

U.S. Department of Transportation

Notice of Funding Opportunity Number DTFH6116RA00002

“Beyond Traffic: The Smart City Challenge – Phase 2”

Issue Date: 3/25/2016

Application Due Date: 5/24/2016

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The U.S. Department of Transportation (USDOT) / Federal Highway Administration (FHWA) is using www.grants.gov for issuance of this Notice of Funding Opportunity (NOFO). Applicants must register at grants.gov under NOFO Number DTFH6116RA00002 to receive notifications of updates/amendments to this NOFO. **It is the Applicant's responsibility to monitor the grants.gov site for any updates/amendments to this NOFO.** USDOT is using www.grants.gov for posting this NOFO only. Applications shall be submitted to the Email address designated below, NOT via the grants.gov system.

Summary Information

Funding Opportunity Summary:	Up to \$40 Million in Federal Funding for a Smart City Demonstration
Federal Agency Name:	U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA) Office of Acquisition and Grants Management 1200 New Jersey Avenue, SE Mail Drop: E62-204 Washington DC 20590 Attn: Sarah Targgaard, HCFA-32
Funding Opportunity Title:	Beyond Traffic: The Smart City Challenge – Phase 2
Announcement Type:	This is the initial announcement of this funding opportunity. This is not a follow-on notice.
Funding Opportunity Number:	DTFH6116RA00002
Type of Award:	Cooperative Agreement
Catalog of Federal Domestic Assistance (CFDA) Number:	20.200 Highway Research & Development
Eligibility:	Eligibility for this funding opportunity is limited to the following USDOT-selected Smart City Challenge Finalists: • City of Austin, TX • City of Columbus, OH • City and County of Denver, CO • City of Kansas City, MO • City of Pittsburgh, PA • City of Portland, OR • San Francisco Municipal Transportation Agency
Application Due Date:	Applications due by 5/24/2016 at 3:00 pm Eastern Time by Email to SmartCityChallenge@dot.gov
Questions:	Submit Questions to: SmartCityChallenge@dot.gov

SECTION A – PROGRAM DESCRIPTION

The United States Department of Transportation (USDOT) is encouraging cities to put forward their best and most creative ideas for innovatively addressing the challenges they are facing. The vision of the Smart City Challenge is to demonstrate and evaluate a holistic, integrated approach to improving surface transportation performance within a city and integrating this approach with other smart city domains such as public safety, public services, and energy. The USDOT intends for this challenge to address how emerging transportation data, technologies, and applications can not only be integrated with existing systems in a city to address transportation challenges, but used to spur reinvestment in underserved communities. The USDOT seeks bold and innovative ideas for proposed demonstrations to effectively test, evaluate, and demonstrate the significant benefits of smart city concepts.

The USDOT will make an award of up to \$40 Million for one city that can demonstrate how advanced data and intelligent transportation systems (ITS) technologies and applications can be used to reduce congestion, keep travelers safe, use energy more efficiently, respond to climate change, both connect and create opportunities for underserved communities, and support economic vitality.

The USDOT issued two separate solicitations to carry out this challenge. The first solicitation resulted in selection of seven Smart City Challenge Finalists who received funding to support concept development and planning activities. This follow-on second solicitation invites the Smart City Challenge Finalists to apply for funding to support implementation of their proposed demonstration.

This document is the second of the two solicitations. The purpose of this solicitation is to request detailed applications from Smart City Challenge Finalists on their proposed plans to conduct a Federally funded Smart City Demonstration in their jurisdiction.

The Smart City Demonstration is expected to provide safety improvements, enhance mobility, increase ladders of opportunity by incentivizing reinvestment in underserved communities, reduce energy usage, and address climate change. The USDOT identified twelve vision elements – defined in more detail in Section A of this funding opportunity. A successful Smart City Challenge Demonstration would align with USDOT goals and vision elements.

1. STATEMENT OF PURPOSE

The USDOT hereby requests applications for assistance to result in one award to provide funding support for the implementation of a Smart City Challenge Demonstration, in the estimated Federal funding amount of \$40 Million. This competition is limited to Smart City Challenge Finalists selected previously by the USDOT.

The estimated timeline follows:

Estimated Date	Action
March 2016	The USDOT Solicits Applications from Finalists for Smart City Challenge Demonstration
May 2016	Applications Due from Finalists
June 2016	Selected Smart City Challenge Demonstration Awardee Announced

2. CRITERIA FOR SELECTION OF SMART CITY CHALLENGE FINALISTS

TECHNICAL MERIT: The Government will evaluate applications on following technical merit criteria, which are of equal importance.

- Demonstration of an innovative, integrated, and holistic approach to conduct the Applicant's Smart City demonstration consistent with the USDOT's demonstration goals and twelve vision elements as defined in Section A.
- Extent that the Applicant's vision and goals address issues identified in *Beyond Traffic*, including increases in population, urbanization, the movement of people and the movement of goods.
- Extent that applicants improve access to reliable, safe, and affordable transportation for underserved communities. This includes, but is not limited to connecting people to jobs, removing physical barriers to access, incentivizing reinvestment in underserved communities, and strengthening communities through neighborhood redevelopment.
- Extent applicant addresses the digital divide when creating and implementing technology solutions for individuals who might not otherwise have access to specific types of smart city technologies.

- Extent applicant can demonstrate targeted outcomes for other USDOT priorities including reducing congestion and addressing climate change and resilience.
- Extent applicant can demonstrate targeted outcomes for safety, that aim to significantly reduce transportation related injuries and fatalities.
- Demonstration of a sound technical, data management, management, and staffing approach.
- Extent the Applicant is committed to partners that are consistent with USDOT desired characteristics including a commitment to integrating with the sharing economy; and a clear commitment to making open, machine-readable data accessible, discoverable and usable by the public to fuel entrepreneurship and innovation.
- Demonstration of sufficient capacity and capability to perform.

3. LEGISLATIVE AUTHORITY

Specific statutory authority for conducting this effort is found in the Intelligent Transportation Systems Research Program in 23 U.S.C. §516(a), which authorizes the Secretary of Transportation to “...carry out a comprehensive program of intelligent transportation system research and development, and operational tests of intelligent vehicles, intelligent infrastructure systems, and other similar activities.”

Funding is authorized under Section 6002(a) of Public Law 114-94, the Fixing America’s Surface Transportation Act (FAST Act).

The authority to enter into a cooperative agreement for this effort is found under 23 U.S.C. § 502 - Surface Transportation Research, Development, and Technology, paragraph (b), which states:

- (3) cooperation, grants, and contracts. — The Secretary may carry out research, development, and technology transfer activities related to transportation—
- (A) independently;
- (B) in cooperation with other Federal departments, agencies, and instrumentalities and Federal laboratories; or
- (C) by making grants to, or entering into contracts and cooperative agreements with one or more of the following: the National Academy of Sciences, the American Association of State Highway and Transportation Officials, any Federal laboratory, Federal agency, State agency, authority, association, institution, for-profit or nonprofit corporation, organization, foreign country, or any other person.

4. BACKGROUND

In February of 2015, the United States Department of Transportation (USDOT) released “*Beyond Traffic: Trends and Choices 2045*.” Beyond Traffic examines the long-term and emerging trends affecting our Nation’s transportation system and the implications of those trends. It describes how demographic and economic trends, as well as changes in technology, governance, and our climate are affecting how people and goods travel today, and how they could affect travel in the future. It outlines choices that will require cities to think differently about how we move, how we move things, how we move better, how we adapt, and how we align decisions and dollars.

Smart cities are emerging as a concept that can be used to address these issues starting today. The trends identified in *Beyond Traffic 2045* have major implications for cities. Cities deliver many benefits – greater employment opportunities, greater access to healthcare and education, and greater access to entertainment, culture and the arts. People are moving to cities at an unprecedented rate. Our population is expected to grow by 70 million over the next 30 years, and most of this population growth will be concentrated in metropolitan areas or cities. Growing urbanization will continue to put significant strain on city infrastructure and transportation networks.

Transportation is critical to making a city work. Transportation is deeply connected to economic opportunity providing Americans with connections to employment, education, healthcare, and other essential services. Many cities see advantages in urbanization, but these cities are also saddled with concentrated growth, shrinking revenues, and increased transportation demand. Inefficiencies in our transportation system cost Americans, on average, each over 40 hours stuck in traffic each year – an annual financial cost of \$121 billion. At the same time, Americans spend more on transportation than they do on food, healthcare, and clothing. Low-income Americans spend nearly a quarter of their annual income on transportation while high-income American spend about one-tenth on transportation. Finally, research indicates that cities account for 67% of all greenhouse gases (GHGs) released into the atmosphere. The transportation sector is the second-biggest source of GHGs, responsible for 28% of U.S. emissions.

To overcome these challenges, cities must find ways to foster the emergence of technologies that have the potential to transform transportation. A number of trends in technology are taking place. Improvements to how we collect and analyze data, how communications and mobile platforms evolve, how rapidly connected and automated vehicle technologies emerge, and how soon all modes of transportation transition to

using clean forms of energy hold the promise of making our future transportation system safer, more accessible and efficient, and more environmentally sustainable.

With Intelligent Transportation Systems (ITS) laying the groundwork for innovative transportation solutions, many cities are currently serving as laboratories for new types of transportation services and cleaner transportation options leveraging those solutions. Smart cities are emerging as a next-generation approach for city management by taking steps forward along the transportation technology continuum. Integrating ITS, connected vehicle technologies, automated vehicles, electric vehicles, and other advanced technologies – along with new mobility concepts that leverage the sharing economy – within the context of a city will provide enhanced travel experiences and makes moving people and goods safer, more efficient, and more secure. By enhancing the effective management and operation of the transportation system, smart city solutions can leverage existing infrastructure investments, enhance mobility, sustainability, and livability for citizens and businesses, and greatly increase the attractiveness and competitiveness of cities and regions.

5. VISION AND GOALS OF A SMART CITY

This section describes the USDOT's vision of a successful Smart City, and the specific goals that collectively describe important elements of the planned demonstration.

EXPECTED OUTCOMES OF THE SMART CITY CHALLENGE

- **Improve Safety** – By using advanced technologies, including connected vehicle technologies, to reduce the number of collisions, fatalities, and injuries for both vehicle occupants and non-vehicle occupants.
- **Enhance Mobility** – By providing real-time traveler information and emerging mobility services to improve personal mobility for all citizens including people with lower incomes, people with disabilities, and older adults.
- **Enhance Ladders of Opportunity** – By providing access to advanced technology and its benefits for underserved areas and residents, increasing connectivity to employment, education and other services, and contributing to revitalization by incentivize reinvestment in underserved communities.
- **Address Climate Change** – By implementing advanced technologies and policies that support a more sustainable and cost-effective relationship between transportation and the environment through more efficient fuel use and emissions reductions.

To show what is possible when communities use technology to connect transportation assets into an interactive network, the USDOT's Smart City Challenge is concentrating federal resources into one city, selected through a nationwide competition. As part of this effort, the USDOT is encouraging cities to put forward their best and most creative ideas for innovatively addressing the challenges they are facing. The Smart City Challenge seeks to demonstrate and evaluate a holistic, integrated approach to improving surface transportation performance within a city and integrating this approach with other smart city domains such as public safety, public services, and energy. The USDOT intends for this challenge to address how emerging transportation and other data, technologies, applications, and clean energy can be integrated with existing and new systems in a city to address transportation challenges.

The USDOT recognizes that each city has unique attributes, and each city's proposed demonstration will be tailored to their vision and goals. This section serves to present the USDOT's high-level vision and goals without making each item a requirement for award. Rather, this section is designed to provide a framework for applicants to consider in the development of a city's proposed demonstration.

The USDOT's vision for the Smart City Challenge is to identify an urbanized area where advanced technologies are integrated into the aspects of a city and play a critical role in helping cities and their citizens address the challenges in safety, mobility, access to opportunity, sustainability, clean energy, economic vitality, and climate change. Advancements in ITS, connected vehicles, automated vehicles, electric vehicles, and other advanced technology will be a critical part of meeting these transportation challenges, as will the merging Internet of Things (IoT) which offers data from various sectors (e.g., energy and weather) and sources (e.g., the private sector and connected citizens). A smart city uses these data to maximize efficiencies within their management systems while enabling an open, growing ecosystem of third party services that provide additional benefits to citizens.

The Smart City Challenge will give consideration to projects that seek to improve access to reliable, clean, safe, and affordable transportation for a wider spectrum of its underserved communities. A Smart City will develop novel ways to reform the digital divide and use smart technologies and concepts to strengthen connections to jobs, remove physical barriers to access, and strengthen communities through neighborhood redevelopment. A Smart City will sequence deployment of these technologies and innovations so they benefit underserved communities early in the process. The Smart City Challenge identifies these concepts as Ladders of Opportunities. Ladders of

Opportunity projects may increase connectivity to employment, education, services and other opportunities, increase access to digital resources, broaden the availability of affordable clean transportation options, support workforce development, or contribute to community revitalization, particularly for underserved areas.

The Smart City Challenge is expected to improve safety, enhance mobility, enhance ladders of opportunity, accelerate the transportation to clean transportation, and address climate change. Specific goals of the Smart City Challenge include:

- Identify the transportation challenges and needs of the citizen and business community and demonstrate how advanced technologies can be used to address issues in safety, mobility, access to opportunity, energy efficiency, and climate change, now and into the future.
- Determine which technologies, strategies, applications, and institutional arrangements demonstrate the most potential to address and mitigate, if not solve, transportation challenges identified within a city.
- Support and encourage cities to take the evolutionary and revolutionary steps to integrate advanced technologies – including connected vehicles, automated vehicles, and electric vehicles – into the management and operations of the city, consistent with the USDOT vision elements.
- Demonstrate, quantify, and evaluate the impact of these advanced technologies, strategies, and applications towards improved safety, efficiency, and sustainable movement of people and goods.
- Examine the technical, policy, and institutional mechanisms needed for realizing the potential of these strategies and applications – including identifying technical and policy gaps and issues – and work with partners to address them.
- Assess reproducibility of interoperable solutions and qualify successful smart city systems and services for technology and knowledge transfer to other cities facing similar challenges. Follow systems engineering best practices and utilize available architectures and standards to develop interoperable, reproducible systems with national extensibility, including the use of open source technologies.
- Work with Federal partners and programs focused on providing technical and financial resources for optimizing the usage of advanced and affordable clean transportation options.

- Collaborate with regional agencies on the best use of a city's Federal transportation assets and Federal workforce to accelerate the deployment of clean transportation and connected and automated vehicle technologies.

The USDOT's ideal Smart City would have continuity of committed leadership, authority, and capacity to carry out the demonstration throughout the period of performance and continue operation after the period of performance is over. Additionally, the city would have a commitment to integrating with the sharing economy; and a clear commitment to making open, machine-readable real-time and archived data accessible, discoverable and usable by the public to fuel entrepreneurship and innovation.

