

# B'SMART

Beyond Traffic: USDOT Smart City Challenge

**Connecting Communities to Opportunities in Baltimore for a Safe, Efficient, Sustainable, Equitable and Economically Competitive Smart City**



A Proposal Submitted to the  
U.S. Department of Transportation  
Notice of Funding Opportunity DTFH6116RA00002  
By the City of Baltimore, Maryland



STEPHANIE RAWLINGS-BLAKE  
MAYOR

*100 Holliday Street, Room 250  
Baltimore, Maryland 21202*

February 2, 2016

The Honorable Anthony R. Foxx  
Secretary  
United State Department of Transportation  
1200 New Jersey Avenue, SE  
Washington, DC 20590

Dear Secretary Foxx:

I am pleased to submit this application for the Smart City Challenge Grant on behalf of the City of Baltimore, Maryland. Baltimore City continues to struggle with disconnected communities that lack adequate access to jobs, health, and food services. Some of the poorest and most distressed neighborhoods in the City are also some of the least connected to employment opportunities. The lack of access makes it increasingly difficult for these communities to grow and thrive.

As is the case with many older eastern American cities that were built around industry, Baltimore's population has decreased and neighborhoods have changed both demographically and economically. Many of the businesses that used to employ thousands of Baltimore residents have closed or relocated and new jobs are found in areas that are not easily accessible by public transit. As a result the transportation network that may have worked twenty, thirty, or forty years ago does not work today. However; Baltimore does have the basic components of a world-class transportation network for both residential and commercial use.

For residents, Baltimore has local and commuter bus systems as well as Light Rail, heavy rail, and commuter rail systems. Unfortunately, these systems fail to adequately connect the Baltimore of 2016. The City is in need of a smarter transportation system that uses innovation and technological advances to connect its residents. Transit systems should be more interconnected, especially in the most distressed communities and transit hubs should be created to promote economic growth and access to jobs.

For businesses looking to invest or locate in Baltimore, the Port of Baltimore is a leading American port and the most inland port on the east coast. In addition, the Port of Baltimore offers easy and efficient access to freight rail lines as well as Interstate highways. Businesses are already showing interest in relocating close by the Port as Amazon opened a large distribution center in 2014 in southeast Baltimore. What is lacking, however, is an industry-leading system for freight logistics to accelerate economic development and job growth.

The Smart City Challenge Grant provides a unique opportunity to develop a vision for a smarter, more innovative, and better connected Baltimore. The vision we are proposing in this application is termed "B'Smart: Baltimore's Smart City Vision." The City of Baltimore will provide efficient, safe, and sustainable transportation to help its citizens access jobs, education, healthcare, and lifeline services using innovative solutions to address key barriers to disconnected communities. We will connect communities to economic opportunities starting with the low-income and historically underserved neighborhoods of West Baltimore by using smarter, sustainable, and innovative technologies.

I understand there is tremendous competition for this grant opportunity as many American cities face similar issues. I assure you, should Baltimore win this grant award, the funding will be used to implement a model that will not only be transformational to Baltimore but transferable to other cities. Baltimore has many aspects and components of a multimodal transportation network that, if better connected, could be an example to other cities on how to build, develop, and eventually connect a diverse and multimodal transportation network. I ask for your favorable consideration of this application.

Should you have any questions or would like additional information, the Director of Transportation for Baltimore City, William Johnson, would be happy to meet with you. Director Johnson can be reached by phone at (410) 396-6802 or by email at [WilliamM.Johnson@baltimorecity.gov](mailto:WilliamM.Johnson@baltimorecity.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Stephanie Rawlings-Blake". The signature is fluid and cursive, with the first name "Stephanie" written in a larger, more prominent script than the last name "Rawlings-Blake".

Stephanie Rawlings-Blake

Mayor

City of Baltimore

Cc: William M. Johnson, Director of Transportation, City of Baltimore  
Kaliopo Parthemos, Chief of Staff, Office of the Mayor  
Andrew Smullian, Deputy Mayor of Government Relations and Labor, Office of the Mayor  
Khalil Zaied, Deputy Mayor of Operations, Office of the Mayor  
Colby McFarland, Department of Transportation, City of Baltimore  
Caitlin Doolin, Department of Transportation, City of Baltimore

# Transform Baltimore

Transforming distressed neighborhoods through...

Leadership

Smart City Technologies

Community Support

Partnership

Economic Development

Education

Job Training

...into economically vibrant communities



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# Executive Summary

The disconnected community, separated from vital ladders of opportunity for growth and development, is a chronic issue that has plagued the American city. While rapid growth in personal automobile sales over the last century gave Americans the freedom to travel at a moment's notice, and the construction of high-speed expressways connected previously disconnected rural and suburban communities, urban areas suffered the consequences. Highways were constructed through previously vibrant urban communities, displacing families and destroying property along the way. Those with the necessary means relocated to the suburbs. Those remaining were left disconnected from economic opportunity and upward mobility, and were forced to depend increasingly on limited public transit options. This vicious cycle continued to accelerate over time, concentrating poverty in neighborhoods with poor transportation connections, fewer jobs, higher crime, and inadequate access to important services including healthcare, food, and more recently, broadband Internet access.

Though much promise exists for smart city technologies to lead a revitalization of urban communities across the nation, issues in making this vision a reality remain. The Baltimore Vision for Smart City (**B'Smart**) is a bold step forward that connects communities to opportunities, starting with historically underserved neighborhoods in West Baltimore that bore the brunt of displacement and disconnection through the construction of the "highway to nowhere" in the 1960's and 1970's. To transform Baltimore into a city of greater economic prosperity and social equity, it is vital to successfully demonstrate how smart city technologies can better connect low-income communities, often with limited access to Internet and smartphones, to economic opportunities, and how these technologies integrate with the existing infrastructure and create new prospects within these communities.

The City of Baltimore and its partners have developed a comprehensive approach toward this goal. At its core are the Smart Community Hubs, where traditional transit services meet smart mobility services, enabled by connected/automated/electric vehicles and the sharing economy, to provide low-cost options to connect users to transit hubs and final destinations. These hubs will also house electric vehicle and smart grid infrastructure, public Internet/Wi-Fi/Smart phone portals, next-generation city logistics operations, on-site job training opportunities and additional features that will attract new businesses and spur economic development.

Baltimore proudly includes a series of innovative smart city solutions in this proposal specifically designed for low-income communities, such as connected V2V/V2X-enabled mesh networks offering free Wi-Fi access to the West Baltimore community, low-cost automated mobility service for hub connection and accessibility, wayfinding tools for elderly and disabled citizens, low-income credits in sharing economy ecosystems, new jobs from technology implementation, and many more. Another strength of the proposal stems from the connected and automated port concept, supported by crowd-sourced freight solutions at the Port of Baltimore and Smart Community Hubs.

Baltimore is the ideal candidate for the USDOT Smart City Challenge. Following the civil unrest that took place in West Baltimore this past spring, city, regional, state, federal and private-sector leaders have publicly stated their commitment to revitalizing underserved communities in Baltimore. In 2015 alone, USDOT chose West Baltimore as one of the seven cities to receive technical assistance for economic development related to transportation projects through its LadderStep pilot. The State announced a \$700 million plan to eliminate blight in West Baltimore and a \$135 million plan to improve transit service.

While Baltimore's struggles have been highlighted over the past few months, it is by no mean alone. Many American cities, especially cities that developed around heavy industry, are facing similar challenges. The **B'Smart** vision can be easily replicated and shared elsewhere. At the heart of the Baltimore team are more than 50 committed city, regional and state agencies, leading universities, locally invested non-profits, and Fortune 500 corporate partners. The assets, expertise and commitment these partners bring, coupled with the **B'Smart** vision and the USDOT Smart City Challenge investment, will generate the biggest, most progressive, and most transferable impact with the highest chance of a truly transformative success.

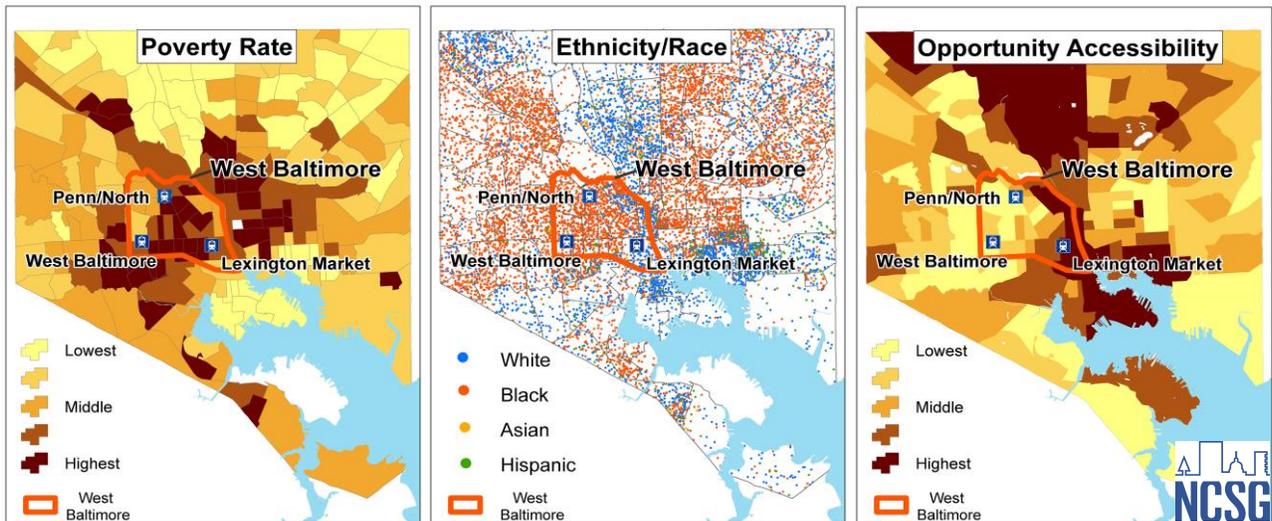
# 1 Baltimore Smart City Vision & Goals

## | 1.1 Transform Baltimore: Connecting Communities to Opportunities

The City of Baltimore, Maryland is home to some of the best hospitals and medical schools in the world, a vibrant job and culture center at the Inner Harbor, and an extensive multimodal transportation system including the Port of Baltimore, the 13<sup>th</sup> largest port in the nation and the top importer of automobiles in the country. The new transportation vision for Baltimore is one of sustaining economic vitality and improving quality of life by attracting and supporting state-of-the-art technological developments and innovation.

The **Baltimore Smart City Vision** focuses on *transforming* disconnected communities with smart city solutions throughout the city, and the action starts with connecting low-income communities in West Baltimore to economic opportunities while attracting businesses and jobs back to this community.

The city, regional and state leaders are eager to employ smart city technologies to address top transportation issues in Baltimore: transit accessibility, travel reliability, urban congestion, vehicle and pedestrian safety, energy and emissions, freight mobility, and first/last-mile access.



The **primary urban challenge** in Baltimore is socially and economically disconnected communities with poor transportation accessibility to jobs and opportunities. A recent [Harvard study](#) reveals that a person born in a low-income community in Baltimore has the least chance of ascending out of that income group in the entire nation. Historically underserved communities with mostly minority residents in West Baltimore have some of the highest poverty rates and poorest access to opportunities (see graphs above; see proposal back cover for all image sources and credits). In 2015, West Baltimore became the face of struggles with poverty and urban decay with the civil unrest following the death of Freddy Gray. The systemic connectivity issue facing West Baltimore was further highlighted when the long-awaited Red Line light rail transit project in the community was recently cancelled.

**The Baltimore Smart City Vision (B'Smart)** aims to transform Baltimore, immediately connecting West Baltimore to economic opportunities through integrated smart transportation and economic development solutions, and gradually expanding the focus to the rest of the city and transferring the model to cities and states across the nation.

This vision is supported by four interrelated smart city strategies:

- (1) **Connect West Baltimore to existing opportunities** with affordable, safer, more efficient, sustainable smart mobility options integrated with transit;
- (2) **Attract developments and jobs** back to low-income communities with smart city technology deployment;
- (3) **Create smart city ecosystems** for passenger and freight travel through sharing economy and open data; &
- (4) **Innovate port & city logistics** to improve freight efficiency, reliability and safety, and reduce costs and emissions.



## | 1.2 Smart Community Hub

With resources from this USDOT grant and commitments from the city and its partners, Baltimore will demonstrate the **Smart Community Hub** concept at three existing multimodal transit stations: West Baltimore Marc, Lexington Market, and Penn-North (**Hub Creation**).

**An evolutionary approach for implementing revolutionary technologies** in Baltimore by transforming existing transit stations to multifunctional Smart Community Hubs with smart mobility, safety & sustainability.

Various smart city technologies, such as automation and connected vehicle, will also diversify and enhance the efficiency, safety, and sustainability of mobility services connecting Community Hubs (**Hub Connection**) and first/last mile linkages between Community Hubs and trip origins/destinations (**Hub Accessibility**). Smart city technologies for freight will be implemented at and around Smart Community Hubs and the Port of Baltimore for connected, automated and crowd-sourced city logistics hubs of the future (**Hub Logistics**).



### Multi-Functional Smart Community Hub: Here's How it Works

#### 1 Multimodal Transportation Hub

where traditional and smart mobility services connect to each other for seamless transfers

#### 4 Hub Connection

EV-based rapid transit, automated transit, personal rapid transit, CV-enabled safety&mobility solutions, and smart bike/pedestrian greenways supplement existing signalized arterials, bus transit, metro rail, and commuter rail to connect the community hubs.

#### 2 EV & Smart Grid Hub

EV charging/rental/sharing and smart-grid hub integrating power & transportation sectors

#### 5 Hub Accessibility

Sharing economy ecosystem proving dynamic shuttle, ride sharing/bike sharing/EV rental/ADA on-demand services for traveling to and from hubs, complete with e-payment with low-income household.

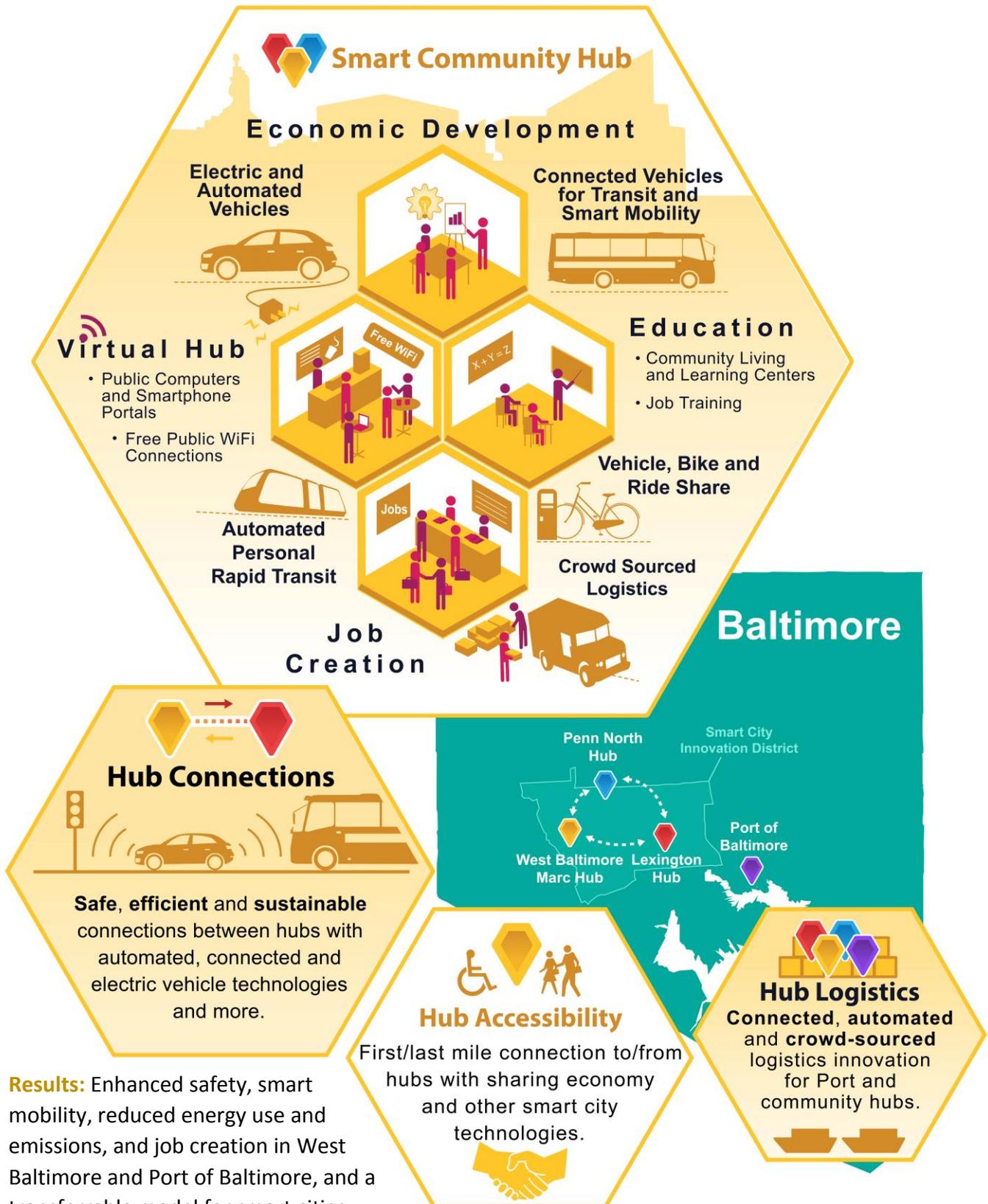
#### 3 Community Job and Living Hub

where job training, economic development, health care & ICT access congregate in&around hubs

#### 6 Hub Logistics

Connected logistics automating and tracking each freight movement at the Port and crowd-sourced urban delivery hubs, with dynamic freight operations and sharing economy freight ecosystem for shippers, carriers, businesses and citizens.

## Improve Safety, Mobility, and Sustainability with the Smart Community Hub Implementation Framework



**Results:** Enhanced safety, smart mobility, reduced energy use and emissions, and job creation in West Baltimore and Port of Baltimore, and a transferrable model for smart cities.

### | 1.3 B'Smart Goals and Performance Measures

The five primary goals supporting the B'Smart vision of connecting communities to opportunities, key performance metrics, and B'Smart 2020 objectives are summarized below.

Goals	Description	Performance Metrics	B'Smart 2020 Objectives
<b>Safety</b>	Life and property of citizens must be protected as they access opportunities.	Crash rate/severity, Pedestrian, bicycle, transit, and freight crashes and fatalities, Citizen rating of community safety/security	Move toward zero deaths, Reduce crashes across all modes by 20%, Increase citizen rating of safety and security in WB by 50%
<b>Mobility</b>	Smart City offers more reliable and efficient trips for travelers and freight on all modes. It also provides more non-auto travel options to citizens through mobility-on-demand and sharing economy.	Congestion delay, Travel time index, Planning time Index, Bottlenecks, Speeds, Transit service time and on-time arrival, Transit ridership, Cost and time on mobility-on-demand and sharing economy modes, Population coverage of new mobility modes, Urban delivery delay, Freight congestion cost, Area coverage of sharing economy urban delivery modes	10% improvement across all efficiency metrics, 20% improvement across all reliability metrics, Population and area coverage of new mobility modes and sharing economy modes reaches 80% of the WB community
<b>Sustainability</b>	Smart City promotes environmentally friendly and energy efficient urban solutions with renewable resources	Emissions and fuel use per person mile, Air quality index, Electric Vehicle share, Non-auto mode share, Walkability score, Renewable energy source for power grid, EV sharing economy mode ridership	10% reduction in fuel use and emissions for trips from/to the WB community, More EV, sharing economy, and other non-auto trips than auto trips
<b>Equity</b>	Access to affordable and reliable transportation broadens opportunities and is vital for addressing poverty, unemployment and access to health care and education.	Average commute time for all city residents, and especially WB residents, Average cost per urban trip for WB residents, Access/egress travel time to/from the Smart Community Hubs, Coverage of public Wi-Fi in WB, Number of computer and smart phone portals in Smart Community Hubs	20% reduction of commute time and costs for WB residents, 50% reduction of hub access/egress time, Low/no-cost Wi-Fi coverage to 50% of WB residents, 1,000 public computer and smart phone portals in Community Hubs
<b>Job Creation</b>	Smart City promotes economic growth and job creation in existing and new business sectors.	Jobs created in WB, Jobs created at the Port, Jobs created in the City, Unemployment rate, Household income, Number of WB residents trained for job skills and entrepreneurship	3,000 new jobs with >2/3 of them in WB and Port, 10% reduction in unemployment rate, 10% increase in income, Job training to 1,000 WB residents each year

### | 1.4 Why Baltimore?



#### Biggest Impact

- > On urban congestion
- > Transit service quality
- > Disconnected communities
- > Economic inequality

**B'Smart** addresses a community with the most urgent needs for revitalization through technology and innovation. Smart city technologies improving hub connection and accessibility with connected and automated vehicle and sharing economy modes can significantly decrease auto mode share, reduce accidents, and reduce recurrent and non-recurrent congestion delay. Aggressive technology

deployment plans for EV and smart grid will further reduce energy use and emissions. All

proposed technology deployments are strategically located inside a Smart City Innovation District (later extended to the entire city and beyond), which will allow for maximum benefits and for these technologies to multiply. The Baltimore proposal also leverages more than one billion of on-going investments (see Section 9), enabling the USDOT grant to maximize impact.

## Most Transferrable

- > Universally applicable concepts
- > Data and performance sharing
- > Removal of tech. adoption barrier
- > Platform with 50+ member cities

**Baltimore** faces population, transportation, and community challenges representative of many U.S. cities that are struggling to revitalize their urban centers and to connect communities. The Baltimore approach of converting existing transit stations to Smart Community Hubs is applicable and transferrable to all American cities with existing

transit centers, new urbanism neighborhoods, or job hubs. A truly multimodal transportation infrastructure in Baltimore, including all forms of transit services, sharing economy modes, and a major water port and airport, allows for comprehensive deployment of smart city technologies and maximizes the opportunity for other cities to transfer technologies of their interests for specific types of infrastructure. A major barrier to new technology adoption for city governments is inequity because low-income and minority population groups are often the last to adopt and benefit from emerging technologies. By focusing on improving equity and assisting low-income communities, a success in Baltimore will remove this key technology adoption barrier for other cities. Existing platforms for data/analytics/technology/experience sharing are already in place, led by Baltimore and its university partners, that can immediately transfer smart city technologies to more than 100 cities and universities (see Section 7).

