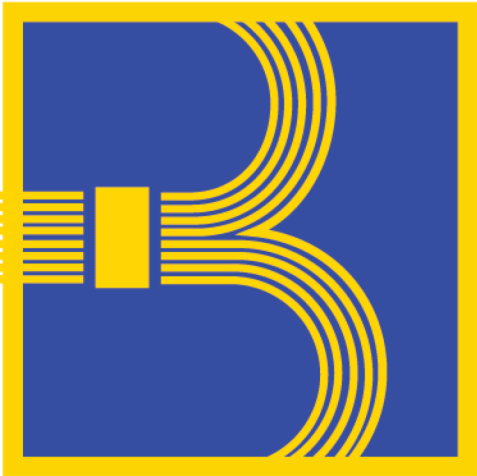


# BOSTON SMART UTILITIES 2020 UPDATE



**BOSTON  
SMART  
UTILITIES**



*City of Boston  
Mayor Martin J. Walsh*



**boston planning &  
development agency**



# Outline

- ❑ Overview of Boston Smart Utilities Program
- ❑ 2018 Pilot Policy: Assessment and Updates
- ❑ 2020 Policy: New Recommendations
- ❑ Q&A / Discussion



## Boston Harbor

Nor'easter - March 1-3, 2018



## Back Bay

Blackout – Scotia Street Substation



## North End

Repetitive Street Openings



## Boston Underground



## Mass Ave.

Traffic Congestion



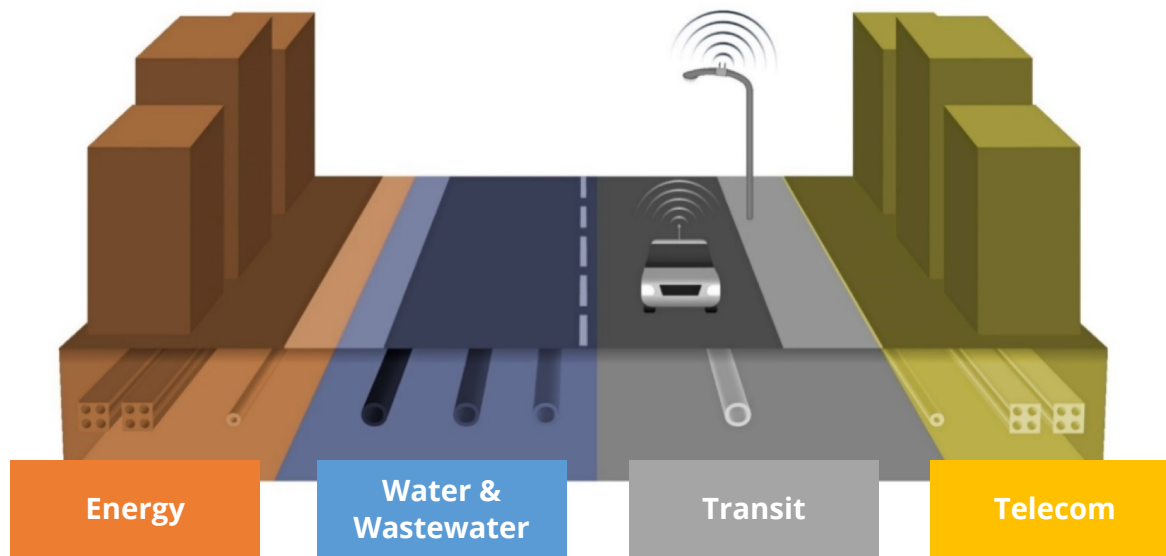
## Mass Ave. & Beacon St.

Smart Sensors Pilot



# BOSTON SMART UTILITIES (BSU) PROGRAM

- Provides **new model for upfront integrated utility planning & design**
  - Focuses on utilities across four sectors
  - Led by inter-departmental Steering Committee
- Encourages **deployment of Smart Utility Technologies (SUTs)**



## GOALS



### Efficiency

Make utilities easier to build, maintain and upgrade



### Equity

Reduce utility costs for residents and businesses



### Resiliency

Harden infrastructure against flooding risk and heat waves



### Economic Development

Attract businesses and jobs through world-class essential services



### Innovation

Integrate cutting edge technologies and lead through innovation

# BSU STEERING COMMITTEE

*8 Agencies/Departments*

*Have met biweekly since 2016*

## John “Tad” Read

*Senior Deputy Director for  
Transportation & Infrastructure Planning  
Boston Planning & Development Agency*

## Bryan Glascock

*Deputy Director for Regulatory Planning  
and Zoning  
Boston Planning & Development Agency*

## Mary Knasas

*Senior Planner III  
Boston Planning & Development Agency*

## Manuel Esquivel

*Sr. Infrastructure & Energy Planner  
Boston Planning & Development Agency*

## Bradford Swing

*Director of Energy Policy and Programs  
Mayor’s Office Environment, Energy,  
and Open Space*

## Amy Cording

*Interim Director of Engineering  
Boston Transportation Department*

## Irene McSweeney

*Chief of Operations  
Boston Water and Sewer Commission*

## Anne Schwieger

*Broadband and Digital Equity Advocate  
Department of Innovation &  
Technology*

