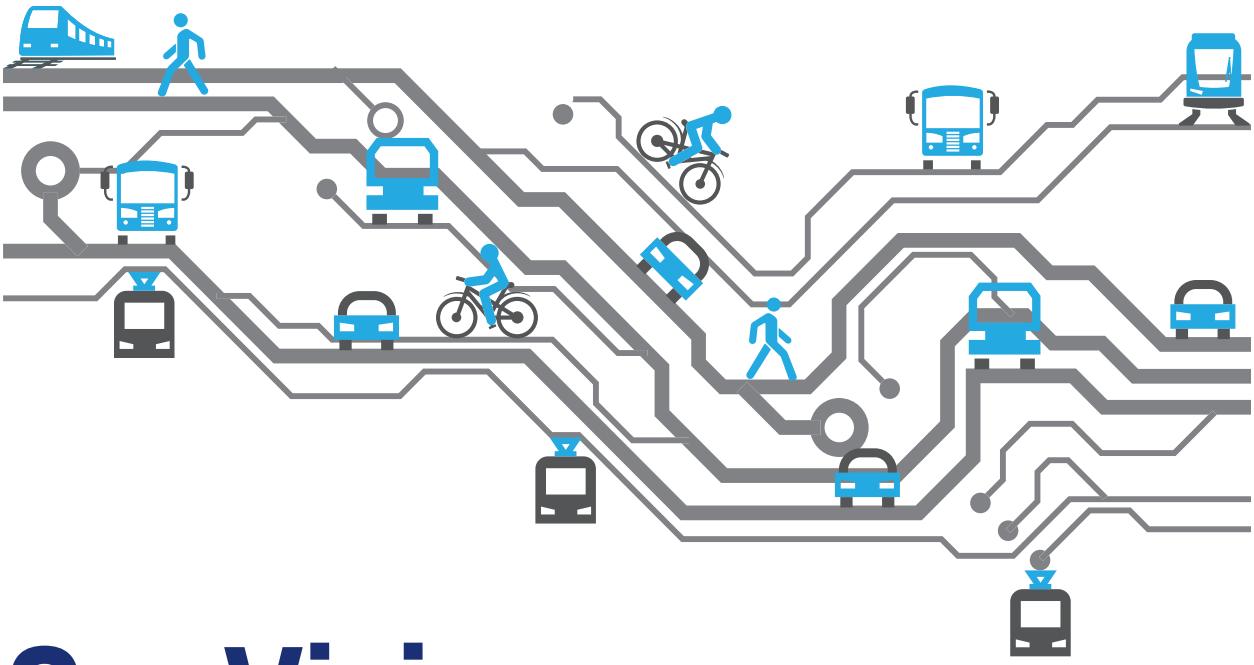
CITY OF BATON ROUGE, EAST BATON ROUGE PARISH:



Our Vision for a Resilient, Open-Access Transportation Super-Network

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Our Vision: A Resilient, Open-Access Transportation Super-Network

In August 29, 2005, Hurricane Katrina made landfall in New Orleans, and one of the largest domestic disasters in U.S. history subsequently tested the State of Louisiana. Hundreds of thousands of evacuees fled the devastation in a 70-mile journey to Baton Rouge. For many, that one-hour trip took days to complete due to the bottlenecked interstate and arterial road systems feeding into Baton Rouge. Our community welcomed these new residents, temporary or otherwise, but quickly realized the transportation system that had served us for decades was ill-equipped to support a sudden population influx of this magnitude.

Even before the devastation of Hurricane Katrina took hold of our community, our then incoming and now current Mayor-President Melvin "Kip" Holden campaigned and was elected on a platform focused on applying short-term fixes that would help get traffic in Baton Rouge moving again – fixes that following such rapid population growth for our area became more acute. Innovative change was necessary in a way that would programmatically address this congestion issue, and Baton Rouge residents were desperate for a solution. Through the efforts of Mayor Holden, our staff at the City-Parish, and partners in the community, we developed what would become known as the "Green Light Plan" for street and road improvements. The innovation, and success, of this program cannot be understated as a precedent for what can take hold in our community when we organize around a cohesive vision and work to accomplish it. During a time when municipalities across the U.S. struggled to identify sources of funding for such transformative capital improvement programs, our leadership developed a program with a mix of innovative funding solutions, and our Baton Rouge residents responded in-kind by overwhelmingly approving to self-impose a 25-year, half-cent sales and use tax to fund the measures and projects required by this program.

From 2005 to 2016, under the leadership of current Mayor Holden, more than $600 million in the form of a comprehensive capital improvements program has been expended or obligated to fund road projects designed to increase capacity and connectivity across our road system. The reality is that while other communities may propose a set of solutions focused around innovation in transportation, ours is a community with a proven record of success.

We have been there before and we are ready to do it again. And today, with such substantial transportation-related capital projects either complete or underway, we now shift our focus to long-term solutions.

Imagine a mother and her two children leaving their home for the day to go to school and work. Rather than taking their family vehicle, the mother uses a smartphone application to request a shuttle van that arrives promptly, whisking the family away. What she does not see is the algorithmic approach the application's technology uses to define the most efficient route not just for this family, but for others in the shuttle, to get to their end destination as quickly and efficiently as possible. The shuttle van is able to maintain a speed of 40 miles per hour or more throughout its journey, with very few stops, thanks to application program interfaces (APIs) that allow the transit application to talk directly with traffic signals along some of Baton Rouge's most heavily used arterial routes. This instinctive traffic signal function also helps minimize sit-and-wait time for transit providers or vehicles with a certain number of passengers. Game theory informs how traffic signals process other vehicles through these intersections in an intelligent, real-time manner, ensuring that load-balancing is in effect at all times and traffic is processed efficiently and safely through intersections – with data transmitted directly into an open-data environment that allows anyone to devise applications or additional solutions to add even more efficiency for travelers.

In essence, traffic signals have become data sensors that communicate with other sensor-based technologies across Baton Rouge through the Louisiana Optical Network Initiative (LONI), one of the most advanced optical networks in the nation. These same signals communicate wirelessly with vehicles to guide the vehicle through intersections and smoothly navigate it through the network of arterial roads. Vehicles

are automatically rerouted when certain intersections experience heavy utilization that might cause traffic delays. This data is communicated to other networks, such as Louisiana's statewide traffic system, to ensure non-local routes are able to incorporate traffic trends on high-volume routes like Interstates 10 and 12 – two key arteries for our dominant petrochemical and port-related shipping industries. Public and corporate policies work together to mitigate vehicle volume during peak travel times.

These technologies were not simply identified and integrated into our local transportation system. They were applied and then built upon with technologists, developers, and traffic engineers competing to find better, more innovative ideas through new programs like the Transportation Technology Innovation Center, a joint program incorporating top talent from leading engineering programs at Baton Rouge's two major universities – Louisiana State University (LSU) and Southern University (SU) – as well as the Louisiana Transportation Research Center (LTRC) and technology corporations like IBM, serving as a testing ground and innovation hub for new technologies.

Meanwhile, a few miles down the road, start-ups are working with local political leadership to create technology and operational solutions focused on traffic or transportation-related issues, all through an entrepreneur-in-residence program that co-locates entrepreneurs with City of Baton Rouge and Parish of East Baton Rouge (City-Parish) traffic engineers and programmers at City Hall. Through this incubation, collaborative teams focus on improving transportation data management and usage to develop solutions. These entrepreneurs are able to leverage unprecedented access to public sector data through the City-Parish's open data portal, which expanded from a leading portal for all mid-sized cities in the nation to one that serves as a data clearinghouse for all public sector data in south Louisiana. The portal coordinates with other key municipalities or parishes, which now have the technological capacity to track, manage, and export traffic-related data in a meaningful way through technical assistance provided by City-Parish officials.

In addition, Neighborhood Innovation Labs in economically disadvantaged areas throughout Baton Rouge work to solve similar traffic or transit-related problems, with a direct pipeline to area university programs and workforce opportunities. Meanwhile, the City-Parish's commitment to fostering first-mile, last-mile solutions that build a comprehensive framework for public transportation have resulted in new transportation options, such as bikeshare programs with integration into the City-Parish's open data environment, that connect to key transit hubs and provide alternate modes of transportation in high-density areas.

That future of transportation in Baton Rouge is not all that difficult to imagine. When one begins to consider every element of the transportation system as a data packet, with different utilities and needs from each, the flow of people and goods begins to look much more like a true network. In essence, traffic flow is being translated into a network topology, where data packets flow through routers and switches in a 99.9% uptime environment with redundancies in place for system spikes or crashes. And in Baton Rouge, where the infrastructure and resources already exist – from technology backbones and a history of solution-oriented transportation programs to a mix of leading industries, workforce talent, and top research capabilities – there is no place more poised to redefine the future of transportation in mid-sized cities by functioning as a test lab with inter-modality as a core focus.

Resiliency is a quality in objects to hold or recover their shape, or in people to stay intact. Here in Baton Rouge, the application of that definition similarly holds dual meaning. Just over 10 years ago, the transportation system in Baton Rouge endured a spike unlike most mid-sized cities have ever seen – one that sustained for months and years to come as New Orleans and coastal communities worked to rebuild in a post-hurricane environment. In a state that has experienced the full impact of four major hurricanes in the past 10 years, with greater frequency of high-impact events expected because of climate change and population growth, the unfortunate reality is that it is only a question of when the next disaster will strike. No other community is better positioned to develop and export a model for adaptation and response to unexpected, external events such as these.

This community is resilient well beyond the textbook definition. Investments must be made to ensure the City-Parish's transportation system is placed on a path to recover from disruption. This kind of a resilient system is what we see as the future of Baton Rouge – a system in which people do not need to own a vehicle to move around, and where a major event such as an accident on one of our major interstates does not cripple the rest of the transportation system. By integrating new, reliable modes of transportation ranging from bikes and trams to on-demand rideshare and transit to gondolas – in tandem with the significant resources and efforts that have been expended in recent years and will continue to take place in the form of capital projects, infrastructure investments, and a commitment to continuous performance improvement - the solutions outlined in this application can make this future a reality.

We firmly believe Baton Rouge is uniquely positioned to innovate and succeed as a demonstration project for mid-size communities around the country. Here are just a few reasons why:

- A track record for innovation in how a clear vision, leadership, and community support can transform a municipal transportation system
- The necessary political drive, will, and leadership to affect the type of change typically required by strong levels of innovation
- A friendly tax environment that incentivizes digital innovation
- A struggling transit system poised to be re-imagined and serve as a model for how other mid-sized communities can similarly re-purpose their own transit systems
- A strong academic foundation powered by leading universities and researchers laser-focused on developing innovative solutions for transportation issues
- An existing fiber optic network that offers more than $50 million in infrastructure to facilitate lightning-fast data exchanges
- Strong community-based partnerships that ensure innovative ideas are both executed upon and long-lasting, transcending political regimes
- Innovative public-private partnership agreements between local government and cutting-edge technology providers
- A unique geographic, multimodal landscape home to some of the nation's leading industrial clusters and a rapidly growing technology sector
- A dedication to strategic digital innovation and adoption of an open-government model rooted in how the open-sourcing and exchanging of data can positively impact a mid-sized community

The future of transportation in Baton Rouge is one without tradition – where doing things the way they have always been done is a mindset that is all but non-existent and where true innovation is taking place through a resilient, open-access transportation super-network that relies on grass-roots, community support and welcomes innovation.

