

bxp Boston Properties

Pelli Clarke Pelli Architects

ARROWSTREET

OJB THE OFFICE OF JAMES BURNETT
LANDSCAPE ARCHITECTURE

MAGNUSSON KLEMENCIC ASSOCIATES

WSP | PARSONS BRINCKERHOFF

McNAMARA · SALVIA

BRIA

AHA CONSULTING ENGINEERS

vhb

ARUP

HALEY ALDRICH

RWDI
CONSULTING ENGINEERS & SCIENTISTS

JENSEN HUGHES

Nutter

THE BACK BAY SOUTH END GATEWAY PROJECT

BOSTON, MASSACHUSETTS

SEPTEMBER 18, 2017

CAC #13



AGENDA

- Introductions
- Affordable Housing
- Project Evolution Since DPIR
- Additional Shadow And Wind Analysis
 - Impact Studies
- CAC Comments
- Public Comments
- Next Steps

PROJECT PROCESS

- MEPA Review
 - ENF (Environmental Notification Form) COMPLETE
 - DEIR (Draft Environmental Impact Report) COMPLETE
 - FEIR (Final Environmental Impact Report) COMPLETE
- Article 80 Review
 - PNF (Project Notification Form) COMPLETE
 - DPIR (Draft Project Impact Report) COMPLETE
 - **SID (Supplemental Information Document)**
 - **PDA Amendment**
 - **45 Day Comment Period**

PUBLIC PARTICIPATION PROCESS

- **LOI Filing • December 29, 2015**
- **PNF Filing • March 29, 2016**
- Regen Sustainability Charrette • April 13, 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 Full Commission • June 07, 2016
- IGBC Presentation • June 15, 2016
- NABB Presentation • June 15, 2016
- **CAC #4 • June 15, 2016**
- PNF/ENF Comment Period Closes • June 17, 2016
- **CAC #5 • June 29, 2016**
- **CAC #6 • July 13, 2016**
- A Better City Presentation • July 19
- BPDA Scoping Determination • August 30, 2016
- **Back Bay Station Public Mtg • September 26, 2016**
- **CAC #7 • October 6, 2016**
- **DPIR/DEIR Filing • January 31, 2017**
- **CAC #8 • February 23, 2017**
- Disability Commission • February 27, 2017
- **Public Meeting • March 01, 2017**
- BPDA Urban Design • March 07, 2017
- Back Bay Association • March 09, 2017
- **CAC #9 • March 13, 2017**
- Boston Public Library • March 22, 2017
- Bay Village Neighborhood Association • March 27, 2017
- Ellis South End • March 28, 2017
- **CAC #10 • March 29, 2017**
- **Public Meeting • April 04, 2017**
- New Old South Church • April 05, 2017
- Trinity Church • April 06, 2017
- Greater Boston Convention Center and Visitors Bureau • April 06, 2017
- NABB Presentation • April 06, 2017
- **CAC #11 • April 06, 2017**
- BCDC Subcommittee Meeting • April 11, 2017
- Tent City Presentation • April 12, 2017
- **CAC #12 • April 13, 2017**
- DPIR/DEIR Comment Period Closes • April 18, 2017
- **Back Bay Station Public Meeting • May 3, 2017**
- Fairmount Copley Plaza • May 04, 2017
- Boston Preservation Alliance • May 23, 2017
- WalkBoston • May 25, 2017
- New Old South Church • May 26, 2017
- BCDC Subcommittee Meeting • May 30, 2017
- BCDC Subcommittee Meeting • June 13, 2017
- MEPA FEIR Filing • June 30, 2017
- **BPDA Supplementary Information Document Filing • August 18, 2017**
- MEPA Certificate • August 18, 2017
- **Public Meeting • September 13, 2017**
- **CAC #13 • September 18, 2017**
- BPDA Comment Period Closes • October 2, 2017

PROJECT EVOLUTION SINCE DPIR

- *Station Addition Reduced To One Level*
- *Addition Of 11,000 SF Public Plaza Along Clarendon Street*
- Phasing/Scope Of Public Realm Improvements
 - Sidewalk Under Garage & Crosswalk At Stanhope Street: Either Garage East or Station East
 - If Station East Delivered Before Garage West, Outdoor Lift And Accessibility Improvements
 - Clarendon Street Orange Line Headhouse Sidewalk Improvements
 - Additional Offsite Hubway Delivered With Garage West
- Sidewalk Dimensions
 - Dartmouth Street From 21.5' To 23.5'
 - Stuart Street From 17.5' To 18.5'
- Stuart Street Pedestrian Bridge Postponed
- Through Block Connector Refinements - Stuart Street
- Through Block Connector Refinements - Clarendon Street
- *Back Bay Station Restroom Renovation Is Complete*
- *IMR Has Been Submitted By MDOT To FHWA On 8/31/2017*
- *MBTA Phase 1 Ventilation Project Scheduled To Start Q1 2018*

AFFORDABLE HOUSING



INCLUSIONARY DEVELOPMENT PROGRAM (IDP)

- May Be Satisfied In One Of Three Ways:
 - Units On-Site
 - Units Off-Site
 - Payment-In-Lieu
- A Combination Of The Above Methods May Also Be Used
- Back Bay South End Gateway Project Is Subject To The 2010 IDP Policy

ON-SITE CREATION

- 13% Of Total Units To Be Affordable
(Equivalent To 15% Of Market Rate *Units*)

Example: 100 Unit Building
13 Affordable Units
87 Market Rate Units
(13/87 = 15%)

OFF-SITE CREATION OR PAYMENT IN LIEU

- 15% Of Market Rate Units To Be Affordable

Example: 100 Unit Building (*With Off-Site Creation*)

100 Market Rate Units On Site

15 Affordable Units Off-Site (15% Of 100)

$15 - 13 = 2$ Additional Affordable Units

$115 - 100 = 15$ Additional Total Units (Including *Affordable*)

	On-Site	Off-Site	Benefit To Off-Site Creation
TOTAL UNITS	100	115	+15
Affordable Units	13	15	+2

BACK BAY SOUTH END GATEWAY PROJECT ON-SITE CREATION

Garage East

Station East

TOTAL

240 Total Units

360 Total Units

600 Total Units

@13%

31 Affordable Units

47 Affordable Units

78 Affordable Units

209 Market Rate

313 Market Rate

522 Market Rate

BACK BAY SOUTH END GATEWAY PROJECT OFF-SITE CREATION OR PAYMENT IN LIEU

Garage East	Station East	TOTAL
240 Total Units	360 Total Units	690 Total Units
36 Affordable Units	54 Affordable Units	90 Affordable Units
240 Market Rate	360 Market Rate	600 Market Rate

@15%

90 - 78 = 12 Additional Affordable Units
 690 - 600 = 90 Additional Total Units (Including *Affordable*)

	On-Site	Off-Site	Benefit To Off-Site Creation
TOTAL UNITS	600	690	+90
Affordable Units	72	90	+12



BEACON HILL

DOWNTOWN

BACK BAY

LEATHER DISTRICT

BAY VILLAGE

CHINATOWN

EAST FENS

SOUTH END

3/4 MILE RADIUS

ROXBURY

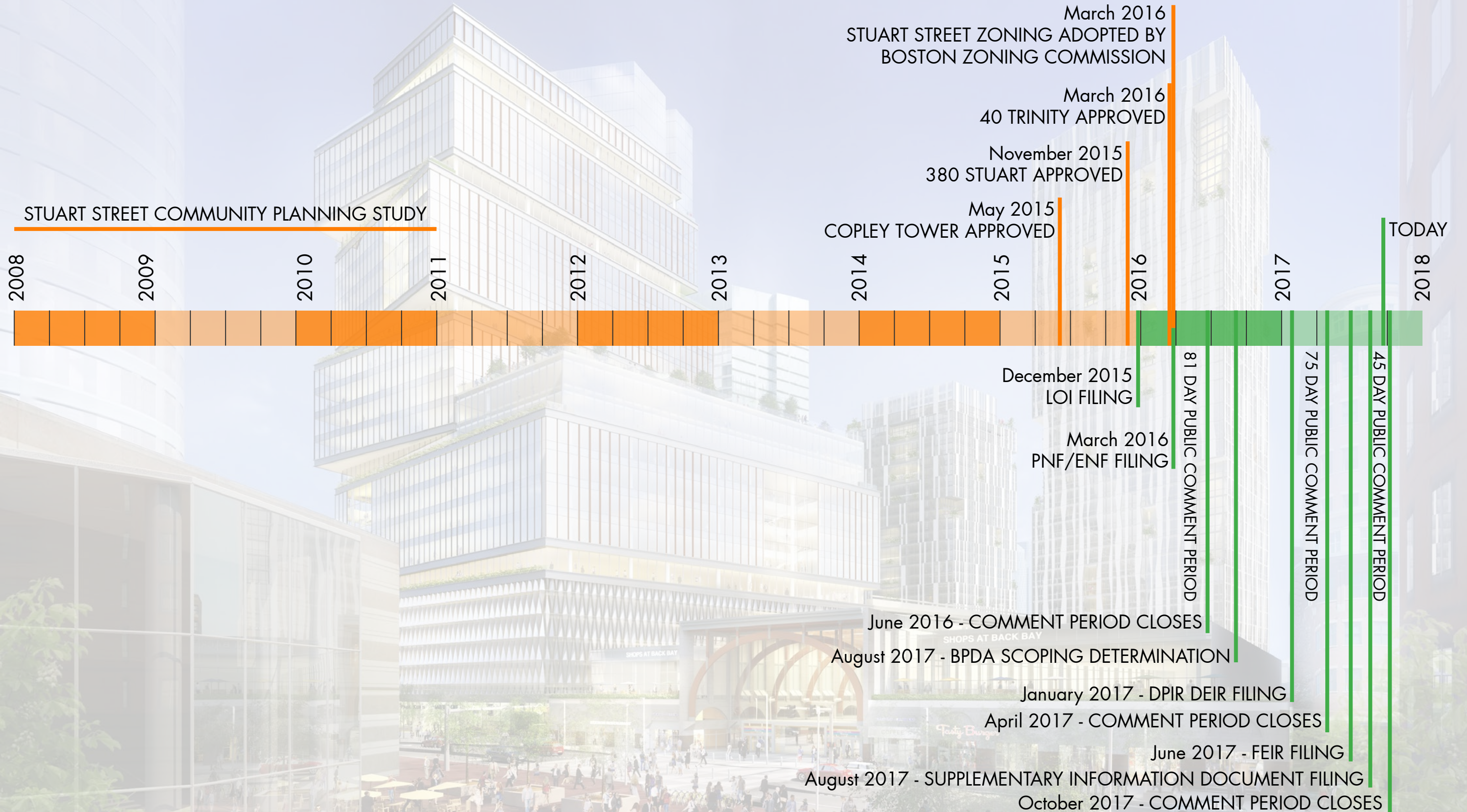
BACK BAY SOUTH END GATEWAY PROJECT EXTRAORDINARY PUBLIC BENEFITS

- \$37M Station Renovation
- Custodianship Of Station For 99 Years
- Additional Approx. \$35M In Public Infrastructure
 - New Station Entrances
 - New Through-Block Connectors
 - New Public Plaza
 - New Redundant Elevators
 - Public Realm And Other Transit Improvements



AERIAL LOOKING TO THE NORTHEAST - FUTURE EXISTING CONDITION

TIMELINE



Stuart Street Planning Study - Proposed Development Options

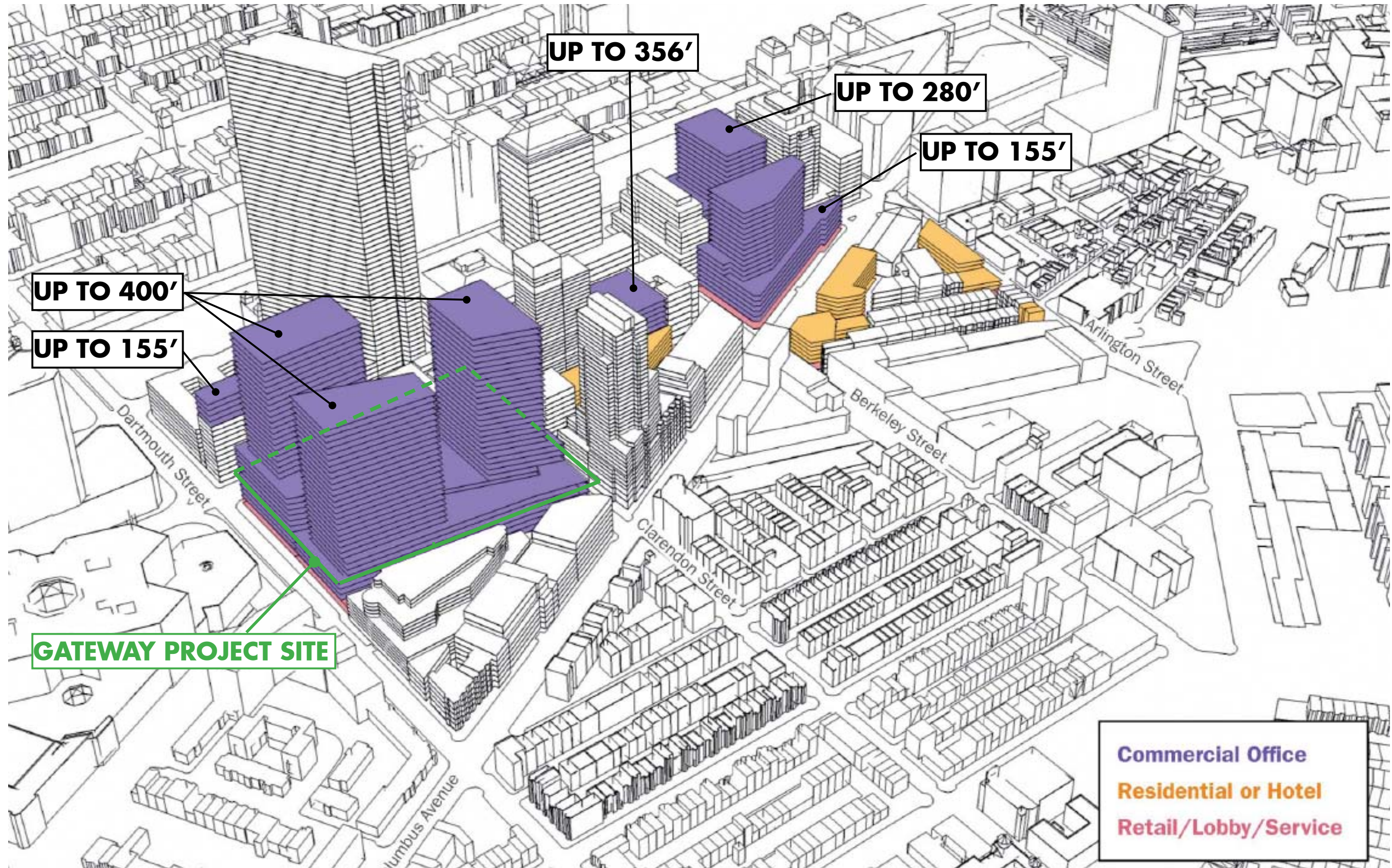


Image Source: Boston Redevelopment Authority, Stuart Street Planning Study Presentation September 21, 2015. Height references from BPDA CAC Presentation March 29, 2017