## Alison Brizius

*Director of Climate and  
Environmental Planning  
Environment Department*

## Zachary Wassmouth

*Chief Design Engineer  
Public Works Department*

## Todd Liming

*Chief Engineer  
Public Improvement Commission*

## Nayeli Rodriguez

*Technologist for the Public Realm  
Mayor’s Office of New Urban  
Mechanics*



# SMART UTILITIES POLICY FOR ARTICLE 80

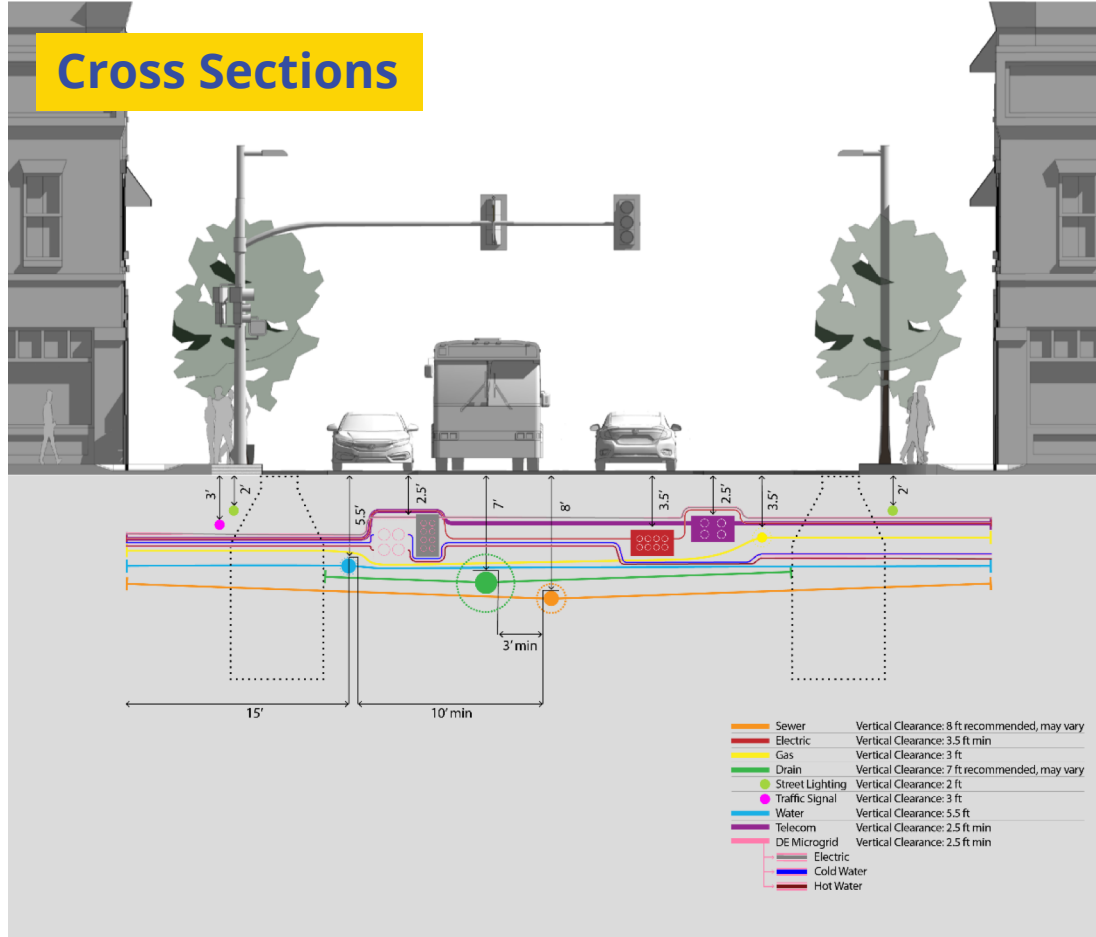
*Adopted June 2018 as Pilot Policy*

	Article 80 Size Threshold	Specifications
<b>District Energy Microgrid</b>	>1.5 million SF	Feasibility Assessment; if feasible, then Master Plan & District Energy Microgrid Ready design
<b>Green Infrastructure</b>	>100,000 SF	Install to retain 1.25" rainfall on impervious areas (Increase from 1" currently required by BWSC)
<b>Adaptive Signal Tech.</b>	All projects requiring signal installation or improvements	Install AST & related components into the traffic signal system network
<b>Smart Street Lights</b>	All Projects requiring street light installation or improvements	Install additional electrical connection & fiber optics at pole
<b>Telecom Utilidor</b>	>1.5M SF of Development, or >0.5 Miles of Roadway	Install Telecom Utilidor

