SMART UTILITIES VISION

DRAFT Request for Proposals

Date: July 13th, 2016

Disclaimer: All language provided here is in PRELIMINARY DRAFT form and subject to change before issuance of a Request For Proposals (RFP).

Feedback Opportunity: Please use this form to provide feedback on the RFP: http://bit.ly/29Etqyn

Project Updates: Please visit the BRA website for RFP schedule updates: http://bit.ly/2a9dcNB

For questions, please contact Travis Sheehan at travis.sheehan@boston.gov

CONTENTS

INTRODUCTION

The Boston Smart Utilities Project is intended to rethink the way utility infrastructure is designed and implemented in Boston, resulting in greater coordination, efficiency, and energy savings and yielding greater environmental and community resilience. The BRA is collaborating with a range of other City departments to identify inefficiencies in current infrastructure design and implementation processes and to propose new, more efficient and resilient design strategies for underground and overhead utility infrastructure. City departments collaborating with the BRA include Department of Information Technology, Public Works Department, New Urban Mechanics, Environment Energy and Open Space, Boston Water and Sewer Commission, and the Boston Transportation Department.

To spearhead the Boston Smart Utilities Project, the Boston Redevelopment Authority ("BRA") is issuing an RFP for a "Smart Utilities Vision", yielding engineering recommendations and policies that help to achieve our goals.

GOALS OF THE SMART UTILITIES VISION

The Smart Utilities Vision will yield engineering recommendations and policies to promote the construction of utility infrastructure that:

- Is easier to build, maintain and upgrade
- Reduces costs for building owners and residents
- Increases community resilience
- Provides world-class services for residents and businesses
- Dramatically reduces greenhouse gas emissions

These goals can be achieved by:

- Greater coordination between utility companies, real estate developers, local, and state government on implementation strategies and
- The implementation of Smart Utilities Technologies.

TECHNOLOGIES WE'D LIKE TO SEE IMPLEMENTED IN BOSTON

Smart Utilities Technologies ("SUT") are the hardware and software solutions that are central to enhancing resource efficiency, community resilience, and economic competitiveness. The City is taking a leading role to promote SUTs for various reasons. Some technologies do not have a good market presence. Some SUTs require years of pre-planning to implement. Some technologies increase first costs while reducing lifecycle costs. SUTs include:

District Energy + Microgrids

- Hot and cold water distribution infrastructure
- Resilient, local, low carbon energy generation
- Electrical distribution infrastructure that can 'island' during grid outage

Smart Transit

- Autonomous vehicles: hardware and software to enable market
- Mobility as a service [streamlined ride sharing services]: garage and street space required to enable service
- Electric Vehicles: hardware and software to enable market

Water + Wastewater

- Water re-use technologies: infrastructure to support building or district scale water recapture and re-use
- Space-heating generation: using sewage waste-heat recovery to feed low-cost, no carbon heating to buildings
- Green infrastructure: hardware to reduce loads on storm water infrastructure

Gigabit + High Speed Communications

- Conduit and Fiber: to increase competition in the marketplace and lower end-user costs
- Wireless hardware: to support Internet of Things for utilities and personal devices
- Communications Protocols: software and standards solutions that enable secure communications for utilities and personal devices

THE PILOT PROJECT

The City will pilot Smart Utilities in the PLAN: South Boston Dorchester study area. The PLAN: South Boston Dorchester Avenue planning initiative ("PLAN: South Boston Dot Ave"--link) focuses on a 144-acre area. Under the draft plan, the vision for the area consists of significant new transit-oriented development, creating demand for transportation and infrastructure upgrades and enhanced utilities such as energy, water, and communications infrastructure buried beneath the street. As a planning area where 2 miles of new streets are proposed along with significant utility infrastructure upgrades, the PLAN: South Boston Dot Ave study area presents an opportunity to pilot a new approach for providing resilient, sustainable, and world-class utility services. Piloting the Smart Utilities Project in this study area will set the stage for citywide policies that can be applied throughout Boston when roads are being reconstructed and when there is new demand for utility infrastructure.