Stuart Street Planning Study - Proposed Development Options

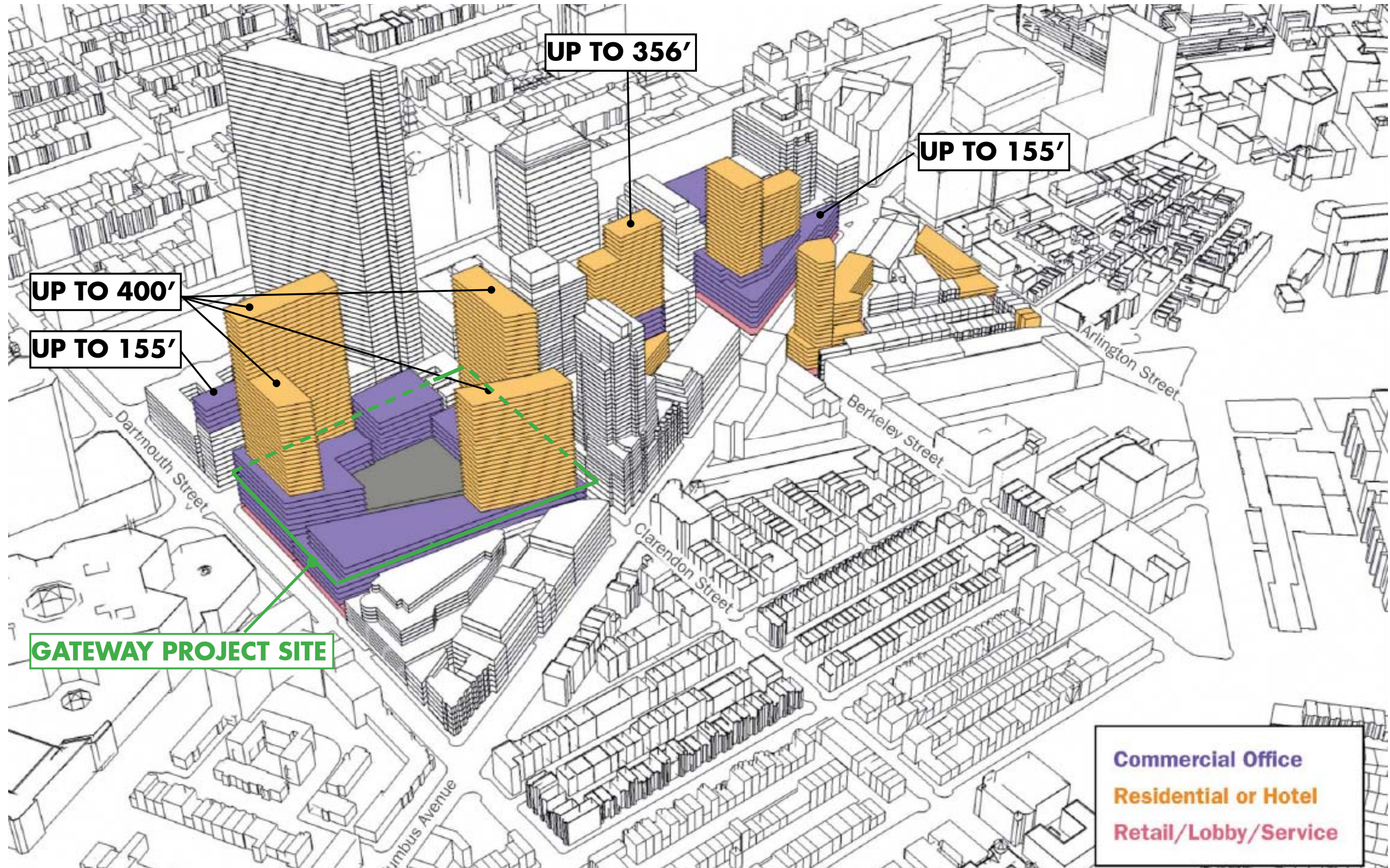
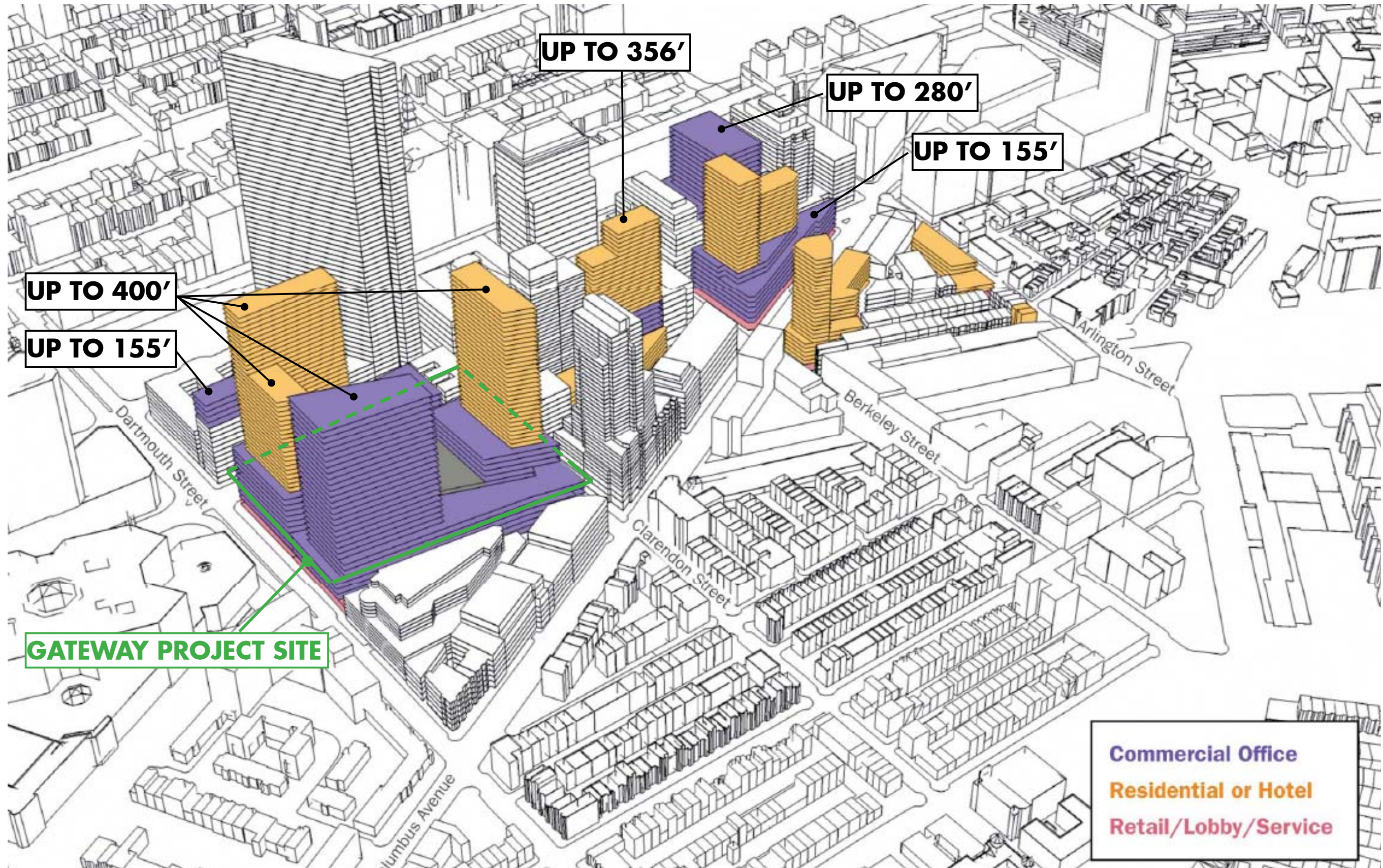


Image Source: Boston Redevelopment Authority, Stuart Street Planning Study Presentation September 21, 2015. Height references from BPDA CAC Presentation March 29, 2017

Stuart Street Planning Study - Proposed Development Options



Commercial Office
Residential or Hotel
Retail/Lobby/Service

Image Source: Boston Redevelopment Authority, Stuart Street Planning Study Presentation September 21, 2015. Height references from BPDA CAC Presentation March 29, 2017

Stuart Street Planning Study - December 21st Shadow Study - 9:00am

(Based on Conceptual Buildings ranging from 300' to 400' in Height)

- Existing Shadow
- New Shadow



- #1 New Old South Church
- #2 Boston Public Library (McKim Building)
- #3
- #4 Trinity Church
- #5
- #6
- #7 YWCA Building
- #8 Youth's Companion Building

Image Source: Boston Redevelopment Authority, Stuart Street Planning Study Presentation December 22, 2009

Stuart Street Planning Study - December 21st Shadow Study - 12:00pm

(Based on Conceptual Buildings ranging from 300' to 400' in Height)

- Existing Shadow
- New Shadow



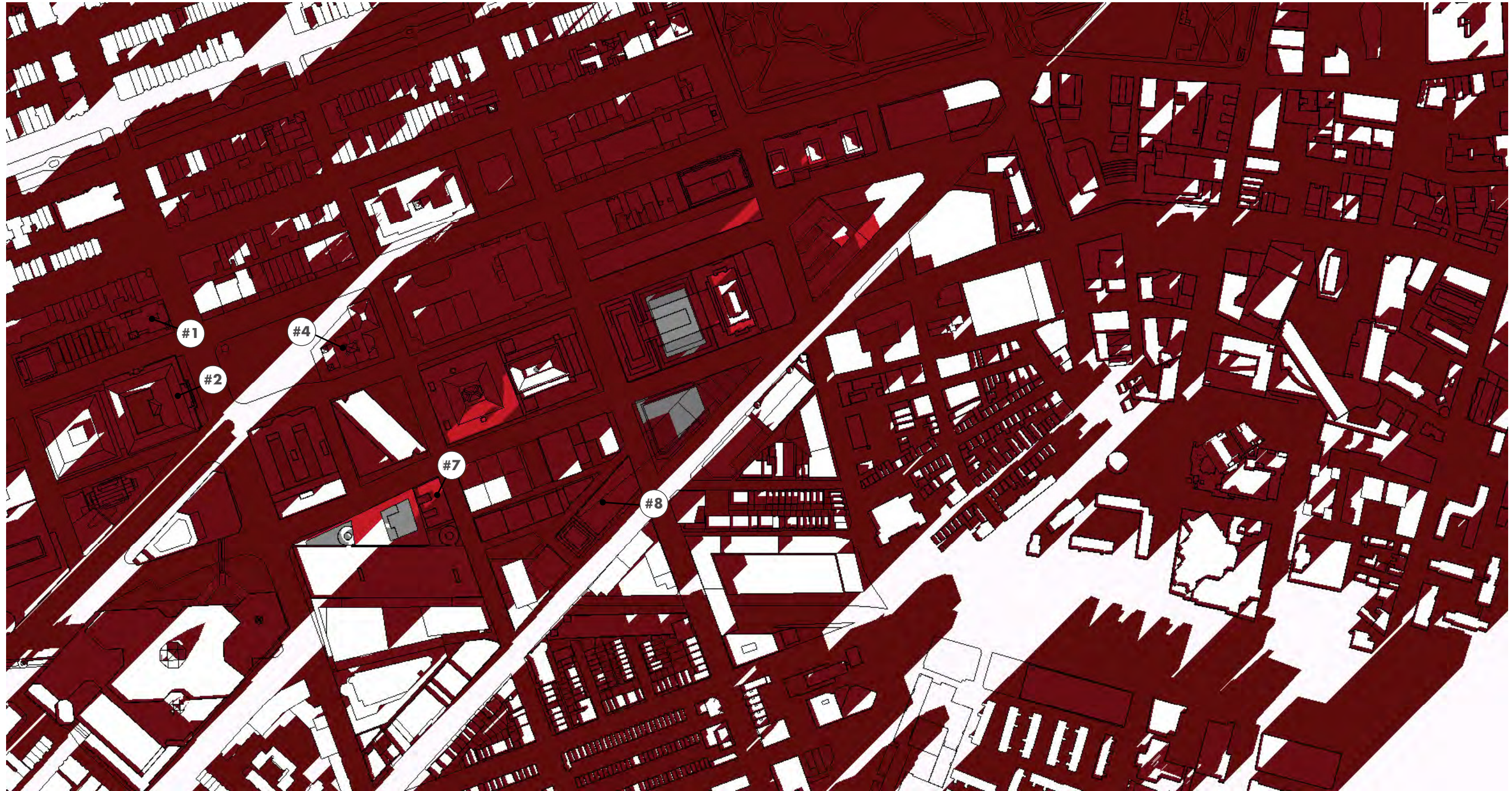
- #1 New Old South Church
- #2 Boston Public Library (McKim Building)
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- #8 Youth's Companion Building