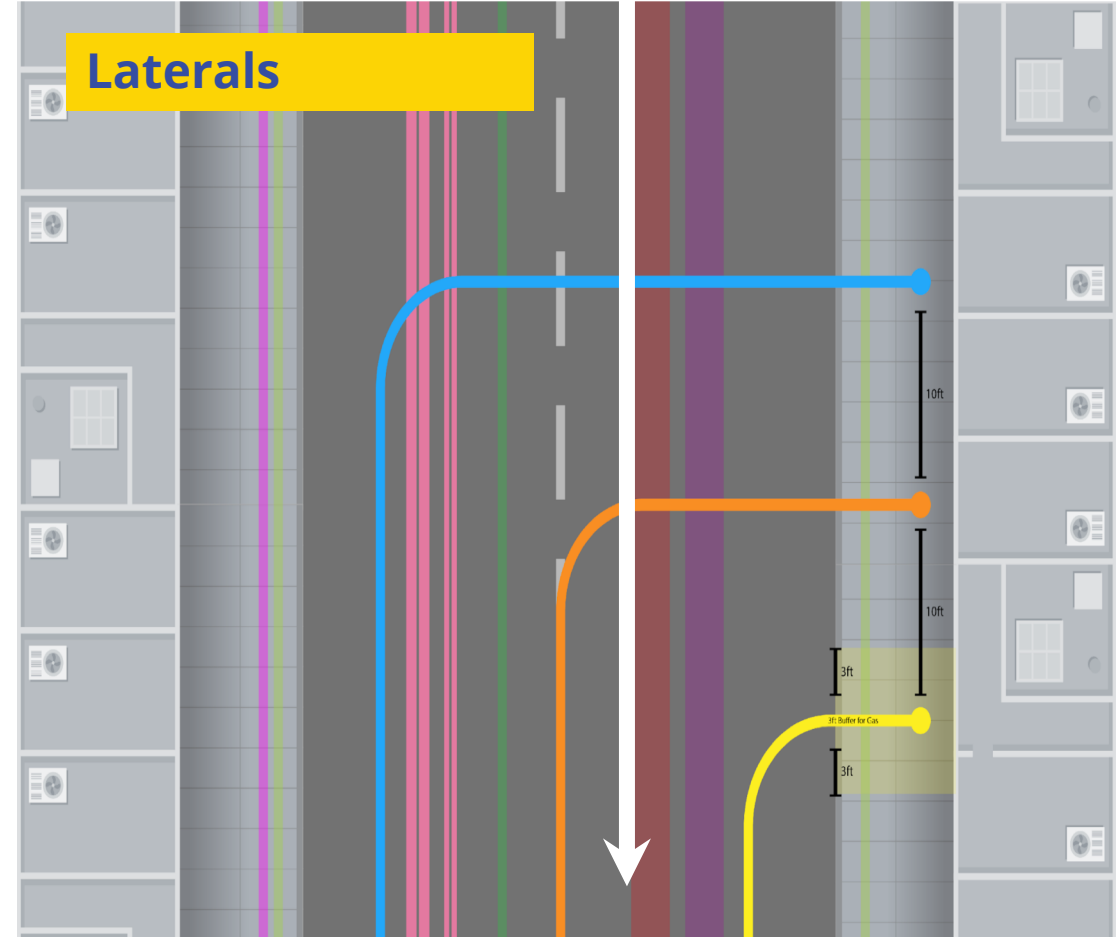
# SMART UTILITY STANDARDS

## *Cross Sections and Laterals*

### Cross Sections



### Laterals



# Outline

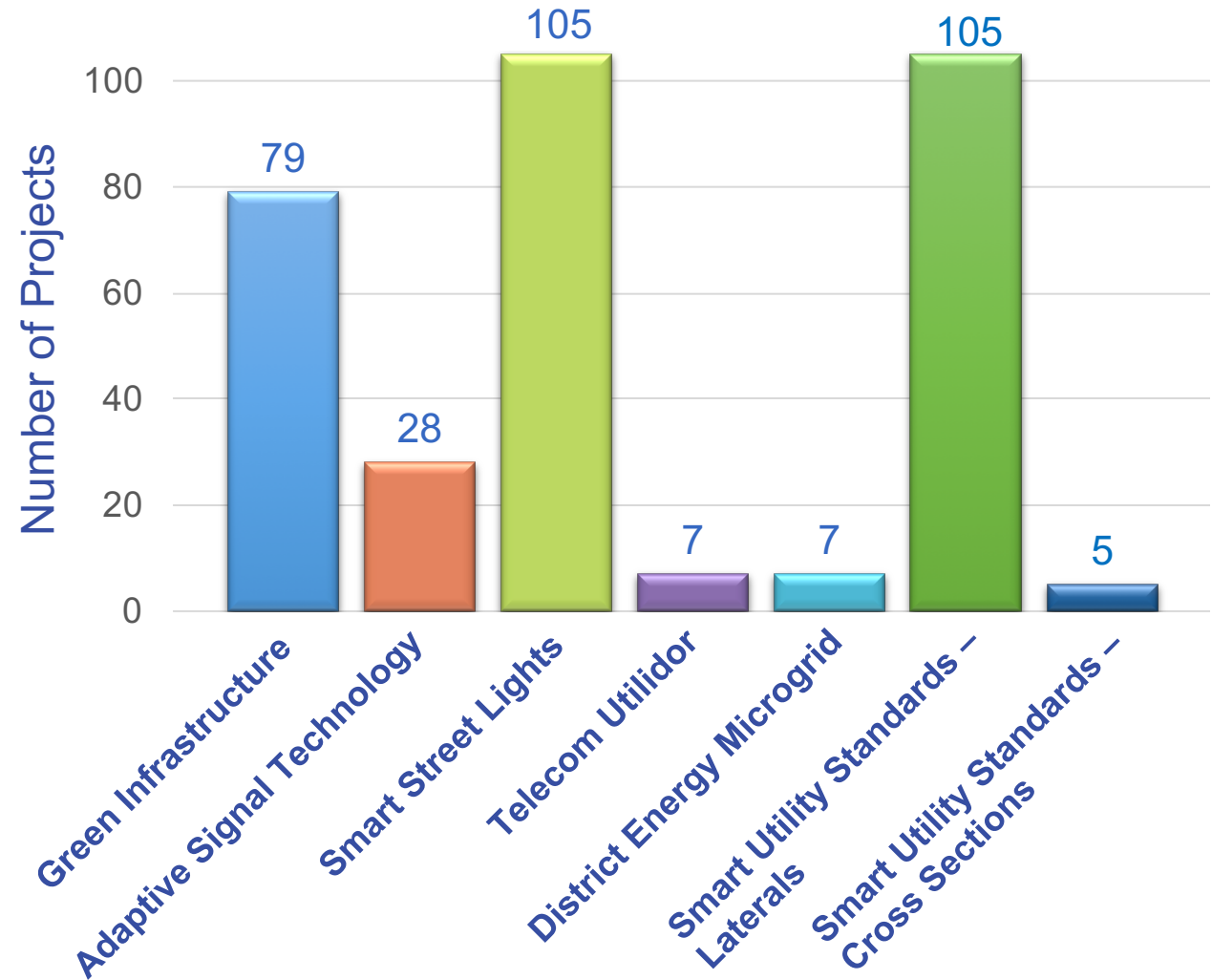
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# OVERALL STATISTICS

## Projects Reviewed Under Smart Utilities (2018-present)

	Number of Projects	Total Area of development (SF)
Under Review	61 (58%)	31,750,403
Board Approved	44 (42%)	25,936,032
<b>Total</b>	<b>105</b>	<b>57,686,435</b>

