

## **Part 1 – VISION NARRATIVE**

Provide a technical narrative of the Applicant’s proposed vision and goals for a Smart City Challenge. The “Vision” document shall include a high-level summary of the following:

1. Define your vision for your Smart City. Describe your city’s challenges and how the proposed elements of this proposed project can be used to address those challenges. The vision should define your approach for implementing and operating the demonstration project, including your program management approach.

Newport News has a strong applied technology base with a well-developed dynamic research and development sector. The City seeks to enhance its surface transportation network to meet the needs of local traffic and commuters through the application of sensor based and automated control systems. The Traffic Adaptive Smart City Project will utilize the existing signal system network and upgrade traffic control signal equipment to enable operation of adaptive traffic control citywide. The conversion of the City’s existing time based actuated signal system to a traffic adaptive signal control system will provide better overall service to motorists and has the ability to export real time traffic progression data to users via mobile application.

As the nature of transportation users changes it is critical for Cities like Newport News to provide safe and reliable facilities for a variety of modes. Improved progression and information sharing with the motoring public provides not only congestion mitigation and the associated air quality benefits, but is also a key component in improving operation of bus transit on City streets. The potential for including GPS based transit preemption in the adaptive signal system and other connected vehicle systems improves efficient mobility for transit dependent populations.

Citizen surveys have consistently returned that traffic flow is the number one concern in the City of Newport News. Newport News is located on a peninsula that is long and narrow, bordered by York County to the northeast and the City of Hampton to the east. There are interstate and railroad corridors that run the length of the city with limited crossovers, effectively bisecting the City’s transportation network. The State is currently widening I64 which will increase capacity and will increase demand on the City’s local network. During highway incident management traffic will divert to the local streets further burdening the local network.

The demonstration project will build on the City’s existing traffic adaptive signal system which consists of a small group of seven traffic signals located at the I-664 off ramps on Jefferson Avenue. This initial site has been in place for less than one year and has been

very efficient in adapting to changing traffic patterns during incidents on the interstate. The demonstration would build on the success of this project and develop a detailed plan to expand this system citywide. The Traffic Adaptive Smart City Project will demonstrate that a citywide traffic adaptive signal network provides motorists with less delay, better progression, less fuel consumption and an overall better travelling environment.

This project will be administered by the City of Newport News Department of Engineering as a traditional Design/Bid/Build Project. The design phase will evaluate the existing signal infrastructure and provide the planned approach for upgrades to the system. All signal cabinets, controllers, vehicle detection and the communications network will be evaluated for compatibility with the upgrade for traffic adaptive and connective vehicle technology. The project will be field implemented in three phases starting with the critical signalized intersections located in the north end of the City adjacent to the I-64 corridor. Phase two will focus on the center of the city and the third phase will improve signals in the south end of the city. Each phase will implement a logical group of intersections acting together in a traffic adaptive mode. A library of timing plans and parameters for the adaptive timing will be developed as part of the project. In addition, polices will be developed for inspection, maintenance, and a system of alerts to monitor the measures of effectiveness to ensure optimal operations.

2. Describe the population characteristics of your city and show how it aligns with the USDOT's characteristics for a Smart City, including:
  - a. Mid-size city with population between approximately 200,000 and 850,000 people in the city limits;
  - b. Dense urban population; and
  - c. Represents a significant portion (preferably more than 15%) of the population of your local urbanized area.

**Note:** City population and density should be based on the city's Census-designated place (CDP) population in the 2010 Decennial Census. The city's urbanized area is defined as the Census Urbanized Area (UZA) to which it was assigned during the 2010 Census. Definitions of Urbanized Area and Census-Designated Place are provided by the US Census Bureau at: <https://www.census.gov/geo/reference/frn.html>

Your city's 2010 CDP and UZA population can be viewed using the *2010 Urban Area to Place Relationship File* at: [https://www.census.gov/geo/maps-data/data/ua\\_rel\\_download.html](https://www.census.gov/geo/maps-data/data/ua_rel_download.html)

Your city's density should be calculated using its 2010 CDP population divided by its 2010 land area in square miles, as provided by the US Census Bureau.

