Boston Properties

Pelli Clarke Pelli Architects

ARROWSTREET

OJB THE OFFICE OF JAMES BURNETT LANDSCAPE ARCHITECTURE

MAGNUSSON KLEMENCIC ASSOCIATES

WSP | PARSONS BRINCKERHOFF

McNAMARA·SALVIA

BR+A

AHA CONSULTING ENGINEERS

vhb

ARUP

HALEY ALDRICH

RWDI CONSULTING ENGINEERS & SCIENTISTS

JENSEN HUGHES

Nutter

THE BACK BAY SOUTH END GATEWAY PROJECT

BOSTON, MASSACHUSETTS

MARCH 13, 2017

CAC #9

AGENDA

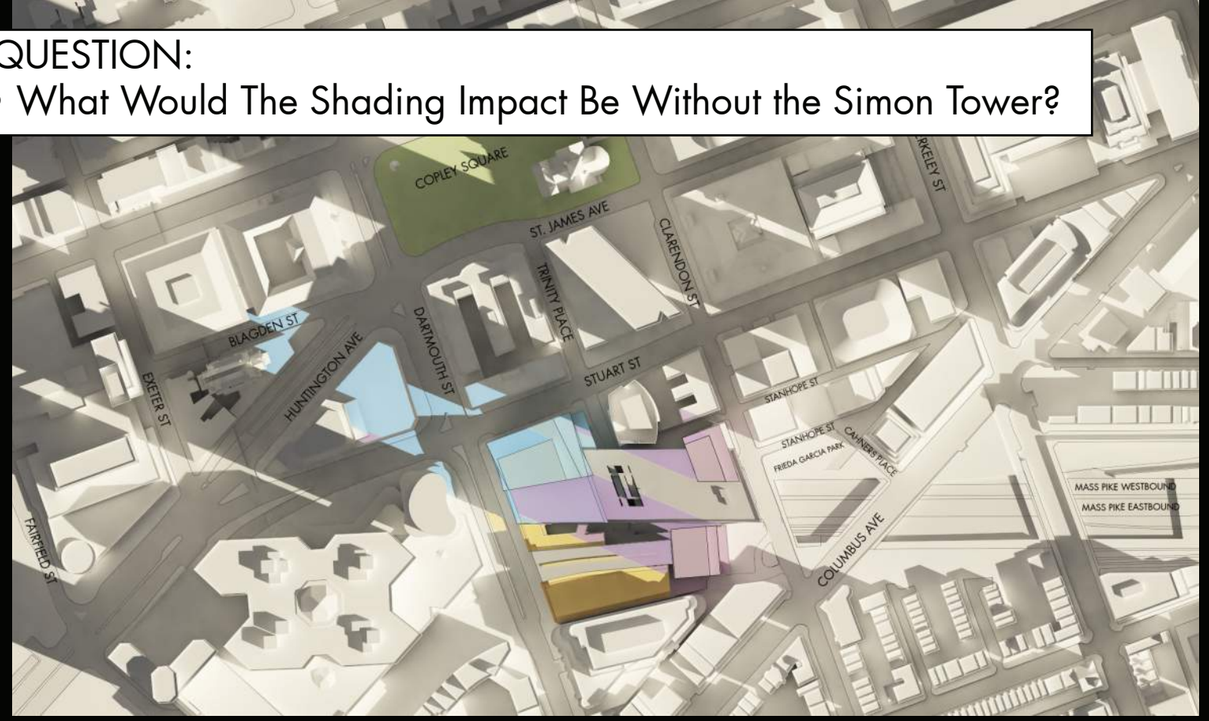
- Project Status (5 Min.)
- Responses to CAC Questions (10 Min.)
- Air Quality And Greenhouse Gas Mobile Sources (15 Min.)
- Sustainability (15 Min.)
- BXP Green Practices (5 Min.)
- Transportation And Parking (15 Min.)
- CAC Comments (20 Min.)
- Public Comment (20 Min.)
- Next Steps (5 Min.)

PROJECT STATUS

- Key Dates
  - PNF Filing • March 29, 2016
  - ENF Filing • April 15, 2016
  - CAC #1 • April 28, 2016
  - BPDA Scoping Session • May 11, 2016
  - Back Bay Public Meeting • May 11, 2016
  - CAC #2 • May 12, 2016 (Site Visit)
  - MEPA Scoping Session • May 18, 2016
  - South End Public Meeting • May 18, 2016
  - CAC #3 • May 26, 2016
  - BCDC Public Meeting • June 07, 2016
  - CAC #4 • June 15, 2016
  - CAC #5 • June 29, 2016
  - CAC #6 • July 13, 2016
  - CAC #7 • October 6, 2016
  - DPIR/DEIR Filing • January 31, 2017
  - CAC #8 • February 23, 2017
  - Public Meeting • March 01, 2017
  - **CAC #9 • March 13, 2017**
  - CAC #10 • March 29, 2017
  - Public Meeting • Week of April 03, 2017

RESPONSES TO CAC QUESTIONS

QUESTION:
- What Would The Shading Impact Be Without the Simon Tower?



9:00AM EDT

12:00PM EDT

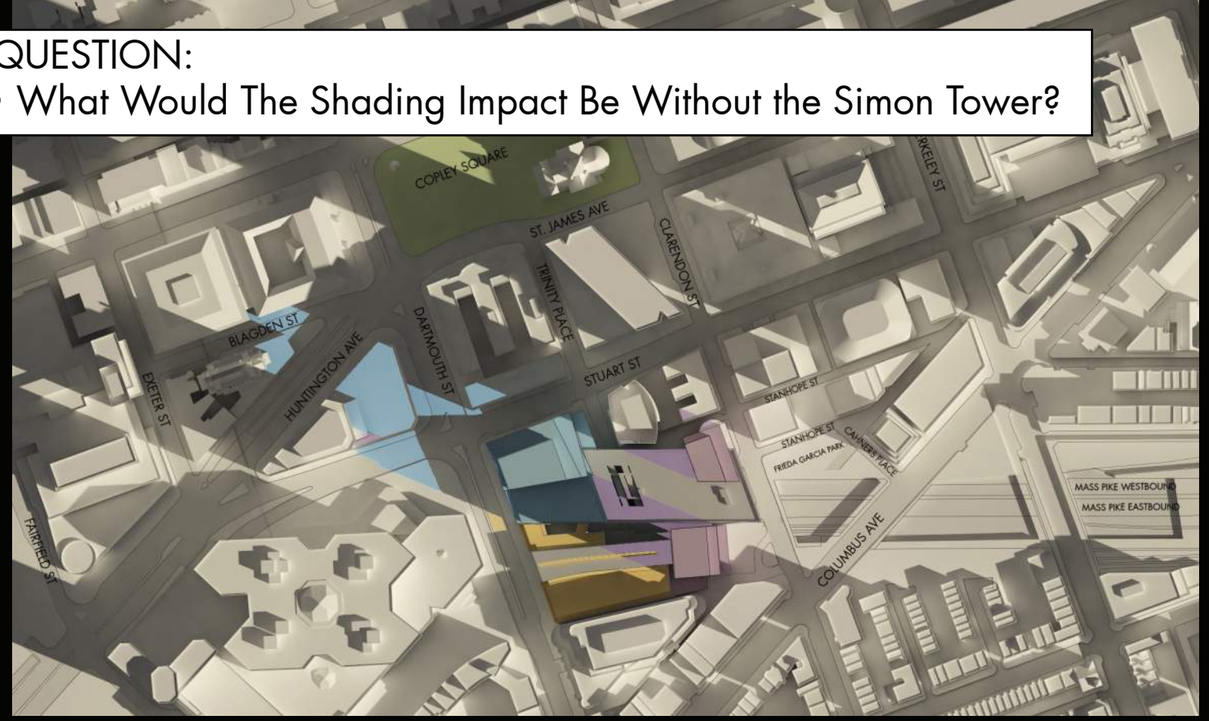
3:00PM EDT

LEGEND
- Commercial
- Residential
- Retail

SHADOW IMPACT - MARCH 21 AND SEPTEMBER 21

bxp Boston Properties 13 MARCH 2017

QUESTION:
- What Would The Shading Impact Be Without the Simon Tower?



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LEGEND
- Commercial
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SHADOW IMPACT WITHOUT SIMON TOWER - MARCH 21 AND SEPTEMBER 21

bxp Boston Properties 13 MARCH 2017

QUESTION:
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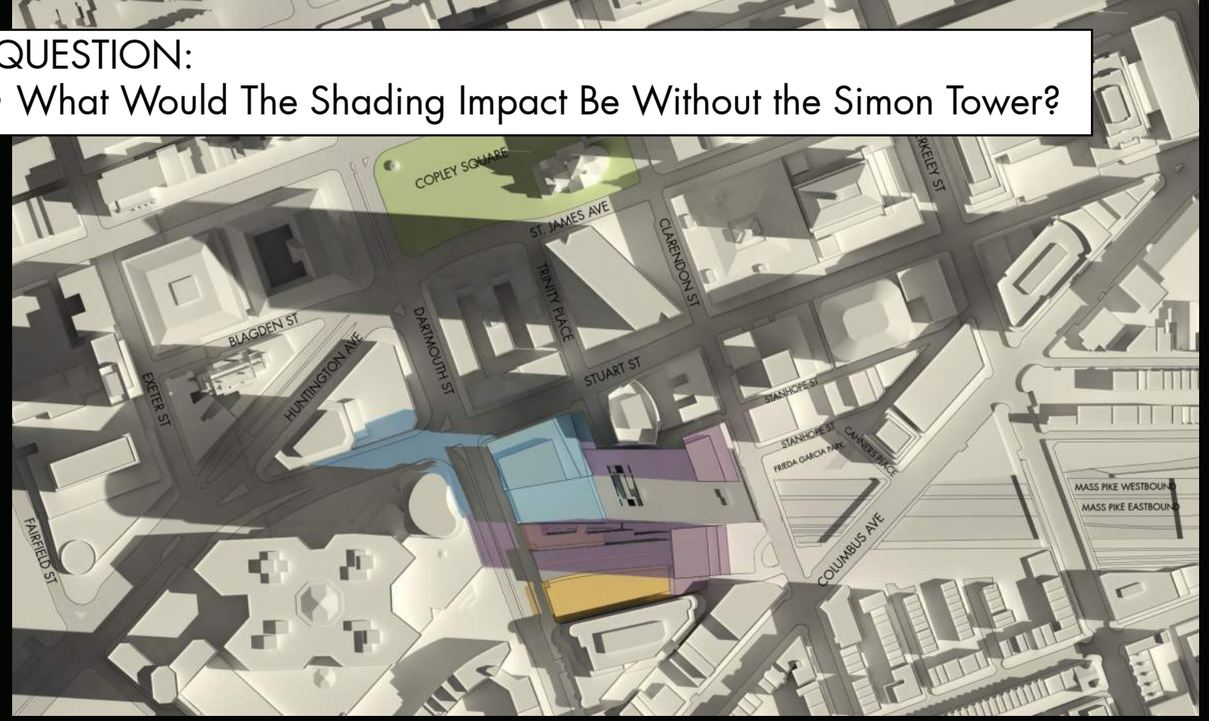

9:00AM EDT

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SHADOW IMPACT - JUNE 21

bxp Boston Properties 13 MARCH 2017

QUESTION:
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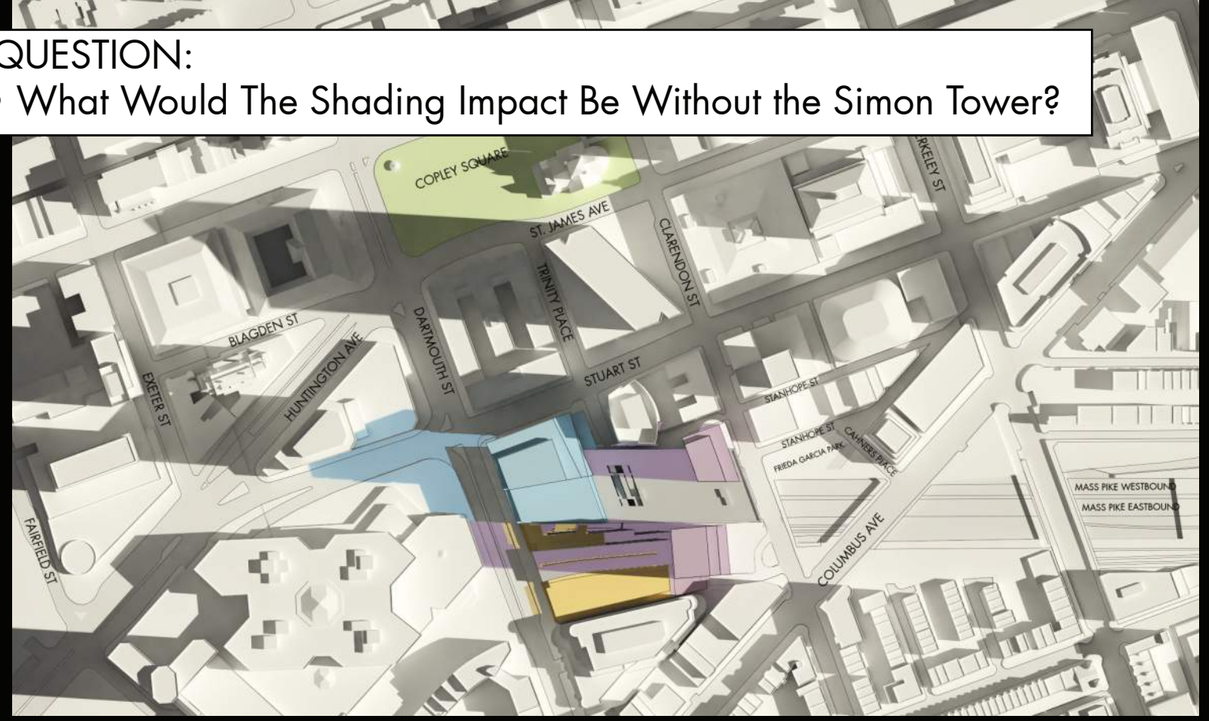