## Most Progressive

- > Revitalization & transformation of low-income communities
- > Job training and job creation
- > Technologies for lowering cost and accessing opportunities
- > Best demo site in the nation

**B'Smart** will directly benefit more than 50,000 low-income and minority residents in West Baltimore by improving their transportation access to opportunities, lowering their transportation costs, providing new jobs near their existing homes, offering job training at easily accessible locations, expanding access to free public Wi-Fi and smart phones, and re-connecting the communities with sharing economy tools and new community hubs. West Baltimore, a community

devastated by the 2015 protests, hungry for innovation and ready for a transformation, has been at the center of a national dialogue on issues and solutions in disconnected communities.

## Highest Chance of Success

- > Full partner support
- > Effective risk management
- > Carefully staged implementation plan
- > Strong track record of tech-demo execution

**Baltimore** has established a strong track record of successfully launching and executing technology innovation initiatives. Most recently, by promoting innovations in the bio, health care and cybersecurity technology sectors and by working through public-private-

philanthropic partnerships, the City has created 22,572 new jobs and reversed the half-century

trend of population decline. **B'Smart** is strongly supported by leaders of city, regional and state governments, ports, community organizations, and more than 50 committed and capable academic, non-profit and private-sector partners (see Appendix A for support letters). The proposed evolutionary approach focuses on compatibility and complementarity between futuristic smart city technologies and the existing multimodal transportation hubs, which mitigates technology, institutional, and policy risks. The implementation plan (see Section 5) is also carefully staged with low-risk projects completed first to ensure success, strength program support, and avoid program-halting incidents. All these qualifications, combined with hundreds of millions of dollars of committed investments in Baltimore transit stations, transit links, and [Innovation Village](#) in West Baltimore pave a solid foundation toward a transformative success.

## 2 Baltimore City Characteristics

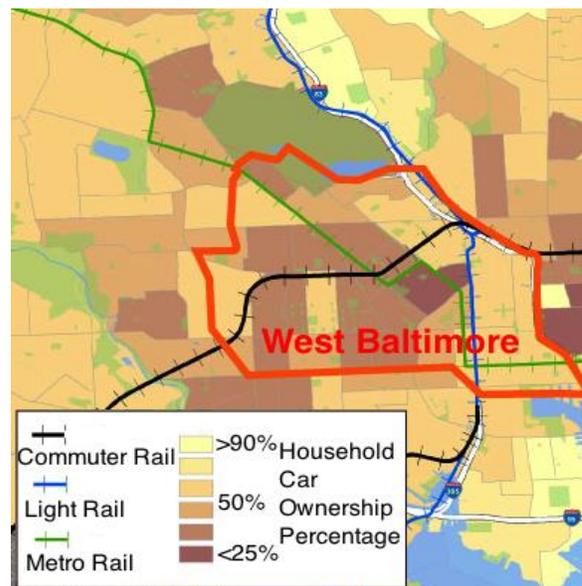
### | 2.1 Population and Density

Baltimore meets the specified attributes for an ideal Smart City in terms of population (200K – 850K), density and having a significant portion of the overall Urban Area population (>15%):

- > **Population Size**
  - 666,271 (Baltimore City)
  - 2,753,396 (Baltimore MSA)
  - 23% (City/MSA)
- > **Population Density**
  - 7,687 people/sq. mi. (Baltimore City)
  - 1,058 people/ sq. mi. (Baltimore MSA)
  - 7 times denser in Baltimore City

### | 2.2 Multimodal Transportation Infrastructure System

**Transit** The Baltimore metro area has a comprehensive public transportation system including Metrorail, light rail, commuter rail, regular bus, rapid bus, and mobility/paratransit services, 1,509 service vehicles, 563 rail transit track miles, and 2,056 bus route miles. While extensive in scope, the Baltimore transit system requires major improvements. A typical Baltimore resident can only get to 11% of the jobs in the region within an hour using public transportation, with an average transit commute time of 55 minutes. The existing rail transit system in and around West Baltimore is illustrated in the map, which also shows low car ownership and transit dependency of this community. Poor accessibility to and from the rail transit stations has been a key factor for the lack of opportunities and the lack of business and economic development in West Baltimore.



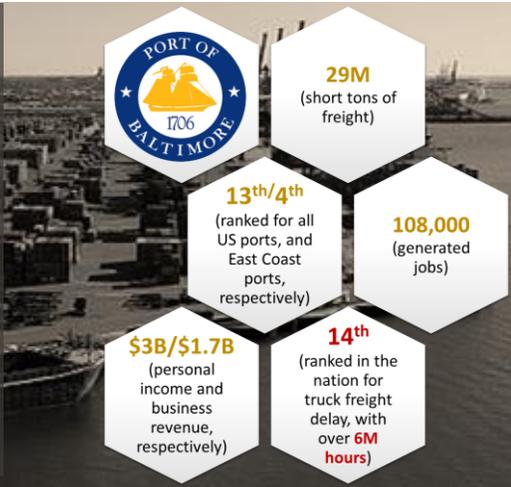
Baltimore used to be a city connected by streetcars. The current bus routes essentially replaced the streetcar lines. The residential and job centers of the city have significantly changed since the time of the streetcars; but the bus routes have not. Additionally, increased ridership on the Light Rail and Heavy Rail Metro subway have led to poor performance. In Fall 2015, Maryland Governor Larry Hogan announced a plan to improve the transit system in Baltimore and committed \$135 million to this effort.

**Highway** The City of Baltimore has authority over the operations of all roadways within the city boundary, except tolled facilities and Interstate highways. Major issues with the highway system are congestion and safety. Baltimore has an average commute time of 31 minutes, the worst of all mid-sized cities identified by USDOT. In 2013, the City of Baltimore experienced 20,933 crashes, of which 1,243 involved at least one pedestrian or bicyclist. As a result of these crashes, 6,815 people were injured and 28 killed.



### Port of Baltimore

The Port of Baltimore remains a strong economic engine, generating 108,000 jobs in the region. However, the aging vehicular and freight infrastructure in Baltimore create major bottlenecks for freight movements along the East Coast. Port of Baltimore is ranked 14<sup>th</sup> in the nation for truck freight delay (over 6 million hours annually). The expansion of the Panama Canal will bring new economic opportunities to Baltimore and along with the expected major increase in freight shipments, creates an increased urgency to address freight mobility/reliability and urban logistics issues in and around the Port of Baltimore.



**Sharing Economy Modes** The concept of a sharing economy, e.g., vehicle sharing and ride sharing, has been ongoing in Baltimore for more than 40 years (including the first [Commuter Connections](#) ride share program). The City has also approved a bike-sharing program that will be launched in Fall 2016. Baltimore, in partnership with the University of Maryland, received \$4.5 million from the US DOE in 2015 to develop a sharing economy ecosystem to incentivize residents and businesses to make sustainable travel decisions that minimize energy use. The private sector has also started sharing economy transportation and logistics services in the region, including dynamic mobility-on-demand transit services and urban delivery services.





**Smart Grid & EV Infrastructure** Electric vehicle usage in Baltimore is prevalent and staged for significant growth. Maryland is one of the country's first eight states participating in the Zero Emission Vehicle Memorandum of Understanding (ZEV MOU). Baltimore City was one of the first federal and state award recipients of EV funding to install public EV charging stations in 2010. The city and partners did so along the 13-State I-95 corridor, known as the transportation "backbone" of the East Coast. Baltimore has grown its EV presence since the earliest development of EV production models in 2010-2012, placing EVs into its own municipal fleet with state funding support. Baltimore is also the headquarter location for the Maryland Department of the Environment (MDE) and Maryland Transit Administration (MTA), both of which are working aggressively to promote EVs, renewable energy and smart grid developments. The Port of Baltimore has introduced EV into port operations. The city and state work very cooperatively with the local utility, Baltimore Gas & Electric (BGE) on smart grid applications to assure the strongest grid operations, resilience and security, while also encouraging EV usage. Among several incentive programs in Baltimore, BGE initiated an EV pilot program to encourage the use of EVs in 2014.



**ICT, ITS & TMC Infrastructure:** Baltimore has an extensive existing Information and Communications Technology (ICT) infrastructure including fiber optics, Wi-Fi and cellular connections. Baltimore City Traffic Management Center (TMC) and the Emergency Operations Center, in collaboration with the Maryland State Highway Administration (SHA) and Maryland Transit Administration (MTA), maintain an award-winning Intelligent Transportation Systems (ITS) infrastructure including **CHART** incident response, traffic sensors and data, activity traffic management, integrated corridor management, and travel demand management. The Baltimore City TMC is in charge of non-freeway traffic control and coordinates with SHA and MTA on ITS and traffic management on freeways and transit, respectively. Baltimore and its regional agency partners are known nationally for their ability to deploy new ICT, ITS and TMC technologies. Baltimore is a recipient of the Integrated Corridor Management demonstration grant from the USDOT FHWA, the Advanced Demand and the Dynamic Network Modeling grant from SHRP2 with a focus on active traffic management. Areas of needs regarding ICT, ITS, and IMC include low Internet access and low smart phone market share in low-income neighborhoods, and signal communications.

## | 2.3 Additional Baltimore Advantages



### Environment Conducive to Technology Demo

**With** the termination of the Red Line rail transit proposal in West Baltimore, the city, region and state are eager to adopt smart city technologies that not only facilitate personal, commodity, and digital traffic, but serve as the foundation for connecting low-income inner city residents with the new-economy job growth that continues across the region. Recently, the city designated West Baltimore as part of the “Sustainable Communities” making this area eligible for funding from a variety of state agencies. The city’s comprehensive plan was also recently updated for the first time in 30 years, immediately followed by “Transform Baltimore,” the City’s completely revised and modernized zoning ordinance. These critical and progressive planning tools, as well as the recently adopted economic development, sustainability, climate change, disaster, and food systems plans, provide a strong institutional foundation for smart city development in Baltimore. Baltimore is also participating in the USDOT Ladders of Opportunity Program with a focus in West Baltimore.



### Committed Leadership and Capacity

**In the wake** of the Freddy Gray protests, the city government is committed to returning Baltimore, and especially West Baltimore to prosperity and equity. On Martin Luther King Day 2016, the Mayor of Baltimore, along with major regional and state government leaders, announced the Innovation Village initiative in West Baltimore to promote developments and job creation. The Governor of Maryland also just allocated \$135 million for “[BaltimoreLink](#),” a new multimodal transit strategy for connecting Baltimore residents and jobs. As part of the regional “Opportunity Collaborative,” the city produced a “Regional Plan for Sustainable Community Development” that received national acclaim. To help implement the regional plan, the state recently committed **\$700 million** for replacing vacant buildings with new affordable and mixed use housing with West Baltimore being the focus area. B’Smart also aligns well with the high-priority long-standing city goals of improving transit, connecting communities, enhancing safety and security, and addressing climate adaptation. Baltimore has identified urban congestion mitigation, transit service improvement, safety, and emission reduction as the top transportation goals for the City, consistent with the USDOT goals.



### Integration with the Sharing Economy & Open Data Access

**B’Smart** strives to expand, improve and electrify vehicle, bike, and ride sharing programs, and to develop sharing economy ecosystems for both passenger and freight with dynamic on-demand crowd-sourced services with built in e-payment. A bold innovation in low-cost ICT and CV vehicle network technology will be deployed to provide free Internet access to all of West Baltimore. Data from users, mobile devices and smart infrastructure sensors will be integrated to support customized, real-time travel information, passenger and freight trip planning, performance monitoring, and decision-making. Baltimore is the inventor of the now multi-city [CitiStat](#) program that collects city data and provides access to city officials, entrepreneurs and citizens. Through partnership with the University of Maryland and Johns Hopkins University, Baltimore is part of the internationally leading [RITIS](#) platform for integrating, sharing and analyzing urban data, and connected with the [MetroLab Network](#) and [21<sup>st</sup> Century Cities Initiative](#), two major multi-city alliances for smart city technology transfer.

# 3 Technology Overview and Site Map

The proposed **B'Smart** technology deployments, consistent with the **12 USDOT Smart City Vision Elements**, are summarized in the table below and detailed in Section 4.

USDOT Vision Elements	Baltimore Smart City Vision Elements	Goals Achieved	Risk	Key Partners*
1. Urban Automation	Electric and Automated Vehicle Sharing-Ride Sharing Automated and Dynamic Shuttle Services Automated Mag-Lev Personal Rapid Transit (PRT) Automation for Parking, Freight and Safety	S,M,G,E	◆ ◆ ◆ ◆	Ford, GM, Lyft, Bosch, Verizon, GE, Voyage Control, SkyTran, SidewalkLabs, U Michigan GOVonomy
2. Connected Vehicles	Next Generation Low-Cost V2X and V2I Technologies Connected Smart Signal and Traffic Management Outsourced Wider-Area Connected Vehicle Tech. CV-Enabled Mesh Network for Public Access to Internet	S,M,G,E,J	◆ ◆ ◆ ◆	U Maryland, U Michigan, Eberle Design, Econolite, Port of Baltimore, Veniam, Telogis, Cyberg, Y, GOVonomy
3. Intelligent, Sensor-Based Infrastructure	Users, Vehicles and Cell Phones as Probe Sensors Smart Infrastructure Sensors and Virtual Sensors	S,M,E	◆ ◆	U Maryland, TomTom, INRIX, HERE, Ford, Telogis, Google/Waze,
4. Urban Analytics	B'Smart Urban Analytics Platform Performance Monitoring and Prediction	S,M,G	◆ ◆	U Maryland, Johns Hopkins U, Urban Insights, BU-BNIA
5. User-Focused Mobility Services and Choices	Ecosystem for Mobility-on-Demand (MOD) Services Incentive-Based Demand Management for Optimization Real-Time Traveler Information for All Vehicle/Bike/Ride Sharing Services with Job Creation	M,G,E,J	◆ ◆ ◆ ◆	Lyft, GM, Ford, Split, Transit Choices, Commuter Connections, CMTA, MDOT, MTA, Sidewalk Labs, AARP
6. Urban Delivery and Logistics	Connected and Automated Port Crowd-Sourced Urban Delivery with Job Creation Dynamic Freight Trip Planning Service	S,M,G,E,J	◆ ◆ ◆	Port of Baltimore, Roadie, Under Armour, Voyage Control, Veniam, Cyberg
7. Partnerships	Discussed separately in Section 5 of the proposal		◆	All
8. Smart Grid, Roadway Electrification and Electric Vehicles	Vehicle Electrification EV Infrastructure and Incentives Cleaner Energy Sources for Smart Grid	M,G,J	◆ ◆ ◆	GE, Ford, BG&E, BEVI, TimberRock, EnviroBro, NREL, Cyberg, MEA, MCEC, MDCC, MDE,
9. Connected, Involved Citizens	Rate Your Ride and Rate Baltimore Open Data Portal for Promoting Entrepreneurship	E,J	◆ ◆	CMTA, U. Maryland, Community Associations
10. Architecture and Standards	Bandwidth, Storage, Security, Privacy, etc.	S,M,G	◆	Cisco, Verizon, Bosch, GE, INRIX, U. Maryland
11. Low-Cost, Efficient, Secure and Resilient ICT	Low-Cost ICT in West Baltimore and more	S, M, E, J	◆	Cisco, Verizon, Bosch GOVnomy
12. Smart Land Use	Innovation Village Economic and Land Development in West Baltimore	M,G,E,J	◆	Sagamore Dev., Abell Found., Coppin State U

**Related B'Smart Goals:** S – Safety; M – Mobility; G – Green/Sustainability; E – Equity; or J – Job Creation

**Risk Level Assessment:** Green ◆ – Low) Yellow ◆ – Medium; and Red ◆ – High

\* **Partners** – Partnerships discussed in this proposal indicate interests from the partners in working with Baltimore to deploy smart city technologies (see Appendix for partner detail), but do not at this stage indicate a commitment from the City.

**B'Smart** Vision Elements will be initially deployed at the three West Baltimore Smart Community Hubs, the multimodal corridors connecting these hubs, the Smart City Innovation District, and the Port of Baltimore (see annotated site map below). Certainly Vision Elements, such as low-cost connected vehicle solutions, B'Smart sharing economy ecosystem, open data sharing and urban analytics platforms, will immediately make citywide impact. With strategic partnerships and business models developed through this USDOT grant, Baltimore intends to expand this implementation framework based on Smart Community Hubs to the entire city and the region, and transfer technologies to other cities.



**Deployment Locations**  
**Yellow** – At or near the three Smart Community Hubs in West Baltimore for Hub Creation;  
**Red** – Along Route 40 and Route 1 multimodal corridors connecting the three hubs for Hub Connection;  
**Green** – Covering the entire Smart City Innovation District for improving Hub Accessibility;  
**Purple** – At Port of Baltimore or Smart Community Hubs for Hub Logistics; or  
**Gray** – Covering the entire City of Baltimore.

## 4 Smart City Vision Elements

A primary focus of B'Smart is to solve unique and often understudied issues regarding smart city technology deployment in low-income communities, such as low smartphone/internet market share, low car ownership, price sensitivity, citizen education and community security. In addition to meeting USDOT expectations on all 12 Vision Elements, Baltimore has designed and plans to implement smart city solutions that are especially valuable in low-income communities and highlighted with a “**Ladders of Opportunity**” symbol in the narratives below.

### | 4.1 Urban Automation

Key barriers to opportunity for low-income residents and businesses in West Baltimore to access opportunities are the monetary and time costs of transportation. While the average city resident spends 16% of their income on transportation, low-income residents spend more than 30% of their income on transportation. Baltimore values urban automation as a means to reduce the costs for its residents to access/egress Community Hubs and travel between hubs, while simultaneously improving safety, mobility and sustainability at the same time.

**Electric/Automated Vehicle and Ride Sharing** In partnership with GM, Baltimore will implement EV vehicle sharing and ride sharing at the West Baltimore Marc Hub with the new 200-mile range Chevrolet Bolt EV, **reducing fuel costs for low-income renters and riders.** The city will gradually introduce automation to this vehicle fleet as B'Smart expands to Lexington Market and Penn-North Hubs.



**Automated Personal Rapid Transit (PRT)** Advances in urban transportation automation enable new automated PRT modes that promise much higher person throughputs and higher speed than existing urban travel modes. Baltimore has had preliminary discussions with an automated PRT start-up company named [SkyTran](#) (see support letter from SkyTran) to explore deployment options for a futuristic velocity-based-magnetic-levitation system. These next-generation automated PRT vehicles move on a network of slim elevated guideways that enable fast, on-demand, and point-to-point travel. Though any potential relationship with SkyTran is dependent on successful testing and demonstration of this innovative technology and its ability to carry passengers, SkyTran remains a potential game-changing development that could dramatically leverage smart community hubs created in Baltimore through USDOT's support in the Smart City Challenge.





**Automated and Dynamic Shuttle Services** Parking cost is high at major job centers in Baltimore. The Ford GoRide dynamic shuttle service will be introduced in Baltimore to provide efficient and on-demand shuttle services to transport West Baltimore residents from Community Hubs and relative low-cost remote parking facilities to job centers. Replacing the shuttle fleet with automated electric buses at a later stage would make it financially viable for the city to **offer automated shuttle services to West Baltimore residents as a free hub connection and hub accessibility option.**



**Urban Automation for Parking, Freight and Safety** Baltimore also plans to partner with leading companies (e.g., [Bosch](#), [Voyage Control](#), [Veniam](#), [Mobileye](#), [Sidewalk Labs](#)) to explore additional urban automation technologies such as automated parking, freight and port automation, automation-based transit driver assistance, and pedestrian safety systems.

## | 4.2 Connected Vehicles

Baltimore envisions a citywide CV deployment, “Connected Baltimore,” with low-cost technologies. This will ensure smooth travel across the entire city without “end of service” bottlenecks occurring when system boundaries are reached. Immediate applications will focus on arterial connected signal management, first-responder safety and CV-enabled integrated corridor management for Hub Connections and Hub Accessibility.

**Next Generation Low-Cost V2X and V2I Technologies** Baltimore, in partnership with the University of Maryland and University of Michigan, has developed a concept of low-cost city-wide V2I and V2X technologies based on Wi-Fi and other existing communication networks. These technologies allow the city to monitor performance and understand how the operations of facilities and services can be enhanced in near-real time. Baltimore will enable CV data from transit, first responders, commercial vehicles, city and public vehicles, and pedestrians through massive, yet extremely low-cost deployments by leveraging new technologies from its university and private sector partners.



**Connected Smart Signal and Traffic Management** Baltimore’s aging infrastructure consists of hundreds of signalized intersections with little connectivity to each other. Connected Baltimore will integrate high-resolution controller data, re-identification data, outsourced probe data, and connected vehicle data. Through partnerships with the [University of Maryland](#),



Google/Waze, Eberle Design, Econolite, TomTom, University of Michigan, and others, Baltimore will deploy DSRC and Wi-Fi-based CV technologies to enable the collection of detailed signal and sensor actuation data at 0.01-second resolution that supports signal maintenance, safety applications, transit priority, freight priority, traveler information for in-vehicle systems, real-time coordinated signal operations between freeway and

arterial networks, and next-generation performance criteria. Re-identification data provides travel time samples at 1-second resolution and privacy-protected origin-destination data, helping the city understand where vehicles enter the network, their routes, and exit points.

**Outsourced Wider-Area CV Technology** Commercial vehicle operations in Baltimore are significant given the city’s many port terminals, an Amazon distribution system, Under Armour operations, and Johns Hopkins health care logistics. Furthering the vision of Connected Baltimore, the city has partnered with Telogis to access real-time CV data from over 250,000 commercial vehicles, including headlight use, seatbelt use, wiper use, emissions, driving behavior, traction control engagement, origin-destination, and more. This information will be integrated with aforementioned CV data sources to help Baltimore understand environmental conditions and passenger/ freight travel patterns to make informed, real-time decisions for a smart mobility system.



**CV-Enabled Public Internet Access** A key opportunity barrier in low-income communities is poor Internet access that prevents many from benefiting from Smart City technologies.

B’Smart recognizes that connected vehicles and infrastructure (e.g., smart street lights, transit stations) are ideal low-cost Wi-Fi hotspots that can expand wireless Internet coverage by forming a **vehicle-infrastructure mesh network offering free Internet access in low-income communities**. This technology relies entirely on existing fiber and Wi-Fi infrastructure, and only requires installing a



multi-network On-Board/On-Infrastructure Unit equipped with Wi-Fi/DSRC/cellular interfaces on city vehicles, buses, commercial vehicles from partners and street infrastructure. Free, public Wi-Fi access should also attract small businesses, new residents, and persons from other neighborhoods to West Baltimore, in a way that also **reunites the communities and the city**.



### | 4.3 Intelligent, Sensor-based Infrastructure

B'Smart incorporates data sources from deployed smart city infrastructure that, when coupled with the nationally leading [RITIS](#) and [CitiStat](#) urban analytics tools in Baltimore, will provide an advanced platform for addressing complex urban challenges both in and beyond Baltimore.