CONSULTANT SKILLSET

The BRA and City of Boston are seeking a partner who can provide:

- Economic and environmental analysis for real estate development and utility infrastructure, ranging from construction cost estimation to resource demand modeling
- A deep understanding of technology options that enhance economic, environmental, and resiliency performance in urban districts
- Regulatory analysis and recommendation for regulated utility companies (in Massachusetts)
- Process improvement insights for real estate developers (in Boston)
- Strategic advice on regulatory and legal capabilities of the City of Boston and the BRA
- Civil engineering advisory
- Assistance in the implementations of interviews, meetings and workshops

DELIVERABLES

Below is a statement of the RFP Deliverables, please share your thoughts!

1. Describe the Base Case (September 2016 - December 2016)

Conventional Approach: What will the demand be for new utility services be in the Study Area? Using conventional approaches and technologies, what are the future costs to build and maintain streets, underground and overhead utilities? How resilient would the conventional approach be?

2. Define the Opportunity (October 2016 - December 2016)

Smart Approach: To meet our goals (stated above), what infrastructure should be built in the Study Area? What Smart Utility Technologies and road construction methods are most appropriate? What data sharing platforms and data protocol are needed?

3. Define the Construction Plan (December 2016 - April 2017)

To take the "Smart Approach", how would we sequence the development of roads, utilities, and data management in the Study Area?

4. Sketch an Implementation Plan (February 2017 - June 2017)

To implement this plan in the Study Area, what data frameworks, engineering plans, financing vehicles and governance structures do the BRA and the City of Boston need?

5. Take it to Scale (April 2017 - July 2017)

How can the BRA and the City of Boston implement this plan in other areas of the city that are not part of a comprehensive rezoning effort like the Study Area?

6. Chart the Course Forward (July 2017)

How can the BRA and the City of Boston sustain the relevance of this work and stakeholder relationships going forward? What would the consultant recommended as next steps?

STAKEHOLDER ENGAGEMENT

Stakeholder Engagement is key to the success of the Smart Utilities Vision. Dozens of interviews, interim check-in meetings, executive briefings, and workshop-style group meetings will be required to successfully integrate the wide-ranging viewpoints of the project stakeholders. This engagement includes but is not limited to:

Community Members include property owners, property managers, and real estate developers in the PLAN: South Boston Dot Ave study area. Community Members will require a minimum of three group briefings: an introductory, an interim progress, and end briefing on the strategies. Additionally, one-on-one interviews will be conducted with Community Members to understand Boston's conventional approach to utility development from the real estate developer's perspective.

- Up to 20 individual or small group meetings: with stakeholders such as property owners, developers, neighborhood associations, businesses.
- Up to 3 Neighborhood-Wide Meetings: To inform about project at key stages and solicit feedback.

Utility Companies include electric, gas, steam, water, City utility and infrastructure departments, and telecommunications companies who are responsible for energy, water, transit, and communications infrastructure. One-on-one meetings will be conducted with Utility Companies to first understand their conventional approaches to infrastructure development and understand the legal and regulatory frameworks that govern their capital planning practices. As the Vision develops, progress meetings will need to be conducted to ensure that the strategies proposed in the Vision are aligned with Utility Companies' goals. The consultant will share their legal and regulatory research and propose any relevant strategies in the progress meetings. Utility companies are already convened by the City's Infrastructure Advisory Group and the team will leverage those convening to discuss the Vision as a group.

- Up to 40 individual or small group interviews/meetings at various stages of the process to understand utility companies' goals and processes and receive feedback on analyses and recommendations
- Up to 4 plenary meetings with utility companies collectively to present research and recommendations and solicit feedback.

City Officials include the Vision Steering Committee, key leadership such as Department Heads, and staff. Operations staff will be interviewed in the beginning of the Vision process so that the consultant may understand the conventional approach to infrastructure development in Boston. Up to 10 department heads will require interviews to develop the Base Case. The same staff will require interim briefings to best understand the strategies in the Vision. Additionally, at least 3 interdepartmental meetings will be conducted to brief key leadership on the Vision work plan, strategies, and final work

products. Furthermore, the Steering Committee and project staff will require input from the consultants to conduct their bi-weekly progress meetings for the project.