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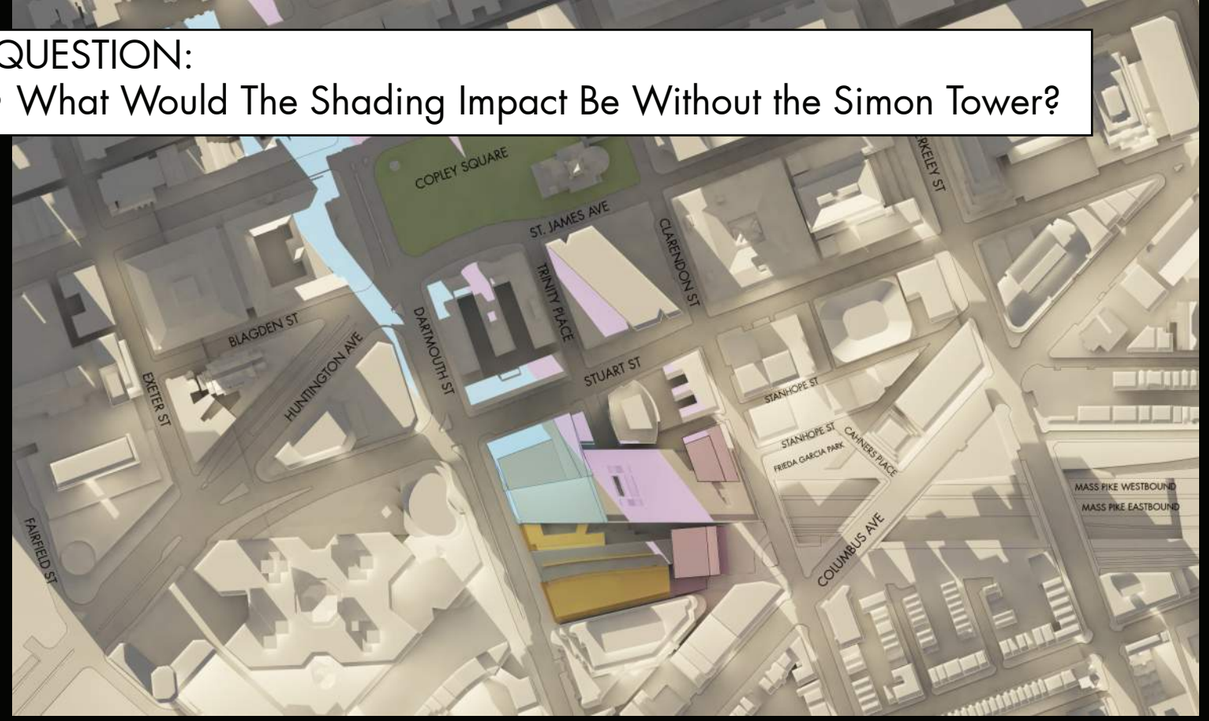
SHADOW IMPACT WITHOUT SIMON TOWER - JUNE 21

QUESTION:
- What Would The Shading Impact Be Without the Simon Tower?



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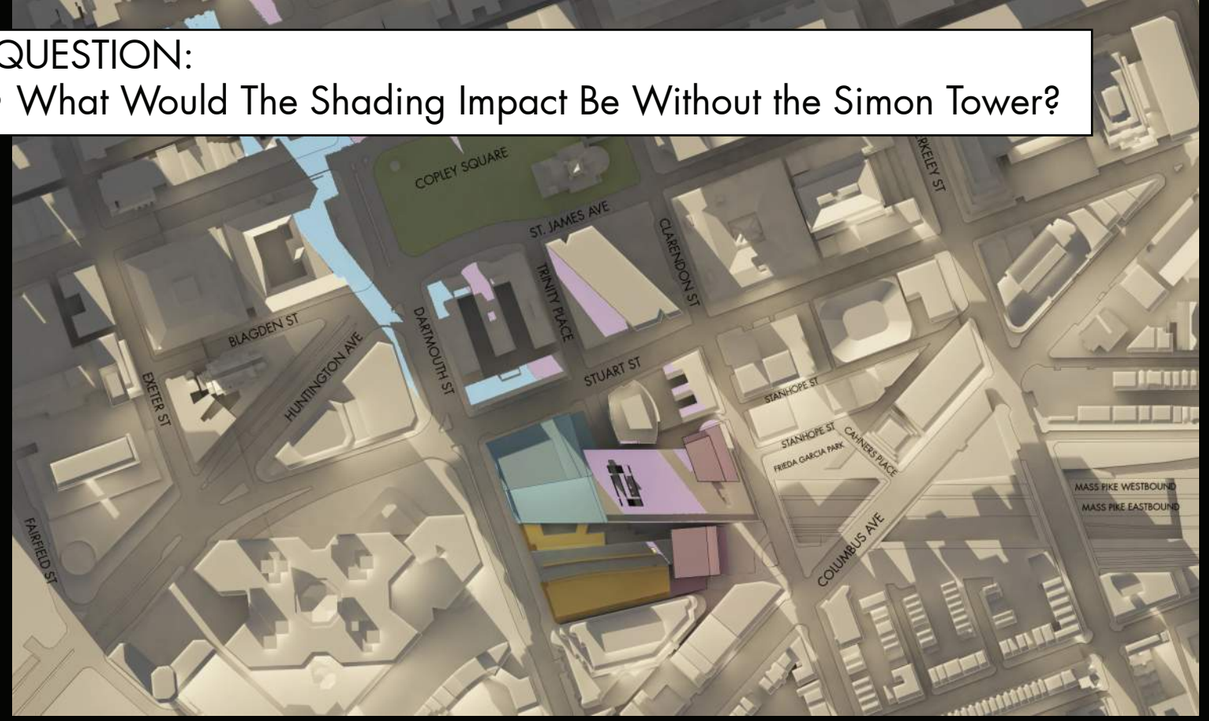
SHADOW IMPACT - DECEMBER 21

bxp Boston Properties 13 MARCH 2017

QUESTION:
- What Would The Shading Impact Be Without the Simon Tower?



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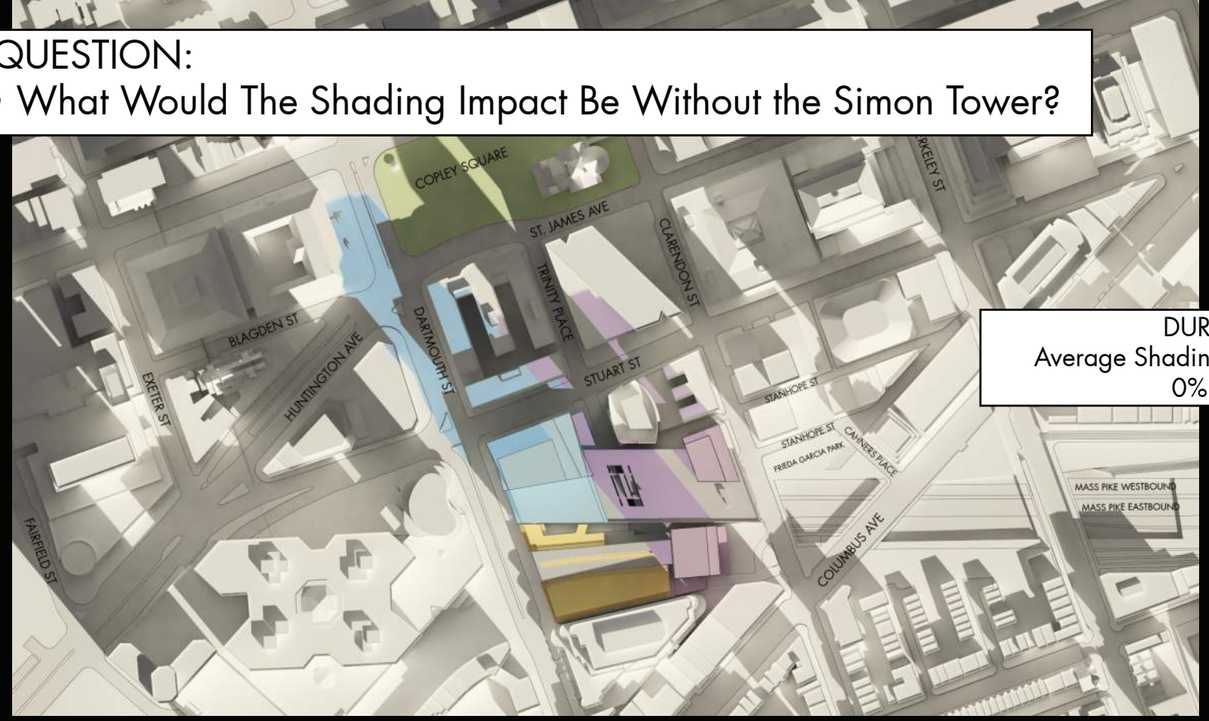
SHADOW IMPACT WITHOUT SIMON TOWER - DECEMBER 21

QUESTION:
- What Would The Shading Impact Be Without the Simon Tower?



10:09AM EDT

DURATION 1
Average Shading on Copley Square:
0% to 2.7%

11:19AM EDT

11:53AM EDT

DURATION 2
Average Shading On Copley Square:
0% to 0.45%

12:37PM EDT

QUESTION:
- What Would The Shading Impact Be Without the Simon Tower?

10:09AM EDT

DURATION 1
Average Shading on Copley Square:
0% to 2.7%

11:19AM EDT

11:53AM EDT

DURATION 2
Average Shading On Copley Square:
0% to 0.45%

12:37PM EDT

SHADOW IMPACT WITHOUT SIMON TOWER - OCTOBER 21

bxp Boston Properties 13 MARCH 2017

QUESTION:
- What are the Shadow Impacts To Stained Glass Windows in the New Old South Church And Trinity Church?

SHADOW IMPACTS TO HISTORIC RESOURCES

- New Old South Church - West and South Facade Restored Windows
  - Shading During Approximately 12 Weeks Of The Year (Nov 09 to Feb 01)
    - Duration Ranges From Approximately 10 to 100 Minutes

- Trinity Church - Christ Preaching Windows
  - Shading During Approximately 11 Weeks Of The Year (Nov 16 to Feb 01)
    - Duration Ranges From Approximately 10 to 60 Minutes

QUESTION:

- What Are The Square Footages Of Clarendon Plaza?

~7,500 SF

~1,000 SF

~750 SF

ADDITIONAL QUESTIONS

- Phasing Images and Public Benefits By Phase
- RWDI Pedestrian Wind Analysis By Phase
- View of Garage East Lobby
- Questions On Sidewalk Width On Dartmouth Street

COMMUNITY & AGENCY FEEDBACK ON PNF AND PROJECT EVOLUTION

- 85 Comment Letters Received
- Over 1,100 Individual Comments
- Desire For Public Open Space
- Desire To Preserve Architectural Integrity Of Back Bay Station
- Desire To See More Detail On Public Realm Design

- Station East
    - Addition Of 11,000sf Public Plaza
- Station West
    - Abandoned Two-Story Addition
- Site Wide
    - Detailed Development & Phasing Of Public Realm Improvements

AIR QUALITY AND GREENHOUSE GAS (GHG) MOBILE SOURCES

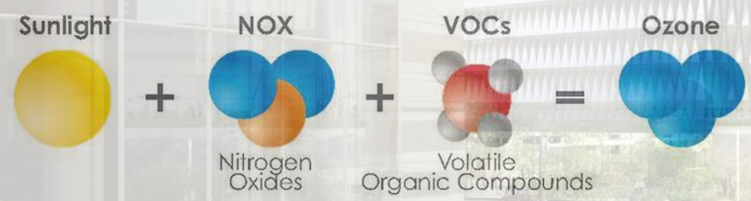
Methodology

AIR QUALITY

Attainment Status:
- Carbon Monoxide Maintenance Area
- Revoked 1-hour and 8-hour Ozone

Air Quality Pollutants Assessed:
- Mobile Sources: CO, VOCs, NO_x, and CO_2
- Stationary Sources: CO_2

Maximum allowable contaminant thresholds:
- National Ambient Air Quality Standards (NAAQS)