**Users, Vehicles and Cell Phones as Probe Sensors** Baltimore plans to utilize public-private partnership agreements with dozens of committed data providers (e.g., Google/Waze, TomTom, INRIX, HERE, Verizon) managed through RITIS at the University of Maryland – home to the largest transportation data center in the U.S. – to collect and integrate user-generated data and smart infrastructure data, including: **(1)** Data

from mobile and cell phone communication providers including real-time population location, origin-destination, seismic activity and more; **(2)** Data from connected vehicles, buses, commercial vehicles and signals on origin destination, speed, route, location, and ridership; **(3)** Data from sharing economy ecosystem apps through which users generate data as probe sensors; **(4)** User ratings from the Rate-Baltimore connected/involved citizen app on City service performance; and more.



**Smart Infrastructure Sensors and Virtual Sensors** Baltimore will expand and improve smart infrastructure with physical and virtual sensors, such as:

**(1)** Bike and pedestrian sensors built into high volume sidewalks, cross walks and bike share systems (partners: Ford, Sidewalk Labs); **(2)** Virtual freight sensors providing information on freight origin destination, volume, route, and weight (University of Maryland); **(3)** Wireless and solar powered smart parking meters that measure occupancy, road conditions, vehicle idling, and collect parking revenue (BEVI); **(4)** Smart street lights that also monitor infrastructure condition and **improves community security with better street lighting** (GE); **(5)** On-board sensors in automated and connected vehicles (Telogis, Voyage Control, Ford, GM); and **(6)** Video network surveillance system with video analytics for transportation and low-income community security (Bosch).

### | 4.4 Urban Analytics

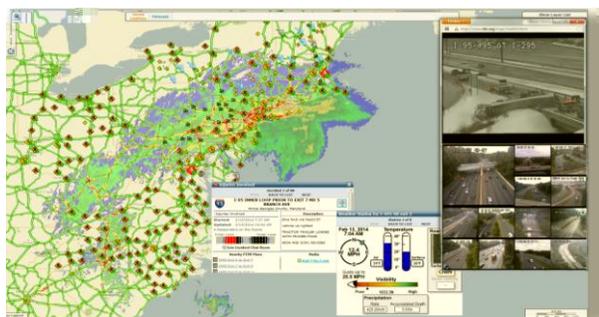
With real-time and archived data from existing and new sensors, B'Smart includes an integrated Urban Analytics Platform that enables performance monitoring, performance prediction, system optimization, and multi-city analytics sharing. This platform will include new performance metrics related to equity and economic opportunities in West Baltimore.



**community security with better street lighting** (GE); **(5)** On-board sensors in automated and connected vehicles (Telogis, Voyage Control, Ford, GM); and **(6)** Video network surveillance system with video analytics for transportation and low-income community security (Bosch).

**B'Smart Urban Analytics Platform – Ready from Day One** The B'Smart Urban Analytics Platform will leverage existing industry-leading systems, including RITIS, CitiStat, and 21<sup>st</sup> Century Cities Initiative, all led by Baltimore or its university partners. Since the core data sharing and analytics engine is already in place with more than \$35 million prior federal and state investments in RITIS alone, the B'Smart Urban Analytics Platform and its data assets will be quickly deployable, secure, low cost to maintain, scalable, and easy to replicate in other regions; it will attain measurable benefits on "day one." This also allows Baltimore to spend more of the USDOT Smart City Challenge grant on other Vision Elements.

A key innovation planned for the B'Smart Urban Analytics Platform is the realization of self-creating, dynamic, and predictive city dashboards and visual analytics. Whereas most analytics and dashboard systems require users to configure settings, define parameters, and otherwise make queries, B'Smart intends to employ forward-thinking, machine-learning, big-data concepts that dynamically and continually analyze incoming data, compare it to historic data, search for patterns, look for correlations and statistical outliers, and then report only the interesting and important elements that are discovered. In this sense, the B'Smart dashboards are "self-creating," intelligent, predicative, optimizing, and searching for problems, patterns, and solutions that humans might not even think to explore. The result is a more informed government, better served citizens, and more efficient, sustainable and safe mobility.



**Performance Monitoring and Prediction** Baltimore designs its performance measures and monitoring/prediction systems that will allow the city to continually monitor and refine its deployments in order to ensure maximized benefits of each application and tailoring them to various operations and environmental conditions. See Section 6 for additional details.

#### 4.5 User-focused Mobility Service and Choices

Sharing economy for passenger travel, including automated vehicle/bike/ride travel modes introduced in Section 4.1, is integrated in a **B'Smart Ecosystem** for dynamic on-demand mobility services, with considerations for low-income, elderly and disabled users, built on partnerships between the city, transit agencies, universities and the private sector (e.g., Lyft, GM, Ford, Split) for seamless modal integration, transfer and e-payment.

### Ecosystem for Mobility-on-Demand (MOD) Services

The B'Smart Sharing Economy Ecosystem is where dynamic travel demand meets on-demand mobility service providers working together to offer the most affordable, efficient and sustainable travel options. Users enter their trip origin, destination, and arrival time, and all providers of mobility services (e.g., transit, rapid/personal transit, ride sharing, ride hailing, vehicle sharing, bike sharing, parking) offer service price and level of service information. Users choose a service provider or a combination of service providers and complete payment within the same ecosystem. For equity and multimodalism, B'Smart stresses an open ecosystem that promotes market entries and allows multiple service providers to collaborate, helping users complete a trip with connecting services from multiple service providers (e.g., ride share on Lyft to a bus hub, ride a city bus, and then use Ford e-bike sharing to get to the final destination). B'Smart's payment system will also include **low-income user credits and discounts** for West Baltimore families.



### Incentive-Based Travel Demand Management for System Optimization

Another B'Smart innovation is employing predictive analytics and control optimization to minimize traffic delay, energy use and emissions with personalized incentives that strategically encourage system users to adjust their travel decisions that are good for themselves and optimize transportation system performance. By strategically introducing personalized long-term (e.g., rewards for joining vehicle share and ride share programs), pre-trip (e.g., rewards for delaying departure until after rush hour) and real-time incentives (e.g., rewards for en-route diversion to

**Long-Term Incentives**

- Join new Ride-Share Program: 1000pts
- Eco Drive Target for May 2015: 25 MPG (Current: 20 MPG)
- CONGRATULATIONS! GOLD LEVEL: +50% bonus for every point you earn!

**Pre-Trip Incentives**

- Destination: DOE HQ Preferred Arrival: 8am: 200pts
- Depart: 6:50 am Arrive: 7:35 am: 200pts
- Eco-Driving Target for trip is 28 MPG: 100pts
- Total Points 15414 Rank 3 out of 15 Among all users Top 23%

**Real-Time Incentives**

- Eco-Driving 28 MPG CURRENT: 25 MPG Tip: Brake more softly. +50pts
- ACCIDENT AHEAD DETOUR: +50pts
- DETOUR 20 min vs. 35 min: +50pts
- You saved 15 min You saved others 10 min: 50pts

less congested routes and for adopting eco-friendly driving behavior), the City can encourage some users through monetary and non-monetary incentives to adjust their travel choices for the optimization of system energy use and efficiency. This technology is funded with a \$4.5 million grant from the U.S. DOE and developed by the [National Transportation Center](#) at the University of Maryland for Baltimore with planned deployment in 2017.



**Real-Time Traveler Information for All** Real-time traveler information, including that for sharing economy modes, will be provided via web, smartphone, and existing ITS and ATIS system to all citizens. An effort that is already ongoing in Baltimore and would be greatly accelerated by the USDOT Smart City Grant is the **development of wayfinding tools for the elderly and disabled** who may require modes and routes with ADA compatibility.



**Vehicle/Bike/Ride Sharing Services with Job Creation** Many of the existing and proposed sharing economy modes such as vehicle/bike/ride sharing will have depots at the three Smart Community Hubs in West Baltimore for Hub Connection and Hub Accessibility. To **enable low-income West Baltimore residents without cars to join the sharing economy work force**, Baltimore, in collaboration with GM and Lyft, will provide Bolt EVs at the Smart Community Hubs that qualified residents in West Baltimore can rent as contracted drivers to offer ride hailing and ride sharing services as contracted drivers. All sharing economy modes will be integrated into the B'Smart ecosystem and [Commuter Connections](#), which has been promoting vehicle/ride sharing in Baltimore for over four decades.



Don't own a vehicle?  
No problem!  
Rent-Drive-Earn Money



## | 4.6 Urban Delivery and Logistics Innovations

With the many Port of Baltimore terminals in the city, B'Smart is well positioned to deploy smart city technologies that address freight transportation issues related to port operations and city logistics. Key Vision Elements include connected and automated Port of Baltimore and crowd-sourced city logistics operations anchored at Smart Community Hubs in West Baltimore.

**Connected and Automated Port** Freight delays at ports and intermodal facilities significantly increase shipping costs and worsen urban congestion. In a connected and automated Port as B'Smart envisions it, all vehicles, containers, machines and control centers are connected to each other with similar low-cost vehicle mesh networks for connected passenger vehicles and with virtual freight sensors. This technology tracks the movement of all shipped goods inside the port and transmits real-time information to control centers for operations optimization and shipment coordination. Benefits include reduced truck delay and ship docking time, smart port traffic management, safety and security, and real-time user information.



**Crowd-Sourced Urban Delivery with Job Creation** A B'Smart sharing economy ecosystem for urban delivery will dynamically match crowd-sourced delivery capacity with shipping demand, with the proposed Smart Community Hubs in West Baltimore serving as the new city logistics centers for package consolidation and shipment. **Citizens and commercial carriers can turn underutilized space in their personal vehicles and trucks (e.g., less-than-truckload space) into income** while reducing the number of freight delivery trucks in the city. **EVs and electric cargo bikes at the Smart Community Hubs can be rented by residents in West Baltimore to deliver goods, which creates new jobs** in the low-income community and at the same time reduces fuel use and emissions. On-demand carriers collect parcels from customers and deliver parcels to city logistics centers at Smart Community Hubs for consolidation and ship via crowd-sourced methods to final destinations. **Restaurants, retail shops, and other service businesses will also be attracted to areas around the Smart Community Hubs to utilize this low-cost, reliable delivery service**, providing additional new jobs in West Baltimore. A key partner is **Roadie**, the inventor of the neighbor-helping-neighbor crowd-sourced delivery.



**Dynamic Freight Trip Planning Service** With the B'Smart Urban Analytics Platform incorporating commercial vehicle sensors and system prediction, dynamic freight trip planning services via web, smart phone and in-vehicle systems will be provided to shippers, carriers and receivers for dynamic freight mode, scheduling and routing decision support/optimization, as well as customized commercial vehicle travel information provision (Telogis, Voyage Control).

#### | 4.7 Strategic Partnerships and Business Models

A major strength of the Baltimore proposal is from the city's existing partnerships with regional and state governments, universities, non-profits and corporations. This proposal is the product of more than 100 meetings and phone calls with city partners. To avoid repetition, detailed description of strategic partnerships and business models is only included in Section 5.

#### | 4.8 Smart Grid, Roadway Electrification and Electric Vehicles

Baltimore has been a leader in promoting EV, EV infrastructure, renewable energy and smart grid developments. EV sharing, e-bike sharing and electric transit fleet are also integral parts of B'Smart and its Smart Community Hub vision. Baltimore envisions EV as an environmentally friendly technology for potentially reducing mobility costs in West Baltimore and beyond.



**Vehicle Electrification** Since 2010, GM and GE have partnered with Baltimore on EV to develop clean transportation options for urban residents. Baltimore received Maryland Energy Administration funding in 2015 to introduce EV into the city vehicle fleet, and is committed to contributing to a statewide plan of having **60,000 EV by 2020**. The Port of Baltimore has also employed EV for port operations. B'Smart will **expand EV availability to low-income citizens and businesses in West Baltimore by placing EV and e-bikes at the Smart Community Hubs for vehicle/bike/ride-sharing programs and by employing electric buses and shuttles**. Expansion of EV-ready Smart Community Hubs to other areas of Baltimore is supported by industry and community partners including Ford, BG&E, BEVI, GE, and Sagamore. The city will also work with the Port of Baltimore to expand its vehicle electrification program to apply EV-based terminal tractors, yard mules, employee shuttles, cranes and marine shore power.



**EV Infrastructure and Incentives** Baltimore is dedicated to electrifying privately-owned vehicles and has developed various EV incentives to encourage this conversion including: residential and commercial tax credits, rebate programs, EV charging stations at gas stations, train stations, and workplaces, and EV pilot programs. Innovative, personalized incentives such as reward points and social/peer recognition through the B'Smart sharing economy ecosystem will be introduced with funding from this USDOT Smart City Grant.



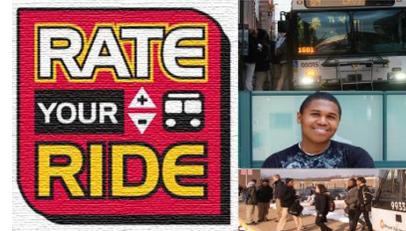
**Cleaner Energy Sources for Smart Grid** Baltimore has worked cooperatively with the State of Maryland and the local utility, Baltimore Gas and Electric (BG&E) on smart grid applications to assure cleaner energy sources, strong grid operations, grid resilience and security, while encouraging EV usage. 38% of Baltimore's net electricity generation comes from Maryland's only nuclear power plant at Calvert Cliff and 7% from renewable energy sources. BG&E has recently been awarded **\$200M** from US DOE for advanced smart grid metering infrastructure and home energy management improvements. B'Smart aims to **partner with BG&E and local energy startups to steer major benefits, like reduced home energy costs from lower-cost solar and other renewable energy sources, toward West Baltimore**, and employ local residents as BG&E employees to build and maintain Smart Community Hubs as smart-grid hubs in West Baltimore.



## |4.9 Connected, Involved Citizens

Connected, involved citizens are data providers, data users, performance evaluators, informed entrepreneurs and community contributors in a smart city. A spotlight B'Smart effort is to improve the access for West Baltimore residents and businesses to the B'Smart data sharing and urban analytics platforms, so they may identify entrepreneurship opportunities in their communities through technology and job training programs at Smart Community Hubs.

**Rate Your Ride and Rate Baltimore** Baltimore citizens currently evaluate their transit rides with the [Rate-Your-Ride](#) tool. B'Smart includes a proposal for a more comprehensive Rate-Baltimore web and mobile app that enables citizens and businesses to evaluate all city services.



**Open Data Portal for Promoting Entrepreneurship** Selected and processed B'Smart data without sensitive information will be published to all citizens and businesses via the existing CitiStat platform. This **open data portal can help citizens and businesses understand and evaluate the evolving market demand and promote entrepreneurship.** For instance, long waiting times for dynamic ride sharing services imply demand and profitability for new entrants in that market. A household planning to open a new service business can improve its business location choice by exploiting newly available pedestrian and bike volume data. Entrepreneurs may monitor crowd-sourced delivery data and be inspired to open a local store with in-demand merchandises and services. Training courses on data analytics and business startups by professors from local partnering universities (e.g., U. of Maryland, Johns Hopkins U., Morgan State U., Coppin State U.) and successful entrepreneurs from partner corporations will be offered at Smart Community Hubs in West Baltimore to **help its residents start their entrepreneurship endeavors, which could in turn create new jobs in their communities.** The training program will be established by the USDOT grant and gradually transitioned into a partner-funded program at no cost to low-income trainees, possibly managed by the USDOT-funded [National Transportation Center](#) at the University of Maryland. In addition, patient



origin-destination information obtained from B'Smart data collection will be shared with the Johns Hopkins Health Care System, the biggest employer in the State of Maryland and a partner on this proposal. Such information will assist the hospital system to optimize location choices of new clinics and health care facilities, and specifically **make health care more accessible to low-income communities by locating more facilities in or near Community Hubs.**

## |4.10 Architecture and Standards

B'Smart is supported by Cisco, Verizon, Bosch, GE, GM, Ford, and University of Maryland (National Transportation Center, Center for Advanced Transportation Technology, Energy

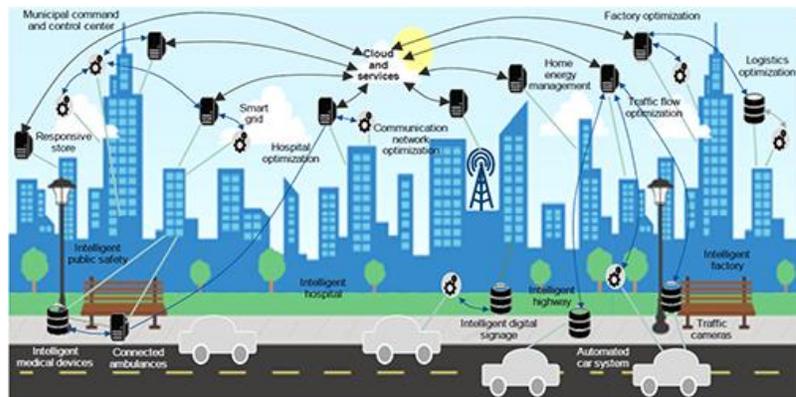
Research Center, and Maryland Cybersecurity Center) that are industry and academic leaders of ITS, CV, AV, EV, smart grid, cybersecurity and other smart city architecture and standards. The Baltimore team has worked actively with various ITS Standards bodies, and continues to work with the USDOT ITS Architecture group, Society of Automotive Engineers and numerous other standards including new CV standards that go beyond vehicle safety messages. With these standards embedded in the B'Smart integrated smart city platform built on RITIS with member cities from 35 states, the B'Smart experience on technology architecture and standards is better situated for redeployment and reuse among other smart cities at low cost. The Baltimore team is cognizant of the architectural challenges and is well versed in risk mitigation on:

**Bandwidth:** The Baltimore team is located on a backbone node of the Internet and has bandwidth capacity to handle all data transferred from B'Smart in real time.

**Storage:** The Baltimore team will and has existing capability to store all data indefinitely.

**Security:** Highest standards of physical and virtual data security used to protect 6 billion new RITIS transportation data records each day.

**Privacy:** Private and sensitive data will be secured using encryption and aggregation.



Cisco Plans an IoT-Enabled Smart City

#### | 4.11 Low-cost, Efficient, Secure and Resilient ICT

Toward an integrated ICT platform for B'Smart and other smart cities, Baltimore will further develop the RITIS platform being used for ITS applications right now in the city, with assistance from ICT industry leaders including Cisco (hardware), Google (software) and Verizon (Telecom and IT services). The combined system of systems that feeds into the B'Smart ICT platform will abide by all standards, protocols and regulations applicable to each technology deployment. Through partnerships with the University of Maryland and the University of Michigan, the B'Smart ICT platform will continue to leverage the existing work from AASHTO, ETSI, CAMP, SAE, and CVRIA to implement multiple levels of cost, efficiency, security and resilience requirements. For example, Baltimore will ensure

communication security on the DSRC and other communication levels, and communication security on higher levels (e.g. TLS protected communication for financial transactions that involve 3<sup>rd</sup> party servers of financial institutions) for sharing economy payment technologies. The goal at the beginning of a USDOT Smart City Challenge Grant in Baltimore is to have an integrated ICT platform design and transferrable architecture ready.

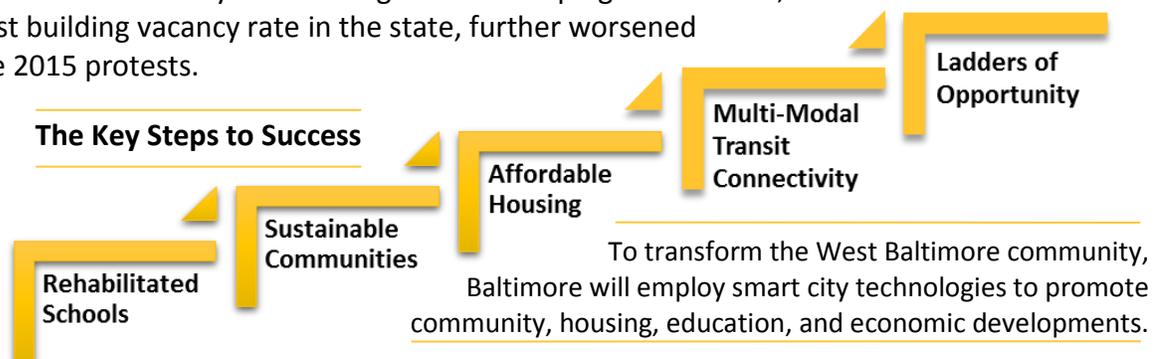




**Low-Cost ICT for West Baltimore** As the primary B'Smart goal is connecting low-income communities to economic opportunities, offering low-cost ICT to West Baltimore residents is a high priority. Related B'Smart technology deployment proposals include: **(1) Free public Wi-Fi access for West Baltimore residents and businesses**, based on CV-enabled vehicle mesh network technology; **(2) Free Wi-Fi and computer/smart phone user portals within proposed Smart Community Hubs**; **(3) Free public Wi-Fi hotspots on all city buses and new mobility service vehicles** in West Baltimore and at Smart Community Hubs; and **(4) Exploring partnership opportunities with foundations, communities, and Verizon to offer new or refurbished smartphones and data plans at extremely low cost in West Baltimore.**

### | 4.12 Smart Land Use

As smart mobility and sharing economy technologies help connect West Baltimore to existing economic opportunities, the B'Smart land use strategies focus on attracting new business developments and new jobs to West Baltimore and on reuniting communities. Specifically, the proposed Smart Community Hubs in West Baltimore will serve as multifunctional nodes in a polycentric development strategy, supported by newly approved zoning ordinance and comprehensive plan documents in Baltimore. New developments in and around the hubs will include mixed-income housing with specific unit shares affordable to existing residents. Mixed-use zones in the area encourage the creation of small office and retail spaces, small business incubators and high-speed broad-band connectivity. Two of the proposed Smart Community Hubs are also designated Baltimore job centers, which **provide free workforce training for jobs in industries that provide ladders to opportunity.** The **introduction of low cost, safe, efficient and sustainable mobility services for passengers and freight travel**, anchored at the Smart Community Hubs and serving the entire Smart City Innovation District, should also **attract service and logistics businesses to West Baltimore.** This USDOT Grant could also leverage \$700 million of State of Maryland funding for redeveloping vacant units; West Baltimore has the highest building vacancy rate in the state, further worsened by the 2015 protests.



**Innovation Village** On MLK Day 2016, the Baltimore Mayor and state leaders announced the establishment of a first-ever **Innovation Village** in West Baltimore. This Smart City Innovation District, sponsored by the Mount Royal Corporation, Coppin State University, and the Maryland Institute College of Art, **features a community-driven development approach and supports an integrated plan to revitalize the West Baltimore neighborhood**, long plagued by disinvestment and blight. Transportation is key to the success of Innovation Village. Specifically, Innovation Village will focus on organizing and building "live learn work play" intersections.