- Up to 10 individual or small group interviews/meetings with City department heads and/or representatives
- Up to 4 Interdepartmental briefings with department heads and their teams throughout the process

State Officials include various advisers to the project that may result in infrastructure funding, the application of innovative financing schemes, and policy discussions about regulatory and legal aspects of the Vision. The first round of interviews with State Officials will help lay the groundwork for available funding streams, legal and regulatory topics, and existing partnerships with the City. Interim meetings with State Officials will help to align the strategies of the Vision with existing programs and funding opportunities. Finally, group briefings with State Officials should be conducted at the beginning, middle, and end of the process to ensure that adequate feedback has been given to the Vision work products.

- Up to 10 individual or small group interviews with State officials

The Smart Cities Advisory Group was convened in May of 2016 to help develop the scope of work for this RFP. The Smart Cities Advisory Group is a useful resource of private and public sector experts in Smart Cities and urban development. A minimum of two sessions should be convened with the Smart Cities Advisory Group to provide feedback on the interim and final work products of the Vision.

- Up to 3 plenary meetings (with up to 80 persons) throughout process to present preliminary findings and hear feedback.

Roles of the BRA and the Consultant throughout Stakeholder Engagement process:

BRA staff will spearhead the scheduling of meetings, designating meeting venues, providing refreshments, providing guidance and feedback on meeting deliverables and agendas.

The Consultant will be responsible for developing meeting agendas, taking and synthesizing extensive notes, bridging latest analysis work with stakeholder specific concerns, and providing appropriate collateral for each engagement to accomplish intention of meeting.

Data Gathering

Consider that the consultant may be gathering all necessary data on existing utility infrastructure in the area from utility companies during the interview process, contacting local engineering firms who possess design drawings, or printed archives from the Public Improvement Commission at City Hall.

There is little-to-no comprehensive assemblage of data for the Study Area's utility infrastructure. All plan documents for projected street networks, building types, and surrounding community information will be made available at no charge by working with the City and BRA's Geographic Information Systems departments.

BUDGET, CONTRACT AND SCOPE OF WORK

BUDGET APPROACH

This RFP encompasses all Consultant and Sub-consultant ("Consultant Team") work scopes, including the needed for services in urban planning, construction, buildings, economic development strategy, infrastructure, and information technologies.

Respondents should submit a fee proposal as shown in Exhibit B to cover all services for the entire project, with the understanding that no additional resources will be available to add consulting services to the Smart Utilities Vision team to address specific subject matter outside the expertise of the selected team.

Fee proposals must be submitted under separate cover and in a sealed envelope.

CONTRACT

The BRA intends to enter into a contract with the Consultant Team specifying tasks and deliverables and procedures for refining the work plan as the project proceeds. Prior to work commencing any phase of the Plan, the BRA will issue a Notice to Proceed to the Consultant Team.

The BRA reserves the right to negotiate changes to the Consultant Team's plan for completing the overall scope of services, including but not limited to the specific services performed by sub-consultants.

SCOPE OF WORK

The Consultant Team will be collaborating with diverse stakeholders. The Team members should not only possess industry expertise in Smart Utilities Technologies implementation, but also in traditional infrastructure operations and planning. Finally, the team should have experience in the real estate and construction industries that can easily be translatable to Boston's experience with road reconstruction and utility infrastructure development.

Not should only be Consultant Team be diverse, but they will also interact with a diverse, multi-disciplinary team inside City Hall including Department of Information Technology, Public Works Department, New Urban Mechanics, Environment Energy and Open Space, Boston Water and Sewer Commission, and the Boston Transportation Department. Additionally, the Consultant Team will spend time gathering data and interacting with State Officials, Utility Company executives and planners, and Boston based property owners and community members.

City staff anticipates the need for the Consultant Team to build spreadsheet and 3D models of the Pilot study area and plan multiple scenarios that are backed by solid economic analysis. Throughout the process, the Consultant Team will assist the City in briefing project stakeholders to receive feedback on SUV strategy and incrementally revise the analytical models. The Consultant Team's efforts are intended to align the various capital planning practices of Boston's Utility Companies and yield a more effective process than the conventional approach to utility development.

SAMPLE METHODOLOGY FOR THE SMART UTILITIES VISION

Below is a sample approach to the Smart Utilities Vision (described in "Outputs of the Smart Utilities Vision RFP" section above), please share your thoughts!

