

Grant Proposal

USDOT SMART CITIES

CITY OF LONG BEACH, CA

February 4, 2016

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PART II- APPLICATIONS STANDARD FORMS & ORGANIZATIONAL INFORMATION

1.0 LONG BEACH'S VISION FOR USDOT'S SMART CITY CHALLENGE

From its most humble beginnings in the late twentieth century, the internet was touted as an “information superhighway” that would connect and forever change the way people, communities, businesses, and governments operated. With the benefit of hindsight, and a few fits and starts, it is clear that those predictions have come to pass. With the digital transition now entrenched, a new trend is emerging that will build on the foundation of the digital information superhighway and once again revolutionize the way people, communities, businesses, and governments connect, communicate, and travel throughout the United States.

What, you may wonder, is this game-changing new trend? The answer is Intelligent Transportation Systems (ITS), an emerging field that holds the potential of improving the efficiency, environmental sustainability, and safety of

every mode of transportation. From bicycles to autonomous vehicles, to rapid transit, to trains and trucks carrying goods throughout the country, ITS technologies are poised to introduce innovations that will improve the quality of life in communities throughout the country.

Developing ITS innovations will require an urban test bed that features every major transportation problem facing the nation. Such a test bed would give public-private sector leaders a real-world laboratory to develop innovative strategies and technologies to address the manifold challenges facing the twenty-first-century mobility landscape. In this way, the City of Long Beach meets all criteria for a laboratory to develop a template for the Smart City of the future.

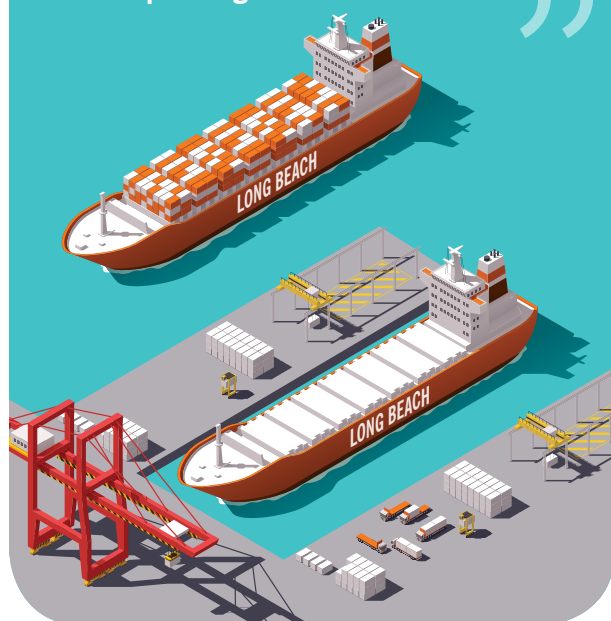
LONG BEACH'S VISION IS...CONNECTED INFRASTRUCTURE

The Port of Long Beach and the neighboring Port of Los Angeles collectively make up one of the largest industrial port complexes in the country, a gateway to more than 50 percent of the nation's imported goods. Indeed, the freight corridors running through and adjacent to Long Beach are a critical component of the local and national economy. However, the many trucks and trains carrying containers to and from the ports also impose massive demands on Long Beach's communities and local environment. With the emergence of megaships and increased trade volumes expected at both ports, those challenges will only become more formidable in the years ahead. Therefore, it is critical that leaders in business and government develop ITS solutions to ensure that Long Beach maintains its critical role as an international trade leader while preserving the health of its communities.

The Long Beach Airport offers another rich opportunity for ITS innovations. Located in the center of the city, the municipal airport has raised a wide range of environmental and community concerns that will only increase as drone technologies increasingly complicate local, national, and international air spaces in the years ahead.

Beyond the formidable maritime, goods movement, and

“The Port of Long Beach and the neighboring Port of Los Angeles collectively make up one of the largest industrial port complexes in the country, a gateway to more than 50 percent of the nation's imported goods.”



aeronautical transportation challenges facing Long Beach, there is also the mobility problem for which Southern California is most famous: commuter traffic on freeways and arterial routes, which are among the most congested in the nation. Here again, Long Beach offers a laboratory to develop ITS innovations to remedy massive traffic congestion, jurisdictional conflicts and safety hazards between not only commuter and urban freight traffic but also public transit and active transit, which is imperative for a city seeking to become the most bicycle-friendly municipality in the country.

LONG BEACH'S VISION IS...A CONNECTED CITY

More than 13,000 leaders in transportation from around the world gathered in Washington D.C., early this year for the Transportation Research Board's (TRB) 95th annual meeting. Again and again, ITS was cited as a trend that will reshape how people and goods will be transported in the future. Terms like "autonomous vehicle," "vehicle-to-infrastructure," "connected corridors," "Big Data," "platooning," "virtual container yards," and many other technologies were presented as solutions to the challenges facing the nation. Every single one of those concepts could be tested in Long Beach if the city and its diverse range of leaders had the resources to set up the aforementioned transportation laboratory.

That said, the success of Long Beach's ITS innovations in the future will be determined by the information technology foundation it establishes to ensure connectivity with not only every mode of transportation but with its local government and business and civic communities. Most of the next-generation ITS technologies mentioned above will only be possible if the city can build upon the best practices of the prior digital information superhighway revolution with a fiber optic network installed throughout the city that will make a wholesale integration with city services possible.

LONG BEACH'S VISION IS...CONNECTED PEOPLE

As a result of its legacy of innovation, manufacturing, and creativity, Long Beach is a place ready to undertake the design and development to create an environment that will attract the next generation of ITS entrepreneurs. If you lay out this infrastructure and the connectivity it provides,

private investment from technology entrepreneurs is likely to follow.

SO, WHY SHOULD USDOT INVEST IN LONG BEACH FOR THE SMART CITY CHALLENGE?

1. Our History of Innovation

Since incorporating in 1888, the City of Long Beach has been at the forefront of investing in innovative transportation, trade, and logistics infrastructure. From its residents issuing a \$240,000 municipal bond to construct the City's municipal wharf in 1909, to investing \$1.6 billion dollars in 2013 to reconstruct the Gerald Desmond Bridge to better accommodate goods movement for those using the principal truck route and a significant percentage of the nation's waterborne cargo that travels underneath it, Long Beach's commitment in constructing innovative infrastructure continues as we move deeper into the 21st Century.

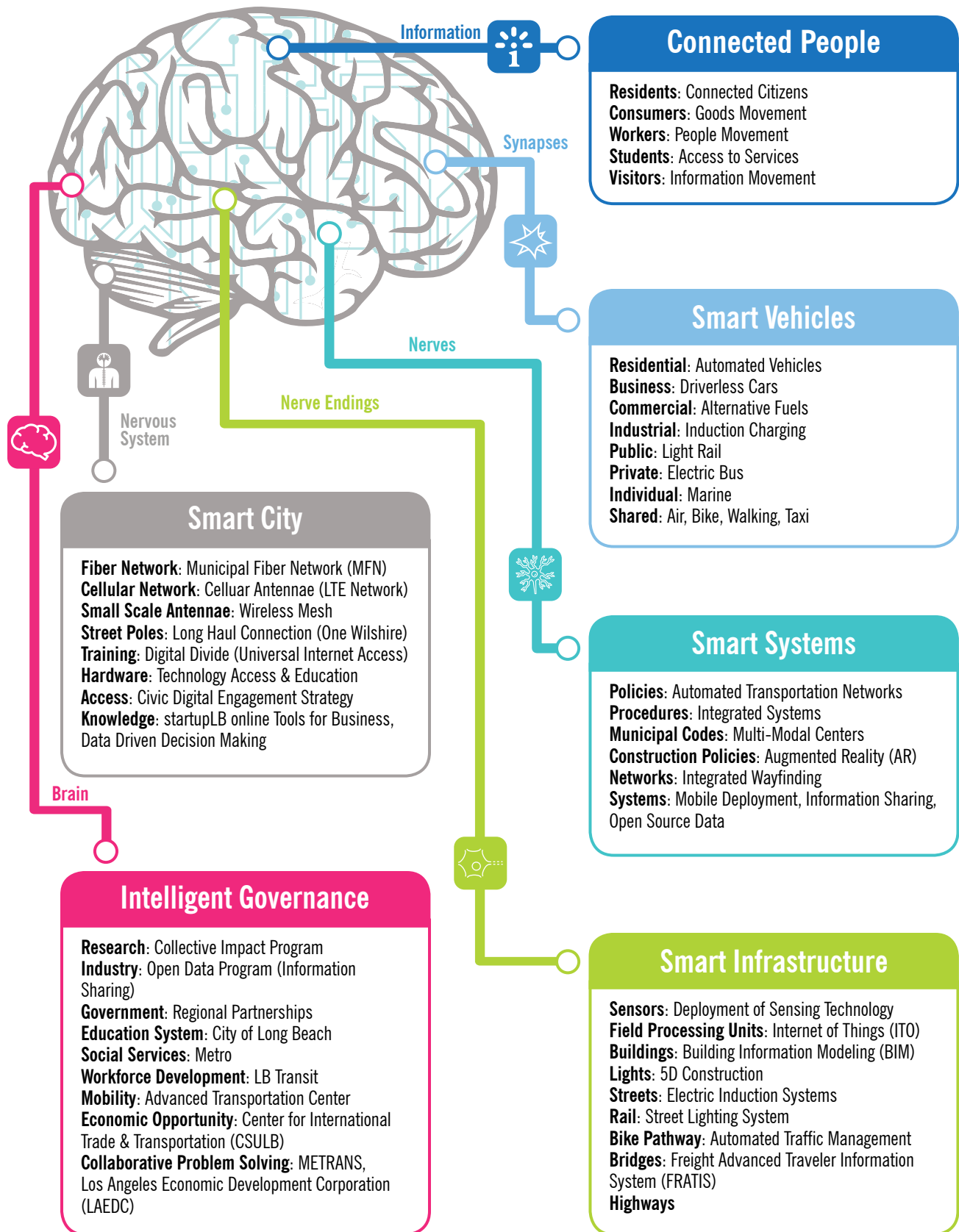
2. Our Strategic Location as the Nationwide Center of Logistics

Corporate needs for transportation decision-making are unlike those of most mid-sized cities in America, yet cities across the country will benefit with reduced costs and operational efficiencies to move goods to and from the Pacific Rim through the Port of Long Beach. Owned and operated by the City of Long Beach, the Port, when factored in conjunction with the adjacent Port of San Pedro operated by the City of Los Angeles, is our nation's second busiest seaport. It is even noted in the "How We Move Things" section of USDOT's *Beyond Traffic 2045* report as one of the most important destinations affecting our transportation future:

"The twin ports of Long Beach and Los Angeles process hundreds of billions of dollars' worth of imports and exports each year. Imports arrive on giant container ships and are transferred to trucks and trains which take the cargo to intermodal transfer centers and, from there, to warehouses and stores across the country."

