



Northern Virginia Transportation Authority

FY2024-2029 Six Year Program

Smart & Connected Vehicle Infrastructure

Date Submitted: 07/28/2023

APPLICATION #: ALX-037

Project Description

This project will increase safety and reduce congestion in Alexandria. It will deploy a network of sensors, edge servers, and a data management system to facilitate live communication with human-driven motor vehicles and autonomous shuttles. It will use a “plug-and-play” design that lays the basic framework for information to be collected, analyzed, and communicated to vehicles while staying adaptive to future unforeseen technologies. The first use-case of this framework will transmit Signal Phase and Timing (SPAT) data to compatible vehicles. This information will allow both human-driven and especially autonomous vehicles to optimize their approach speed at intersections, reducing stopping time and congestion on heavy traffic corridors. Vehicles can also flag their presence at these intersections to influence signal timing and priority. The second use-case of this framework will use camera, and potentially LIDAR detection, to identify vulnerable road users intending to cross dangerous intersections. If a pedestrian is spotted, the framework will notify compatible oncoming vehicles of the danger. This use case also has the potential to notify vehicles of out-of-control drivers entering the intersection at high speeds. These two use cases have been selected because they will immediately yield benefits to both human-driven and autonomous vehicles in Alexandria. As autonomous vehicles arrive in the form of shuttles or private vehicles, and new connected and autonomous technologies are developed, they will be able to leverage this framework to communicate information both to road users and to the hub at the city's Transportation Management Center (TMC). This framework will include three core features. The first is updating traffic signal hardware and software to allow basic two-way communication and data exchange with motor vehicles. This allows our system to collect information in the field and pass vital information to road users but is agnostic to specific vendors or tools. The second feature is a deployment of edge servers to process the information being collected by the first feature. This feature includes backup power and redundant servers to ensure consistent service. The third feature is a micro-cloud computing environment in Alexandria's Transportation Management Center to store and analyze the data coming from edge servers. This system will minimize latency and prioritize scalability in its simple design.

Primary Mode(s)	Secondary Mode(s)
Application Number	ALX-037
Primary TransAction ID Number	113
Submitting Jurisdiction/Agency	City of Alexandria
Location	This project will be deployed within and surrounding the Potomac Yard area, an innovation hub that includes the new Virginia Tech Innovation campus and the new Metrorail station. This area also serves as the bridge between Old Town Alexandria and the National Landing site in nearby Crystal City. Specific intersections within this location will be chosen based on congestion levels and safety risk at the time of deployment to maximize the impact of the project. Intersections that have high pedestrian traffic will be prioritized.
Requested NVTA Funds	\$5,000,000.00
NVTA Funds Approved	N/A
Previous NVTA Funds Received	\$0.00
Total Cost to Complete Project	\$5,050,000.00

Project Location



Project Milestones

	Study	Design / Engineering / Environmental	ROW and Utilities	Construction	Asset Acquisition
Earlier					
FY23					
FY24					
FY25					
FY26					
FY27	X				
FY28		X			
FY29		X		X	
Beyond				X	

Year of expected project completion: FY2031

Project Funding

Source	Study	Design / Engineering / Environmental	ROW and Utilities	Construction	Asset Acquisition	Total
Total Cost	\$50,000	\$1,500,000	\$0	\$3,500,000	\$0	\$5,050,000
NVTA Funds Applied	\$0	\$1,500,000	\$0	\$3,500,000	\$0	\$5,000,000
Local	\$50,000					\$50,000
Total Other	\$50,000	\$0	\$0	\$0	\$0	\$50,000
Gap	\$0	\$0	\$0	\$0	\$0	\$0

Project Analysis Highlights

Congestion Reduction Relative to Cost (CRRC) Rating	277.60
Congestion Reduction Relative to Cost (CRRC) Rank	2
TransAction Project Rating	21.70
TransAction Project Rank	15
Project's Past Performance (Percentage of expected funds that was reimbursed by 12/31/2023)	N/A
Jurisdiction/Agency's Past Performance on All Projects (Percentage of expected funds that was reimbursed by 12/31/2023)	83.86%
Percentage of Total Project Cost Covered by Funds from Sources Other than NVTA	0.99%
Local Priority	4
Number of Supporting Resolutions (does not include resolution from applicant's own Board/Council)	0
Number of NVTA-Funded Project(s) Nearby	2
Regional Funds allocated to NVTA-Funded Project(s) Nearby	\$70,350,000