## Projects Reviewed by Smart Utility Technology (SUT) and Standards (SUS) (2018-present)



Green Infrastructure	
Adaptive Signal Technology	
Smart Street Lights	
Telecom Utilidor	
District Energy Microgrid	





green

## Green Infrastructure

- Current threshold: **>100,000 SF, install to retain 1.25" rainfall** on impervious areas (a 0.25" increase over the 1" BWSC baseline)
- Description: An **approach for water management** that uses infrastructure such as bioretention basins and permeable pavers to **mimic and restore natural processes**
- Benefits: Different types of GI provide different co-benefits, **such as stormwater retention, pollution control,** and **mitigation of urban heat island effect, etc.**

Green  
Infrastructure



Policy achieving increased stormwater retention and associated pollution control: **88,000 cu ft of additional stormwater capacity across 46 projects**


**Need to incentivize other benefits** of Green Infrastructure

Adaptive Signal  
Technology

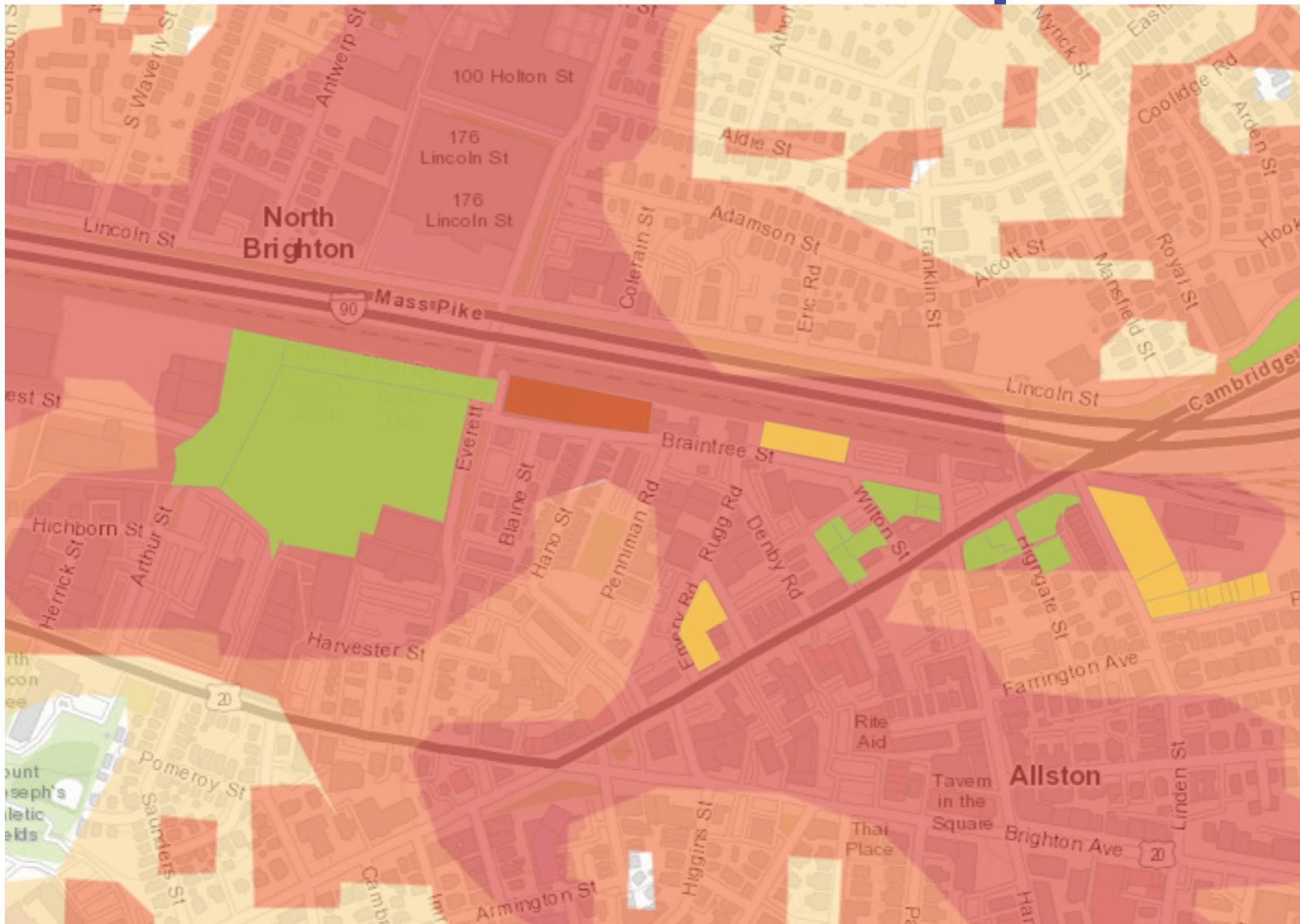
Smart Street  
Lights

Telecom  
Utilidor

District Energy  
Microgrid

Green Infrastructure		>100,000 SF	Install to retain 1.25" rainfall on impervious areas <b>and use priority maps to promote other GI benefits</b>
Adaptive Signal Technology			
Smart Street Lights			
Telecom Utilidor			
District Energy Microgrid			

# Urban Heat Island Effect Maps





## Article 80 Status

- Pre-File
- LOI
- Under Review
- Board Approved

## Heat Island Effect

- Moderate
- High
- Very High



Green Infrastructure		>100,000 SF	Install to retain 1.25" rainfall on impervious areas <b>and use priority maps to promote other GI benefits</b>
Adaptive Signal Technology			
Smart Street Lights			
Telecom Utilidor			
District Energy Microgrid			