Methodology

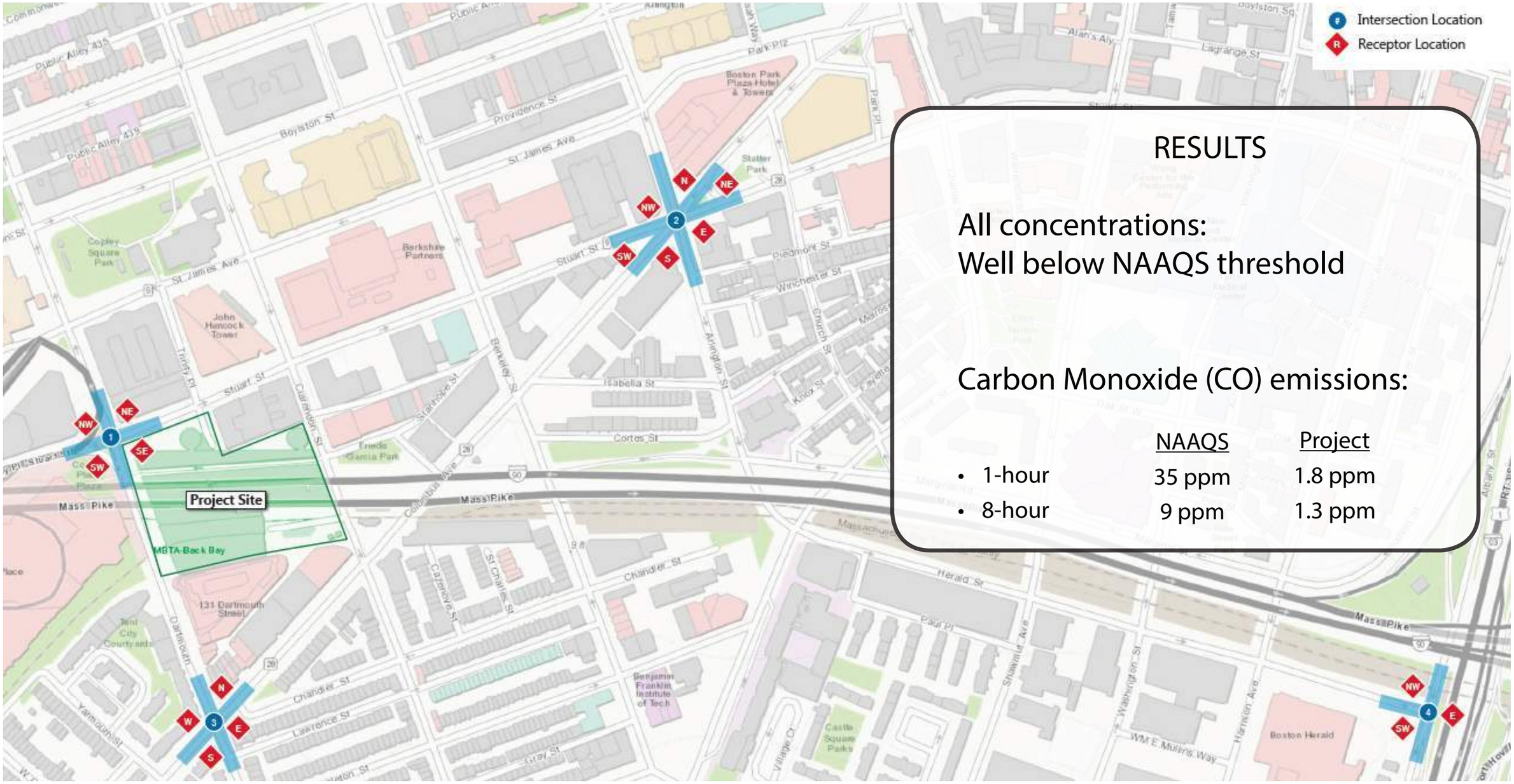
MOBILE SOURCE EMISSIONS

Number of Intersections:
- Screening of 28 intersections
- Study of 4 worst case intersections

Mitigation Measures:
- Transportation Demand Measures (TDM)
- Roadway Improvements

Emissions Model:
- EPA MOVES 2014 Emission Model

Mobile Source Emissions: Microscale



RESULTS

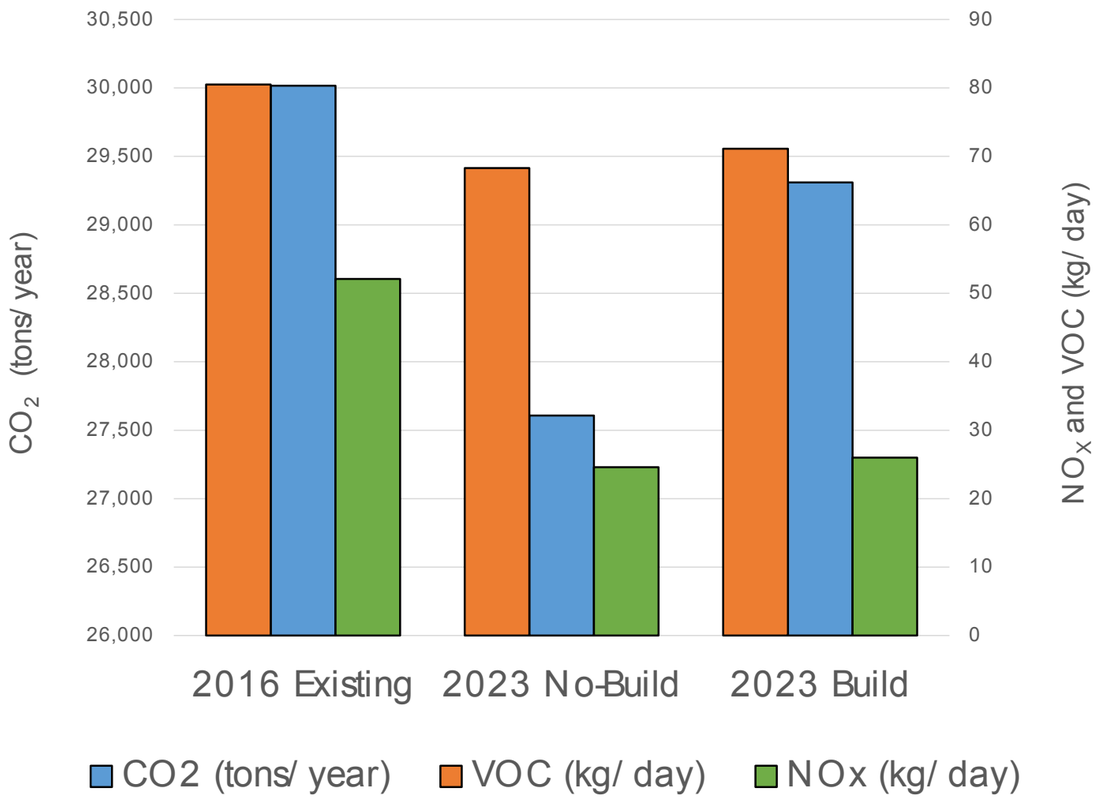
All concentrations:
Well below NAAQS threshold

Carbon Monoxide (CO) emissions:

	NAAQS	Project
• 1-hour	35 ppm	1.8 ppm
• 8-hour	9 ppm	1.3 ppm

Mobile Source Emissions: Mesoscale

Pollutant Emissions



Impact of Mitigation Measures

	Project Related Emissions	TDM Measures	Roadway Improvements	Project Emissions
• CO_2 (tons/yr)	1,702	-34	-995	673
• VOCs (kg/day)	2.8	-0.06	-0.6	2.1
• NO_x (kg/day)	1.4	-0.03	-0.7	0.6

RESULTS

60% reduction in CO_2 emissions from roadway improvements and TDM measures

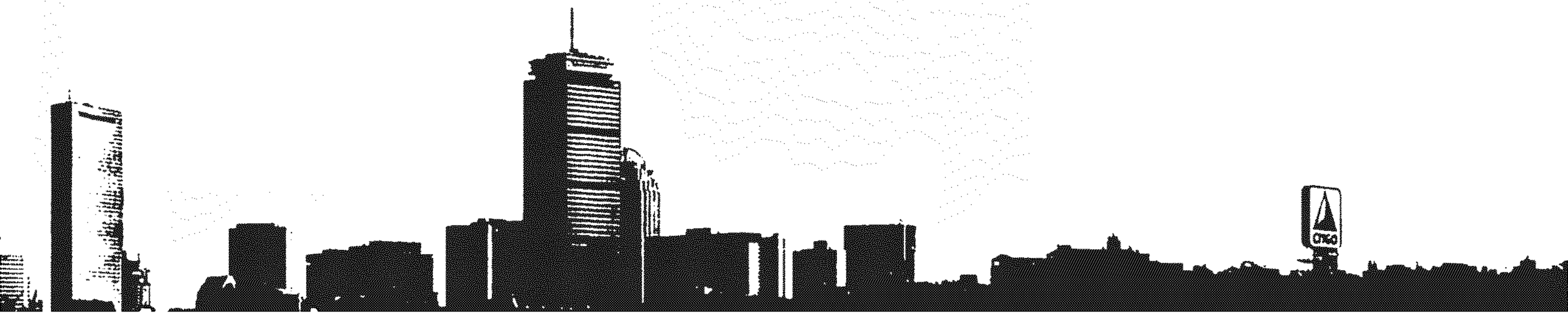
SUSTAINABILITY

Regulatory Context

- MEPA Greenhouse Gas Policy

- Massachusetts Stretch Energy Code (10% more efficient than ASHRAE 90.1-2013)
    - Implications for energy modeling:
        - Baseline Scenario: ASHRAE 90.1-2013
        - Design Scenario: must show at least 10% savings

- City of Boston Article 37



Low lighting power densities (0.6 W/sf) from LED lighting

High performance building envelope

Maximize daylighting and minimize glare

Green tenant guidelines

High efficiency mechanical equipment, including:
- Gas fired condensing boilers
- Active chilled beams
- Dedicated outside air

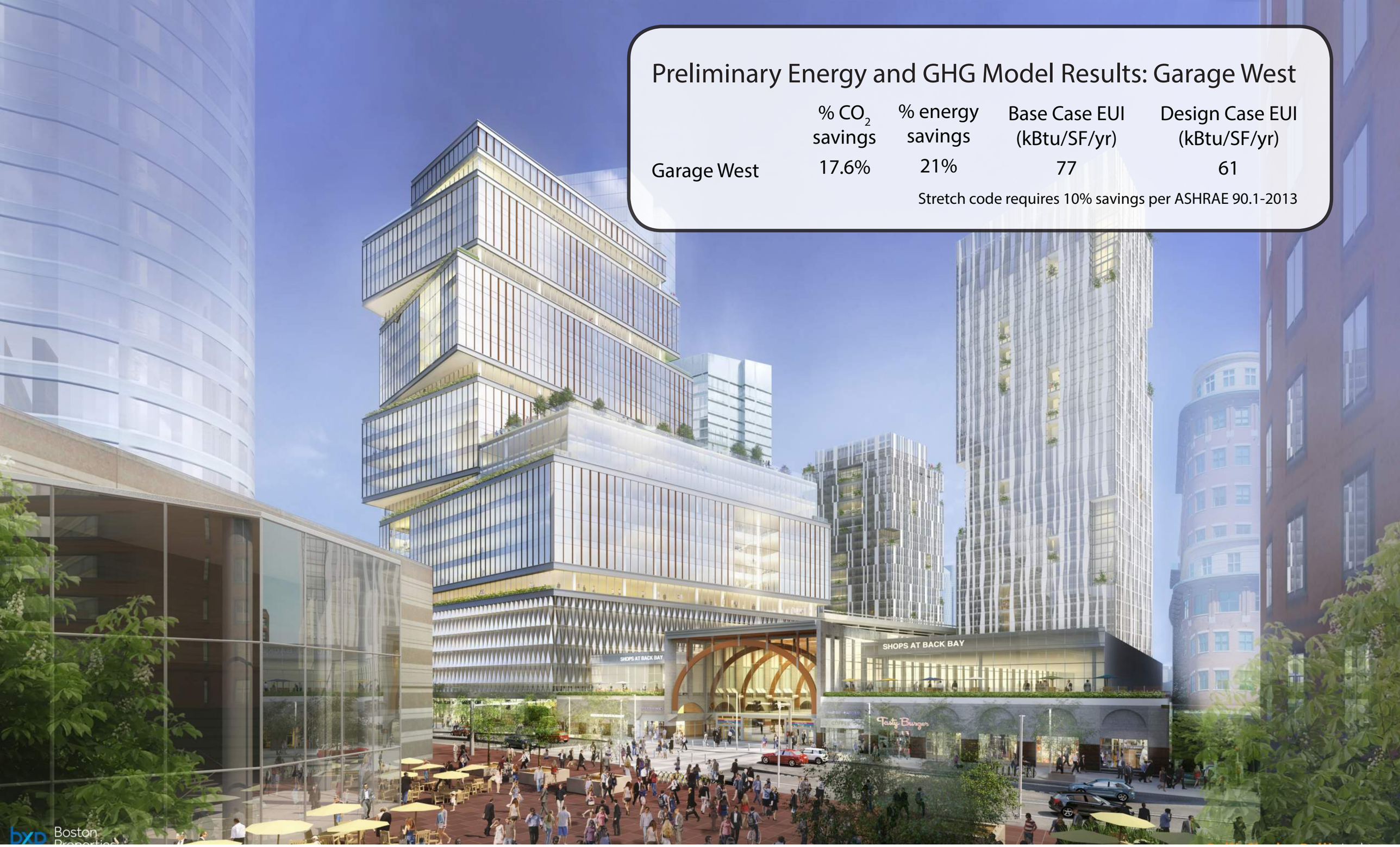
Green roof for reduced heat island effect, stormwater attenuation, and visual amenity

Good indoor air quality through demand controlled ventilation and use of materials with low volatile organic compounds

Preliminary Energy and GHG Model Results: Garage West

	% CO_2 savings	% energy savings	Base Case EUI (kBtu/SF/yr)	Design Case EUI (kBtu/SF/yr)
Garage West	17.6%	21%	77	61

Stretch code requires 10% savings per ASHRAE 90.1-2013



Green roof for reduced heat island effect, stormwater attenuation, and visual amenity

Operable windows &

High performance building envelope

Maximize daylighting and minimize glare

High efficiency mechanical equipment, including:
- Gas fired condensing boilers
- Dedicated outside air

Good indoor air quality through the use of materials with low volatile organic compounds

Preliminary Energy and GHG Model Results: Station & Garage East

	% CO_2 savings	% energy savings	Base Case EUI (kBtu/SF/yr)	Design Case EUI (kBtu/SF/yr)
Station East & Garage East	14%	20%	79	63

Stretch code requires 10% savings per ASHRAE 90.1-2013


Good indoor air quality through demand controlled ventilation and use of materials with low volatile organic compounds
High efficiency mechanical equipment with energy recovery
Green tenant guidelines
High performance building envelope
STATION RESTAURAN
COFFEE
COFFEE

Preliminary Energy and GHG Model Results: Station West

	% CO_2 savings	% energy savings	Base Case EUI (kBtu/SF/yr)	Design Case EUI (kBtu/SF/yr)
Station West	7.3%	8%	239	220