So how do we get there? Our blueprint is multi-pronged in nature, with a guiding framework and cadence carefully designed to innovate, change, and transform in a way that any mid-sized community like ours can and should do.

Key elements of our approach include:

- **PHASE 1:** Re-imagined and re-invigorated public transportation coupled with active public engagement, strong public-private partnerships, and progressive regulatory policies all working to increase access for all transportation system users
- **PHASE 2:** Smart infrastructure installation and conversion of public transit fleets to electric
- **PHASE 3:** Incremental adoption of electric, autonomous vehicles
- **PHASE 4:** A community no longer dependent on traffic signals or traditional means of facilitating movement through public spaces – one that is innovative beyond reproach and one that sets the standard for what all mid-sized communities should aspire to be

Background: Baton Rouge at a Glance

As both the capital city of Louisiana and home to Louisiana's largest parish (county), Baton Rouge is one of the most – if not the most – unique mid-sized cities in the nation. Governed by a consolidated form of government, the City-Parish operates under the executive leadership of Mayor-President Melvin "Kip" Holden and is legislated by a 12-member Metropolitan Council (Council), with council members representing various portions of the 471 square miles that comprise East Baton Rouge (EBR) Parish. Four chartered cities exist within EBR – the City of Baker, the City of Zachary, the City of Central, and the City of Baton Rouge – with the city limits of Baton Rouge encompassing 87.92 square miles.

EAST BATON ROUGE PARISH: KEY DEMOGRAPHICS[1]	
Population (2010)	440,171
Population density	934.546 persons per square mile
Persons per square mile (City of Baton Rouge)	2,607.131
Urbanized area in East Baton Rouge Parish	42.49 percent[2]
Median household income	$48,506
Persons below poverty line (2009-2013)	19.2 percent
Mean travel time to work, workers age 16+ (2009-2013)	23.0 minutes
Commuters from outside Baton Rouge (non-residents)	58%[3]

While the City of Baton Rouge operates as the consolidated seat of government for both itself and EBR, our application – and the problems it seeks to address – is intended to encapsulate any and all traffic issues that exist across all 471 square miles of our parish. Just as water knows no political boundaries – an adage with which we in Louisiana are all too familiar – the same applies to traffic, from recurring areas of congestion on our interstate system to arteries that may move from free-flowing one minute to bottlenecked the next. Over 58% of the Baton Rouge workforce commutes from outside the city. As such, any set of solutions focused on traffic issues must be one that extends beyond city boundaries and addresses the problem in a community-wide, holistic manner. With a population of 440,171 as of the 2010 United States Census, our parish and community embody the "mid-sized" definition as one that is small enough for innovation to exist and spread rapidly, but large enough that such advances matter tremendously. In our opinion, there is no better petri dish in the U.S. with the size, demographics, industry, and other characteristics as ours that can serve as a model for creating a transformational solution to solving traffic issues. That is the essence of each approach that we are proposing – a comprehensive solution with each element working in tandem, and one that is structured as a model to be defined, tested, and refined in Baton Rouge prior to being exported to other markets.

A community-driven approach

Our application was developed by drawing on the resources, intellect, and partnerships that are omnipresent throughout Baton Rouge. This application is community-based and community-driven, which we hope is evident by the numerous letters of support from political and business leaders throughout Baton Rouge provided in this submittal. When we began developing our approach, we brought together more than 30 of Baton Rouge's brightest technology and traffic engineering minds to hear pitches, ideas, and technologies relevant to this effort – a discussion that led to tangible applications included in our proposed solution.

This proposal is not the first example of our community coming together to solve pressing challenges in Baton Rouge. In recent years, stakeholders have identified unique opportunities to move Baton Rouge forward by leveraging existing assets and infrastructure similar to those that we propose as valuable cornerstones within this Smart City approach. This collaboration is evident when looking at the development of the Baton Rouge Health District, a unified medical community currently being formed to allow health care providers to combine their diverse strengths and compete with medical centers nationwide. The Health District is also implementing smart land use and proper transportation planning into its long-range vision. Or consider the Water Campus, which will create a world-class research center for the globe's best scientists, engineers, and public and private businesses working to restore and protect shrinking coastlines. They are developing scientific models of the impacts of sea-level rise and climate change to inform how we respond and ensure we are implementing sustainable solutions. Over $60 million has been committed to implement the first phase. When finished, the 33-acre campus will include approximately 1.8 million square feet of research, office, commercial and residential space. Estimates from the Louisiana Department of Economic Development (LED) predict the Water Campus will house 4,000 new employees and create as many as 45,000 jobs in this entirely new economic sector for Louisiana over the next two decades. In each of these examples – both of which materialized quickly to move beyond planning – dozens of public and private sector partners came together to adopt a shared vision for growth and success. Truly transformative projects supersede the abilities of one entity and rely on a commitment from the community. This Smart City implementation will be no different.

Strong, capable, and willing political leadership

One of the primary reasons initiatives such as the Water Campus, the Health District and this Smart City challenge are able to succeed is the willingness of our policymakers to be flexible and innovative. Our executive and legislative leadership firmly supports considering any policies required to achieve our desired objectives through this effort – from public policies that encourage user adoption to those that welcome innovative transportation disruptors to those that support technologies that connect vehicles to one another and supporting data hubs.

Our political and economic environment not only permits initiatives like these to take place, but welcomes them with very few inhibitors to stall progress. For example, in 2006, the Louisiana Legislature passed legislation to create the Digital Media and Software Development Incentive program, one of the nation's strongest and most comprehensive software development tax incentives of its kind. For qualifying companies registered to do business in Louisiana, the incentive provides an 18% credit on qualifying expenditures with an additional 7.2% credit on Louisiana resident payroll, and offers complete scalability – there are no minimums, caps, or expirations on the incentive. Effective July 1, 2018, this incentive rate is set to jump to a 25% credit on qualifying expenditures with an additional 10% credit on Louisiana resident payroll. To-date, hundreds of companies statewide have taken advantage of this leading differentiator for Louisiana's software development and technology industry, including those in Baton Rouge such as Stixis (100 new jobs), Electronic Arts (400 new jobs), and IBM (800 new jobs). In Baton Rouge alone, $75.8 million in expenditures have been claimed throughout the life of the program, resulting in

$25.2 million in credits issued to the area's technology firms. Unlike many other cities, companies choosing to locate in this area to design new software applications and build on our Smart City proposal will reap financial benefits through our innovative tax programs.

In addition, the Alternative Fuels Tax Credit encourages the conversion of vehicles to alternative fuel usage for CNG, propane, and electric vehicles and further bolsters our claim to a regulatory environment that recognizes industry trends and welcomes a new age of automotive technology. This consumer-oriented incentive applies a 36% credit to the conversion of vehicles to alternative fuel usage or, if a taxpayer is unable to or elects not to determine the exact cost of the qualified clean-burning motor vehicle fuel property, he may claim a credit equal to 7.2% of the cost of the motor vehicle or $1,500, whichever is lower.

The success of these types of programs and a regulatory environment that welcomes a burgeoning technology industry has not gone unnoticed. In 2014, Business Facilities Magazine ranked Louisiana first in its Best Business Climate Rankings, remarking, "Pick a successful growth strategy other states are starting to replicate and you'll discover that Louisiana has made it work on a grand scale. Nowhere is this more evident than in the unprecedented cooperation between higher education resources and business in Louisiana."

A public transit system in need of an overhaul and poised to be re-imagined

In Baton Rouge, the Capital Area Transit System (CATS) operates our public transit system, and the need for such transit services is highly acute. According to the U.S. Census Bureau's 2010-2013 American Community Survey, 10.2% of households in the City of Baton Rouge are without a vehicle of their own, with that number dropping to 6.9% when considering the parish of EBR. [4] With more than 1 in 10 households in Baton Rouge city limits not having a vehicle of their own to get to work, the grocery store, or doctors' offices, it is critical to have a robust, reliable transit system capable of filling that void. In addition, a tremendous opportunity exists in Baton Rouge to expand our public transit system to accommodate riders of choice.

Consider the following:

- An overwhelming majority of workers – 82% – in EBR drive alone to work in their vehicles[4]
- Over 28% of commuters in EBR drive alone to work and commute for over 30 minutes[4]
- Only 1.7% of workers aged 16 years and over commute to work by public transportation[4]– well short of the 5.5% goal established by the Healthy People 2020 national health target

In April of 2010, voters approved a 10-year, 10.6 mill property tax – both a recognition of the transit problems and a commitment to fund solutions – which allocated $17.3 million in revenue to CATS' 2015 annual budget, with total revenue in the same budget reaching just over $27.7 million. [5] Re-purposing this funding and re-imagining our transit system could solve systemic problems in our existing public transportation system. Given that, along with ridership statistics and growth of our urbanized core, it is critical that solutions be put in place now in order to have a lasting effect in a fully functioning transit system.

The epitome of strong community assets and multi-modal infrastructure

Baton Rouge boasts the necessary assets and infrastructure to ensure any community-wide models developed here have applicability to other areas in the U.S., as well as the institutional resources to innovate in a dramatic way. Our rapidly developing downtown area is situated along the banks of the Mississippi River, providing easy access to the nation's ninth most active port, which handles nearly 60 million short tons of cargo annually. Additionally, our two major universities are in close proximity and offer

academic resources and opportunities for unique partnerships. Four major rail lines, an airport minutes from downtown Baton Rouge, and one of the nation's largest petrochemical industries are also unique assets to our capital area. In addition, a $50 million integrated fiber network provides connectivity among universities into a single research and development platform, serving as a key asset capable of driving collaboration, innovation, and supercomputing activities across Baton Rouge. In essence, our inventory of assets and infrastructure offers a full-stack, holistic environment for the development of an exportable Smart City model.

PORT OF GREATER BATON ROUGE

As the farthest inland deepwater port on the Mississippi River, the Port of Greater Baton Rouge – based in West Baton Rouge Parish, just across the river from downtown Baton Rouge – serves as a key link between Louisiana, neighboring states from Florida to Texas, 31 additional states and two Canadian provinces, and the Gulf Intracoastal Waterway. Our local port jurisdiction is 85 miles of the Mississippi River, including neighboring Ascension and Iberville Parishes, with hundreds of millions of dollars in activity invested or committed in recent years to expansion-related activities.

LOUISIANA STATE UNIVERSITY

The state's flagship university, LSU, is home to more than 30,000 undergraduate and graduate students and strong academic centers of education and research across a number of disciplines, including civil engineering, computer engineering, and computer science – bolstered by a $14 million investment from the state of Louisiana to increase the number of annual computer science graduates as part of a public-private partnership between LED, LSU, and IBM.[6] Through this partnership, in 2013, LSU's College of Engineering committed to double its computer science faculty and triple its graduates during a five-year timeframe, with a goal of placing LSU's Computer Science program in the top 10 to 15 nationally for B.S. degrees in computer science awarded annually.

LOUISIANA TRANSPORTATION RESEARCH CENTER

LTRC – a research, technology transfer, and training center sponsored jointly by the Louisiana Department of Transportation and Development (LaDOTD) and LSU– is located on LSU's campus and provides researchers and students with access to state-of-the-art laboratories and research equipment. LTRC is home to more than 90 employees and operates out of a 50,000-square-foot facility – that include two buildings – where scientists and engineers conduct advanced research on a wide range of transportation related projects to develop innovative engineering and technology-oriented solutions to Louisiana's transportation problems. The center has nearly 50 active transportation research projects involving investigators at LSU and other Louisiana universities.