3. Our Approach in Investing in Backbone Infrastructure for Achieving USDOT Smart City Challenge Goals and Vision Elements

In response to USDOT's *Beyond Traffic 2045* report, Long Beach envisions unlocking ITS technologies and









* Each node includes **Target Areas:** Programs and Policies.

CONNECTED INFRASTRUCTURE, CONNECTED CITY, CONNECTED PEOPLE

A HISTORY OF INNOVATION

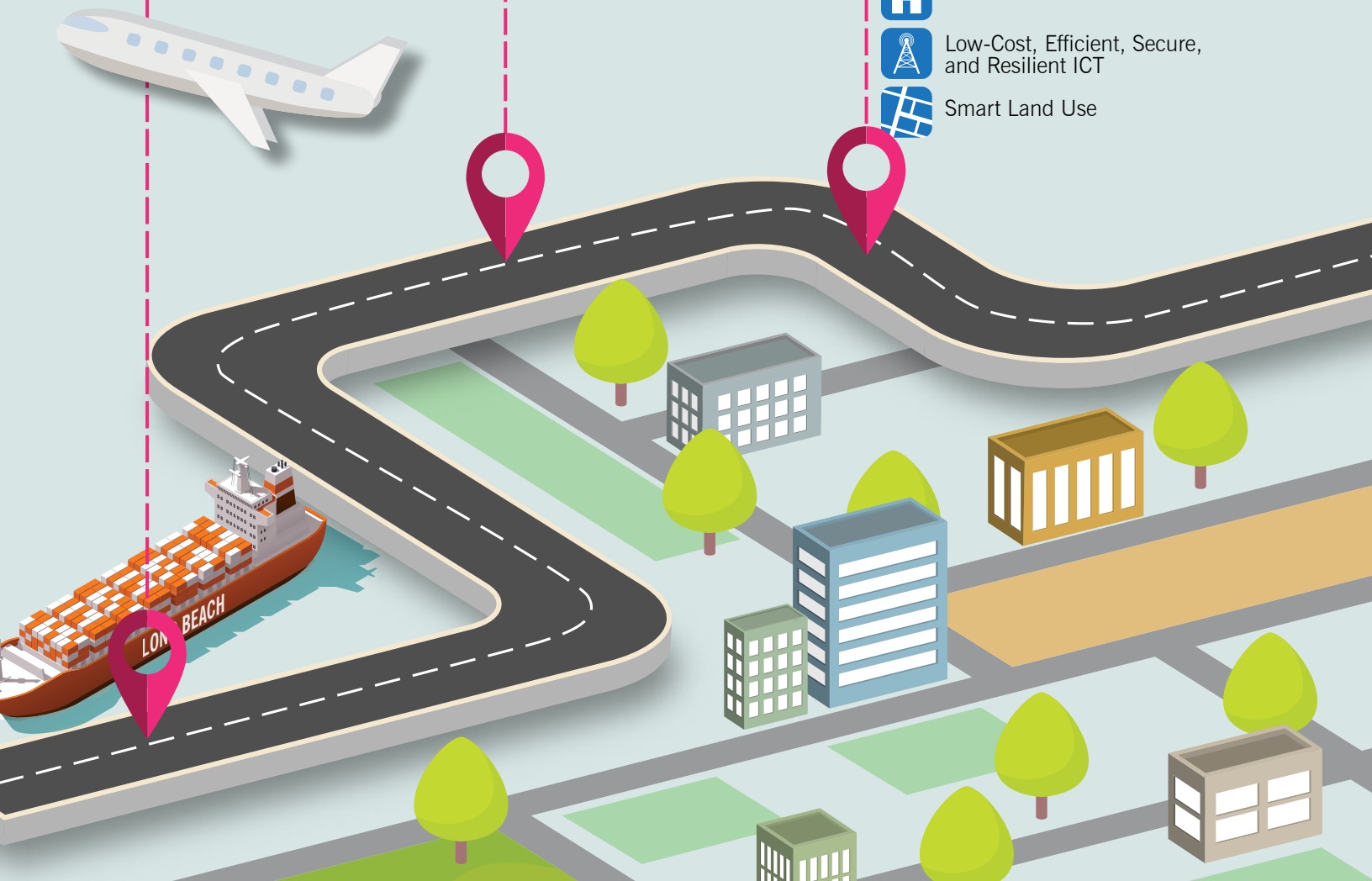
-  Modern Sea Port
-  Railway
-  Airport
-  Freeway System
-  Leader for Engineering, Advanced Manufacturing, and Goods Movement

LEADING INTO THE 21ST CENTURY

-  Economic Opportunity
-  Access to Services
-  Livability
-  Safety
-  Mobility
-  Sustainability

LONG BEACH'S VISION

-  Urban Automation
-  Connected Vehicles
-  Intelligent, Sensor-Based Infrastructure
-  Urban Analytics
-  User-Focused Mobility Services and Choices
-  Urban Delivery and Logistics
-  Strategic Business Models and Partnering Opportunities
-  Smart Grid, Roadway Electrification & Electric Vehicles
-  Connected, Involved Citizens
-  Architecture and Standards
-  Low-Cost, Efficient, Secure, and Resilient ICT
-  Smart Land Use



revolutionizing goods movements across Southern California and the nation through constructing a fiber optic connection along the existing Blue Line Railway right-of-way owned by the Los Angeles Metropolitan Transportation Authority (Metro). This right-of-way directly connects downtown Long Beach 22 miles north to the One Wilshire building in downtown Los Angeles, which holds the West Coast's largest telecommunication hub and is the single point of contact for over 33 percent of all internet transmissions between the United States and Asia. This will be the critical connection to develop a "neural hub" that will enable implementation of the following goals in our Smart City Challenge proposal, which include but are not limited to:

- » High tech infrastructure that connects all pieces of the transport system to the internet, to other municipal systems, and to the people it serves in real time.
- » Smart Infrastructure embedded with internet-connected sensing technology that responds and reports in real time to activities that occur in transportation and municipal systems.
- » Smart Vehicles and Traffic Controls that automatically interact, respond, and transmit data provided by transportation infrastructure to improve safety, speed, and transportation planning.
- » Intelligent Governance that takes a collaborative approach to problem solving, connecting research, industry, government, and residents.
- » Connected People that are aware of their transportation options, engage with their government to improve their city and its systems, and can take advantage of economic opportunities around them.

Implementation of these goals will revolutionize our ability to collect and analyze information to improve not just mobility and goods movement, but safety, as well as vastly improve connectivity between government and the public, and increase opportunities for civic engagement for all citizens and stakeholders.

4. Our Commitment to Realize USDOT's Vision

The City of Long Beach is currently implementing high-tech, smart city strategies across key environmental, economic, and social areas of service. With the recent commitments from City leadership, an in-house Innovation

Team (i-team) was created in February 2015 to plan for massive infrastructure projects underway in the downtown and Port of Long Beach. This includes incorporation of ITS technology in the implementation of these projects, including the development of a Citywide Fiber Optic Plan, which was released as an RFP in December 2015.

Moreover, the City of Long Beach has received support for our proposal from Metro, as well as securing a research partner through METRANS, a Tier 1 University Transportation Center (UTC). METRANS is a joint partnership between the University of Southern California (USC) and California State University, Long Beach (CSULB). This partnership will enable the creation of efficient, effective, equitable, scalable and replicable plans that will improve the quality of life in Long Beach, allowing for the incorporation of ITS systems through the installation of a citywide fiber optic network to quickly move the City of Long Beach's vision of automated and interconnected vehicles and people forward into implementation. If selected, we intend to allow for opportunities to integrate our network with others in the surrounding metropolitan region and serve as prototypes for other cities.

5. Our Value to the USDOT Smart City Challenge Program

Investing in the City of Long Beach offers an unprecedented value for USDOT's Smart City Challenge Program. The connected Los Angeles and Long Beach ports in Southern California's San Pedro Bay alone handled about 117 million metric tons of imports and exports in 2014 for a total value of \$395.7 billion. Automation of the City's Port through a \$40 to \$50 million investment (approximately 10% to 12% of the port's annual revenue) will significantly increase the capacity of trade while simultaneously improving regional mobility and reducing greenhouse gas emissions. Best of all, this investment will unlock economic benefits not only in Long Beach and the surrounding Los Angeles Metropolitan area, but throughout the United States.

In conclusion, the City of Long Beach is excited and enthusiastic in moving forward with its Vision of Connected Infrastructure, Connected Government, and Connected People.



2.0 POPULATION CHARACTERISTICS

Long Beach is in the Los Angeles-Long Beach-Anaheim Urbanized Area (#51445) of California, the second-largest UZA in the country with 12.1 million people. This UZA includes Los Angeles County, the nation's most populous county, and Orange County, the fifth most populous county. The City of Long Beach is the second largest city in the UZA, but represents only 3.8 percent of the UZA's huge population. Although that is a smaller percentage than the USDOT guidelines recommend, 15 percent of the UZA population is 1.8 million, more than twice the population in the guidelines.



Although Long Beach represents less than 15 percent of the UZA, it is still a strong candidate for the program because of other characteristics. The city operates its own transit system, traffic operations division, and public health department. Its other unique assets include a high-performing health care industry; manufacturing, trade, and transport industries; airport; public school system; and state university and two community colleges. Long Beach is also a top tourist destination with a renowned aquarium, naval and aerospace history, and dynamic art and culture community.