Stretch code requires 10% savings per ASHRAE 90.1-2013

Preliminary Energy + GHG Model Results

	% CO_2 savings	% energy savings	Base Case EUI (kBtu/SF/yr)	Design Case EUI (kBtu/SF/yr)
• Garage West	17.6%	21%	77	61
• Garage East	14.0%	20%	79	63
• Station East	14.0%	20%	79	63
• Station West	7.3%	8%	239	220
• Project Wide	15.4%	20%		

Stretch code requires 10% savings per ASHRAE 90.1-2013

Not Cost-Effective

Renewable Energy Systems

Solar Thermal

- Solar thermal: 0.9% carbon footprint reduction
- Potential locations: Garage East and Station East
- Simple Payback: 14 years
- Challenges: competes with solar PV for roof area

Wind

- Wind: 0.1% carbon footprint reduction
- Potential locations: Garage East, Station East, and Garage West
- Simple Payback: exceeds system life span
- Challenges: low-wind, low generation, and low savings compared to other strategies

Cost-Effective

Renewable Energy Systems

Solar PV

- Roof-Mounted PV: offsets 58 tons CO_2 / year
- Potential locations: Garage East, Station East, and Garage West
- Simple Payback: 6-7 years

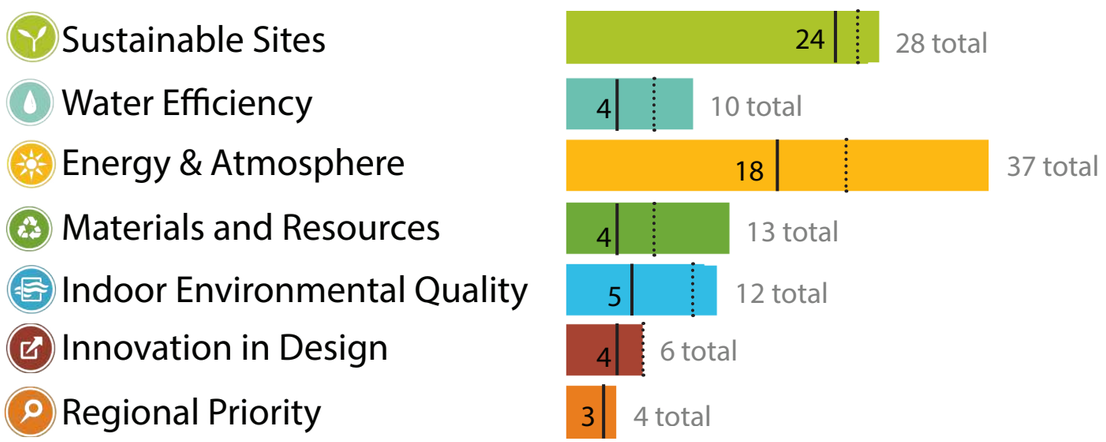
- Building-Integrated PV: offsets 157 tons CO_2 / year
- Potential locations: Garage East, Station East, and Garage West
- Simple Payback: 14-16 years
- Still being studied for feasibility

Combined Heat and Power (CHP)

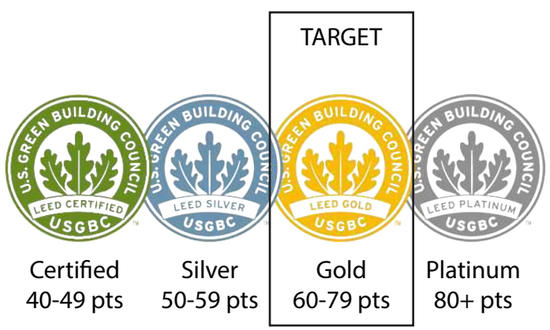
- CHP: offsets 18 tons CO_2 / year
- Potential locations: Garage East, Station East, and Garage West
- Simple Payback: 3-4 years

LEED

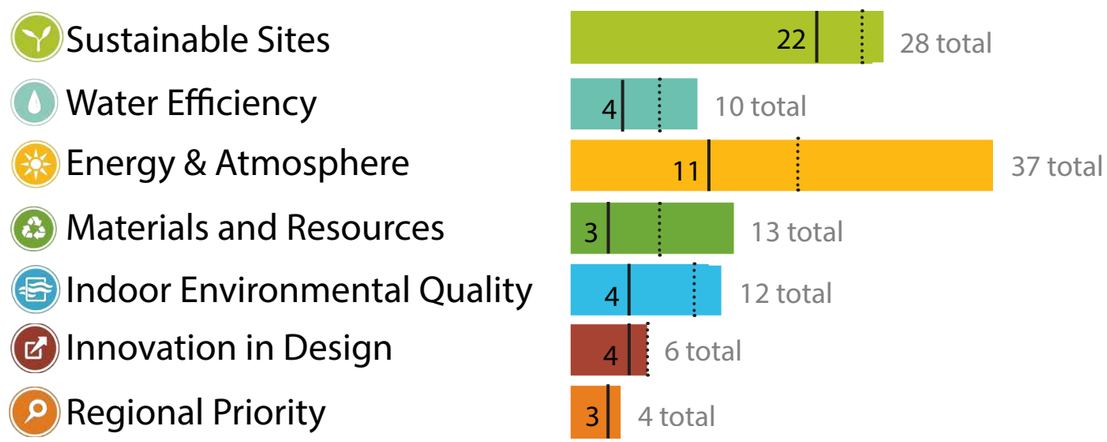
Garage West (office)
LEED-CS



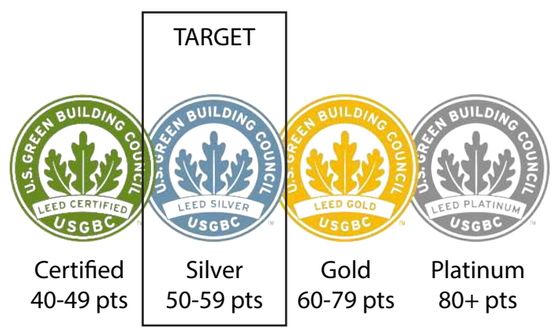
62 'yes' (22) 'maybe' 110 total



Station West (retail)
LEED-CS

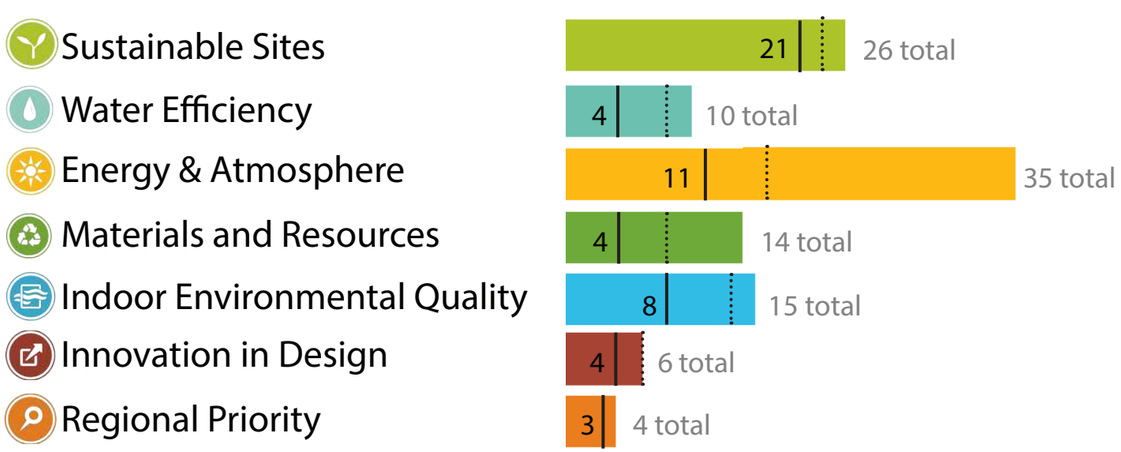


51 'yes' (28) 'maybe' 110 total

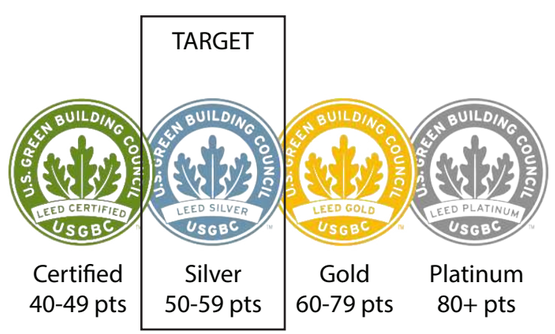


LEED

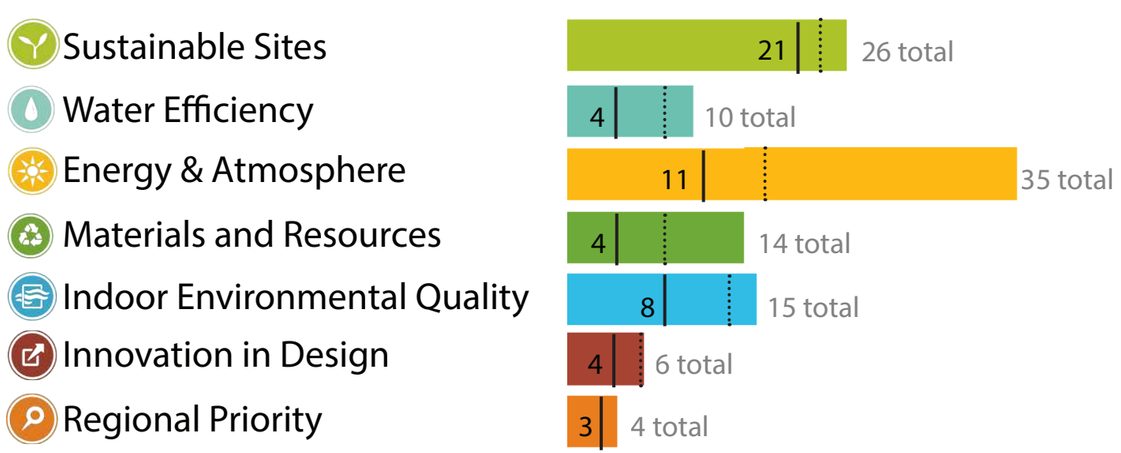
Garage East (residential)
LEED-NC



55 'yes' (23) 'maybe' 110 total



Station East (residential)
LEED-NC



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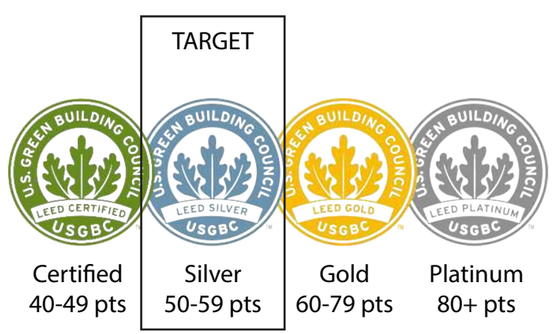

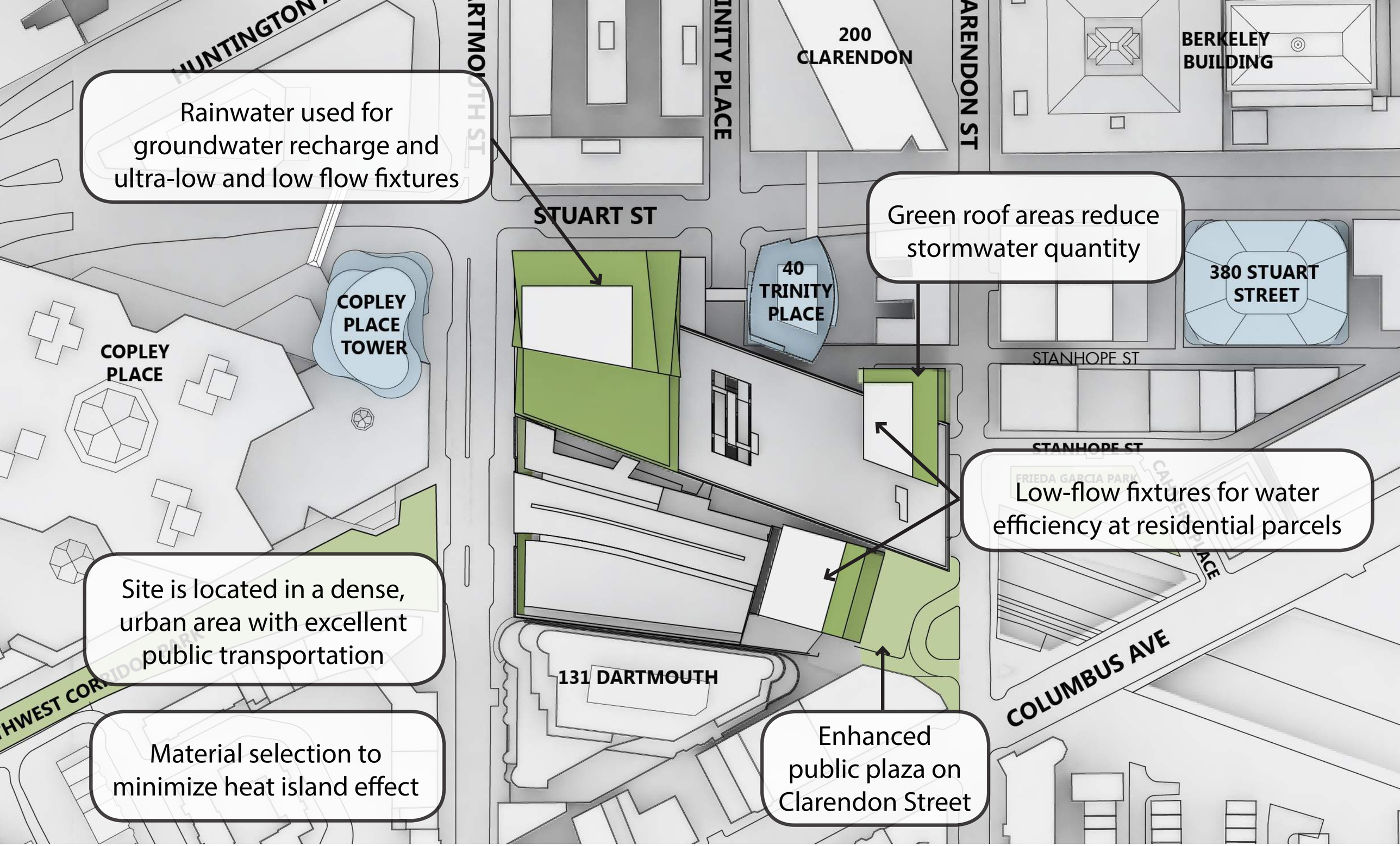
Rainwater used for groundwater recharge and ultra-low and low flow fixtures
Green roof areas reduce stormwater quantity
Low-flow fixtures for water efficiency at residential parcels
Site is located in a dense, urban area with excellent public transportation
Material selection to minimize heat island effect
Enhanced public plaza on Clarendon Street
HUNTINGTON AVE
DARTMOUTH ST
TRINITY PLACE
200 CLARENDON
CLARENDON ST
BERKELEY BUILDING
STUART ST
COPLEY PLACE TOWER
COPLEY PLACE
40 TRINITY PLACE
380 STUART STREET
STANHOPE ST
FRIEDA GARCIA PARK
131 DARTMOUTH
COLUMBUS AVE