SOUTHERN UNIVERSITY

Less than 15 miles from LSU, SU's campus is home to more than 6,000 students and the university's College of Engineering and Computer Science program with four programs ranked among the top 10 producers of African-American students who receive undergraduate engineering degrees. As a whole, the SU System is the nation's only historically black university system, anchored by its flagship campus in Baton Rouge.

RAILROAD INFRASTRUCTURE

Four major rail lines provide freight service within the Baton Rouge area, with routes ranging from north-south following the Mississippi River and Interstate 55 and east-west along U.S. 190. In addition, the Huey P. Long Bridge crossing the Mississippi River in Baton Rouge offers the only railroad bridge between Vicksburg, Mississippi, and New Orleans.

BATON ROUGE METROPOLITAN AIRPORT

With direct service to four major hub airports, the Baton Rouge Metropolitan Airport (BTR) serves as a key connector between Baton Rouge and the rest of the world. In addition to commercial flight offerings, BTR's Aviation Business Park is located on the north side of the airport and includes nearly 800 acres with current tenants ranging from the regional Coca-Cola Bottling Co. to the Mayor's Office of Homeland Security and Emergency Preparedness – home to our Emergency Operations Center, a high-tech facility out of which critical government services are delivered and managed during times of emergency or natural disaster.

LOUISIANA OPTICAL NETWORK INITIATIVE

LONI is a unique, integrated fiber optic and high performance computing (HPC) system connecting every university, college, and major research institute in Louisiana into a single platform – representing one of the nation's most innovative, integrated fiber and HPC architectures. Owned and managed by the State of Louisiana, LONI was conceived to accelerate research and education while attracting industry and government partners to Louisiana. With more than 1.5 petaflops of total computational capacity and more than 1,600 miles of fiber in the LONI network, LONI's powerful cloud supercomputer resources provide an extremely enticing environment for any kind of activity – including the unification of data and computational capacity into a single platform.

To date, over $50 million has been invested in LONI, making it an asset that can immediately be leveraged to build, model, and power the technology and data-transfer needs of a smart city. In addition, LONI's ready-made access points allow for easy connection from data sensors and swift integration into state and local traffic management systems thanks to existing partnerships between LONI, the LaDOTD, and the City-Parish.

AN ENTREPRENEURIAL ECOSYSTEM

In addition to the thousands of workers who power our area's dominant petrochemical industry, Baton Rouge is also home to a growing technology sector. We boast an ecosystem of tech-savvy entrepreneurs with dozens of start-up companies based out of our two area business and technology incubators – the Louisiana Business and Technology Center and the Louisiana Technology Park, operated by parent organization Research Park Corporation. Operations range from Cellcontrol, which uses technology to protect drivers from mobile distractions, to Freebird, an app harnessing the power of interconnectivity to popularize and vet ideas for community improvement.

LSU's Student Incubator offers a similar environment to foster the growth of student entrepreneurs through dedicated office space, business consulting, and seed-based funding competitions such as the LSU Venture Challenge. The innovation offered by our university student base holds great potential to radically change both our transportation system and entrepreneurial community. For example, in January 2016, a team of LSU engineering students designed a hovering pod capable of traveling in a Hyperloop tube, "a concept promoted by inventor Elon Musk as a 'fifth mode of transportation' that is faster and more efficient than cars, planes, boats and trains."[7] The team plans to raise private funds to build a model Hyperloop pod with final implementation connecting Baton Rouge and New Orleans.

Why Baton Rouge?

TRANSIT OPTIONS

Our CATS system struggles to meet rider expectations, improve upon its public image, and deliver services in a way that grows its impact and reach among residents. Riders of choice overwhelming reject CATS' services with only 13% of the entire CATS ridership choosing to use the transit system. While

these are the realities of our current system, we believe the integration of innovative technologies and related solutions outlined in this application can transform our public transit system in a way that can be exported to other mid-size cities similarly struggling with transit services.

In 2015, CATS reported 2,742,387 unlinked trips through 30 fixed routes, up from 2,316,896 unlinked trips in 2013. Much of this increase is attributed to a change in service offerings, which were based off recommendations outlined in a "Comprehensive Operations Analysis" of the CATS network. In January 2013, 20 routes existed. In March 2014, through the implementation of these recommendations, four transit hubs were added, 19 of the existing 20 routes were adjusted to meet user demand, and 10 new routes were added.

Currently, 87% of CATS riders do not have a choice of whether to use the bus system, further demonstrating the low percentage of riders of choice in our market. Over the years, operators of the system have worked to add more routes that may increase ridership from riders of choice. In recent years, CATS has tested park-and-ride systems and implemented several routes in neighborhoods whose residents are not considered typical public transit users; some of these routes have been successful, but most have not taken root in the community.

Typical CATS riders use the system consistently and frequently. Ninety-three percent of customers use the system at least three days per week and 76% use the system more than five days per week. CATS is used largely by riders traveling to and from work, with 66% of customers indicating this as the primary purpose for using the system. Generally speaking, the demographics of CATS ridership indicate low-income and minority residents are the primary users. Ninety-six percent of riders earn less than $50,000 annually, and 74% earn less than $25,000. Seventy-eight percent of CATS customers are black, and only 19% are white, compared to a parish-wide residential breakdown of 46% black and 49% white.

In an effort to gauge rider needs and satisfaction, CATS has been completing customer surveys over the last several quarters that offer mixed results – while 81% of riders indicated that CATS goes where desired and 75% indicated that CATS operated when the rider desired, 51% felt that CATS did not have enough buses on each route, and 51% found that CATS buses arrived late. Establishing expectations for on-time performance and adhering to them is the top priority and service element for customers of a successful public transit system, and these metrics must be improved along with rebranding public transit in Baton Rouge to the point where these expectations are realized across both riders of need and choice.

CATS' current window of on-time performance is up to one minute early and 10 minutes late. Based on this definition and rider survey data, if CATS achieved 100% on-time performance, 58% of customers would not be satisfied. Meeting on-time performance demands is a challenge for the bus system given the often unpredictable congestion within the City-Parish. If CATS could more reliably predict traffic problems, or otherwise be notified in real-time of traffic-related incidents, on-time arrivals could improve. Additionally, of the 83 total CATS fixed-route vehicles, 28 vehicles are past their useful life because of their age and mileage. An additional 28 vehicles, while they have not reached the end of their useful life yet, have recurring maintenance issues. Most of the vehicles currently in use run on diesel fuel. In 2013, the fleet consumed 550,978 gallons of ultra-low-sulfur diesel; fuel consumption in 2015 was estimated at around 855,000 gallons.[8] Vehicle repairs and breakdowns are critically affecting the on-time performance and rising maintenance costs, with CATS estimating a shortfall of $80 million for fleet and facilities improvements in the coming years.

In addition to our bus transit system, we have begun to see exponential growth in shared-use mobility services for Baton Rouge residents – growth that has been very intentional on the part of policymakers. In 2014, a contingent of council members began actively working to recruit rideshare companies and establish ordinances that would welcome these operators to our market. These efforts resulted in Uber establishing operations in Baton Rouge shortly thereafter, with our City-Parish government sending a

clear signal to other innovators in this space that our doors and market are open for business. This message and our approach to legislating and embracing these types of technological advances is very unique and atypical for mid-sized cities, and even here in Louisiana, where a community like New Orleans has endured a number of setbacks[9] related to implementing a policy framework for ridesharing services due to political controversy and opposition from traditional taxicab operators.

In July 2014, at initial launch, 30 Uber drivers were licensed to operate within EBR Parish. By the end of 2015, 737 Uber drivers held licenses issued by the City-Parish. Additionally, with the increase in drivers, Uber has been able to decrease wait times from 12 minutes at launch to five minutes, demonstrating a strong presence in the community and swift measures taken by the industry to meet rider demand that has grown tremendously, with the community embracing this new service and experiencing little push-back from elected officials or others.[10]

BATON ROUGE TRAFFIC CONGESTION

More than 500,000 people move through Baton Rouge on a daily basis which, when compared to our city of just over 200,000, demonstrates traffic load that greatly exceeds our residential population. Our parish-wide road infrastructure consists of 2,589 road miles: 210 of those miles are major collectors, 231 are minor arterials, 66 are minor collectors, and 246 are other principal arterial roads. Many of these roads are overly congested on a daily basis given the commuters (58% of our Baton Rouge workforce),[3] freight trucks, and visitors who travel through our community en route to another end destination.

Mobility data collected by Texas A&M's Urban Mobility Scorecard suggests that Baton Rouge is one of the most congested mid-size urban areas in the country. At a staggering 47 hours, Baton Rouge has the third highest yearly delay per auto commuter relative to other medium-sized urban areas in the nation. Similarly, at 23 gallons, Baton Rouge ranks third highest among medium-sized urban areas for excess fuel per auto commuter due to congestion. Even more notably, Baton Rouge has the largest congestion cost per auto commuter of comparably sized cities at $1,262 – nearly 1.5 times the national average of $870.[11]

The Urban Mobility Scorecard also tracks freeway planning time – the time that should be planned for a 20-minute trip in light traffic. With a score of 2.80, which represents a 56-minute planned travel time for a 20-minute trip, Baton Rouge ranks as the third worst performing mid-size city on this index.[11] Unfortunately, residents have been forced to adopt the need to plan extra time into travel – a regular delay that impacts access to health care, jobs, recreation, and basic quality-of-life.

CITY-PARISH INFRASTRUCTURE

The City-Parish is equipped with approximately 550 traffic signals that are part of a state-of-the-art system that follows state and national architecture and intelligent transportation system standards. Given our current traffic signal standards powered by the Trafficware ATC controller, our signals can be updated to meet future standards and innovations by installing software rather than requiring a complete overhaul of the signal infrastructure. Every traffic signal in Baton Rouge is equipped with cameras, detection loops, or sensors so that traffic patterns can be determined and the signal timing optimized. All of our traffic signals have been updated to work autonomously. In addition, approximately 275 of the 550 signals include software that allows them to respond to external, real-time data to re-route traffic flow.

Our central management system is powered by Trafficware's ATMS.now, which operates our signal system and is tied into the traffic signal optimization software. ATMS.now is a powerful tool for monitoring and controlling traffic control and ITS infrastructure, with an interface that allows us to bring traffic network data into a single repository for a real-time, integrated view of traffic operations. ATMS Maps integrate traffic data with Google Maps, Bing Maps, and Geographic Information Systems (GIS) to provide high-resolution imagery and other map layers for our traffic engineers, while Econolite Centracs stores

vehicular turn movements and allows for remote setup, diagnosis, and monitoring of traffic conditions. Additionally, signal communication is based on Ethernet fiber optics and wireless technologies, as well as legacy Ethernet over a twisted pair configuration.

Our traffic signal system allows for two-way communications between the traffic signal system and the Advanced Traffic Management and Emergency Operations Center (ATM/EOC) – a key element to our ability to react in real-time to unplanned spikes or surges in roadway activity or emergency situations, as we have experienced numerous times in planning for or reacting to hurricanes and other disasters. Our ATM/EOC is a coordinated effort among the City-Parish, the LaDOTD, and the Federal Highway Administration, which allows for the efficient flow of information among traffic signal components such as traffic signal controllers, malfunction management units, video detection cameras, emergency pre-emption, and uninterruptible power supplies via an Ethernet backbone. Given the importance of having a common operational picture for times of disaster or major traffic surges, our ATM/EOC facility serves a critical role in bringing together first responders (fire, police, and EMS), traffic engineering and intelligent transportation systems, law enforcement (local, state, and federal), emergency preparedness, the Capital Transportation Corporation (CATS), and 911 dispatchers.[12]

Finally, while Baton Rouge is recognized as a Bronze Level Bicycle Friendly City by the League of American Bicyclists, our pedestrian and bike infrastructure is not up to best practice standards, with an overall walk score of 37 and an overall bike score of 47.[13] While many plans and developments are in progress to improve infrastructure, large-scale changes are needed to encourage residents to choose walking or bicycling instead of driving to nearby locations.