Further, since our proposal relies heavily on connected signalization and fiber optic technologies as the critical element in unlocking Intelligent Transportation Systems, our reach will extend beyond the official borders of our city since the Long Beach Public Works Department operates many of the signals in our adjacent cities. Deployment of fiber optic technologies will allow Long Beach to reach a greater percentage of the UZA and if any of the smaller, adjacent cities also hope to incorporate the technologies of a SMART city, they will have a much greater chance of success through collaborating with us.

POPULATION

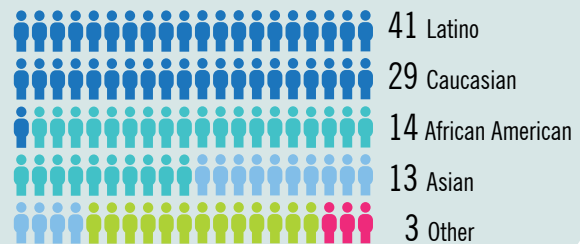
	City of Long Beach	462,257 people
	Los Angeles County	10.2 million people

LAND AREA & POPULATION DENSITY

	City of Long Beach	50.2 sq. miles
	Population Density	9,194 persons/sq. mile 

 (Highest pop. density for a mid-sized City in Southern CA)

RACE & ETHNIC DIVERSITY %



3.0 OTHER CHARACTERISTICS

THE CITY'S EXISTING PUBLIC TRANSPORTATION SYSTEM

In addition to providing extensive transit service, LBT has also been committed to promoting multi-modal mobility. Each LBT bus in its fleet is equipped to carry up to three bicycles. LBT has coordinated with the City so that many of its bus stops are equipped with safe and community-centric bike racks. A privately operated bike-focused facility, known as the Long Beach Bike Station, is now located on the First Street Transit Gallery near LBT's Transit and Visitor Information Center. This Bike Station gives residents and visitors of the City a safe and secure location to park their bikes. It also includes a retail shop for bike accessories and a trained technician specializing in bicycle repairs is also on site.

LBT also works in conjunction with the regional transit operator, the Los Angeles County Metropolitan Transportation Authority. Metro runs 3 bus lines through Long Beach and its 22-mile Blue Line light-rail line contains 9 stations in the City, terminating in downtown Long Beach.

A CONTINUITY OF COMMITTED LEADERSHIP AND CAPACITY TO CARRY OUT THE DEMONSTRATION THROUGHOUT THE PERIOD OF PERFORMANCE:

The Mayor of Long Beach has directed the City's Economic Development Commission to prepare an Economic Development Blueprint by June 2016. The

purpose of this plan is to coordinate economic activity across City departments and sectors to foster investment and development in the City of Long Beach. This will involve a number of recommendations about how the City can maximize use of property and infrastructure to grow economic activity; implement new technologies to improve services and opportunities for citizens; and to partner with the private sector to become a center for innovation and entrepreneurship. This project will involve extensive outreach across categories of Smart Cities initiatives, including economic opportunity, planning, land use, technology, mobility, energy distribution and use, natural resources, utilities, public safety, among others—to coordinate initiatives in an effort to catalyze economic development, alongside the efforts of the Fiber Optic Network Deployment the City is taking bold steps to adapt and grow its economy, adapt to climate change, and revolutionize the safety and efficiency of our transportation network.

Additionally, the City Manager has directed the i-team to develop a Long Beach Center for Innovation, to formalize collaboration between research, industry and government, to cultivate innovation, and bring innovative ideas to the business community in the City and surrounding region. The Center will identify, cultivate, fund, and test new technologies across sectors that can improve the City's performance, service delivery, and access to services for residents. This initiative will involve partnerships with University of Southern California and Cal State Long Beach.

LONG BEACH TRANSIT:



Service area of approx.
100 square miles



35 routes



Over 52,000 boardings
for paratransit services



Routes to 12
neighboring cities



223 buses (low-floor,
wheelchair accessible)



AquaBus and Aqua Link
water taxi services in
harbor and along coastline



Over 28 million
trips annually

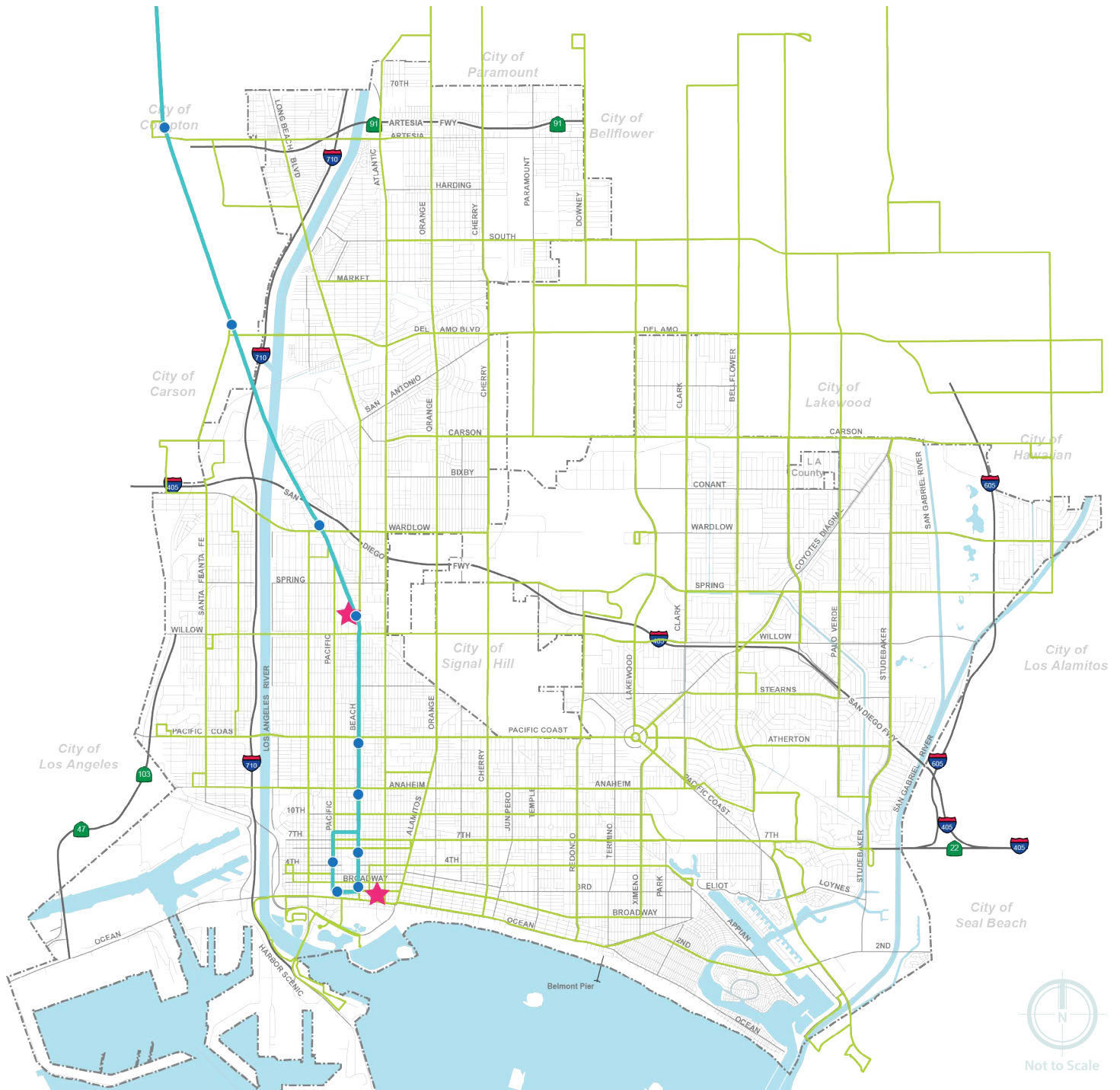


1,900 stops



Largest hybrid gasoline-
electric fleet in the nation

Section 3.0



EXISTING LOCAL TRANSIT ROUTES

LEGEND

- Bus Routes (LB Transit, Metro, and OCTA)
- Metro Rail
- Metro Rail Stations
- ★ Multimodal Hub

A COMMITMENT TO INTEGRATING WITH THE SHARING ECONOMY:

In response to the increasing popularity of Transportation Network Companies (TNC) like Uber and Lyft, the City of Long Beach did not follow the path of many cities by restricting or limiting access. Instead, the City reduced regulations on the taxi industry to allow them to compete more efficiently. Long Beach is the first major U.S. city to eliminate price floors, allowing taxi companies to operate much more like a TNC and ensure the public can travel more easily and affordably while reducing the dependence on private vehicles.

A CLEAR COMMITMENT TO MAKING OPEN, MACHINE-READABLE DATA ACCESSIBLE, DISCOVERABLE, AND USABLE BY THE PUBLIC TO FUEL ENTREPRENEURSHIP AND INNOVATION:

The City of Long Beach has been a leader in trying new technologies in local government for some time. The City recently received a number of awards for its innovative approach to service delivery, including the use of seven

custom-built mobile applications for service delivery such as the award winning Go Long Beach application, and a series of web-based, open data modules. Some examples include:

- » Budget Visualization: <https://longbeachca.opengov.com/transparency#/>
- » Live Well Long Beach: <http://www.livewelllongbeach.org/>
- » Open Long Beach: <http://www.longbeach.gov/openlb/>
- » Map It: <http://tsdgis.longbeach.gov/apps/MapLB/>
- » Family of Mobile Apps: <http://www.longbeach.gov/ti/modernization/go-long-beach-apps/>
- » Go Long Beach: https://www.youtube.com/watch?v=twYAcqES4_M

The City has also been a leader in the use of mobile applications to deliver information and services directly to resident mobile phones. There are seven custom mobile applications that bring City services to citizen mobile phones described on the following page.



CITY OF LONG BEACH AWARDS



Code for America Fellowship

In 2015, the City was awarded the 2016 Code for America Fellowship to create a new online platform for early stage entrepreneurs. The project "startupLB Tools for Business" will aggregate resources from public, private, and educational institutions into one place to prepare and guide entrepreneurs through the business startup process.



Top 10 Digital Cities Award

Most recently, the City received a Digital Cities Top 10 Award for 2015, for the fifth year in a row,

for its innovative approach to service delivery, including the use of seven custom-built mobile applications for service delivery. More information on these apps are provided on the following page.