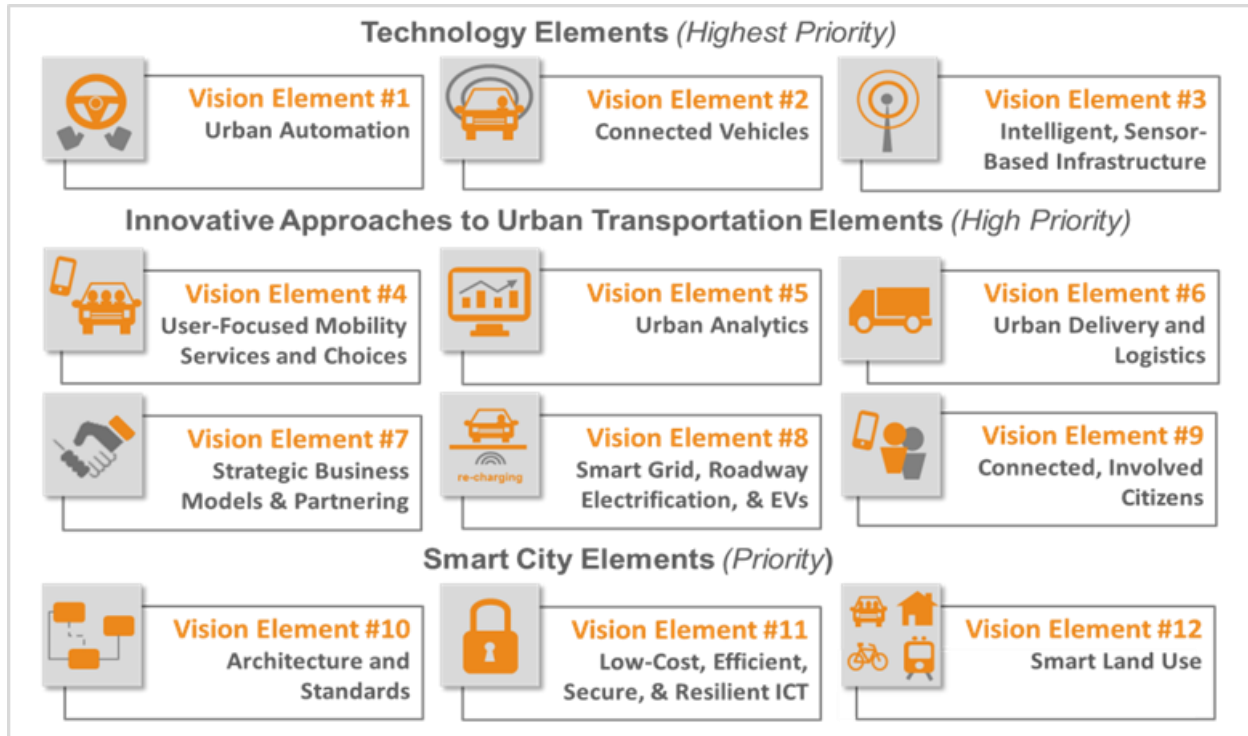


Figure 1. Beyond Traffic: The Smart City Challenge Vision Elements

The USDOT identified twelve vision elements that comprise a Smart City. A successful proposal would align to some or all of the USDOT's vision elements and foster integration between the elements. Through alignment with these vision elements, the Smart City Challenge is expected to improve safety, enhance mobility, enhance ladders of opportunity, accelerate the transition to clean transportation, and address climate change. The vision elements reflect the strategic priorities and themes put forth in the USDOT's ITS Strategic Plan 2015-2019 (<http://www.its.dot.gov/strategicplan/>) and the

USDOT's Strategic Plan 2014-2018 (<https://www.transportation.gov/dot-strategic-plan>). Vision elements were derived from foundational research conducted by the ITS JPO's Connected Cities Research Program and communicated to 570 stakeholders during a free public webinar held by the ITS JPO on February 26, 2015. The USDOT vision elements build on enablers defined by the Smart Cities Council (<http://smartcitiescouncil.com/smart-cities-information-center/the-enablers>). The twelve vision elements are depicted in Figure 1 and described in more detail below.

The USDOT is encouraging Applicants to consider these twelve elements in developing ideas for their city's approach for a Smart City Challenge demonstration which should address real-world issues and challenges citizens and cities are facing.

TECHNOLOGY ELEMENTS

This group of three Vision Elements includes technologies that are of the highest priority to the USDOT.

Vision Element #1: Urban Automation. Automated transportation offers tremendous possibilities for enhancing safety, mobility, accessibility, equity, and the environment. The Smart City can provide national leadership through its demonstration and assessment of automated transportation applications and systems for the movement of goods and people. There are many ways to incorporate automated transportation into a Smart City. For the purpose of illustration, some examples of automated transportation in an urban environment include:

- Self-driving vehicles coupled with smart infrastructure;
- Self-driving shuttles and other forms of fully automated vehicles operating at low speeds to enable new mobility options for services such as first/last mile travel to local destinations and access to public transportation;
- Fully automated trucks and buses used in intermodal facilities, such as ports, depots, and maintenance facilities to improve driver and vehicle efficiencies; and
- Driver-assisted automation to reduce congestion and localized pollution and smog.

The aforementioned examples are not intended to express preference for the purpose of evaluating proposals. Applicants are encouraged to propose innovative automation strategies that demonstrate safety, mobility, and/or environmental benefits in an urbanized area.

Vision Element #2: Connected Vehicles. Connected vehicles use vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications to provide connectivity that will enable countless safety, mobility, and environmental applications. Connected vehicle technologies allow vehicles to send and receive information about their movements in the network – offering cities unprecedented opportunities to provide more responsive and efficient mobility solutions in real-time and in the long term. Data derived from connected vehicles provide insights to transportation operators, help to understand demand, and assist in predicting and responding to movements around a city. When made accessible to a broader ecosystem of developers, these data can enable new research and applications that further benefit citizens. A successful Smart City may demonstrate safety, mobility, and/or environmental applications. These applications – which can increase efficiency and accessibility, enhance safety and reduce congestion – may provide more responsive mobility solutions in real-time. Applications may be developed and managed by cities or third parties. In deploying connected vehicle and infrastructure services, Smart Cities may seek to integrate a variety of commercially available communication technologies including cellular, satellite, Wi-Fi and others. At the same time, Dedicated Short Range Communication (DSRC) technology operating in the 5.9GHz range may be used to expand demonstrations of V2V and V2I applications based on DSRC¹. For more information on the USDOT’s Connected Vehicle Research Program and potential applications, visit: <http://www.its.dot.gov/research.htm>.

Vision Element #3: Intelligent, Sensor-Based Infrastructure. Smart cities contain and use a collective intelligent infrastructure that allow sensors to collect and report real-time data to inform transportation-related operations and performance and trends of a city. These data allow city operators to evaluate how the city is operating and how to enhance the operation of facilities, systems, services, and information generated for the public. Intelligent infrastructure includes sensors that collect traffic, pedestrian, bicyclist, environmental data, and other information available throughout the city. A successful Smart City will integrate these data with existing transportation data and operations, allowing the city to improve operations of the transportation network. Additionally, infrastructure could be used to monitor transportation assets to improve infrastructure management, reduce maintenance costs, prioritize investment decisions, and ensure a state of good repair. Where possible, a Smart City will make these data accessible to a broader ecosystem of developers to enable new research and applications. Smart Cities should leverage existing infrastructure investments, including sensors operated by other public sector agencies, academia, the private sector, and personal mobile devices.

¹ Specifically, IEEE P1609, 802.11p, and, SAE J2945/1 and J2735 standards

INNOVATIVE APPROACHES TO URBAN TRANSPORTATION ELEMENTS

This group of six Vision Elements includes innovative approaches to urban transportation and is categorized as a high priority by the USDOT.

Vision Element #4: Urban Analytics. This vision element includes platforms for understanding and analyzing data to address complex urban challenges (e.g., personal safety and mobility, network efficiency, and environmental sustainability) and/or measure the performance of a transportation network. In a data-rich environment, cities and citizens are increasingly able to share, use, and leverage previously unavailable datasets to address complex urban problems and improve current operations and capabilities. Urban analytics create value from the data that is collected from connected vehicles, connected citizens, and sensors throughout a city or available from the Internet using information generated by private companies. Analytics that utilize data from across various systems in a city have tremendous potential to identify new insights and unique solutions for delivering services, thereby improving outcomes. Analytics can be used to predict future conditions and the potential benefits of implementing different operational strategies, control plans and response plans coordinated among agencies and service providers. Furthermore, analytics can be applied across sectors to create new and different applications. One example might be an application of travel demand management that also factors in environmental and energy consumption as part of the optimization – providing more context to citizens' personalized recommendations. Additionally, data analytics can also be used to understand the potential benefits of deployed solutions. To do so, transportation-related performance measures and evaluation are needed to quantify the intended and measured impact of all proposed solutions on personal safety and mobility, network efficiency, and environmental sustainability, representing the priorities of this challenge. For example, performance measurement may indicate greater access to jobs and services; reduction in congestion and delays; increase in transit, walking, or cycling; a reduction in crashes, injuries, and or fatalities; improved incident response and clearance times; and reductions in emissions. In a Smart City, these performance measure should be made publicly available as open data.

Vision Element #5: User-Focused Mobility Services and Choices. This vision element consists of strategies, initiatives, and services that increase transportation choices and options by supporting and improving mobility across all modes for all travelers, including aging Americans and persons with disabilities. A major component

includes advanced traveler information systems that provide real-time traffic, transit, parking, and other transportation-related information to travelers. Smart cities support sustainable mobility using traveler-oriented strategies that deliver innovative solutions across all transportation modes, including transit, bicycling, electric vehicles, and shared use mobility services, to improve the mobility of all travelers, including older Americans as well as people with disabilities. Shared-use transportation has grown tremendously in recent years with the increase in smartphone applications. The sharing economy and new transportation services provide people with more options and help to overcome barriers to the use of non-driving forms of transportation. Advanced technology and services deployed throughout a city empower people to adopt “car-free” and “car-light” lifestyles with dramatically less driving if they so choose. For people to be willing to share assets there must be a seamless, low-friction way to do so. Mobility on Demand (MOD) is an emerging concept built on shared use approaches and a shift in mass transit. It augments public transportation and supports the efficient movement of people. Open data and technology enable the efficient coordination, use, and management of all mobility services in the system. From the user’s perspective, travel choices are simplified through open data and communications technology that provides personalized information – including traveler information, travel options, and integrated mobile payment – directly to the user. In smart cities, the integration of new technologies into the transportation system facilitates a dynamic supply of mobility services and operations by leveraging emerging mobility services, integrated transit networks and operations, real-time data, connected travelers, and cooperative ITS. The result is a more traveler-centric, transportation system-of-systems approach, providing improved mobility options to all system users.

Vision Element #6: Urban Delivery and Logistics. This vision element includes innovative solutions that support efficient goods movement through use of data or technology to create opportunities for a more efficient supply chain approach that delivers safer logistics management, improved on-time pickups and delivery, improved travel time reliability, reduced energy use, and reduced labor and vehicle maintenance costs. As populations increase and urbanization continues, cities need to identify innovative ways to effectively and efficiently move goods – including food, energy, and manufactured goods – into and throughout cities. The Smart City may consider improving urban goods movements by including freight-specific information exchanges that enable dynamic travel planning to improve freight movement efficiency, including load matching and drayage operations. Additional strategies may leverage urban delivery hubs that use connected urban delivery vehicles and flexible (shared use) commercial delivery solutions. The aforementioned examples are for illustration

purposes and are not intended to express preference for the purpose of evaluating proposals. Applicants are encouraged to propose innovative urban delivery strategies that demonstrate safety, mobility, energy efficiency, and/or environmental benefits in an urbanized area.

Vision Element #7: Strategic Business Models and Partnering Opportunities.

Opportunities exist to leverage creative strategic partnerships that draw in stakeholders – including those from the private sector, non-profit organizations, foundations and philanthropic organizations, academia/University Transportation Centers (UTC), Federal agencies, and other public agencies – to advance smart city solutions. The private sector is pushing innovation and developing new technologies and approaches that can be augmented through new collaborations with government. The public sector is also pushing innovation, creating new opportunities/models for governance and interagency partnerships that will increase return on investment while accelerating deployment. Successful implementation of a Smart City will likely rely on strategic partnering opportunities between public agencies and the private sector – especially for cities that have limited resources to bring to bear on the challenges they face. Innovative partnerships among city or local government, regional Federal agencies, planning organizations, the private sector, vehicle manufacturers, academia, associations, and other stakeholder groups are needed to advance smart city solutions and identify sustainable business models to maintain and expand capabilities in the future. Through cooperation, city governments may partner with non-governmental organizations that can bring resources to the city. Applicants are encouraged to leverage Federal resources through cost share, in-kind donations, and partnering. The USDOT encourages Applicants to make robust use of partnerships, including partnerships that significantly leverage Federal resources and initiatives, work already underway, and the technical capabilities of universities and other stakeholders who provide services to public agencies. In particular, cities are encouraged to partner with a University Transportation Center (UTC) or member of a UTC consortium to leverage product and service development assets and develop the workforce (<http://www.rita.dot.gov/utc/>). USDOT also encourages Applicants to consider whether using innovative procurement processes, such as challenges and competitions, micro-procurements, and “entrepreneur in residence” programs would allow smaller and less established potential partners to participate in their demonstration. In addition to formal partnerships, Applicants are encouraged to engage a broader ecosystem of stakeholders including start-ups, small businesses, local technologists, and other parties interested in helping to implement the Smart City Demonstration and use the data it generates through the course of the demonstration.

Note: The Connected Vehicle Reference Implementation Architecture (CVRIA) and associated SET-IT software tool provides a means to depict the institutional relationships with the enterprise layer of the architecture. For more information, visit: www.iteris.com/cvria.

Vision Element #8: Smart Grid, Roadway Electrification, and Electric Vehicles.

This vision element includes strategies and initiatives that leverage the smart grid – a programmable and efficient energy transmission and distribution system – in an effort to support the adoption or expansion of roadway electrification, robust electric vehicle charging infrastructure, and the acceleration of electric vehicle deployment. With electric vehicles (note: the term electric vehicles or “EVs” include full Battery Electric Vehicles (BEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Extended Range Electric Vehicles (EREVs)) becoming more prevalent and more advanced, increasing opportunities exist for the vehicle to interact with the smart grid. Opportunities also exist for the integration of intelligent transportation systems with the smart grid and other energy distribution and charging systems. For example, smart-grid technology can enable electric vehicle-charging [grid-to-vehicle (G2V)] load to be shifted to off-peak periods, thereby flattening the daily load curve and significantly reducing both generation and network investment needs. Technology like this can help bring the numerous economic and environmental benefits of electric vehicles to the forefront of a city by coupling and integrating with a robust deployment of electric vehicle charging infrastructure. Likewise, wireless inductive charging technologies increase opportunities for uninterrupted usage of electric vehicles, allowing electric vehicles to charge their batteries wirelessly while the vehicle is stopped or, with certain technologies, even while in motion. Electric vehicles are increasingly available across vehicle class (e.g., transit buses and medium duty vehicles) and price points. Providing access to electric vehicles through car share programs can provide increased access for underserved communities, reduce total operational costs, and contribute to improvements in local air quality.

Vision Element #9: Connected, Involved Citizens. Connected citizens generate, share, and use data and information in new and useful ways. This vision element consists of strategies, local campaigns, and processes to proactively engage and inform citizens at the individual level by deploying hardware, software, and open data platforms in an effort to increase personal mobility. Advanced technologies would be used to enhance overall mobility for all citizens including people with disabilities, older adults, and young Millennials who will act as an important engine of the future economy. One

example of connected, involved citizens is leveraging the use of crowdsourcing. Crowdsourced data provides communication conduits through mobile technologies to connect citizens with city operators about a myriad of topics. In a successful Smart City, citizens would provide user-generated content to cities, opting-in to provide data from smartphones. Another example of connected, involved citizens includes leveraging broad access to open government data providing a platform for citizens and entrepreneurs to serve as co-creators and co-producers of new and innovative transportation services.

SMART CITY ELEMENTS

This group of Vision Elements includes three smart city elements and is categorized as a priority by the USDOT.