DATA COLLECTION AND DATA NETWORKS

In recent years, the City-Parish has taken an aggressive approach toward adopting an open government philosophy and establishing an open-data environment capable of generating internal operational efficiencies and external engagement with residents, businesses, and even application developers seeking to leverage our public sector data. In January 2015, Mayor Holden announced the launch of ***Open Data BR***, Baton Rouge's official open-data portal, which received regional and national recognition for its robust catalog of high-quality, high-value data sets. Shortly thereafter, Mayor Holden announced the launch of ***Open Budget BR*** – a new, interactive way for residents to publicly access line-item information from the annual City-Parish budget – and a revamped GIS program known as ***eBRGIS***, which includes more than 90 on-demand GIS web services easily available for public access. In line with these recent advancements, we have placed a strong focus on developing a robust catalog of transportation and traffic related datasets.

These data include:

- **TRANSPORTATION INFRASTRUCTURE:** Bus Routes, Bus Stops, Railroads, Bridges, Bike and Pedestrian Routes, Aviation Facilities, Crosswalks, Traffic Signals, Pavement Edges, Street Centerlines, and Street Intersections
- **STREET CENTERLINE ATTRIBUTES:** Functional Class, Jurisdiction, Owner, Speed Limit, Incept Year, Historical Street Names, Number of Lanes, Measured Linear Referencing System Distance, One Way Traffic Flow, Type, Block Range, Name, State Highway Route Number, ZIP Code, and Number of Sidewalks
- **ANCILLARY DATASETS:** Traffic Incidents, Fire Incidents, Crime Incidents, City-Parish Building Permits, EBRP Business Occupancy Registrations, and Land Use and Zoning
- **TRAFFIC MANAGEMENT DATA:** Turn Movement Counts, Real-Time Greenbands and Timing Splits Used, and Measure of Effectiveness Data (Vehicle Occupancy), Average Speed, Free Flow Speed, Travel Time Index, and Planning Time Index

In addition, our City-Parish GIS team is currently working with the Baton Rouge Police Department to develop and implement a Public Safety Common Operational Picture (PSCOP), a digital interactive mapping platform utilizing GIS technology. This platform provides a single source for users to access near real-time data and other information for coordination, communication, and analytics to support daily and emergency operations for public safety in Baton Rouge and surrounding metro areas. When complete, the PSCOP will encompass three strategic areas of public safety using the following mapping and data products: automatic vehicle location (AVL) for on- and off-duty police vehicles, crime incidents, traffic incidents, traffic cameras, critical infrastructure, special event road closures, population and demographics, and business locations. The design of this cutting-edge platform will serve as a critical component to ensuring effective deployment and response to public safety and emergency situations, as well as a model for other agencies.

BATON ROUGE PUBLIC HEALTH

In 2013, the Center for Disease Control (CDC) issued transportation recommendations tied to improving overall public health. "Expanding the availability of, safety for, and access to a variety of transportation options and integrating health-enhancing choices into transportation policy has the potential to save lives by preventing chronic diseases, reducing and preventing motor-vehicle-related injury and deaths, improving environmental health, while stimulating economic development, and ensuring access for all people."[14] Baton Rouge has room to improve in each of these categories and, in this way, can be a pilot for communities around the country to demonstrate innovations that result in meaningful change.

Preventable chronic diseases like diabetes and obesity are highly prevalent in our community. In Louisiana, self-reported obesity is fourth highest in the country at 34.9%.[15] Baton Rouge has the highest obesity rate of the 100 most populous U.S. metropolitan areas as surveyed by Gallup and Healthways at 35.9%.[16] While there are many contributing factors to obesity, a lack of access to active transportation options and a fully functioning transit system are strong causative factors in our community. Louisiana has a diabetes prevalence of 10.8%, and EBR Parish has a prevalence of 11.5%[17]. Diabetes and obesity account for $1.5 billion in healthcare spending in Baton Rouge alone.[18] Because of the high rates of these diseases and the enormous expenditures tied to their treatment, Baton Rouge must find innovative ways to improve health outcomes. Encouraging residents to change their daily habits will be critical to any effective public health intervention. Finally, Louisiana currently ranks last in the country for avoidable hospital use and cost.[18] Limited access to transit options inhibits people from accessing health care in appropriate settings. Baton Rouge must improve its built environment by implementing more complete streets, and public transit options must be increased to offer more variety and flexibility to users.

ENVIRONMENTAL VULNERABILITIES

Louisiana is one of the most vulnerable states as it relates to climate change. Approximately one football field of land is lost every 48 minutes along our coast, which equates to approximately 16 square miles a year. This loss is due to many factors, including climate change, drilling and dredging for oil and gas, and levees along the Mississippi River.[19] According to the 2012 Coastal Master Plan created by the Louisiana Coastal Protection and Restoration Authority (CPRA), "Louisiana could lose an estimated 1,750 square miles of land in the next 50 years. This loss of land will increase flooding risk in communities across south Louisiana. It is estimated that annual damages from flooding will increase ten-fold over this same time period, from a coast-wide total of approximately $2.4 billion today to $23.4 billion in 2061." According to the White House's National Climate Assessment, our coast has the highest levels of coastal vulnerability to natural hazard of any other area in the Gulf of Mexico.[19]

Baton Rouge has always served as a temporary haven for those in Louisiana evacuating from storm events and excessive flooding. In these peak population times, our transportation infrastructure struggles to support the heavier load. These data points on Louisiana's sinking coast demonstrate the likely reality

that Baton Rouge will become home for many of Louisiana's coastal residents in the near-term. We must be ready to welcome our neighbors and have a transportation system in place that can adapt to meet the needs of everyone.

In addition to our increased flooding risk and land loss, Baton Rouge is currently classified as a non-attainment area with ozone levels at 72 ppb. Under revised Environmental Protection Agency (EPA) standards of 65-70 ppb, Baton Rouge will remain in non-attainment status.[20] While several air quality improvements are underway, many large-scale industrial projects are expected in the region in the near term. The Greater Baton Rouge Industry Alliance has tabulated $23.7 billion in announced or underway industrial projects in our area. The Baton Rouge Area Chamber reported that 16,400 new jobs were expected locally in 2015.[20] This economic growth is a wonderful development for our community, but will necessitate innovative solutions to our air quality challenges.

According to 2013 estimates by the EPA, "greenhouse gas emissions from transportation accounted for about 27% of total U.S. greenhouse gas emissions, making it the second largest contributor of greenhouse gas emissions after the Electricity sector."[21] With our growing economy, the impact of transportation on air quality and climate change will only grow without innovations to reduce congestion and individual vehicle emissions.

Commitment to Improve

Our community and leadership are poised for change and ready to embrace transformational approaches to our transportation woes. We recognize the need to move people efficiently, while enabling them to travel safely, economically, and bearing all users in mind. Furthermore, we acknowledge that our congestion cannot be mitigated by simply building more roads.

In our most recent gubernatorial election, solving our transportation problems was the number one issue for voters.[22] Surprisingly, Baton Rouge's traffic became a state-wide issue with each gubernatorial candidate pledging to address chokeholds in the capital city that, in turn, affect the rest of the state.[23] Business leaders have joined together to form the Capital Region Industry for Sustainable Infrastructure Solutions (CRISIS) Coalition to promote and prioritize innovative solutions to the area's traffic crisis. These businesses feel the negative effects from our community's transportation challenges and expect these effects to worsen as the area adds tens of thousands of jobs in the next few years.[24]

ADOPTION OF COMPLETE STREETS

In 2011, the Council adopted the FUTUREBR Comprehensive Plan, which called for the adoption of a Complete Streets policy. As a result of concerted efforts by local organizations, concerned citizens, and political leadership, the Council adopted a Complete Streets Policy in November 2014, and an ordinance creating a Complete Streets Advisory Committee to provide resident input was adopted in April 2015. The Advisory Committee will have its first meeting in February 2016. The Complete Streets policy requires the City-Parish to give more consideration for things like sidewalks, crosswalks, bus shelters, and bike lanes in transportation projects. Under the policy, roadway projects "shall be designed and planned, to the greatest extent possible, to accommodate all users of the transportation system."[25]

IBM SMARTER CITIES

Baton Rouge was awarded technical assistance through the competitive *IBM Smarter Cities Challenge* and received a summary report in early 2015. The report described short-, medium-, and long-term recommendations that address implementing the appropriate IT platform to support a data-driven transportation planning process and focusing on smarter transport, smarter planning, and citizen engagement. Based on the report, the City-Parish intends to leverage data-driven intelligence about transportation

demands and new growth, while developing a strategy that includes stakeholders at the local, regional, and state levels.

EPA BIKESHARE FEASIBILITY STUDY

In 2015, Baton Rouge received technical assistance from the EPA to evaluate bikeshare implementation. A task force of more than 20 stakeholders, including governmental agencies, local universities, philanthropic organizations, and resident advisory groups, contributed to the study. While there are many challenges to implementing a bikeshare program in Baton Rouge, the overwhelming consensus of the task force and ***final EPA study*** was that a bikeshare program is implementable and a critical link in Baton Rouge's transportation infrastructure. Following the completion of the study, the task force has continued championing a bikeshare program and has engaged Toole Design Group to complete an implementation plan coupled with a detailed site plan and equity plan for the program in our community. This study will be completed by the summer of 2016 and will outline next steps necessary for implementation, which is expected in early 2017.

NICHOLSON TRAM

Downtown Baton Rouge and LSU are separated by 1.5 miles of congested roadways, including Nicholson Drive. Nicholson in particular has several large-scale construction projects completed, underway, or slated to begin. IBM has opened an 800-employee service center downtown, the Water Campus is under construction, and the River District mixed-use development plans are being finalized. More than 3,700 housing units and 2 million square feet of commercial and office space will open in the coming years. Because of these impending developments and a strong desire for connections between LSU and downtown Baton Rouge, the City-Parish has proposed a tram to link the two together. In the fall of 2014, Baton Rouge was awarded a $1.8 million federal transportation grant through the TIGER grant program to study plans to develop a high-capacity all-electric transit system along Nicholson Drive.[26]

GONDOLAS

In addition to City-Parish-led efforts, local entrepreneurs and nonprofits are looking to bring new modes of transportation to the community. For example, a Mississippi River Ropeways project is studying the creation of a gondola crossing the Mississippi River. Because many industry jobs are located across the river in West Baton Rouge Parish, but employees often live on the east side of the river, congestion along existing, limited river crossings is abysmal at peak transportation times. Additionally, the Baton Rouge Area Foundation (BRAF), a community foundation with nearly $600 million in assets, is investigating the use of urban gondolas in the Health District. Gondolas in this area will serve not only to enable visitors to the Health District to avoid traffic, but they will also connect these institutions to encourage collaboration. Since gondolas are cost-effective and can be implemented relatively quickly, they are appealing in our community.