Image Source: Boston Redevelopment Authority, Stuart Street Planning Study Presentation December 22, 2009

Stuart Street Planning Study - December 21st Shadow Study - 3:00pm

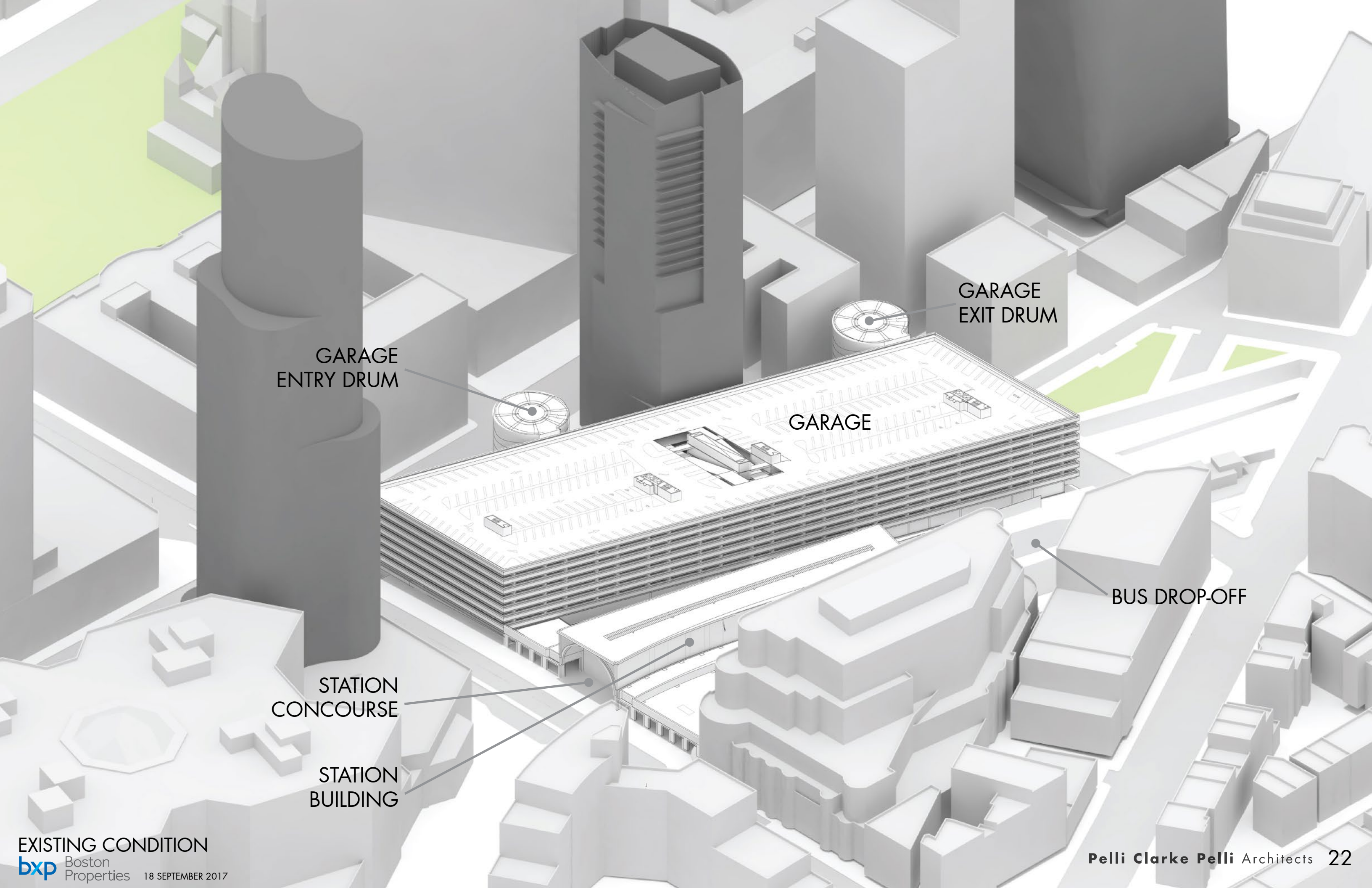
(Based on Conceptual Buildings ranging from 300' to 400' in Height)

- Existing Shadow
- New Shadow



- #1 New Old South Church
- #2 Boston Public Library (McKim Building)
- #3 Trinity Church
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- #7 YWCA Building
- #8 Youth's Companion Building

Image Source: Boston Redevelopment Authority, Stuart Street Planning Study Presentation December 22, 2009



GARAGE
ENTRY DRUM

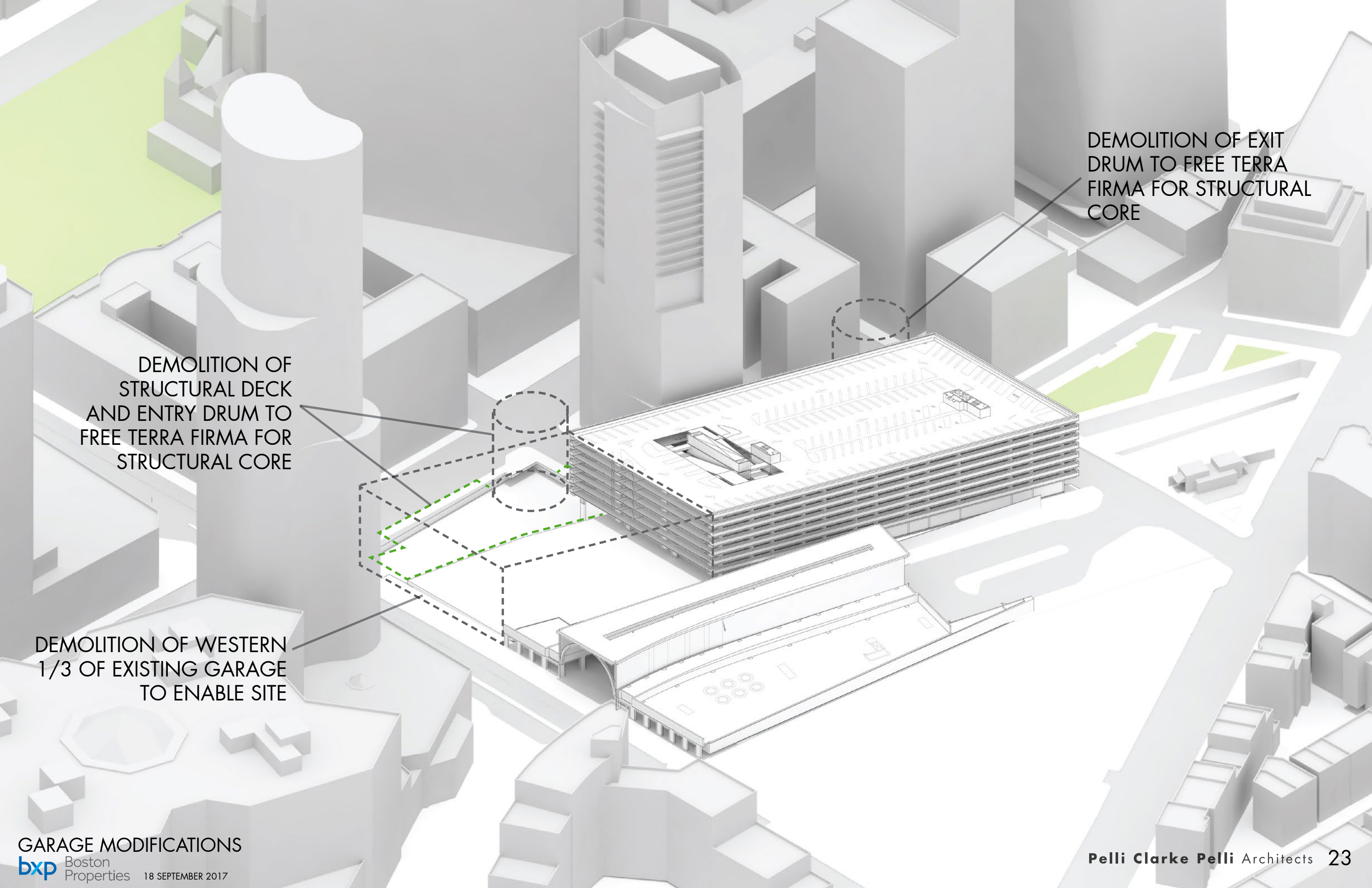
GARAGE
EXIT DRUM

GARAGE

BUS DROP-OFF

STATION
CONCOURSE

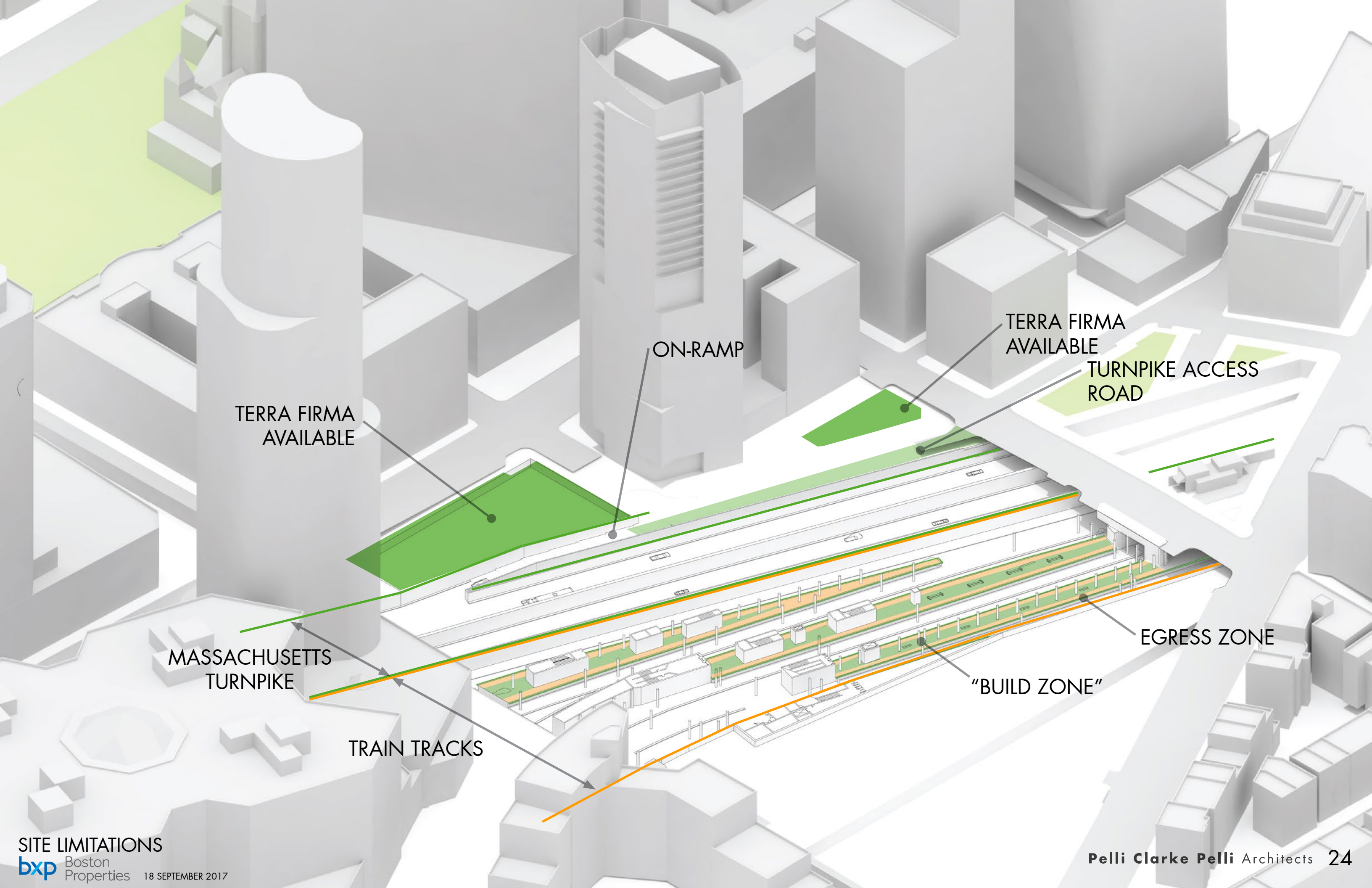
STATION
BUILDING



DEMOLITION OF EXIT
DRUM TO FREE TERRA
FIRMA FOR STRUCTURAL
CORE

DEMOLITION OF
STRUCTURAL DECK
AND ENTRY DRUM TO
FREE TERRA FIRMA FOR
STRUCTURAL CORE

DEMOLITION OF WESTERN
1/3 OF EXISTING GARAGE
TO ENABLE SITE



TERRA FIRMA AVAILABLE

ON-RAMP

TERRA FIRMA AVAILABLE

TURNPIKE ACCESS ROAD

MASSACHUSETTS TURNPIKE

TRAIN TRACKS

"BUILD ZONE"