Bloomberg Philanthropies Grant

In 2015, the City was awarded a three year, \$3 million grant from Bloomberg Philanthropies. Long Beach was one of fourteen cities selected in December 2014 as part of the Bloomberg Philanthropies' Innovation Teams program. The program aims to improve the capacity of City Halls to effectively design and implement new approaches that improve residents' lives.

LONG BEACH'S ENVIRONMENT FOR DEMONSTRATION PROJECTS & STRATEGIES



1909

Residents issued a \$240,000 bond to build a municipal wharf.



1940s

The Navy selected Long Beach as the principal landing site for the Navy fleet, and Donald Douglas produced more than 4,200 C-47 Skytrain planes for the war near the Long Beach Airport.



1930s

Ford, DuPont, and Proctor and Gamble operated factories in the harbor, and oil was discovered under the city.

1960s

Long Beach became the Queen City when it acquired the ocean liner Queen Mary from Cunard Lines.





1970s

The Sea-Land Service announced plans for a huge container ship that would carry 1,200 containers on board; the port received its designation as a foreign trade zone changing the way goods came into the country, were assembled, and transported to their final destinations.



1980s

The 27-story World Trade Center—the largest in the country after New York at the time—opened in downtown Long Beach, positioning the city as an international center of trade and logistics.

2010s

Recent projects include the \$20 million Alameda Corridor project to consolidated rail transport out of the port, the \$1.6 billion renovation of the Gerald Desmond Bridge, and innovative partnership to construct the \$1 billion Civic Center project, among others.

Over the past five years, the City of Long Beach and the surrounding Southern California region experienced an increase in technology and technology-related businesses, jobs, and venture capitalist investments in these industries. With tech giants such as Google, Microsoft, Facebook, and YouTube opening offices on the west side of Los Angeles, and with companies like Laserfiche, Free Conference Call.com locally, the region has become the third (closing in on second) largest hub of technological startups in the world. The opening of Google's Venice office in 2011, along with the sprouting of more than 500 other startups spanning from Santa Monica to Venice and Playa del Rey, validated the emergence of Silicon Valley's warm, trendy, and surfer-friendly counterpart, "Silicon Beach." The increase of startup technology business and jobs (topping 350k) in the region boasted \$3 billion in venture capital investment in 2014 alone.

Historically, the city has been a center for advanced manufacturing and engineering industries centered around transportation, trade, and logistics. The City of Long Beach is implementing high-tech, smart city strategies across each key environmental, economic, and social area of service. With a growing commitment from leadership to build an in-house force of innovation, and massive infrastructure projects underway in the downtown and Port of Long Beach, the City of Long Beach is poised to develop ways in which to foster creative, technology-based solutions for our nation's most challenging mobility problems. The prime sociocultural and geographical landscape, history of economic prosperity, and proximity to other technology and research hubs and networks make the City uniquely poised to implement the next phase of smart cities transportation breakthroughs that will be a model for the nation.

MOBILE APPS FOR CITY OF LONG BEACH SERVICES



Long Beach Airport App

The Long Beach Airport app gives travelers free access to real-time flight arrival and departure information. Informative tabs offer quick links to airport parking information, restaurants, shopping, ground transportation, terminal map, social media, and city assets.



Go LBPD

Go LBPD creates easy access to The Long Beach Police Department information relating to news, crime prevention, alerts, events, videos, and photos through social media feeds such as Facebook, Twitter, YouTube, and Flickr, along with the ability to submit crime tips.



Go Uptown LB App

The Go Uptown LB app is a healthy eating active living (HEAL) resource that directs Uptown residents of Long Beach to local opportunities and resources for an engaged, active, healthy life.



VOTE Long Beach App

The VOTE Long Beach app is designed to give registered voters of Long Beach the opportunity to access City of Long Beach Election Information, 24/7. Users can quickly locate a Long Beach polling place, view their sample ballot, request and track a Vote by Mail ballot and receive instant Election updates.



Public Library Mobile App

The Long Beach Public Library mobile app puts the library in readers' hands anytime, anywhere. Users can search the library catalog, check their account, place a hold, see what's new, get recommendations, get directions, check library hours, and connect with a librarian when they are on the go.



Go Long Beach App

The GO Long Beach app is designed to give residents, businesses, and visitors the opportunity to access City Hall, 24/7. Citizens are able to quickly submit service requests for issues such as graffiti, potholes, and sign damage. Users can select an issue, take a picture, and tap submit—the App knows the exact location and sends the issue directly to city staff.



Animal Care Services App

The Long Beach Animal Care Services app allows local pet owners and animal lovers to easily search for adoptable cats and dogs, find local dog parks, impounded animals, and locate emergency and after-hours veterinary facilities.

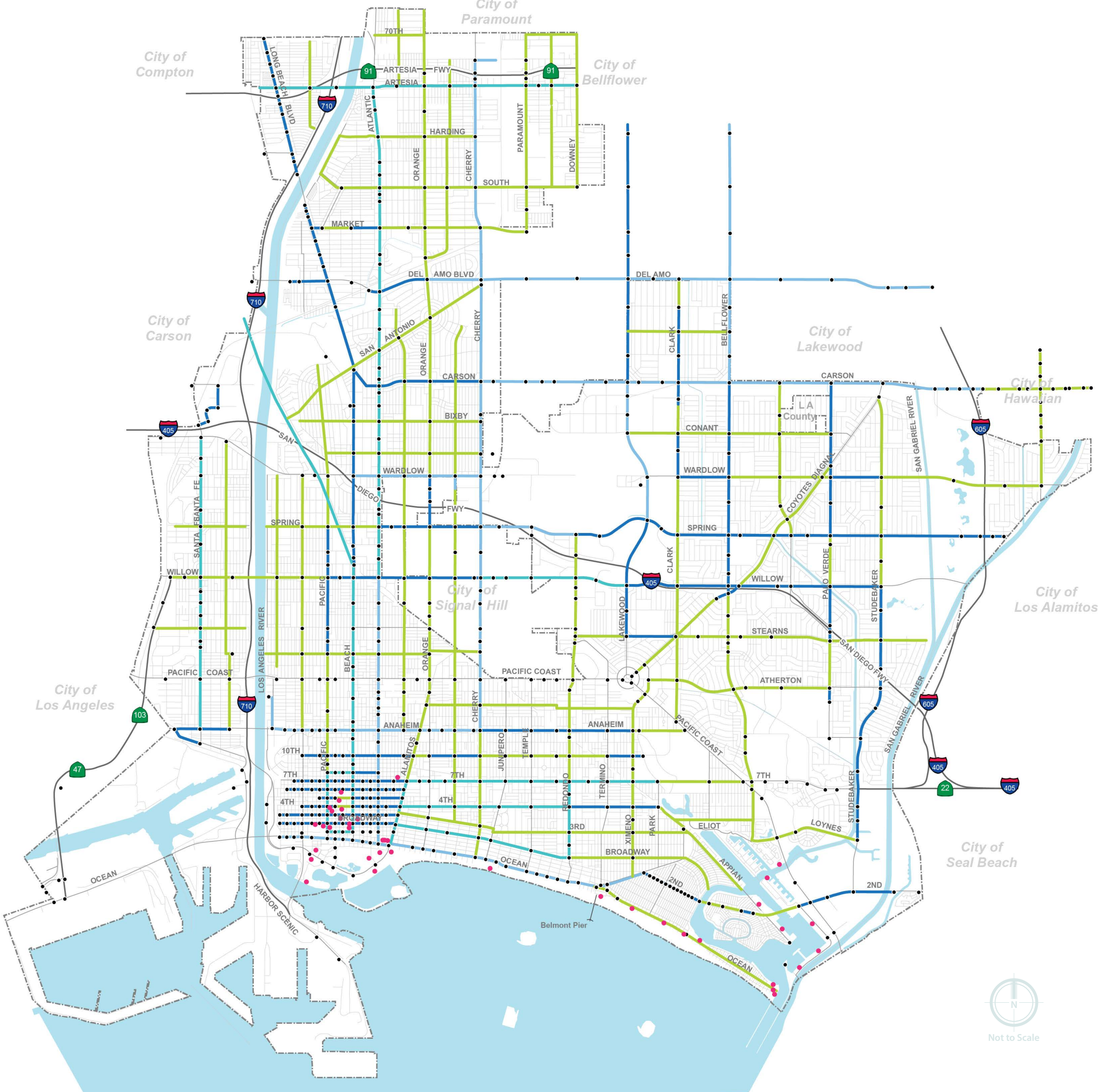
**These apps can be found by visiting:*

- » Family of Mobile Apps: <http://www.longbeach.gov/ti/modernization/go-long-beach-apps/>

4.0 ANNOTATED SITE MAP



LEGEND

- Existing Fiber
- Current Projects
- Fiber will Replace Existing Copper in Bad Conduits
- Proposed Fiber
- Traffic Signals
- City-Owned Parking: Opportunity sites for roadside technology locations and automated vehicle operations





5.0 ALIGNMENT WITH USDOT VISION ELEMENTS

Consistent with the vision of the City of Long Beach to create a highly-integrated transportation network that monitors and responds to the people it supports on a daily basis, the City has identified potential applications and approaches, projects and programs, within each of the 12 vision elements, that could easily grow out of a municipally owned fiber optic network that connects to One Wilshire and our vision of Connected Infrastructure, Connected People, and a Connected City. This approach prizes data as an asset to be shared and inform City, Corporate, and Personal decision making on how and when to move people and goods, how to better maintain and make the most of all our municipal systems, and how to make better decisions with a more informed and connected populace.