Vision Element #10: Architecture and Standards. This vision element emphasizes complete and well-documented systems architectures – governed by rules, documentation, and standards – that may be extended to a nationwide or broader deployment and support interoperability between systems. Because vehicles and travelers move broadly across regions, uniform operation that is accessible to everyone is essential for safe and efficient transportation operations. Interoperable regional ITS and other infrastructure system architectures that can be extended to a nationwide or broader deployment based on accessible, well-defined standards is needed for consistent implementations that will lead to the required uniformly accessible operation. Multiple system architectures will need to interoperate with the ITS architecture to efficiently support a smart city.

Vision Element #11: Low-Cost, Efficient, Secure, and Resilient Information and Communications Technology (ICT). This vision element includes strategies and practices that advance information and communications technology (ICT) that is affordable, adaptable, scalable, efficient, secure and resilient. This may include telecommunications platforms, enterprise software, storage, visualization systems, and operations to inform decision making. This will include ICT that contributes to one common operating platform to inform city government decision-making. ICT infrastructure, technologies, and services are a critical part of a Smart City. ICT consists of interoperable, unified communications and the integration of telecommunications, and computing as well as necessary enterprise software, storage, and visualization systems, which enable users to access, store, transmit, and manipulate information. The success of a Smart City depends upon affordable ICT that enables dynamic ingest, sharing, and

use of data. The ICT in a Smart City, including telecommunications and computing, needs to be resilient, secure and respectful of privacy. Resilient design includes supporting standards common technology architectures and integrative policies. If one part of the system fails or is compromised, the entire system should not collapse, and the gap in service should be bridged effectively and restored quickly.

Privacy and security play a critical role in enabling smart cities because they build trust with people. Privacy and security constitute practices that safeguard data, privacy, and physical assets. Private information relates to any data emitted, collected, or stored about individuals. A key concept in privacy analysis is Personal Identifiable Information (PII). PII is any information that can be used to distinguish or trace an individual's identity, which is not specific to any category of information or technology; each case and associated risks must be individually examined for context and the combination of data elements that are provided or obtainable. The Smart City needs to determine the extent to which their system or systems will collect or store PII and PII-related information, and ensure that there is a legitimate need for this information to meet the goals of the system and that the data is only accessible for and used for these legitimate purposes which may include sharing it with qualified researchers. Wherever possible, efforts should be made to provide public access to versions of the data that remove any PII-related elements.

To support the overall security and privacy of participants in this Challenge, the USDOT is developing a prototype security credential management system (SCMS) which will be available for use in DSRC-based communications. The SCMS will provide digitally signed certificates that can be used to ensure trusted DSRC communications between connected vehicle devices, roadside devices and the SCMS. The USDOT will provide technical support for interfacing with the prototype SCMS, as well as tools intended to support the Smart City.

Physical security of the deployed devices and security for non-DSRC communications are not covered by the SCMS and should be addressed using existing appropriate best practices in the demonstration. Rigorous, proven processes are needed to ensure that security mechanisms are embedded in systems and infrastructure to protect against attacks. Secure solutions must be integrated into architecture designs and security risks must be continually managed. Challenge sites are expected to use industry best practices as they relate to objects and interfaces used in their installations.

Vision Element #12: Smart Land Use. This vision element includes strategies and practices that ensure land use is optimized through a combination of planning and innovation deployments designed for a better connected community that expands the range of transportation choices and access to employment, housing, education, and health services. A successful Smart City ensures that land use is efficiently optimized. Urban land use concentrates growth in compact walkable urban centers to avoid sprawl. It also advocates compact, transit-oriented, shared-use, walkable, bicycle-friendly land use, including neighborhood schools, complete streets, and mixed-use development with a range of housing choices. Smart land use values long-range, regional considerations of sustainability and citizen needs with the goals of achieving a unique sense of community and place; expanding the range of transportation, employment, and housing choices; equitably distributing the costs and benefits of development; preserving and enhancing natural and cultural resources; and promoting public health.

5. CONDUCTING A FEDERALLY FUNDED SMART CITY DEMONSTRATION

Under this solicitation, the seven Smart City Challenge Finalists are invited to apply for funding to support implementation of their proposed vision. The purpose of this solicitation is to request detailed applications from Smart City Challenge Finalists on their proposed approach and plans to conduct a Federally funded Smart City Demonstration in their jurisdiction.

The USDOT recognizes that each Smart City Challenge Finalist will have unique strategies they plan to implement to address the challenges they face. Likewise, each finalist will have unique partnerships and technical approaches they will take to implement their solution. Under this solicitation, finalists are being asked to describe how they plan to make their high-level vision a reality. Rather than prescribing an approach that the city must follow to implement their solution, the USDOT is providing context to its expectations for demonstration.

While cities will be responsible for defining their own approach to implementing their vision, the USDOT is requiring some products and deliverables needed to demonstrate, quantify, and evaluate the impact of advanced technologies, strategies, and applications towards improved safety, efficiency, ladders of opportunity, and sustainable movement of people and goods. Other products and deliverables are needed to foster transferability/reproducibility to support technology and knowledge transfer to other cities facing similar challenges.

The following sections are intended to delineate the tasks and deliverables required in

the performance of the Smart City Demonstration. Specific application requirements for this NOFO are included in Section D.

A. PROGRAM MANAGEMENT

Implementation of a Smart City Demonstration will require a disciplined approach to manage the execution of the work and make sure the team responsible for implementing the Smart City Demonstration delivers the highest quality products on time and within budget. Common processes and procedures should be used to ensure quality, timeliness, and cost control. Effective program management should consider:

- **Scope Management.** This includes ensuring that all required activities are performed. The Recipient should have mechanisms in place for verifying and controlling the overall scope of the Smart City Demonstration.
- **Schedule Management.** This includes managing the timely execution of work activities. A Project Schedule should list all activities required to bring all required work to a successful completion. Successful schedule management should identify how the team will monitor the project schedule and manage changes after a baseline schedule has been approved. Schedule management includes identifying, analyzing, documenting, prioritizing, approving or rejecting, and publishing all schedule-related changes.
- **Communications Management.** This includes the systematic planning, implementing, monitoring, and revision of all the channels of communication within the project partners and with other stakeholders. For the purposes of the Smart City Challenge, a *partner* refers to an organization or individual on the Smart City Team. A *stakeholder* refers to an organization or individual potentially impacted by the Smart City demonstration itself, regardless of whether they are team members (partners) or not. Communications management ensures effective internal team communications and governance methods, as well as communications with the USDOT's Agreement Officer Representative (AOR).
- **Cost Management.** This includes the process of planning and controlling the budget for the Smart City Demonstration. Effective cost management should ensure that any issues with funding surface quickly, before cost overruns can occur.
- **Quality Management.** This includes effectively managing the quality of the products produced, from planning to delivery. Quality management includes procedures to be followed to implement a quality program and provide the USDOT with visibility into product quality (e.g., process and product evaluations,

record keeping, nonconformance tracking, and reporting channels). Quality management addresses both Quality Control (QC) and Quality Assurance (QA) processes. QC is defined as the monitoring and controlling actions required during a project to ensure that a product – or performed service – adheres to a defined set of quality criteria. QA ensures that the appropriate quality planning and QC mechanisms are defined and utilized to prevent mistakes or defects.

- **Configuration Management.** This includes managing how items to be placed under configuration control are identified, when they are identified, and when they are placed into a configuration control process or system. Configuration management may include establishing a Configuration Control Board (CCB) and include procedures for handling proposed changes to items under configuration control, and the role of the USDOT in configuration control.
- **Risk Management.** This includes identifying, prioritizing, and managing program risks in a timely and efficient manner. Risks that may impact the schedule, scope, or costs of activities performed under the program should be identified, documented, and tracked. Plans for mitigating risks should be identified and implemented.

The Recipient shall prepare a Program Management Plan (PMP) that describes the activities required to perform the work, per current PMBOK guidance². The PMP shall explain the roles and responsibilities of all key individuals within the program/project team. At a minimum, the PMP shall contain a Scope Management Plan, a Schedule Management Plan, a Communications Management Plan, a Cost Management Plan, a Quality Management Plan, Configuration Management Plan, and a Risk Management Plan.

The PMP shall be accompanied by a detailed Smart City Demonstration Project Schedule, considered to be a logical component of the PMP, although it may be a physically separate electronic file. The Project Schedule shall list all activities required to bring all required work to a successful completion and shall contain – at a minimum – three levels of the Work Breakdown Structure (WBS). The Project Schedule shall be updated monthly. The Project Schedule shall describe the following:

- Name of the work activity;
- Expected start and end dates;

² PMI (2012), A Guide to the Project Management Body of Knowledge, 5th Ed.

- Name of the individual with the primary responsibility for accomplishing the work;
- Dependencies with other work activities in the Project Schedule; and
- All deliverables, procurements, or milestones resulting from the work activity.

The PMP shall be delivered in draft to the AOR. After receiving the AOR's comments and resolving them, the Recipient shall provide the "final" version of the PMP and its related documents. During the course of the Smart City Demonstration, the Recipient may propose modifications to the PMP. Any such modifications shall go through the cycle of draft submission, AOR review and comment, comment resolution, and submission of a "final" version.

Shortly after award, representatives from the Recipient's Smart City Demonstration team shall attend a kick-off meeting to be held in Washington, DC with the AOR and its representatives to ensure that all parties have a common understanding of the AOR's requirements and expectations. The Recipient shall bring its key personnel to this meeting and the AOR will arrange the location, the agenda, and the list of other attendees. This kickoff meeting shall occur no later than two weeks after award of the Cooperative Agreement.

The USDOT requires the Recipient to provide quarterly progress reports and briefings that identify all deliverables and deliverable status (not initiated, in progress X% complete, draft delivered, in revision X% complete, final delivered, accepted). Quarterly reports shall contain a narrative of accomplishments by task and projected activities in the next quarterly period. Quarterly reports shall also contain an updated project schedule with a schedule risk narrative, a technical risk narrative, a partnership risk narrative, a retrospective cost narrative, and a projected cost-to-complete narrative. Quarterly progress briefings shall be conducted in person, alternating quarters between the Smart City Demonstration site and at the USDOT headquarters in Washington, DC.

Required Deliverables

- Kick-off Meeting
- Project Management Plan (PMP)
- Project Schedule
- Quarterly Progress Reports and Briefings

B. SYSTEMS ENGINEERING APPROACH

Effective development and implementation of the technical and institutional solutions to enable an efficient, interoperable, and replicable smart city demonstration requires rigorous application of established systems engineering best practices. To reduce the risk of schedule and cost overruns and increase the likelihood that the demonstration will meet users' needs, the Recipient shall provide evidence of following a systems engineering process when implementing its vision. Benefits of following such as approach include improved stakeholder participation; more adaptable, resilient systems; verified functionality and fewer defects; higher level of reuse from one project to the next; and better documentation.

The International Council of Systems Engineering (INCOSE) defines *Systems Engineering* as:

“An interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem.

Systems Engineering integrates all the disciplines and specialty groups into a team effort forming a structured development process that proceeds from concept to production to operation. Systems Engineering considers both the business and the technical needs of all customers with the goal of providing a quality product that meets the user needs.”

The USDOT recognizes the benefits of following a systems engineering approach and supports innovative approaches that a Recipient may follow that are tailored to fit the needs of their demonstration. The USDOT also recognizes that components of the Smart City Demonstration may be digital in nature and may use other incremental and iterative development concepts, such as agile software development, to deliver applications. These modern systems engineering techniques represent practical approaches that allow for system developers to provide an initial capability followed by successive deliveries to reach the desired final product. Iterative development considers adaptive planning, evolutionary development, early delivery, continuous improvement, and encourages rapid and flexible response to change. This incremental, fast-paced style of development may help keep the solution open and flexible to accept new features and technologies. These techniques can be used to reduce the risk of failure and enable the ability to test and deploy so that features may be added often and put into production easily. By addressing the whole experience from start to finish (e.g., actions taken on-line, through mobile applications, and off-line touch point) system

developers are able to identify pain points and prioritizes activities according to public needs. Incremental and iterative development emphasizes velocity and adaptability throughout the entire lifecycle.

To document how the Recipient plans to follow a systems engineering approach, a Systems Engineering Management Plan (SEMP) shall be developed. The SEMR shall describe what systems engineering process the Recipient plans to follow during the execution of the project's work and how the Recipient plans to manage the specific systems engineering activities that will be performed during the project.

Systems engineering deliverables to support the smart city demonstration include:

- **Concept of Operations (ConOps).** A Concept of Operations (ConOps) serves as the foundation document that frames the overall smart city system and sets the technical course for a project. Its purpose is to clearly convey a high-level view of the system to be developed that each stakeholder can understand. A Smart City Demonstration ConOps should describe the city's holistic, integrated solution to be deployed for the Smart City Demonstration, and how operational practice should be altered based on the introduction of new applications. Among other elements, the ConOps should include a set of proposed high-priority "needs" through structured stakeholder interaction, a context diagram, discussion of enhancements to operational practices, and use cases or scenarios. The ConOps shall explicitly describe how the Recipient plans to interface with all proposed partners including current and anticipated USDOT partners Paul Allen's Vulcan, Inc., Mobileye, Autodesk, Amazon Web Services, NXP, Alphabet's Sidewalk Labs, and others. IEEE Standard 1362-1998 includes guidelines for format and content to support development of a ConOps.
- **Demonstration Site Map and Installation Schedule.** The Demonstration Site Map should identify the specific geographic area and indicate locations related to key issues, current and proposed roadside technology locations, connected automated vehicle operations, and other explanatory features to support strategies that align with the city's proposed strategies. During the course of the effort, the Demonstration Site Map should be updated to reflect any changes decided during the demonstration effort. In addition, the Recipient Project Team should create a Site Installation Schedule that identifies infrastructure installation activities. For each type of infrastructure element to be installed, this schedule shall indicate:
 - The type of infrastructure element to be installed;

- Planned installation start and end dates for each infrastructure element;
 - Organization or individual responsible for the installation;
 - Milestone(s) identifying when the installation of each type of infrastructure element is completed; and
 - Planned start and end dates for unit testing the operation of each infrastructure element (by type).
- **Systems Requirements Specification (SyRS).** System requirements define *what* the system will do but not *how* the system will do it. Working closely with stakeholders, requirements should be elicited, analyzed, validated, documented, and baselined. IEEE Standard 1233-1998 includes guidelines for format and content to develop a System Requirements Specification (SyRS). Requirements should include:
 - Functional Requirements. Including communications, security, and safety requirements.
 - Interface Requirements. Including identification of relevant standards (where appropriate).
 - Data Requirements. Including data-sharing requirements.
 - Performance Requirements. Including system performance targets and performance requirements.
 - Security Requirements. Including limits to physical, functional, or data access, by authorized or unauthorized users.

The requirements should identify what the systems must accomplish; identify the subsystems; and define the functional and interface requirements among the subsystems. The role of each subsystem in supporting system-level performance requirements should be identified, including associated subsystem functional, interface, performance, security, data, and reliability requirements.

- **System Architecture and Standards Plan.** A Systems Architecture Document and Standards Plan should be developed that documents the architecture for systems associated with the Smart City Demonstration and associated standards that will be used. The architecture document should consider:
 - Enterprise Architecture. Describes the relationships between organizations required to support the overall system architecture.

- Functional Architecture. Describes abstract functional elements (processes) and their logical interactions (data flows) that satisfy the system requirements.
- Physical Architecture. Describes physical objects (systems and devices) and their application objects as well as the high-level interfaces between those physical objects.
- Communications Architecture. Describes the communications protocols between application objects.