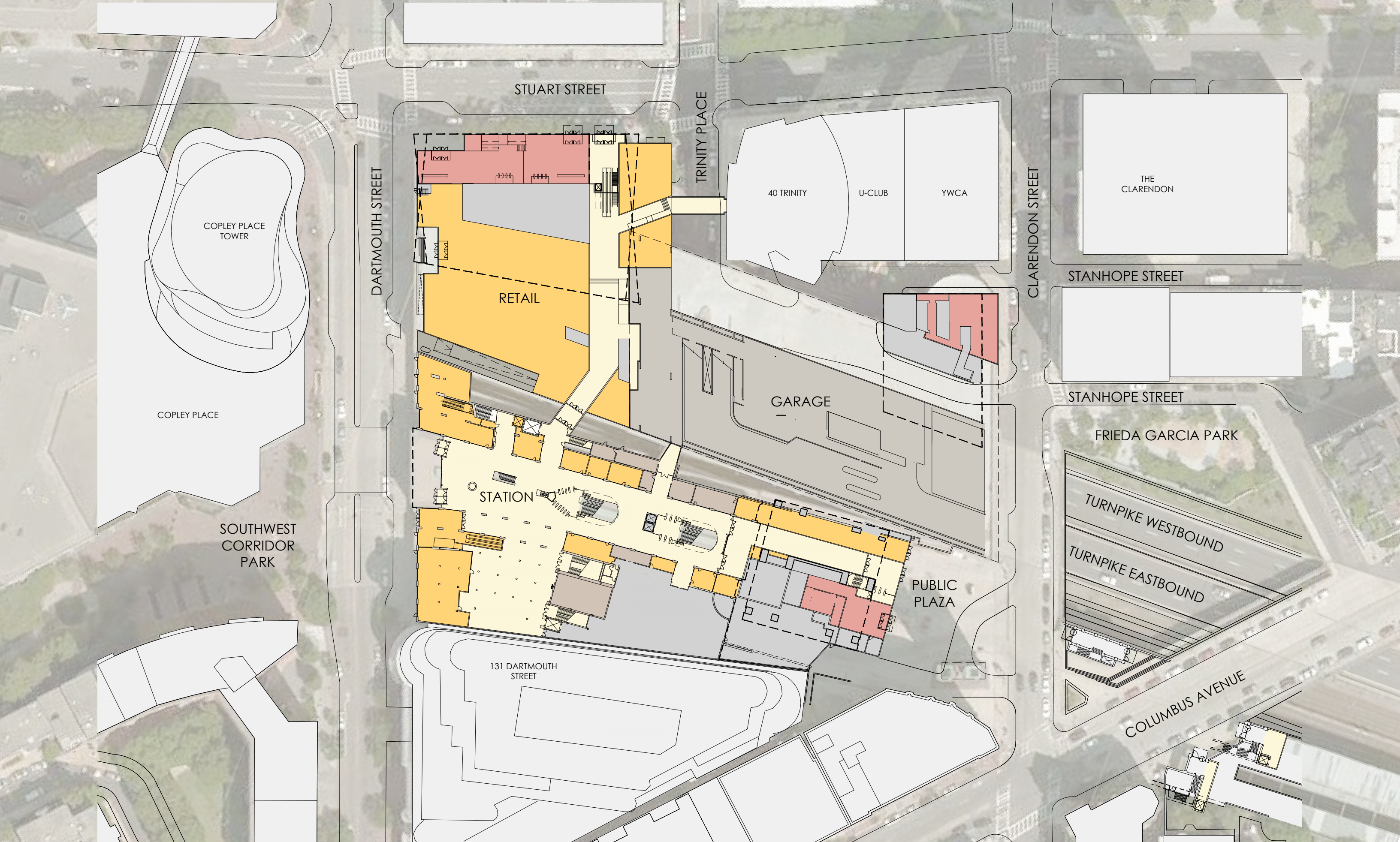
EGRESS ZONE



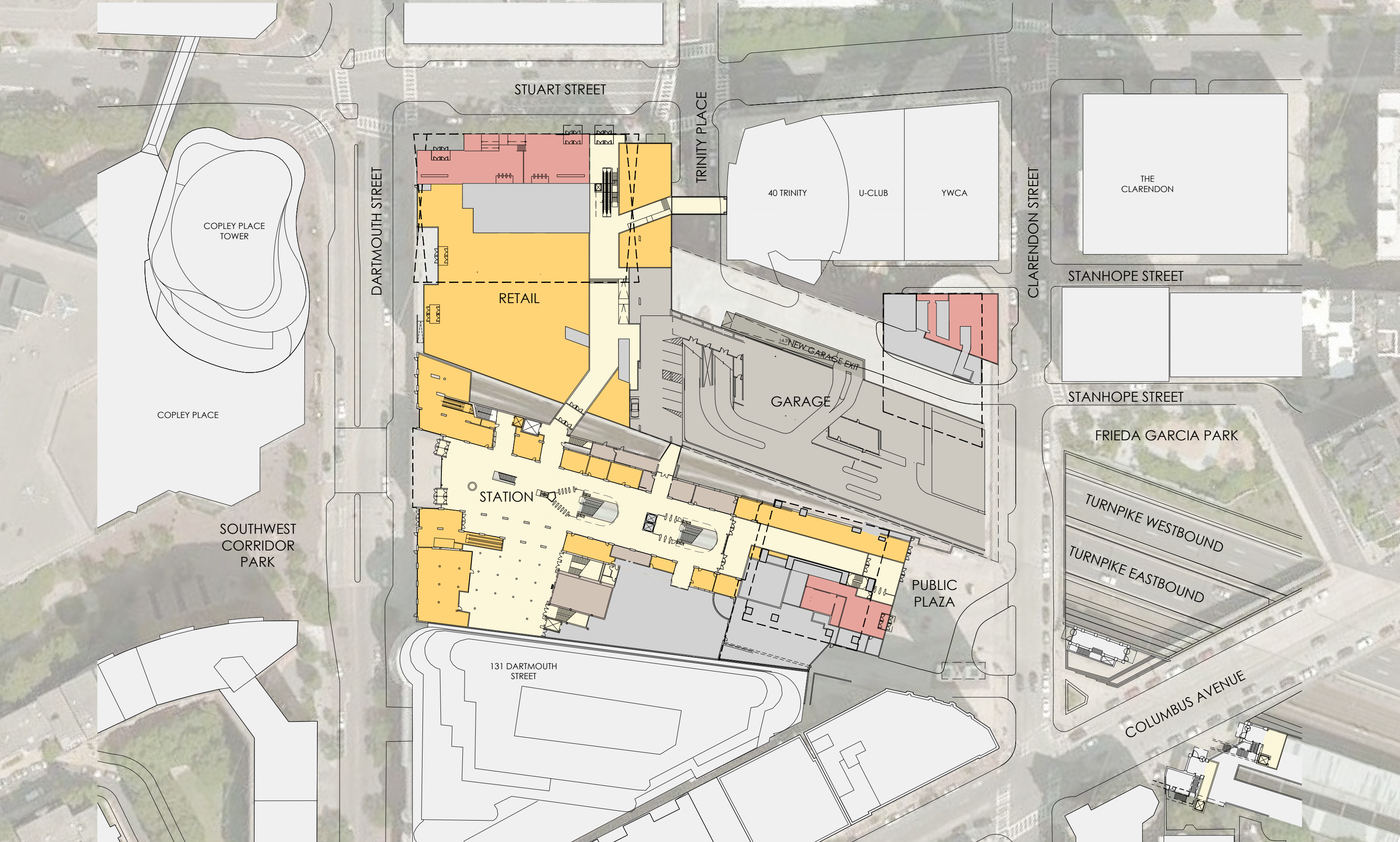
AERIAL LOOKING TO THE NORTHEAST - FUTURE PROPOSED BASE SCHEME



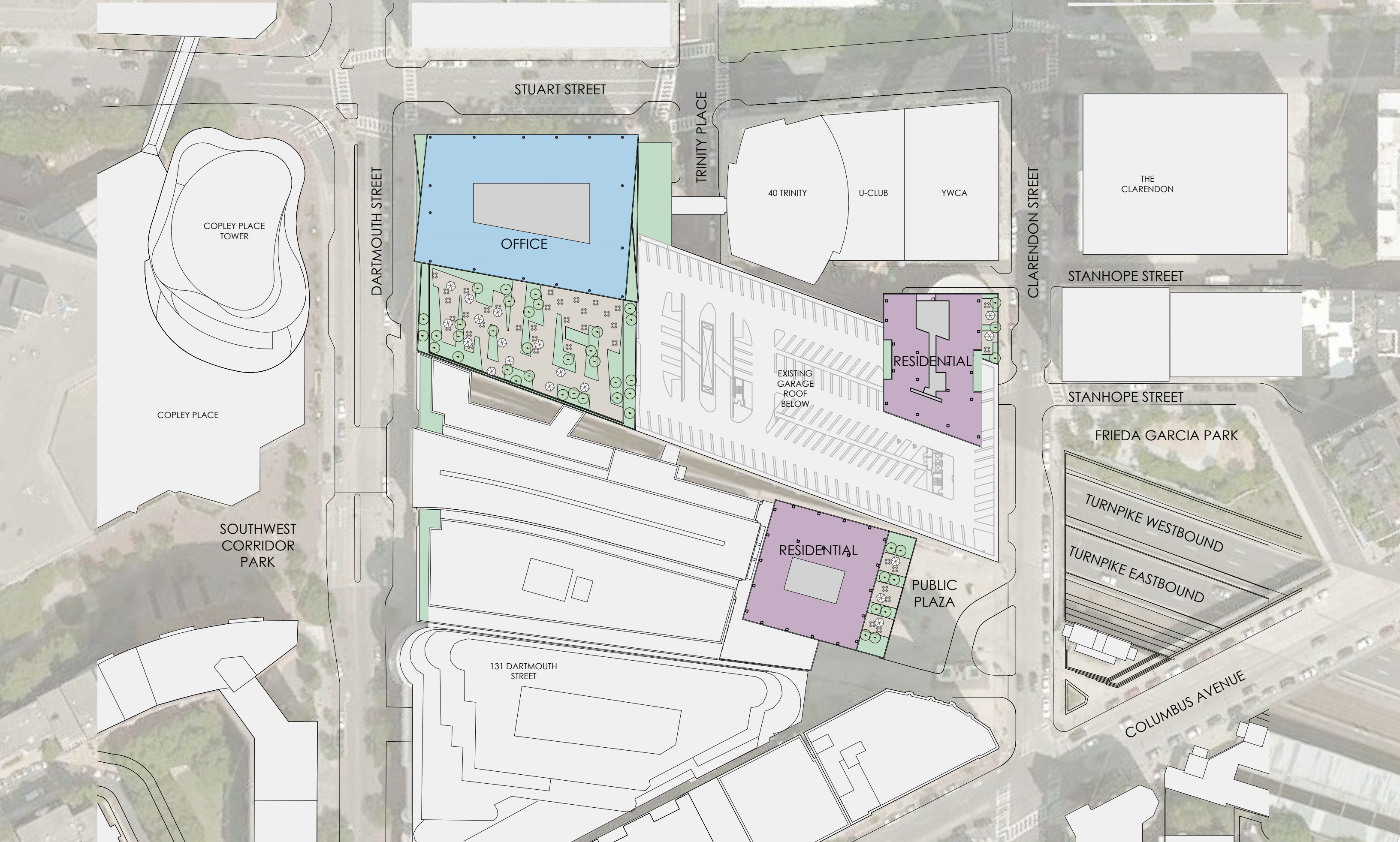
AERIAL LOOKING TO THE NORTHEAST - FUTURE PROPOSED ALTERNATE SCHEME



GW: BASE SCHEME DECK LEVEL • GE: LEVEL 2 • SE: CONCOURSE LEVEL • SW: CONCOURSE LEVEL



GW: BASE SCHEME DECK LEVEL • GE: LEVEL 2 • SE: CONCOURSE LEVEL • SW: CONCOURSE LEVEL



GW: TYPICAL PLAN • GE: TYPICAL PLAN • SE: TYPICAL LEVEL • SW: ROOF PLAN



VIEW FROM DARTMOUTH ST AND COLUMBUS AVE - PROJECT RENDERING



VIEW FROM DARTMOUTH AND NEWBURY STREETS - PROJECT RENDERING



VIEW FROM COPLEY SQUARE - PROJECT RENDERING



VIEW FROM DARTMOUTH AND ST JAMES STREETS - PROJECT RENDERING



VIEW FROM SOUTHWEST CORRIDOR - EXISTING CONDITIONS



**SECOND FLOOR
EXTENSION
ABANDONED**

SHOPS AT BACK BAY

BACK BAY STATION

SHOPS AT BACK BAY

SUSPY BURGER



VIEW FROM SOUTHWEST CORRIDOR - BASE SCHEME



VIEW FROM SOUTHWEST CORRIDOR - ALTERNATE SCHEME