DELIVERABLE 1. DESCRIBE THE BASE CASE

1.1 Interviews and data gathering

- Interview local utility companies to understand their conventional approach for sequencing the planning and implementation of local distribution infrastructure. These local utilities includes water, energy, transit, and communications infrastructure.
- Interview local utility companies to understand their conventional approach for projecting growth in resource demand. Resource demand includes water, energy, transit, and communications infrastructure.
- Interview local real estate development companies to understand their conventional approach for requesting utility infrastructure to services new and existing properties.
- Project the additional utility demand in the Study area and quantify the amount of infrastructure it would require to meet those demands.
- Record and document findings in a progress report that can be easily shared to educate all stakeholders

1.2 Define the Costs and Impacts

- Using conventional approaches and technologies, project the future costs to build and maintain streets, underground and overhead utilities
- Additionally, analyze and quantify environmental impacts such as local air quality, noise, and traffic obstructions.

DELIVERABLE 2. DEFINE THE OPPORTUNITY

2.1 Define Technologies that meet City's Goals

- Build upon the list of 'Smart Utility Technologies' and gather performance data from global examples

2.2 Scenario Planning for the Sequencing of Road and Utility Buildout

- Simulate Smart Utility Technologies in action, measuring their financial, environmental, and resilience performance against the base case utility infrastructure
- Simulate various strategies for the sequencing of road and utilities construction (spreadsheet or 3d modeling).
- Advise the City on a tiered time horizon for the simulation. The milestones include but are not limited to: 2020- Partial build-out of the Study Area; 2030- Full build-out of the Study Area; 2070- Properties experience sea-level rise +3 feet for monthly high tides.
- Assess how the plan will beneficial to vulnerable populations (i.e. elderly populations, low-to-no income residents, persons with disabilities, etc.).

2.3 Cost/Benefit of the Opportunity

- Develop the metrics and perform a cost/benefit analysis against the base case
- Describe how the various cost allocations could change (i.e.- construction, excavation, and road paving) from the 'base case' scenario

DELIVERABLE 3. DEFINE A CONSTRUCTION PLAN

3.1 Define the best sequence for the development of roads, utilities, and data management in the Study Area

- Develop recommendations for cost-saving measures in utility construction and implementation. These measures may include shared duct banks, utility vaults, or preemptive investment in infrastructure that precedes property development.
- Define how the Construction Plan reduces end user costs.
- Develop a final report with methodology and findings

DELIVERABLE 4. SKETCH AN IMPLEMENTATION PLAN

4.1 Data Sharing Platform

- Develop the strategy for a data sharing platform and identify the optimal strategy for its implementation.
- Develop a strategy for open protocol to implement Internet of Things (IoT) for urban systems at the district scale.

4.2: Governance

- Support up to three (3) workshops with relevant stakeholders. The workshops will introduce the objectives of the Smart Utility Vision, findings from the engineering study.
- Develop Governance Recommendations for (1) risk sharing mechanisms, (2) new revenue opportunities, and (3) new governance opportunities that emerge from the engineering recommendations. Governance models may include recommendations for any shared utility assets, like common duct banks or utility vaults that do not already have an overseeing

authority. Likewise, if the engineering recommendations include a new protocol for utility planning, recommend a governance model. Governance can be formed as agreements, protocol, or actual governing bodies formed to implement a utility coordination or development strategy.

- Support the City in their engagement strategy to collaborate with utility partners in developing the Governance Recommendations.
- Interview local utility companies and City agencies to map their capital planning practices. Identify the catalysts (i.e. new property development) for utility investment that pertains to the growth potential within the Study Area.
- Survey the legal authority of the City of Boston, the Boston Redevelopment Authority, and related government and quasi-governmental agencies to build, own, and/or operate new or existing infrastructure.

4.3: Financing

- Interview local utility companies and City agencies to map their investment practices and risk appetites as it pertains to the engineering recommendations and Governance Recommendations.
- Interview state granting agencies, institutional investors, and state Utility regulators to map the possible vehicles for financing the engineering recommendations and legal capacity to participate in the Governance Recommendations. These recommendations may include typical urban financing vehicles like tax increment financing but also special capital investment strategies enabled by infrastructure regulators like the Department of Public Utilities.
- Develop recommendations for financing strategies that support the Governance Recommendations and the engineering recommendations.
- Support the City in their engagement strategy to collaborate with utility partners in understanding the Financing Recommendations.
- Survey existing best practices of "big-data" monetization and describe the ethical implications for City Government.
- Survey best practices in urban utility and infrastructure finance that would support the engineering solutions.
- Survey grant funding sources from the US Federal Government and Massachusetts State agencies that would support the engineering solutions.