The National ITS Architecture is a mature architecture that provides a common framework for the ITS community to plan, define, and integrate ITS solutions. The Connected Vehicle Reference Implementation (CVRIA) was developed to extend the National Architecture to include detailed information to support development of fully interoperable regional connected vehicle architectures. The CVRIA and the associated SET-IT software tool will be fully integrated into a comprehensive National ITS Architecture and single comprehensive software toolset to support development of interoperable regional architectures including complete ITS infrastructure and connected vehicle capabilities along with interface information needed for standards selection. Prior to integration into a single comprehensive ITS architecture with a single integrated software tool, the CVRIA (and associated SET-IT tool) and the National ITS Architecture (and the associated Turbo Architecture Tool) will be available to support systems architecture efforts. The USDOT envisions that the Recipient will use the CVRIA, the National ITS Architecture, and published and under-development ITS standards to demonstrate interoperable ITS capabilities which are nationally extensible.

To the extent viable, the USDOT envisions the Recipient will define and demonstrate integration of ITS systems with other systems which comprise a smart city. As part of this effort, the Recipient shall develop a Standards Plan that identifies the nature of required interfaces to other systems, which should be defined to utilize existing networking or other standards when available. In following the systems engineering process, the Recipient shall identify information exchange needs and/or use cases. To the extent that such exchanges are supported by standards, the Recipient should catalog applicable standards that will be used. Where new standards are needed, these needs should be fully documented in the Standards Plan. Further, to the extent viable, these interfaces should be documented using the CVRIA system architecture tools and feedback should be provided to the USDOT to facilitate expansion of

CVRIA to accommodate these additional interfaces. To support nationwide deployment of ITS infrastructure and connected vehicle technologies, the Recipient should use existing ITS standards, architectures, and certification processes for ITS and connected vehicle based technologies whenever viable, and document those cases where such use is not viable. To provide information required to refine ITS architecture and standards in support of nationwide deployment, the Recipient should also document their experiences and cooperate with architecture and standards developers to improve the quality of these products based on lessons learned in deployment.

- **System Design Document (SDD).** System design is created based on the system requirements specification (SyRS) including a high-level design that defines the overall framework for the system. Subsystems of the system are identified and decomposed further into components. Requirements are allocated to the system components, and interfaces are specified in detail. Detailed specifications are created for the hardware and software components to be developed, and final product selections are made for off-the-shelf components. IEEE Standard 1016-1998 (IEEE Recommended Practice for Software Design Descriptions) includes guidelines for format and content in to develop a System Design Document (SDD).
- **System Test Plan.** A System Test Plan should be used to demonstrate that the system satisfies all of the requirements. The System Test Plan should identify what methods (i.e., analysis, demonstration, inspection, and testing) will be used to ensure that the developed system satisfies the system's requirements.
- **Interface Control Documents (ICDs).** Since there will be likely be multiple organizations involved in the Smart City Demonstration development effort, Interface Control Documents (ICDs) should be developed so that all parties can build components of the system that will work together. ICDs inform different organizations building parts of the system that must interact with each other what the specific elements of that interface are and how those elements must be expressed. ICDs could be as simple as specifying what types of connecting wires must be used to couple two manufacturers' devices together. ICDs may be as complex as specifying the protocol suites and standards that must be used to ensure that two different computer devices can communicate over some form of telecommunications.
- **Testing Documentation.** System Integration should take place to ensure that the different pieces of the Smart City system interoperate correctly. Integration Unit testing should take place to ensure that individual components meet their

specifications. Integration should take place to confirm that all interfaces have been correctly implemented and to confirm that all requirements and constraints have been satisfied. System testing should verify that the developed system satisfies the system's requirements To support testing the Recipient should consider the following:

- Test Descriptions. Test Descriptions include written descriptions of the individual verification and validation processes that will occur as part of the effort to ensure that the system was built correctly and that the correct system was built. Test descriptions should be linked back to the requirements whose fulfillment they will determine. The document should include a requirements-to-test procedure matrix that shows the test coverage relationship among the tests and the requirements. Every requirement should have at least one test case associated with it and each test case should have at least one requirement associated with it.
- Test Cases. Each test case include a set of test inputs, execution conditions, and expected results developed for a particular objective, such as to exercise a particular path within a system or a software application or to verify compliance with a specific requirement or set of requirements.
- Test Procedures. Test Procedures spell out exactly how one verifies and validates that the component of the system undergoing integration actually functions as intended and as desired. If test data are going to be used as part of the verification and validation process in this step, the test procedures should also spell out how one will determine that the system actually performed the correct transformations on the data entered.
- Test Data. Test Data should include scripts used to execute software operations, data that must be entered by someone as part of the process of verification and validation of the system and its component integration, or a description of what system-generated data will flow through different components of the system to accomplish a system function.
- Test Results. Documents that describe the results of each test conducted.
- **Operations and Maintenance Plans**. Operations and Maintenance (O&M) plans should describe policies and high-level procedures governing operation and maintenance of the system. Minimally, it should address the activities described in the project's Concept of Operations and any other activities needed to achieve the project's objectives.

Note: The Recipient may elect to conduct formal walkthroughs (see IEEE Standard 1028-1997) for key systems engineering deliverables to solicit inputs and feedback from stakeholders to help ensure consensus.

To support knowledge and technology transfer efforts, all systems engineering documentation developed for the Smart City Demonstration should be developed with the intent to share publically and be formatted for Section 508 compliance.

Required Deliverables

- Systems Engineering Management Plan (SEMP)
- Concept of Operations (ConOps)
- Demonstration Site Map and Installation Schedule
- Systems Requirements Specification (SyRS)
- System Design Document (SDD)
- System Architecture and Standards Plan
- Other Systems Engineering documents – as identified by the Recipient and agreed to by the USDOT – that provide evidence of following a systems engineering approach

C. PERFORMANCE MEASUREMENT

A primary objective of the Smart City Challenge is to demonstrate, quantify, and evaluate the impact of advanced technologies, strategies, and applications toward addressing the city's challenges. To understand the impacts of smart city strategies, a set of rigorously defined performance measures and associated quantitative performance targets for each performance measure that are achievable within the timeframe of the Smart City Demonstration shall be defined. A Performance Measurement Plan shall be developed by the Recipient that identifies performance measures as well as plans for collecting data and reporting on performance.

The Smart City Demonstration should focus on combinations of technology solutions that align with the USDOT's twelve vision elements. As part of the demonstration, the Recipient shall identify performance measures and a set of quantitative performance targets associated with each performance measure. Performance measures shall be developed to address how integrated Smart City strategies impact safety, mobility, ladders of opportunity, a transition to clean transportation, economic vitality, and/or address climate change. In particular, performance measures should describe how the Smart City Demonstration may:

- Reduce traffic-related fatalities and injuries;
- Reduce traffic congestion
- Improve travel time reliability;
- Increase the use and integration of electric vehicles;
- Increase the transition to clean energy;
- Reduce transportation-related emissions;
- Improve personal mobility and increase accessibility for all citizens, including low-income individuals and persons with disabilities;
- Optimize multimodal system performance;
- Increase the number of mobility options and services;
- Improve public access to real-time integrated multimodal transportation information;
- Provide cost savings to transportation agencies, businesses, and the traveling public;
- Increase the connectivity between city services and connected travelers;
- Increase connectivity to employment, education, services and other opportunities; and/or
- Provide other benefits to transportation users and the general public.

The Performance Measurement Plan should discuss the types of data the Recipient plans to collect and how the Grant Recipient plans to collect the data to support ongoing performance of the Smart City Demonstration. Proposed hypotheses should be documented as well as methodologies for collecting: (i) pre-demonstration data that can be used as a performance baseline, (ii) continuous data during life of the demonstration to support performance monitoring and evaluation, (iii) cost data including unit costs and operations and maintenance costs, and (iv) information on the timeframe that applications or other technology solutions are deployed during the course of the demonstration period. The Performance Measurement Plan should also address how the Recipient will release these performance measures as open data.

As part of the Smart City Demonstration, the Recipient is expected to respond to the USDOT's Survey on Deployment Tracking. The USDOT's Deployment Tracking Project has conducted national surveys on a regular basis since 1997, with the most recent previous survey conducted in 2013. The purpose of this effort is to assist the USDOT in measuring the deployment of ITS technology nationally. The ITS Deployment Tracking Project surveys transportation agencies in the largest U.S. cities on a regular basis. For more information, visit: <http://www.itsdeployment.its.dot.gov/>. In addition, the Recipient

may also be asked to respond to other USDOT survey instruments related to ITS or other deployment tracking.

Required Deliverables

- Performance Measurement Plan
- Response to USDOT Deployment Tracking Surveys (as required)

D. DATA PRIVACY REQUIREMENTS

As noted elsewhere in this document, data collected by the Recipient in connection with the Smart City Demonstration will include Personally Identifiable Information (PII) and Sensitive Personally Identifiable Information (SPII).

- **PII** is information that can be used to distinguish or trace an individual's identity, such as their name, Social Security number, biometric records, etc., alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, mother's maiden name. The definition of PII is not anchored to any single category of information or technology. Rather, it requires a case-by-case assessment of the specific risk that an individual can be identified by examining the context of use and combination of data elements. Non-PII can become PII whenever additional information is made publicly available. This applies to any medium and any source that, when combined with other available information, could be used to identify an individual
- **SPII** is a subset of PII which if lost, compromised or disclosed without authorization, could result in substantial harm, embarrassment, inconvenience, or unfairness to an individual. Sensitive PII requires stricter handling guidelines because of the increased risk to an individual if the data are compromised. The following PII is always (de facto) sensitive, with or without any associated personal information:
 - Social Security number (SSN)
 - Passport number
 - Driver's license number
 - Vehicle Identification Number (VIN)
 - Biometrics, such as finger or iris print
 - Financial account number such as credit card or bank account number
 - The combination of any individual identifier and date of birth, or mother's maiden name, or last four of an individual's SSN

In addition to de facto Sensitive PII, some PII may be deemed sensitive based on context.

Categories of Records Collected. Typically, the Recipient will include many of the following forms of personal information about individual participants and their motor vehicle and motor vehicle use:

Participant Background Information

- Individual Identifiers;
- Full Name (First, Middle, Last);
- Demographic information, including age and gender;
- Individual subject research identifier created by DOT; and
- Driver's license number, issuing state, and qualifiers.

Vehicle Identifiers

- Personal vehicle identification number (VIN) and registration information;
- Vehicle Identification Number (VIN) of government issued vehicles; and
- Identifiers for equipment installed by DOT in personal or government issued vehicle.

Contact Information

- Mailing/Residential Address;
- Phone number(s);
- Email address(es);
- Institutional or organizational affiliation;
- Work/Business related contact information; and
- Occupation and work schedule.

Eligibility Information

- Driver history and habits;
- Medical history relevant to the scope of the research project; and
- Outcomes of criminal background check.

Project Information

- Vehicle sensor information;
- Video or still images, including infrared;
- Audio recordings;
- Dynamic information about a vehicle, including location, heading,
- proximity to and interaction with other vehicles and infrastructure;

- Dynamic information about a driver's interaction with the vehicle, including steering wheel, turn signal, and accelerator and brake pedal positions; and
- Data collected from drivers by means of surveys, focus groups, or interviews.

USDOT Data Privacy Policy. Improper handling of PII or SPII by a Recipient could have significant adverse impacts on the privacy of individuals. For this reason, USDOT is committed to ensuring that the Recipient institutes sufficient data privacy controls to mitigate the risk of harm to individuals that would result in the improper handling or disclosure of the PII and SPII collected from individuals in connection with a DOT-funded Smart City Transportation Project.

The Recipient shall:

- Devote sufficient resources, and develop and adhere to policies and procedures to ensure that privacy-risks stemming from a Smart City Transportation Project are mitigated appropriately and in accordance with the privacy controls identified below;
- Develop and submit for USDOT approval a Data Privacy Plan that documents the technical, policy and physical controls that it will put in place (and require its sub-grantees and contractors to put in place) to mitigate potential privacy harms; the plan should include a System Security Plan (SSP) or other documentation sufficient to verify that the Recipient will store PII only on IT infrastructure that is subject to appropriate security controls;
- Ensure that sub-recipients, contractors, and partners who handle or may access PII or SPII developed by the Recipient in connection with a Smart City Transportation Project adhere to the Recipient's Data Privacy Plan and have policies and procedures in place to safeguard the security and privacy of participant data. To this end, the Recipient shall include in all sub-grant agreements and contracts appropriate data security and privacy requirements;
- Upon request by USDOT, provide sufficient documentation to demonstrate that its IT infrastructure, policies and procedures (and those of any sub-grantee or contractors having access to PII or SPII) comply with the privacy control requirements set forth below, including but not limited to confirming that PII and SPII will be stored only on IT infrastructure employing security controls commensurate with the risk to the individual that would result from unauthorized access, disclosure, or use of the information.

Required Privacy Controls. Generally, the Recipient (and their sub-grantees and contractors) shall develop and document in their Data Privacy Plan the following privacy controls, which shall apply (as appropriate) throughout the data lifecycle:

- Collection of PII
 - Collect only PII that the researcher has been authorized to collect by USDOT.
 - Collect the minimum PII required for the research and not more.
- Notice to Human Subjects
 - Provide appropriate advanced notice, if at all possible at the point of collection, to the individuals from whom the PII is being collected.
 - Obtain advanced approval for the notice from the USDOT Contracting Officer.

Use and Sharing of PII

- Ensure that Recipient personnel acknowledge PII responsibilities to ensure that PII is used only as authorized.
 - Not use PII for purposes other than those authorized by USDOT.
 - Ensure that access to PII is on a “need to know” basis for authorized purposes only.
 - Not exceed authorized access to PII, or disclose PII to unauthorized persons.
- Security
 - Protect all PII, electric or hardcopy, in their custody from authorized disclosure, modification, or destruction so that the confidentiality, integrity and availability of the information are preserved.
 - Store PII only on IT infrastructure employing security controls commensurate with the risk to the individual that would result from unauthorized access, disclosure, or use of the information.
 - Encrypt all PII in transit or at rest.
 - Encrypt all PII transmitted or downloaded to mobile computers/devices.
 - Ensure that all individuals having access to PII have received training in the policies and procedures that protect PII.
- Maintenance and Disposal
 - Maintain PII in accordance with the applicable NARA records schedule (available from the NHTSA Contracting Officer or, in the case of NHTSA–conducted research, from the NHTSA Records Officer).

- After conclusion of the research project, maintain PII only as permitted by the NARA schedule and, in the case of contractor-conducted research, relevant data rights classes in the applicable contract.
- Privacy Documentation
 - Document compliance with the provisions of the Recipient's Data.
 - Privacy Plan and the Data Privacy and Security provisions in the Grant Agreement.
 - Upon request, provide to the USDOT Contracting Officer sufficient documentation to demonstrate compliance with the Recipient's Data Privacy Plan and the Data Privacy and Security provisions in the Grant Agreement.
- Privacy Reporting
 - Immediately report to the USDOT Contracting Officer any suspected loss of control or any unauthorized disclosure of PII by the Recipient, its sub-grantees or contractors.
 - Immediately report to the USDOT Contracting Officer all suspected or actual unauthorized collection, use, maintenance, dissemination or deletion of PII by the Recipient, its sub-grantees or contractors.