BATON ROUGE-NEW ORLEANS COMMUTER RAIL

This major multi-modal project has garnered broad support from political leadership, local non-profits, and regional coalitions. Baton Rouge and New Orleans are becoming a super region where economic development and quality of life are intricately linked. More than 2.2 million people live in the region and 46% of the jobs in Louisiana are located within the corridor.[27,28] The region is projected to add 75,000 new jobs by 2022, and already, 48,000 people commute between Baton Rouge and New Orleans daily.[29] Because of the growing exchange of human capital between the two cities, advocates from both are working together to promote the idea of a commuter train. Local and state elected officials have rallied behind the cause, seeing it as an economic boon for the region. Newly elected Governor John Bel Edwards has indicated his strong support for the project.[30]

ELECTRIC CAR STRATEGY

Commercial Properties Realty Trust (CPRT), the real estate development arm of BRAF, is currently pursuing an electric car strategy in partnership with Louisiana Clean Fuels to promote electric vehicles in Baton Rouge. Through this program, CPRT will purchase vehicles for employees of BRAF and CPRT to utilize around town. The vehicles will be wrapped in electric vehicle promotional decals to increase community awareness. More importantly, the program will begin with the installation of 10 electronic vehicle-only parking spaces downtown and at the Water Campus with designated chargers. Entergy, a prominent power company headquartered in Louisiana, and Nissan are sponsoring several of these charging stations. City-Parish ordinances are currently being developed that will allow fines to be imposed on individuals without electric vehicles who park in these reserved spots.

PARKING METER IMPROVEMENTS

Baton Rouge is currently replacing all parking meters with smart meters so residents can go online to see available spaces, reserve spaces in advance, and pay for parking using smartphone functionalities or a credit card in lieu of spare change. More than 200 spaces in downtown Baton Rouge will be converted in the coming months. This important conversion is a step toward integrating the service with other transportation options, the upcoming tram implementation and bikeshare program, to name a few.

INNOVATION IN ZONING

In late 2014, Frank Duke was named planning director for the City of Baton Rouge. In his initial review of the zoning code, he stated that "in [his] 30 years in planning and 25 years as planning director, [he'd] never found a development ordinance in more need of work." Duke spent much of 2015 working on rewriting the City-Parish zoning code and intends to focus on a complete overhaul of the City-Parish zoning ordinance in the coming months. A functioning and progressive zoning code is critical to a properly operating transportation system. To date, parking and landscaping zoning code updates are near completion. Duke intends to focus in the near-term on making Baton Rouge more walkable and accessible for all users.[31]

Our Proposal

Today, we turn our focus to finding long-term solutions to traffic and transportation access with an emphasis on the next 20 years and building a model that other mid-sized cities across the nation can emulate. With traffic and congestion as real barriers to economic development for businesses and to residents' quality of life, we recognize that the previous event-and-response cycle focused on short-term solutions is not enough. Instead, we must adopt practices and technologies for wider and more sustainable improvement. We must also integrate a resilient posture into even routine planning, engineering, technology deployment, and operational practices to allow agencies to prepare and plan for, absorb, recover from, and more successfully adapt to decreases in functionality – no matter the cause, scale, or duration. Weather events such as hurricanes and flooding may come along only once every few years, but smaller events like traffic accidents and road construction that cripple interstates and stall bus lanes for even an hour happen almost every day. Having a resilient transportation system capable of adapting quickly and recovering from these types of variations is the fundamental goal of our proposal.

Ultimately, Baton Rouge will be home to a transportation super-network – a network that welcomes and supports autonomous vehicles and incorporates technology that not only allows drivers and vehicles (both autonomous and human-driven) to communicate seamlessly with one another and intersection control systems, but also incorporates real-time data from sources like cameras, road sensors, and weather stations to create easier, safer, and more reliable travel. This transportation super-network of computers, sensors, apps, and real-time communications will ultimately define what we mean when we reference

our goal of becoming a community with no traffic signals. With cars able to communicate with other information hubs as they move through the streets, traffic signals will become obsolete, metal vestiges of the past, replaced instead by tiny data boxes, hidden sensors, and invisible short-range communications. Imagine approaching an intersection during rush hour without the prospect of having to sit behind a line of cars, waiting and waiting to inch slowly forward to the front of the line. Even better, imagine strolling or biking and approaching an intersection unobstructed by hanging wires and flashing metal canisters.

Our dream of a community with no traffic signals is only 10 to 15 years away. Redefining the way our residents think about transportation is just as important as developing and launching the technologies. Today, multi-modal transportation alternatives in Baton Rouge are not yet available, and access to public transportation is limited, as are real-time traffic and transportation data. When faced with having to travel from point A to B, people in our community rarely consider any option other than getting in a gas-fueled car or truck, driving the route they know best (hoping but not knowing whether it is congested with traffic) and parking at their destination. Today, transportation in Baton Rouge is about vehicles and roads, with little opportunity for users to customize their trip or use data and technology to make it faster, easier, or more affordable. Changing this engrained mindset and transforming the systems and infrastructure that have informed it will take time. Therefore, this proposal is organized in phases, with each phase adding new modes of transportation and/or technologies, while at the same time exposing residents to new ways of using transportation and becoming critical contributors to and recipients of data in Baton Rouge's transportation super-network.

To successfully carry out our phased approach, strong public-private partnerships will be essential. Thus, we will work closely with private sector innovators, technology firms, engineers, and many others to develop, test and implement new technologies and systems. Our existing partnerships with companies like IBM, Ridecell and Trafficware will serve as robust starting points, but will be expanded, and new partnerships developed. We will also leverage key knowledge resources in our community such as LSU, SU, LTRC, and The Water Institute of the Gulf (TWIG) to research concepts and ideas, model and test new scenarios, and incubate new technologies. Each of these partners brings a great wealth of knowledge and expertise that can be leveraged and exported to develop and implement real, cutting-edge solutions to transform transportation in Baton Rouge.

We acknowledge that today, Baton Rouge may lag behind many other mid-sized communities in transportation with a transit system that disproportionately affects low-income individuals. However, our foundation in technology and infrastructure coupled with our community-wide focus on affecting change in dramatic, forward-thinking ways – reinforced by unwavering support from local and state officials and strong partnerships with critical stakeholders – places Baton Rouge in a position to uniquely benefit from this Smart City Challenge. Rather than slowly and gradually improve our transportation network, we instead have a unique opportunity to leapfrog various stages of innovation and potential barriers to change, thereby implementing radical new technologies that will have quick and massive impacts on Baton Rouge's overall quality of life, population health, and resiliency.

Implementation Plan

PHASE 1 (1-2 years)
- **Ridecell** [Vision Elements 4, 5]
- **Public Engagement** [Vision Element 9]
- **First Mile/Last Mile Infrastructure** [Vision Element 5]
- **Regulatory & Policy Changes** [Vision Elements 10, 12]
- **Partnerships, Planning, & Innovation** [Vision Elements 4, 7]

PHASE 2 (3-5 years)
- **Connected Vehicles** [Vision Elements 2, 3, 4, 6, 7, 11]
- **Electric Vehicles** [Vision Element 8]

PHASE 3 (5-15 years)
- **Electric, Autonomous Vehicles** [Vision Elements 1, 2, 4, 6, 8, 11]

PHASE 4 (15+ years)
- **Resilient Open-Access Transportation Super-Network** [Vision Elements 1, 2, 3, 4, 5, 11]

Phase 1 (Vision Elements 4, 5, 7, 8, 9, 10, and 12)

During Phase 1 of our implementation plan, we will focus on increasing access to and awareness of public transportation. By launching new, more adaptable and efficient ride services, multimodal options, and related technologies, we will increase public transportation ridership but also transform the mindset of a community that is overly dependent on private vehicles. Public outreach and education will be critical elements of this transformation. We will also use Phase 1 to lay the groundwork for further innovation through tools such as advocating for regulatory and policy changes and forming robust public-private partnerships to spur transportation technology research and innovation.

RIDECELL TECHNOLOGY

As detailed previously, our public transit system has significant challenges. The integration of new technologies and operational models to the system could have an immediate, significant impact – not only on the ability of all riders to get to their destinations more quickly, but also on secondary indicators such as population health, the environment, and employment.

Over the past several weeks, leadership from the City-Parish and other stakeholders have facilitated a partnership with Ridecell, a San Francisco-based startup company that partners with transit agencies to reimagine transit, making it both easier to use and significantly cost-effective to operate. Through our partnership with Ridecell, we intend to incorporate Ridecell's technology for on-demand, shared-ride services into the current CATS model. Using this technology, riders are able to request pickup at a specific location through an easy-to-use app on their smartphones. Riders without a smartphone can request a ride through the web or by a phone call to a central dispatcher. Ridecell's technology is then able to find the most optimum driver, vehicle and route, based on a number of real-time data points – including traffic congestion, destination preference, and the locations and destinations of other riders in the area requesting pick-ups. For busier areas with multiple riders on a pick-up route, a bus might be the most efficient vehicle. For a route with only two riders, a smaller three or four-person vehicle that can navigate roads more quickly with a smaller carbon footprint may be appropriate. This same Ridecell technology allows for customization of almost every aspect of a trip, from start to finish. Customers are notified when a driver is on the way, receive a real-time estimated time of arrival, and can track the approaching vehicle via GPS. Fleet vehicles will continue to be owned by CATS and operated by public employees, using this new Ridecell technology.

Initially, we may limit travel destinations to "dynamic transportation hubs" – places where riders can easily walk to their final destination or connect with other modes of transportation to do so. Baton Rouge

and community stakeholders have been working together over the past several months and years to introduce multiple new transportation modes to our portfolio. We anticipate a formal bikeshare program launching in early 2017; carshare companies are actively exploring Baton Rouge; gondolas are envisioned for use in key corridors; a tram line recently received federal funding for planning; and passenger rail service between Baton Rouge and New Orleans is imminent. Dynamic transportation hubs will be co-located with these multi-modal transit opportunities so that riders arriving at one of the proposed hubs can connect with any one of these new multi-modal transportation options or other fixed bus routes to reach their ultimate destination.

With numerous smart growth and well-planned developments underway in Baton Rouge, we will be able to locate many of these dynamic hubs in areas with pedestrian-friendly infrastructure such as bike paths and sidewalks. These transportation hubs will not be permanent, heavy infrastructure facilities similar to the bus stations we know today. Instead, they will operate like interim coordination centers where riders in a particular area link up with their most efficient last-mile option. The hubs could easily and cost-effectively be moved to different locations within Baton Rouge to reflect changing rider demand and accommodate new development. Moreover, we propose introducing a new, integrated payment system through Ridecell's technology that will allow riders to pay for multiple transportation options through a single smartphone app. Riders will be able to set up a single account "loaded" with transportation credits that can be used on any number of transportation options (bikeshare, carshare, trams, trains, and gondolas), whether run by the City-Parish or not. The system will also allow the City-Parish or third-party vendors to apply subsidies, discounts, or vouchers for designated users, including low-income riders that might qualify for certain benefit programs.