Garage West (office): LEED CS

LEED 2009 for Core and Shell Development

Project Checklist

Back Back / South End Gateway Project: Garage West

Sustainable Sites — Possible Points: 28

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
2			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	2
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
		1	Credit 8	Light Pollution Reduction	1
1			Credit 9	Tenant Design and Construction Guidelines	1

Water Efficiency — Possible Points: 10

Y	?	N			
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
2	1	1	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 37

Y	?	N			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
9	4	8	Credit 1	Optimize Energy Performance	3 to 21
	1	3	Credit 2	On-Site Renewable Energy	4
2			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
3			Credit 5.1	Measurement and Verification—Base Building	3
2			Credit 5.2	Measurement and Verification—Tenant Submetering	3
	2		Credit 6	Green Power	2

Materials and Resources — Possible Points: 13

Y	?	N			
Y			Prereq 1	Storage and Collection of Recyclables	
		5	Credit 1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 5
2			Credit 2	Construction Waste Management	1 to 2
		1	Credit 3	Materials Reuse	1
1	1		Credit 4	Recycled Content	1 to 2
1	1		Credit 5	Regional Materials	1 to 2
	1		Credit 6	Certified Wood	1

Indoor Environmental Quality — Possible Points: 12

Y	?	N			
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
	1		Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3	Construction IAQ Management Plan—During Construction	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
	1		Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
	1		Credit 5	Indoor Chemical and Pollutant Source Control	1
		1	Credit 6	Controllability of Systems—Thermal Comfort	1
1			Credit 7	Thermal Comfort—Design	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

1			Credit 1.1	Exemplary Performance SSc2 Development Density	1
1			Credit 1.2	Exemplary Performance SSc4.1 Public Transportation	1
	1		Credit 1.3	Exemplary Performance MRc2 Construction Waste Management	1
	1		Credit 1.4	Innovation in Design: Green Building Education	1
1			Credit 1.5	Innovation in Design: Green Cleaning Policy/Program	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

		1	Credit 1.1	On-site renewable energy	1
1			Credit 1.2	Stormwater design - quantity control	1
1			Credit 1.3	Heat island effect - nonroof	1
1			Credit 1.4	Heat island effect - roof	1

Y	?	N		
62	22	25	Total	Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Station West (retail): LEED CS

LEED 2009 for Core and Shell Development

Project Checklist

Back Back / South End Gateway Project: Station West

Sustainable Sites — Possible Points: 28

Y	?	N			
			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	2		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	2
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
		1	Credit 8	Light Pollution Reduction	1
1			Credit 9	Tenant Design and Construction Guidelines	1

Water Efficiency — Possible Points: 10

Y				
		Prereq 1	Water Use Reduction—20% Reduction	
2	2	Credit 1	Water Efficient Landscaping	2 to 4
	2	Credit 2	Innovative Wastewater Technologies	2
2	1	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 37

Y				
		Prereq 1	Fundamental Commissioning of Building Energy Systems	
		Prereq 2	Minimum Energy Performance	
		Prereq 3	Fundamental Refrigerant Management	
4	13	Credit 1	Optimize Energy Performance	3 to 21
	4	Credit 2	On-Site Renewable Energy	4
2		Credit 3	Enhanced Commissioning	2
2		Credit 4	Enhanced Refrigerant Management	2
3		Credit 5.1	Measurement and Verification—Base Building	3
	3	Credit 5.2	Measurement and Verification—Tenant Submetering	3
	2	Credit 6	Green Power	2

Materials and Resources — Possible Points: 13

Y	?	N			
			Prereq 1	Storage and Collection of Recyclables	
		5	Credit 1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 5
2			Credit 2	Construction Waste Management	1 to 2
		1	Credit 3	Materials Reuse	1
1	1		Credit 4	Recycled Content	1 to 2
	2		Credit 5	Regional Materials	1 to 2
	1		Credit 6	Certified Wood	1

Indoor Environmental Quality — Possible Points: 12

Y				
		Prereq 1	Minimum Indoor Air Quality Performance	
		Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1		Credit 1	Outdoor Air Delivery Monitoring	1
	1	Credit 2	Increased Ventilation	1
1		Credit 3	Construction IAQ Management Plan—During Construction	1
1		Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1		Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
	1	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
	1	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
	1	Credit 5	Indoor Chemical and Pollutant Source Control	1
		1	Credit 6	Controllability of Systems—Thermal Comfort	1
	1	Credit 7	Thermal Comfort—Design	1
	1	Credit 8.1	Daylight and Views—Daylight	1
	1	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

1		Credit 1.1	Exemplary Performance SSc2 Development Density	1
1		Credit 1.2	Exemplary Performance SSc4.1 Public Transportation	1
	1	Credit 1.3	Exemplary Performance MRc2 Construction Waste Management	1
	1	Credit 1.4	Innovation in Design: Green Building Education	1
1		Credit 1.5	Innovation in Design: Green Cleaning Policy/Program	1
1		Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

	1	Credit 1.1	On-site renewable energy	1
1		Credit 1.2	Stormwater design - quantity control	1
1		Credit 1.3	Heat island effect - nonroof	1
1		Credit 1.4	Heat island effect - roof	1

Y	?	N		
51	28	31	Total	Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Station East (residential): LEED NC

LEED 2009 for New Construction and Major Renovations

Project Checklist

Back Back / South End Gateway Project: Station East

Sustainable Sites — Possible Points: 26

Y	?	N			
21	3	2			
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
		1	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y	?	N			
4	4	2			
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
2	2		Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y	?	N			
11	5	19			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
4	3	12	Credit 1	Optimize Energy Performance	1 to 19
		7	Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
3			Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y	?	N			
4	4	6			
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
		2	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
1	1		Credit 4	Recycled Content	1 to 2
1	1		Credit 5	Regional Materials	1 to 2
	1		Credit 6	Rapidly Renewable Materials	1
	1		Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y	?	N			
8	5	2			
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
	1		Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
	1		Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
		1	Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

4	2				
1			Credit 1.1	Exemplary Performance SSc2 Development Density	1
1			Credit 1.2	Exemplary Performance SSc4.1 Public Transportation	1
	1		Credit 1.3	Exemplary Performance MRc2 Construction Waste Management	1
	1		Credit 1.4	Innovation in Design: Green Building Education	1
1			Credit 1.5	Innovation in Design: Green Cleaning Policy/Program	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

3		1			
		1	Credit 1.1	On-site renewable energy	1
1			Credit 1.2	Stormwater design - quantity control	1
1			Credit 1.3	Heat island effect - nonroof	1
1			Credit 1.4	Heat island effect - roof	1

Y	?	N		
55	23	32	Total	Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Garage East (residential): LEED NC

LEED 2009 for New Construction and Major Renovations

Project Checklist

Back Back / South End Gateway Project: Garage East

Sustainable Sites — Possible Points: 26

Y	?	N				
21	3	2		**Sustainable Sites**	**Possible Points:**	**26**
Y			Prereq 1	Construction Activity Pollution Prevention		
1			Credit 1	Site Selection		1
5			Credit 2	Development Density and Community Connectivity		5
		1	Credit 3	Brownfield Redevelopment		1
6			Credit 4.1	Alternative Transportation—Public Transportation Access		6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms		1
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles		3
2			Credit 4.4	Alternative Transportation—Parking Capacity		2
	1		Credit 5.1	Site Development—Protect or Restore Habitat		1
	1		Credit 5.2	Site Development—Maximize Open Space		1
1			Credit 6.1	Stormwater Design—Quantity Control		1
1			Credit 6.2	Stormwater Design—Quality Control		1
1			Credit 7.1	Heat Island Effect—Non-roof		1
1			Credit 7.2	Heat Island Effect—Roof		1
		1	Credit 8	Light Pollution Reduction		1

Water Efficiency — Possible Points: 10

4	4	2		**Water Efficiency**	**Possible Points:**	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction		
2	2		Credit 1	Water Efficient Landscaping		2 to 4
		2	Credit 2	Innovative Wastewater Technologies		2
2	2		Credit 3	Water Use Reduction		2 to 4

Energy and Atmosphere — Possible Points: 35

11	5	19		**Energy and Atmosphere**	**Possible Points:**	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems		
Y			Prereq 2	Minimum Energy Performance		
Y			Prereq 3	Fundamental Refrigerant Management		
4	3	12	Credit 1	Optimize Energy Performance		1 to 19
		7	Credit 2	On-Site Renewable Energy		1 to 7
2			Credit 3	Enhanced Commissioning		2
2			Credit 4	Enhanced Refrigerant Management		2
3			Credit 5	Measurement and Verification		3
	2		Credit 6	Green Power		2

Materials and Resources — Possible Points: 14

4	4	6		**Materials and Resources**	**Possible Points:**	**14**
Y			Prereq 1	Storage and Collection of Recyclables		
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof		1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements		1
2			Credit 2	Construction Waste Management		1 to 2
		2	Credit 3	Materials Reuse		1 to 2

Materials and Resources, Continued

1	1		Credit 4	Recycled Content	1 to 2
1	1		Credit 5	Regional Materials	1 to 2
	1		Credit 6	Rapidly Renewable Materials	1
	1		Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

8	5	2		**Indoor Environmental Quality**	**Possible Points:**	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance		
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control		
1			Credit 1	Outdoor Air Delivery Monitoring		1
		1	Credit 2	Increased Ventilation		1
1			Credit 3.1	Construction IAQ Management Plan—During Construction		1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy		1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants		1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings		1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems		1
	1		Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products		1
	1		Credit 5	Indoor Chemical and Pollutant Source Control		1
1			Credit 6.1	Controllability of Systems—Lighting		1
		1	Credit 6.2	Controllability of Systems—Thermal Comfort		1
1			Credit 7.1	Thermal Comfort—Design		1
	1		Credit 7.2	Thermal Comfort—Verification		1
	1		Credit 8.1	Daylight and Views—Daylight		1
	1		Credit 8.2	Daylight and Views—Views		1

Innovation and Design Process — Possible Points: 6

4	2			**Innovation and Design Process**	**Possible Points:**	**6**
1			Credit 1.1	Exemplary Performance SSc2 Development Density		1
1			Credit 1.2	Exemplary Performance SSc4.1 Public Transportation		1
	1		Credit 1.3	Exemplary Performance MRc2 Construction Waste Management		1
	1		Credit 1.4	Innovation in Design: Green Building Education		1
1			Credit 1.5	Innovation in Design: Green Cleaning Policy/Program		1
1			Credit 2	LEED Accredited Professional		1

Regional Priority Credits — Possible Points: 4

3		1		**Regional Priority Credits**	**Possible Points:**	**4**
		1	Credit 1.1	On-site renewable energy		1
1			Credit 1.2	Stormwater design - quantity control		1
1			Credit 1.3	Heat island effect - nonroof		1
1			Credit 1.4	Heat island effect - roof		1

Y	?	N			
55	23	32	**Total**	**Possible Points:**	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Boston Properties

SUSTAINABILITY PROGRAM INTRODUCTION

- Promote Our Growth And Operations In A Sustainable And Responsible Manner Across Our Five Regions (Boston, NYC, Washington D.C., San Francisco, Los Angeles)

- Focus On The Economic, Social, And Environmental Aspects Of Our Activities
    - Design And Construction Of New Development
    - Operations Of Existing Buildings

[b]responsible

Avoid and Mitigate Risk
Reduce Operating Costs
Protect Asset Value
Improve Resilience
Attract and Retain Tenants
Drive Socially Responsible Investment

When there's a scoreboard, people play differently.

ENERGY STAR® PortfolioManager

ENERNOC

MEASURABL

GRESB

Whole Building Energy and Water Use

Energy Intelligence

Real-time Energy Data
Utility Bill Management
Energy Advisory Services
Demand Response
Energy Procurement

Annual KPIs for Sustainability Reporting

Annual Portfolio ESG Data

15x20 Energy Use Reduction
Reduce energy use intensity, targets a 15% reduction by 2020. Units are kBtu/SF.

20x20 Greenhouse Gas Reduction
Reduce Scope 1 and Scope 2 greenhouse gas emissions intensity, targets a 20% reduction by 2020. Units are $kgCO_2e$/SF.

20x20 Water Use Reduction
Reduce water use intensity, targets a 20% reduction by 2020. Units are gallons/SF.

65x20 Waste Diversion
Increase waste diverted from landfill, targets a 65% diversion rate by 2020. Units are % diverted.

- 16.8 million square feet LEED Certified
- >80% at Gold and Platinum Level
- All new development projects are pursuing LEED certification

- Executive Member of EPA's Certification Nation program
- 63 ENERGY STAR labelled properties – representing 68% of our actively managed portfolio.