Additional Information. There are many types of privacy and security controls available to safeguard the confidentiality of PII. NIST Special Publication 800-122 (Guide to Protecting the Confidentiality of PII)³ provides guidelines for a risk-based approach to protecting the confidentiality of PII. Additional information about privacy and security safeguards that may protect PII can be found in Appendix J to NIST Special Publication 800-53.⁴ Furthermore, NIST provides guidance regarding big data architectures and security requirements in NIST Special Publication 1500-1⁵ and NIST Special Publication 1500-4.⁶

³ NIST Special Publication 800-122 (Guide to Protecting the Confidentiality of PII) may be found at: <http://csrc.nist.gov/publications/nistpubs/800-122/sp800-122.pdf>

⁴ NIST Special Publication 800-53, Appendix J (Security and Privacy Controls for Federal Information Systems and Organizations) can be found at: <http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r4.pdf>

⁵ NIST Big Data Interoperability Framework: Volume 1 Definitions, <http://dx.doi.org/10.6028/NIST.SP.1500-1>

⁶ NIST Big Data Interoperability Framework: Volume 4, Security and Privacy, <http://dx.doi.org/10.6028/NIST.SP.1500-4>

The Recipient may wish to include in their Data Privacy Plan the following checklist to help demonstrate that they considered the privacy and security controls detailed above. It also may be used by the Recipient to help verify that its sub grantees and contractors have done so.

Checklist. Please review NIST Special Publication 800-122 for additional information about the questions below or the information that the Recipient may be required to produce in connection with their Privacy Plans. If you still require assistance, please contact the Contracting Officer handling the relevant procurement/contract for additional information.

1. Has your organization ever performed work for a Federal agency that involved handling PII? **NO YES** (if **YES**, please provide the name of one such agency and contract number).
2. Does your organization have any policies/procedures to protect the security and confidentiality of PII? **NO YES** (if **YES**, please attach or detail).
3. Does your organization have any policies/procedures to control and limit access to PII? **NO YES** (if **YES**, please attach or detail).
4. Does your organization store PII on network drives and/or in application databases with proper access controls (i.e., User IDs/passwords)?
5. Does your organization limit access to PII only to those individuals with a valid need to know?
6. Does your organization prohibit or strictly limit access to PII from portable and mobile devices, such as laptops, cell phones, and personal digital assistants (PDA), which are generally higher-risk than non-portable devices (e.g., desktop computers at the organization's facilities)? **NO YES** (if **YES**, please explain or attach relevant policy).
7. Does the information system used by your organization to store PII contain automated or easy-to-use process to ensure that only authorized users access PII – and only to the extent that each user has been authorized to do so? **NO YES** (if **YES**, please explain or attach relevant policy).
8. Does your organization monitor events that may affect the confidentiality of PII, such as unauthorized access to PII? **NO YES** (if **YES**, please explain or attach relevant policy).
9. Does your organization audit its information systems on a regular or periodic basis? **NO YES** (if **YES**, please explain or attach relevant policy)

10. Does your organization analyze information system audit records for indications of inappropriate or unusual activity affecting PII, investigate suspicious activity or suspected violations, report findings to appropriate officials, and take necessary actions? **NO YES** (if **YES**, please explain or attach relevant policy)
11. Does your organization restrict access to information system media containing PII, including digital media (e.g., CDs, USB flash drives, backup tapes) and non-digital media (e.g., paper, microfilm)? **NO YES** (if **YES**, please explain or attach relevant policy)
12. Does your organization restrict access to portable and mobile devices capable of storing PII? **NO YES** (if **YES**, please explain or attach relevant policy)
13. Does your organization require that information system media and output (such as printed documents) containing PII be labeled to indicate appropriate distribution and handling? **NO YES** (if **YES**, please explain or attach relevant policy)
14. Does your organization securely store PII, both in paper and digital forms, until the media are destroyed or sanitized using approved equipment, techniques, and procedures? **NO YES** (if **YES**, please explain or attach relevant policy)
15. Does your organization sanitize digital and non-digital media containing PII before disposing of or reusing the media? **NO YES** (if **YES**, please explain or attach relevant policy)

Required Deliverables

- Data Privacy Plan

E. DATA MANAGEMENT AND SUPPORT FOR INDEPENDENT EVALUATION

Management systems within a smart city – both within transportation and across other sectors of a city – are expected to share data to allow for communication between cities and their citizens and enable an open, growing ecosystem of third part services that provide additional benefits to citizens. Systems that allow for data sharing also enable cities to maximize efficiencies through intelligent management of assets across sectors. Open data and technology enable the efficient coordination, use, and management of all mobility services in the system. A Data Management Plan should be submitted per requirement of the USDOT Public Access Plan. Requirements are outlined at <http://ntl.bts.gov/publicaccess/creatingaDMP.html>.

The Recipient shall develop a Data Management Plan that describes how data – including data across multiple sectors in a city – will be collected, managed, integrated, and disseminated before, during, and after the Smart City Demonstration. This includes real-time and archived data that are inputs to and outputs from systems managed by the city and its partners. The document shall discuss the city's plans for managing their data as a strategic asset and making open, machine-readable data available to the public – subject to applicable privacy, security and other safeguards – to fuel entrepreneurship and innovation to improve citizens' lives, create jobs, and spur economic development. In cases where the data includes PII or other restrictions, the document shall address how the city will make that data available, as possible, in a secure environment for the use of qualified researchers. The Data Management Plan shall also describe:

- The data the city currently collects and plans to collect as part of the Smart City Demonstration and how these data will be used by the lead agency, project partners, other agencies, and stakeholders to further address city challenges.
- Opportunities to integrate transportation data 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, it shall describe how other data could be integrated with transportation data to improve transportation operations.
- The terms of existing and future data sharing agreements that will be put in place during the project period and the city's approach to preserving project data for future use. If the city plans to partner with outside organizations (nonprofits, universities, corporations, etc.) it shall 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.
- 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 plan.
- Practices that safeguard data, privacy, and physical assets. The Data Management Plan shall identify the extent to which their system or systems will collect or store Personal Identifiable Information (PII) and PII-related information, and ensure that there is a legitimate need for this information to meet the goals of the system and that the data is only accessible for and used for these legitimate

purposes. If PII is collected, practices for scrubbing or removing PII from data sets shall be described so that data may be used for independent evaluation and/or made available to the USDOT's Research Data Exchange (RDE).

As part of the Smart City Demonstration, an Independent Evaluation will be conducted by the USDOT. The Independent Evaluator will conduct an evaluation applying quantitative and qualitative evaluation methodologies to conduct before and after performance assessments; cost-benefit assessments of the demonstration; assess user acceptance/citizen satisfaction of the demonstration; document lessons learned, challenges and approaches for mitigating, addressing, and /or overcoming them; estimate total impacts, costs, and return-on-investment (ROI) of the demonstration; and assess if the Smart City Demonstration achieved its vision.

The Recipient shall develop an Evaluation Support Plan detailing their expected support to the independent evaluation effort. During demonstration, the Recipient shall execute its Evaluation Support Plan. The support may include provision of frequently collected data and corresponding meta data; provision of frequently monitored performance measures estimates and desired targets; limited availability of the site for the independent evaluators to conduct additional field tests and experiments to supplement data not available from the site; and participation in surveys and interviews conducted by the independent evaluators.

Systems deployed as part of the Smart City Demonstration must be capable of generating the data needed to calculate measures over time – that is, to show how well the systems are performing with respect to performance measures and targets identified in the Performance Measurement Plan. 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. The Recipient is responsible for supporting the independent evaluator's access to the site and to site staff to conduct evaluation-related experiments, interviews, and surveys.

To support independent evaluation, the Recipient shall apply data quality measures and processes including security protocols to convert the raw data into processed, quality data and ensure that those data are stored in a secure database, with the database schema defined by the Independent Evaluator. The Recipient shall securely transmit

these data to support evaluation, on a schedule and using a medium agreed upon with the Independent Evaluator, to the Independent Evaluator's location. Data collected for use by the Independent Evaluator shall be considered "owned" by the USDOT. The Recipient shall transmit only those data required to support evaluation by the Independent Evaluator; any additional data that the site collects for its own use shall also be stored in its own secure data storage system, but kept separate from data required by the Independent Evaluator and the USDOT. However, the Recipient may use data collected for the Independent Evaluator in its own analyses.

Connected vehicle, mobile device, and infrastructure sensor data captured during the Smart City Demonstration are expected to be broadly shared with the community to inform prospective deployers of smart city applications. Incorporating data sharing practices into the overall design of the Smart City Demonstration will also enable more innovation and participation. However, data sharing is subject to the protection of intellectual property rights and personal privacy and must be handled securely. Appropriately prepared system control, performance and evaluation data are expected to be shared with the USDOT and posted in timely fashion on resources such as the Research Data Exchange (RDE) (www.its-rde.net) stripped of PII. The USDOT envisions that this data sharing capability will better support the needs of ITS researchers and developers while reducing costs and encouraging innovation. Data accessible through the RDE will be well-documented and freely available to the public. The USDOT expects appropriate data – determined by the Recipient and the USDOT – to be made freely available to the public on the RDE. Hence, the Recipient shall transfer appropriate data collected under the Smart City Demonstration to the RDE.

While the RDE currently only supports dissemination of archival data that has been stripped of PII, the USDOT may develop future capabilities to support the dissemination of real-time data, sharing sensitive data with qualified researchers, and automate cleansing of data sets to remove PII to enable public dissemination. The USDOT expects to work closely with the Recipient to ensure that data produced during the demonstration is shared efficiently and cost effectively, leveraging these and other shared resources as appropriate to increase the completeness and timeliness of data exchange.

Required Deliverables

- Data Management Plan
- Independent Evaluation Support Plan
- Data to support USDOT's Independent Evaluation

- Data provided to the USDOT's Research Data Exchange (RDE)

F. SAFETY MANAGEMENT AND SAFETY ASSURANCE

The Recipient shall describe any underlying safety needs associated with the safety of all travelers, subjects, and other personnel associated with the Smart City Demonstration.

The Recipient shall develop a Safety Management Plan that includes a systematic approach to achieving acceptable levels of safety risk with the demonstration. The Recipient shall establish and define the methods, processes, and organizational structure needed to meet safety goals. These processes should build upon the processes and procedures that already exist for city operations, but also consider how new strategies deployed as part of the Smart City Demonstration may impact those processes. Safety scenarios shall be developed that are related to the applications and technologies – including but not limited to automated vehicle deployments – selected for demonstration. These scenarios shall include an analysis of likelihood and potential impact. Potential mitigating actions taken at various times and locations shall be identified for each scenario. A set of “safety needs” shall be derived from this scenario-based analysis. The Recipient shall identify levels of safety risk associated with the Smart City Demonstration, using established processes where possible, (e.g., ISO 26262 ASIL). The nature of these assessment processes will be dependent on the applications selected and the nature of the specific safety risks.

During the demonstration, the Recipient shall evaluate the continued effectiveness of implemented risk control strategies and support the identification of new hazards. The Recipient shall continually provide insight and analysis regarding methods/opportunities for improving safety and minimizing risk.

If some or all components of the Smart City Demonstration plan to use human participants, the Recipient shall obtain Human Use Approval from an accredited Institutional Review Board (IRB). Under federal regulations, an IRB is a group of individuals that has been formally designated to review and monitor research involving human subjects. In accordance with federal regulations, an IRB has the authority to approve, require modifications in (to secure approval), or disapprove research. This review serves an important role in the protection of the rights and welfare of human research subjects. The purpose of IRB review is to assure, both in advance and by periodic review, that appropriate steps are taken to protect the rights and welfare of humans participating as subjects in the research. Certain IRBs have been “accredited”

by private accreditation agencies. Note that the USDOT will not act as an IRB for the purposes of this award. The Recipient is responsible for obtaining IRB approval for human participation within the Smart City Demonstration.

Required Deliverables

- Safety Management Plan
- Human Use Approval Summary

G. COMMUNICATIONS AND OUTREACH

The Recipient shall have a comprehensive communications and outreach program that covers both outreach activities and the accommodation of requests for site visits by media, researchers, and others. Communications and outreach should consider:

- Media strategy for both local and national press;
- Media coordination with the USDOT;
- Web/social media presence;
- Trade show strategy;
- Outreach strategy to promote the demonstration locally;
- Community awareness strategy;
- Crisis communications plan in case of unforeseen events, natural disasters, and other threats; and
- Accommodation of site visits and demonstration of capabilities.

Public relations and marketing should consider the delivery of:

- News articles, press releases, brochures, fact sheets;
- Photos;
- Website content;
- Videos;
- Talking points, press events, PowerPoint slide decks; and
- Trade show events.

For Recipient consideration, levels of outreach are expected to include:

- Two local press conferences each year;
- Three articles a year to be published in industry trade journals;
- A promotional video (6-12 minutes) about the Smart City Demonstration, including two additional updates;

- A Smart City Demonstration website;
- Travel and participation in six workshops/conferences/trade shows each year with one of them being international; and
- Participation in four public USDOT-organized webinars per year regarding Smart City Challenge Demonstration progress/performance and lessons learned.

The Recipient shall include regular coordination with USDOT communications staff, to facilitate the branding, re-use and re-distribution of materials developed by USDOT and the Smart City Demonstration team.

Required Deliverables

- Communications and Outreach Plan
- Public relations and marketing materials defined by the Recipient
- Outreach Products, including:
 - A promotional video (6-12 minutes) about the Smart City Demonstration, including two additional updates;
 - A Smart City Demonstration website;
 - Travel and participation in six workshops/conferences/trade shows each year with at least one outside of the United States or in support of international cooperation; and
 - Participation in four public USDOT-organized webinars per year regarding Smart City Challenge Demonstration progress/performance and lessons learned.
- Other communications and outreach deliverables as identified by the Recipient

H. INTERNATIONAL COLLABORATION

The USDOT is interested in sharing lessons learned from the Smart City Demonstration with its international partners. The USDOT currently has memorandums of understanding (MOUs) with the European Commission, Japan, Korea, Canada, and Mexico. The Recipient will be expected to collaborate on similar projects with international partners with which USDOT has research coordination agreements for the purpose of expanded learning. The format of the collaboration may include hosting foreign scanning tours, complementary alignment of evaluation activities, or it could involve a partial alignment of deployment or research activities and objectives to create twinned complementary project components. These exchanges assume that the international partners will fund projects on topics of relevance to the USDOT, and that an agreement can be reached among the international partners, USDOT, and the

program managers of the research and deployment programs. The USDOT will identify areas of shared interest with its international partners from among awarded programs and initiate collaboration discussions. No funds will be exchanged between USDOT and foreign-funded programs; each side will have responsibility for their respective budgets.

The proposal should include an estimate of travel funds needed for three team members to participate in one international and one US meeting each year of approximately three days duration, plus six days of effort for meeting preparation, and six days for reports preparation associated with the collaboration aspects of this project. These terms are for planning purposes only and do not constitute a commitment by the USDOT to support research exchange with foreign-funded programs; USDOT reserves the right to renegotiate these terms as funding, priorities, and opportunities for collaboration with the international partners may change.

Required Deliverables

- Participation in one International Collaboration meeting each year of approximately three days duration, plus six days of effort for meeting preparation, and six days for reports preparation associated with the collaboration aspects of this project

I. PARTICIPATION IN RELEVANT ITS ARCHITECTURE AND STANDARDS DEVELOPMENT EFFORTS

The Recipient shall assist in supporting activities of the ITS Architecture and Standards Programs where those activities are impacted by Smart City initiatives. Making use of published and developmental ITS architectures and standards, the Recipient will encounter cases where additional needs become evident as well as cases where improvements or corrections to existing architecture and standards are warranted. The Recipient shall take appropriate actions to assure that these lessons-learned are made available to support evolution of architecture and standards to improve suitability to support nationwide or greater interoperability of ITS as well as interoperability of ITS with other smart city systems and architectures. Such support will include participation in select Standards Development Organization (SDO) working groups/committees, including providing input to their work in the form of technical information (e.g., objectives, user needs, data requirements) about the Smart City initiative and lessons learned from Smart City Development and deployment activity. When appropriate, in-person participation in select meetings will be included. Participation in relevant ITS Standards development efforts may include providing technical input for multiple SDOs

and standards-relevant organizations such as the International Organization for Standardization (ISO) Technical Committee 204 (TC204) and possibly TC22, European Telecommunications Standards Institute (ETSI), European Committee for Standardization (CEN), Institute of Electrical and Electronics Engineers (IEEE), SAE International (SAE), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), National Electrical Manufacturers Association (NEMA), and National Institute of Standards and Technology (NIST).