## Adaptive Signal Technology (AST)

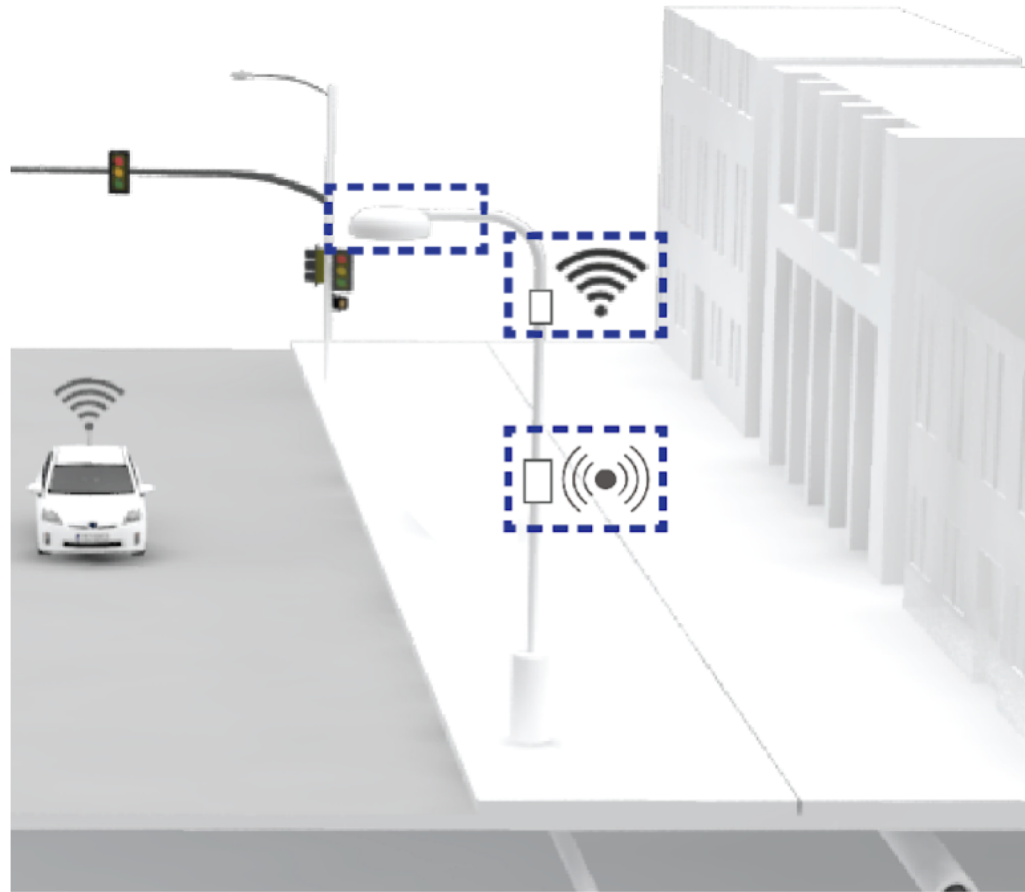
- Current threshold: any **project requiring traffic signal installation or improvements**, install AST and related components
- Description: Motion sensors and technology that create a **network of signals that communicate to improve traffic flow and safety**
- Benefits: Under **BSU** we focus on technology that provides benefits for **all modes of transportation**

Green Infrastructure		>100,000 SF	Install to retain 1.25" rainfall on impervious areas <b>and use priority maps to promote other GI benefits</b>
Adaptive Signal Technology		AST standards are forthcoming, based on Seaport District AST pilot program  Opportunity to integrate other technology and infrastructure for all modes, such as unconnected traffic signals and bus Transit Signal Priority (TSP) in corridors of interest	
Smart Street Lights			
Telecom Utilidor			
District Energy Microgrid			

Green Infrastructure		>100,000 SF	Install to retain 1.25" rainfall on impervious areas <b>and use priority maps to promote other GI benefits</b>
Traffic, Transit, Bike & Ped Supporting Tech		If in corridor of interest, in coordination with BTD	Integrate technology and/or infrastructure (i.e., shadow conduit) to support interconnection of traffic signals, BRT TSP, AST, and/or other Active Transportation supportive technology
Smart Street Lights			
Telecom Utilidor			
District Energy Microgrid			



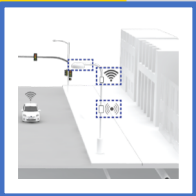


Green Infrastructure		>100,000 SF	Install to retain 1.25" rainfall on impervious areas <b>and use priority maps to promote other GI benefits</b>
Traffic, Transit, Bike & Ped Supporting Tech		If in corridor of interest, in coordination with BTD	Integrate technology and/or infrastructure (i.e., shadow conduit) to support interconnection of traffic signals, BRT TSP, AST, and/or other Active Transportation supportive technology
Smart Street Lights			
Telecom Utilidor			
District Energy Microgrid			



## Smart Street Lights

- Current threshold: any **project requiring new street lights or improvements, install additional electric/fiber** at the pole
- Description: **Smart technology mounted on traditional light poles**, such as cameras, antennas, and sensors
- Benefits: Technology that supports **safety, enhancement of telecom services, traffic management**, pollution control, etc.