- Ranked 2nd among US Office companies in 2016
- Achieved highest "Green Star" last 5 years
- Ranked 36th out of 733 global companies in 2016 (among the top 5% of all participants)

- 2014 Special Recognition – Most Improved Leader in the Light Award
- 2015 Leader in the Light Award Joint Winner


2016
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TRANSPORTATION AND PARKING

Transportation Analysis Methodology

- Existing 2016 conditions (existing traffic volumes)
- Future 2023 No-Build conditions (with background traffic growth & approved projects)
  - Base scheme: I-90 on-ramp open
  - Alternate scheme: I-90 on-ramp closed
- Project trips calculated by each mode
- Vehicular Project trips distributed through roadway network
- Potential Impacts and appropriate mitigation are identified
- Analysis for Transit network is similar

Daily (24 Hour) Project Trips

Base Scheme

	Vehicle (SOV + HOV)	Transit (Train + Bus)	Other (Walk, Bike, Etc.)
Office	1,999	2,998	704
Residential	822	1,246	1,849
Retail	806	1,853	436
Total	3,627 (29%)	6,097 (48%)	2,989 (23%)

Alternate Scheme

	Vehicle (SOV + HOV)	Transit (Train + Bus)	Other (Walk, Bike, Etc.)
Office	2,036	3,054	716
Residential	817	1,241	1,841
Retail	842	1,937	455
Total	3,695 (29%)	6,232 (48%)	3,012 (23%)

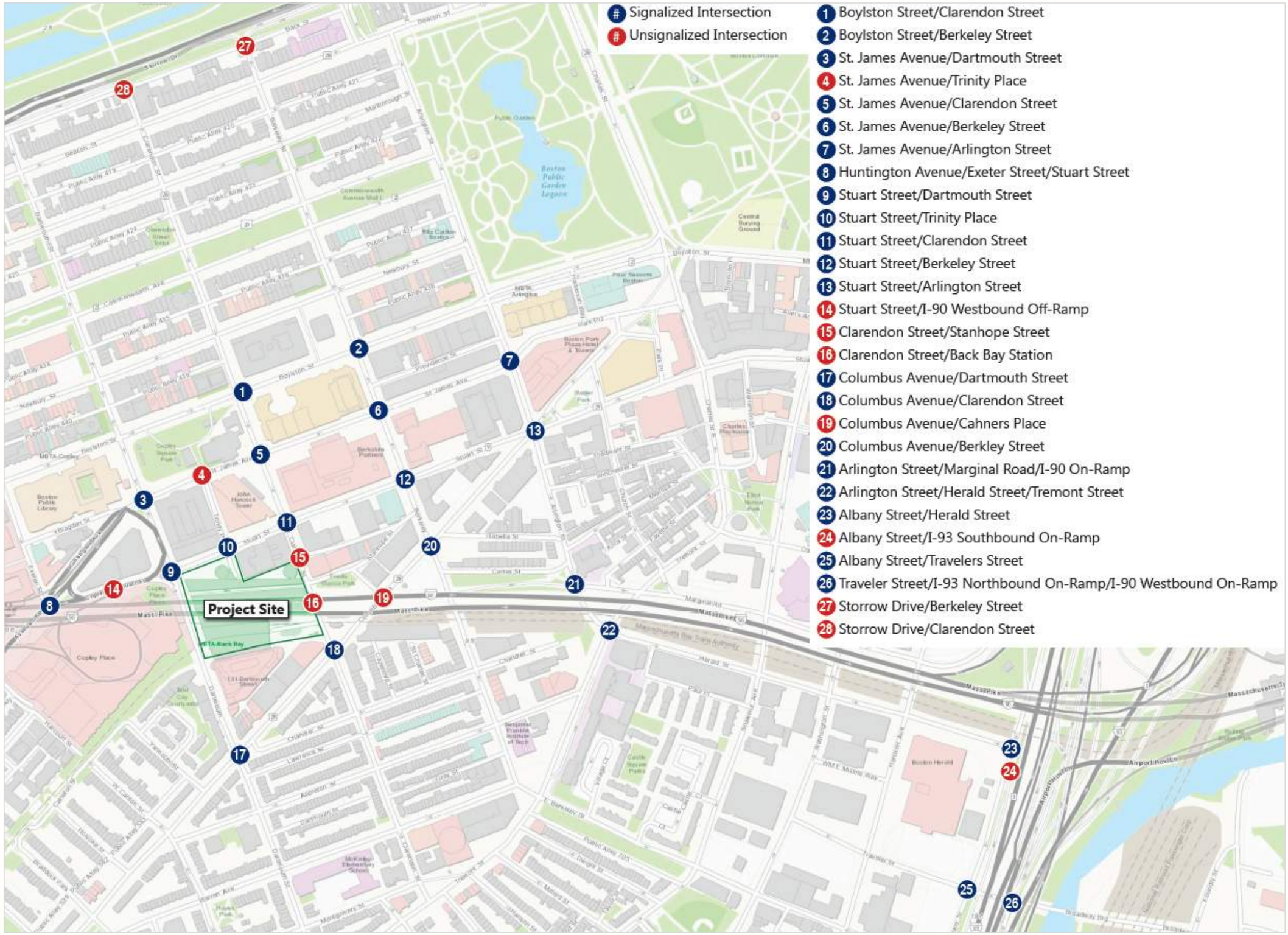
Peak Hour Project Vehicle Trips

Base Scheme

	Morning Peak Hour (8:00 – 9:00 AM)	Evening Peak Hour (5:00 – 6:00 PM)
Office	304	265
Residential	69	68
Retail	14	60
Total	387	373

Alternate Scheme

	Morning Peak Hour (8:00 – 9:00 AM)	Evening Peak Hour (5:00 – 6:00 PM)
Office	310	270
Residential	69	68
Retail	14	44
Total	393	382



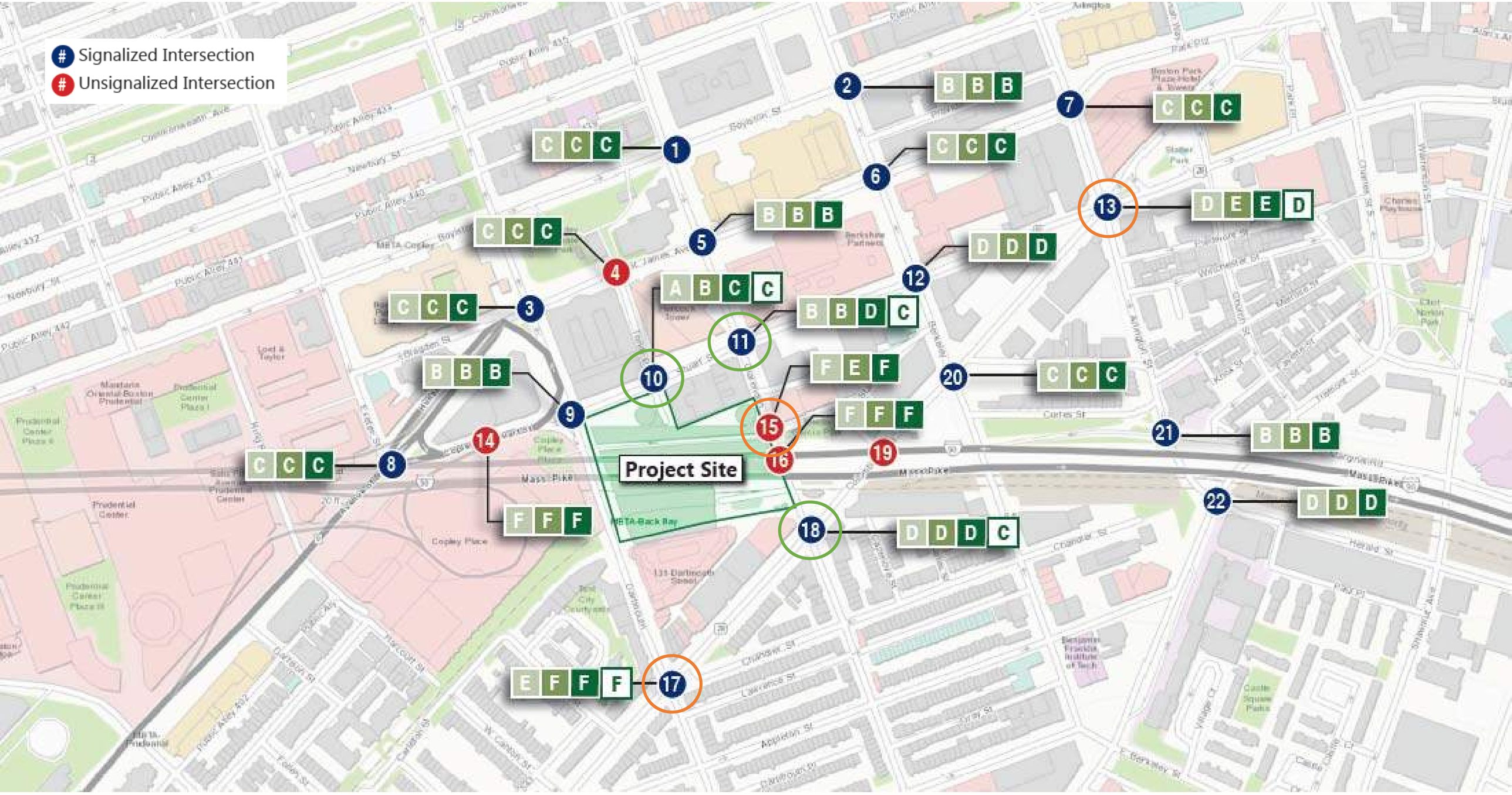
Project Study Area

Intersection Level of Service (LOS) Analysis

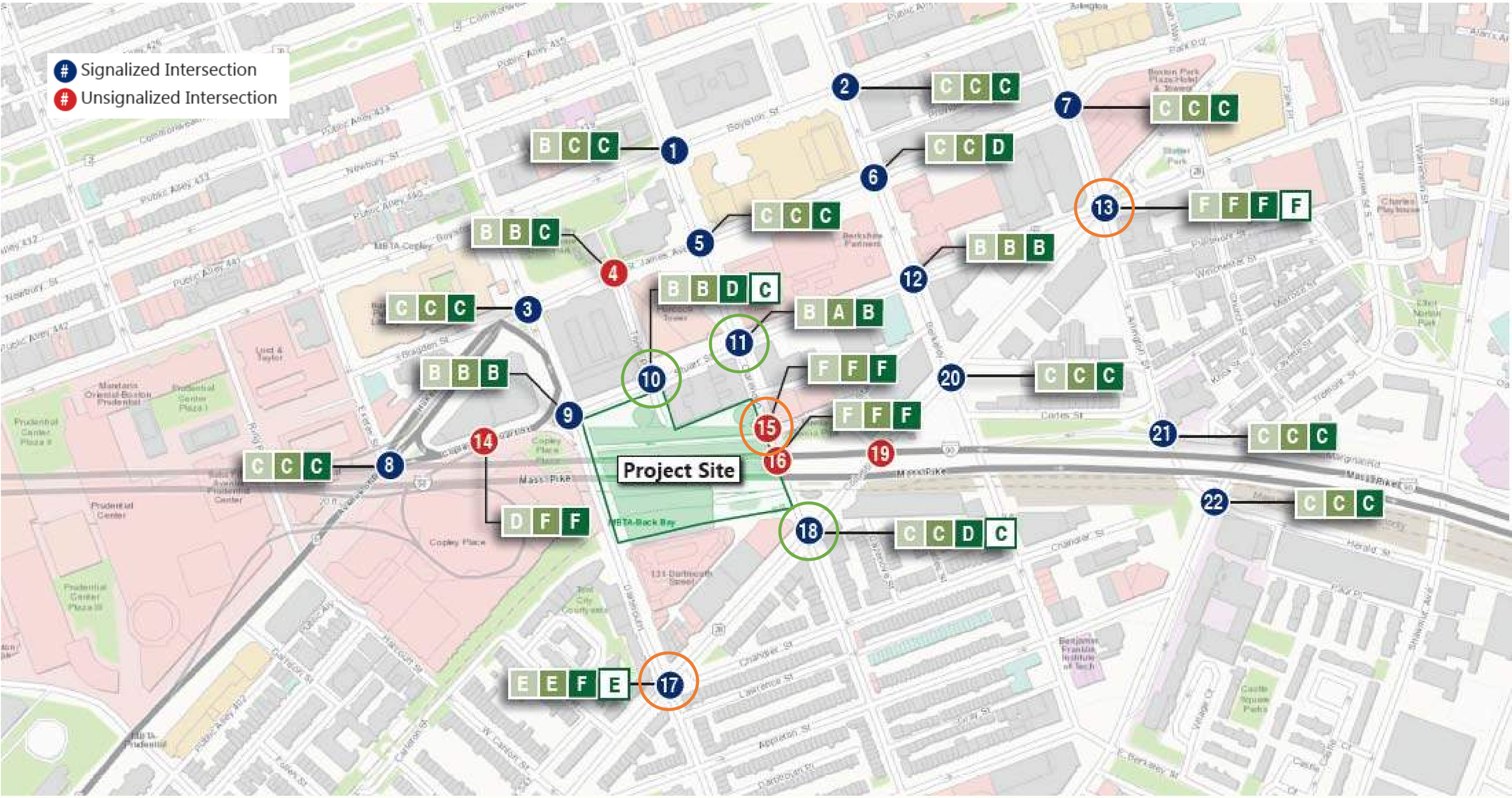
- Level of Service is graded on a scale from LOS A to LOS F
- Level LOS A represents best operations, LOS F represents worst operations
- In an urban area, LOS D or better is considered acceptable
- LOS is reduced below LOS D or remains at LOS E or F at limited locations
  - Base Scheme:
    - This occurs at 3 locations in the AM peak and 2 locations in the PM peak
    - Mitigation/improvements are identified at 5 locations
  - Alternate Scheme:
    - This occurs at 3 locations in the AM peak and 2 locations in the PM peak
    - Mitigation/improvements are identified at 6 locations
- Improvements include roadway layout as well as signal/timing/phasing changes