APPROACH		RESULTS
 Vision Element #1 Urban Automation	» Deploy Freight Advanced Traveler Information System (FRATIS) Applications through a Application Enabled Device to Trucks (AED), including Freight-Specific Dynamic Travel Planning and Performance (FSDTPP), as well as Drayage Optimization (DO)	» FSDTPP – Reduced travel times through automated routing of trucks along less congested alternate routes when I-710 is congested. » DO – Reduced times in the pickup and loading of freight through queuing information provided to the Port’s 14 truck terminals.
	» Enable Trucks to install Q-WARN technology, an Intelligent Network Flow Optimization (INFLO) suite of applications that is available through third-party cellular based probe data	» Q-WARN – Reduces accidents and increases safety by providing warnings on road hazards, existing accidents and unsafe travel conditions commonly encountered along I-710, reducing congestion in process.
 Vision Element #2 Connected Vehicles	» Install Transit Signal Priority (TSP) on Long Beach Transit Vehicles and on other transit vehicles that operate in the City of Long Beach.	» Transit vehicles will move more efficiently, reducing delays and eliminating bus bunching, improving transit reliability and reducing travel times for transit users, supporting the overall movement of people and multi-modal transportation in Long Beach.
	» Install Freight Signal Priority (FSP) on Long Beach Transit Vehicles to prioritize movement of goods along designated roadway corridors from the Port of Long Beach.	» Truck carrying freight will move more efficiently, reducing delays in the movement of goods, reducing travel times and pollution, improving the environment and economic productivity in the City, region and country concurrently.
	» As part of the FRATIS suite of applications, install the cellular-based ECO-FRATIS application on vehicles transporting goods to and from the Port. ECO-FRATIS is provided by the Applications for the Environment: Real-Time Information Synthesis (AERIS) Program.	» ECO-FRATIS – Guiding goods movement vehicles down the most eco-friendly route, this application will simultaneously reduce congestion and pollution emitted from vehicles, while enabling opportunities for driver feedback to track the performance on routes provided.

APPROACH	RESULTS
<div data-bbox="199 317 261 380"></div> <div data-bbox="267 312 456 457"> Vision Element #3 Intelligent, Sensor-Based Infrastructure </div> <ul style="list-style-type: none"> » Install Street Embedded Sensors, which will create a system of Smart Parking Meters. 	<ul style="list-style-type: none"> » Installation of sensors will reduce congestion by providing real-time parking availability for residents, workers and visitors in Long Beach, as well as provide real-time data on the occupancy of parking, improving the efficiency of existing infrastructure and encouraging economic development.
<div data-bbox="199 1522 261 1585"></div> <div data-bbox="267 1518 466 1598"> Vision Element #4 Urban Analytics </div> <ul style="list-style-type: none"> » Install a range of sensors (Video, DSRC, Hybrid) at roadway intersections, enabling the capability for prioritizing the movement of bicyclists and pedestrians (PED-SIG) at signalized intersections, enabling collision avoidance sensors within the “dilemma zone” at crosswalks during yellow light cycles, as well as data systems that track and assess travel times. 	<ul style="list-style-type: none"> » Pedestrian signal systems (PED-SIG) through mobile accessible technologies – Accidents involving vehicles and pedestrians at DSRC enabled intersections will be significantly reduced as a result of extending the walk cycle for those needing time to cross by issuing alerts to drivers, which will promote multi-modal transportation and improve the efficiency of the overall Mobility network in Long Beach. » Bicycle detection signal priority through video detection sensors – Installation of sensors will enable to distinguish the difference between vehicles and bicyclists at the stop bar, allowing for a longer light cycle for the bicyclist. This will result in a reduced number of collisions between bicyclists and vehicles, as well as promoting multi-modal transportation and provide an accurate and affordable method of counting bicyclists travelling within the City of Long Beach. » Dilemma zone and collision avoidance sensors – Red lights will be activated at all corners of the intersection when vehicles approach stop bars at a speed greater than what is sufficient to cross during the yellow light cycle, greatly reducing vehicular accidents, reducing congestion, increasing safety and ultimately improving mobility throughout the City of Long Beach. » Travel time data systems – Data collected from these Bluetooth or Wi-Fi data collection systems can assist in providing performance measurements, including travel time, speed and segment delay. This will benefit the City of Long Beach in determining where investments to infrastructure are best executed to eliminate congestion hot-spots.
<ul style="list-style-type: none"> » Install a Probe-Enabled Traffic Monitoring Application (PETM) on participating freight vehicle fleets 	<ul style="list-style-type: none"> » Installation of this application will help improve the accuracy of traffic data in Long Beach and the surrounding region, and will greatly assist the Los Angeles Metropolitan Transportation Authority (Metro) in collecting data in frequently congested locations, potentially improving mobility on a regional scale.
<ul style="list-style-type: none"> » Install a Probe-Enabled Pavement Maintenance Technology, inviting users of 511 mobile applications to act as pavement condition monitors 	<ul style="list-style-type: none"> » The City will better identify poor roadway pavement locations, focusing infrastructure investments on where it is needed most, maximizing fiscal responsibility and improving mobility.

APPROACH		RESULTS
 Vision Element #5 User-Focused Mobility Services and Choices	<p>» Develop technology to enable the mobilization of Autonomous Vehicle Shuttles. Long Beach will consider implementation of this technology surrounding the Downtown Transit Mall, which is adjacent to the City's World Trade Center.</p>	<p>» Development of this technology, which may also include self-parking vehicles and vehicles managed by mobility service providers, will improve highway safety, decrease congestion, lower emissions, expand mobility, and create new economic opportunities for jobs and investment.</p>
 Vision Element #6 Urban Delivery and Logistics	<p>» Launch logistics applications focused on Drayage Operations (DO) and warehouses in the Gateway Cities area accessing the Port of Long Beach.</p>	<p>» This will improve and enhance existing deployments by allowing freight operators to transform into mobility fleet operators, as scheduling and routing is optimized to improve efficiencies at the Port.</p>
 Vision Element #7 Strategic Business Models & Partnering Opportunities	<p>» Construct innovative partnerships among the City of Long Beach, local planning organizations, the private sector, vehicle manufacturers, academia, professional associations, and other stakeholder groups to advance smart city solutions. The City of Long Beach is directly incorporating this strategy through partnering with METRANS, a University Transportation Center (UTC) joint partnership between the University of Southern California (USC) and California State University, Long Beach (CSULB).</p>	<p>» Benefits of partnerships are numerous, however, four principal components of developing strategic partnerships include: (1) incorporating trusted mobility advisors to help maximize the value in transportation infrastructure, (2) providing a platform for specialized analytic services through consulting with mobility data aggregators, (3) to serve our population with mobility fleet operators, enabling a population that chooses to access vehicles rather than own them, and (4) finding providers of horizontal operating systems for mobility-related devices.</p>
 Vision Element #8 Smart Grid, Roadway Electrification & Electric Vehicles	<p>» Develop Smart Grid and Roadway Electrification Technology to Enable Inductive Charging for Long Beach Transit Vehicles.</p>	<p>» Development of this technology will improve air quality in Long Beach through providing buses that produce zero emissions. Rollout of this program is expected to occur in Fall 2016.</p>
 Vision Element #9 Connected, Involved Citizens	<p>» To encourage connected and involved citizens, develop a City-led Innovation Team to coordinate large-scale programmatic innovation initiatives across governmental and non-governmental sectors.</p>	<p>» The City received a \$3 million dollar grant to fund the hiring of an Innovation Team (i-team), which occurred in February 2015. Since then, the i-team has met with 80 organizations and 700 individuals, and is preparing a High Tech Infrastructure Plan concurrently with other economic development initiatives. This will enable the potential rollout of ITS and lay the groundwork for a fiber optic network to connect these technologies in Long Beach.</p>
 Vision Element #10 Architecture and Standards	<p>» Demonstrate interoperable ITS capabilities through use of the Connected Vehicle Reference Implementation and the associated SET-IT software tool.</p>	<p>» The City is working with consultants experienced in the development of such technologies, including Iteris, Inc., and will directly benefit from working with architecture and standards developers in improving the quality of products based on lessons learned in deployment.</p>

APPROACH	RESULTS
 <p>Vision Element #11 Low-Cost, Efficient, Secure, & Resilient ICT</p>	<ul style="list-style-type: none"> » Develop a citywide policy on open source data, making data and information easily accessible for citizens, businesses, and developers of applications. The City of Long Beach is currently undergoing a year of training to ensure that data sources are secure and that information presented is within the rules and regulations in the State of California and United States. » Citizens will be more informed and engaged in civic and community issues, with improved efficiencies in government services. In addition, data will be presented in a fashion that can be easily transferred to develop data for other agencies, enabling collaboration and enabling a regional system of ITS technologies.
 <p>Vision Element #12 Smart Land Use</p>	<ul style="list-style-type: none"> » Through the development of launching smart infrastructure and ITS technologies, Long Beach will collect data that will encourage a range of smart land use decisions that will improve public safety, inform effective and flexible regulations, as well as expand economic opportunity. » Overall quality of life will improve through more effective use of existing infrastructure, as well as enforcement focusing on real-time hotspots versus complaints received after violations or crimes occur. Regulations will be modified to reflect actual conditions versus modeled impacts.

6.0 RISKS & MITIGATIONS

Risks that come with the deployment of the ITS system and other smart technologies include:

- » Risks associated with development of the backbone fiber optic network.
- » Risks associated with deployment of ITS technologies that are enabled as a result of developing the backbone network.
- » Risks with the data that is communicated and collected within the ITS technologies themselves.
- » Connecting to One Wilshire along Metro's right-of-way will require extensive coordination and currently unsecured agreements with entities outside of our jurisdiction. While we fully expect to be able to work any issues out, we currently have no guarantees or assurances that all the partners needed will be able to fully participate in making this part of the vision happen.
- » Mobilizing a project of this scale, very quickly, with as much coordination as will be required, will also be very difficult.

Specifically in terms of the deployment of ITS technologies, timely deployment is critical, as well as establishing relationships between Core Systems and the enterprises that will use the technologies. In addition, adequate operations and maintenance personnel are also important to ensure that ITS applications are performing as efficiently as possible. In regard to the transmission of data itself, it is also key that external support systems are developed to monitor the safety, privacy, and security of data transmitted to ensure that systems are protected from potential hacking or terrorist attacks.