DELIVERABLE 5. TAKE IT TO SCALE

5.1: New Street Construction

Develop guidelines for underground and overhead utilities that synthesizes the study findings for new build-out districts. These guidelines should be completed to the technical quality that can be used by design and engineering departments of each utility. These guidelines are intended to be enforceable through the Governance Recommendations.

5.2: Existing Street Construction
Develop guidelines for underground and overhead utilities that synthesizes the findings for existing, congested streets. This includes guidelines for (1) full road-reconstruction projects and (2) small, incremental excavation projects like fixing gas leaks. These guidelines should be completed to the technical quality that can be used by design and engineering departments of each utility.

5.3: Quantify the Benefits of the Design Guidelines
Estimate the time and monetary savings created by the development of the Design Guidelines. Gather evidence throughout the Smart Utility Vision process to develop the Design Guidelines so that they create the most value for all stakeholders.

5.4: Mapping Technologies
Develop recommendations for technologies and best practices of mapping "as-built" conditions of underground utilities.

DELIVERABLE 6. CHART THE COURSE FORWARD

Key themes will recur during the execution of the Smart Utilities Vision. For this deliverable, the consultant should provide written recommendations about next steps to make these themes actionable. The consultants and City will have built deep relationships with internal and external stakeholders by the completion of the SUV. These themes will emerge with clearer next steps upon which the consultants should provide thoughtful written reflection.

6.1 Articulating the Long View on Infrastructure Investment
How can the outputs translate to better practices for utility companies? How will the RFP consultant team work with utility partners to untangle the regulatory and legal hurdles emerging from coordinated utility planning? What are the lifecycle-cost assessment methods that resonate with various utility investment practices?

6.2 A "Center of Excellence" for Smart Utilities
How can the Smart Utility Vision process codify a lasting body of stakeholders that pursue the necessary legislative, regulatory, and business models required to implement Smart Utilities in Boston and Massachusetts? Which stakeholders will need to be engaged that are not currently involved? Is there an opportunity to leverage this entity for investment by non-profit or corporate entities?

6.3 A Team Approach to Data Security, Acquisition and Monetization
How will the City pursue the data sharing efforts with utility companies? What data are key indicators of performance to meet the City's goals? What are the security practices and protocols necessary to unlock the deployment Internet of Things (IoT) to be mutually beneficial to utility companies and Bostonians?

6.4 Articulating the Benefits to Vulnerable Populations

Sea Level rise will disproportionately affect Boston's vulnerable populations. How will Smart Utilities benefit vulnerable populations and enhance social equity in Boston's neighborhoods?

EVALUATION CRITERIA

Each proposal will be reviewed and rated by a qualified selection committee consisting of BRA and other city staff. From this rating finalists will be selected with interviews, during which time such respondents will have the opportunity to present their proposal and respond to questions. A recommendation will then be sent to the BRA Board for final approval.

A contract will be awarded based on the selection of the most thoughtful and favorable proposal of services. Each proposal will be initially evaluated to determine whether the respondent submitting the proposal meets the minimum threshold requirements described below. Those respondents and the proposals of those respondents, which the BRA has determined have met the minimum threshold requirements, will then be evaluated according to the evaluation criteria described in subsections below.

Minimum Threshold Requirements

1. All proposals shall be evaluated on the basis of the following criteria:
2. Whether proposals include all required documentation and meet the submission deadline.
3. Whether applicant for Consultant Team has been operating as a business for at least one year continuously under the same name.
4. Adequate financial resources to ensure ability to complete project.
5. Demonstration by applicant of adequate insurance and an appropriate risk management strategy.
6. Compliance, to be determined by the BRA, with all applicable statutes governing conflict of interest.