AM Peak Hour LOS Results – Base Scheme

PM Peak Hour LOS Results – Base Scheme



AM Peak Hour LOS Results – Alternate Scheme



PM Peak Hour LOS Results – Alternate Scheme

Proposed Mitigation

Signal Phasing/Timing

- Stuart St/Arlington St (#13)
- Columbus Ave/Dartmouth St (#17)
- Columbus Ave/Clarendon St (#18)
- Stuart St/Clarendon St (#11)
- Stuart St/Trinity Pl (#10) Alternate Scheme Only

Roadway Modifications

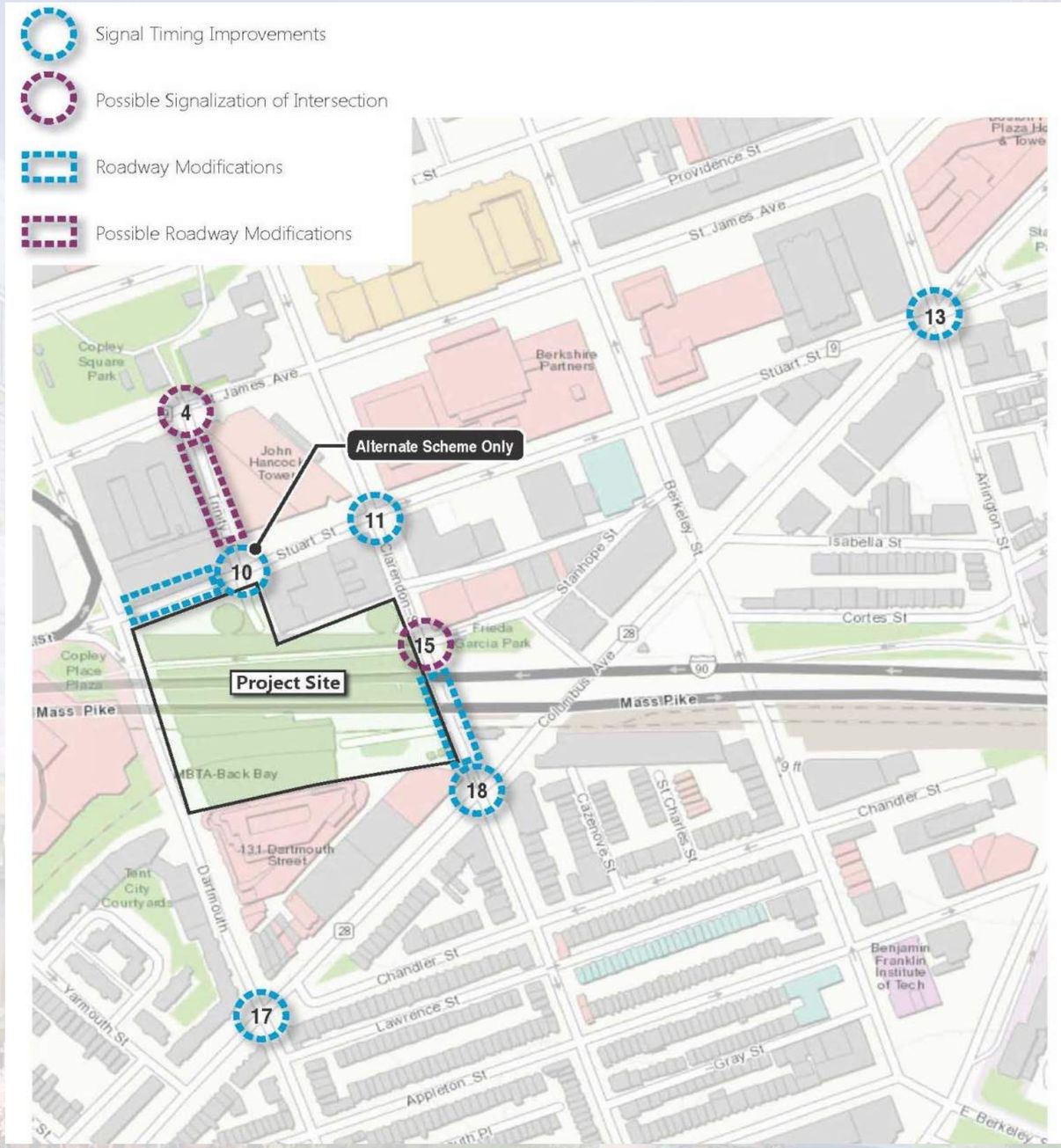
- Stuart Street
- Clarendon Street

Possible Signalization of Intersection

- St. James Street at Trinity Place (#4)
- Clarendon Street at Stanhope Street (#15)

Possible Roadway Modifications

- Trinity Place



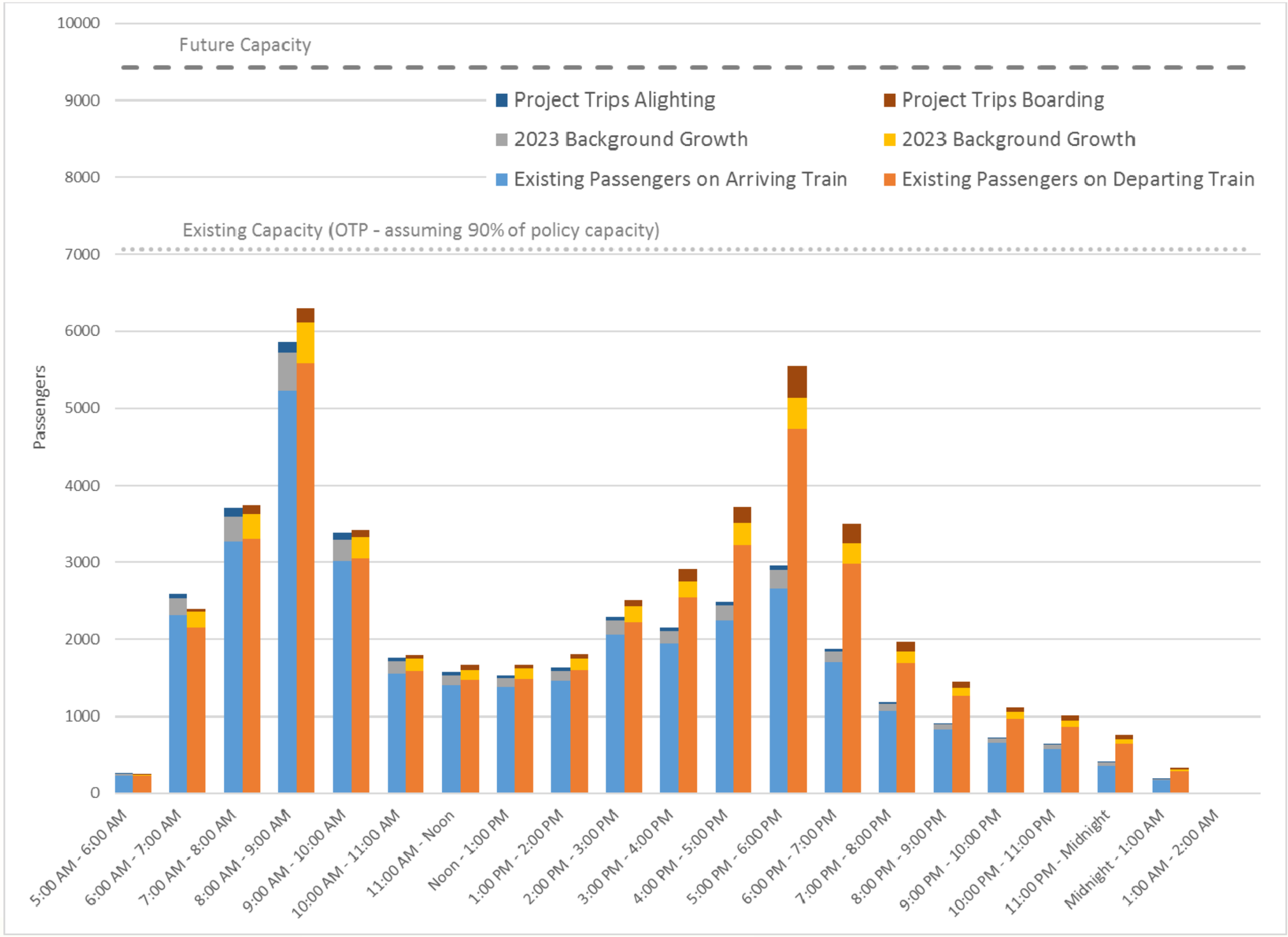
Peak Hour Project Transit Trips

	Morning Peak (8:00 – 9:00 AM)	Evening Peak (5:00 – 6:00 PM)
Office	467	389
Residential	105	103
Retail	31	140
Total	603	632

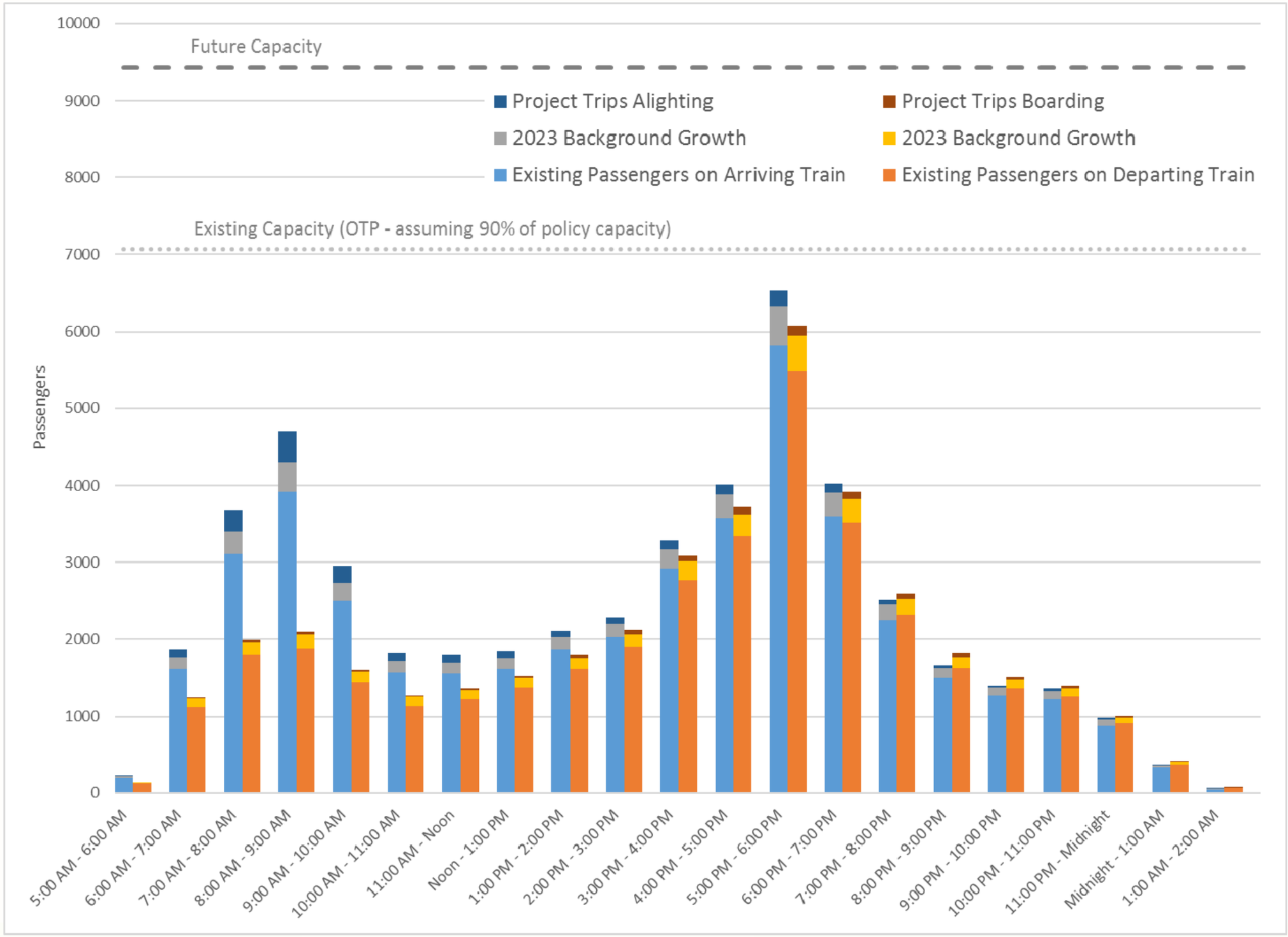
Transit Service	Share	Morning Peak (8:00 – 9:00 AM)	Evening Peak (5:00 – 6:00 PM)
Commuter Rail	24%	142	148
Orange Line	50%	304	320
Green Line	6%	36	36
Bus	20%	121	128

Transit Analysis

- MBTA "Policy Capacity" is based on providing a "safe and comfortable ride"
- "Crush Capacity" includes additional passengers standing in vehicle
- Almost 50% of Project trips will be by transit of which 50% use Orange Line
- Existing capacity analysis conservatively based on "On-Time-Performance" (90% Policy Capacity)
- New Orange Line cars in 2019 will reduce headways from 6 to 4 minutes
- Orange Line capacity will increase substantially before the Project is built
- Orange Line operates well within Policy Capacity for Future No-Build and Build conditions
- No increase in capacity assumed for Commuter Rail and Bus analysis
- Commuter Rail largely operates within capacity for Future No-Build and Build conditions
- Bus services largely operate within capacity for Future No-Build and Build conditions