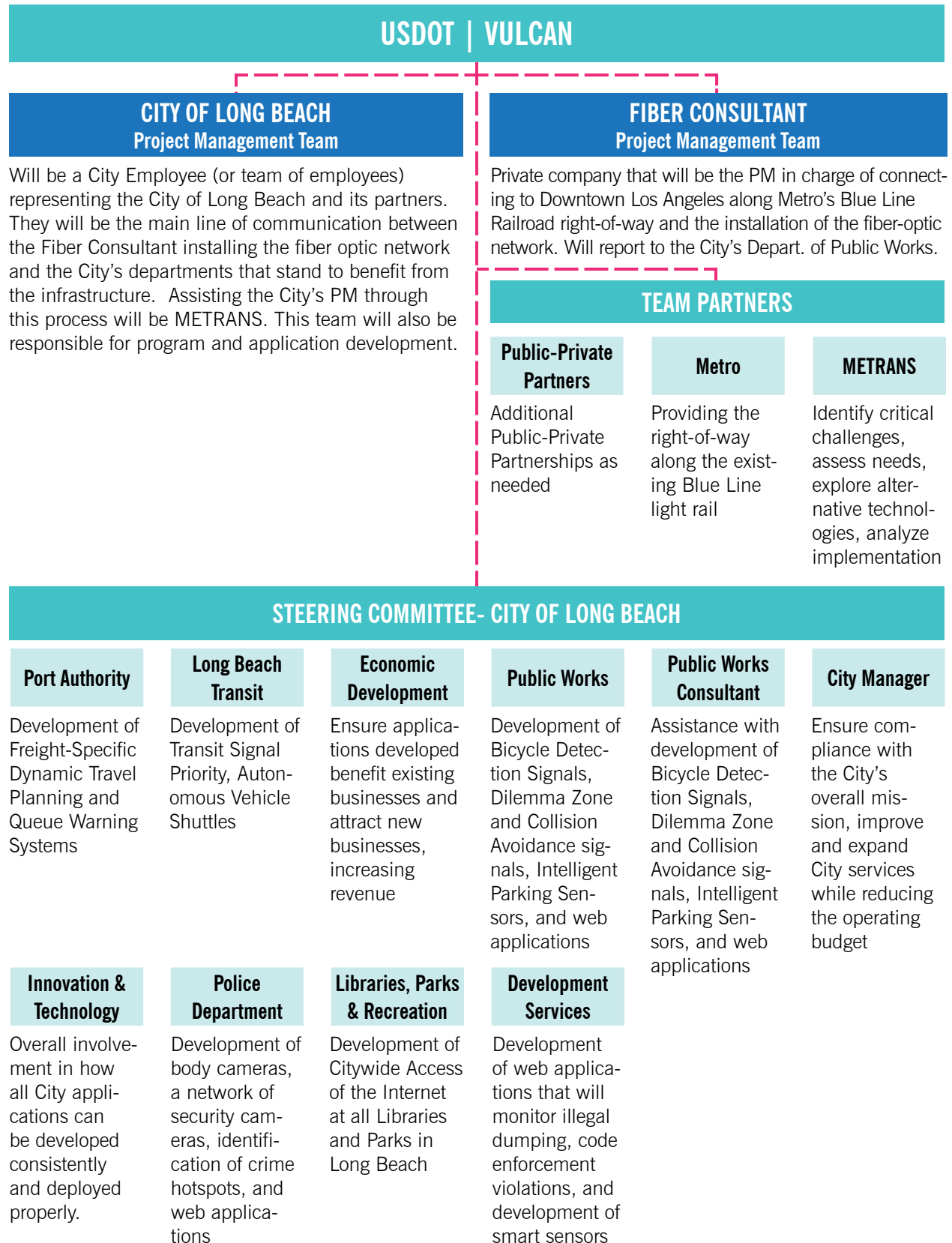
Key technical, policy, and institutional steps will include the following to ensure proper deployment of Long Beach's vision:

- » Develop a thorough citywide fiber optic plan:
 - » Inventory existing systems and service availability
 - » Citywide needs assessment
 - » Develop conceptual network routes and infrastructure requirements
 - » Develop technical specifications and cost estimates

- » Assess potential service models and strategies for management of infrastructure and programs that will be developed from such infrastructure
- » Assess potential business models and financing strategies for funding infrastructure installation and creation of applications that can be derived from the installed infrastructure
- » Coordinate with the city departments that will likely be involved in installing infrastructure or developing applications derived from installed infrastructure
- » Coordinate with regional agencies regarding rights-of-way selected for infrastructure installation
- » Develop partnerships with businesses and organizations that are experienced and knowledgeable in the construction of fiber optic networks or deployment applications that harness data collected from the network

The city is well positioned to mitigate any potential risks associated with the deployment vision because it is in the process of developing a citywide fiber optic plan, recently releasing an RFP to hire an expert to conduct a full assessment of. As part of developing a strategy to implement citywide infrastructure, the City will institute a Steering Committee composed of various City departments that will directly participate in the development of applications and data that will be generated as a result of the installation of a citywide fiber optic network. To ensure proper management of the project from visioning, to planning, to construction, to implementation, the City has an in-house Innovation Team, commissioned by the city manager's office to focus on innovative information and technology projects. Through this team, partnerships have been developed with METRANS, a local university transportation center that is knowledgeable in the innovative application of fiber optic technology, and with Iteris, a firm that is at the forefront of installation of fiber optic infrastructure. In addition, support for establishing right-of-way for the installation of the fiber optic line has been confirmed through Metro, which owns the Blue Line light-rail right-of-way that leads from downtown Long Beach to the One Wilshire building, where connection to the West's largest telecommunications center can potentially take place.

7.0 PARTNERS & STAKEHOLDERS



PROJECT MANAGEMENT TEAM

Long Beach is a Mayor/Council-City Manager form of government. Thus, the Project Management Team, while largely directed by the Public Works Department, will also directly report to the City Manager's Office, and will have the full support and coordination of a Citywide effort, similar to the recent efforts of Bloomberg Philanthropies Innovation Team, the Gerald Desmond Bridge Replacement Project, and others.

The Project Management Teams will communicate regularly with a top executive team, including the city manager and assistant city manager, through bi-weekly briefings. A Project Management Team representative will also attend weekly gatherings of all department directors. Finally, that same Project Management Team

representative will meet regularly with the Mayor and Council members to keep them informed and engaged.

The Mayor and City Council, executive leadership team, and department directors will also participate in the application and approach development process, to engage all municipal systems in taking full advantage of the project and its applications. While some activities will require subject matter expertise, the scoping process requires understanding across a wide spectrum of leaders. Their active participation will encourage and accelerate the innovation we are building for.



8.0 TRANSPORTATION INFRASTRUCTURE



ARTERIAL MILES

181 miles (Principle: 70.9; Minor: 110.8) - Source: GIS



FREEWAY MILES

32.4 miles - Source: GIS



TRANSIT SERVICES

As stated previously, Long Beach Transit serves a 98 square mile area, including 12 neighboring cities with over 28 million trips annually. The 35 routes are serviced by 223 buses at over 1,900 stops throughout the system. Long Beach Transit also provides Demand Responsive Paratransit services, with over 52,000 boardings in FY14. Long beach Transit also provides Water Taxi Services between shopping and dining destinations across the bay, with an annual ridership of nearly 60,000 trips in FY14.

Long Beach also hosts 9 stations for the Metro Blue Line, a light rail system operated by Los Angeles Metro. The blue line is a 22-mile regional light rail line connecting Downtown Los Angeles to Downtown Long Beach with over 26 million boardings annually. 5.8 million boardings take place in Long beach -- 22% of the total boardings for the Blue Line. (Source: LB Transit Report & Wikipedia)



SHARED-USE MOBILITY SERVICES

With an increasing consumer demand for home deliveries, and ever-evolving logistics strategies used by businesses, pick-up and delivery truck trips in urban area are increasing at a rapid pace. In addition, as businesses explore creative ways to meet customer requests for quicker deliveries, they are venturing into using services similar in concept to UBER and LYFT where conventional passenger vehicles are used for home deliveries. Further, as more and more people are moving into urbanized areas, and many local jurisdictions pursue high density developments to increase

land utility, advancing environmental and social goals, it is anticipated that overall population in urban areas are going to increase, inducing a demand for urban deliveries and pick-ups.

The impact of this increase in urban deliveries is starting to emerge in different parts of the country. High density, vibrant communities with busy commercial nodes such as Manhattan (New York), San Francisco (California), and London (United Kingdom) are experiencing competing priorities for limited curbside space, with the City of Long Beach facing this reality as well. Many transportation planners and traffic engineers are confronted with the issue of meeting competing economic demand with the current infrastructure. For example, curbside parking space is a scarce resource in many urban areas, albeit critical in fostering economic activities. Safety is also another area of concern as the density of pedestrian, cars, and trucks increase in any given area.

Related to home deliveries, parcel theft in residential areas has increased over time, perhaps in correlation to an increase in home deliveries. This is a major concern to both businesses and parcel carriers as they incur financial loss.



INTELLIGENT TRANSPORTATION SYSTEMS (ITS), INCLUDING TRANSPORTATION MANAGEMENT CENTERS AND FIELD EQUIPMENT

The Greater Los Angeles region is home to two deep water ports: the Ports of Long Beach and Los Angeles (together called the San Pedro Bay Ports). The Port of Long Beach (POLB) comprises 3,200 acres of land and has five on-dock rail yards. The Port of Los Angeles (POLA) comprises 4,200 acres of land and has four on-dock rail yards. Between them, the Ports have terminals devoted to containers, liquid bulk, dry bulk, break bulk, automobile imports, and cruise terminals. The San Pedro Bay Ports handled about 117 million metric tons of imports and exports in 2014 – for a total value of about \$395.7 billion.

Section 8.0

Some of the imported cargos coming into the San Pedro Bay Ports are transloaded at various locations around the Port Area. Transloading is broadly defined as activities that involve the deconsolidation of the contents of marine containers, which are usually 40-foot equivalent units (FEUs) and reloading their contents into 53-foot domestic trailers that can be transported by trucks. Transloading allows for the movement of increased amounts of goods while utilizing less equipment, resulting in significant cost savings through economies of scale and other transportation related savings. Transloading sometimes provides value added services as well. Existing infrastructure, equipment and trade flows in the greater Los Angeles region provide a substantial competitive advantage and serve as a major economic incentive for importers to move freight requiring transloading through Southern California.

With buzzing economic activity and growing truck traffic in the region, City of Long Beach has a need to take advantage of the technology to enhance goods movement. With the implementation of Moving Ahead for Progress in the 21st Century Act (MAP-21), it is now required to include evidence of consideration of innovative technologies and operational strategies, including intelligent transportation systems (ITS), which improve the safety and efficiency of all modes of transportation including freight.