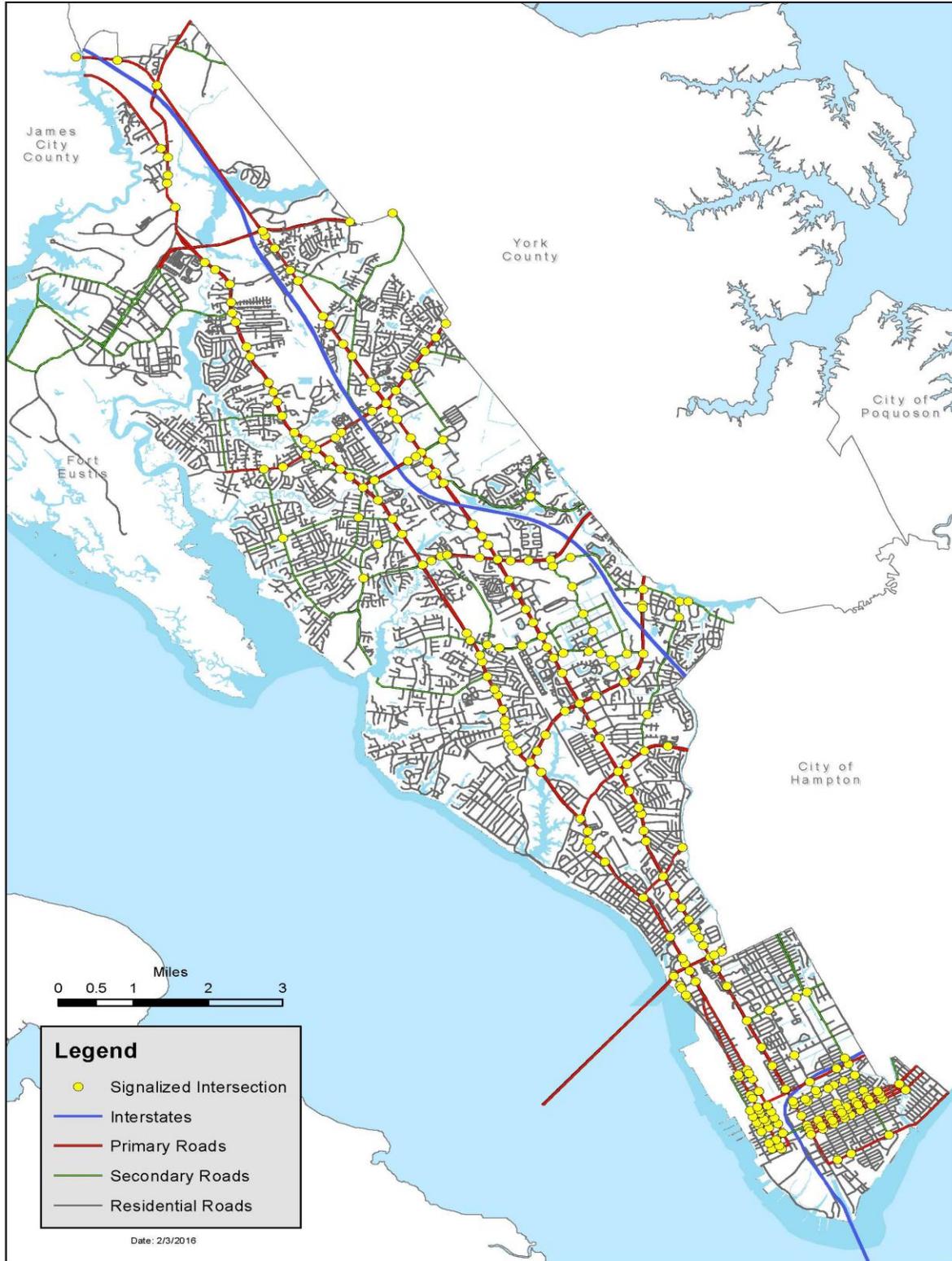
The City of Newport News had a population of 180,719 people in the 2010 Census. Newport News is not a traditional dense urban city and does not have more than 15% of our population within an urbanized area. Though the City of Newport News has a population of less than 200,000, there is a high index of traffic flowing in/out/through the transportation network. According to the Hampton Roads Commuting Pattern analysis, 108,248 commuters travel in and out of Newport News every day with 55,855 commuters coming into the city to their place of work.