# 5 Implementation & Partnerships

**Implementation Plan** The City of Baltimore plans to establish a B’Smart Governing Board (the Board) to oversee the implementation of the USDOT Smart City Challenge Grant, led by the Mayor and City Department of Transportation with representatives from USDOT, key regional, state, transit and local agencies, and selected academic, community, and non-profit organizations. The Board will institute: (1) A Program Management Committee led by the city and a general contractor, as well as members from partners subcontracted to implement vision elements; (2). A Science and Technology Committee led by the University of Maryland with members who are local and national experts on smart city technologies, and that assist the Board in designing programs and projects and evaluating performance; and (3) An Outreach Committee in charge of technology transfer activities, based on the existing Baltimore Smart City Taskforce. Conflict of interest will be carefully avoided at all stages of the decision-making process. The Board will conduct open competitions to select contractors. Cost/risk sharing and recruitment of West Baltimore residents and businesses will be contract requirements.

The preliminary plan for implementing the various Vision Elements is to employ a phased approach due to project interdependencies and risk management needs. With many proposed Vision Elements building on ongoing efforts, these shovel-ready projects will be funded in Phase 1 and should start making measurable impact by the second year of the USDOT Grant. Other lower-risk projects will be implemented in Phase 2 to allow time for local communities, citizens, and businesses to provide inputs. High-risk, high-reward projects will be implemented in Phase 3, so the City will have enough time to understand the technology risks and evaluate demos from technology providers before implementation.

Phases	Vision Element Implementation
<i>Phase One</i> Starting in Fall 2016	VE3 Intelligent Sensor-Based Infrastructure VE4: Urban Analytics VE7: Partnerships and Business Models VE9: Connected Involved Citizens VE10: Architecture and Standards
<i>Phase Two</i> Starting in Spring 2017	VE2: Connected Vehicles VE5: Sharing Economy VE6: Urban Delivery and Logistics VE8: EV, Electrification and Smart Grid VE11: Low-cost, safe, secure & resilient ICT VE12: Smart land use
<i>Phase Three</i> Starting in Spring 2018	VE1: Urban Automation

## Risks and Risk Management

Baltimore has carefully selected a set of lower-risk smart city technologies to achieve the B’Smart vision and goals, complemented by several high-risk, high-reward technologies on urban automation, due to their potential for significantly reducing transportation costs for West Baltimore residents and businesses (see the Table in Section 3 for technology risk details). The phased Implementation Plan helps minimize project risks too. For instance, in Phase 2, the city will deploy dynamic EV shuttle services for first/last-mile connection to Smart Community Hubs. The deployment of *automated* EV for dynamic shuttle services in Phase 3 will be contingent on the success of the Phase 2 projects. For all high-risk, high-reward projects, Baltimore will require significant cost sharing from the winning contractor. The institutional and policy risks

for B'Smart are typical in most cities, including the requirement of extensive agency coordination, lack of staffing expertise, possible leadership and staff changes. A Baltimore advantage stems from the proposal's focus on West Baltimore and strong commitment from all levels of city, regional, and state governments to bringing this community back to prosperity. These supports, rooted deeply in community needs and citywide consensus, will not disappear due to leadership or staffing change at one or more agencies.

**Strategic Partnerships and Business Models** The Baltimore Regional Plan for Sustainable Development of June 2015 recommends improving transportation access and connectivity of low-income neighborhoods to high-growth job centers, and aligning affordable housing in neighborhoods that are close to growing job centers. Building on the Plan recommendation, a unique B'Smart Public-Private-Philanthropic Partnership (P4) will be formed for long-term sustained leadership and support for smart city development in Baltimore. This partnership is broader in membership and stakeholder compositions (see graph) than the B'Smart Governing Board that is for technology implementation within the scope of this USDOT Smart City Challenge. B'Smart P4 will align the interests and opportunities of private, public, academic, not-for-profit, quasi-government and community entities specializing in transportation, research, work force development, housing, real estate, energy, utility, information and communications, and social economic equity.

The first priority of this partnership is to develop a comprehensive strategic plan for Smart Baltimore, drafted, adopted and approved by all major stakeholders in the city, region and state. Subsequently, B'Smart P4 will work through liaisons at key public-sector agencies integrating the Smart Baltimore Plan into their business plans and long-range plans. This will establish the foundation for sustained and diversified funding support for smart city technology deployment, all coordinated by the Smart Baltimore Plan vision and goals.

Part of the USDOT Grant, in collaboration with Baltimore and Maryland Small Business Development Centers, would help establish a small business and start up incubator at the West Baltimore Marc Hub, the first to be rebuilt into a Smart Community Hub. B'Smart business contracting models for technology deployment will also be explored and shared, including Design-Build-Finance-Operate-Maintain-Transfer or any of its variants, build-own-operate and lease-develop-operate.

The City of Baltimore is also pleased to work with the USDOT partners, such as **Vulcan** and **Mobileye**, to address climate change and vehicle-pedestrian-bike safety issues together.

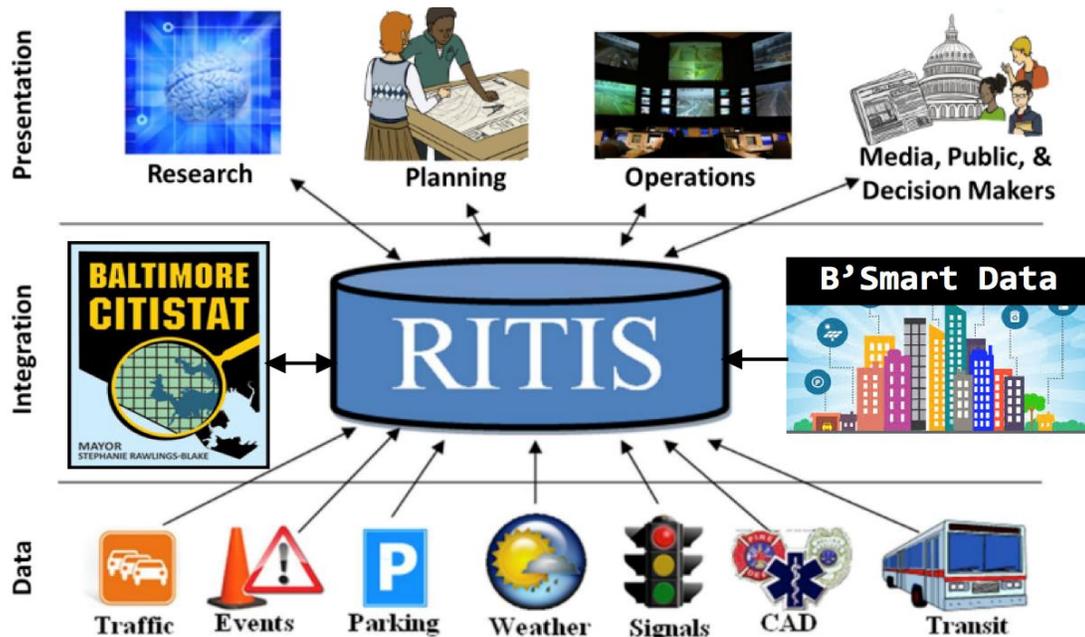


# 6 Data & Performance Monitoring

**Data Collection & Sharing** The city of Baltimore has access to a wide range of data sources that support the Smart City Challenge, including crowd sourced GPS probe data, all infrastructure sensor data, real-time bus data, urban delivery and logistics data, connected vehicles data, parking, weather, event, signal data and more. This access is through a partnership with the University of Maryland, which hosts the largest transportation data center in the U.S. and archives 6 billion data records each day. Data sharing agreements with all local, regional and state agencies, dozens of leading data providers including Google/Waze, INRIX, TomTom, HERE, and cities in over 35 states are already in place through the [RITIS](#) platform.

## B'Smart RITIS Data Collection and Sharing Platform Overview

(The Regional Integrated Transportation Information System (RITIS) collects, standardizes, fuses, and visualizes various data sources and systems into a platform for use by a wide range of users and applications)



In addition, Baltimore [CitiStat](#), embedded in the Mayor’s Office, systematically collects and analyzes data in order to identify areas city-wide that are in need of improvement. New data feeds from the deployment of proposed Smart City technologies will be collected or otherwise obtained from technology partners through data sharing agreements, integrated with existing data items, and shared with the decision makers, planners, operators, researchers, media and the general public (each with their individual data portals with different data access rights). All data feeds will be subject to industry-leading privacy and security protection already established in RITIS. All B'Smart data records will be physically stored in a secure data center with limited access and cybersecurity procedures. Potentially sensitive data will be encrypted during data transfer and on storage mediums to reduce potential exposure.

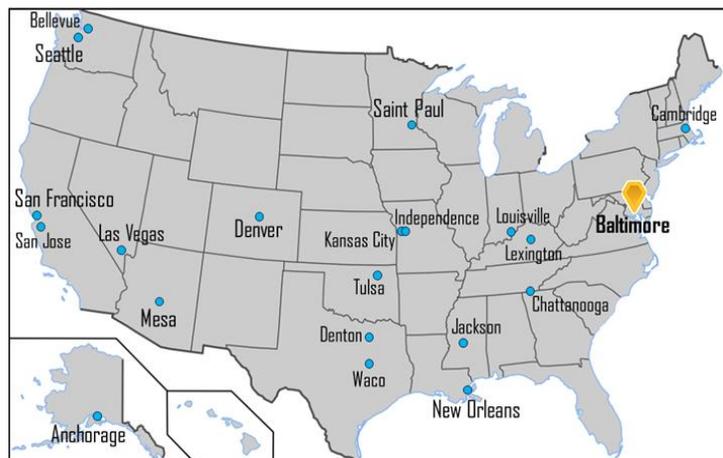
**Performance Monitoring and Prediction** B'Smart program performance will be measured and reported independently by the University of Maryland, which has already been responsible for producing regional transportation system performance reports for local and regional governments in Baltimore. Performance metrics including safety, mobility, sustainability, equity and job creation, will be published with live dashboards and openly shared. The existing multimodal performance-monitoring platform in Baltimore will be extended to include capabilities for measuring the impact of newly introduced smart city technologies, and for predicting/optimizing technology performance with advanced modeling and simulation tools.



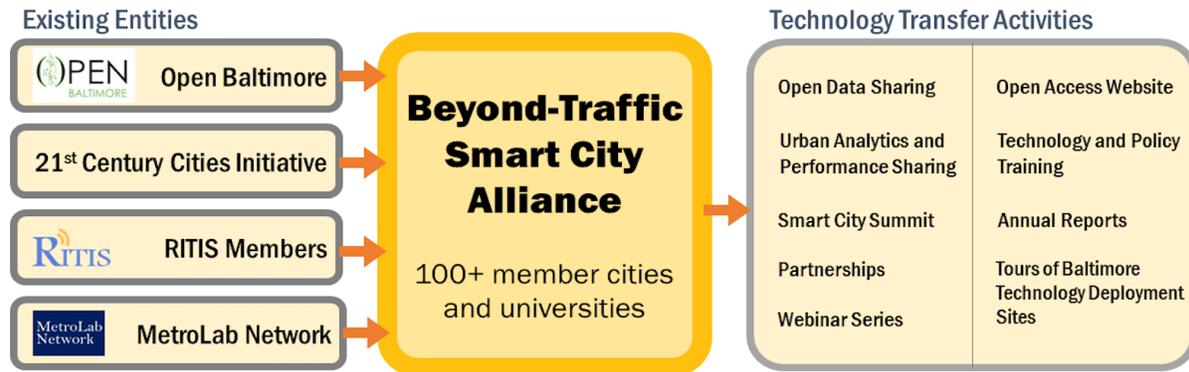
These predictive and optimizing tools are based on a state-of-the-art agent-based model system for citywide, large-scale simulation of all its population and vehicles, and are already developed for Baltimore with previous federal funding to Maryland DOT and its university partners. These next-generation urban analytics tools provide not only estimated total technology benefits, but also distributional effects by income, gender, age, location, etc. for equity analysis.

## 7 Technology Transfer

Baltimore benefits from several existing multi-city data sharing and best-practice sharing platforms for technology transfer (T2), wherein Baltimore or its partners play leadership roles. “Open Baltimore,” an open data platform to catalyze T2 to other cities, is on the leading edge of identifying and sharing best practices, including the development of publicly accessible resources, encouraging the use of data standards to enhance cross-city analysis and collaboration, and convening cities both in person and remotely to share success stories and challenges. The Center for Government Excellence, part of the [21<sup>st</sup> Century Cities Initiative](#) at Johns Hopkins University, is well positioned to leverage its experience working with 20 mid-sized cities (see graph; more than 50 member cities by June 2016) on performance management and open data, and to play a key role in developing a framework for disseminating best practices in Baltimore to other cities across the country. In addition, government agencies in 35 states are already members of the [RITIS](#)



platform that Baltimore will employ for B’Smart data collection and urban analytics. Lastly, Baltimore plans T2 activity in collaboration with [the MetroLab Network](#) of smart cities.



Baltimore proposes to establish and lead a **“Beyond-Traffic Smart City Alliance,”** with more than 100 members just from the above four established platforms. Key technology transfer activities by this Alliance will include open data sharing, urban analytics and performance sharing, an annual Smart City Summit including tours of deployment sites in Baltimore and other cities, a webinar series, technology and policy training for city leaders and staff, a website sharing success stories and lessons learned, and an annual report on the current state of the practice of smart city developments across the U.S., and partnership development with universities, non-profits and corporations. Baltimore will also work with its university partners to develop a series of online courses and workshops for training and knowledge dissemination.

For immediate T2, Baltimore intends to reach agreements with all partners to share B’Smart architecture and standards, as well as integrated data collection, urban analytics and decision-making platforms that other cities can utilize to deploy smart city technologies.

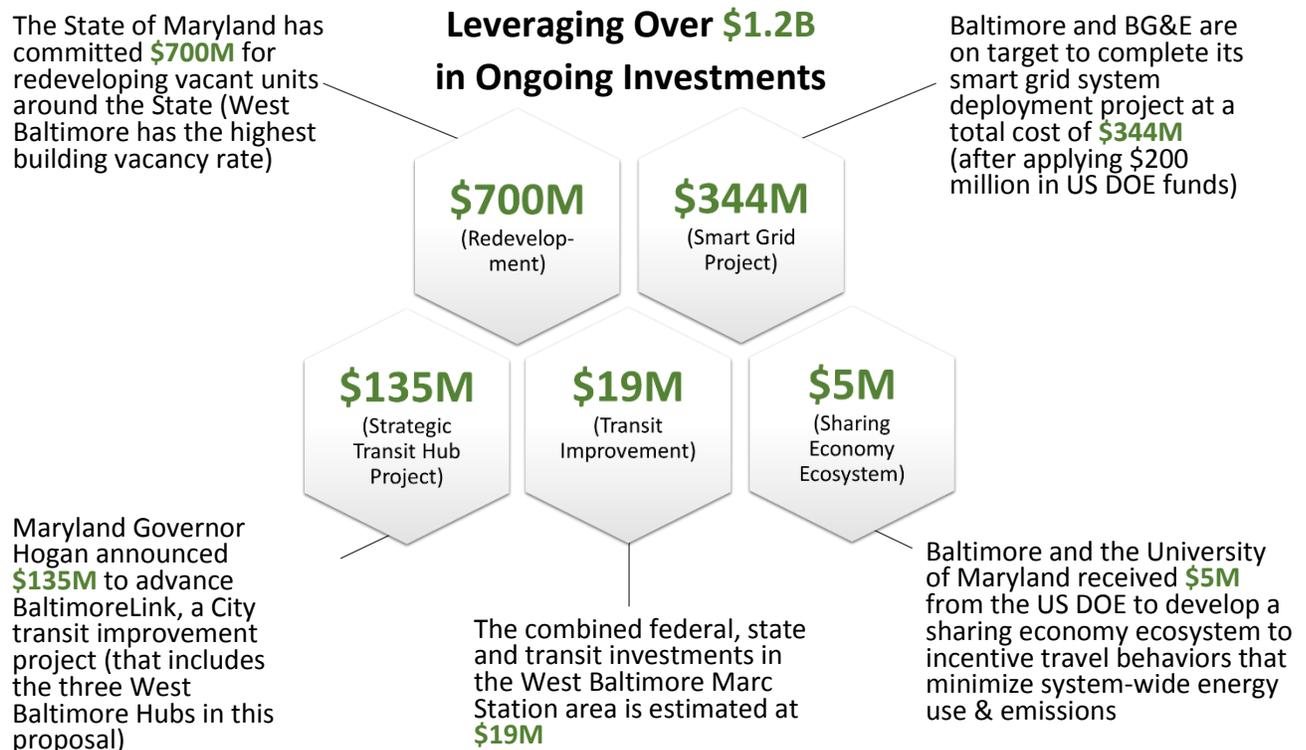
## 8 Team Qualifications

**City of Baltimore Qualifications** Since 2001, Baltimore has had multiple successes in promoting and deploying 21<sup>st</sup> Century, hi-tech solutions through citywide initiatives to address citizen and business needs. Examples include technology demonstration initiatives in health care, bio, and cybersecurity technology sectors, which have created vibrant new businesses and added more than 22,000 new jobs to date. Baltimore has shown its capability of effectively managing federal grants (e.g., Ladder of Opportunity, TIGER) and making measurable impact through strategic planning, partnership building and outcome-based decision-making. Baltimore meets and exceeds all USDOT requirements for the Smart City Challenge. City, regional and state leaders have reaffirmed their commitment to community revitalization in Baltimore’s most vulnerable communities, demonstrated by sizable investments in transportation, schools, infrastructure and development, including the launch of the Baltimore’s first innovation district, the [Innovation Village](#) in West Baltimore.

**B'Smart Technical and Implementation Qualifications** B'Smart hosts a diverse and experienced team of experts in technology and program implementation, including all key regional and state government agencies, internationally leading universities, non-profit groups and corporate partners (see tables in Section 3 and Appendix A for partner qualification summary and relevance to the proposed Vision Elements). These assets give Baltimore the confidence to start the USDOT Smart City Challenge in the communities that are facing serious challenges and have the most urgent needs; that, among other qualifications, demonstrate the city's drive to transform a USDOT investment into impact, example and success.

## 9 Cost Share & Matching Resources

**Leveraging Ongoing Investments in West Baltimore:** In the aftermath of the 2015 protests in West Baltimore, city, state, and community partners have committed hundreds of millions of dollars, investing in transit, schools, and economic development that will benefit this community. The USDOT grant will be able to leverage and exponentially augment the impact of these ongoing investments by introducing innovations in smart city technologies.



**New Cost Share and Matching Funds:** Baltimore will meet with existing and new partners at the full proposal stage of the application process and discuss cost share and matching commitments. The goal is to turn the \$50 million USDOT grant into a pool of resources several times larger for technology deployment and demonstration. Forms of cost share could include cash, in-kind, equipment/facility donation, and complementary use of software and platform.



# Appendix A

## Support Letters



The City of Baltimore has received letters of support from 52 public-sector, private-sector, academic and non-profit partners. The contribution of the partners to individual Baltimore Smart City Vision Elements is summarized in the tables below.

Public	Partner Name	Capabilities/Expertise	Page #
 Baltimore Metropolitan Council	Baltimore Metro Council	Coordinates interest of the Baltimore Region's local elected officials to promote economic opportunity and quality of life	A-5
 BRTB Baltimore Regional Transportation Board	Baltimore Regional Transportation Board	Metropolitan Planning Organization for the Baltimore Region	A-7
 MDE	Maryland Department of Environment	Oversees environmental policies and regulations in Maryland	A-9
 Maryland Department of Planning	Maryland Department of Planning	Ensures that all public plans support Maryland's economic, community and environmental vitality.	A-11
 Maryland Department of Transportation	Maryland Department of Transportation (MDOT)	Oversees the operation and maintenance of all transportation modes in the state of Maryland	A-14
 SHA State Highway Administration	Maryland State Highway Administration	Operates and maintains the highway infrastructure in the state of Maryland (Part of MDOT)	
 MTA Maryland	Maryland Transit Administration	Oversees the transit operations in the state of Maryland (Part of MDOT)	
 PORT OF BALTIMORE	Port of Baltimore	Freight hub for Eastern shore with interests in efficient freight movement, partner for demonstration of freight technologies (Part of MDOT)	

Academia	Partner Name	Capabilities/Expertise	Page #
 UNIVERSITY OF MARYLAND	University of Maryland (UMD)	Nationally-renowned expertise on smart growth, cybersecurity, big data, data analytics, visualization, and sharing, active traffic management, traveler behavior, app development, urban planning	A-15
 COPPIN STATE UNIVERSITY EST. 1900	Coppin State University	West Baltimore based historically black college	A-17
 JOHNS HOPKINS UNIVERSITY	Johns Hopkins University	Expertise on big data urban performance metrics, open data and data sharing	A-19
 MORGAN STATE UNIVERSITY	Morgan State University	Baltimore based historically black college with research expertise on transportation economics and freight movements	A-21

	University of Baltimore	Home of Baltimore Neighborhood Indicators Alliance (BNIA) that collects and disseminates Baltimore community data	A-22
	University of Michigan	Expertise on CV/AV and smart signal technologies and deployment	A-23

Private	Partner Name	Capabilities/Expertise	Page #
	Baltimore Gas and Electric	Baltimore's gas and electric provider with experience in EV charging technologies	A-25
	Bosch	Expertise in internet of things, cybersecurity, smart city technology deployment	A-27
	Cisco	Leaders in ICT, sensors, data collection, and Smart City technology deployment	A-28
	Cyberg Partners	Expertise in alternative fuels, CV/AV, EV technologies, including freight EV	A-29
	EnviroBro	Expertise in metric monitoring and reduction of GHG	A-32
	Ford	Leader in vehicular smart city technologies and initiatives	A-34
	GE	Smart light industry leader with urban deployment experience	A-35
	GM	Vehicle manufacturer supporting, developing, and implementing connected and automated vehicle technologies	A-37
	Google/Waze	Leaders in travel and location services, pioneers in AV technologies Collaborative agreement with Google/Waze and UMD	
	GOVonomy	Expertise in providing affordable, off-the shelf IT solutions to government agencies.	A-38
	HERE	Leader in probe data vehicle collection and driver guidance services	A-41
	INRIX	Leader in probe data vehicle collection and driver guidance services	A-42
	Live Traffic Data	Expertise in ITS, CV/AV, and smart signals	A-44
	Lyft	Leading MOD service provider, interests in EV and AV technologies	A-46
	Roadie	Smart phone app based service that allows drivers to "rent" their unused cargo space to transport goods.	A-47
	Sagamore Development	Baltimore based real-estate developer	A-49