VIEW FROM DARTMOUTH STREET AND STUART STREET - EXISTING CONDITION

NEW
STATION
ENTRANCE



VIEW FROM STUART AND DARTMOUTH STREET - PROPOSED CONDITION



VIEW FROM STUART STREET AND TRINITY PLACE - EXISTING CONDITION



BRIDGE TO
40 TRINITY

NEW STATION
ENTRANCE

VIEW FROM STUART STREET AND TRINITY PLACE - PROJECT RENDERING



STUART STREET CONNECTOR ENTRANCE ON STUART STREET - PROJECT RENDERING



CK BAY
TH END
ATION



CRUMBLE

BACK BAY SOUTH
ORANGE LINE
COMMUTER RAIL



ORANGE LINE
COMMUTER RAIL
AMTRAK

GL

VIEW OF STUART STREET CONNECTOR - PROJECT RENDERING

BACK BAY SOUTH END STATION

ORANGE LINE
COMMUTER RAIL
AMTRAK



THROUGH-BLOCK CONNECTOR - LOOKING SOUTH



THROUGH BLOCK CONNECTOR - LOOKING NORTH



VIEW OF GARAGE EAST STREET LEVEL - EXISTING CONDITION



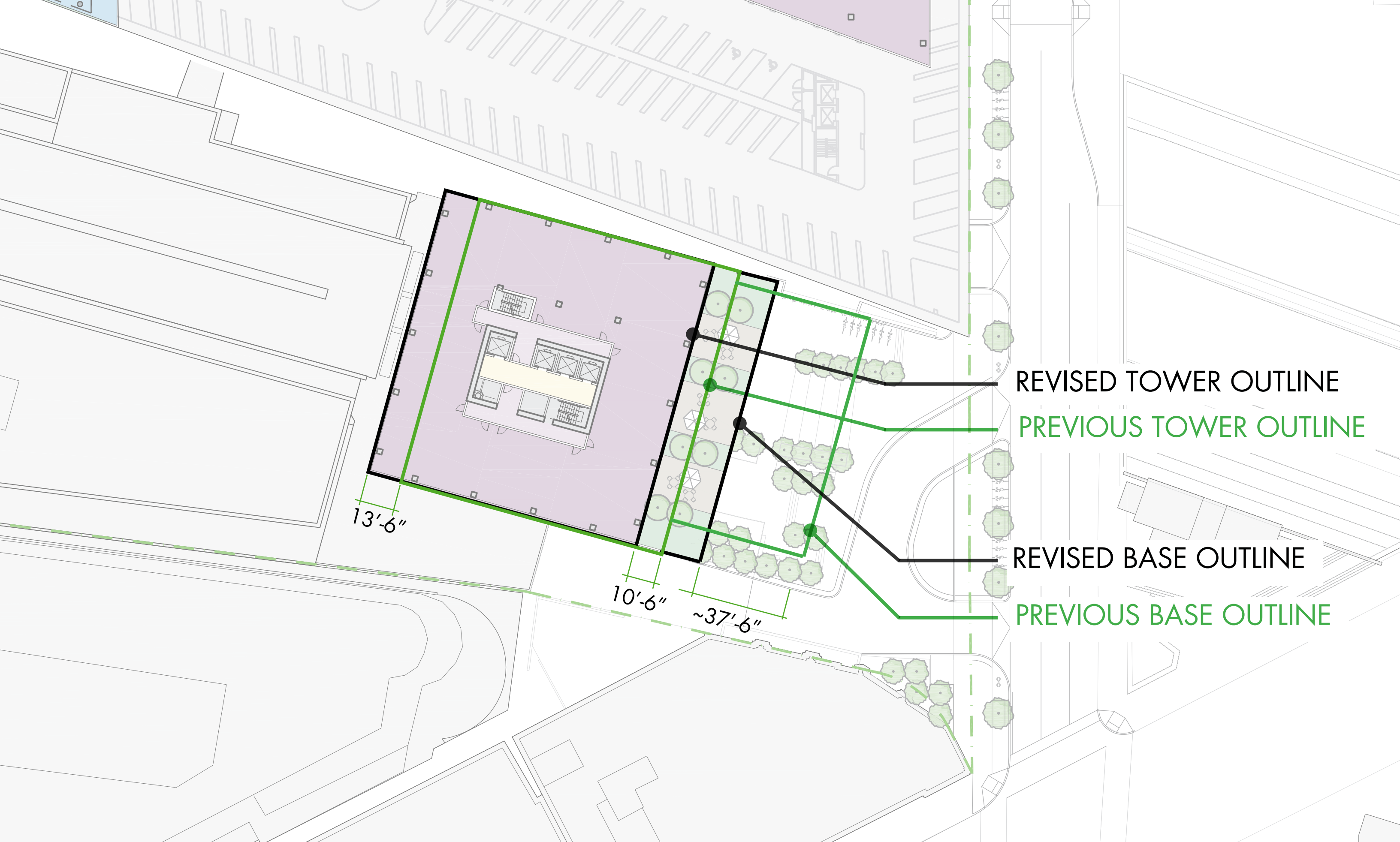
VIEW OF GARAGE EAST STREET LEVEL - PROJECT RENDERING



VIEW FROM COLUMBUS AVENUE - EXISTING CONDITION



VIEW FROM COLUMBUS AVENUE - PROJECT RENDERING

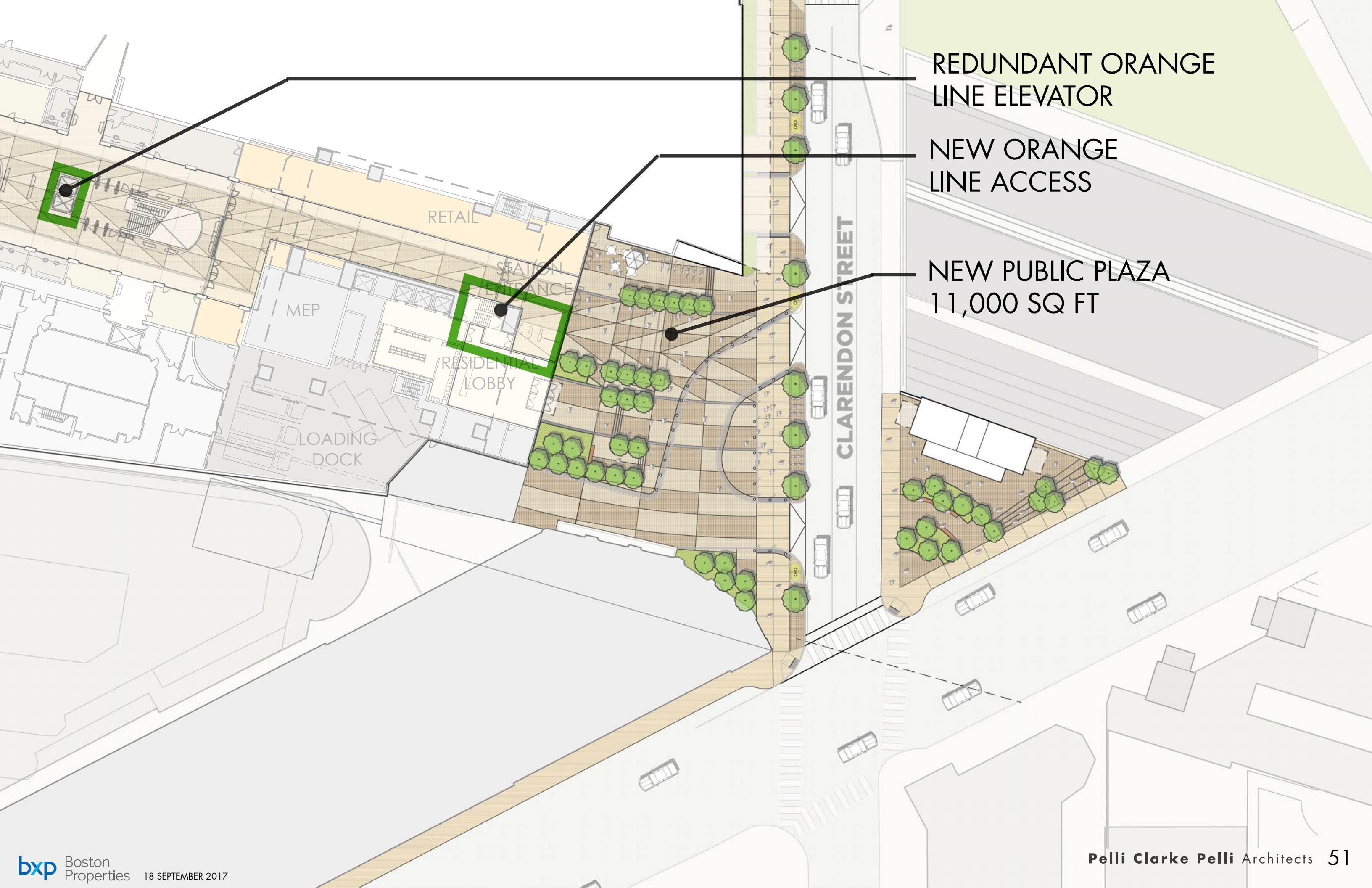


REVISED TOWER OUTLINE

PREVIOUS TOWER OUTLINE

REVISED BASE OUTLINE