3. Describe other characteristics of your city and show how it aligns with the USDOT's characteristics for a Smart City, including:
  - a. Existing public transportation system; The City's public transportation system consists of a roadway network of Interstate, primary, and local roads, bus and taxi service, Newport News Williamsburg International Airport, Amtrak rail service, and freight rail. The City operates a traffic signal system of 260 traffic signals operating on central management software via a fiber optic communications network. The system includes several ITS systems including count stations, high water alert, vehicle emergency preemption, and over height detection.
  - b. Environment that is conducive to demonstrating proposed strategies; The City of Newport News is on a peninsula and has two major arterials that parallel the Interstate corridor. These arterials and the interstate are major evacuation routes out of the Peninsula and Southside Hampton Roads. A traffic adaptive signal system would be responsive to incidents on these corridors and create more efficient movement of traffic. The traffic signal system was updated and a new communications network was installed in 2010. This system is capable of communicating to the 260 traffic signals throughout the city. This network is tied into the Virginia Department of Transportation (VDOT) network and can be tied to the adjacent localities for information sharing.
  - c. Continuity of committed leadership and capacity to carry out the demonstration throughout the period of performance; Newport News City Council is supportive of advancing the transportation network. Currently the city is administering several transportation projects including a new Multi-Modal Transportation Center linking passenger rail with local and over the road bus service, Atkinson Boulevard, a \$68 million new roadway and bridge project crossing the Interstate and CSX corridor, and biannual citywide signal system retiming. The City manages approximately \$70 million in Federal and State grant projects annually.
  - d. A commitment to integrating with the sharing economy; None at this time.
  - e. A clear commitment to making open, machine-readable data accessible, discoverable and usable by the public to fuel entrepreneurship and innovation. City data is shared with the Hampton Roads Transportation Operations

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Subcommittee of the HRTPO. This group of local and VDOT Traffic Engineers work together in the region and have developed a regional architecture for transportation networks. The localities and VDOT are committed to monitoring roadway traffic and have established sharing data as a high priority.

4. Provide an Annotated Preliminary Site Map. The map shall identify the specific geographic location being proposed for the Challenge and indicate locations related to key issues, proposed roadside technology locations, connected automated vehicle operations, and other explanatory features to support strategies that align with the USDOT vision elements. The map shall be no larger than one page (up to 11 inches by 17 inches is acceptable for this item only) when printed.



City of Newport News  
**Signalized Intersections**



5. Describe how your holistic, integrated approach aligns to the twelve USDOT vision elements described in this solicitation. For each vision element, describe your approach including the technology solutions proposed. Illustrate how the proposed technology solutions can synergistically combine to create measurable impact while reducing costs associated with both deployment and operations.

Our objective is to more efficiently move people and goods through our surface transportation network by enhancing our intelligent sensor-based infrastructure and expanding the City's Traffic Adaptive Program. The system is able to detect mobile device IP addresses to define traffic patterns and adjust our signals to improve traffic flow. Expanding our current system will require additional receivers, communication links to the receivers and controllers, as well as programming. A fully developed traffic adaptive system with external communication and data sharing will save motorists costs by mitigating traffic delays, reducing daily travel times, and minimizing fuel emissions and allow for the future of self-driving vehicles. An economic benefit will be reliability and efficiency improvements for the delivery of goods and services.

6. Identify and rate key technical, policy, and institutional risks associated with the deployment vision and discuss plans for mitigating those risks.

There is minimal risk in developing this project. Small scale traffic adaptive systems have been in place throughout the country for several years. The system will require monitoring, regular review, and standard preventative maintenance to ensure that it is working as designed. This will be handled as a standard responsibility of the signal engineer and traffic signal shop activity through the City's regular operating budget.

7. Outline team partners, key stakeholders, and demonstration governance processes. Describe existing and future public and/or private partnerships, including university research partnerships.

The City of Newport News will coordinate with several partners and stakeholders on the Smart City Traffic Adaptive Project. Major stakeholders include VDOT, Newport News Public Works, Newport News Public Schools, Newport News Police and Fire Departments, CSX Railroad, and Hampton Roads Transit (Bus Service). The City has established long term relationships with these partners and has been successful working together on several transportation projects. The City is currently in the selection process for a PPTA to relocate a Public School Bus Transportation, Training, and Food Service facility.

8. Describe existing transportation infrastructure and system features in your city, including:

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- a. Arterial miles - There are approximately 334 arterial lane miles on two major arterial roadways that travel the length of the City. Critical segments of these arterials are over capacity and widening to create capacity is not feasible due to right of way constrictions, urban development, and environmental impacts.
  - b. Freeway miles - There are approximately 103 lane miles of two interstate highways, I-64 and I-664.
  - c. Transit services - Hampton Roads Transit provides public bus services within the City as well as connections to other cities across the Hampton Roads Region.
  - d. Shared -use mobility services - Hampton Roads Transit provides this service to the City.
  - e. Information and communication technology (ICT) - None at this time.
  - f. Intelligent Transportation Systems (ITS) including transportation management centers and field equipment - Both the City and VDOT manage Traffic Operation Centers. These centers can communicate via the transportation fiber network.
  - g. Smart Grid Infrastructure including electric vehicle charging infrastructure - There are electric vehicle charging stations included in public and private facilities and parking garages in the City.
9. Define the data your city currently collects. Describe how these data, along with new data to be collected and shared during the demonstration may be used by the lead agency, project partners, other agencies and stakeholders to further address city challenges. Describe how transportation data could integrate with other functions or services in a city (such as public safety, human services, transit, and public works) to improve the management and operations of the city. Likewise, describe how other data could be integrated with transportation data to improve transportation operations. Describe any existing policies and identify their sources (local executive order or policy, local ordinance or state legislation, etc.) applicable to the proposed data to be collected and shared as part of the proposed project. Submissions describing cross-cutting partnerships to advance smart city technologies, related programs and policies are encouraged, but not required. If you plan to partner with outside organizations (nonprofits, universities, corporations, etc.) you should address whether and specify how (e.g., limitation on sharing or use) data from those organizations or interests will be collected, managed, and shared across sectors or with the public, if appropriate. Identify candidate data that is expected to be shared, used, and used for other purposes by the participating project partners or with the public. Describe the terms and conditions that exist or will be established and managed in partnership agreements, data or information sharing agreements, agency specific policies and operating procedures to establish and maintain the systems and interfaces to maintain the integrity of the data and share the information identified in the proposal.