The Recipient is expected to provide one appropriately knowledgeable expert for this participation. In-person participation requirements are estimated at 6 meetings of 3 days each per year, of which 2 are expected to be held outside of the United States. Additional efforts are expected to be required including remote participation during conference calls/webinars as well as drafting of technical input. The Recipient shall request USDOT prior approval for all international travel. The USDOT covers labor and travel costs associated with architecture and standards participation from the Recipient and private sector participants. For each working group/committee meeting with in-person participation, the Recipient shall provide a report to the USDOT describing the meeting outcomes, any impacts to the Smart City Demonstration, and inputs made by the Smart City program.

Required Deliverables

- Attendance at 6 architecture and standards meetings, of which 2 are expected to be held outside of the United States
- Architecture and Standards Meeting Trip Reports

J. INTERIM AND FINAL REPORTING

The USDOT requires the Recipient to submit interim and final reports. Interim reports shall be submitted each year discussing the progress to date and summarizing issues and opportunities. A final report for the Smart City Demonstration shall provide a summary of what was accomplished, the benefits and costs and lessons learned. This document shall be developed with the intent to share publically and be formatted for Section 508 compliance. The final report shall describe:

- Deployment costs (i.e., systems and unit costs) and operational costs (i.e., operations and maintenance costs) of the project compared to the benefits and cost savings the project provides; and

- How the project addressed city challenges and met the original expectations defined in the city's Smart City vision, such as —
 - Data on how the demonstration helped to improve safety, mobility, sustainability, ladders of opportunity, economic vitality, and/or address climate change;
 - The effectiveness of providing a holistic approach to addressing transportation challenges by deploying applications and strategies consistent with the USDOT's twelve vision elements; and
 - Lessons learned and recommendations describing how the demonstration met the objectives identified by the USDOT for the Smart City Challenge and recommendations for other locations considering implementation of similar solutions.

Required Deliverables

- Smart City Demonstration Interim Reports (annually)
- Smart City Demonstration Final Report

6. DELIVERABLES

The selected Smart City Challenge Awardee will receive a cost-reimbursement type cooperative agreement award for implementation of their demonstration in an amount of up to \$40 Million. The award will require the following milestones/deliverables. Due dates will be based on the applicants' proposal.

Section	Deliverable	Due Date	Section 508 Compliant?
A	Kick-off Meeting – conduct a kickoff meeting at the USDOT.	Within two weeks after award	No
A	Project Management Plan (PMP)	TBD	No
A	Project Schedule	TBD	No
A	Quarterly Progress Reports and Briefings – submit progress reports to document technical activities performed. See	Quarterly	No

Section	Deliverable	Due Date	Section 508 Compliant?
	Quarterly Progress Reports clause below.		
B	Systems Engineering Management Plan (SEMP)	TBD	Yes
B	Concept of Operations (ConOps)	TBD	Yes
B	Demonstration Site Map and Installation Schedule	TBD	Yes
B	Systems Requirements Specification (SyRS)	TBD	Yes
B	System Design Document (SDD)	TBD	Yes
B	System Architecture and Standards Plan	TBD	Yes
B	Other Systems Engineering documents – as identified by the Recipient and agreed to by the USDOT – that provide evidence of following a systems engineering approach	TBD	Yes
C	Performance Measurement Plan	TBD	Yes
C	Response to USDOT Deployment Tracking Surveys (as required)	TBD	No
D	Data Privacy Plan	TBD	Yes
E	Data Management Plan	TBD	Yes
E	Independent Evaluation Support Plan	TBD	Yes
E	Data to support USDOT's Independent Evaluation	TBD	No
E	Data provided to the USDOT's Research Data Exchange (RDE)	TBD	No

Section	Deliverable	Due Date	Section 508 Compliant?
F	Safety Management Plan	TBD	Yes
F	Human Use Approval Summary	TBD	No
G	Communications and Outreach Plan	TBD	Yes
G	A promotional video (6-12 minutes) about the Smart City Demonstration, including two additional updates;	TBD	Yes
G	A Smart City Demonstration website	TBD	Yes
G	Travel and participation in six workshops/conferences/trade shows each year with one of them being international	TBD	No
G	Participation in four public USDOT-organized webinars per year regarding Smart City Challenge Demonstration progress/performance and lessons learned	TBD	No
H	Participation in one International Collaboration meeting each year of approximately three days duration, plus six days of effort for meeting preparation, and six days for reports preparation associated with the collaboration aspects of this project	TBD	No
I	Attendance at 6 architecture and standards meetings, of which 2 are expected to be held outside of the United States	TBD	No
I	Architecture and Standards Meeting Trip Reports	TBD	No

Section	Deliverable	Due Date	Section 508 Compliant?
J	Smart City Demonstration Interim Reports (annually)	TBD	No
J	Smart City Demonstration Final Report	TBD	Yes

Note: Section 508 requirements are included in NOFO Section F's General Terms and Conditions available online at: <http://www.fhwa.dot.gov/aaa/generaltermsconditions.cfm>.

SECTION B – FEDERAL AWARD INFORMATION

1. FUNDING AND NUMBER OF AWARDS

The USDOT intends to make one award for the conduct of the Smart City Challenge demonstration as a result of this Notice of Funding Opportunity. The selected Smart City Challenge Awardee will receive a cost-reimbursement type cooperative agreement award for implementation of their demonstration in an amount of up to \$40 Million.

The USDOT has partial funding available for the Smart City Challenge demonstration award. The Government's obligation under the award is contingent upon the availability of appropriated funds from which payment for agreement purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available by the Agreement Officer for this award and until the awardee receives notice of such availability, to be confirmed in writing by the Agreement Officer.

Estimated funding by year is:

FY 16:	\$15 Million (partial funding available)
FY 17:	\$15 Million (subject to availability of funds)
<u>FY 18:</u>	<u>\$10 Million</u> (subject to availability of funds)
Total	\$40 Million

2. TYPE OF AWARD

The planned award type for the Smart City Challenge demonstration award is a cost-reimbursement cooperative agreement.

3. PERIOD OF PERFORMANCE

The estimated period of performance for the Smart City Challenge demonstration award is up to four years. The USDOT expects the demonstration to be implemented and tested within three years. The fourth year is expected to be used for finalizing the evaluation of the demonstration.

Ideally, the awardee, on a self-sustaining basis, will continue to operate the systems and services implemented in the Smart City Challenge after completion of the USDOT funded demonstration.

4. DEGREE OF FEDERAL INVOLVEMENT

The USDOT anticipates substantial Federal involvement between it and the Smart City Challenge Awardee (“Recipient”) during the course of this demonstration. The anticipated Federal involvement will include technical assistance, education and guidance to the Recipient.

The USDOT intends to encourage and facilitate development of agreements between the Recipient and third-party partners. Partners and resources that are likely to be available to the Recipient are summarized below.

USDOT Partner	Resources
Paul Allen’s Vulcan, Inc.	Up to an additional \$10 million of funding to support the deployment of electric vehicles and other carbon emission reduction strategies.
Mobileye	Installation of Mobileye's Shield +TM technology on transit buses. The Recipient will need to work with Mobileye to secure this technology contribution.
Autodesk	A year-long subscription to <i>Infraworks</i> , an information modeling platform that uses 3-D visualizations and real-world data to plan major engineering projects as well as on-site training.
Amazon Web Services (AWS)	Up to \$1 million of credits to AWS Cloud services and AWS Professional Services. AWS will also provide solution architecture and best practices guidance to the Smart City Finalists and will collaborate with USDOT on efforts to engage the startup community, and bring ideas to the finalists.
NXP	Wireless communication modules that allow cars to securely exchange data, such as hazard warnings, over distances of more than a mile to prevent accidents and improve traffic flow.

USDOT Partner	Resources
Alphabet's Sidewalk Labs	Flow technology, an analytics platform that the city can use to identify traffic-prone areas and parts of a city that are underserved by public transportation — all by using traffic patterns culled from aggregated, anonymized data. From that information the software can suggest solutions like ride-sharing, new transportation access or a rerouting of traffic to better serve the community.

SECTION C – ELIGIBILITY INFORMATION

1. ELIGIBLE APPLICANTS

This funding opportunity is limited to the USDOT-designated Smart City Challenge Finalists listed on page 3 of this NOFO.

2. COST SHARING OR MATCHING

For the Smart City Challenge Demonstration award, cost sharing or matching will NOT be required but is encouraged. If proposed, the Government will evaluate cost share as part of the cost/budget review. The degree of cost share and leveraging of non-federal funds will be considered beneficial to the extent the cost share is considered feasible and demonstrates a furtherance of the goals of the Smart City Challenge.

SECTION D – APPLICATION AND SUBMISSION INFORMATION

1. APPLICATION SUBMITTAL

Applications are due by the date and time listed on page 3 of this NOFO by Email to SmartCityChallenge@dot.gov. Applications shall provide a detailed approach for the city's proposed demonstration, as well as a detailed budget to include cost share planned if applicable.

2. FORMAT OF APPLICATION SUBMISSION

- a) Applications must be prepared on 8½ x 11 inch paper. Foldouts must not be used.
- b) Text must be printed using a font size no less than 12 point font.
- c) Tables are permitted and text in tables and captions may be doubled spaced and may be 10 point font.
- d) Page margins must be a minimum of 1 inch top, bottom and each side. Labeling information and page numbers may be located within the 1 inch margins.
- e) A Header or Footer identifying the Applicant Name may be located within the 1 inch margins.
- f) Applications shall be double spaced.

3. CONTENT OF APPLICATION SUBMISSION

Applicants shall submit an application consisting of the following:

- 1. VOLUME 1 – TECHNICAL APPLICATION (up to 5 files, total combined page limit of 75 pages)
 - a. Technical Approach
 - b. Data Management Approach
 - c. Management Approach
 - d. Staffing Approach
 - e. Capacity and Capability
- 2. VOLUME 2 – BUDGET APPLICATION (up to 4 files, no page limit)
 - a. Application Standard Forms (SFs)
 - b. Cost/Budget Information
 - c. Organizational Information

d. Letters of Commitment from Partners/Team Members

Note: An Applicant may include, at their option, to facilitate displaying the organization of their application, a one-page cover page, and a second page to include both a Table of Contents and/or a Listing of Tables/Figures. These pages are for orienting evaluators to the contents of the application package and will not be evaluated and are not included in the page limitation.

Note: Volume 1, Staffing Approach, requires brief tailored resumes of key personnel. Such resumes ARE included within the 75 page limit for Volume 1. Any letters of commitment from partners/team members shall be included in Volume 2. Volume 2 has no page count.

VOLUME 1 – TECHNICAL APPLICATION

A. Technical Approach

- Executive Summary (limited to 5 pages). Describe your city's challenges and how your smart city proposal will be used to address those challenges – including discussion of the proposed applications or technology solutions that will be deployed. The summary shall also specifically describe how the innovative solutions to improve safety, mobility, provide ladders of opportunity, and address climate change. The description should include how residents will be better connected. The executive summary should include unique benefits and outcomes for underserved communities, including low income communities, minority groups, people with disabilities, older adults, and other underserved communities. The executive summary should specifically address how the city plans to advance equality for access to technology, transportation, and other key elements, to ensure that we eliminate and/or avoid a digital divide for underserved communities.
- Provide a detailed technical approach for implementing and operating the demonstration project, including task descriptions, schedule, milestones and deliverables, performance measures, program management approach, and a detailed description of how the demonstration will be implemented. 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 demonstration and operations.

- Describe the extent of the proposed applications or technology solutions that will be implemented as part of the demonstration. Include details on the number of automated vehicles that will be deployed, the number of vehicles equipped with DSRC enabled connected vehicle technologies and applications, the number of intersections that will be equipped with advanced technologies (i.e., DSRC enabled connected vehicle technologies), the connected vehicle applications committed to being deployed, and the number of sensors and ITS devices and other equipment that will be installed along the roadway to support the demonstration. Identify the number and locations of public electric vehicle charging stations and plans for deploying additional stations.
- Provide an Annotated Site Map. The map shall identify the specific geographic location being proposed for the demonstration and indicate locations related to key issues, proposed sensor and 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.
- Describe your approach for interacting and engaging with partners. Partnerships are considered beneficial to the extent that the partner is making a firm commitment to helping the Applicant realize its vision and the partnership demonstrates a furtherance of the goals of the Smart City Challenge. Applicants should provide a detailed description of any partnerships, including details surrounding any commitment to make specific contributions to assist the Applicant in realizing its vision. The USDOT partners' commitments are summarized below and Applicants will have multiple opportunities engage with USDOT partners prior to May 20, 2016. Current and anticipated USDOT partners include Paul Allen's Vulcan, Inc., Mobileye, Autodesk, Amazon Web Services, NXP, Alphabet's Sidewalk Labs, and the U.S. Department of Energy (DOE). The USDOT partners' commitments are summarized below
 - Paul Allen's Vulcan, Inc. is offering up to an additional \$10 million of funding to the winning city to support the deployment of electric vehicles and other carbon emission reduction strategies.
 - Mobileye is offering to install Mobileye's Shield +™ technology on every bus. Mobileye's Shield +™ driver assistance safety technology is designed to enable bus drivers in the selected city to avoid and mitigate imminent collisions and protect road users including cyclists, pedestrians, and

motorcyclists. The Recipient will need to work with Mobileye to secure this technology contribution.

- Autodesk is offering a year-long subscription to *Infraworks*, an information modeling platform that uses 3-D visualizations and real-world data to plan major engineering projects. Autodesk will also provide on-site training.
- Amazon Web Services (AWS) is offering Up to \$1 million of credits to AWS Cloud services and AWS Professional Services. AWS will also provide solution architecture and best practices guidance to the Smart City Finalists and will collaborate with USDOT on efforts to engage the startup community, and bring ideas to the finalists.
- NXP is offering wireless communication modules that allow cars to securely exchange data, such as hazard warnings, over distances of more than a mile to prevent accidents and improve traffic flow.
- Alphabet's Sidewalk Labs is offering its Flow technology, an analytics platform that the city can use to identify traffic-prone areas and parts of a city that are underserved by public transportation — all by using traffic patterns culled from aggregated, anonymized data. From that information the software can suggest solutions like ride-sharing, new transportation access or a rerouting of traffic to better serve the community.

Note: For the purposes of evaluation, partnerships with identified USDOT partners are not viewed more competitively than partnerships with comparable entities making comparable commitments. The USDOT, however, will consider the firm commitments of any comparable partner described in the application, including a specific description of the level financial, technical support, services, or other resource contributions.