Weekday Orange Line Inbound Loads at Back Bay Station



Weekday Orange Line Outbound Loads at Back Bay Station

AM Peak Hour Commuter Rail V/C Ratio Analysis

	2016 Existing		2023 No-Build		2023 Build	
	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio
Franklin Line Inbound (to South Station)	0.72	0.44	0.79	0.49	0.80	0.49
Franklin Line Outbound (to Franklin)	0.01	0.03	0.01	0.03	0.01	0.03
Needham Line Inbound (to South Station)	0.56	0.39	0.61	0.43	0.62	0.43
Needham Line Outbound (to Needham)	0.09	0.04	0.10	0.04	0.10	0.04
Providence/Stoughton Line Inbound (to South Station)	0.94	0.52	1.04	0.57	1.05	0.57
Providence/Stoughton Line Outbound (to Providence/Stoughton)	0.17	0.16	0.19	0.18	0.19	0.18
Framingham/Worcester Line Inbound (to South Station)	0.68	0.40	0.75	0.44	0.75	0.44
Framingham/Worcester Line Outbound (to Framingham/Worcester)	0.10	0.18	0.11	0.22	0.11	0.21

PM Peak Hour Commuter Rail V/C Ratio Analysis

	2016 Existing		2023 No-Build		2023 Build	
	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio
Franklin Line Inbound (to South Station)	0.04	0.03	0.05	0.03	0.05	0.03
Franklin Line Outbound (to Franklin)	0.40	0.62	0.44	0.67	0.44	0.68
Needham Line Inbound (to South Station)	0.04	0.04	0.04	0.04	0.04	0.04
Needham Line Outbound (to Needham)	0.77	1.14	0.83	1.24	0.84	1.24
Providence/Stoughton Line Inbound (to South Station)	0.06	0.04	0.06	0.04	0.07	0.04
Providence/Stoughton Line Outbound (to Providence/Stoughton)	0.58	0.91	0.63	0.99	0.63	1.00
Framingham/Worcester Line Inbound (to South Station)	0.15	0.11	0.16	0.12	0.17	0.12
Framingham/Worcester Line Outbound (to Framingham/Worcester)	0.33	0.50	0.36	0.54	0.36	0.55

AM Peak Hour Bus V/C Ratio Analysis

	2016 Existing		2023 No-Build		2023 Build	
	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio
Bus 9 Inbound	0.51	0.35	0.67	0.46	0.72	0.46
Bus 9 Outbound	0.25	0.30	0.32	0.40	0.32	0.42
Bus 10 Inbound	0.33	0.20	0.33	0.20	0.35	0.20
Bus 10 Outbound	0.25	0.50	0.26	0.51	0.26	0.51
Bus 39 Inbound	0.06	-	0.07	-	0.08	-
Bus 39 Outbound	-	0.16	-	0.17	-	0.17
Bus 55 Inbound	-	-	-	-	-	-
Bus 55 Outbound	0.29	0.31	0.29	0.31	0.30	0.31
Express Bus 170 Inbound	-	-	-	-	-	-
Express Bus 170 Outbound	0.11	0.20	0.12	0.22	0.19	0.24
Express Bus 502 Inbound	0.38	0.02	0.43	0.02	0.46	0.02
Express Bus 502 Outbound	0.19	0.16	0.22	0.18	0.22	0.19
Express Bus 503 Inbound	0.56	0.13	0.74	0.18	0.88	0.18
Express Bus 503 Outbound	0.06	0.13	0.07	0.17	0.77	0.23

PM Peak Hour Bus V/C Ratio Analysis

	2016 Existing		2023 No-Build		2023 Build	
	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio	Entering V/C Ratio	Exiting V/C Ratio
Bus 9 Inbound	0.15	0.08	0.18	0.10	0.20	0.10
Bus 9 Outbound	0.18	0.54	0.22	0.66	0.22	0.69
Bus 10 Inbound	0.46	0.24	0.53	0.27	0.56	0.27
Bus 10 Outbound	0.29	0.40	0.33	0.46	0.33	0.52
Bus 39 Inbound	0.07	-	0.08	-	0.08	-
Bus 39 Outbound	-	0.05	-	0.06	-	0.07
Bus 55 Inbound	-	-	-	-	-	-
Bus 55 Outbound	0.31	0.42	0.39	0.52	0.44	0.66
Express Bus 170 Inbound	0.23	0.05	0.27	0.06	0.31	0.15
Express Bus 170 Outbound	-	-	-	-	-	-
Express Bus 502 Inbound	0.21	0.04	0.26	0.05	0.28	0.05
Express Bus 502 Outbound	0.04	0.59	0.05	0.73	0.05	0.78
Express Bus 503 Inbound	0.04	-	0.05	-	0.12	-
Express Bus 503 Outbound	0.07	0.70	0.10	0.93	0.10	1.11

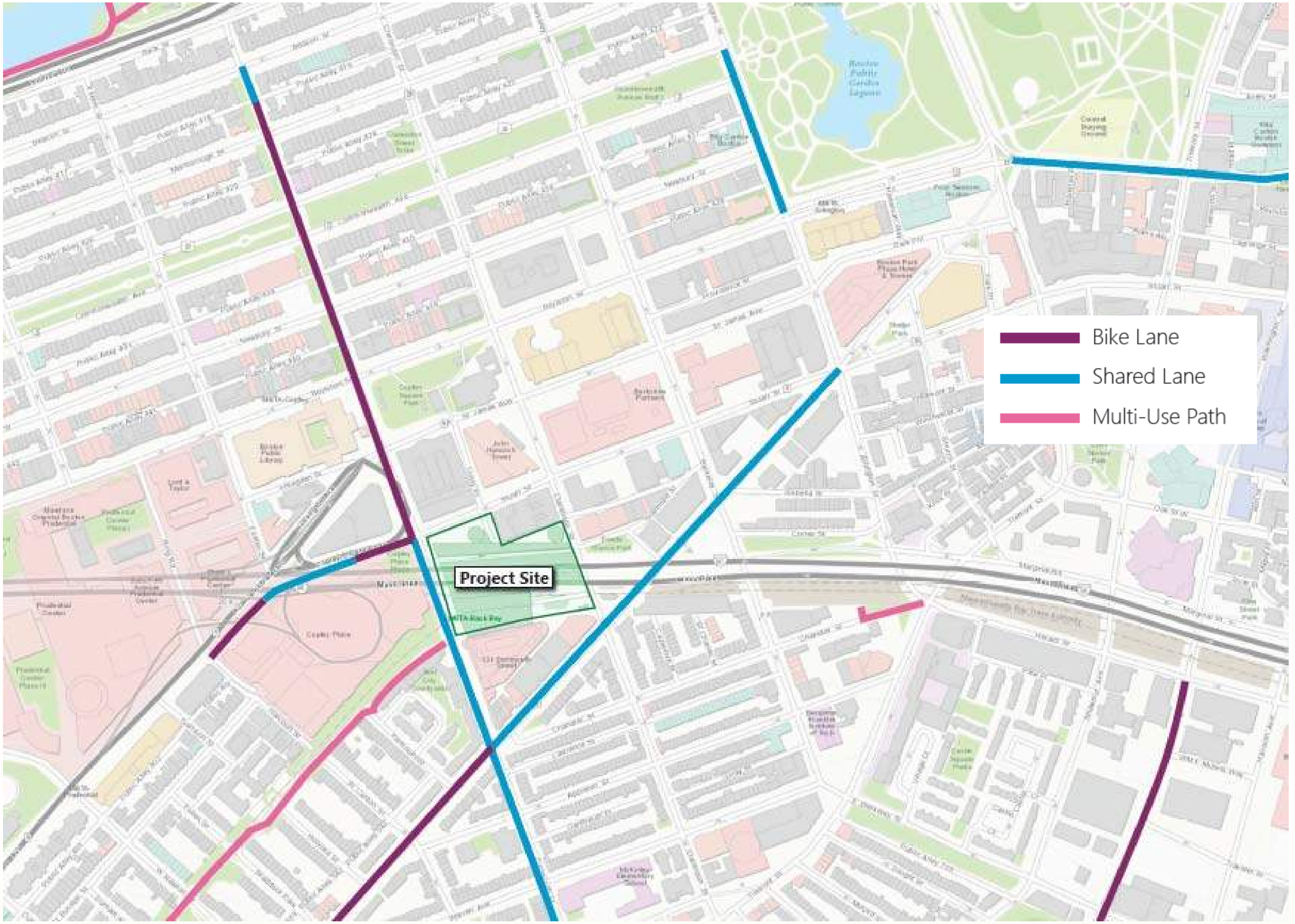
Project Parking Ratios

Existing garage average daily occupancy is 78%

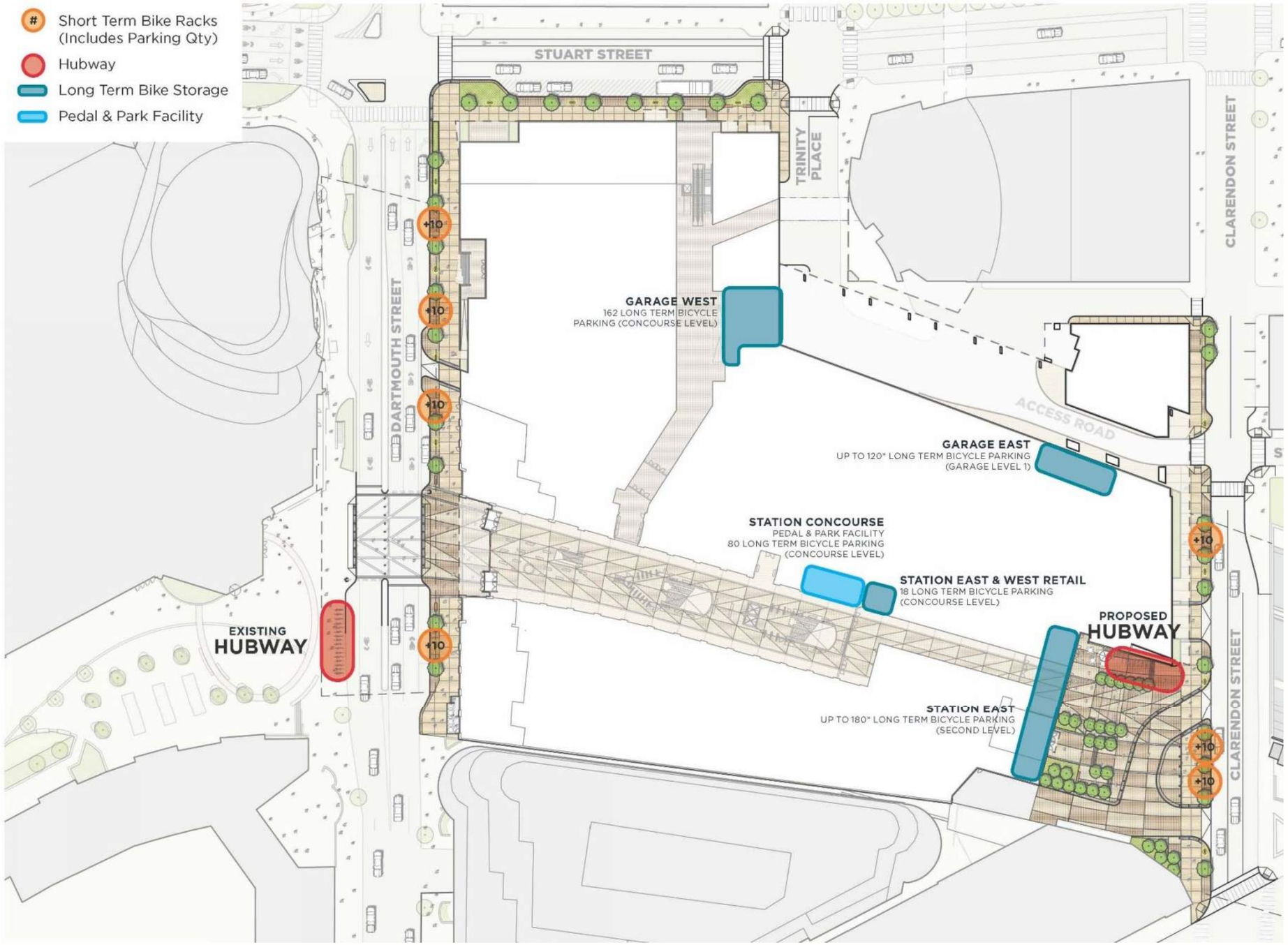
Parking ratios are based on other Downtown Boston mixed-use and TOD projects

* Shared parking between residential and office users

Lane Use	Size	Parking Ratio	Parking Spaces
Office	582,600 SF	0.4	233
Residential	600 units	0.4	180 *
Retail	58,900 SF	0.4	24
Project Sub-total			437
Existing commitments			992
Permitted public parking			Up to 576
Total			Up to 2,013



Existing Bicycle Network



- Garage West
  - 162 Long Term Spaces
  - 30 Short Term Spaces
- Garage East
  - 120 Long Term Spaces
  - 10 Short Term Spaces
- Station East
  - 180 Long Term Spaces
  - 10 Short Term Spaces
- Station West
  - 18 Long Term Spaces
  - 20 Short Term Spaces

Proposed Bicycle Parking

Transportation Demand Management (TDM)

- Preferential parking for carpools/vanpools
- Short term bicycle parking near lobbies
- Hubway station delivered with Station East Parcel
- Covered and secure bicycle parking for residents and employees with each Parcel
- Join A Better City (ABC) TMA to access its alternate transportation programs
- On-site Transportation Coordinator for City, local TMA and tenants/residents
- Provide transit maps, schedules, commuting options, etc.
- On-site transportation events
- Monitoring program
- Construction Management Plan (CMP)
- Transportation Access Plan Agreement (TAPA)

NEXT STEPS + CONTACT INFORMATION

- CAC Meeting #10 • March 29, 2017
- Public Meeting • Week of April 03, 2017
- MEPA DEIR Comment Period Closes • ~~March 10~~ April 18, 2017
- BPDA DPIR Comment Period Closes • April 18, 2017

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Q&A

THANK YOU!