	Sidewalk Labs	Expertise in applications of technology to solve complex urban problems	A-50
	SkyTran	High speed, automated, low-cost PRT system developer	A-51
	Split	MOD service provider, transit/rideshare oriented	A-52
	TimberRock Energy Solutions	Expertise on EV technologies and implementation	A-53
	TomTom	Leader in probe data vehicle collection and driver guidance services	A-55
	Urban Insights	Expertise in deep urban data collection, analysis, visualization and performance measurement	A-57
	Veniam	International expertise in the internet of moving things with experience in collaborating with public agencies and universities	A-59
	Verizon	15 years of expertise on smart city technologies, including data security and telecommunication standards	A-61
	Voyage Control	Freight management and logistics software providers	A-63

Non-Profit/Government Funded	Partner Name	Capabilities/Expertise	Page #
	Abell Foundation	Advocate for the enhancement of the quality of life in Maryland, with a particular focus on Baltimore	A-65
	Baltimore Arts Realty Corporation	Nonprofit real estate development corporation creating safe, sustainable and affordable space for the creative economy in Baltimore	A-66
	Baltimore Development Corporation	Provide economic development services to the city of Baltimore	A-68
	BEVI	Advocate for EV technologies with expertise on EV technologies and implementation	A-69
	CMTA	Multi-modal expertise and advocate improving and expanding transportation options for the citizens and businesses of Central Maryland	A-70
	Enterprise Community Partners	Advocate for opportunity for low- and moderate-income people through affordable housing in diverse, thriving communities	A-71
	Greater Baltimore Committee	Leading voice for the business community on issues relating to economic growth, job creation,	A-72

		workforce development, transportation and quality of life.	
	I-95 Corridor Coalition	A partnership of transportation agencies, toll authorities, public safety, and related organizations for the Eastern Shore	A-74
	Maryland Clean Cities Coalition	Enhances air quality by encourage the development of clean-burning alternative fuel vehicles (AFVs) as well as their associated fueling infrastructure	A-75
	Maryland Clean Energy Center	Advocate to advance clean energy and energy efficiency products, services, and technologies as part of a specific economic development strategy in Maryland	A-76
	Mount Royal Community Development Corporation	The advisory board for Baltimore's Innovation Village	A-77
	National Renewable Energy Lab	National lab for research, development, commercialization, and implementation of renewable energy technologies.	A-79
	Transit Choices	Coalition concerned groups, businesses, and individuals to transform Baltimore into a more livable, walkable 21st century City	A-80

**Baltimore Metropolitan Council**

Offices @ McHenry Row  
1500 Whetstone Way, Suite 300  
Baltimore, MD 21230-4767

Telephone: 410-732-0500  
Fax: 410-732-8248  
www.baltometro.org

January 29, 2016

Anne Arundel County  
Baltimore City  
Baltimore County  
Carroll County  
Harford County  
Howard County

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing today to express my enthusiastic support of the City's application to the United States Department of Transportation's (USDOTs) Smart City Challenge grant. As the region's Council of Governments, the Baltimore Metropolitan Council has recently released the "Regional Plan for Sustainable Development" that embodies much of the City's vision for this effort, especially those that enable:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connecting communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- A focus on West Baltimore MARC, Penn North Metro, and Lexington Market as Community Hubs, each being areas that can really use enhanced connectivity and attention; and,
- Creation of collaborative partnerships between public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

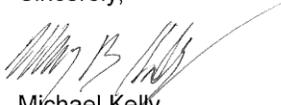
Mayor Stephanie Rawlings-Blake  
Page Two

The Baltimore Metropolitan Council recognizes the importance of technology, especially transportation technology, in making cities more healthy, productive, and sustainable places to live. The Baltimore Metropolitan Council is pleased to lend its staff capacity toward this effort. We believe this initiative will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey our support for the Smart City Challenge grant. We look forward to supporting this interdisciplinary and innovative endeavor.

Sincerely,



Michael Kelly,  
Executive Director



January 29, 2016

City of Annapolis  
Mike Pantelides  
Mayor

Anne Arundel County  
Steve Schuh  
County Executive

City of Baltimore  
Stephanie Rawlings-Blake  
Mayor

Baltimore County  
Kevin Kamenetz  
County Executive

Carroll County  
Stephen Wantz  
Member, Board of Commissioners

Harford County  
Barry Glassman  
County Executive

Howard County  
Allan H. Kittleman  
County Executive

Maryland Department of Transportation  
Pete Rahn  
Secretary

Maryland Department of the Environment  
Ben Grumbles  
Secretary

Maryland Department of Planning  
David Craig  
Secretary

Maryland Transit Administration  
Paul Comfort  
Administrator

---

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1500 Whetstone Way, Suite 300  
Baltimore, MD 21230  
Telephone 410-732-0500  
Facsimile 410-732-8248  
www.baltometro.org

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing today to express the Baltimore Regional Transportation Board's (BRTBs) support of the City's application to the United States Department of Transportation's (USDOTs) Smart City Challenge grant. As the region's Metropolitan Planning Organization, the BRTB has recently approved the region's long range transportation plan "Maximize 2040" that embodies much of the City's vision for this effort, especially those that enable:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connecting communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, climate change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
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- A focus on West Baltimore MARC, Penn North Metro, and Lexington Market as Community Hubs, each being areas that can really use enhanced connectivity and attention; and,
- Creation of collaborative partnerships between public agencies and organizations, anchor institutions, funders, and nonprofits focused on establishing economic inclusion as the business culture of norm.

Mayor Stephanie Rawlings-Blake  
Page Two

The BRTB recognizes the importance of technology, especially transportation technology, in making cities healthier, productive, and sustainable places to live. The BRTB is pleased to lend its support of this effort. We believe this initiative will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey our support for the Smart City Challenge grant. We look forward to supporting this interdisciplinary and innovative endeavor.

Sincerely,



Clive Graham, Empowered Chair  
Baltimore Regional Transportation Board

cc: Baltimore Regional Transportation Board Members

**MARYLAND DEPARTMENT OF THE ENVIRONMENT**

1800 Washington Boulevard • Baltimore MD 21230

410-537-3000 • 1-800-633-6101 • [www.mde.maryland.gov](http://www.mde.maryland.gov)Larry Hogan  
GovernorBen Grumbles  
SecretaryBoyd Rutherford  
Lieutenant Governor

January 28, 2016

Ms. Sarah Tarpgaard, HCFA-32  
U.S. Department of Transportation  
Federal Highway Administration  
Office of Acquisition and Grants Management  
1200 New Jersey Avenue, SE  
Mail Drop: E62-204  
Washington DC 20590

Re: Funding Opportunity DTFH6116RA00002, Smart City Challenge Grant

Dear Ms. Tarpgaard:

I am writing this letter in support of the City of Baltimore's application to the United States Department of Transportation's Smart City Challenge grant. The Maryland Department of the Environment embraces the City's vision that enables:

- Efficient, clean, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connection of communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- Creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, gaps in transit service quality, reliability and resiliency to effects of climate disruption, and urban congestion;
- Creation of Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- This proposal's focus on West Baltimore MARC and Lexington Market Hubs, areas that can significantly benefit from enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, and nonprofits focused on establishing economic inclusion as the business culture norm.

The Department has long supported initiatives designed to strengthen Baltimore City and the region. In Baltimore City these projects include: installing emissions control devices on school buses,



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Page Two  
Ms. Sarah Tarpgaard  
January 28, 2016

ambulances, fire trucks, trash trucks, construction equipment and dump trucks; purchasing diesel hybrid DPW bucket trucks; installing idling reduction devices on school buses; installing electric vehicle charging stations and a natural gas fueling station; and integrating alternative fuel vehicles into the parking patrol fleet. This Smart City Challenge initiative will build off of Baltimore's previous efforts to enhance transportation and will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

The Department is pleased to support Baltimore City's application for the Smart City Challenge Grant. Please contact me by phone at 410-537-3255 or by email at [george.aburn@maryland.gov](mailto:george.aburn@maryland.gov), if you have any questions or I can be of any further assistance.

Sincerely,

  
George (Tad) S. Aburn, Jr., Director  
Air & Radiation Management Administration



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Via Maryland Relay Service



Larry Hogan, Governor  
Boyd Rutherford, Lt. Governor

David R. Craig, Secretary  
Wendi W. Peters, Deputy Secretary

January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Mayor Rawlings-Blake:

I am writing this letter in support of the City of Baltimore's application to the United States Department of Transportation (USDOT) Smart City Challenge Grant. We believe a technologically advanced transportation system will improve the system's safety, efficiency and reliability, as well as the sustainability and economic viability of the City of Baltimore.

The Maryland Department of Planning (Planning) embraces the City's goals for:

- An efficient, safe and sustainable transportation system that connects historically underserved communities, particularly in West Baltimore, to economic opportunities and helps citizens access jobs, education, healthcare, and lifeline services;
- An integrated/transferable technology platform that helps address connectivity shortcomings and provides useful analytics and performance monitoring; and
- A collaborative partnership of public agencies and organizations, anchor institutions, funders and nonprofits focused on economic inclusion.

Moreover, Planning supports the proposal to create Smart City Community Hubs. These multi-functional transportation, logistics, education, living, and job centers can connect people to opportunities in the City and region.

Planning has long supported initiatives designed to strengthen the City and region. We are well-positioned to work with the City on this grant, particularly on the Smart Land Use component of its work plan.

We coordinate implementation of Maryland's planning policies and provide analysis and technical support to help local jurisdictions achieve their goals for smart and sustainable growth. In coordination with other state, local, regional, and federal agencies, we work for better integration of transportation and land use planning to support sustainability and

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301 West Preston Street - Suite 1101 - Baltimore - Maryland - 21201  
Tel: 410.767.4500 - Toll Free: 1.877.767.6272 - TTY users: Maryland Relay - [Planning.Maryland.gov](http://Planning.Maryland.gov)

Page | 2  
Mayor Stephanie Rawlings-Blake  
January 29, 2016

promote multimodal transportation with viable transportation choices for all users. Moreover, Planning develops tools and analyses with GIS and census data, which we can use to assist the City in achieving its goals.

While emerging transportation technologies such as automated vehicles may improve the efficiency and effectiveness of transportation infrastructure and services, they may also lead to inefficient development patterns outside of the City. Planning can assist the City in developing transportation and land use strategies that integrate advanced transportation technologies with smart land use strategies and transit oriented development that stimulate economic development and support transit usage.

In addition to addressing the need to better connect isolated communities to economic opportunity, the City of Baltimore is well-positioned to take advantage of demographic and economic trends, which affect how people and goods travel. The new mobility modes and sharing economy, e.g., Uber, Zipcar, and bicycle-sharing systems, can be enhanced and integrated into the existing transportation system to better serve the transportation needs of the growing number of millennials living in the City. The millennials are more likely to adapt and use these emerging transportation modes/tools. Our demographic analysis of adult millennials (ages 25-34) shows that:

- (1) In 2013 the proportion of adult millennials in Baltimore City (18.2%) was the highest in Maryland;
- (2) Baltimore City had the largest increase in college-educated adult millennials in Maryland between 2000 and 2013 (+19,349) which made up nearly one-third (31.4%) of the total state-wide gain; and
- (3) Compared to cities around the country of at least 600,000 in population, Baltimore City had the third largest percentage increase in college-educated millennials in the country between 2000 and 2013 (75.1%), behind only the District of Columbia and Fort Worth. Its rate of increase beat the percentage gains in other millennial hot spots such as Denver (57.3%), Portland (54.6%), Austin (49.1%) and Boston (39.3%).

Millennials also prefer to live in walkable and mixed-use neighborhoods with viable transportation choices. The 2014 American Community Survey data show that just under one-half (48.2%) of younger workers (ages 25 to 44) in Baltimore City use public transportation to get to work, far higher than any other age group.

Page | 3  
Mayor Stephanie Rawlings-Blake  
January 29, 2016

I am pleased to convey Maryland Department of Planning's support for the Smart City Challenge. Please contact Mr. Stuart Sirota, Assistant Secretary for Planning Services, at (410) 767-0901 or through email: [stuart.sirota@maryland.gov](mailto:stuart.sirota@maryland.gov) if we can be of further assistance.

Cordially,



David R. Craig  
SECRETARY



**Maryland Department of Transportation**  
The Secretary's Office

**Larry Hogan**  
Governor

**Boyd K. Rutherford**  
Lt. Governor

**Pete K. Rahn**  
Secretary

January 28, 2016

The Honorable Stephanie Rawlings-Blake  
Mayor  
100 Holiday Street, Room 250  
Baltimore MD 21202

Dear Mayor Rawlings-Blake:

The Maryland Department of Transportation (MDOT) strongly supports the application from Baltimore City for the U. S. Department of Transportation (USDOT)'s Smart City Challenge Grant. MDOT supports Baltimore City's vision for an efficient, safe, and sustainable transportation system that will help citizens access jobs, education, healthcare, and lifeline services.

The City of Baltimore and State of Maryland are uniquely poised to benefit from this opportunity. The infusion of innovative transportation demand methods will bring congestion relief, reduce air pollution, and move people, goods, and services. We look forward to supporting Baltimore City as they develop solutions to strengthen the infrastructure of the city and region.

Sincerely,

Pete K. Rahn  
Secretary

Attachment

Smart City Challenge Information

cc: Mr. Colby McFarland, Project Manager, Baltimore City Department of Transportation

My telephone number is 410-865-1000  
Toll Free Number 1-888-713-1414 TTY Users Call Via MD Relay





2133 Lee Building  
College Park, Maryland 20742-5125  
301.405.4175 TEL 301.405.8386 FAX

January 28, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street, 5th Floor  
Baltimore, MD 21202

Subject: Letter of Support for Baltimore City's entry into the Department of  
Transportation's Smart City Challenge

Dear Mayor Rawlings-Blake:

I am pleased to offer my enthusiastic support to the Smart Cities Challenge application led by Baltimore City and includes several important University of Maryland, College Park (UMD) centers such as the National Transportation Center, Center for Transportation Technology, National Center for Smart Growth, Maryland Cybersecurity Center, and Energy Research Center.

As the state's flagship university, UMD has a strong commitment to serving communities across the state and especially the State's largest, and in many ways, most important city. The University also recognizes the importance of technology, especially transportation technology, in developing and maintaining cities that are healthier, more productive, and sustainable places to live. The University is pleased to lend its substantial research capacity, international reputation, and human capital toward this effort.

Our specialized centers at UMD will bring tremendous resources to this project.

- **Center for Transportation Technology:** distinguishes itself through its record of developing and applying innovative approaches to transportation through research, education, and deployment assistance.
- **National Transportation Center:** is one of only five National Transportation Centers supported by the US Department of Transportation and the only one with the strategic goal of Economic Competitiveness.
- **National Center for Smart Growth Research and Education:** is a national leader in research and leadership training on land use and sustainability across the globe.
- **Maryland Cybersecurity Security:** applies expertise in computer science as well as economics, criminology, and public policy to the challenge of cyber security.
- **Energy Research Center:** provides comprehensive research on energy production and consumption to make the most efficient use of natural resources and minimizing impacts across a broad spectrum of energy technology.

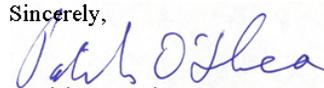
The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
January 28, 2016  
Page 2

Together, these centers offer unsurpassed breadth and depth of expertise in all aspects of smart cities. In addition to these leading research centers, UMD provides a broad range of expertise in engineering, computer science, social and health sciences, business, and economics that it brings to this project.

We recognize the Smart City Challenge as a unique and highly visible opportunity. As such, the Division of Research will work with the City and the proposal team to facilitate the necessary administrative infrastructure to support the research and operations associated with this project should it be selected. The strength of this proposal and the tremendous opportunity it presents to improve the lives of Baltimore residents is unsurpassed.

We look forward to supporting this interdisciplinary and innovative endeavor.

Sincerely,



Patrick G. O'Shea  
Vice President and Chief Research Officer

PGO/GJK:smp



Office of the President  
2500 West North Ave., Baltimore, MD 21216  
Phone (410) 951-3838 | Fax (410) 333-5369

January 29, 2016

The Honorable Stephanie Rawlings-Blake  
Mayor of Baltimore City  
City Hall - 100 North Holliday St., Room 250  
Baltimore, Maryland 21202

Dear Mayor Rawlings-Blake:

I am writing to convey Coppin State University's strong support for the U.S. Department of Transportation (USDOT) Smart City Challenge. We understand that this commitment requires Coppin's readiness to partner in a citywide proposal. Coppin has a mission and commitment to the revitalization of West Baltimore. The proposal will address and mitigate, if not solve, transportation challenges for our students, specifically, connecting the neighborhoods of West Baltimore by creating Smart City Hubs at Penn Station, West Baltimore MARC Station, and Lexington Market.

This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help Coppin students, alumni and citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, climate change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

Mayor Stephanie Rawlings-Blake

January 29, 2016

Page 2 of 2

Coppin State University has long supported initiatives designed to strengthen our city and region. The University is uniquely capable of addressing the preparation of students from the State of Maryland, Baltimore City and County, and particularly, the citizens of West Baltimore. Given the economic and social conditions of West Baltimore, the institution continues to take the leading role in the economic revitalization of its immediate community through the following efforts:

- **Broadband Technology Opportunities Program (BTOP)** - provides the opportunity for the citizens of West Baltimore to improve their computer skill sets and access to educational opportunities.
- **Revitalization of West Baltimore** - Partnership with CSU/City of Baltimore & CHCDC- a revitalization effort to improve facility infrastructure which in turn, improves their communities.
- **Center for Community Health (SON)** - School of Nursing operates a community clinic to citizens who cannot afford the high costs of health care. This initiative will have city-wide, regional and, we hope, national impact.
- **Baltimore City Anchor Plan (BCAP)** - a Mayor's initiative that seeks to strengthen communications and collaboration and connect resources between the City of Baltimore and major higher education and medical institutions in the City of Baltimore.
- **Baltimore Integration Project (BIP)** - Since 2011, BIP has worked with Coppin and other partners to advance reinvestment, support area neighborhoods and businesses, and create jobs for Baltimore residents through economic inclusion. Strategies have leveraged new capital investment, anchor institutions, and expanded workforce resources and services to connect residents to the city's economic strengths and assets.
- **Innovation Village** - Partnership to revitalize West Baltimore by bringing new businesses, start-ups and business incubators to the community. Coppin and the Maryland Institute College of Art are the two educational anchors for the project. Over the next several months we will learn more about our involvement and how it can help our students and the community.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future. Please convey Coppin State University's support for the Smart City Challenge grant. Please contact me at (410)951-3833 if I can be of any further assistance.

Sincerely,



Maria Thompson, Ph.D.  
President

*File:rawlings-blake 1.29.16*

# JOHNS HOPKINS

UNIVERSITY & MEDICINE

January 28, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

We are writing in support of Baltimore City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. As a major economic engine for the Baltimore region, Johns Hopkins is deeply invested in the success and growth of the city and in planning strategically for its future. The focus and promise of this grant will help to advance our work in Baltimore, and we stand fully behind this application.

As the choices we make today about our transportation infrastructure – from building versatile central transit hubs that can help people better access opportunity across the region, to developing effective, integrated technologies to help analyze our collective movements – will have long-term impacts on the health of our economy, environment, and population, we must be guided by research, data and best practice from other similar cities. Through the Smart City Hubs proposed in Baltimore's application, transportation truly enables new possibilities, as residents are able to access various services, job training programs, and quality health care facilities, like those offered by The Johns Hopkins Hospital.

We are, therefore, delighted by the comprehensive, analytical approach of this application, and particularly pleased by the proposed role of the Johns Hopkins University 21st Century Cities Initiative and the Center for Government Excellence.

The 21<sup>st</sup> Century Cities Initiative is a dynamic, cross-disciplinary research initiative focused on urban study and change. Charged with testing innovative solutions for creating wealth, expanding opportunities, transforming education, promoting well-being and health, strengthening infrastructure, and cultivating the arts in our cities, the initiative brings together researchers and thought leaders from across Johns Hopkins University. Focused first on opportunities in Baltimore, the initiative will then partner with cities facing similar challenges in the United States and internationally.

The Honorable Stephanie Rawlings-Blake, Mayor  
January 28, 2016  
Page 2

The Center for Government Excellence, which is housed in the 21<sup>st</sup> Century Cities Initiative, is well-positioned to assist Baltimore in this Smart City Challenge grant, and to disseminate results and best practices surfaced through this work. As part of the Bloomberg Philanthropies-funded What Works Cities initiative, the Center helps governments build capacity for decision-making that is rooted in evidence, transparent accountability and citizen engagement. Over the next two years, Center staff are visiting 150 mid-sized cities, and already be working with over 50 cities on advanced open data and performance management by the time the grant begins this summer. Not only does the Center for Government Excellence have the technical expertise to implement the best practices in the fields of open data, performance, and analytics, it is also already building a network of cities through which it can transfer best practices and technology nationwide.

We are enthusiastic about Baltimore's participation in this Smart City Challenge opportunity, and about Johns Hopkins' contribution to the effort. Thank you for conveying our support for this application, and please contact us if we can be of additional assistance.

Sincerely,



Ronald J. Daniels  
President  
Johns Hopkins University



Ronald R. Peterson  
President  
Johns Hopkins Health System



National Transportation Center

January 27, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

RE: Letter of Support for Baltimore City's entry into the Department of Transportation's Smart City Challenge.

Dear Madam Mayor Rawlings-Blake:

I offer enthusiastic support of the National Transportation Center (NTC) at Morgan State University to the Smart Cities Challenge application led by Baltimore City and including the University of Maryland, College Park.

As the state's urban public university, Morgan State has a strong commitment to serving communities across the state and especially the state's largest and most important city, Baltimore. Morgan State's NTC recognizes the importance of transportation access and technology in making cities healthy, productive, and sustainable places to live. NTC is pleased to lend its substantial research, education and technology transfer capacities toward this effort.

The NTC is an active partner in two USDOT University Transportation Centers, focusing on environmental sustainability and economic competitiveness with the University of Virginia and University of Maryland, respectively. We have a national reputation in research on urban mobility, connected and electric vehicles and equity issues.

We will work with the proposal team to conduct mutually agreed-upon research and other activities associated with this project, should it be selected. The strength of this proposal and the tremendous opportunity it presents to improve the lives of Baltimore residents is extraordinary and we are pleased to support it.