Over time, as ridership increases and the system becomes more efficient, we will add a point-to-point component that allows riders to use the Ridecell technology not only to reach transportation hubs, but also to travel directly to their final destination. Two significant advantages of the Ridecell technology are the ability to collect reliable, real-time data about users, routes, traffic patterns and travel times, and the ability to quickly and easily scale the system up or down, depending on demand, as well as the number of available drivers and vehicles. In areas with high concentrations of elderly riders, for example, we may want to move quickly to point-to-point service that allows riders to bypass transportation hubs and avoid switching travel modes. For student housing areas near LSU where most riders are trying to reach the same general destination, it may be more efficient to limit service to shared rides to dynamic transportation hubs on or near campus. In fact, Ridecell technology will allow us to create one or multiple smaller transportation networks within our larger parish-wide network, such as shared-ride networks for LSU, SU, or the thousands of State of Louisiana employees working downtown. Simply put, this technology will allow our transportation system to respond to demand and resource availability in ways that are not possible in our existing static model.

This dynamic transit model that our partnership with Ridecell will allow us to introduce in Baton Rouge will have numerous positive impacts. First and foremost, by seamlessly integrating on-demand with mass transit, the technology will help increase access to and ridership of public transportation. Based on available data and initial conversations with CATS leadership, Ridecell estimates its technology could double, even triple, ridership. Moreover, we believe the technology will increase access for *all* users as the Ridecell platform is capable of generating route options based on a rider's unique situation. Riders may desire the cheapest route alternative, the route alternative with the fewest transfers, or even the fastest time to destination. Because Ridecell will be able to link users to new modes of transportation, both physically and via their technology, end users will be better informed in making decisions about how they travel. In addition, by cutting down on wait and travel times, reducing the number of transfers required, and introducing customized vehicles and routes, many middle- and upper-income riders who today do not consider public transportation a practical or desirable option may become more open-minded to doing so. Second, Ridecell will allow CATS to access a plethora of data to optimize cost and maximize value.

Average wait time, average route time, top locations, requests by hour/day/month, and usage per student/employee are examples of data points that CATS can use to scale and adjust the system to create the most efficient model at any given moment in time. Third, by allowing users to track approaching vehicles, riders can wait safely inside their pick-up location rather than outside for long periods of time at a bus stop. Finally, with customized vehicles whose ridership is maximized, large buses will not run on fixed routes that do not attract users and emit unnecessary greenhouse gases. Shared rides in more efficient vehicles will minimize impact on our climate and air quality, even before we move to an all-electric fleet.

In addition to incorporating Ridecell technology, we will launch several other initiatives during this initial implementation phase to lay the foundation for future innovations and technologies.

PUBLIC ENGAGEMENT TO REACH CONNECTED, INVOLVED CITIZENS

We plan to launch an aggressive public outreach and education campaign to increase awareness about accessing and using public transportation. Residents must understand how this new technology works and how it will facilitate a transportation alternative that is affordable, easy-to-use, and will allow them to customize their trip and their data to directly impact how our public transportation system works. Enticing new riders to use public transportation will not happen overnight. CATS must overcome a struggling brand and educate the public on the innovative technologies that will now be employed. Both current and future users of the system will need to easily understand the benefits, backed up by convincing, sound data.

IMPROVEMENT OF FIRST/LAST MILE INFRASTRUCTURE TO EXPAND USER-FOCUSED MOBILITY CHOICES

Implementing the dynamic transportation model outlined above will not be possible without an extensive, reliable network of first- and last-mile infrastructure that allows riders to connect to their final destination. Several initiatives are already underway, with some such as a bikeshare program and trams being closer to implementation than others. Regardless of the specific mode of transportation, there must be vigorous collaboration among stakeholders, including public officials, nonprofits, and the private sector. Champions who appreciate these first- and last-mile solutions as necessary components of a seamless, connected transportation network must be identified and must work closely with the City-Parish to integrate these alternatives. We believe our letters of support demonstrate a willingness of many partners to lead these projects.

REGULATORY AND POLICY CHANGES TO FOSTER INNOVATION AND ESTABLISH WELL-DEFINED STANDARDS

We will also begin working with local, state and federal officials and policymakers, as well as private sector players, to develop and implement policy changes needed for future phases of innovation. In the short-term, policies like staggered start times, programs to incentivize using public transportation, and ride-sharing can be integrated within corporate policies in our local industry. As detailed later in this application, we intend to develop a transportation network that invites and supports vehicle-to-vehicle (V2V) communication, vehicle-to-infrastructure (V2I) communication, electric vehicles, autonomous vehicles, and other cutting-edge technologies. A thorough survey of existing ordinances, laws, regulations, and zoning codes must be conducted to ensure our regulations do not limit or hamper innovation, nor the deployment of new technologies on our roads. Moreover, we must begin engaging policymakers and industry experts, from engineers to computer scientists, to develop new standards that embrace and integrate national standards like CVRIA and other existing ITS standards. We have already initiated discussions with companies like Google and IBM to begin thinking about these issues and developing a public policy strategy to ensure Baton Rouge is well-positioned for autonomous car technology. In addition, our City-Parish and other stakeholders are already researching necessary changes to existing regulations to accommodate and incentivize electric vehicle use. With employers investing in electric

vehicle fleets and the prospect of converting our public fleets to electric vehicles in the near future, we acknowledge that special electric vehicle parking and charging regulations must be implemented quickly. As evidenced by our pledges of support, local officials and policymakers stand ready to do their part to move the needle forward in Baton Rouge and establish our community as a desirable place for innovators in transportation to do business.

PARTNERSHIP OPPORTUNITIES FOR PLANNING, INNOVATION AND URBAN ANALYTICS

Unlike many other mid-sized cities, Baton Rouge is fortunate to have several strong educational and research institutions who are eager to export their knowledge to help transform transportation in our community. We have also established a very friendly regulatory and tax framework in Louisiana that encourages digital innovation in areas such as cloud computing, software development and mobile applications. This framework has incentivized companies like IBM and smaller start-ups to make Baton Rouge their home. These companies and many others who may not yet operate in Louisiana must be partners whose knowledge and innovations can be leveraged and deployed in Baton Rouge.

Both LSU and SU have pledged their support of this proposal and expressed their desire to serve as key partners with the City-Parish and other stakeholders. Through this effort, we will create a Transportation Technology Innovation Center in which LTRC, LSU's high-performing engineering school, SU, TWIG, private sector innovators and public sector policymakers operate as partners under one organization focused solely on transportation innovation that can be developed in Baton Rouge and exported throughout the country.

Other, more narrowly focused partnerships will prepare our current systems and infrastructure for new technology and innovations. Regardless of the specific technology we implement, we will need to collect, analyze, share and disseminate huge amounts of data. Real-time rider, driver, traffic and weather data, as well as signal-to-signal, V2I, and V2V communications, are just a few of the datasets that new technologies generate and need to operate effectively. A thorough analysis of the large data capacity needs of our system of the future, and decisions about how data will be managed and shared, who will adjust systems based on data, and how we convert data to usable information for the public will require a great deal of collaboration among the City-Parish and stakeholders – especially those with expertise like IBM. We will also expand our successful Open Data BR portal from one that currently aggregates and publishes only City-Parish data, to a central open-source hub for data across our nine-parish capital region. Technical assistance will be provided to the parishes and municipalities surrounding Baton Rouge to help those with fewer resources adopt similar approaches, workflows, and systems for capturing data and integrating it into our own, thereby truly creating a one-stop shop for public sector data that supersedes political and geographic boundaries.

We will establish an entrepreneur-in-residence program to encourage greater collaboration between the City-Parish, State, and businesses engaged in technology innovation, help bring fresh ideas to the City-Parish, and give entrepreneurs a chance to enter the public-sector technology market. Teams of entrepreneurs might spend several weeks or months working side-by-side with local officials on their selected projects. By aligning goals and working in the same physical space, officials and entrepreneurs can more efficiently leverage data, use public assets, and improve transportation. Such a program would also help Baton Rouge establish a reputation among peer cities and entrepreneurs as a place where innovation is encouraged and can easily be leveraged and deployed.

Additionally, neighborhood Innovation Labs will be created in at-risk, low-to-moderate income areas of our community focused on both neighborhood revitalization as well as cultivating residents' skills to positively affect changes and solutions to our area's noted traffic-related issues. These labs will be identified in conjunction with the Office of the Mayor-President, Office of Community Development, and the Mayor's Blight Elimination Team based on available infrastructure within these communities, leveraging land

and facilities owned by the City-Parish – including blighted housing set for auction or demolition – that are remodeled and repurposed into micro-incubators with areas for classroom-style learning, computer labs, and demonstration areas. Technical assistance such as computer coding classes will be provided to interested residents, with City-Parish traffic engineers and IT specialists providing hands-on support for project-based learning and business consulting provided to those seeking to turn ideas into a business. Not only will these micro-incubators serve as an important neighborhood revitalization and workforce development measure, but they will also provide another layer of solutions fully oriented toward solving community-wide traffic and transportation issues.

Phase 2 (Vision Elements 2, 3, 4, 6, 7, 8 and 11)

CONNECTED VEHICLES

With access to dynamic, on-demand shared transportation available and strong partnerships for innovation in place, we will shift our focus in Phase 2 to introducing new infrastructure and technologies that will optimize the flow of motorists, pedestrian traffic, and freight in order to create the transportation super-network we ultimately envision for Baton Rouge. This infrastructure will tap into LONI so that data is shared instantaneously across the state for research and analysis. We also plan to harness the capabilities of LONI to facilitate real-time data capture and integrate these data into one central data exchange with a focus on publishing for real-time public access. The establishment of this transportation-related data exchange and interface is consistent with recommendations offered by IBM as part of the 2014 Smarter Cities Challenge grant awarded to our City-Parish. We will also continue to increase electric vehicle infrastructure and technologies so our transportation system is not only redundant, affordable, safe, efficient and adaptable, but also environmentally resilient and sustainable.

Vehicle manufacturers are developing and launching new technologies that directly link vehicles to their physical surroundings, including traffic signals and traffic management centers, pedestrians, other vehicles and emergency management, to improve safety and allow for more optimal routes. Manufacturers like Audi, BMW, GM and Tesla are already incorporating a number of technologies that will allow their vehicles to communicate with traffic signals over a combination of WiFi and 3G mobile by 2017. With this technology, for example, traffic signals can send out timing information to cars that then provide messages to drivers to help them optimize driving so they do not have to stop as often or can automatically turn their vehicles on and off at red lights to reduce emissions. As noted above, Baton Rouge's traffic infrastructure already includes traffic signal software that controls signals and transmits data to signal timing optimization software. With this new system, Baton Rouge's existing traffic server will replicate data in real-time to a second firewalled server. Vehicle infrastructure developed by auto manufacturers will tie into the second server and send that data straight to their vehicles. With hardware largely in place and a network established in the community, Baton Rouge is well-situated to incorporate this new technology into its existing traffic management system, with very few modifications and at a relatively low cost.

Baton Rouge also stands ready to embrace V2V communication technology. IBM, which is invested in Baton Rouge and committed to serve as a long-term partner to the City-Parish, is already conducting research and traffic pilots to demonstrate how connected cars automatically share and broadcast dozens of data points, such as the car's location, speed, heading, brake status, and other data to nearby vehicles within a few hundred meters. Other cars can use this information to build a detailed picture of what is unfolding around them, revealing trouble that even the most careful and alert driver, or the best sensor system, would miss or fail to anticipate. Through IBM's partnership with Baton Rouge, we will leverage this knowledge and work closely to ensure our data analytics and processing systems are equipped to support all connected vehicle technologies.