PREVIOUS BASE OUTLINE



REDUNDANT ORANGE
LINE ELEVATOR

NEW ORANGE
LINE ACCESS

NEW PUBLIC PLAZA
11,000 SQ FT



VIEW FROM CLARENDON STREET - EXISTING CONDITION



NEW STATION
ENTRANCE

BACK BAY SOUTH END STATION

Y. CREW

BEST SWISS CLUB NIZZA LE SPORT



BACK BAY SOUTH END STATION

NEW 11,000sf PUBLIC PLAZA



VIEW TOWARD STATION FROM CLARENDON STREET THROUGH-BLOCK CONNECTOR



SECTION THROUGH CLARENDON STREET THROUGH-BLOCK CONNECTOR



VIEW OF NEW WINTER GARDEN AND CLARENDON STREET STATION ENTRY



STATION WEST - VIEW TOWARD NEW CLARENDON STREET ENTRY



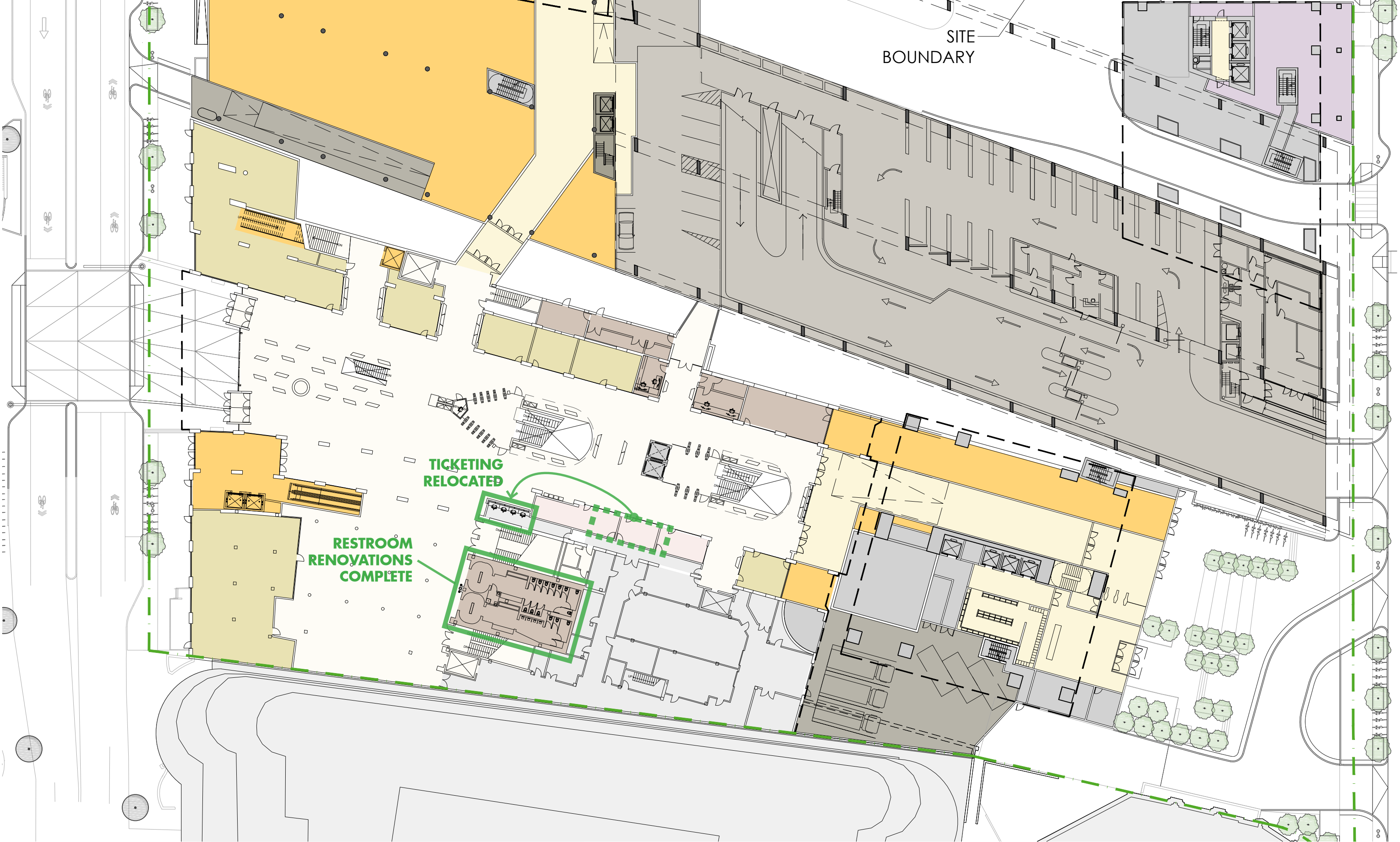
STATION WEST - VIEW OF CENTRAL HALL LOOKING TOWARD DARTMOUTH STREET



STATION WEST - VIEW OF POTENTIAL PEDESTRIAN BRIDGE



STATION WEST - VIEW OF CENTRAL HALL FROM DARTMOUTH STREET ENTRY



SITE
BOUNDARY

TICKETING
RELOCATED

RESTROOM
RENOVATIONS
COMPLETE



BATHROOM RENOVATIONS - EXISTING CONDITIONS



BATHROOM RENOVATIONS - PROJECT RENDERING



BATHROOM RENOVATIONS - COMPLETED CONDITION



VIEW FROM DARTMOUTH STREET - EXISTING CONDITION



