Avenue North

The Arlandria Small Area Plan recommended safety improvements to the intersection of Mt. Vernon Avenue and West Glebe Road. Staff has been working with the community over the past two years to develop concept designs for this intersection, and others. Cost estimates for this particular intersection are higher than originally anticipated, and this additional funding will allow the construction of this project to move forward.

Proposed Funding: Up to \$1,000,000

Multimodal Access Study

The Landmark/Van Dorn Small Area Plan Update identified the need for a pedestrian and bicycle connections at several locations including a bridge over I-395, bridges over Cameron Run, and connections over the rail tracks and Backlick Run to the Eisenhower Metrorail. This funding will be used for feasibility studies for any or all of these projects to determine more specific locations, costs, and concept designs that can be used to apply for future grant funding.

Proposed Funding: Up to \$500,00

Safe Routes to School

The Safe Routes to School Walk Audits identified several recommendations that are capital intensive, such as curb extensions or median improvements. This funding will help implement these safety recommendations, which will be prioritized closer to the time the funding is available.

Proposed Funding: Up to \$1,500,000

DASH Charging Equipment

DASH's goal is to convert 100% of their bus fleet to zero emissions vehicles by 2037. In order to meet this goal, DASH will need to install more charging infrastructure to meet service requirements. This funding will be used for either depot or on-route charging.

Proposed Funding: Up to \$1,000,000

ATTACHMENTS:

Attachment 1: DRAFT Transportation Commission Endorsement Letter

Attachment 2: FY 2025 - FY 2029 CMAQ/RSTP Approved and FY 2030 Proposed Funding



Alexandria Transportation Commission
301 King Street
Alexandria, VA 22314

Phone: 703.746.4025

www.alexandriava.gov

Honorable Mayor Wilson and Members of City Council
City Hall
301 King Street
Alexandria, VA 22314

November 15, 2023

Re: Endorsement of Congestion Mitigation and Air Quality Improvements (CMAQ) and Regional Surface Transportation Program (RSTP) Project Funding Request for FY30

Dear Mayor Wilson and Members of City Council:

At its November 15 meeting, the Transportation Commission voted to endorse the CMAQ and RSTP Project Funding Request for FY30 for up to \$5 million. We enthusiastically support funding for multi-modal transportation projects which have many goals, including reducing air pollutants in nonattainment areas such as the Washington region. The City's request for FY30 includes funding for Mt. Vernon Avenue North, DASH Technology, DASH charging infrastructure, Safe Routes to School, and a Multimodal Access Study.

FY 2030 CMAQ/RSTP Proposed Program

Project Name	FY30
DASH Technology	\$1,000,000
Mt. Vernon Avenue North	\$1,000,000
Multimodal Access Study	\$500,000
Safe Routes to School	\$1,500,000
DASH Charging Equipment	\$1,000,000
TOTAL	\$5,000,000

Sincerely,

Melissa McMahon
Chair, Alexandria Transportation Commission

cc: Alexandria Transportation Commission
City Manager James F. Parajon
Adriana Castañeda, Director, T&ES
Hillary Orr, Deputy Director, T&ES