This technology will transform the driver experience in Baton Rouge. As a driver approaches an intersection, he will be alerted that the light is going to turn red in 10 seconds. The driver may use this information to begin slowing down, creating a safer approach for the driver and others. Once the vehicle is stopped, the driver may opt for the vehicle to automatically shut down or enter an efficiency mode until the light turns green again. Alternatively, the driver's vehicle GPS device may suggest the driver turn before the intersection to avoid the congested intersection altogether and re-route the driver to a more optimal route. Moreover, in addition to the traffic signal pushing data out to vehicles and drivers, the signal will also become a major receiver of data that it can use to optimize routes and create safer conditions for all vehicles. Signal-to-signal communications, for example, will allow signals to receive real-time information about surrounding traffic counts and congestion points so that signal timing can change to re-route vehicles on optimized routes. Baton Rouge is already engaged in discussions with Trafficware about expanding our existing partnership to include this connected vehicle technology, and LaDOTD is working to make this software platform their state-wide system, which makes the concept even more deployable as it could readily be expanded to state-wide implementation.

Baton Rouge is also uniquely situated to realize greater benefit from a V2I communication system because of the area's high concentration of heavy industry – primarily our Mississippi River port operations and the huge number of petrochemical plants situated along the River. Today, hundreds of large petrochemical transport trucks carrying hazardous cargo navigate Baton Rouge's roads and interstates with nothing more than a traditional GPS device to guide them to their destination. City-Parish traffic engineers report that these transporters frequently end up driving through residential areas with narrow streets not designed for heavy trucks or equipment. Traffic is routinely backed up when the transporters get stuck trying to make sharp turns, and chemical spills on our highways and interstates are all too frequent news stories. Advanced V2I software could easily be adapted to route these heavy industry vehicles to designated truck lanes and away from dense residential areas, congested highways and potentially dangerous environments, creating a safer road network for all drivers. Moreover, once V2V communication technology is deployed, other drivers can be notified of nearby transport vehicles, yet another opportunity to help reduce the number of potentially dangerous collisions and spills.

Just as large trucks carry enormous amounts of hazardous petrochemicals through Baton Rouge, so do railroads. Four major railroad lines run through the Baton Rouge area, primarily carrying petrochemicals to and from nearby plants and refineries. These trains run often, and cross traffic at 217 locations in the parish. Some of the crossings have upgraded safety features, but others do not, and the consequences of collisions with these hazardous materials are significant. Deploying V2I and V2V will not only create safer crossings, but will also create more efficient and adaptive traffic flow in the surrounding areas. Crossing lights or trains themselves equipped with connected vehicle software could easily communicate with drivers and vehicles about approaching trains before reaching a crossing, not only alerting drivers of the approaching train, but also allowing vehicles to automatically re-route drivers to a more optimal path to their destination.

V2I and V2V communication technology can also be used in Baton Rouge to create a more responsive and adaptive system that prioritizes certain categories of vehicles and responds to rider demand and external factors. Just as we propose to customize connected vehicle technology to guide petrochemical transporters to specific routes, we can give priority to emergency response vehicles, school buses, shared-ride public transportation vehicles, or evacuation buses during disasters. Today, ambulances approaching an intersection use an infrared beam to communicate with the traffic signal up to 2100 feet away, prompting the signal to turn green. Unfortunately, the ambulance cannot communicate with the next signal until it fully passes through the first intersection and, if turning, completes the full 90-degree turn and comes within 2100 feet of the next signal. Technology allowing these response vehicles to communicate with signals and other nearby vehicles from the moment they are deployed will help create safer and quicker response times, as intersections can adjust along the route using priority signal operations well in advance

of the response vehicle's arrival. Because the system will allow signals to talk to one another and communicate priority changes, it will maintain coordinated traffic flow on roadways along the emergency route, thereby minimizing disruptions to cross-street traffic.

Based on our successful deployment of this smart infrastructure along locally owned roads, we will work with our counterparts at LaDOTD to implement smart highway infrastructure along state-owned roadways that will be linked into the LONI network. This increased collaboration will allow for a completely integrated data system utilized seamlessly by drivers along roadways.

Lastly, there are opportunities to deploy V2I and V2V communication technology in Baton Rouge to help eliminate unique risks associated with our community's environmental vulnerabilities. Communities across south Louisiana, including Baton Rouge, are more vulnerable to flooding and extreme weather events than almost any other area in the world. With new technologies, real-time weather data will be communicated not only to traffic signals but also to drivers and vehicles. GPS, satellites and even road sensors can alert traffic signals to shift drivers off flooded roadways or avoid areas where dangerous weather is approaching, while V2V communications could alert other travelers to avoid certain areas. While numerous weather apps exist in the market today, the communication of detailed, granular data about specific dangerous road conditions will add a new level of safety and resiliency to our transportation system. Recently, IBM announced its acquisition of The Weather Channel's product and technology business. IBM's data analytics and cloud services, coupled with The Weather Channel's massive weather data services platform, create a unique opportunity to develop technologies to minimize disruptions and inform decision making around extreme weather events. With IBM as a partner, we believe Baton Rouge has a unique opportunity to serve as a testing ground for this type of innovation.

With the cataloguing of all of this new data, the City-Parish will create a robust website and related smart phone app to provide user-friendly, real-time data to users and to gather individual user data that can be pushed out to optimize transportation modes. The raw data collected from smart infrastructure and vehicles will be repurposed as usable information for residents, while also being pushed out to the applications drivers are most likely to turn to for traffic assistance. Similarly, real-time data gathered from users will provide valuable information about location and demand. The gondola system we propose, for example, will be connected to this information system, with gondola cars easily added to the system or the speed increased when data indicates foot travel in the area is heavy.

ELECTRIC VEHICLES

CATS recently commissioned the University of New Orleans Transportation Institute to prepare an Alternative Fuels Assessment designed to examine the pros and cons of various alternative fuels. The assessment recommended that CATS move towards a fully electric bus fleet, noting that "the long-term benefits of such an electric system far outweigh the cost of the technology." The report detailed the numerous benefits of moving to this fuel source. First, electric buses have zero tailpipe emissions, which means less impact on the environment as well as offering the best option for earning revenue from emission credits. Second, while electric buses were the most capital-intensive option examined, they are the cheapest to operate and maintain since the cost of electricity is significantly lower than the cost of any other fuel on a per-mile basis, and electric motors are more durable than internal combustion engines – so long-term maintenance costs would be lower. The report concluded the savings in fuel and maintenance costs would actually save CATS money over the course of 30 years, despite the high capital expense associated with converting to electric. Since the report, CATS has continued to investigate electric fleet options.

Multiple electric fleet vendors, including Proterra, have expressed interest in working with CATS to begin converting to electric. Proterra's electric buses and charging equipment enable customers to select the right amount and type of energy storage to meet specific route requirements, with battery packs located underneath each bus. Charging stations are low-impact and resemble street lights. The vehicles utilize

wireless charging technology and can be configured for both on-route and depot charging at a variety of rates to maximize charging opportunities. The system also allows for easy battery pack reconfiguration so batteries can be switched out depending on operational needs. Fast-charge batteries can be recharged on-route in less than 10 minutes, or fast-charge configured buses can be charged in-depot (or even at curbside pullouts or in buildings) to take advantage of off-peak charging times. This option allows buses to travel over 700 miles in 24 hours. Conversely, buses configured with extended range batteries could travel up to 180 miles between charges.

Although Proterra's technology does not currently include linking electric charging to solar power, Proterra is already working towards this innovation. Estimates show that using solar panels, positioned efficiently on the rooftops of transportation hubs and stations, for example, would reduce the annual operational cost of an electric fleet vehicle by approximately 50% (from about $100,000/year for electric or $50,000/year for solar-electric vs. $450,000/year for diesel). Louisiana's generous electric conversion and solar tax credits, as well as steadily decreasing solar panel installation costs, make converting vehicle fleets to electric even more cost-effective. For smaller vehicles, Louisiana offers an electric conversion tax credit of 36% of the cost of the qualified clean-burning motor vehicle fuel property. Larger, more expensive vehicles, such as bus fleets, would need to be negotiated with the Louisiana Department of Revenue. Tesla currently operates in Louisiana through this type of arrangement. Louisiana's solar tax credits cover up to 50% of the first $25,000 spent for installation, in addition to the 30% federal tax credit. Companies and individuals in our area have already realized significant benefits from this favorable tax environment, with East Baton Route Parish ranking fourth among Louisiana's 64 parishes in total number of net solar installations.

In addition to the CATS bus fleet, we also propose converting the *entire* CATS fleet to electric vehicles. For optimized routes carrying only 1-3 passengers, smaller, less-expensive electric fleet vehicles such as Nissan Leafs or Chevrolet Volts could carry out the pick-ups. We are hopeful that moving to an all-electric public transportation system will help open the minds of Baton Rouge residents to the advantages of electric vehicles for their own personal use. With many popular destinations in Baton Rouge spread out across longer distances, range anxiety is a real fear for many people. For this reason, exposing our community to electric vehicles in as many ways as possible will be a critical component to shifting mindsets and incentivizing people in our community to purchase, rent or share electric vehicles. Today, there are a handful of electric vehicle charging stations in our community. However, as detailed previously, additional electric charging stations are coming to the City-Parish soon. A number of vendors, including Telefonix, have expressed interest in partnering with the City-Parish and private-sector companies to expand electric vehicle charging infrastructure.

Finally, with support from organizations like Argnonne National Lab, we intend to explore the application of smart grid infrastructure in Baton Rouge. To support widespread electric vehicle acceptance, we recognize the importance of proper smart grid infrastructure planning and standards.

Phase 3 (Vision Elements 1, 2, 4, 6, 8, and 11)

As the City-Parish embraces smart infrastructure and electric vehicle infrastructure, the entire community will need to adapt to fit into the changing transportation environment. Research has demonstrated that people are not yet ready to embrace autonomous vehicles due to concerns with safety and an inability to trust the technology.

To demonstrate a first-mover commitment, all City-Parish vehicles will be converted to autonomous, electric vehicles over time during Phase 3. In so doing, residents will become accustomed to seeing first responders travel around the city without human drivers at the helm. The benefits of having law enforcement, firefighters, and emergency medical service technicians in autonomous vehicles will be easily understood as they are able to focus on the safety of our community, rather than the traffic in their path. Transit and other shared-

use vehicles will be converted to autonomous vehicles incrementally as riders learn to trust the technology through their first-hand experiences. And, as transit performance improves to meet residents' needs, more and more people will turn to public transit for their transportation needs.

For those residents choosing to maintain a personal vehicle, incentives can be put in place so that the vehicle conforms to changing infrastructure. Just as the State has incentivized the purchase of alternative fuel vehicles, autonomous vehicle purchases can be incentivized with state tax credits. Or, perhaps technology developed within the Transportation Technology Innovation Center can be introduced into existing vehicles to convert them to fully autonomous transportation options. Furthermore, pilot zones where only electric, autonomous vehicles are allowed to enter will inevitably force users to convert their personal vehicle. The freight industry will also be required to adapt our technologies into their travel modes. Large freight trucks will become autonomous vehicles communicating with signals and other vehicles to traverse roads deemed safe for their travel, and multimodal facilities like ports and railway hubs will become safer, more efficient spaces for the movement of large or hazardous cargo. Finally, the availability of on-demand shared ride services like Uber will reach new highs, as the only limitation will be the availability of vehicles, not the availability of drivers.