- Discuss your approach for testing/demonstrating highly automated vehicles, including how many vehicles you expect to include in the demonstration, how they will be demonstrated (i.e., by citizens, paid drivers, etc.) and the disposition of those vehicles at the conclusion of the demonstration. Outline whether you believe there to be any federal regulatory issues that could prevent testing/demonstrating of highly automated vehicles. Describe any potential impediments to testing/demonstrating highly automated vehicles in your city, jurisdiction, or locality and discuss how you plan to overcome these impediments.
- Describe city's ability and commitment to electric vehicles, de-carbonizing of its electricity grid, and transitioning its major fleets to lower-emitting non-fossil fuel alternatives. In particular, discuss plans (including timelines) for:

1. Changes in procurement policies to support the conversion of city vehicle fleets, public transit, and municipally managed taxis from conventional (internal combustion) to electric vehicles.
 2. The conversion of private fleets from conventional to electric vehicles.
 3. The implementation of electric vehicle car share or electric vehicle Transport Network Company (TNC) programs.
 4. The de-carbonization of the city's electricity supply.
 5. Increasing consumer adoption of electric vehicles.
 6. Developing of lessons learned, data-driven metrics, sustainable financing tools and other best practices that will comprise a "playbook" for other cities to follow.
- Describe current and planned electric vehicle deployment and de-carbonization activities including:
 1. Current or planned programs offered by local electric utilities that promote renewable and zero emission electricity production and/or electric vehicle adoption. Discuss the city's relationship with its electric utility (or utilities) including whether there is an active conversation underway regarding electric vehicles, charging stations infrastructure, citizen and commercial customer outreach, electricity demand management programs and whether these programs explicitly consider the needs of electric vehicle charging. Also, describe any local or state regulations, incentives, and/or policies that create barriers to electric vehicle adoption.
 2. Sustainability, advanced fuel, or Climate Action Plans, non-attainment policies, or other plans that guide fleet purchasing decisions for the city.
 3. Local incentives or programs to encourage electric vehicle adoption.
 4. Plans or technologies that may mitigate any adverse impacts on electric vehicle performance that can be associated with seasonal weather variation.
 5. Current publicly available electric vehicle infrastructure as well as plans to expand availability.
 6. The availability of electric vehicle and plans to engage with vehicle manufacturers (OEMs) to enhance availability.
 - Provide measurable goals and objectives for your proposed demonstration and describe your approach for monitoring the impact of the demonstration on mobility, safety, ladders of opportunity, efficiency, clean energy, sustainability,

and climate change. Identify a set of targeted performance measures that relate to the primary impact of your proposed demonstration.

Note: 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. The Recipient is responsible for supporting the independent evaluator's access to the site and to site staff to conduct evaluation-related experiments, interviews, and surveys.

- 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 demonstration.
- Describe your approach for following a systems engineering process to reduce the risk of schedule and cost overruns and increases the likelihood that the demonstration will meet the user's needs. Describe processes and approaches that will be used to engage stakeholder participation; result in more adaptable, resilient systems; help to verified functionality and fewer defects; support higher level of reuse from one project to the next; and result in better documentation.
- Describe your approach for ensuring the safety of all travelers, subjects, and other personnel associated with the Smart City Demonstration. Discuss a systematic approach to achieving acceptable levels of safety risk with the demonstration.
- Describe your approach for implementing a comprehensive communications and outreach program that covers both outreach activities and the accommodation of requests for site visits by media, researchers, and others.

B. Data Management Approach

- Describe your approach for data management. Discuss your plans for managing their data as a strategic asset and making open, machine-readable data available to the public – subject to applicable privacy, security and other safeguards – to fuel entrepreneurship and innovation to improve citizens' lives, create jobs, and spur economic development. Include a narrative discussing:

1. The types of data to be produced in the course of the demonstration;
2. Policies for access and sharing data, including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, and other rights or requirements;
3. Policies and provisions for re-use, re-distribution, and the production of derivatives; and
4. Plans for archiving data and other research products, and for preservation of access to them.

For more information, visit: <http://ntl.bts.gov/publicaccess/creatingaDMP.html>

- 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 from various sources and sectors 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 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.

C. Management Approach

- Provide a detailed management approach, including project team organization, team members and partners, key stakeholders, and demonstration governance processes. The management approach should demonstrate the city's ability to

manage and leverage partnerships to achieve an innovative, integrated, and holistic Smart City Demonstration. Describe your organizational capacity to manage all partners

- Describe existing and future public and/or private partnerships, including university research partnerships. Include organizational structure and capability; and organizational hierarchies, roles, responsibilities, and lines of communication between team members.
- Identify and describe the role of all proposed partners for the Smart City Demonstration. Describe your approach for engaging start-ups, small businesses, local technologists, and other parties interested in implementing the Smart City Demonstration throughout the course of the project and using the data it generates. Provide a detailed explanation of each partners' role in the Smart City Demonstration including how and why they are being proposed for the demonstration.
- Describe any opportunities to leverage Federal resources through cost share, in-kind donations, and partnering.
- Provide a project management approach to ensuring quality, timeliness, and cost control.
- Provide a risk management approach to include identification and prioritization of key technical, policy, and institutional risks associated with the demonstration and discuss plans for mitigating those risks.

D. Staffing Approach

- Provide a detailed staffing approach to include a project organizational chart identifying proposed staff members assigned to the project. The chart must be supported with narrative text to include the title and a brief description of each position's responsibilities, as well as the proposed level of effort and allocation of time (% in relation to their other duties) for each position on a yearly basis and in summary format. The hours in this table must be consistent with the information presented in Volume II Budget Application.
- Provide a description of key staff including specific experience on related ITS and transportation projects.
- Provide brief *tailored* resumes for the proposed Program Manager/Principal Investigator and other key personnel to include name, experience, education and proposed role in project.

- Include a contingency plan to replace key staff over the life of the award. The contingency plan must demonstrate that the Applicant has the ability to replace key staff without any adverse impact on performance.

E. Capacity and Capability

- Provide evidence that establishes your capacity and capability to take on a project of this magnitude, including executive commitment, workforce capacity, degree of infrastructure readiness, data and performance management capabilities.
- Provide evidence of a commitment to operate and maintain the Smart City Demonstration system(s) in a self-sustaining basis once the USDOT Demonstration is completed.

VOLUME 2 – BUDGET APPLICATION (no page limit)

a. Application Standard Forms (SFs)

1. SF424

Note: Applicants may leave fields 5a, 5b, 6, 7, and 13 blank on the form.

2. SF424A

Note: Section A:

- Block 1(a): Print opportunity title listed on page 3;
- Block 1(b): Print CFDA number listed on page 3;
- Block 1(c): Print Total Federal Funds Requested in dollars; and,
- Block 1(d): Print Total Cost Share in dollars if applicable, and leave columns (e), (f), and (g) and rows 2, 3, and 4 blank.

3. SF424B

4. SFLLL

Note: The form must be completed and submitted even if no lobbying to report. If no lobbying to report insert none or n/a in the relevant blocks.

Applicants may locate downloadable versions of the required Standard Forms (SF) online. Grants.gov offers a library of forms available online at <http://www.grants.gov/web/grants/forms/sf-424-family.html#sortby=1>.

b. Cost / Budget Information

Provide a separate detailed budget plan for each year and summarize the information for all years for all activities. Spreadsheets can be formatted similarly to the format in DOT Form 4220.44, located at: http://www.fhwa.dot.gov/aaa/pdfs/frm4220_44.pdf.

The detailed budget plan must include each of the following items/sub-items:

Detailed budgets and supporting information clearly delineating and supporting all estimated proposed costs: with columns for Federal Share,

Cost Share (if applicable) and Total Costs (per year and in summary form) as follows:

- i. Labor Rates- Direct labor-by-labor categories to include hours, rates and escalation. Anticipated promotions for any personnel must be included with the escalation calculation. The annual direct labor escalations rate and its basis should be clearly stated with the proposal. Discuss your proposed rate as compared to historical experience and include when and how escalation will be calculated/implemented.
- ii. Indirect Rates- Discuss your proposed rates for all years. Identify all the various specific indirect rates including what they are (pool and base), and what they are based on (e.g.; labor overhead based on direct labor dollars) and how they are applied/calculated. Provide dollar values as well as percentages. Please also provide any audit information to support these rates (for example, a copy of audit results or Department of Health of Human Services rate agreement).

Note: Per 2 CFR 200.414(f), Indirect (F&A) Costs, an Applicant may elect to propose a de minimis indirect rate of 10% of modified total direct costs.

- iii. Other Direct Costs- Applicants must provide a breakout and justification of Other Direct Costs by Category (travel, equipment, etc.)
- iv. Subcontractor/Consultant Costs - If subcontractors/sub-recipients (lower-tiered organizations and/or individual consultants) will be used in carrying out this project, the following minimum information concerning such, must be furnished:
 - a) Name and address of the organization or consultant.
 - b) Description of the portion of work to be conducted by the organization or consultant.
 - c) Cost details for that portion of work.

- d) Applicant's cost/price analysis of each subcontractor/consultant showing the Applicant's determination that the proposed subcontractor/consultant costs and pricing is fair and reasonable; and
 - e) Letter of commitment from each subcontractor/consultant (this includes any subcontractor/consultant that will be included in the Federal share, the non-Federal share or in a non-paid (volunteer) capacity).
- v. Cost Share Detail. If applicable, provide detail and support for cost share as part of overall project budget. Clearly delineate cost share match versus Federal share.

c. Organizational Information

In addition to the forms and budget detail, provide answers to the following organizational information questions in a pdf format:

1. Identify any exceptions to the anticipated award terms and conditions as contained in Section F, Federal Award Administration Information.
2. Identify any preexisting intellectual property that you anticipate using during award performance, and your position on its data rights during and after the award period of performance.
3. The use of a Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number is required on all applications for Federal grants or cooperative agreements. Please provide your organization's DUNS number in your budget application.
4. A statement to indicate whether your organization has previously completed an A-133 Single Audit and, if so, the date that the last A-133 Single Audit was completed.
5. A statement regarding Conflicts of Interest. The Applicant must disclose in writing any actual or potential personal or organizational conflict of interest in its application that describes in a concise manner all past, present or planned organizational, contractual or other interest(s), which may affect the Applicants' ability to perform the proposed contract in an impartial and

objective manner. Actual or potential conflicts of interest may include but are not limited to any past, present or planned contractual, financial, or other relationships, obligations, commitments or responsibilities, which may bias the Applicant or affect the Applicant's ability to perform the agreement in an impartial and objective manner. The AO will review the statement(s) and may require additional relevant information from the Applicant. All such information, and any other relevant information known to DOT, will be used to determine whether an award to the Applicant may create an actual or potential conflict of interest. If any such conflict of interest is found to exist, the AO may (a) disqualify the Applicant, or (b) determine that it is otherwise in the best interest of the United States to contract with the Applicant and include appropriate provisions to mitigate or avoid such conflict in the agreement pursuant to 2 CFR 200.112.

6. A statement to indicate whether a Federal or State organization has audited or reviewed the Applicant's accounting system, purchasing system, and/or property control system. If such systems have been reviewed, provide summary information of the audit/review results to include as applicable summary letter or agreement, date of audit/review, Federal or State point of contact for such review.
7. Terminated Contracts - List any contract/agreement that was terminated for convenience against the Applicant within the past 3 years, and any contract/agreement that was terminated for default within the past 5 years. Briefly explain the circumstances in each instance.
8. Describe how your organization will obtain the necessary resources to fund and fulfill the proposed cost share, if applicable.
9. The Applicant is directed to review Title 2 CFR Part 170 (http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title02/2cfr170_main_02.tpl) dated September 14, 2010, and Appendix A thereto, and acknowledge in its application that it understands the requirement, has the necessary processes and systems in place, and is prepared to fully comply with the reporting described in the term if it receives funding resulting from this Notice. The text of Appendix A will be incorporated in the award document as a General Term and

Condition as referenced under this Notice's Section F, Federal Award Administration Information.

10. Disclose any violations by the Applicant of Federal criminal law involving fraud, bribery, or gratuity violations. Failure to make required disclosures can result in any of the remedies described in 2 CFR 200.338 entitled Remedies for Noncompliance, including suspension or debarment. (See also 2 CFR Part 180 and 31 U.S.C. 3321).

11. A statement to acknowledge receipt and acceptance of any Notice of Funding Opportunity Amendments issued by the USDOT.

c. Letters of Commitment from Partners/Team Members

Provide signed letters of commitment from proposed partners/team members, such as proposed major subcontractors, consultants, and organizations providing support activities (services, equipment, and expertise) to the demonstration. Letters of Commitment show evidence that proposed major partners/team members are committed to perform their proposed role in the demonstration in the event of award. Letters of Commitment should be on letterhead from the proposed partner/team member, signed by an authorized representative, and include a brief description of the proposed role, responsibility, and/or support activities proposed. Note: It is not necessary for Applicants to submit letters of support from third party organizations that support the initiative but are not proposed to perform an activity under the award.

4. Oral Presentations

In addition to the written application, the Government may request an Oral Presentations to the USDOT. The Government reserves the right to videotape or audio tape any and all such Oral Presentation(s).

The Selection Official may take into account information provided during the Oral Presentations in the award decision.

Schedule and Location for Oral Presentations

If Oral Presentations will be conducted, the USDOT will contact the Applicants to schedule the anticipated Oral Presentations and provide further details. Oral Presentations will likely be held in Washington, DC, at the USDOT Headquarters, but may occur at the Applicant location. Oral Presentation shall comply with these instructions and any additional instructions that the Government may provide.

Format

Each Oral Presentation will occur as follows:

- The Applicant will have a maximum of 60 minutes to present their proposed Smart City Demonstration approach. The Government reserves the right to open these presentations up to public participation, or release the recordings for public purposes.
- The Government reserves the right to hold a question-and-answer session immediately after the Oral Presentation. The question-and-answer session does not count against the Oral Presentation time limit.

Participation and Attendance

An Applicant's Oral Presentation team shall include the proposed Program Manager and up to five others. The Applicant may send a maximum of 6 representatives to the Oral Presentation. Representatives may be from the prime Applicant, proposed subcontractors/consultants/partners, or a combination thereof as deemed appropriately representative by the Applicant. The Government reserves the right to open these presentations up to public participation, or release the recordings for public purposes.

Topics

During the Oral Presentation, the Applicant shall, at a minimum, address the following topics:

1. Introduction of presenting personnel with their title/position and role in this project.
2. Executive Summary of proposed Smart City Challenge Demonstration, including your city's challenges and how the demonstration will address those challenges.

3. Describe your technical, management and staffing approach to performing the demonstration.
4. Describe proposed key subcontracting, consulting or partnership/teaming arrangements to implement the program.
5. Describe key measures and outcomes.
6. Describe your capacity and capability to perform the proposed demonstration.
7. Describe your approach for interacting and engaging with current and anticipated USDOT partners including Paul Allen's Vulcan, Inc., Mobileye, Autodesk, Amazon Web Services, NXP, Alphabet's Sidewalk Labs, the U.S. Department of Energy (DOE), and any other partners who are identified by the Applicant. **Note:** Partnerships with identified USDOT partners are not viewed more competitively than partnerships with comparable entities making comparable commitments, but the USDOT will consider the firm commitments of any comparable partner described in the application, including a specific description of the level financial, technical support, services, or other resource contributions. Partnerships are considered beneficial to the extent that the partner is making a firm commitment to helping the Applicant realize its vision and the partnership demonstrates a furtherance of the goals of the Smart City Challenge.
8. Address each of the Technical Merit evaluation criteria set forth in this NOFO.
9. Any additional topics provide by the USDOT prior to the Oral Presentation.

Presentation Media

Applicants shall prepare all presentations using electronic presentation tools when making its Oral Presentation. The Applicants shall provide, at the time of the Oral Presentation, 25 hard copies of the presentation materials to the Government, and an electronic version of the presentation materials. The Oral Presentation is not due until requested by the USDOT.

5. UNIQUE ENTITY IDENTIFIER AND SYSTEM FOR AWARD (SAM)

The Applicant is required to: (i) be registered in SAM before submitting its application; (ii) provide a valid unique entity identifier in its application; and (iii) continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

The Federal awarding agency may not make a Federal award to an Applicant until the Applicant has complied with all applicable unique entity identifier and SAM requirements. If an Applicant has not fully complied with the requirements by the time the Federal awarding agency is ready to make a Federal award, the Federal awarding agency may determine that the Applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another Applicant.