Comparative Evaluation Criteria

All respondents determined to have met the minimum threshold requirements will then be evaluated in the following categories previously outlined in the Submission Requirements above:

- Qualifications and Experience
- Response to Scope of Services
- Consultant Team
- Allocation of Resources

Criteria Rating Description

1. QUALIFICATIONS AND EXPERIENCE

HIGHLY ADVANTAGEOUS when it has been determined that the respondent has substantial: a) experience with utility and telecommunications development advisory services; b) experience in engineering and economic simulation and modeling for urban development; c) familiarity with civil engineering practices in the Boston; d) experience in communicating effectively with diverse stakeholders and facilitating group dialogues.

ADVANTAGEOUS when it has been determined that the respondent has some: a) experience with utility development advisory services; b) experience in engineering and economic simulation and modeling for urban development; c) familiarity with civil engineering practices in the Boston; d) experience in communicating effectively with diverse stakeholders and facilitating group dialogues.

NON-ADVANTAGEOUS when it has been determined that the respondent has limited or no: a) experience with utility development advisory services; b) experience in engineering and economic simulation and modeling for urban development; c) familiarity with civil engineering practices in the Boston; d) experience in communicating effectively with diverse stakeholders and facilitating group dialogues.

2. RESPONSE TO THE SCOPE OF SERVICES

HIGHLY ADVANTAGEOUS when it has been determined that the respondent has: a) shown an extensive and thorough understanding of the Scope of Services as demonstrated by the respondent's creative approach to this RFP; b) presented a well-conceived and organized work plan; c) recommended and incorporated well-conceived additional and innovative work items which are ancillary/supplemental to the scope of services.
ADVANTAGEOUS when it has been determined that the respondent has: a) shown an understanding of the scope of services [DJ1] as demonstrated by the respondent's creative approach to this RFP; b) presented an organized work plan; c) recommended and incorporated additional and innovative work items which are ancillary/supplemental to the scope of services.
NON-ADVANTAGEOUS when it has been determined that the respondent has: a) not shown an understanding of the scope of services as demonstrated by the respondent's creative approach to this RFP; b) not presented an organized work plan; c) not recommended and incorporated additional and innovative work items which are ancillary/supplemental to the scope of services.

3. CONSULTANT TEAM

a. Project Manager Qualifications

HIGHLY ADVANTAGEOUS when it has been determined that the respondent has assigned a highly qualified project manager and other key personnel to this project.

ADVANTAGEOUS when it has been determined that the responded has assigned a qualified project manager and other key personnel to this project.
NON-ADVANTAGEOUS when it has been determined that the responded has assigned an unqualified project manager and other key personnel to this project.

b. Experience of Project Team Members

HIGHLY ADVANTAGEOUS when it has been determined that the respondent shows significant experience of project team members with relevant projects and planning initiatives.
ADVANTAGEOUS when it has been determined that the respondent shows experience of project team members with relevant projects and planning initiatives.
NON-ADVANTAGEOUS when it has been determined that the respondent shows no experience of project team members with relevant projects and planning initiatives.

c. Involvement of Service Provider Principals

HIGHLY ADVANTAGEOUS when it has been determined that the respondent shows extensive hands-on involvement in the past of Service Provider principals with similar projects and planning initiatives.
ADVANTAGEOUS when it has been determined that the respondent shows hands-on involvement in the past of Service Provider principals with similar projects and planning initiatives.
NON-ADVANTAGEOUS when it has been determined that the respondent shows little or no hands-on involvement in the past of Service Provider principals with similar projects and planning initiatives.

4. ALLOCATION OF RESOURCES AND SCHEDULE

HIGHLY ADVANTAGEOUS when it has been determined that the proposal: a) allocates significant resources to priority work items; and b) contains a highly realistic and detailed work schedule to complete the tasks described in the scope of services.
ADVANTAGEOUS when it has been determined that the proposal: a) allocates sufficient resources to priority work items; and b) contains an adequate work schedule to complete the tasks described in the scope of services.
NON-ADVANTAGEOUS when it has been determined that the proposal: a) allocates insufficient resources to priority work items; and b) does not contain an adequate work schedule to complete the tasks described in the scope of services.

FURTHER READING

PLAN: South Boston Dorchester Avenue
Draft plan

Boston Smart Utilities
BRA Webpage for Boston Smart Utilities

BRA Website
Mission and Vision

Related City Initiatives
Mayor's Housing Innovation Lab

Community Energy Planning
BRA Webpage for Community Energy Planning

Utility Planning Coordination in Boston
COBUCS webpage