DRAFT

CMAQ/RSTP FY24-FY29 Program & FY 30 Proposed											
Project Name		UPC	PRIOR YEAR	FY24	FY25	FY26	FY27	FY28	FY29	FY30 Proposed	PROJECT TOTAL
West End Transitway Operations	CMAQ	T19651	\$ -	\$ 1,030,422	\$ 1,515,124	\$ -	\$ -	\$ 1,000,000			\$ 3,545,546
Duke Street Transitway Operations	CMAQ		\$ -	\$ -	\$ -	\$ -	\$ 3,756,473	\$ 3,350,554	\$ 4,164,995		\$ 11,272,022
Alexandria Bus Shelters	RSTP	106962	\$ 2,186,753	\$ -	\$ -	\$ -	\$ -				\$ 2,186,753
Transportation Demand Management	CMAQ	T21536	\$ 6,002,193	500,600	\$ 500,000	\$ 423,865					\$ 7,426,658
Alexandria Transit Store (Commuter Outreach)	CMAQ	T21453	\$ 600,000	\$ 600,000	\$ -	\$ -	\$ -	\$ 200,000			\$ 1,400,000
Bike Sharing Initiative	CMAQ	100420	\$ 1,911,008	\$609,179	\$ -	\$ 412,092	\$ -				\$ 2,932,279
ITS Integration (SMART MOBILITY)	CMAQ	106562	\$ 3,240,111	\$ 600,000	\$ 2,434,768	\$ -	\$ -				\$ 6,274,879
SMART Mobility Implementation			\$ -	\$ -	\$ -	\$ 3,977,269	\$ 1,048,116				\$ 5,025,385
DASH Technology	RSTP	21999	\$ 550,000	\$ 255,745	\$ -	\$ 1,195,000	\$ -			\$ 1,000,000	\$ 2,000,745
Pedestrian & Safety Mobility Enhancements on Primary Corridors	RSTP	19637	\$ 1,334,000	\$ 1,682,899	\$ -	\$ -	\$ -				\$ 3,016,899
Parking Technologies	RSTP	102943	\$ 2,062,190	\$ -	\$ -	\$ -	\$ -				\$ 2,062,190
King-Commonwelath Bridges											
Mount Vernon Avenue	CMAQ	114864	\$ 1,520,000	\$ -	\$ -	\$ -	\$ -	\$ -		\$ 1,000,000	\$ 1,520,000
City of Alexandria Transportation Master Plan	RSTP	106964	\$ 840,077	\$ -	\$ -	\$ -	\$ -		\$ 750,000		\$ 1,590,077
Route 7 at Beauregard	CMAQ	107962	\$ 640,265								\$ 640,265
New Scheduling Software for DASH	CMAQ	117623	\$ 477,568	\$ -	\$ -	\$ -	\$ -				\$ 477,568
Multimodal Access Study			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500,000	\$ -
Safe Routes to School			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,500,000	\$ -
DASH Charging			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,000,000	\$ -
CMAQ/RSTP Subtotal			\$ 26,964,698	\$ 5,278,845	\$ 4,449,892	\$ 6,008,226	\$ 4,804,589	\$ 4,550,554	\$ 4,914,995	\$ 5,000,000	\$ 61,699,996

City of Alexandria, Virginia

MEMORANDUM

DATE: NOVEMBER 15, 2023

TO: MEMBERS OF THE TRANSPORTATION COMMISSION

FROM: HILLARY ORR, DEPUTY DIRECTOR, TRANSPORTATION

SUBJECT: AGENDA ITEM #6 – ITEMS FOR CONSENT

ISSUE: Staff update to Transportation Commission on various projects.

RECOMMENDATION: That the Commission receive the items for consent.

A. AlexWest Small Area Plan Update

Progress continues on the [AlexWest Small Area Plan](#). A Community Meeting focused around Mobility and Transportation is scheduled for Monday, November 13 at Ferdinand T. Day School. Topics include updates to the Transportation Study, discussion of current projects in the area, the West End Transitway, and discussion of goals for connectivity and access in the plan area.

B. Rainbow Crosswalks

On June 13, 2023, City Council directed staff to explore opportunities to incorporate pride artwork on King Street in response to a request from Councilman McPike. Staff will discuss the proposal and feedback from the LGBTQ+ Task Force and Human Rights Commission at the November 28 City Council meeting. The goal is to install Pride artwork by June 1, 2024.

C. Stop for Pedestrians City Code

In December, City Council will consider a change to City Code requiring motorists to stop for pedestrians crossing or attempting to cross the street. Currently, City Code requires motorists to yield to pedestrians, which was consistent with State Code. In the 2023 legislative session, SB 1069 provided authority to named localities, including Alexandria, to install signs requiring drivers to stop for pedestrians who are crossing or attempting to cross the street. Additionally, the Vision Zero Action Plan identifies the strategy 2A.4 to “pursue and support state legislation to require drivers to stop, rather than yield, for pedestrians in the crosswalk.” Therefore, staff is proposing an update to Section 10-3-924(D) to mirror state legislative language. The proposed change is both consistent with Vision Zero goals and

increases the legal standing to enforce crosswalk infractions.