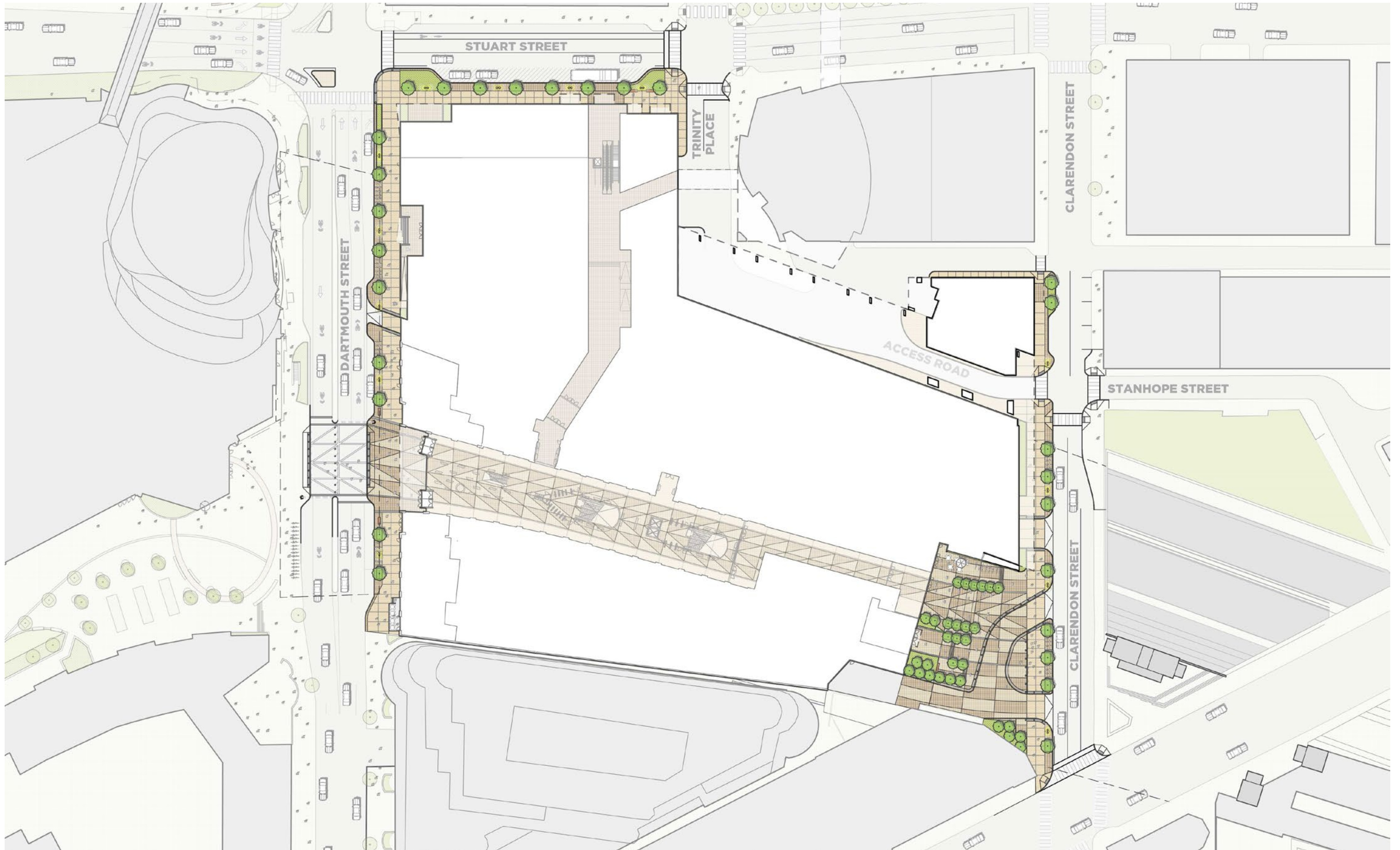
VIEW FROM DARTMOUTH STREET - PROJECT RENDERING



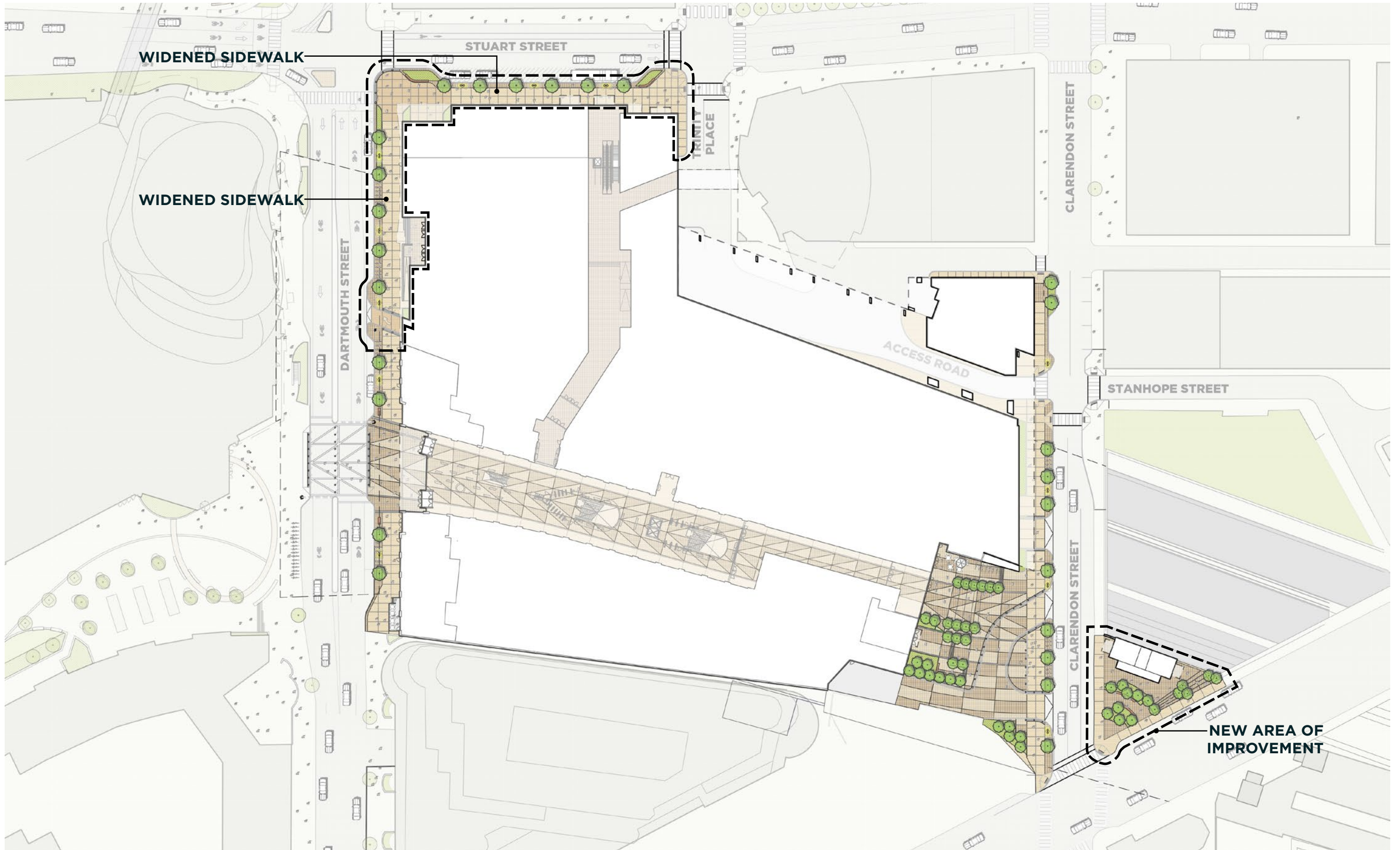
STATION WEST RENDERING FROM DARTMOUTH STREET - NIGHT

PUBLIC REALM





Source: OJB / PCPA / Arrowstreet / Parsons Brinkerhoff



Source: OJB / PCPA / Arrowstreet / Parsons Brinkerhoff

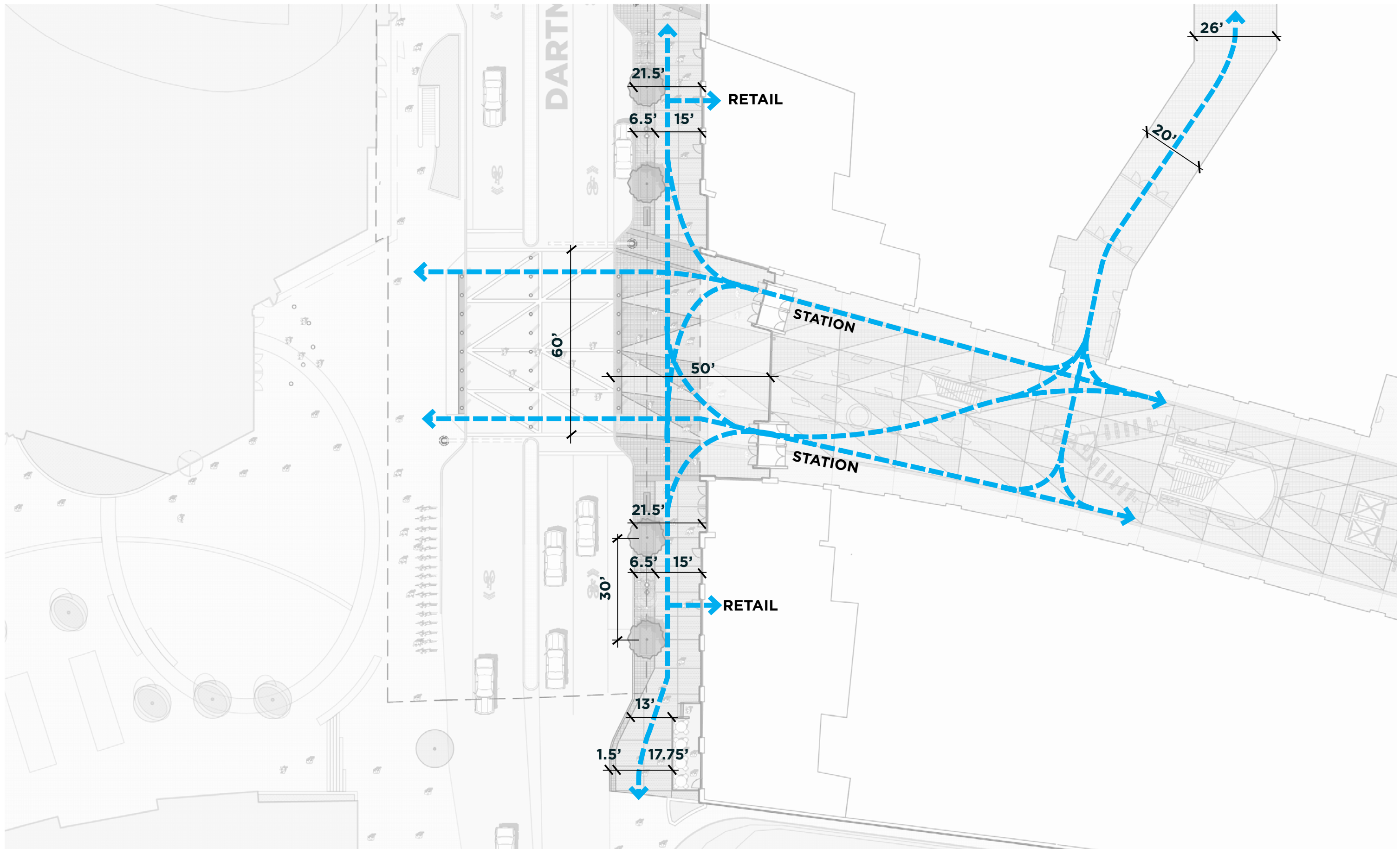
SITE PLAN - PROPOSED SITE CONDITIONS

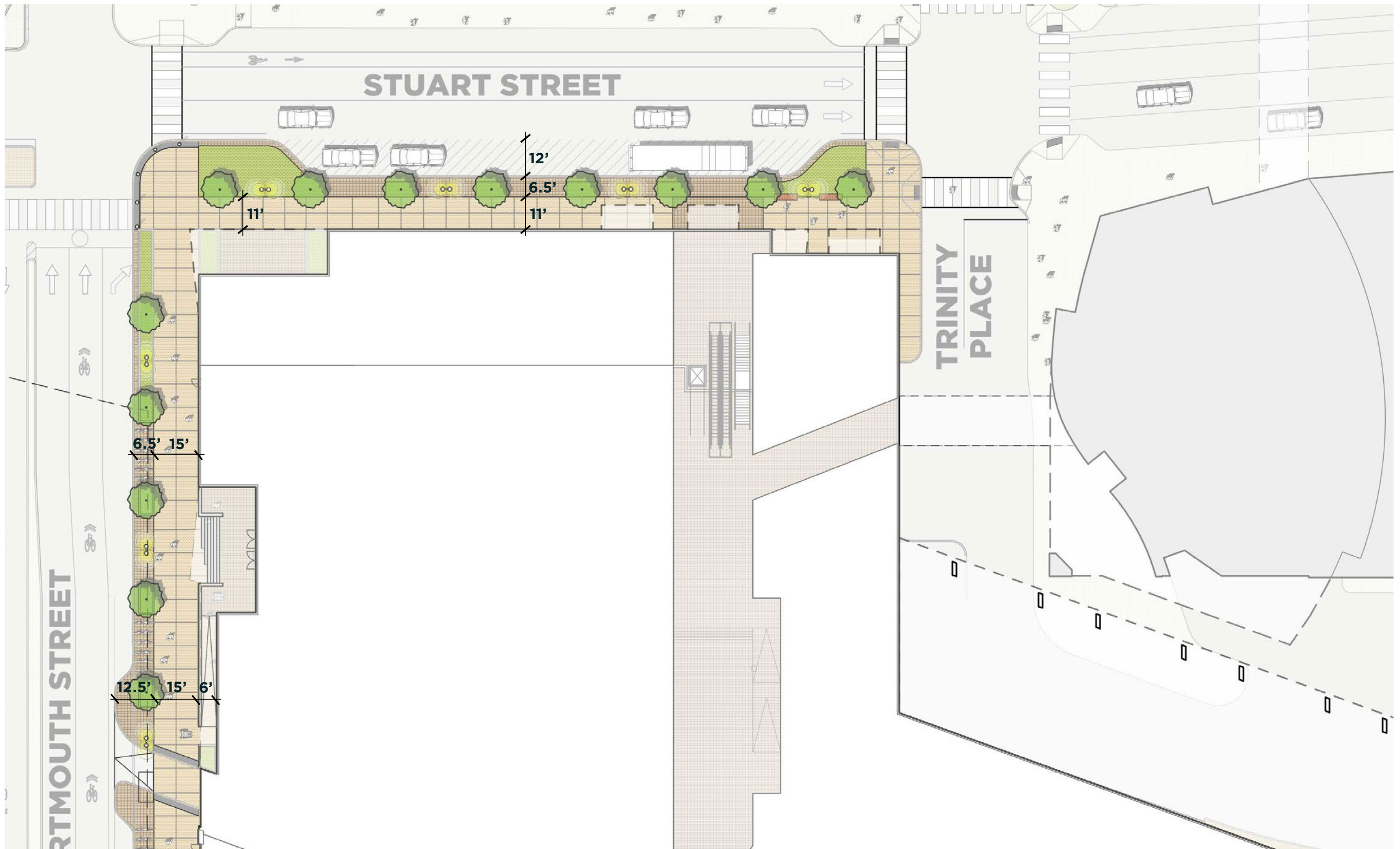


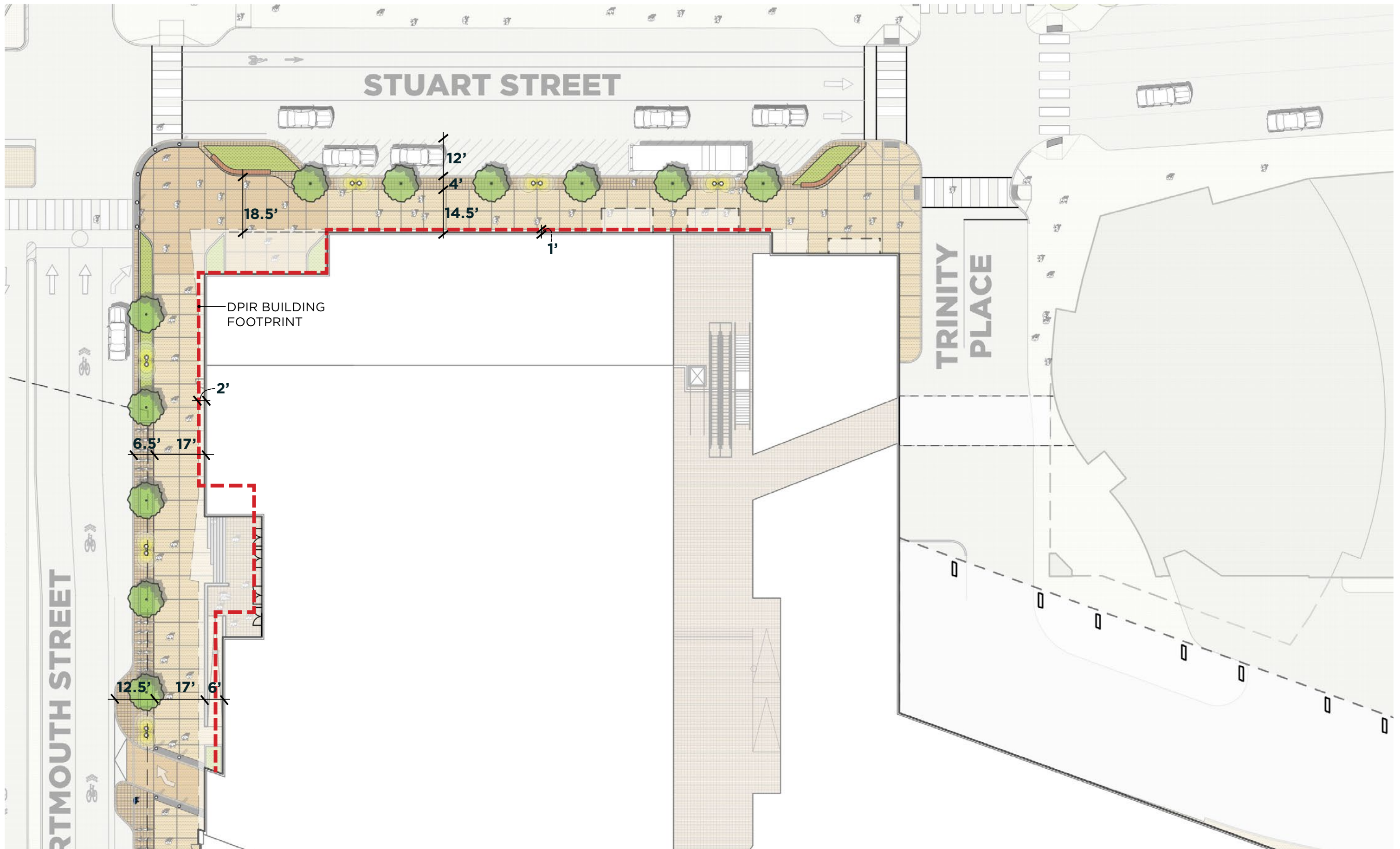
Source: OJB / PCPA / Arrowstreet / Parsons Brinkerhoff

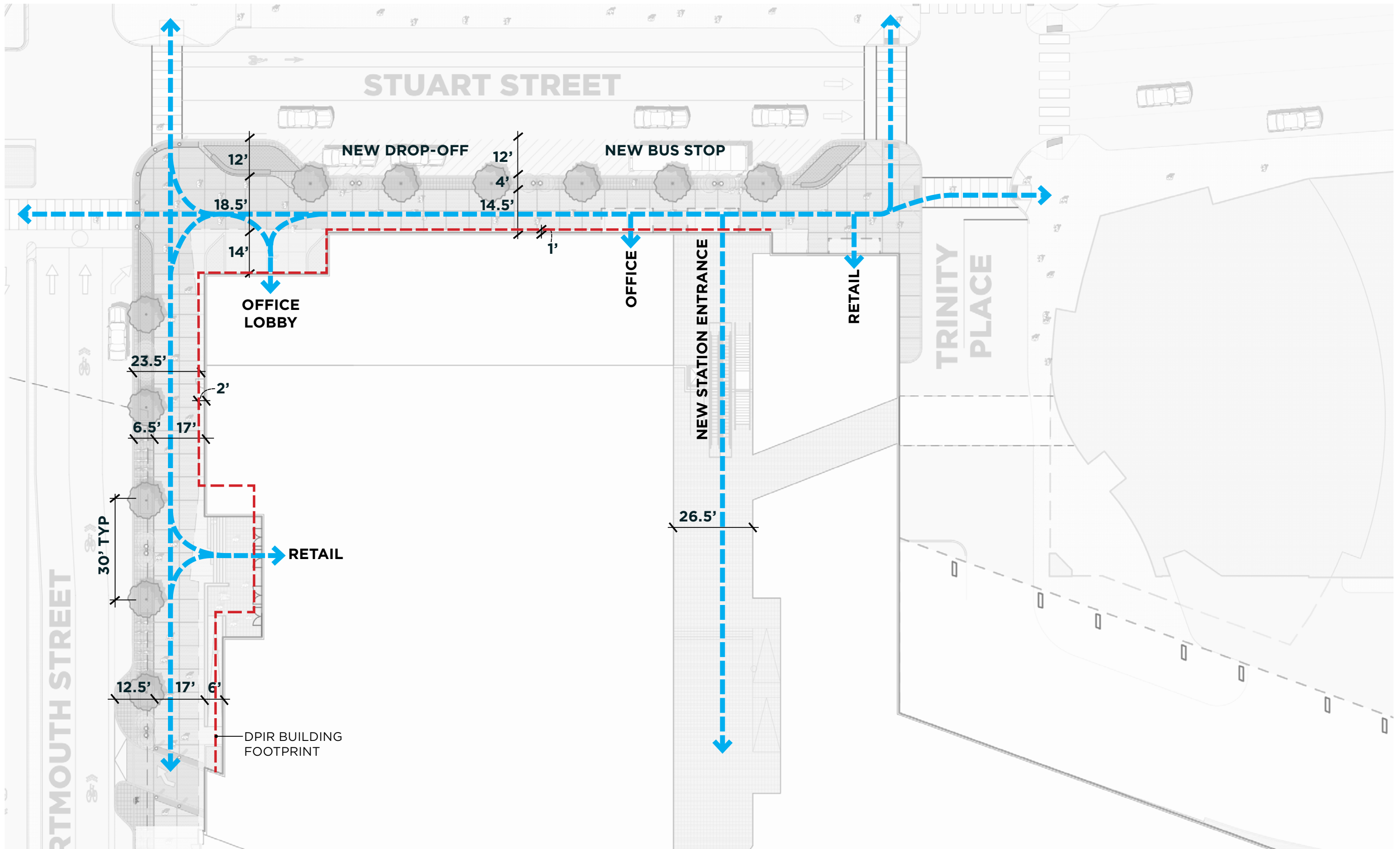
SITE PLAN - INCLUSION OF OFF SITE HUBWAY













6.5'
FURNISHING
ZONE

14.5'
PEDESTRIAN
ZONE

8'
BUILDING
OVERHANG

FACE OF BUILDING

Harvard Vanguard
Medical Associates
Atrius Health



6.5'

15'

DARTMOUTH STREET SIDEWALK - VIEW TOWARDS NORTH - PEDESTRIAN ZONE AS PER DEIR/DPIR



6.5'

17'

Former Footprint

DARTMOUTH STREET SIDEWALK - VIEW TOWARDS NORTH - PEDESTRIAN ZONE INCREASED BY 2 FEET

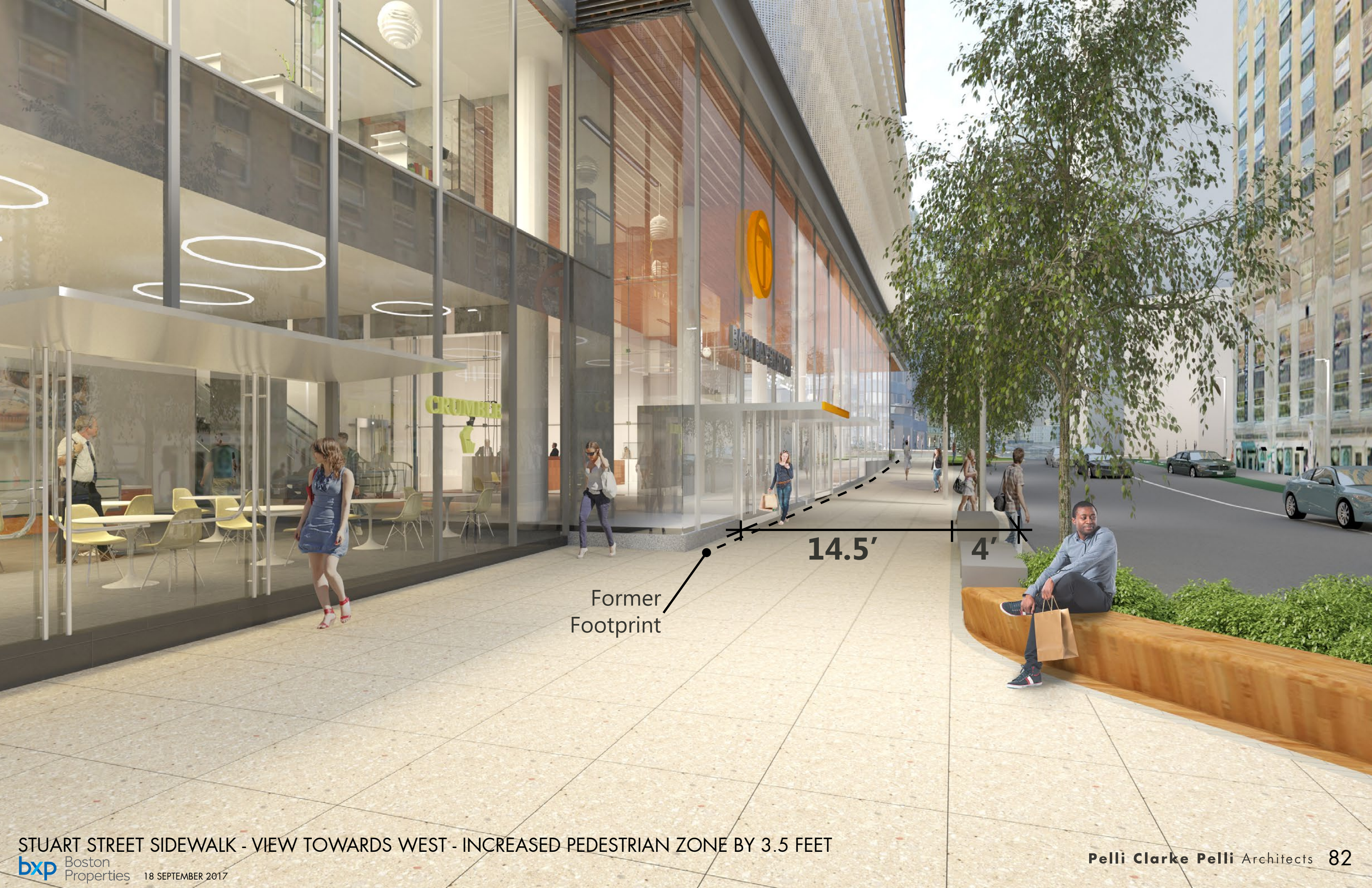


8'
SIDEWALK



11' / 6.5'