The freight industry has embraced ITS as a way to reduce cost, increase competitiveness, and mitigate impacts to communities and the environment. ITS technologies allow freight infrastructure to increase its efficiency and capacity by enabling the value and volume of freight and freight movement to increase while reducing demands on the system. ITS technologies are very flexible and can

be applied to the vast transportation infrastructure of highways, streets, bridges, tunnels, railways, seaports, and airports, as well as associated vehicles, including cars, buses, trucks, trains, aircraft, and maritime vessels. ITS can also be applied to mobile freight handling equipment, such as cranes, forklifts, and conveyor belts. Even the shipping containers used to transport goods can have ITS applications.

Both public agencies and the private sector have recognized the need for a coordinated, strategic approach to ITS deployment and have established direct links between ITS planning and other transportation and strategic planning efforts. It is expected in future that ITS and technology projects will be specifically identified and funded within every freight funding program and that nearly all freight projects will have an ITS or an advanced technology component.



SMART GRID INFRASTRUCTURE INCLUDING ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Long Beach is in the process of deploying a pilot program to test inductive charging technology for a small subset of electric shuttle buses, and the City of Long Beach will monitor and evaluate the benefits of expanding the program.

9.0 DATA COLLECTION

Over the past decade, the City installed over 63 miles of fiber optic cable to build the backbone of a high tech city. In partnership between the Technology & Innovation Department and i-team, the City is currently crafting a long-term “High Tech Infrastructure Master Plan” to maximize City technology assets to support the development of high tech government, business, communities and residents in order to improve civic engagement and access to government services. The plan includes an assessment of current assets, an assessment of current and future technology needs, financial projections for expanding the high tech infrastructure, and a business plan for implementation. The RFP for consulting support was issued in January 2016 and is expected to be completed by August 2016.

Additionally, the Departments of Public Works and Development Services have been working with the City Attorney’s Office on a draft ordinance to expedite telecommunication companies’ access to the public right-of-way for installations of personal wireless telecommunications facilities, which consists of base station equipment and antennas on sites in the public right-of-way. Ultimately, working with telecommunications companies to expand the use of small antennas may lead to better performance for both cities and public services that rely on cellular data (e.g. public safety cameras, smart meters, sensing technology). No budget estimate is available at this time but revenue generated from the leasing of light poles for this purpose may provide new structural revenue for operations, maintenance, and infrastructure improvements of the City’s light poles.

In November of this year, LBT plans to launch a new interactive customer service feature which will allow customers to send a text in order to receive next bus arrival information. In a world of smartphones and mobile applications, this simple texting feature is more relevant, because it also makes a positive impact on the people in our community that rely on a basic cellphone. The customer just needs the ability to text in order to receive next bus times. This new capability will better connect the community with LBT service and encourage the use of public transit for their travel needs.

In tandem with the development all current city data initiatives, the Long Beach Innovation Team is pursuing a data-driven approach to city planning, including developing a citywide policy on open source data, making data and information easily accessible for citizens, businesses, and developers of applications that improve the urban experience. Concurrently with the development of this policy, the City’s information technology staff has been officially certified to properly present government data, undergoing over a year of training to ensure that the City’s data sources are secure and information presented is within allowed rules and regulations in the State of California and the U.S., as well as being presented per current best practices that can be easily transferred and adopted by other agencies.



21ST CENTURY DATA IN LONG BEACH

Parking

Intelligent sensors help drivers find spots more quickly.

Traffic Signals

Smart devices contain sensors, microphones, cameras, and Wifi connectible nodes.

Street Lighting

Smart pins allow lights at specific locations to be brightened or dimmed remotely.

Illegal Dumping

Smart devices monitor problematic locations.

Air Quality Monitoring

Sensors monitor key environmental data.

Traffic

Advanced monitoring of traffic congestion, pedestrians, and bicycle volumes.

Energy & Gas

Smart meters and recycling efforts can be monitored.

Threats from Unidentified Objects

Smart devices look for suspicious objects at large gatherings and critical infrastructure.

Water

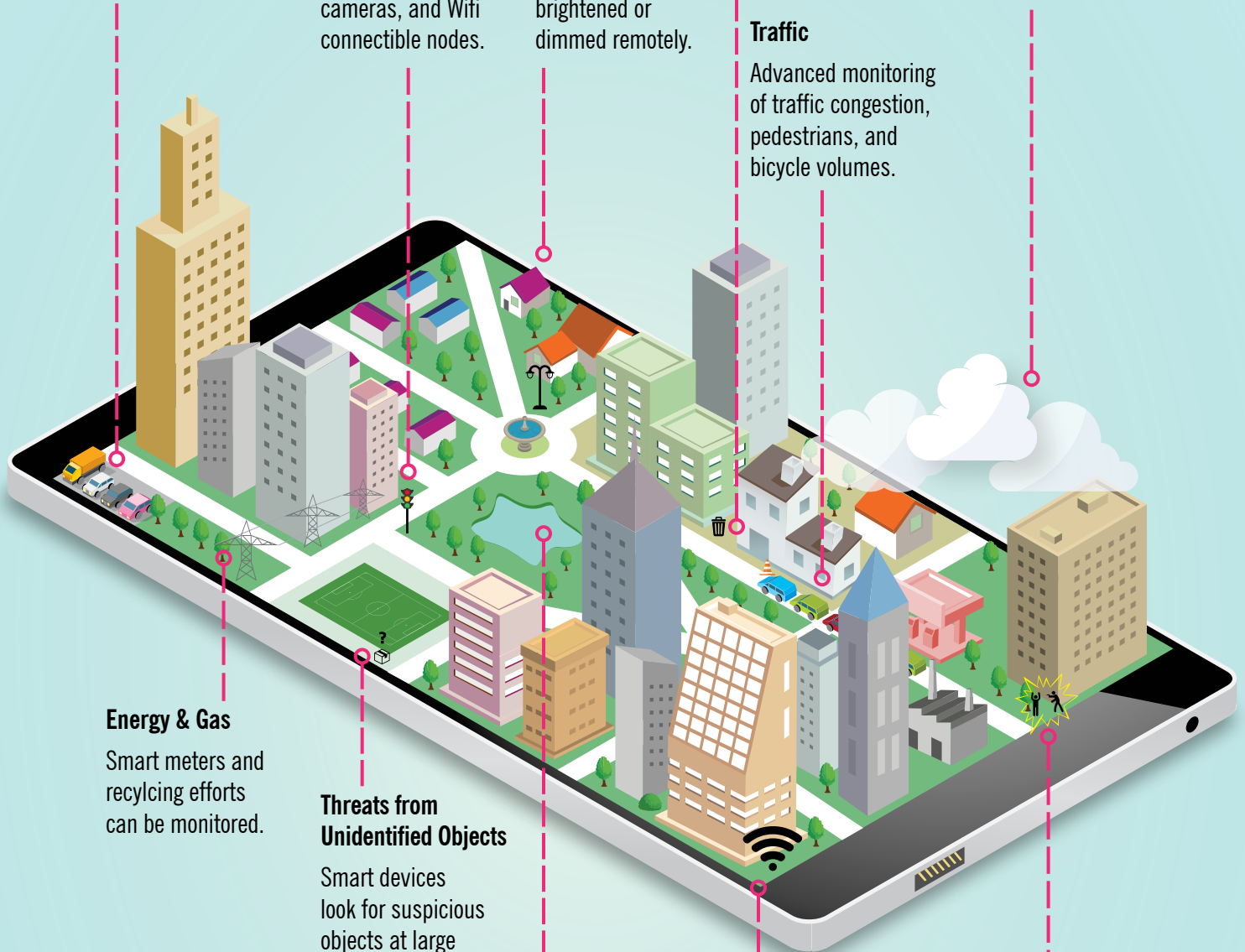
Smart meters monitor water usage and quality.

Public Wi-Fi

Wi-Fi serves as a foundation for a connected city and helps bridge the digital divide.

Gun Shot Detection

Microphones alert law enforcement teams of gunshots.



10.0 STANDARDS, ARCHITECTURES, AND CERTIFICATION PROCESSES FOR INTELLIGENT TRANSPORTATION SYSTEMS

Technological advancements within the transportation industry are rapidly developing. Private industry is investing heavily in autonomous vehicles and technology improvements, with announcements frequently made by private industry that deployment and wide distribution of autonomous vehicles are within 5 to 10 years. These deployments have been predicted to have significant impacts to the public infrastructure and in initial deployments are projected to have greater congestion impacts. Investigation of these impacts is necessary to properly prepare public agencies, however this is beyond any one agency to explore.

The United States Department of Transportation (USDOT) is proactively investigating these impacts and has developed various application concepts for connected vehicles. In the USDOT's ITS Strategic Plan, two primary strategic priorities were identified: Realizing Connected Vehicle Implementation and Advancing Automation. It is essential that the City of Long Beach follow USDOT's direction to initiate discussions to facilitate the introduction of these technologies, identify appropriate use case scenarios, and demonstrate the application of these solutions in a real-world, operational environment.

The Los Angeles County Metropolitan Transportation Authority's (Metro) Highway Program has supported these technology advancements through a team focused on Intelligent Transportation Systems (ITS) improvements. Realizing the eminent need for public infrastructure technology to maintain consistency with automotive advancements, the Metro Highway Program capitalized on existing partnerships with public agencies to develop a coalition. The City of Long Beach supports Metro's strategy and intends to be involved in this coalition while developing its citywide fiber optic network.

This public agency coalition will be the channel to ensure technological advances meet the needs and priority of the region and goals and objectives in Metro's Long Range Transportation plan. This coalition will provide the industry and Los Angeles County information regarding impacts to

the environment and the transportation network. This coalition focuses on improving mobility and safety by using ITS to increase the efficiency of our roadway network and prepare for future technology advancements. Metro Highway Programs will guide this coalition to spearhead conceptual initiatives in areas of research, policy, strategic planning, and sponsor innovation through local demonstration.

11.0 MEASURABLE GOALS & OBJECTIVES



EFFICIENCY:

Integrate core service areas to create efficiencies in services, improving fiscal responsibility.