D. WMATA Budget

On October 26, WMATA staff presented on the potential impacts the FY25 \$650 million operating deficit will have on customers and the jurisdictions. Metro must plan for both severe service cuts (including measures like six-car trains, turnbacks, and bus route cuts) and targeted cuts/fare increases. These measures will shrink the budget gap, but alone cannot close the gap. As only 22% of Metrorail costs are variable costs, severe service cuts are needed to make a dent in the budget. In another aim to cut into the FY25 operating deficit, WMATA will attempt to transfer some preventative maintenance to the capital budget. Discussions continue among regional working groups (led by NVTC and MWCOG) on how the jurisdictions can work to cover the FY25 operating deficit.

WMATA staff will be looking for direction on fare and preventative maintenance scenarios on November 16.

E. Safe Routes to School Walk Audits Update

In 2023, the City conducted a second round of Safe Routes to School (SRTS) Walk Audits focusing on five Alexandria City Public School (ACPS) campuses. The Walk Audit reports, which are expected to be completed in early November, identified recommended infrastructure and operational improvements that will improve safety for people who walk and bike to school.

The following campuses were part of the 2023 Walk Audits: FT Day Elementary School, Francis C. Hammond Middle School, George Washington Middle School, and the Minnie Howard and King Street campuses of Alexandria City High School.

Participants in the Walk Audits included City staff, consultants, representatives from ACPS, and members of each school community including school leadership, neighbors, advocates, and Alexandria Police Department. Additionally, more than 600 people submitted input through an on-line feedback form. For more information on the 2023 SRTS Walk Audits visit: alexandriava.gov/go/4203

F. AlexMoves Survey

Data collection is underway for the biennial AlexMoves Survey. Transportation planners use census data to learn information about travel patterns for commuting. However, a majority of trips are not commute trips. To learn more about residents travel behavior to be able to make more informed planning decisions, the City has started conducting biennial travel surveys from a statistically significant sample of residents. Letters will be sent to a random sample of households in Alexandria asking them to participate in the survey. An open participation

survey, available to all residents, will be available online soon. Results of the 2021 AlexMoves Survey are available [here](#).

G. FY 2025 Budget Letter

Staff and Chair McMahon summarized the budget priority discussion from the October meeting in a letter to City Manager James Parajon, provided in Attachment 1.

H. Eisenhower Avenue Study Update

The Virginia Department of Transportation (VDOT) is continuing to work with City staff on the Eisenhower Avenue Transportation Study through the Project Pipeline Program. During phase 1 of this process, between July 2023 and October 2023, the project team performed a review of existing conditions, and the City conducted community outreach via an online feedback form.

The feedback form was open from August 28-September 17 and had over 300 respondents. In summary, the initial feedback found that the community had concerns about safety, general safety, and the lack of supporting infrastructure for pedestrians and cyclists. The community also mentioned that it is a good corridor for east-west vehicle travel due to the lack of congestion but perceived a lot of the existing traffic as cut-through/bypass traffic because of congestion on I-495.

The project team completed the Phase 1 review in October of the existing conditions along the Eisenhower Avenue Transportation Study area between Van Dorn Street and Holland Lane. The existing conditions review includes traffic congestion, volume patterns, speeding, existing infrastructure/site conditions, and safety. In summary, they were able to validate most needs consistent with the City's Vision Zero action plan and what the community had mentioned. Based on the project team evaluation, the immediate key focus areas are:

- Congestion and Safety at the intersection of Eisenhower Avenue and Van Dorn Street
- Lack of pedestrian facilities between Van Dorn Street and the Van Dorn Metro Station
- Speeding and Safety between Metro Road and Clemont Ave
- Speeding, safety, and a disjointed cross-section between the Holmes Run Trail and Mill Road (West)
- Safety and pedestrian infrastructure at Eisenhower Avenue and Stovall Street, and at Eisenhower Avenue and Mill Road (East)

Phase II (December 2023 and February/March 2024) will focus on solutions that address these needs, developing recommendations with additional public input. The City will post the phase I results of both VDOT's results and our community outreach on the city website at <https://www.alexandriava.gov/transportation-planning/eisenhower-avenue-transportation-study>. VDOT will also post their updates on their project website at <https://vapipeline.org/studies/nova/nv-23-07.asp>.