The benefits of autonomous cars are numerous, but there are security concerns that must be addressed. An autonomous car and traffic sensing system provides multiple components that can be hacked, including GPS, LiDAR, cameras, detailed digital maps, and other instrumentation. For example, autonomous cars will interrogate and reserve an intersection within seconds of approaching it, a transaction that could be hacked and compromised. A variety of attacks could be perpetrated including denial, spoofing, physical attacks (for example, causing a truck carrying hazardous materials to crash in a location where many residents are vulnerable to the effects of a spill), and attempts to induce situations that overload systems (including temporary stop signs and moving or stationary obstacles).

To address concerns about privacy and cybersecurity, we will work with companies like IEM, an international homeland security company with experience in Intelligent Transportation Systems and cyber security that has maintained a Baton Rouge office for over 30 years. Specifically, we will work with IEM, IBM and others to reduce opportunities for system breaches by limiting cellular network use to centralized monitoring, using a one-way communication channel and ensuring the DSRC network has strong access controls; designing, developing and testing software with the security mindset, including incorporating strong vulnerability and cyber-attack detection capabilities; assessing the security benefits of passive vision-based technology vs. LiDAR; and retaining fail-safe systems that enable manual control in the event of an attack.

Given its current status as a destination for hurricane evacuees and its growing vulnerability to extreme weather events, Baton Rouge is also an excellent place to consider another aspect of a fully autonomous vehicle future. In a future with potentially no vehicle ownership, protocols will be necessary to handle emergency evacuations. As a cutting edge homeland security organization, IEM will assist the City-Parish in designing, testing, and implementing the right protocols for emergency evacuations during implementation of the Smart City Challenge.

Phase 4 (Vision Elements 1, 2, 3, 4, 5, and 11)

Ultimately, our city will evolve well beyond traditional traffic signals. With increased adoption of autonomous, electric vehicles, all intersections will be optimized so that autonomous vehicles move seamlessly through. Existing traffic signal infrastructure will be repurposed to convert antiquated lights into data hubs, directing traffic seamlessly and simultaneously from all entering streets. As a vehicle approaches an intersection, in essence, it will reserve the right to pass along a pre-determined route ensuring that it avoids any oncoming traffic.

Most important to this final implementation will be the safety of pedestrians and bicyclists. Through innovative apps or some yet to be determined technology, multi-modal residents wishing to cross through intersections will also have to reserve their route upon approach. Cars will be directed away from passing pedestrians to ensure ample space and safety is maintained.

Desired Outcomes

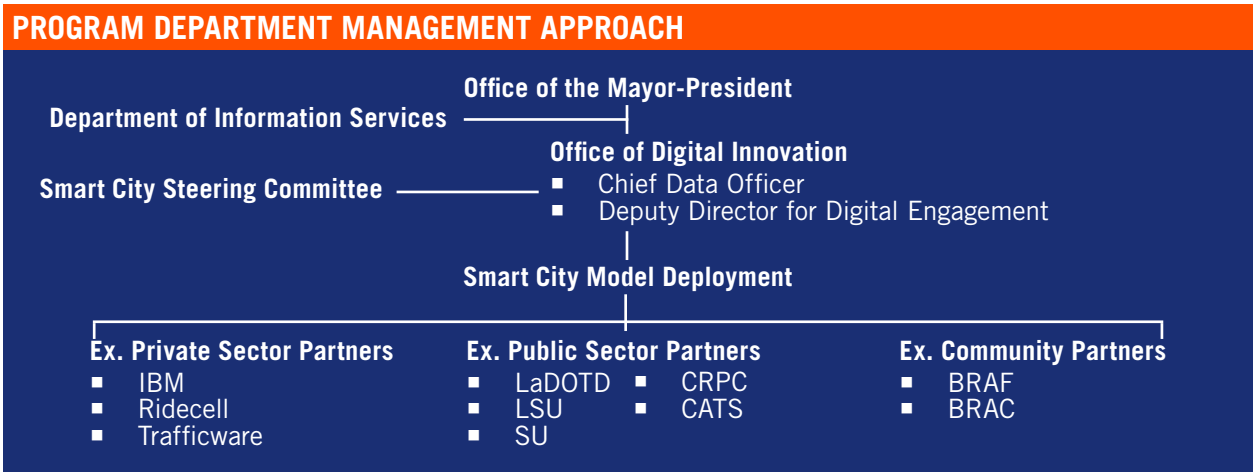
Measuring the impact of these transformational changes will be critical to successful implementation. Each of the indicators outlined below will help determine how effective our solutions are at increasing access to public transportation, increasing active transit options, minimizing our environmental impact, and improving public health in our community.

Indicators	Tracked by	Current
Yearly Delay per Auto Commuter	Texas A&M Transportation Institute	47 hours[11]
Mean Travel Time to Work	City-Parish	23.1 minutes[4]
Workers Commuting by Public Transit	City-Parish	1.7%[4]
Workers Commuting by Walking	City-Parish	2.1%[4]
Solo Drivers with Long Commute	City-Parish	28.8%[4]
Workers Who Drive Alone to Work	City-Parish	82%[4]
Bicycle and Pedestrian Fatalities and Serious Injuries	Capital Region Planning Commission	901[32,*]
Intersection Crashes	Capital Region Planning Commission	6,689[32,*]
DUI/DWI Incidence	Capital Region Planning Commission	1,271[32,*]
Diabetes Prevalence	Center for Disease Control	11.5%[17]
Obesity Prevalence	Gallup/Healthways	35.9%[15]
Air Quality	Capital Region Planning Commission	72 ppb[20]
Public Electric Vehicles	City-Parish	0%

**Note:* *These statistics are over the 7-year period from 2007-2013*

These measures, as well as all those referenced within our application that we seek to improve upon, will be fundamental to assessing the success of this program. Specific targets for improvement will be identified in the next phase of the application in conjunction with budgeting and detailed phasing.

Conclusion



In order to effectively execute this proposal, the City-Parish will establish a dedicated program office known as the Office of Digital Innovation, housed within the Mayor's Office. This organizational structure has already been designed and, as such, represents an opportunity for immediately making this Smart City initiative its flagship initiative. This office will be led by a Chief Data Officer (CDO), who will ensure the successful integration of all data-related elements of this effort and work in conjunction with the Department of Information Services to deploy and manage related technologies and solutions. In addition, this CDO will manage complex relationships among our partners, while continuously evaluating our implementation. Also housed within this office will be a Deputy Director for Digital Engagement who will be a dedicated resource for ensuring effective collaboration among all community stakeholders and partners, while continuously evaluating our implementation. While these staff will report directly to our Mayor-President, the office will be an agile operation that can and should move nimbly across City-Parish agencies and our community to effectively deliver the services and solutions we propose. The leadership of this office will be guided by a community-based Smart City Steering Committee, represented by key partner organizations and responsible for providing insights, counsel, and connectivity to ensure sustained implementation of this effort.

Baton Rouge will become a Smart City of the future. Our community will embrace technologies and innovations that to many are unimaginable today. We will transform how people move from A to B by leapfrogging our current transportation infrastructure to the infrastructure of the future. Intersections will be safer and all users of our system will have full, unimpeded access to our new transportation network. Ultimately, we will embrace mobility that is efficient, safe, affordable, and sustainable. We will become a pilot for communities across the country who struggle like we do with congestion. Fueled by strong, proven partnerships, we will show how true collaboration leads to fundamentally new approaches to old problems and truly become a community with no traffic signals.

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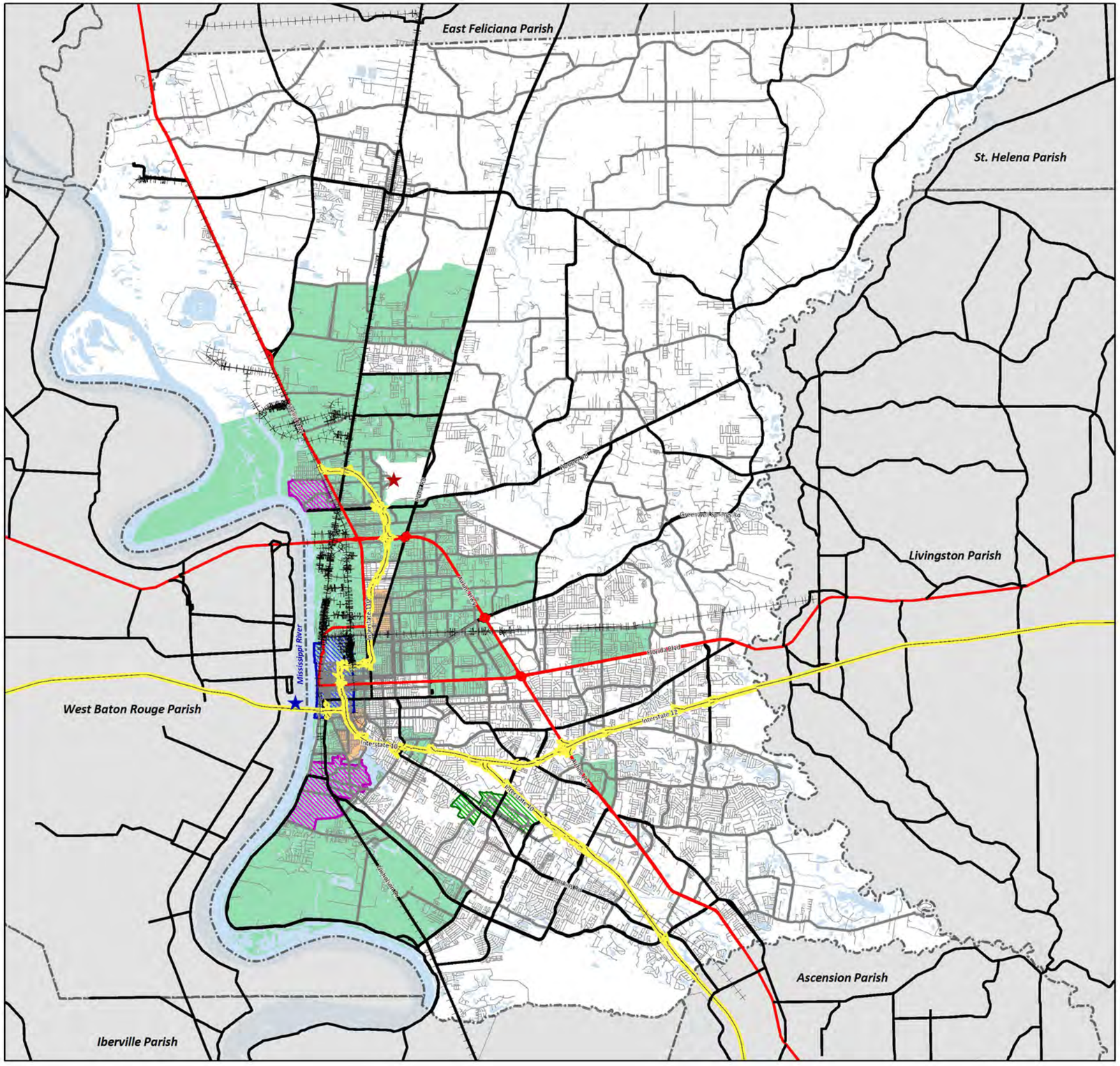
Transportation Infrastructure
East Baton Rouge Parish



Legend

- Block Groups - Moderate Income
- Block Groups - Low Income
- Metro Airport
- Port of Greater Baton Rouge
- Downtown
- Universities
- Health District
- Railroad
- Interstate
- US Route
- State Route
- Arterial
- Local Street
- Hydrography

U.S. Department of Transportation

"Beyond Traffic: The Smart City Challenge"

February 3, 2016

SCALE = 1:187,000

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Miles

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