Respectfully yours,

Z. Andrew Farkas, Ph.D.  
Director and Professor

1700 E. Cold Spring Lane • 327 CBEIS • Baltimore, Maryland 21251-0001  
Tel: 443-885-3666 • Fax: 443-885-8275 • [www.morgan.edu/soe/ntc](http://www.morgan.edu/soe/ntc)

## THE JACOB FRANCE INSTITUTE

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202  
January 21, 2016

1420 N. Charles Street  
Baltimore, Maryland 21201-5779

410/837-4727 (telephone)  
410/837-5814 (facsimile)  
[www.ubalt.edu/jfi](http://www.ubalt.edu/jfi)

Dear Madam Mayor Rawlings-Blake:

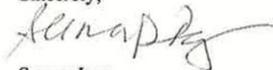
I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

The Baltimore Neighborhood Indicators Alliance-Jacob France Institute (BNIA-JFI) at the University of Baltimore has long supported initiatives designed to strengthen our city and region. As the Baltimore member of the National Neighborhood Indicators Partnership (NNIP), BNIA-JFI has been acquiring and disseminating community-based data for all of Baltimore's neighborhoods since 2000 to track progress towards improved quality of life. This proposal aligns with our central mission by addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future. This initiative will have city-wide, regional and, we hope, national impact.

BNIA-JFI supports Baltimore's Smart City Challenge grant and hope the application is favorably reviewed.

Sincerely,



Seema Iyer  
Associate Director

MERRICK SCHOOL OF BUSINESS  
UNIVERSITY OF BALTIMORE



January 26, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. I support the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

A key component in this vision is the use of connected and automated vehicles (CV/AV), as well as Smart Signal technologies to connect historically underrepresented citizens to Smart City Hubs. At the University Michigan Transportation Research Institute (UMTRI), we have long supported research on such Smart city technologies. As a faculty member at UMTRI, I have access to the state-of-the-art CV/AV test bed, M-city. This key asset, along with my expertise in this area, and my collaborative relationship with many of the major US auto-manufacturers will accelerates Baltimore's transition to the flagship Smart city in the US.

I appreciate the opportunity to work with your outstanding team in achieving Baltimore's Smart City vision.

If I can be of any further assistance, please contact me via email or phone:  
email: [henryliu@umich.edu](mailto:henryliu@umich.edu)  
phone: (734) 647-4796

Sincerely,



Professor, Department of Civil and Environmental Engineering  
Research Professor, Transportation Research Institute - UMTRI  
University of Michigan, Ann Arbor



An Exelon Company

Calvin G. Butler Jr.  
Chief Executive Officer  
  
2 Center Plaza  
110 West Fayette Street  
Baltimore, MD 21201

Telephone 410.470.3814  
www.bge.com  
calvin.butler@bge.com

January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Mayor Rawlings-Blake:

I am writing this letter in support of Baltimore City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. Baltimore Gas and Electric (BGE) embraces the City's vision that enables:

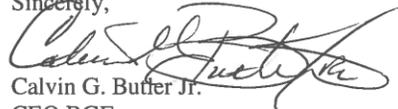
- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Communities to connect with economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, climate change, and urban congestion;
- The creation of Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- Enhanced connectivity on West Baltimore Marc Station and Lexington Market Hubs, areas that can really use the attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture norm.

BGE has long supported initiatives designed to strengthen our city and region. As you know, BGE is celebrating its 200<sup>th</sup> Anniversary serving Baltimore and the surrounding region. In addition, BGE has deployed substantial smart grid infrastructure throughout the region, including smart meters, wireless communications, automated restoration technology and supporting

systems. BGE is a leading advocate for sustainable transportation, including natural gas and electric vehicles. We are an integral member of the Baltimore community and we support this important effort to advance Baltimore's transportation, communications and community well-being through the USDOT Smart Cities program.

Please convey BGE's support for the Smart City Challenge grant application. Please contact me if I can be of any further assistance.

Sincerely,



Calvin G. Butler Jr.  
CEO BGE



January 27, 2016

The Honorable Anthony Foxx  
Secretary, U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
Washington DC 20590

Robert Bosch LLC  
38000 Hills Tech Dr.  
Farmington Hills, MI 48331  
Telephone +1(248)553-9000  
www.Bosch.us

**Re: City of Baltimore's Smart City Challenge Proposal**

Dear Secretary Foxx,

It was a pleasure meeting with you on January 7, 2016, at the Consumer Electronics Show (CES) regarding the Smart City Challenge. I am writing to inform you that Bosch has agreed to partner with the City of Baltimore to deliver mobility innovations and technology integration solutions should it be awarded the Department of Transportation (DoT) Smart Cities Challenge grant.

Baltimore's vision for a smarter approach to mobility addresses emerging transportation technologies, data, and applications. Bosch's expertise in multiple DoT Vision Elements, alongside Baltimore's proposed solutions, offer unique, data-driven ideas to improve lives by making all modes of transportation safer, easier, and more reliable.

The development of this preliminary proposal with the input of Bosch and other leading industry and academic organizations makes this proposal worthy of consideration for inclusion in the final five cities that will compete for DoT's award. DoT's groundbreaking initiative will be an excellent platform to accelerate the development and adoption of these technologies and solutions in forward-thinking communities such as Baltimore.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Mike Mansuetti', written in a cursive style.

Mike Mansuetti  
President

 **BOSCH** are Trademarks of Robert Bosch GmbH, Germany



January 22, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street - 5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

On behalf of Cisco Systems, I am pleased to offer this letter of support for the City's application to the United States Department of Transportation's (USDOT) Smart City Challenge grant as we embrace the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Smart City technologies to help create, enhance and connect access to Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- Collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion

Cisco Systems, a global leader in the design, manufacturing, and sale of networking equipment, has long supported initiatives like this built on an intelligent and converged network forming the foundation for new infrastructures of connected roads, railways, airports, stations, and ports. Key assets that Cisco brings to this team include, but are not limited to expertise in cyber security, knowledge and development of ICT architectures and standards, and experience in deployment of Smart City technologies in cities such as Hamburg, Germany and Chicago, Illinois. We are confident that this initiative will have city-wide, regional and, we hope, national impact.

Please convey Cisco's enthusiastic support for the Smart City Challenge grant but in the event of an award, this letter does not constitute a specific financial or resource commitment.

Sincerely,

A handwritten signature in cursive script that reads "Matt Reidy".

Matt Reidy  
Sr. Director Strategy, Planning & Operations  
Cisco US Public Sector

January 28, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOTs) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

The Cybergry Team, which includes New West Technologies, Cybergry Labs, Primetrix, Binary Group, and the Digit Group, Inc., has long supported initiatives designed to

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Mayor Stephanie Rawlings-Blake  
January 28, 2016

strengthen our city and region. The Cybergery Team will afford the City key support in the following areas:

- International Smart City planning, design, and implementation experience;
- Advanced transportation technology assessment, planning, demonstration and deployment;
- Comprehensive cybersecurity threat assessment and mitigation strategy development and implementation;
- Data analytics, integration, and end-use systems support; and
- Local market transformation programs.

The Cybergery Team's international Smart City's experience is particularly noteworthy and relevant, having led the financing, design-build and technology innovation solutions in metropolitan locations in the US, Australia, Europe, MENA, India, Southeast Asia and China.

Our Team brings comprehensive qualifications and experience at the Federal, state, and local levels as it relates to Electric Vehicle (EV) research, development, and implementation. We have supported EV technology R&D programs at the U.S. Department of Energy (DOE) for over two decades, helping to monitor industry and national laboratory research efforts and market developments. We have conducted assessments for DOE and other research organizations on topics such as Smart Mobility, freight electrification, electrified urban transport, vehicle-to-"x" (V2X) market status, and EV supply equipment (EVSE) grid integration challenges. The Cybergery Team has conducted a variety of strategic planning exercises for implementing EVs and EVSE infrastructure for government and commercial fleets across the country. We are currently providing technical support to several DOE EV-oriented deployment programs including EV Everywhere Grand Challenge (<http://energy.gov/eere/everywhere/about-ev-everywhere>), Workplace Charging Challenge (<http://energy.gov/eere/vehicles/ev-everywhere-workplace-charging-challenge>), and DOE Clean Cities (<https://cleancities.energy.gov/about/>), all of which seek to promote and implement EVs and supporting charging infrastructure nationally. In regards to Connected/Autonomous Vehicle programs, our team members are currently developing strategy and guidance documents for DOE on cybersecurity and standardization challenges for wide-scale EV utilization, electrified freight technology, and electrified urban transport. Lastly, we are supporting private sector company R&D efforts for connected/autonomous vehicle control and communications systems.

The Cybergery Team also maintains an impressive history of work as related to freight efficiency improvement and advanced transport system development. We have managed and supported a variety of R&D activities for advanced truck and trailer technologies involving alternative fuels (natural gas, propane, biodiesel, gas-to-liquid fuels, and biomass-to-liquid fuels), advanced propulsion systems including hybrid electric, hybrid hydraulic, and fuel cells, and onboard and offboard idle reduction technologies. We have

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Mayor Stephanie Rawlings-Blake  
January 28, 2016

designed and led some of the first demonstrations of truck stop electrification (TSE) and electric trailer refrigeration unit (eTRU) in the country, and we have supported heavy truck technology outreach programs like DOE's 21st Century Truck Partnership. We have developed and assessed innovative intermodal freight concepts, including foodway corridors for increasing urban delivery efficiency, and analyzed and modeled electrified marine freight applications. The Cybergery Team has also developed innovative freight transit concepts, combining revolutionary truck technology with dedicated freightways, platooning, autonomous operation, and advanced terminal operations for achieving industry-changing improvements for first and last mile deliveries.

This initiative will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey the Cybergery Team's support for the Smart City Challenge grant. Our technical points of contact are Michelle Avillanoza ([mavillanoza@nwttech.com](mailto:mavillanoza@nwttech.com)), Greg Wilcox ([gwilcox@nwttech.com](mailto:gwilcox@nwttech.com)), and Wyly Wade ([wwade@cybergerypartners.com](mailto:wwade@cybergerypartners.com)). Please also feel free to contact me directly at [tdivittorio@cybergerypartners.com](mailto:tdivittorio@cybergerypartners.com) if I can be of any further assistance.

Sincerely,



Terry DiVittorio, President and Chief Operating Officer  
Cybergery Partners, Inc.



**EnviroBro LLC**  
603 Luxor Court  
Fort Washington, MD 20744  
916.533.4197/202.738.4582  
*Sustainable Strategies & Solutions*

January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

*California*

*Maryland*



**EnviroBro LLC**  
603 Luxor Court  
Fort Washington, MD 20744  
916.533.4197/202.738.4582  
*Sustainable Strategies & Solutions*

Page Two  
Mayor Stephanie Rawlings-Blake  
January 29, 2016

EnviroBro LLC organization has long supported initiatives designed to strengthen our city and region that include:

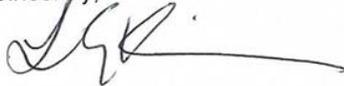
- Developing strategies and best management practices to reduce greenhouse gas (GHG) emission
- Developing and maintaining (GHG) reduction metrics to determine progress
- Developing and maintaining socio-economical metrics
- Developing and maintaining strategic partnerships
- Provide outreach to encourage community participation
- Searching for additional federal and state funding opportunities

This initiative will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey the EnviroBro LLC support for the Smart City Challenge grant. Please contact me at (202) 738-4582 or LRobinson202@gmail.com if I can be of any further assistance.

Sincerely,



Leonard E. Robinson  
Senior Strategist  
EnviroBro LLC

*California*

*Maryland*



**Brad Simmons**  
Director  
Government and Stakeholder Relations

**One American Road  
Room 1000-A1  
Dearborn, MI 48126**

January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter on behalf of Ford Motor Company in support of Baltimore's application to the United States Department of Transportation's (USDOT) Smart City Challenge grant. Our company embraces the City's vision to make its citizens' lives better by improving safety, enhancing mobility, and addressing environmental concerns, consistent with the Smart City Challenge's core goals. Some of the ways we envision doing so include:

- Expanding the use of driver-assisted technologies to potentially make driving safer, provide a more convenient driving experience, and ease traffic congestion;
- Developing new ways to connect vehicles and infrastructure with other vehicles to help prevent crashes, improve vehicle flow on freeways, and minimize fuel consumption;
- Pursuing electric powertrains and battery systems that allow us to offer electrification on more than 40 percent of our vehicle lineup by 2020;
- Pioneering technologies -- like our new on-demand Dynamic Shuttle service being piloted for employees based on our headquarters campus in Dearborn, Michigan -- to make public transit more accessible for all and reduce congestion;
- Developing commercial and personal electric bicycle applications to deliver faster and easier daily commutes and help businesses operating in urban areas; and
- Continuing to engage in partnerships with others working on similar initiatives.

Ford Motor Company supports initiatives designed to advance the goals of the Smart City Challenge and has significant practical experience in similar partnerships with other cities. Given the impact your Smart City Challenge proposal could have on the future of mobility and its alignment with Ford's goals in that area, we look forward to the opportunity to partner with Baltimore moving forward.

Please convey Ford Motor Company's support for Baltimore's Smart City Challenge grant application. If we can be of further assistance, please contact me at (313) 390-9880 or by e-mail at [bsimmon1@ford.com](mailto:bsimmon1@ford.com).

Sincerely,

A handwritten signature in blue ink that reads "Brad Simmons".



Philip Mandry  
GM, Intelligent City Sales

1975 Noble Road  
East Cleveland, OH 44112  
General Electric Company

T +1 216 266 2511  
M +1 856 297 0941  
[philip.mandry@ge.com](mailto:philip.mandry@ge.com)  
[www.currentbyge.com](http://www.currentbyge.com)

January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street, 5<sup>th</sup> Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

We write this letter in support of the City of Baltimore’s application to the United States Department of Transportation (USDOT) Smart City Challenge grant. We are in support of all cities that embrace a smart city vision. GE’s Intelligent Cities is leading the design and development for today’s intelligent LED fixtures equipped with sensors, transmitters and microprocessors which act as high-performing data grids, capable of providing extraordinary levels of insight into urban environments. These insights are driven by Predix™, our Cloud platform for the Industrial internet and occur in real time, delivering significant benefits, and the acceleration of becoming a leading smart city.

We understand Baltimore seeks to provide the following for its smart city vision:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connect communities to economic opportunities starting with the lowest-income and historically underserved areas of their communities;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers such as disconnected communities, transit service quality and reliability, climate change, and urban congestion;



General Electric Company

The Honorable Stephanie Rawlings-Blake, Mayor

January, 22, 2016

- Creation of Smart City Community Hubs to connect people to opportunities in the City and across the region by providing multi-functional transportation, logistical, education, living, job center and health services resulting from the conversion of today's existing static transit centers;
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as a business culture or norm.

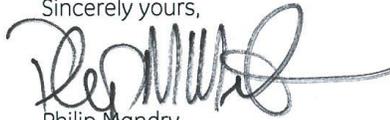
It is also our understanding that the successful award of this grant to the City will be directed to the City's most impoverished neighborhoods.

GE Intelligent Cities has long supported these kinds of smart city pursuits, most recently with the cities of San Diego and Jacksonville. Both San Diego and Jacksonville deployed LED street lights to connect, collect and analyze data to harness the power of the Industrial Internet to help each city run better while providing new services and conveniences for residents and visitors at each city.

We appreciate the opportunity to support Baltimore's exciting initiatives to achieve its smart city vision.

Please contact me if I can be of any further assistance.

Sincerely yours,



Philip Mandry  
GM, Intelligent Cities Sales



General Electric Company

January 28, 2016

General Motors Global Headquarters  
MC: 482-C30-B36  
300 Renaissance Center  
Detroit, MI 48265-3000

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5<sup>th</sup> Floor  
Baltimore, MD 21202

RE: Smart City Letter of Support

Mayor Stephanie Rawlings-Blake:

We are writing in support of the city of Baltimore’s application for the Smart City Challenge grant. General Motors has worked cooperatively with the city of Baltimore on electric vehicle (EV) expansion and is interested in exploring efforts in the areas of multi-modality, car-sharing and dedicated short range communications (DSRC). We are interested in the expansion of smart infrastructure and coordinating first mile and last mile opportunities.

We see Baltimore as an excellent city to receive the Smart City Challenge grant as it will accelerate the introduction of new technologies and supporting business models. The city of Baltimore has a comprehensive plan to address all elements of the grant application and we see a strong focus in the area of DSRC.

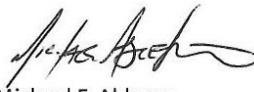
Baltimore is uniquely positioned with a large international seaport, growing population and connection to the District of Columbia.

For all of the above reasons we see Baltimore as a natural leader to demonstrate a true connected city.

Sincerely,



Daniel A. Turton  
Vice President, Federal  
and Administrative Affairs



Michael F. Ableson  
Vice President, Strategy and  
Global Portfolio Planning



John G. Smyth  
Executive Director, Global  
Research and Development





Tuesday, February 2, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. GOVonomy embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;

100 Shoreline HWY, Building B – Suite 386 Mill Valley, CA 94941  
Phone 415-332-4200 | [info@GOVonomy.com](mailto:info@GOVonomy.com)

- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, which are areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

**GOVonomy Supports Baltimore City:**

Silicon Valley based GOVonomy is pleased to team up with Baltimore City to enable integration of transformative technologies for implementation for the USDOTs Smart Cities Grant. GOVonomy is based out of the tech hubs of San Francisco and was co-founded by Silicon Valley entrepreneur Ty Gabriel and award winning Federal Department of Transportation CIO Nitin Pradhan. GOVonomy helps governments and their preferred systems integrators acquire disruptive technologies for transformative solutioneering. GOVonomy is a unique consortium of growing “transformative” Commercial Off the Shelf (COTS) products and platforms from high growth, smaller technology companies. Integrating transformative COTS products enables faster deployment of systems, makes them more affordable and easier to maintain/upgrade while simultaneously creating an innovative and differentiated solution for the governments. GOVonomy’s ecosystem is composed of three communities. The first are the end-clients, which are typically government agencies like USDOT and Baltimore City. The second are the transformative technology suppliers, who are part of the GOVonomy’s high growth portfolio companies. The third are the system integration, IT contracting and management-consulting firms, which act as GOVonomy’s integration partners.

**GOVonomy’s Transformative Tech Portfolio:**

GOVonomy has a portfolio of 50+ pre-qualified innovative COTS tech supplier companies and is evaluating an additional 30+ from Silicon Valley, Boston, New York and other global tech hubs. The GOVonomy consortium brings strong, immediate Silicon Valley type, evergreen, transformative COTS products, platforms and services integration capability to Baltimore Cities solutions table for the Smart Cities Grant. Many of these companies have disruptive technologies relevant to the Smart Cities Grant. GOVonomy will also enable the Federal Government to systematically defuse the grant funds through Baltimore City and create a public private partnership with smaller, high growth Silicon Valley tech companies and encourage their participation in the US transportation industry through this unique partnership.

100 Shoreline HWY, Building B – Suite 386 Mill Valley, CA 94941  
Phone 415-332-4200 | [info@GOVonomy.com](mailto:info@GOVonomy.com)

GOVonomy has long supported initiatives designed to strengthen our city and region. This initiative will have city-wide, regional and hopefully, national impact; and we are very happy to be part of this program. Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how climate is affecting how people and goods currently travel, and how they could affect travel in the future. We believe that GOVonomy can make a central contribution to this effort.

Please convey GOVonomy's support for the Smart City Challenge grant. If I can be of further assistance, please contact me at Nitin.Pradhan@GOVonomy.com or at (415) 332-4200 X 102.

Sincerely,

*Pradhan Nitin*

Nitin Pradhan  
Managing Director, GOVonomy  
Former CIO, USDOT

100 Shoreline HWY, Building B – Suite 386 Mill Valley, CA 94941  
Phone 415-332-4200 | [info@GOVonomy.com](mailto:info@GOVonomy.com)

here

January 22, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Re: Letter Supporting for the City of Baltimore Smart City Challenge Proposal

Dear Mayor Blake:

We are pleased to support the City of Baltimore for the Smart Cities Challenge. The purpose of this letter is express HERE's commitment to their vision and support bringing this vision to reality. HERE, is a recognized global leader in the mapping, real-time traveler information, in-vehicle navigation, and connected and autonomous vehicle deployment. As a strategic partner on the Smart City project, we are committed to supporting all phases with both proven and emerging technologies for enabling smart cities.

HERE brings several key capabilities to the team:

**Cutting edge technologies for Connected & Automated Driving.** HD maps, real-time traffic & dynamic data, cloud connectivity, data analytics, multi-modal in-dash & mobile traveler applications, APIs and SDKs for application building.

**Proven experience.** 30 years of industry firsts - developing and commercializing transportation innovations at a world-wide scale for automotive, consumer, fleet and government.

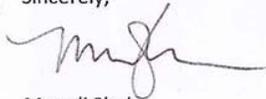
**Extensive reach to travelers.** Unmatched reach across devices inside and outside the vehicle. HERE data powers 9 out of 10 vehicles in the US. The top 20 JD Powers' ranked in-dash navigation systems in the US use HERE maps and traffic. HERE supports Garmin, Samsung, Microsoft, Amazon and many others.

**Scalable and sustainable business models.** HERE's interoperable model for working across automotive, trucking, telematics, consumer, and government markets is backed by decades of growth and success. The ability to scale the building and monetization of location data and software is critical to the success of connected vehicles at scale. HERE has played an instrumental role in setting standards and global specifications for both map and traffic data.

HERE is investing heavily in Connected and Automated Vehicle technologies that will power Smart Cities of the future. Our involvement in this Smart City project will help accelerate the development and adoption of these technologies by the traveling public.

We look forward to the significant benefits that will result from the work of the City of Baltimore in the further development smart city technology.

Sincerely,



Monali Shah  
Head of ITS, HERE North America, LLC  
[monali.shah@here.com](mailto:monali.shah@here.com) 312-894-7244

HERE North America, LLC

425 West Randolph St, Chicago IL 60606



January 29, 2015

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. INRIX embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

INRIX's history, capabilities and experience make it an ideal partner for Baltimore as it develops and implements its Smart City vision. Created in 2005, INRIX was the first crowd-sourced transportation data and analytics start-up created in the US. Today, we collect real-time location data from millions of connected cars, trucks and smartphones every day, and we process that data to provide real-time and historic smart mobility information to describe people and vehicle movement. Our services represent a new and revolutionary way to quantify and think about mobility.



Page Two

Mayor Stephanie Rawlings-Blake

January 29, 2016

INRIX has long supported initiatives designed to strengthen Baltimore and the region. INRIX has worked deeply with the University of Maryland and many of the region's transportation agencies since 2008, including providing travel time information posted on dynamic message signs across Maryland, statewide and region-wide mobility and bottleneck assessments completed by MDSHA and the Baltimore Metropolitan Planning Council, providing a real-time traffic monitoring site available to all agencies in Maryland and currently support a freight fluidity study with origin-destination data.

INRIX looks forward to working with the City and its partners to bring our unique capabilities to bear to enhance the City's effort to develop a detailed vision and implementation plan should it be named a finalist.