Alexandria Transportation Commission
301 King Street Alexandria, VA 22314

City Manager James Parajon
City Hall
301 King Street
Alexandria, VA 22314

October 23, 2023

Re: FY 2025 Budget Priorities

Dear City Manager:

At its October meeting, the Transportation Commission received an update from staff on the FY 2025 budget process and the City Manager's letter to Boards and Commissions to provide feedback on budget priorities. The Transportation Commission recognizes the challenges that the City Manager has highlighted, and supports the priorities being advanced. A City commitment to fund transportation programs and services will continue to be critical to supporting these priority areas, including our City's youth and families and the battle against climate change. The Transportation Commission has identified four specific investment areas most critical to supporting these Citywide goals at this time:

1. Ensuring continuous and sustainable WMATA regional transit service,
2. Implementing the Transit Vision Plan, with more DASH and a focus on regional connectivity,
3. Staffing and resources for Complete Streets and Safe Routes to School, including more protected bike infrastructure to make biking feasible for more people for short trips, and
4. Fully repairing and maintaining Alexandria's multi-use trail system in a state of good repair, for many people rely on it just as others do the roads.

We are all aware of the looming budget shortfall projected in the FY 2025 WMATA operating budget. The Commission recognizes that there are several groups working to identify solutions. We urge the City to continue to press for a long-term, regional resolution to both the recurring budget issues and the real potential that we are seeing a permanent shift in where people work and when and how they travel. While being an active and creative player in those discussions, the City must nonetheless be willing to provide, today, a fair share of additional system subsidy needed to prevent dire threatened service cuts.

Public transit service does much more than help traffic move better. It provides the most vulnerable people in our communities with access to jobs, education, and essential services. It is also a critical tool to reduce greenhouse gases from the transportation sector, the largest contributing sector after the built

environment. The Alexandria Transit Vision Plan contains a framework network to expand access to low-income and minority populations and to make the most of each mile served. Accordingly, the City should prioritize funding to maintain and improve DASH services to realize this vision, with a focus right now on regional connectivity and efficiency.

It is worth noting that investments in public transit directly support the Vision Zero Action Plan, and it is in the best interest of our families and children that we lose no ground against the Vision Zero goal of eliminating serious and fatal crashes in Alexandria by 2028. In addition to public transportation, walking, biking, and active transportation and micro-mobility travel are also entirely feasible options to get from one end of the city to the other, **if** these options are perceived as safe and comfortable. The Transportation Commission therefore also recommends the FY 2025 budget fully support staffing and implementation of Complete Streets and Safe Routes to Schools. In order to make the overall network safer and more comfortable for a wider array of travelers, the Commission recommends implementing more protected bike facilities on streets, and investing in better cross-city east-west bicycle connections.

Finally, the Transportation Commission recommends that in further support of Vision Zero and youth, families, and climate change objectives, the budget must include funding for a comprehensive review of the multi-use trail system and bringing the trail system up to a state of good repair, including replacing damaged trail infrastructure. Increased flooding and severe weather events in Alexandria have taken a toll on several bridges and trails that serve pedestrians, bicyclists, and other micro-mobility travelers in Alexandria, resulting in extensive closures while funding is identified for repairs. Extensive delays in reopening major trails disrupts commute patterns and the formation of active mobility habits for large parts of the city. Achieving multi-use trail state of good repair could put us in a position to actually increase network redundancy and provide more connectivity for users.

Consistent with the goals of the City Manager, the Transportation Commission views safe, comfortable, and sustainable transportation as critical to protecting the youth of Alexandria and helping families access essential services, school, and other opportunities at low cost. Funding public transportation and pedestrian and bicycle infrastructure also play a key role in reducing the City's climate footprint.

Thank you for considering these priorities in your efforts to advance the City's strategic goals.

Sincerely,



Melissa McMahon
Chair, Alexandria Transportation Commission

cc: Alexandria Transportation Commission
Emily Baker, Deputy City Manager
Adriana Castaneda, Director, T&ES
Hillary Orr, Deputy Director, T&ES
Christopher Ziemann, Chief of Transportation Planning Division, T&ES
Megan Oleynik, Urban Planner, T&ES