Green Infrastructure		>100,000 SF	Install to retain 1.25" rainfall on impervious areas <b>and use priority maps to promote other GI benefits</b>
Traffic, Transit, Bike & Ped Supporting Tech		If in corridor of interest, in coordination with BTD	Integrate technology and/or infrastructure (i.e., shadow conduit) to support interconnection of traffic signals, BRT TSP, AST, other Active Transportation supportive technology)
Smart Street Lights		Do not need to depend in installation of new light poles, but can instead <b>focus on projects with significant sidewalk reconstruction</b>	
Telecom Utilidor			
District Energy Microgrid			

# SUTs ASSESSMENT AND UPDATE

## Green Infrastructure



>100,000 SF

Install to retain 1.25" rainfall on impervious areas  
**and use priority maps to promote other GI benefits**

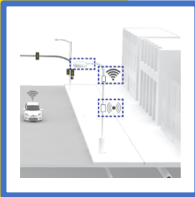
## Traffic, Transit, Bike & Ped Supporting Tech



If in corridor of interest, in coordination with BTD

Integrate technology and/or infrastructure (i.e., shadow conduit) to support interconnection of traffic signals, BRT TSP, AST, other Active Transportation supportive technology)

## Smart Street Lights



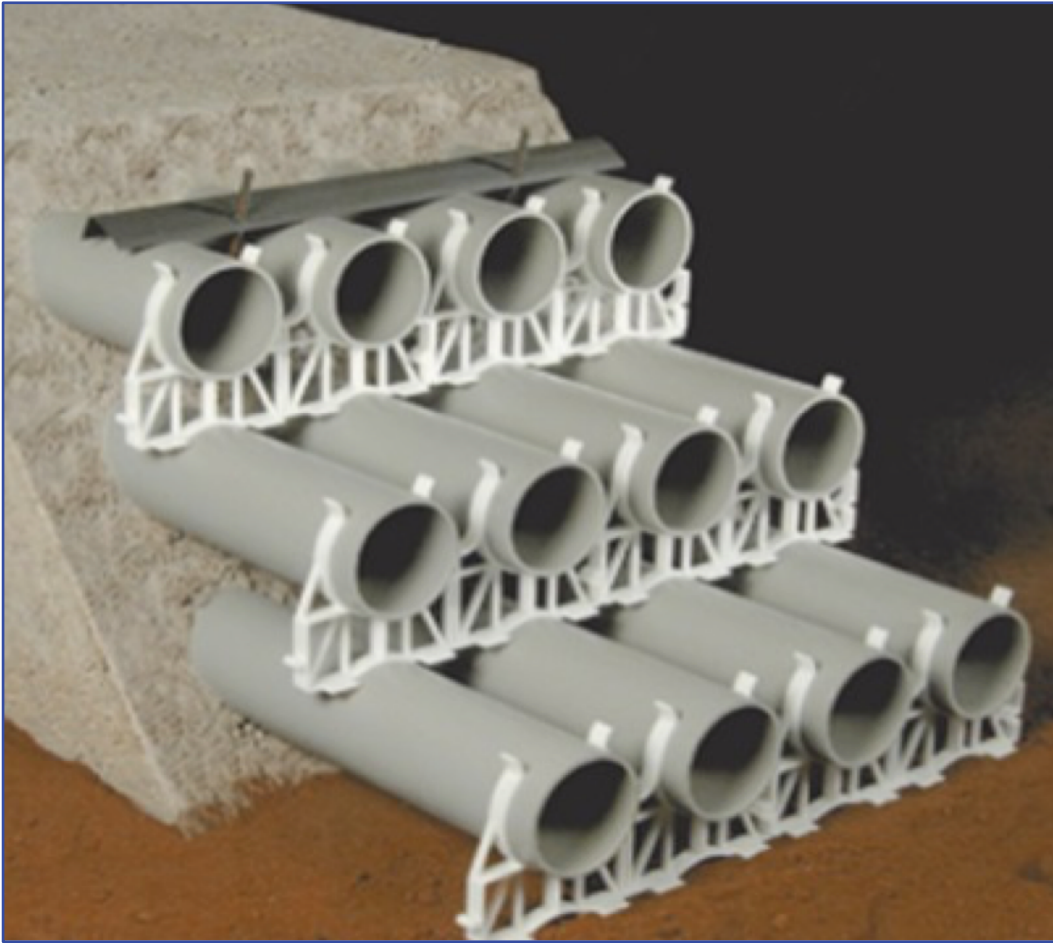
If significant sidewalk reconstruction, in coordination with PIC and PWD

Lay out additional fiber and electric shadow conduit on sidewalks

## Telecom Utilidor



## District Energy Microgrid



## Telecom Utilidor

- Current threshold: **>1.5M SF** of development *or* **>0.5 Miles of roadway**
- Description: A **duct bank with increased capacity for telecom** service
- Benefits: **Mitigates repetitive street openings** when installation of telecom service is required

# SUTs ASSESSMENT AND UPDATE

## Green Infrastructure



>100,000 SF

Install to retain 1.25" rainfall on impervious areas  
**and use priority maps to promote other GI benefits**

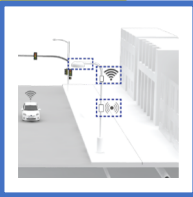
## Traffic, Transit, Bike & Ped Supporting Tech



If in corridor of interest, in coordination with BTD

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## Smart Street Lights



If significant sidewalk reconstruction, in coordination with PIC and PWD

Lay out additional fiber and electric shadow conduit on sidewalks

## Telecom Utilidor



**Collaborating with proponents on design** characteristics (i.e., number of ducts & manholes)

**Opportunity** to coordinate **at lower thresholds in corridors/areas of interest, if within scope of work** (i.e., in coordination with neighborhood planning initiatives)

## District Energy Microgrid

# SUTs ASSESSMENT AND UPDATE

## Green Infrastructure



>100,000 SF

Install to retain 1.25" rainfall on impervious areas  
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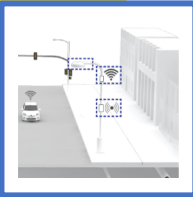
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If significant sidewalk reconstruction, in coordination with PIC and PWD