The City of Newport News Department of Engineering collects and provides the following information to the public and other regional agencies: roadway camera images/video, road/lane closures, construction information and other road restrictions, corresponding detours and alternate routes. The live camera images are provided to the public through VDOT on the 511 Virginia web site. The City is also working with the City of Hampton and VDOT to share Public Safety Computer-Aided-Dispatch (CAD) system information linking Newport News and Hampton 911 Centers across the respective shared fiber networks.

10. Describe your approach for using existing standards, architectures, and certification processes for ITS and connected vehicle based technologies and plans for documenting experiences and cooperating with architecture and standards developers to improve the quality of these products based on lessons learned in deployment.

The Newport News Signal System ITS Master Plan followed the regional system architecture established by the Hampton Roads Transportation Planning Organization (HRTPO). The system was designed to integrate with other Transportation Operations Centers (TOC), traveler information systems, and software integration.

11. Provide measurable goals and objectives for your vision and describe your approach for monitoring the impact of the demonstration on mobility, safety, efficiency, sustainability, and climate change.

**Note:** The selected city for the demonstration will be responsible for identifying a set of targeted performance measures that relate to the primary impact of their proposed deployment. The system deployed must be capable of generating the data needed to calculate these measures over time – that is, to show how well the system is performing with respect to these target measures. Independent evaluation will also be required to validate site system performance with respect to the targeted measures, to collect or infer contextual data that allows for the isolation and mitigation of confounding factors, and to provide supplementary evaluation with respect to a broader set of safety, environmental, mobility and public agency efficiency measures of interest to USDOT. Sites are responsible for supporting the independent evaluator’s access to the site and to site staff to conduct evaluation-related experiments, interviews, and surveys.

Measurable Goals:

1. Reduce commute time on major arterial roadways and side streets.
2. Improve progression during peak hours.
3. Provide route advisory information.

Objectives:

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1. Improve efficiency and coordination with traffic signals.
2. Manage traffic during real-time conditions.
3. Reduce travel times, stops, vehicle emissions, and delays.
4. Improve traffic flow during peak hours.
5. The Hampton Roads area has an emergency evacuation plan and completion of this project will improve efficiency of the evacuation.

12. Provide evidence that establishes your capacity to take on a project of this magnitude, including executive commitment, workforce capacity, degree of infrastructure readiness, data and performance management capabilities.

City Council supports this effort to become a Smart City. The City Manager has designated the implementation of technologies such as those included in the Smart City program as a primary initiative. City staff has been assigned to this initiative and will take advantages of all Smart City opportunities that are offered.

The City of Newport News Department of Engineering is capable of handling a project of this magnitude. The Engineering Department has experienced engineering and technical staff that are prepared to provide oversight and assistance on this project. With the support of Leadership, the Transportation Division is able to receive additional resources and assistance from other divisions in the Engineering Department as well as various City departments such as Development, Planning, and Public Works. In addition, the Engineering Department has been successful in administering multiple federally and state grants for major infrastructure projects. Federal funding sources include the following:

- American Recovery and Reinvestment Act (ARRA)
- Congestion Mitigation and Air Quality (CMAQ)
- Highway Safety Improvement Program (HSIP)
- Regional Surface Transportation Program (RSTP)
- Transportation Alternatives Program (TAP)

13. Describe any opportunities to leverage Federal resources through cost share, in-kind donations, and partnering.

The City does not have plans to leverage federal resources through cost sharing, in-kind donations, or partnering at this time. There may be opportunity to resource share with federal agencies in Newport News including Department of Defense with Joint Base Langley- Eustis, Naval Weapons Station Yorktown and Jefferson Labs. The City has open lines of communication with these federal agencies should the situation arise.