Objectives:

- » Increase the availability of online and fully automated services
- » Increase citizen involvement and engagement
- » Develop online community engagement strategies
- » Coordinate with all City Departments to have a consistent set of online standards

Approach to monitor impact:

Proper implementation of projects will require collaboration across all City departments to develop new and creative ways to reach out and provide services to the City's diverse population, which has a range of literacy and skills.



SAFETY:

Utilize a data-driven approach to fight crime and make the City of Long Beach a safe community for all people, maintaining the City's commitment as its #1 priority.

Objectives:

- » Produce a customized predictive modeling tool for the City of Long Beach, which will focus law enforcement activities that have the greatest impact in reducing violent crimes
- » Utilize data sharing, cameras and sensors, or any new technology to enhance the predictive modeling tool
- » Increase effectiveness of policing, reducing crime rates while maintaining, or reducing, existing financial resources to provide services (at this current time, approximately 50 percent of the City's General Fund budget—roughly \$150 million per year—is spent on police services)

Approach to monitor impact:

There will be a need to establish a security and privacy policy to build trust with citizens, as well as developing resources for staff and technology needed to store, retrieve and analyze data. To enable implementation of this project, partnerships will include the Police Department, Port of Long Beach, Los Angeles County Sheriffs, Long Beach Transit Authority, Technology & Innovation Department, and the City's Public Works department. A public-private partnership may also be explored to further enable implementation of safety initiatives.



MOBILITY:

Encourage and expand the use of existing multi-modal forms of transportation, including light rail, bus, biking, walking, and the personal vehicle, while incorporating technology to improve the efficiency and safety of these modes.

Objectives:

- » Enable signal priority for transit, bicycles and freight, supporting goods movement and multi-modal mobility
- » Install sensors to monitor movement of vehicles and people, including parking of vehicles, collecting data to improve the efficiency and safety of the overall mobility network
- » Move goods more effectively through automation, route guidance and crash avoidance

Approach to monitor impact:

To enable proper implementation of Mobility modes, partnerships would include the Public Works Department, Technology & Innovation Department, Long Beach Transit, Los Angeles Metro, Caltrans, mobility advocates, private sector car businesses and bike sharing partners.



SUSTAINABILITY/CLIMATE CHANGE:

Prioritize investments and establish systems necessary to implement the City's Sustainability Plan, setting and

achieving Greenhouse Gas (GHG) emission reduction targets as set in the plan.

Objectives:

- » Maximize use of capital assets while limiting impacts on the environment and budget
- » Establish tracking, analyzing, reporting, and communications systems to educate stakeholders and achieve reduction targets
- » Have 100% of major city facilities LEED certified by 2020
- » Reduce GHG emissions from City operations 15% by 2020
- » Have 100% of City Fleet alternative fuel or low emission by 2020
- » Provide 8 acres of open space per 1,000 residents by 2020
- » Reduce water use Citywide by 20% in 2020
- » Install sensors citywide to monitor GHG emissions being produced, deploy strategies to reduce emissions, then track sensors to ensure strategies are producing intended results

Approach to monitor impact:

Coordination of this program across multiple departments and agencies requires a commitment from policy makers, City staff, research centers, and private sector partners. In 2015, Mayor Robert Garcia signed the Compact of Mayors to set emission reduction targets for the City, and reaffirm its commitment to environmental sustainability.

Partnerships to be developed outside of the City will that enhance implementation of sustainability and climate goals include the South Coast Air Quality Management District, Los Angeles Regional Collaborative and the Compact of Mayors.



12.0 EVIDENCE OF CAPACITY

EXECUTIVE COMMITMENT

The City is uniquely positioned to coordinate innovation initiatives. In early 2015, the City Council authorized the City Manager to fund the hiring of an Innovation Team (i-team) and appropriate a \$1 million dollar “Innovation Fund”, with funding dedicated to Smart City initiatives and encouraging the development of ITS technologies.

WORKFORCE CAPACITY

In May 2015, the City’s newly installed i-team researched obstacles and opportunities to stimulate economic growth in the City. After meeting with 80 organizations and 700 individuals, visiting campuses and facilities, the i-team has recommended a slate of projects in 2016 that will lead to several cross-departmental innovations, greatly increasing workforce productivity within the City of Long Beach. In 2016, the i-team will also focus on the development of initiatives to improve business strategies for the City, as well as securing partnerships that will enable the planning, construction and deployment of smart infrastructure technologies. The City thus far has been successful in employing such partnerships, as METTRANS has joined the City in partnering on the implementation of smart cities technology, as well as securing support from Metro and the City of Long Beach’s various City Departments, including the Port of Long Beach.

DEGREE OF INFRASTRUCTURE READINESS

As City infrastructure becomes more readily available to be utilized for a wide variety of technological advances, The City of Long Beach has consistently implemented projects and technology that is innovative and futuristic. Over the years, The City of Long Beach prides itself as a leader in technological advances and sets to achieve goals that connect and automate a wide range of everyday users.

The City of Long Beach owns, operates and maintains approximately 550 traffic signals of which an estimated 80% are interconnected by approximately 35 miles of either fiber optic or copper based communication mediums. The City of Long Beach also has current and/or near term projects that will add an additional 25 miles

of fiber based technology along major corridors, some of which directly impact operations of light rail and port elements.

The City of Long Beach Smart Grant Proposal incorporates two major components that will assemble a fiber-based foundation for multiple Smart Technology opportunities. First, The City of Long Beach proposes to retrofit approximately 45 miles of conduit and existing copper based systems to fiber optic technology. Secondly, the City proposes to install an additional 100 miles of conduit and fiber optic technology that will further expand the overall system to achieve grid-like coverage throughout the entire City.

Finally, using a combination of existing and new conduits located along either State or Metro rail right of way, The City of Long Beach proposes to connect to CoreSite One Wilshire (LA1) which is the most developed customer ecosystem on the West Coast that has unmatched connectivity to Asian-Pacific markets. The LA1 data center is interconnected to the LA2 data center via diversely-routed, high count dark fiber, creating a secure, reliable and scalable data campus in Los Angeles. LA1 is the most densely interconnected building on the planet whose dense dark fiber allows for cross connections of domestic and international carriers.

The potential uses and benefits of existing infrastructure found in the heart of urban corridors presents endless Smart technology opportunities within The City of Long Beach. Intelligent fiber based technology installed along major corridors can positively impact citizenry with optimized operations and value-added services that encourage transportation network efficiency and influence cities to be more livable and workable. Strategic linkage to a City-wide fiber optic network provides an excellent foundation upon which to build an intelligent infrastructure through sensors that collect data and act in real time to address a variety of urban challenges.

Intelligent safety lighting installed at signalized intersections along major corridors can positively impact citizenry with optimized operations and value-added services that encourage transportation network efficiency and influence cities to be more livable and workable. The ideal nature of safety lighting/street lights linked to an existing City-wide fiber optic network provides an excellent

foundation upon which to build an intelligent infrastructure through sensors that collect data and act in real time to address a variety of urban challenges.

The City of Long Beach has a roadway network that is generally grid like and the overall layout of the City would provide an excellent foundation for a City-wide Wi-Fi network. The network would provide residents and all users of the roadway with immediate access to information, guidance and educational opportunities.

PROJECT/PROGRAM EVALUATION AND PERFORMANCE MEASUREMENT EXPERIENCE

Performance evaluation, measurement, and monitoring of various pilot/demonstration projects implemented as part of the Smart City Challenge are critical for large-scale deployment in the region and in other cities. Objective evaluations of the demonstrations will help analyze their impacts and unintended effects, assess the extent to which they meet performance targets and other goals, consider adjustments and alternatives for improving efficiency and effectiveness, and facilitate informed decision-making to better achieve desired results. Evaluations will lead to development of “best practices” that will help solve urban challenges across the U.S.

METRANS, a partner with the City of Long Beach in the deployment on smart cities technology, has extensive experience in the collection and evaluation of data and conducting performance measurements on a wide array of projects, programs, and policies. Examples most relevant to the Smart City Challenge include:

- » PierPASS program at the Ports of Los Angeles (POLA) and Long Beach (POLB)
- » Appointment systems at POLA/POLB
- » Clean Air Action Plan at POLA/POLB
- » Vessel speed reduction program at POLA/POLB
- » Alternative fuel cargo handling equipment at POLA/POLB
- » Automated passenger counters on transit buses
- » Smartcard for transit fare payments
- » Traveler information kiosks
- » Automated ride matching services
- » LA Metro Exposition Line Phase 1



13.0 LEVERAGING RESOURCES

The City of Long Beach is well positioned to take advantage of potential opportunities to leverage resources for the deployment of ITS technologies through the installation of a citywide fiber optic network. As part of scope developed by the City's i-team for the development of a Citywide Fiber Optic Plan, which was released as a Request of Proposals in December 2015, a critical component in the development of this Plan will:

- » Analyze potential funding strategies
- » Develop an outline of potential business models to enable deployment of fiber optic infrastructure, which will unlock the deployment of ITS technologies
- » Incorporate applications and programs that can be generated off the infrastructure that is constructed

From developing these strategies, the consultant selected to conduct this analysis will analyze the following to leverage financing for deployment of the project, including:

- » Review of potential financing structures, and related governance and collateral models available to the City, which may include network ownership vehicles such as joint powers agencies, public/private partnerships and economic development corporations
- » Discuss financing network build out and operation, maintenance and administration options
- » Identify legal strategies related to potential project risks

- » Provide an analysis of a variety of funding options including, but not limited to, public/private partnerships, federal/state/private grants, general obligations bonds, revenue bonds and others where appropriate
- » Analyze the advantages and disadvantages of each financing option and the potential impact of the different strategies on the business plan

The consultant will also provide the City with a ten year financial pro forma, including a profit and loss statement, balance sheet, and income statements for the provision of a community gigabit fiber network. This pro forma will provide officials with a highly detailed projection of revenue, expenses, debt costs, rate projections, capital expenses, and build out plans. The analysis will provide detailed schedules that show operating income and cash flow, net present value analysis, projected revenues and benefits, uses and sources of funds, operational expenses, a depreciation schedule, debt service analysis, and key assumptions. Through developing a business model and conducting a financial analysis as part of the City's Fiber Optic Plan, the City will be well positioned to leverage local, regional, and federal resources through cost share, in-kind donations, partnering, and any other financial strategies explored through the plan development process that will be underway in 2016.