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## Telecom Utilidor



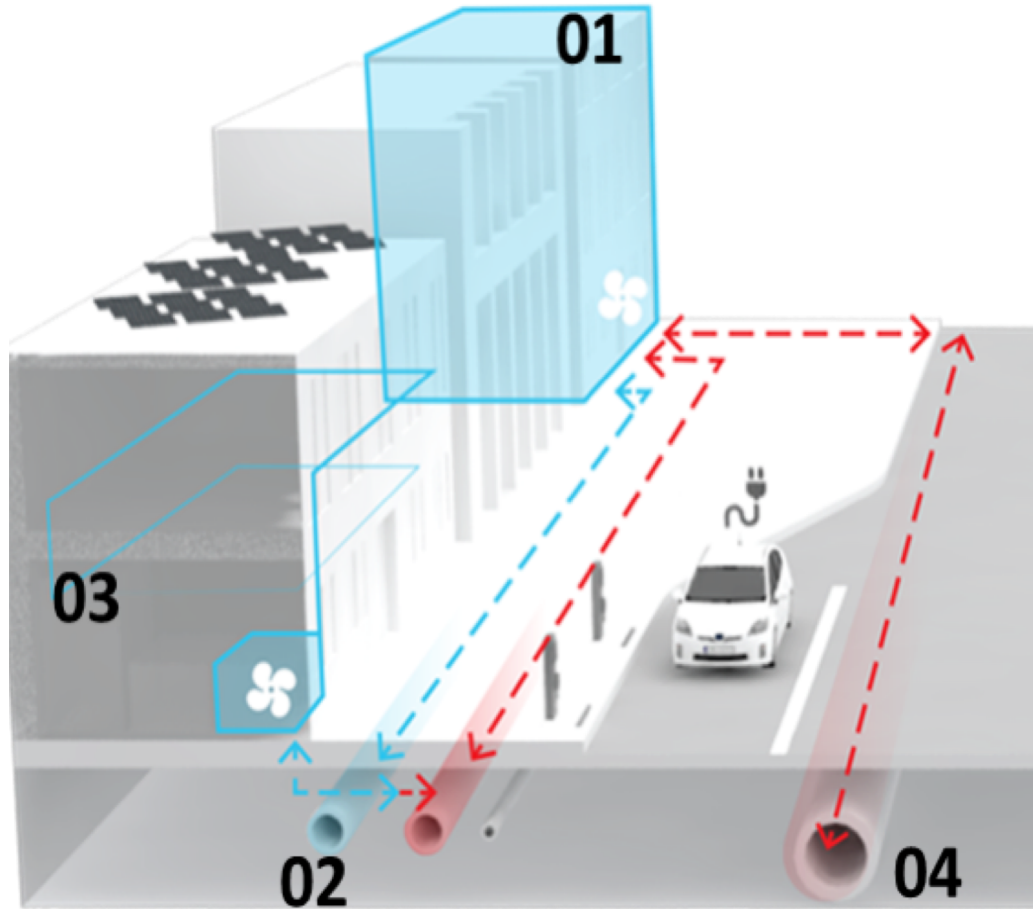
>1.5M SF of Development, or  
>0.5 Miles of Roadway, **or**  
**< 1.5 million SF in priority corridor**

Install Telecom Utilidor **on applicable streets**

## District Energy Microgrid







## District Energy Microgrid

- Current threshold: > **1.5 million SF**, **Feasibility Assessment**; if feasible, then **Master Plan** & District Energy Microgrid Ready design
- Description: **Energy system for clusters of buildings** that provides localized thermal and/or electrical services
- Benefits: Opportunity to **decrease GHG emissions, decrease energy and O&M costs**, and **increase site energy resilience**



# SUTs ASSESSMENT AND UPDATE

## Green Infrastructure



>100,000 SF

Install to retain 1.25" rainfall on impervious areas **and use priority maps to promote other GI benefits**

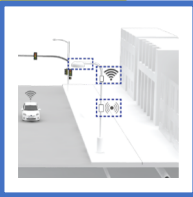
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## Smart Street Lights



If significant sidewalk reconstruction, in coordination with PIC and PWD

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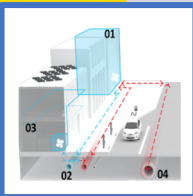
## Telecom Utilidor



>1.5M SF of Development, or  
>0.5 Miles of Roadway, **or**  
**< 1.5 million SF in priority corridor**

Install Telecom Utilidor **on applicable streets**

## District Energy Microgrid



Feasibility Assessments have resulted in **different tailored solutions**, including **in-building cogeneration, district energy “ready” design, and rooftop PV + battery storage analysis**

# SUTs ASSESSMENT AND UPDATE

## Green Infrastructure



>100,000 SF

Install to retain 1.25" rainfall on impervious areas **and use priority maps to promote other GI benefits**

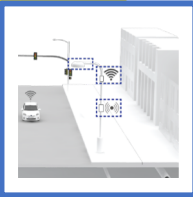
## Traffic, Transit, Bike & Ped Supporting Tech



If in corridor of interest, in coordination with BTB

Integrate technology and/or infrastructure (i.e., shadow conduit) to support interconnection of traffic signals, BRT TSP, AST, other Active Transportation supportive technology)

## Smart Street Lights



If significant sidewalk reconstruction, in coordination with PIC and PWD

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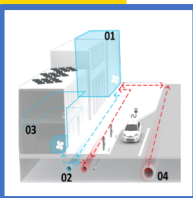
## Telecom Utilidor



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Install Telecom Utilidor **on applicable streets**

## District Energy Microgrid



> 1.5 million SF

Feasibility Assessment **for Advanced Energy Systems, in collaboration with Climate Action Plan (CAP) and Climate Ready Boston (CRB) teams**; if feasible, then Master Plan & District Energy Microgrid Ready design

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- ❑ Overview of Boston Smart Utilities Program
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# NEW SUTs ASSESSMENT AND RECOMMENDATIONS