Please convey INRIX's support for the Smart City Challenge grant. Please contact me at [rick@inrix.com](mailto:rick@inrix.com) or 407-298-4346 if I can be of any further assistance.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Rick Schuman', is written over a light blue horizontal line.

Rick Schuman

VP/GM, Public Sector

**Corporate Headquarter**  
1441 BROADWAY,  
Suite 3057  
New York, NY 10018  
T: 212.465.9622

**LIVE TRAFFIC DATA™**

www.livetrafficdata.com  
info@livetrafficdata.com

**Technology Center**  
1660 South Highway 100  
Suite 500  
St. Louis Park, MN 55416  
T: 612.361.0891

January 25, 2016

To:  
The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Subject: Live Traffic Data letter of partnership and support to the City of Baltimore  
Reference: U.S. DOT Smart City Challenge

Dear Madam Mayor Rawlings-Blake,

Live Traffic Data, LLC (**LTD**) is pleased to offer its partnership and provide this letter of support to the City of Baltimore towards the city's response to the Smart City Challenge of the U.S. Department of Transportation.

LTD is an ITS and connected-road-user technology company with national reputation for the performance of many of its products. LTD offers in open machine readable format high-accuracy traffic signal and performance data, including highest accurate queue length and travel time along signalized surface streets, wirelessly available to connected vehicles and road-users over their mobile devices. In addition, LTD also offers application development support, such as API and SDK, for entrepreneurs to develop new applications. LTD also offers license-free access to its unique data set to the University of Maryland to further research and develop relevant technologies.

LTD's technology aligns with the city's vision elements of

- 2.1. DSRC based connected vehicles (Vehicle-to-Infrastructure connection)
- 2.2. Cellular and Wi-Fi connected vehicles
- 2.3. CV-enabled smart signal and traffic management
- 2.4. Vehicle-to-pedestrian/bike connection
- 3.2. Real-time data collection and visualization
- 3.3. Data-driven performance monitoring platform
- 4.1. Performance monitoring and prediction
- 5.1. Personalized real-time traveler information,
- 5.2. Mobile application for travel guidance/system optimization,

**Corporate Headquarter**  
1441 BROADWAY,  
Suite 3057  
New York, NY 10018  
T: 212.465.9622

**LIVE TRAFFIC DATA™**

[www.livetrafficdata.com](http://www.livetrafficdata.com)  
[info@livetrafficdata.com](mailto:info@livetrafficdata.com)

**Technology Center**  
1660 South Highway 100  
Suite 500  
St. Louis Park, MN 55416  
T: 612.361.0891

- 
- 5.3. Travel guidance for aging and disabled citizens,
  - 9.3. Open data portal for citizen entrepreneurship.

LTD's technology can be used by the city to improve traffic operation, reduce congestion, keep travelers safe, protect the environment, respond to climate change, connect underserved communities and support economic vitality; and can be integrated with existing systems to address transportation challenges of the city.

LTD further offers its products and services to the city at a subsidy.

LTD stands ready to help the city in further development and implementation of its vision. Please contact me ([mark.holzwanger@livetrafficdata.com](mailto:mark.holzwanger@livetrafficdata.com)) or our Chief Technology Officer Dr. Heng Hu ([heng.hu@livetrafficdata.com](mailto:heng.hu@livetrafficdata.com)) if you need further assistance in your pursuit of Baltimore Smart City Vision.

Sincerely,



Mark Holzwanger  
Chief Executive Officer  
Live Traffic Data LLC

Cc: Dr. Lei Zhang, University of Maryland



Anthony R. Foxx, Secretary  
U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
Washington, DC 20590

February 1, 2016

Dear Secretary Foxx,

Lyft strongly supports the City of Baltimore's application for the USDOT Smart City Challenge, and looks forward to partnering with the city to implement several elements of the proposal should Baltimore's application be selected. In its proposal, Baltimore has taken a thoughtful approach to improving mobility for all, while advancing safety and environmental goals.

Like many cities, Baltimore struggles with the challenge of transportation "deserts," where citizens lack access to reliable mobility options. Consistent with Lyft's mission to reconnect communities through better transportation, Baltimore would harness the resources of this grant to unlock the potential of technology and innovation to benefit these disconnected communities, using options like Lyft as a tool to improve economic opportunity and access to jobs. Should Baltimore's application be selected, Lyft is prepared to work with the city on innovative mechanisms to bring the benefits of safe, flexible, on-demand transportation to areas such as West Baltimore. We would also explore working with the city to bring short-term vehicle rental hubs to the city as part of our long-term partnership with General Motors, providing economic opportunity to local residents to join our driver community, while offering a platform for the deployment of electric vehicles such as the forthcoming Chevrolet Bolt.

The city's application also proposes to build a robust, on-demand mobility ecosystem through a smartphone app, including trip planning and payment API integrations between public transit and private modes like Lyft. By creating a suite of connected mobility options that work smoothly in tandem, Baltimore can reduce the need for costly car ownership and expand mobility access, while reducing congestion and emissions.

Baltimore has also identified possibilities to leverage Lyft's partnership with General Motors (GM) on automated vehicles. As Lyft and GM undertake research, testing, and deployment of shared, automated vehicles, the Smart City grant would equip Baltimore to lay the foundation for this transition in the urban environment. Removing human error from driving is forecast to dramatically reduce road fatalities, while greatly cutting the costs of transportation for consumers. And if automated vehicles are deployed through shared networks, tremendous environmental and health benefits can also be realized.

For these reasons, we support Baltimore's Smart City proposal and hope you will give it your serious consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "E. Castor", is positioned above the typed name.

Emily Castor  
Director of Transportation Policy  
Lyft

January 22, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

Since inception, Roadie, Inc. has supported initiatives designed to strengthen cities and regions. Roadie has created mobile technology applications to crowd-source delivery of goods in urban areas to consumers with limited transportation and and/or cargo space. Roadie's network allows drivers to "rent" their unused cargo space to transport goods

Page Two  
Mayor Stephanie Rawlings-Blake  
January 22, 2016

without the waste of packaging materials, providing an alternative to traditional shipping methods and using empty cargo space already on the road. Roadie has more than 500 active users in the Baltimore metro area, and we plan to increase that user count substantially in 2016. This initiative will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey Roadie's support for the Smart City Challenge grant. Please contact me at 678-595-6773 or [eherman@roadie.com](mailto:eherman@roadie.com) if I can be of any further assistance.

Sincerely,



Emily Herman  
Head of Intelligence  
Roadie, Inc.  
3565 Piedmont Road NE  
Building 4, Suite 120  
Atlanta, GA 30305

February 1, 2016

William M. Johnson  
Director  
Baltimore Department of Transportation  
417 E. Fayette Street  
5<sup>th</sup> Floor  
Baltimore, MD 21202

RE: Smart City Letter of Support

Dear Mr. Johnson:

Sagamore Development Company (Sagamore) is pleased to support Baltimore City's Smart City proposal to improve public transportation through the creation of transit hubs.

Sagamore is currently planning the Port Covington project, which will be the future home of Under Armour's Global Headquarters as well as over 9 million square feet of adjacent, mixed-use development. A key objective of our project, consistent with the Smart City Vision, is to advance opportunities for all citizens by connecting them to high-speed internet access, clean energy, sustainable and healthy environments, and most critically, jobs. Moving the City forward in this way will help move low-income residents out of poverty, help heal the City, and help redefine Baltimore as a truly Smart City of opportunity with safe, reliable transit.

Connecting the residents of Baltimore, via efficient transit, to the jobs created by this transformational project is critically important. Through collaboration and partnerships with the City, Maryland Department of Transportation and the U.S. Department of Transportation, we will together position one of the largest urban revitalization projects in the United States for success.

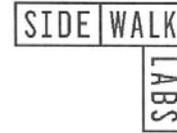
We look forward to a positive funding outcome for Baltimore's U.S. Department of Transportation Smart City Challenge proposal, and for the opportunity to work with you to advance Baltimore's Smart City planning, development and impact.

Very Truly Yours,

By:   
Sagamore Development Company, LLC  
Marc D. Weller  
President

233 Broadway, 21st Floor  
New York, NY 10279

sidewalklabs.com  
212-373-0800



January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of Baltimore's application to the United States Department of Transportation's Smart City Challenge. Baltimore is particularly well-suited to achieve the vision set out by the Challenge. As demonstrated by the city's proposal there is enormous potential for emerging technologies to address the long-standing challenge of building a transportation system that's both more efficient and equitable.

At Sidewalk Labs we share Baltimore's belief that improved transportation outcomes are critical to building a prosperous and inclusive future. We find the city's vision for the emerging landscape of mobility services and technologies both compelling and a critical contribution to the future of our transportation system.

Sidewalk Labs, an urban innovation company funded by Alphabet / Google, is leading the creation of a platform that unlocks both the insight and the actionable potential of the modern urban data ecosystem. This is accelerated by a strategic partnership with Google to put mobility data to work for cities, and our role in creating LinkNYC—a groundbreaking urban connectivity platform. Collectively, these tools and data enables cities and entrepreneurs to solve problems that until recently were impossible.

With the Baltimore's vision, dedicated staff and Sidewalk Labs' technical and policy resources, we believe the challenge offers a rich opportunity to rethink transportation, not just for Baltimore but for the nation.

Sincerely,

A handwritten signature in blue ink that reads "Daniel L. Doctoroff".

Daniel L. Doctoroff  
CEO & Chairman, Sidewalk Labs

**SKYTRAN™**  
*THE NASA SPACE ACT COMPANY*

NASA Research Park, Bldg.14 Rm. 101, Mail Stop 19-100, Moffett Field, CA 94035-1000

January 18, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

RE: Smart City **Letter of Support**

Dear Mayor Rawlings-Blake:

skyTran Inc., a NASA Space Act Company, is pleased to support Baltimore City's Smart City proposal designed to improve public transportation through the creation of transit hubs, starting with communities of greatest need: the urban core of West Baltimore. As a company that has spearheaded the development of elevated, high-speed, low-cost, environmentally compelling transportation, we applaud every effort to respond to the bane of congestion that now envelops every walk of urban life. Indeed, our moto is: *There are No Smart Cities with Dumb Transportation.*

We therefore congratulate Baltimore for its Smart City Vision by realizing the need to advance opportunities for all by connecting its residents to high speed internet access, clean energy, City sustainability, employee wellness, employer profitability and jobs. Moving the City forward in this critical way will help move low-income residents out of poverty, help heal the City of digital and other limiting divisions and help re-define Baltimore as a truly Smart City of opportunity with safe, reliable transit.

We look forward to a positive funding outcome for Baltimore's U.S. Department of Transportation Smart City Challenge proposal, and for the opportunity to work with you to advance Baltimore's Smart City planning, development and impact.

Yours sincerely,

Gerald Jay Sanders, Esq.  
Chairman and CEO  
skyTran Inc.

---

w w w . s k y t r a n . c o m

January 26, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City of Baltimore's application to the United States Department of Transportation's Smart City Challenge grant. [Split Technology, Inc.](#), embraces the City's vision for developing and deploying a set of smart transportation options that are accessible, affordable, safe, and sustainable.

Split is a shared-use mobility technology company based in Washington, DC. We develop and operate dynamic ridesharing systems that complement and extend existing and future transportation networks. Using smartphones, Split users enter their origins and destinations, and our demand-responsive routing algorithms offers shared rides that balance user convenience with system efficiency. Split dispatches and routes a network of vehicles to designated pick-up and drop-off points across a city. Split measures success in terms of environmental sustainability – using fewer vehicles to move more people – and economic sustainability – creating value and opportunity for riders and drivers. Split's vision for smarter shared rides matches with the City of Baltimore's Smart City vision.

In the course of the Smart City proposal process, Split is interested to investigate how our technology and operational model can help realize Baltimore's bold vision to connect its citizens; create opportunities for economic mobility; and reduce congestion and emissions.

Please convey Split's support for the Smart City Challenge grant. Please contact me at [adam@split.us](mailto:adam@split.us) if I can be of further assistance.

Sincerely,



Adam B. Cohen, Ph.D.  
Science Team Lead  
Split Technology, Inc.





January 22, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

Maryland-based TimberRock Advanced Energy has long supported initiatives designed to strengthen our city and region. This includes TimberRock's work with General Motors to

Page Two  
Mayor Stephanie Rawlings-Blake  
January 29, 2016

develop and construction the nation's first solar/EV/smart grid transit hub in the Baltimore region. These prior efforts have received national attention, numerous industry awards and have been supported by the Maryland Energy Administration. TimberRock believes these first-of-their-kind deployments serve as a blueprint for how cities can deploy future energy and transportation infrastructure. The grant that is now being sought would allow Baltimore to build upon these past efforts creating city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

TimberRock strongly supports the Smart City Challenge grant.

Please contact me at [bhollebeck@timberrockes.com](mailto:bhollebeck@timberrockes.com) if I can be of any further assistance.

Sincerely,



Brent Hollenbeck  
Founder & CEO



The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Reference: Support for the City of Baltimore's Smart City Challenge Proposal

January 22, 2016

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOTs) Smart City Challenge grant. TomTom embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

TomTom has long supported initiatives designed to strengthen cities and regions by providing mapping and traffic content and applications for improving accessibility and mobility. This initiative will have city-wide, regional and, we hope, national impact.



Page Two  
Mayor Stephanie Rawlings-Blake  
January 22, 2016

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey TomTom's support for the Smart City Challenge grant. Please contact me at [nick.cohn@tomtom.com](mailto:nick.cohn@tomtom.com) or 603-266-9423 if I can be of any further assistance.

Sincerely,

A handwritten signature in black ink that reads "Nick Cohn".

Nick Cohn  
TomTom



February 4, 2016

The Honorable Stephanie Rawlings-Blake  
Mayor of Baltimore  
c/o Mr. Colby McFarland, MCRP  
City of Baltimore  
417 E. Fayette Street, 5th Floor  
Baltimore, MD 21202

Re: Letter Supporting the City of Baltimore Smart City Challenge Proposal

Dear Mayor Rawlings-Blake:

On behalf of Urban Insights Associates, a wholly owned subsidiary of Cubic Corporation, I am pleased to submit this letter of support for the US Department of Transportation Smart City Challenge grant proposal submitted by the City of Baltimore in cooperation with the University of Maryland. The City's vision of a future Baltimore is an exciting as well as comprehensive and pragmatic solution to issues currently facing the region. As a DC-based company, it is our pleasure to contribute support, resources, and the viewpoints of Urban Insights Associates to the City's Smart City objectives.

Baltimore's application will be strengthened by what our company can supply in providing a cohesive framework to address the full potential of using advanced analytics and data science techniques to improve transportation services delivery across the city and throughout the region. A few of the benefits of these services are described below.

- Baltimore will leap to the forefront of using data science techniques and analysis to support:
  - Data-driven public transportation network operations and service planning that addresses efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services
  - Optimized demand and yield management of transportation services
  - A world class data management infrastructure to support other initiatives such as urban automation, connected vehicles, and intelligent systems that creates an integrated/ transferrable platform for technology deployment, analytics, and performance monitoring
  - Multi-modal analysis of urban mobility for Baltimore's citizens and the planners of those services with an emphasis on connecting communities to economic opportunities starting with the low-income and historically underserved West Baltimore area
  - Development of data-supported performance measures
- The smarter city of Baltimore will not only benefit from the analytic strength of big data tools provided by Urban Insights, but also from other business units under the umbrella of Cubic Transportation Systems. Capabilities deployed globally in tolling administration, intelligent traffic management systems, and advanced fare and transit revenue systems can be leveraged to support Baltimore's Smart City transportation infrastructure. As provider of the SmarTrip and NextBus systems to users across the DC / MD / NVA region, Cubic is already connected with millions of area travelers each day.



- The Proposal will also benefit the citizens of Baltimore through:
  - Increased mobility and accessibility to public amenities and critical services using public transportation
  - Defining technological solutions that knock down key barriers associated with disconnected communities, transit service quality and reliability, climate change, and urban congestion including:
    - Comprehending causes of roadway congestion and strategies for shifting traveler demand to public transportation services as well as managing the public transportation vehicles service fleet through optimization of the network and demand smoothing during peak hours
    - Reduced emissions through strategies for managing roadway congestion
- Creating multi-functional Smart City Community Hubs for transportation, logistics, education, living, and job centers converted from existing transit hubs for connecting people to opportunities in the City and region

A critical component of the City's vision is that of open and accessible data and flow of information. Our philosophy is to give back to the Baltimore community by providing a platform to freely access this data, stimulating new services, innovative uses, and citizen participation in achieving Smart City Challenge goals.

A central theme of our work together will be addressing demographic and economic trends as well how changes in technology, governance, and climate is affecting how people and goods travel today - and how they could affect travel in the future. We have a proven track record in this area. Our parent company has a forty-year heritage of strengthening mobility around the world - and more specifically have supported the daily needs of travelers on MTA, WMATA and others with SmarTrip and NextBus for many years.

Thank you for your review and advancement of the Smart Cities Challenge proposal submitted by the City of Baltimore and its regional partners. We are proud to be a part of this exciting vision for our region. If you have any questions, feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Collins".

Daniel H. Collins, Vice President and General Manager  
Urban Insights Associates, Inc.

[www.urban-insights.com](http://www.urban-insights.com)  
[daniel.collins@urban-insights.com](mailto:daniel.collins@urban-insights.com)



February 02, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

### Letter Supporting the City of Baltimore Smart City Challenge Proposal

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOTs) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

It is our pleasure to contribute support, resources, and the viewpoints of Veniam to help advance, deliver, and demonstrate the benefits of the City's Proposal.

#### What does Veniam do?

Veniam turns vehicles into Wi-Fi hotspots and builds city-scale vehicular networks that expand wireless coverage and collect terabytes of urban data. In controlled spaces such as ports and container terminals, Veniam's game-changing solutions ensure that all mobile workers and assets are securely connected; no matter where they are or at what speed they are moving. Our hardware,



VENIAM Inc.  
331 West Evelyn Avenue, Mountain View, CA 94041, USA | Tel: +1 415 470 33 49 | <http://www.veniam.com>



software and cloud components are running in the world's largest network of connected vehicles, including taxis, waste collection trucks and the entire public bus fleet in Porto, Portugal, offering free Wi-Fi to more than 300,000 active customers. Veniam is backed by leading venture capital firms and strategic investors. Veniam currently has offices in Mountain View, California; Porto, Portugal; and Singapore.

**Who is the Veniam team?**

Veniam's tightly knit team combines technology pioneers with seasoned operatives and business executives, all of whom are committed to making a positive difference in people's lives, their communities, and their professions. We build products to connect our world and deploy innovative networks to enable a wide range of new and disruptive services.

**What is Veniam's Value Proposition?**

Veniam expands Internet access on a massive scale to create a moving mesh network for smart cities – turning vehicles into mobile hotspots, enabling them to connect to each other and the Internet. Veniam helps offload mobile data usage from overwhelmed cellular networks to Internet backhaul through the innovative and cost-effective use of the 802.11p and V2X (DSRC) communications. Veniam cloud-based managed services also enables connected vehicles to be ready for the deployment of safety-related V2V applications and autonomous vehicles.

Veniam welcomes the opportunity to assist the City of Baltimore in formulating and implementing its response to USDOT's Smart City Challenge. Veniam offers a unique opportunity to enhance your application to the USDOT Smart City Challenge. Our cutting-edge technology for building mesh networks of connected vehicles has been commercially tested and has been operating in a mid-sized city for 18 months. It is used daily by tens of thousands of citizens.

We are proud to be part of this exciting vision for the region. If you have any questions, feel free to contact me.

Sincerely,

Joao Barros  
President and CEO  
Veniam, Inc.



VENIAM Inc.  
331 West Evelyn Avenue, Mountain View, CA 94041, USA | Tel: +1 415 470 33 49 | <http://www.veniam.com>



February 1, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of The City of Baltimore (the "City's") application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant.

Verizon has long supported initiatives designed to strengthen cities by helping improve livability for constituents, sustainability with renewable resources and resiliency to major events. We have been providing condition-based monitoring solutions, the cornerstone of today's M2M and IoT products, to government and commercial partners for over 15 years with proven results.

Verizon has built a strong foundation of Smart Cities solutions to help you turn near real-time information into valuable decisions to help improve the efficiency and safety concerns of your city.

Verizon Smart Cities' solutions can help you:

- Engage people to improve and deliver services.
- Create more efficient and economical environments.
- Safeguard citizens, city personnel, data and infrastructures.
- Reduce traffic congestion and improve road safety.

All our solutions can integrate with Thing Space, our solution platform, to offer reporting, analytics and the ability to share actionable data across all data inputs through a robust set of customizable APIs. Our solutions can support and facilitate your diverse connectivity initiatives for buildings and venues, energy and utilities, government and transportation. And our Smart Cities experts can help you develop tailored plans to use natural resources more efficiently, improve public safety, increase non-tax revenue, easily engage residents and advance urban renewal efforts.

Verizon Intelligent Traffic Management solutions allow cities to better manage the flow of traffic, in addition to understanding how traffic is performing along roadways, collecting various types of data and analyzing against industry metrics. The solution can provide basic information such as travel times and origin/destination details, up to more complex details such as red light violations and adaptive signaling. Data can also assist urban planners to locate new facilities and transit hubs, or to reduce the number of stops and improve speeds along busy corridors. Data can be used to facilitate signal optimization, a proven method to reduce congestion, emissions and ultimately improve air quality.

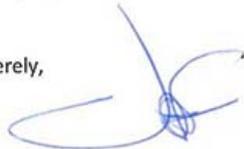
Verizon Intelligent Lighting solutions can integrate, based on the City's needs, LED lighting, digital signage, audio, video and safety sensors to help reduce energy cost, outages and outage duration, along with improving public safety. Digital signage and audio features give municipalities the opportunity to generate non-tax revenue through media content delivery/advertising. From a public safety standpoint, these features can be used to improve smart transportation by providing way finding, traffic direction, civic information, alerts and announcements in case of emergencies (e.g., evacuation). Environmental sensors can trigger alerts based on light, sound and moisture level (e.g., icy road-condition announcements). All these benefits are applicable for lights on streets, parking lots, stadiums, universities, parks, healthcare systems, office campuses and transit stops.

Verizon Intelligent Video makes it possible to get eyes on-site, without investing significant time and resources on streaming video. Cameras record high-quality video, suitable for evidentiary purposes, while data is stored locally instead of streaming, on storage devices sized for short-term needs. Edge analytics, co-located with the camera, spot unusual or abnormal behaviors and trigger alerts to provide actionable information and a more efficient use of backhaul and long-term storage resources. Cameras can also be a valuable tool in public safety by providing insight into transportation infrastructure.