6. SUBMISSION DATES AND TIMES

The application must be received by Email by the application due date/time listed on page 3 of this Notice of Funding Opportunity.

The deadline stated on page 3 is the date and time by which the agency must receive the full and completed application, including all required sections.

7. INTERGOVERNMENTAL REVIEW

An application under this Notice of Funding Opportunity is not subject to the State review under E.O. 12372.

8. FUNDING RESTRICTIONS

The USDOT will not reimburse any pre-award costs or application preparation costs under the proposed cooperative agreements.

9. USE OF INFORMATION FOR OTHER DEPARTMENTAL PURPOSES

Information collected from all applicant submissions may be used for government purposes, including to understand the range of Smart City activities planned and ongoing in cities, and to determine maturity of cities within this framework. In addition, information gathered through this Notice may be used to conduct outreach and engagement related future similar opportunities.

10. INTENT TO RELEASE APPLICATIONS AND NAMES OF APPLICANTS

The USDOT intends to release publicly the names of all Applicants shortly after the application due date.

The USDOT intends to release applications received to representatives of organizations that have signed partnership agreements with the USDOT to support the Smart City Challenge (for example, Paul Allen's Vulcan, Inc.). Such representatives of partnerships will be required to sign non-disclosure agreements prior to gaining access to the applications.

In order to expand public awareness of Smart City technologies, concepts, and ideas, the USDOT intends to release publicly all Volume 1 Technical Application and Oral Presentation materials if applicable after award.

By submitting an application in response to this Notice of Funding Opportunity, the Applicant provides the USDOT permission to:

- Release publicly the names of all applicants;
- Release the Volume 1 Technical Application document and Oral Presentation materials, if applicable, to representatives of the USDOT's authorized Smart City Challenge partners; and
- Release publicly Volume 1 Technical Application document and Oral Presentation materials, if applicable, after selection of the Smart City Challenge Awardee.

SECTION E – APPLICATION REVIEW INFORMATION

1. CRITERIA FOR SELECTION OF SMART CITY CHALLENGE FINALISTS

TECHNICAL MERIT: The Government will evaluate applications on following technical merit criteria, which are of equal importance.

- Demonstration of an innovative, integrated, and holistic approach to conduct the Applicant's Smart City demonstration consistent with the USDOT's demonstration goals and twelve vision elements as defined in Section A.
- Extent that the Applicant's vision and goals address issues identified in *Beyond Traffic*, including increases in population, urbanization, movement of people and the movement of freight.
- Extent that applicants improve access to reliable, safe, and affordable transportation for underserved communities. This includes, but is not limited to connecting people to jobs, removing physical barriers to access, incentivizing reinvestment in underserved communities, and strengthening communities through neighborhood redevelopment.
- Extent applicant addresses digital divide when creating and implementing technology solutions for individuals who might not otherwise have access to specific types of smart city technologies.
- Extent applicant can demonstrate targeted outcomes for other USDOT priorities including reducing congestion and addressing climate change and resilience.
- Extent applicant can demonstrate targeted outcomes for safety, that aim to significantly reduce transportation related injuries and fatalities.
- Demonstration of a sound technical, data management, management, and staffing approach.
- Extent the Applicant is committed to partners that are consistent with USDOT desired characteristics including a commitment to integrating with the sharing economy; and a clear commitment to making open, machine-readable data accessible, discoverable and usable by the public to fuel entrepreneurship and innovation.
- Demonstration of sufficient capacity and capability to perform.

COST: Relative cost will also be considered in the award decision. The budget application will be analyzed to assess cost reasonableness and conformance to

applicable cost principles (see 2 CFR 200 Subpart E Cost Principles). This evaluation factor will not be rated.

For the Smart City Challenge Demonstration award, cost sharing or matching will NOT be required but is encouraged. If proposed, the Government will evaluate cost share as part of the cost/budget review. The degree of cost share and leveraging of non-federal funds will be considered beneficial to the extent the cost share is considered feasible and demonstrates a furtherance of the goals of the Smart City Challenge.

2. REVIEW AND SELECTION PROCESS

The USDOT will utilize the following merit review process to evaluate applications:

A panel of agency experts will evaluate all eligible applications using the merit criteria listed above. The panel will individually evaluate the applications. The panel will then collectively assign a rating to each eligible application using the following merit ratings: Recommended, Acceptable, Not Responsive.

The USDOT reserves the right to use outside expertise and/or contractor support to perform application evaluation.

A panel of agency experts will conduct a risk assessment of the Applicant prior to award.

The Government will select the application that is considered the most advantageous to the Government using the criteria cited above, and subject to the results of an Applicant risk assessment. Applications selected for possible award using the technical merit criteria cited above, will undergo the following risk assessment prior to award. The Government reserves the right to not make an award to an Applicant based on the results of the risk assessment.

The Secretary of Transportation is the official responsible for final award selection. The Government is not obligated to make any award as a result of this notice.

Risk Assessment

The Government will assess the risks posed by an Applicant before they receive an award. This Risk Assessment will include evaluation of some or all of the following items relative to the Applicant and/or sub-applicants as applicable:

- (1) Applicant's financial stability;
- (2) Applicant's quality of management systems and ability to meet the management standards prescribed in 2 CFR Part 200;
- (3) Applicant's history of performance;

Note: History of performance includes the Applicant's record in managing Federal awards, if it is a prior Recipient of Federal awards, including timeliness of compliance with applicable reporting requirements, conformance to the terms and conditions of previous Federal awards, and if applicable, the extent to which any previously awarded amounts will be expended prior to future awards. The Government will evaluate the relevant merits of the Applicant's history of performance based on its reputation and record with its current and/or former customers with respect to quality, timeliness and cost control. The history of performance will be reviewed to assure that the Applicant has relevant and successful experience and will be considered in the risk assessment. In evaluating history of performance, the Government may consider both written information provided in the application, as well as any other information available to the Government through outside sources.

- (4) Applicant's audit reports and findings from audits performed on the Applicant pursuant to 2 CFR Part 200 Subpart F—Audit Requirements or the reports and findings of any other available audits;
- (5) Applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities;
- (6) Applicant's potential for conflict of interest if applicable; and

Note: The FHWA will review information provided by the Applicant, and any other relevant information known to DOT, to determine whether an award to the Applicant may create an actual or potential conflict of interest. If any such conflict

of interest is found to exist, the AO may (a) disqualify the Applicant, or (b) determine that it is otherwise in the best interest of the United States to award to the Applicant and include appropriate provisions to mitigate or avoid such conflict in the Agreement pursuant to 2 CFR 200.112.

(7) Applicant's eligibility to receive Federal funding. Per the guidelines on government-wide suspension and debarment in 2 CFR Part 180, the Government will confirmation that the Applicant and any named sub-applicants are not debarred, suspended or otherwise excluded from or ineligible for participation in Federal programs or activities.

Pursuant to 2 CFR 200.205, prior to making a Federal award, the Federal awarding agency is required to review information available through any OMB-designated repositories of government-wide eligibility qualification or financial integrity information, such as Federal Awardee Performance and Integrity Information System (FAPIIS), Dun and Bradstreet, and Sam.gov. The Government's review of this information will occur as part of the risk assessment.

3. ANTICIPATED ANNOUNCEMENT AND FEDERAL AWARD DATES

The USDOT anticipates announcing the selected Smart City Challenge Awardee in June 2016. The USDOT anticipates awarding of the Smart City Challenge demonstration agreement in July 2016.

SECTION F – FEDERAL AWARD ADMINISTRATION INFORMATION

1. FEDERAL AWARD NOTICES

If your organization's application is selected for award, you will be notified and sent an award document for signature. Applicants not selected for award will be notified in writing by the USDOT.

Only the Agreement Officer (AO) can commit the USDOT. The award document, signed by the AO, is the authorizing document. Only the AO can bind the Federal Government to the expenditure of funds.

Notice that an Applicant has been selected as a Recipient does not constitute approval of the application as submitted. Before the actual award, the USDOT will enter into negotiations if necessary. If the negotiations do not result in an acceptable submittal, the USDOT reserves the right to terminate the negotiation and decline to fund the Applicant.

2. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

General terms, conditions, and governing regulations that apply to this agreement are available online at: <http://www.fhwa.dot.gov/aaa/generaltermsconditions.cfm>

The online list dated March 6, 2015 of "GENERAL TERMS AND CONDITIONS FOR ASSISTANCE AWARDS" shall apply to the resulting award.

Special terms and conditions follow. These terms will be included in the resulting award.

A. PUBLIC ACCESS TO DOCUMENTS

The Recipient agrees that the resulting deliverables/documentation submitted to the USDOT under this Agreement may be posted online for public access and/or shared by USDOT with other interested parties. The USDOT anticipates the documents cited herein may be posted on a USDOT website or other appropriate website.

B. INDIRECT COSTS

Indirect costs are allowable under this Agreement in accordance with the Recipient's Federally Negotiated Indirect Cost Rates as documented in writing and approved by

the Recipient's cognizant Government agency. In the absence of such Government-approved indirect rates, the following rates are hereby approved for use under this agreement as shown below:

<i>Type*</i>	<i>Indirect Rate</i>	<i>Period</i>	<i>Rate (%)</i>	<i>Base</i>
(** Information to be filled in at award **)				

*Types of Rates: Pred - Predetermined; Fixed - Fixed; Final – Final; Prov: Provisional/billing; or De minimus.

In the event the Recipient determines the need to adjust the above listed rates, the Recipient will notify the AO of the planned adjustment and provide rationale for such adjustment. In the event such adjustment rates have not been audited by a Federal agency, the adjustment of rates must be pre-approved in writing by the AO.

This Indirect Cost provision does not operate to waive the limitations on Federal funding provided in this document. The Recipient's audited final indirect costs are allowable only insofar as they do not cause the Recipient to exceed the total obligated funding.

C. DATA RIGHTS

The Recipient must make available to the FHWA copies of all work developed in performance with this Agreement, including but not limited to software and data. Data rights under this agreement shall be in accordance with 2 CFR 200.315, Intangible property.

D. PERSONALLY IDENTIFIABLE INFORMATION (PII)

Personally Identifiable Information (PII) as defined at 2 CFR 200.79 and 2 CFR 200.82 at will not be requested unless necessary and only with prior written approval of the AO with concurrence from the Agreement Officer's Technical Representative (AOR).

E. AVAILABLE FUNDING

The total estimated amount of Federal funding that may be provided under this Agreement is \$_____ (to be filled in at award) for the entire period of performance, subject to the limitations shown below:

(1) Currently, Federal funds identified on page 1 of the award document, are obligated to this agreement.

(2) Subject to availability of funds, and an executed document by the AO, the difference between the current funding and the total estimated amount of Federal funding may be obligated to this Agreement.

(3) The FHWA's liability to make payments to the Recipient is limited to those funds obligated under this Agreement as indicated above and any subsequent amendments.

F. KEY PERSONNEL

Pursuant to 2 CFR 200.308(c)(2), the Recipient must request prior written approval from the AO for any change in Key Personnel specified in the award. The following person(s) are/have been identified as Key Personnel:

Name	Title/Position
(*** to be filled in at award ***)	

G. PROGRAM INCOME

Pursuant to 2 CFR 200.307, Program income earned during the agreement period must be added to the Federal award and used for the purposes and under the conditions of the Federal award, unless otherwise approved by the AO. Program income must not be used to offset the Federal or Recipient contribution to this project.

H. SUBAWARDS

Note: Recipients with a procurement system deemed approved and accepted by the Government or by the AO are exempt from the requirements of this clause. See 2 CFR 200.317 through 200.326.

Unless described in the application and funded in the approved award, the Recipient must obtain prior written approval from the AO for the subaward, transfer, or

contracting out of any work under this award. This provision does not apply to the acquisition of supplies, material, equipment, or general support services.

The following subawards are currently approved under the Agreement:

Name
(*** to be filled in at award ***)

Approval of each subaward is contingent upon a fair and reasonable price determination, and approval by the AO for each proposed subcontractor/sub-recipient. Consent to enter into subawards will be issued through a written approval from the Agreement Officer.

I. ORDER OF PRECEDENCE

The Recipient's technical and budget applications are accepted, approved, and incorporated herein as Attachments A and B. In the event of any conflict between this agreement document and the Recipient's proposal and/or application, this Agreement document shall prevail.

J. DESIGNATION AS RESEARCH OR NON-RESEARCH AGREEMENT

This agreement is designated as: RESEARCH

K. CONFERENCE SUPPORT RESTRICTIONS

The Recipient must obtain written approval from the AOR prior to incurring any costs for conference support. See the definition of conference as contained in 2 CFR 200.432.

Food and beverage costs are not allowable conference expenses for reimbursement under this Agreement.

Note: Costs of meals are allowable as a travel per diem expense for individuals on travel status and pursuant to the Travel clause of this Agreement.

L. AGREEMENT PERFORMANCE REQUIREMENTS SUMMARY

(To be filled in upon award as applicable.)

M. DISPUTES

The parties to this Agreement will communicate with one another in good faith and in a timely and cooperative manner when raising issues under this provision. Any dispute, which for the purposes of this provision includes any disagreement or claim, between the FHWA and the Recipient concerning questions of fact or law arising from or in connection with this Agreement and whether or not involving alleged breach of this Agreement, may be raised only under this Disputes provision.

Whenever a dispute arises, the parties will attempt to resolve the issues involved by discussion and mutual agreement as soon as practical. In no event will a dispute which arose more than three months prior to the notification made under the following paragraph of this provision constitute the basis for relief under this article unless FHWA waives this requirement.

Failing resolution by mutual agreement, the aggrieved party will document the dispute by notifying the other party in writing of the relevant facts, identify unresolved issues and specify the clarification or remedy sought. Within five working days after providing written notice to the other party, the aggrieved party may, in writing, request a decision from one level above the AO. The AO will conduct a review of the matters in dispute and render a decision in writing within thirty calendar days of receipt of such written request. Any decision of the AO is final and binding unless a party will, within thirty calendar days, request further review as provided below.

Upon written request to the FHWA Director, Office of Acquisition and Grants Management or designee, made within thirty calendar days after the AO's written decision or upon unavailability of a decision within the stated time frame under the preceding paragraph, the dispute will be further reviewed. This review will be conducted by the Director, Office of Acquisition and Grants Management. Following the review, the Director, Office of Acquisition and Grants Management, will resolve the issues and notify the parties in writing. Such resolution is not subject to further administrative review and to the extent permitted by law, will be final and binding. Nothing in this Agreement is intended to prevent the parties from pursuing disputes in a United States Federal Court of competent jurisdiction.

3. REPORTING

ADDRESSES FOR SUBMITTAL OF REPORTS AND DOCUMENTS

The Recipient must submit all required reports and documents, under transmittal letter referencing the Agreement number, as follows:

Submit an **electronic copy** to the Agreement Officer at the following address:

<To be filled in upon award>

Submit an **electronic copy** to the AOR at the following address:

<To be filled in upon award>

QUARTERLY PROGRESS REPORTS

The Recipient must submit an electronic copy of the Research Performance Progress Report (SF-RPPR), to the AOR and the Agreement Officer on or before the 30th of the month following the calendar quarter being reported. Final RPPRs are due 90 days after the end of the Agreement period of performance. The SF-RPPR content directions and budget formats are available online:

http://www.nsf.gov/bfa/dias/policy/rppr/format_ombostp.pdf

The Progress Report must include the required certification pursuant to 2 CFR 200.415.

Submit an electronic copy to the ITS JPO at the following address:

ITSPROJECTS@dot.gov.

SECTION G – FEDERAL AWARDING AGENCY CONTACTS

Address any questions to:

SmartCityChallenge@dot.gov