Solar/Battery/ EV Microgrids	
Smart Broadband Buildings	

# NEW SUTs ASSESSMENT AND RECOMMENDATIONS



## Solar/Battery/EV Microgrids

- Description: **Energy systems for clusters of buildings**, integrated within a **defined boundary**, and **capable of disconnecting** and operating independently **from the macro electric grid**. Include power generation (i.e., rooftop PV) and distribution infrastructure (i.e., wires, control systems)
- Benefits: Opportunity to **decrease GHG emissions**, **decrease energy and O&M costs**, and **increase** site energy **resilience**

# NEW SUTs ASSESSMENT AND RECOMMENDATIONS

**Solar/Battery/  
EV Microgrids**





**City departments and State agencies** are spearheading policies **to support individual technologies** (i.e., solar incentives, BTD's EV Policy)

**Opportunity to integrate low-cost microgrid “ready” design** at the building and development site levels to avoid costly retrofits

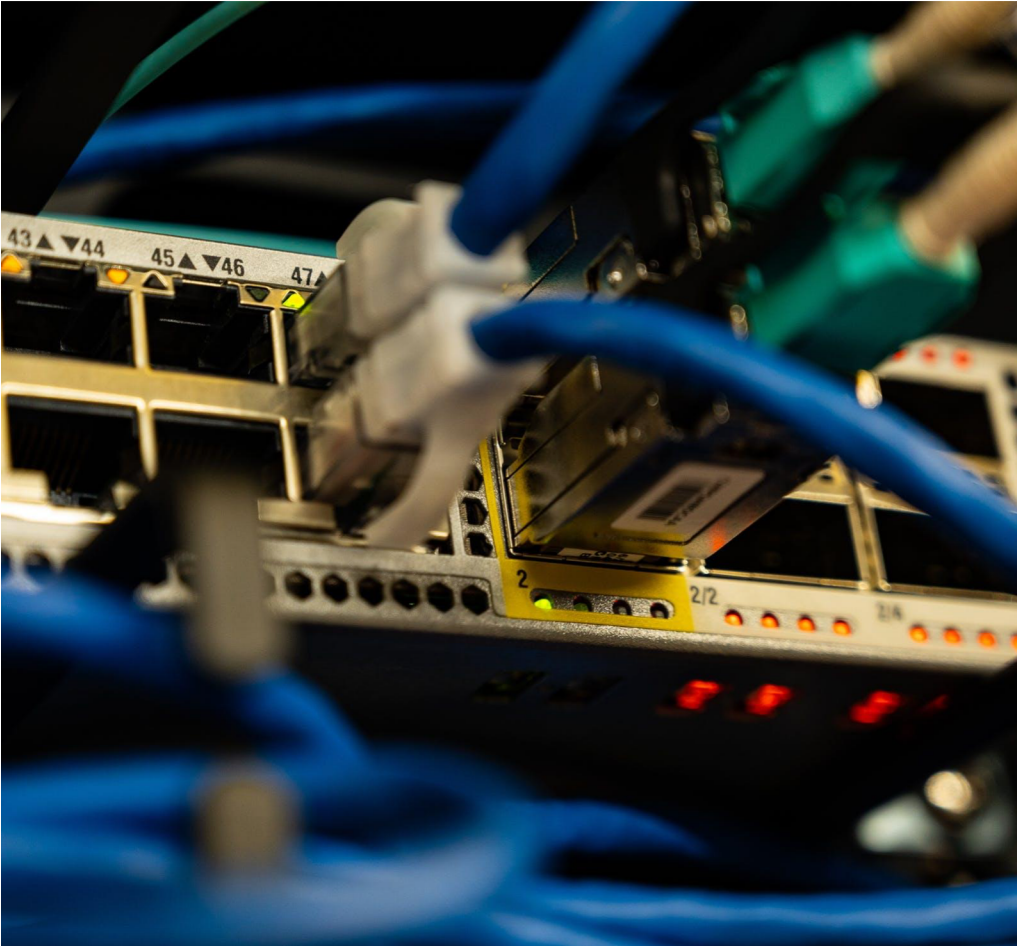
**Smart  
Broadband  
Buildings**

# NEW SUTs ASSESSMENT AND RECOMMENDATIONS

Solar/Battery/ EV Microgrids		All Article 80 projects
		Integrate “ready” design standards, guidelines, and best practices
Smart Broadband Buildings		



# NEW SUTs ASSESSMENT AND RECOMMENDATIONS





## Smart Broadband Buildings

- Description: Building that deploy **standards and guidelines** to create a **broadband ecosystem** that serves the **current and future connectivity needs** of residents, businesses, institutions
- Benefits: **Enabling competition** in the telecom sector, **attracting world-class businesses** by ensuring “**ready**” design for **future** technologies, **mitigating street disruption**, etc.



# NEW SUTs ASSESSMENT AND RECOMMENDATIONS

Solar/Battery/ EV Microgrids		All Article 80 projects
		Integrate "ready" design standards, guidelines, and best practices
Smart Broadband Buildings		<b>Broadband Ready Buildings Checklist already</b> integrated into <b>Article 80 Development Review</b> , and supports goals of Smart Utilities
		<b>Opportunity to integrate low-cost broadband "ready" design</b> at the building and development site levels and avoid costly retrofits

# NEW SUTs ASSESSMENT AND RECOMMENDATIONS

<b>Solar/Battery/ EV Microgrids</b>		<p>All Article 80 projects</p> <p>Integrate “ready” design standards, guidelines, and best practices</p>
<b>Smart Broadband Buildings</b>		<p>All Article 80 projects</p> <p>Integrate “ready” design standards, guidelines, and best practices</p>

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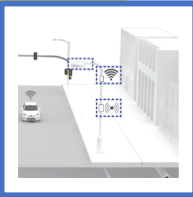
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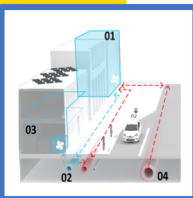
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