Verizon brings together all the assets to deliver results and be a trusted partner. As the provider of the nation's largest and most reliable 4G LTE network, our accolades do not stop there. Our MPLS network is considered the most connected wireline global infrastructure with more than 70% of internet traffic traversing our public IP network. Leveraging our expertise with Cybertrust, Verizon is a top-rated managed security services provider, per Gartner. Verizon offers FISMA compliant, and FedRamp certified, cloud solutions, meeting strict government requirements.

Our unique set of expertise in IoT, wireline and data security and wireless make Verizon a solid partner to enable Baltimore to realize its Smart City goals, both now and in the future. We look forward to working with you and addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel. Please convey Verizon's support for the Smart City Challenge grant. If I can be of further assistance, feel free to contact me at (562) 237-1172.

Sincerely,



Daniel C Feldman

Director, Verizon Smart Cities  
Product and New Business Innovation  
Verizon

**LETTER OF SUPPORT & COMMITMENT**

January 22, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOTs) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

Voyage Control has long supported initiatives designed to strengthen our city and region. Voyage Control builds a software that helps hubs that deal with in- and outbound freight to manage that process in order to increase efficiencies, reduce truck congestion and the overall impact on the environment. We are an award winning

company with clients in the UK as well as the US. Our focus is on construction sites, event centers, ports/airports as well as large mixed use building facilities dealing with in and outbound freight. This initiative will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey the Voyage Control support for the Smart City Challenge grant. Please contact me at [isabelle.steichen@voyagecontrol.com](mailto:isabelle.steichen@voyagecontrol.com) if I can be of any further assistance.

Sincerely,

 1/22/16

Isabelle Steichen, General Manager US

.....  
A B E L L  
.....  
F O U N D A T I O N  
.....

January 29, 2016

The Honorable Stephanie Rawlings-Blake  
Mayor, City of Baltimore  
100 N. Holliday Street  
Baltimore, MD 21202

RE: Smart City Letter of Support

Dear Mr. Johnson:

The Abell Foundation is pleased to support Baltimore City's Smart City proposal to improve public transportation through the creation of transit hubs, starting with communities of greatest need, the urban core of West Baltimore. We congratulate Baltimore for its Smart City Vision to advance opportunities for all by connecting citizens to jobs, clean energy, and information. Moving the City forward in this critical way will help move low-income residents out of poverty, help heal the City of digital and other limiting divisions and help re-define Baltimore as a truly Smart City of opportunity with safe, reliable transit.

We look forward to a positive funding outcome for Baltimore's U.S. Department of Transportation Smart City Challenge proposal, and for the opportunity to work with you to advance Baltimore's Smart City planning, development and impact.

Sincerely,



Robert C. Embry, Jr.  
President

111 South Calvert Street Suite 2300  
Baltimore, Maryland 21202-6174  
Phone 410-547-1300  
Fax No. 410-539-6579

# BARCO

BALTIMORE ARTS REALTY CORP.

February 2, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. This initiative embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

The Baltimore Arts Realty Corporation (BARCO) supports this initiative to strengthen our city and region. It will have city-wide, regional and, we hope, national impact.

1122 Kenilworth Drive, Suite 211, Towson, MD 21204  
Phone: (443) 275-1144 Fax: (410) 321-4882

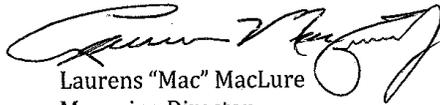
Ms. Pamela W. Lapidis  
February 21, 2013  
Page 2

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Mayor Stephanie Rawlings-Blake  
January 29, 2016

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey BARCO's support for the Smart City Challenge grant, and feel free to contact me at 443- 275-1144 if I can be of any further assistance.

Sincerely,



Laurens "Mac" MacLure  
Managing Director



January 25, 2016

Secretary Anthony Fox  
U.S. Department of Transportation  
1200 New Jersey Ave, SE  
Washington, DC 20590

Dear Secretary Fox and the US Department of Transportation,

The Baltimore Development Corporation (BDC) is pleased to support Baltimore City in its Smart City Challenge Grant Application.

BDC is a 501(c)(3) that works to retain and expand existing business and attract new businesses to Baltimore City. Our job is to ensure that Baltimore City is meeting the needs of its business community in every way possible in order to increase access to jobs and develop the local economy, improve neighborhoods, and grow Baltimore City. Critical to this mission is providing Baltimore's growing business community with a transportation system that provides safe, efficient, and sustainable connectivity to workforce capital; as well as to education, healthcare, and lifeline services.

We are delighted to see the City's application emphasize improving transit service quality and reliability in areas of West Baltimore where transit infrastructure is robust and residential growth is on the rise but access to employment lags behind the Baltimore region. The City's proposal to focus technology deployment at the West Baltimore Marc Station and at the Lexington Market is consistent with where BDC is currently involved in neighborhood revitalization projects and where we see a unique opportunity for the City to continue to develop employment, education, entertainment, and healthcare centers. These locations are ideal as Smart City Community Hubs where new transportation concepts and technologies can leverage the sharing economy.

We thank you for your consideration in Baltimore City's Smart City Challenge application. We hope you will join us in developing our business community, revitalizing our neighborhoods, and growing our City by awarding Baltimore City the opportunity to lead the way in providing bold solutions to make transportation safer, easier, and more reliable.

If you have any concern or questions, please do not hesitate to contact me at 410.837.9305.

A handwritten signature in blue ink, appearing to read "W. Cole", is positioned above the typed name.

William H. Cole  
President and CEO  
Baltimore Development Corporation

36 S. Charles St. Suite 2100 Baltimore, MD 21201 410.837.9305 O 410.837.6363 F [BaltimoreDevelopment.com](http://BaltimoreDevelopment.com)



17 January 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

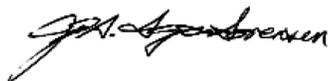
RE: Smart City **Letter of Support**

Dear Mayor Rawlings-Blake:

BEVI, the Baltimore-Washington Electric Vehicle Initiative, enthusiastically supports Baltimore City's Smart City proposal to improve public transportation through the creation of EV-ready smart transit hubs, starting with communities of greatest need in the urban core of West Baltimore. As a close collaborator with the City, BEVI has witnessed the City's leadership in smart city, sustainability and clean energy developments. We congratulate Baltimore for its Smart City Vision to advance opportunities for all by connecting citizens to high speed internet access, clean energy, City sustainability, employee wellness, employer profitability and jobs at strategic transit locations like West Baltimore and Lexington Market to pilot EV-ready Smart Transit Hubs. Development of these locations as wifi-enabled centers will allow citizens to convene, learn, engage, go to work, innovate, start businesses, and give back to one another. In turn this will help move low-income residents out of poverty, help heal the City of digital and other limiting divisions and help re-define Baltimore as a truly Smart City of opportunity with safe, reliable movement of people, cargo and electrons (energy and knowledge).

We look forward to a positive funding outcome for Baltimore's U.S. Department of Transportation Smart City Challenge proposal. Thank you for your leadership, and for the opportunity to work with your dedicated staff to advance Baltimore's Smart City planning, development, programs, resources and impact.

Yours sincerely,



Jill A. Tarzian Sorensen, BEVI Executive Director

BEVI, 111 S. Calvert Street, Suite 2310  
Baltimore, Maryland 21202  
[www.marylandEV.org](http://www.marylandEV.org)

**Board of Directors:**

Central Maryland Transportation Alliance

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President & CEO, Greater Baltimore  
Committee**Vice Chair Laura Gamble**  
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PNC Bank**Sister Helen Amos**

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Vice President, Network Rail Consulting

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Annie E. Casey Foundation**C. William "Bill" Struever**

Managing Director, Cross Street Partners

**H. Walter Townshend, III**President and CEO, Baltimore  
Washington Corridor Chamber**Thomas E. Wilcox**

President and CEO, Baltimore



## Transportation Alliance

January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madame Mayor Rawlings-Blake,

I am writing in support of the City of Baltimore's application to the  
USDOT's Beyond Traffic: The Smart City Challenge.

Titled B'Smart, Baltimore's proposal marries new technologies with  
existing infrastructure to improve access to opportunity in neighborhoods  
that need it most. We know two things from a recent and widely reported  
study, The Impacts of Neighborhoods on Intergenerational Mobility by  
Chetty and Hendren of Harvard University. One, a child's odds of  
escaping poverty are slimmer in neighborhoods where workers face long  
commutes. Two, the city where children face the longest odds of  
escaping poverty is Baltimore. We also know from the Baltimore  
Neighborhood Indicators Alliance that the neighborhoods with the highest  
rates of poverty and longest commute times are located on Baltimore's  
west side. B'Smart would focus transportation resources around existing  
transportation hubs to improve access to jobs and other opportunities and  
reduce commute times.

We support the City's proposal and urge the USDOT to consider  
Baltimore as the mid-sized U.S. City where the Smart City Challenge  
would make the greatest impact.

Sincerely,

Brian O'Malley  
President & CEO

Central Maryland Transportation Alliance | 2 East Read Street, Baltimore MD 21202 |  
www.cmtalliance.org | (410) 332-4172



January 27, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. Enterprise Community Partners, Inc. (Enterprise) embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

For more than 30 years, Enterprise has introduced solutions through public-private partnerships with financial institutions, governments, community organizations and other partners that share our vision that one day, every person will have an affordable home in a vibrant community, filled with promise and the opportunity for a good life. Since 1982, Enterprise has raised and invested over \$16 billion in equity, grants and loans to help build or preserve over 320,000 affordable rental and for-sale homes to create vital communities. Enterprise is currently working with public and private partners in the West Baltimore area and looks forward to collaborating with the City on the Smart City Challenge. This initiative will have city-wide, regional and, we hope, national impact.

Please convey the Enterprise support for the Smart City Challenge grant. Please contact me at 202.649.3925 if I can be of any further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "David Bowers", written over a light blue horizontal line.

David Bowers  
Vice President & Mid-Atlantic Market Leader

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**ENTERPRISE COMMUNITY PARTNERS, INC.**  
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## GREATER BALTIMORE COMMITTEE

*Regional business leaders creating a better tomorrow...today.*

Stephanie C. Hill, Chair  
Lockheed Martin

Donald C. Fry  
President & CEO

January 29, 2016

The Honorable Anthony Foxx  
U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
Washington, D.C. 20590

Dear Secretary Foxx:

I am writing this letter on behalf of the Greater Baltimore Committee (GBC) in support of Baltimore City's application for the United States Department of Transportation's (USDOT's) Smart City Challenge grant.

The Greater Baltimore Committee (GBC) is the preeminent regional business organization representing a broad spectrum of businesses in Baltimore City and its five surrounding counties. For over sixty years, our organization has promoted sound public policy in the areas that affect business with a particular emphasis on transportation since it is so vital to the economic health of a region.

The GBC advocates for public policies that strengthen the business climate of the Greater Baltimore area. The GBC has a rich legacy of working in collaboration with government to find solutions to problems that negatively affect our competitiveness and vitality as a region. It is an organization that prides itself on advocating for changes in public policies that strengthen the business community and improve the quality of life in the region, and it is well known for its involvement in promoting transportation projects needed in the region. The GBC also believes that the business community must focus public attention on needs for the future.

The GBC believes that the Smart City Challenge grant to Baltimore City would allow the city to move forward on its efforts to:

- Promote efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connect communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- Create an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Define technological solutions that knock down key barriers such as disconnected communities, lack of transit service quality and reliability, climate change, and urban congestion;

111 South Calvert Street • Suite 1700 • Baltimore, Maryland 21202-6180 • 410-727-2820 • 410-539-5705 (fax) • [www.gbc.org](http://www.gbc.org)

The Honorable Anthony Foxx  
January 29, 2016  
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- Foster Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use Smart City technologies to help create, enhance and connect access to the Community Hubs;
- Focus on West Baltimore MARC and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- Establish a collaborative partnership of public agencies and organizations, anchor institutions, funders, and nonprofits focused on establishing economic inclusion as an integral part of the City's business culture.

The GBC has long supported initiatives designed to strengthen our city and region. Among other initiatives, in 2013 GBC was responsible for rallying business support to have enacted state legislation increasing state transportation funding. This effort has positioned the City of Baltimore, the region, and the State of Maryland to begin to address demographic and economic trends, as well as changes in technology, governance, and the movement of people and goods currently and in the future. Much more is needed, however, and awarding the Smart City Challenge Grant to the City of Baltimore would ensure further progress along these lines.

Please contact me at 410-727-2820, or at [donaldf@gbc.org](mailto:donaldf@gbc.org) if I can be of any further assistance.

Sincerely,



Donald C. Fry  
President & CEO



January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street, 5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

As Executive Director of the I-95 Corridor Coalition, I am writing this letter in reference to the City's application to the United States Department of Transportation's (USDOTs) Smart City Challenge grant. The Coalition, a state transportation funded consortium of state, city and regional transportation entities including State DOTs, MPO, Transportation and Toll Authorities from Maine to Florida, has, for more than two decades, been active in supporting public agency efforts to enhance transportation safety, mobility, security and economic competitiveness. The I-95 Corridor region contains a number of "mega regions" along the Eastern Seaboard and in its entirety, the region represents the 4<sup>th</sup> largest economy in the world.

A hallmark of the Coalition has been our ability to serve as a neutral forum for public agencies to share issues, challenges, lessons-learned and best practices between agencies, in particular, in areas such as the testing and deployment of intelligent transportation technology and early connected vehicle systems, between our many members and affiliates. The Smart City Challenge Grant embodies many of the same goals as the Coalition's mission and vision. Given the large number of cities and other public entities throughout this region which could benefit from your city's experience in the deployment of many of the Smart City initiative elements, we would certainly welcome the opportunity to serve as a conduit with you for information and best practices sharing to those agencies through our various program committees and related work sharing information and best practices in Transportation Operations, Travel Information, Passenger and Freight Goods Movement and Connected/Automated/Autonomous Vehicles, in the event your application is successfully received.

Please contact Marygrace Parker, I-95 Corridor Coalition Program Coordinator at 518-852-4083, or [i95mgp@i95cc.com](mailto:i95mgp@i95cc.com), if we can be of any further assistance.

Sincerely,

A handwritten signature in black ink that reads "George E. Schoener".

George Schoener  
Executive Director



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January 27<sup>th</sup>, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

RE: Smart City Letter of Support

Dear Mayor Rawlings-Blake:

The Maryland Clean Cities Coalition is pleased to support Baltimore City's Smart City proposal to improve public transportation through the creation of transit hubs, starting with communities of greatest need, the urban core of West Baltimore. We congratulate Baltimore for its Smart City Vision to advance opportunities for all by connecting citizens to high speed internet access, clean energy, City sustainability, employee wellness, employer profitability and jobs. Moving the City forward in this critical way will help move low-income residents out of poverty, help heal the City of digital and other limiting divisions and help re-define Baltimore as a truly Smart City of opportunity with safe, reliable transit.

We look forward to a positive funding outcome for Baltimore's U.S. Department of Transportation Smart City Challenge proposal, and for the opportunity to work with you to advance Baltimore's Smart City planning, development and impact.

Yours sincerely,

Mike Jones  
Clean Cities Coordinator  
410-537-4071

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1800 Washington Boulevard, Suite 755 • Baltimore, MD 21230



January 26, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street; 5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. As an instrumentality of state, the Maryland Clean Energy Center (MCEC) embraces the City's vision to enable efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services with the creation and implementation of Smart City Community Hubs.

We understand the vision for this initiative is to:

- Connect communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- Facilitate the creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Define technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Focus on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- Serve as a collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

Use of Smart City technologies to help create, enhance and connect access to the Community Hubs; will have city-wide, regional and, we hope, national impact.

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey the support of the Maryland Clean Energy Center for the Smart City Challenge grant. Please contact me at if I can be of any further assistance.

Sincerely,

A handwritten signature in black ink that reads "Katherine Magruder".

I. Katherine Magruder  
Executive Director

1212 West Street, Suite 200 • Annapolis, MD 21401 • Phone: 443-949-8505 • Fax: 443-949-8525 • [www.mdcleanenergy.org](http://www.mdcleanenergy.org)



January 29, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. This organization embraces the City's vision that enables:

- Efficient, safe, and sustainable transportation to help citizens access jobs, education, healthcare, and lifeline services;
- Connects communities to economic opportunities starting with the low-income and historically underserved West Baltimore area;
- The creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Defining technological solutions that knock down key barriers: disconnected communities, transit service quality and reliability, Climate Change, and urban congestion;
- Creating Smart City Community Hubs: These multi-functional transportation, logistics, education, living, and job centers converted from existing transit hubs can serve to connect people to opportunities in the City and region;
- Use of Smart City technologies to help create, enhance and connect access to the Community Hubs;
- That this proposal focuses on West Baltimore Marc and Lexington Market Hubs, areas that can really use enhanced connectivity and attention; and,
- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

The Innovation Village was designed to strengthen our city and region by leveraging this City's extraordinary assets, institutions, and talented youth and courageous and stalwart legacy residents. Our model is based on preparing the potential workforce for the 21st century jobs that are coming to Baltimore. Supporting the Smart City initiative will have city-wide, regional and, we hope, national impact.

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Mayor Stephanie Rawlings-Blake  
January 29, 2016



Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future.

Please convey the Innovation Village board of advisors' support for the Smart City Challenge grant. Please feel free contact me at [rich@innovatebaltimore.org](mailto:rich@innovatebaltimore.org) if I can be of any further assistance.

Sincerely,

Richard May  
Chairman, Innovation Village



January 20, 2016

TO: The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street, 5th Floor  
Baltimore, MD 21202

SUBJECT: Letter of Support  
Baltimore, MD application to the United States Department of Transportation's (USDOT's) Beyond  
Traffic: The Smart City Challenge, Funding Opportunity Number: DTFH6116RA00002

Dear Madam Mayor Rawlings-Blake,

The National Renewable Energy Laboratory (NREL) is pleased to support the City of Baltimore's goals, vision, and application to the DOT's Smart City Challenge as a collaborating partner providing expertise and solutions in areas of such as: urban science, transportation automation, efficient vehicle technologies, and cross-sector integration of technologies to meet city goals, and smart infrastructure. NREL's wide-ranging capabilities and expertise in cross-sector energy technologies as well as technology integration and data science for decision support is directly applicable to meeting the City of Baltimore's Smart City Community Hub vision and position NREL to be a strategic partner in executing the City's technology elements. Upon award, NREL is prepared to enter into the necessary agreements and to provide all resources as defined in the proposal for the project's duration.

If funded, NREL's participation in this project will be provided through an agreement with the Alliance for Sustainable Energy, LLC, managing and operating contractor for the National Renewable Energy Laboratory under U.S. Department of Energy M&O Contract No., DE-AC36-08GO28308. The Department of Energy permits access to NREL's unique capabilities and services to support industry, state or local governments, or universities in response to federal agency announcements or nonfederal solicitations. NREL's unique capabilities and services are provided subject to DOE review and approval, in accordance with DOE policies and regulations.

NREL's mission is to advance scientific knowledge and technologies in the areas of energy efficiency and renewable energy. The lead technical contact is Stanley Young, Program Lead for Advanced Transportation & Urban Science, (303) 275-3283, Stanley.Young@nrel.gov.

We look forward to the collaboration and helping the City of Baltimore reach its vision and goals.

Sincerely,

A handwritten signature in black ink, appearing to read "Elizabeth Doris", written over a horizontal line.

Elizabeth Doris  
Principal Laboratory Program Manager – State, Local, and Tribal  
National Renewable Energy Laboratory  
(303) 384 7489

15013 Denver West Parkway  
Golden, CO 80401  
Phone 303-275-3000

NREL is a national laboratory of the U.S. Department of Energy  
Office of Energy Efficiency & Renewable Energy  
Operated by the Alliance for Sustainable Energy, LLC



January 27, 2016

The Honorable Stephanie Rawlings-Blake, Mayor  
c/o Mr. Colby McFarland  
417 E. Fayette Street  
5th Floor  
Baltimore, MD 21202

Dear Madam Mayor Rawlings-Blake:

I am writing this letter in support of the City's application to the United States Department of Transportation's (USDOT's) Smart City Challenge grant. We understand that the City's "B'Smart" Vision targets intelligent urban infrastructure that enhances transportation, high speed internet and energy efficiency at the same time through smart transit hubs. We applaud this focus, particularly with the pilot emphasis on West Baltimore. Transit Choices supports the City's vision to enable:

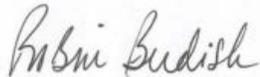
- Smart City Community Hubs, starting with Lexington Market and the West Baltimore Marc Station, "B'Smart Transit Hubs." These Smart Transit Hubs will be multi-functional transportation, logistics, education, living, and job centers connecting people to opportunities in the City and region;
- Improved, efficient, safe, and sustainable transportation to help citizens get to work, school and around town faster and more reliably;
- Communities to build economic opportunities starting with the low-income and historically underserved West Baltimore area;
- Creation of an integrated/transferrable platform for technology deployment, analytics, and performance monitoring;
- Technological solutions that knock down barriers for accessing and using data barriers; use smart sensors to help reduce congestion, improve safety and urban quality of life;

- A collaborative partnership of public agencies and organizations, anchor institutions, funders, nonprofits focused on establishing economic inclusion as the business culture of norm.

Transit Choices has long supported transit initiatives designed to strengthen our city and region. We believe that public transit is an essential means to achieving personal and economic independence. In the face of deep inequality and unrest in Baltimore City, there has never been a greater need to address the shortcomings of our existing public transit systems. People of all ages, races, ethnicities, and abilities deserve access to a transportation system that will enable them to achieve their fullest potential. The City's "B'Smart" Vision initiative will have city-wide, regional and, we hope, national impact

Central to the vision is addressing the demographic and economic trends, as well as changes in technology, governance, and how our climate is affecting how people and goods travel today, and how they could affect travel in the future. Please convey Transit Choices' support for the Baltimore Smart City Challenge grant.

Sincerely,



Robin Budish  
Executive Director  
410.528.8696

516 N. Charles Street, Suite #312 – Baltimore, Maryland 21201



This proposal was completed by [the City of Baltimore](#) with primary assistance from [the National Transportation Center at the University of Maryland \(NTC@Maryland\)](#). Inputs and assistance are also provided by [the National Center for Smart Growth \(NCSG\)](#) and [the Center for Advanced Transportation Technology \(CATT\)](#) at the University of Maryland, [Johns Hopkins University \(JHU\)](#), [Baltimore Washington Electric Vehicle Initiative \(BEVI\)](#), [Baltimore Metropolitan Council \(BMC\)](#), [Central Maryland Transit Alliance \(CMTA\)](#), and more than 50 partners. Use of original materials created for this proposal, in a way that is unrelated to the USDOT Smart City Challenge application process, is prohibited and must be approved by both the City of Baltimore and the University of Maryland. Copyrights of proposal images from team partners belong to the respective partners.

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