STUART STREET SIDEWALK - VIEW TOWARDS WEST - PEDESTRIAN ZONE AS PER DEIR/DPIR

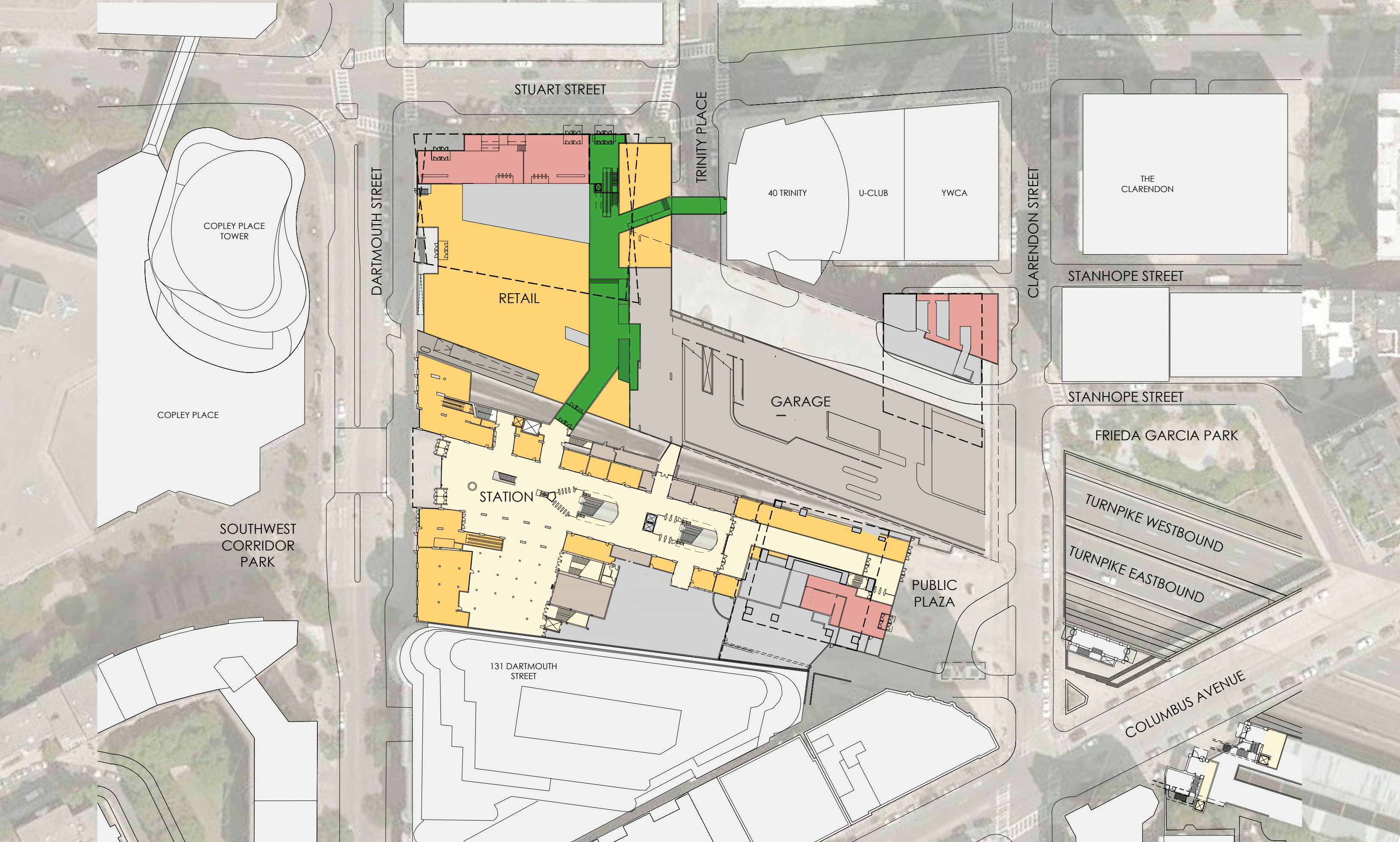


Former Footprint

14.5'

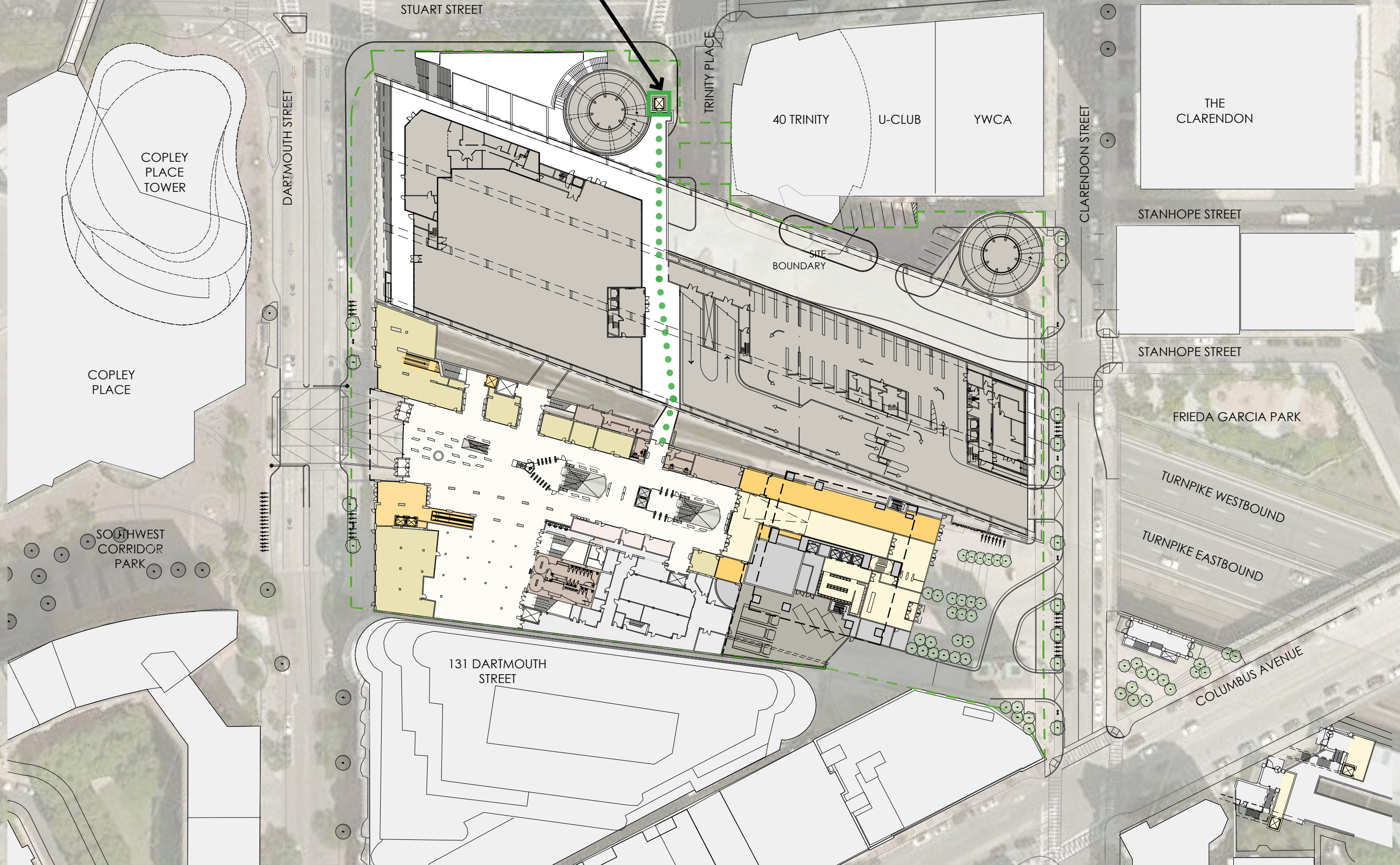
4'

STUART STREET SIDEWALK - VIEW TOWARDS WEST - INCREASED PEDESTRIAN ZONE BY 3.5 FEET



GW: BASE SCHEME DECK LEVEL • GE: LEVEL 2 • SE: CONCOURSE LEVEL • SW: CONCOURSE LEVEL

NEW EXTERIOR LIFT



PHASING SCENARIO - STATION EAST DEVELOPED BEFORE GARAGE WEST



TO BE DELIVERED WITH GARAGE EAST OR STATION EAST

REALIGNED ACCESS ROAD

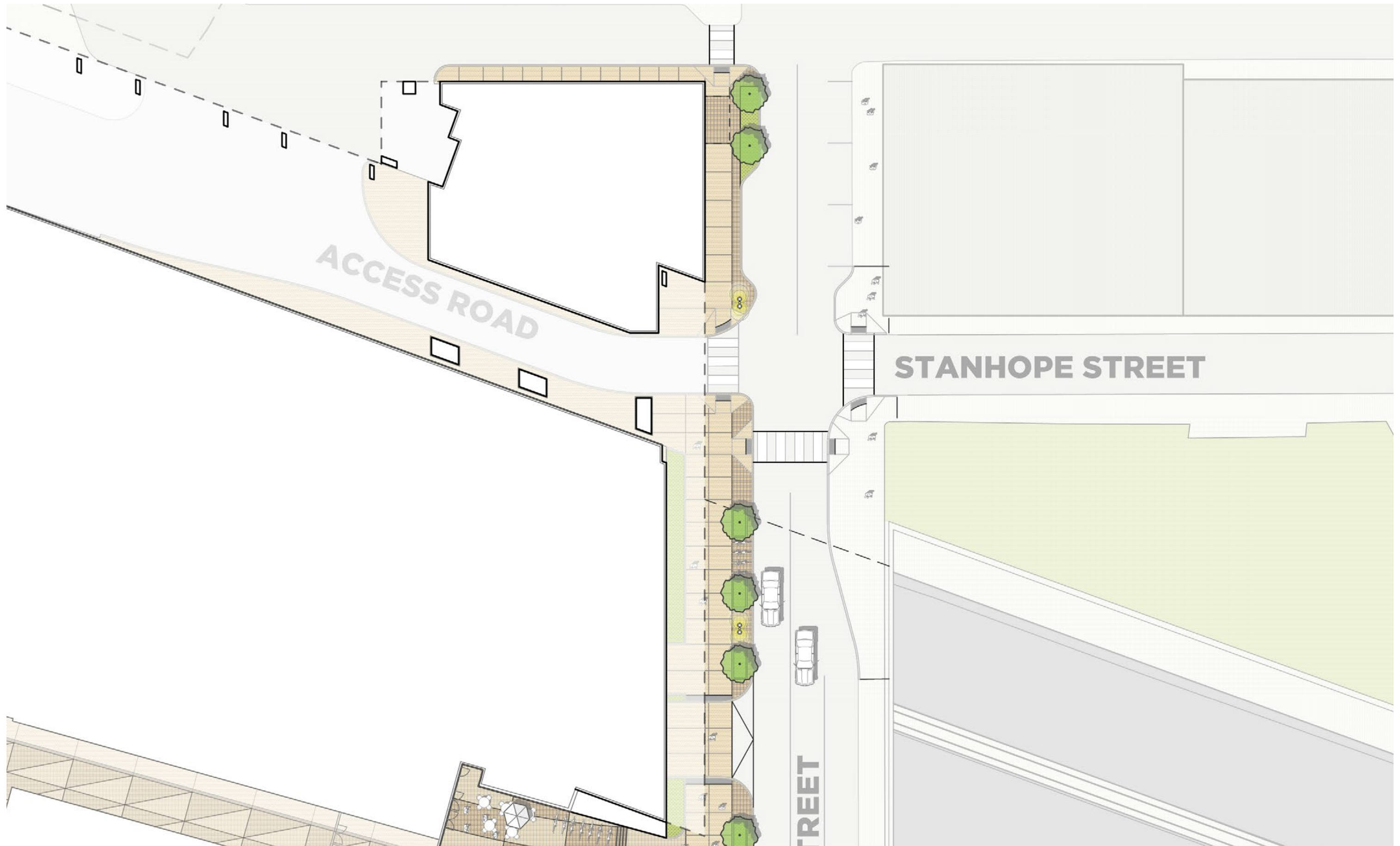
RECONFIGURED CROSSWALKS

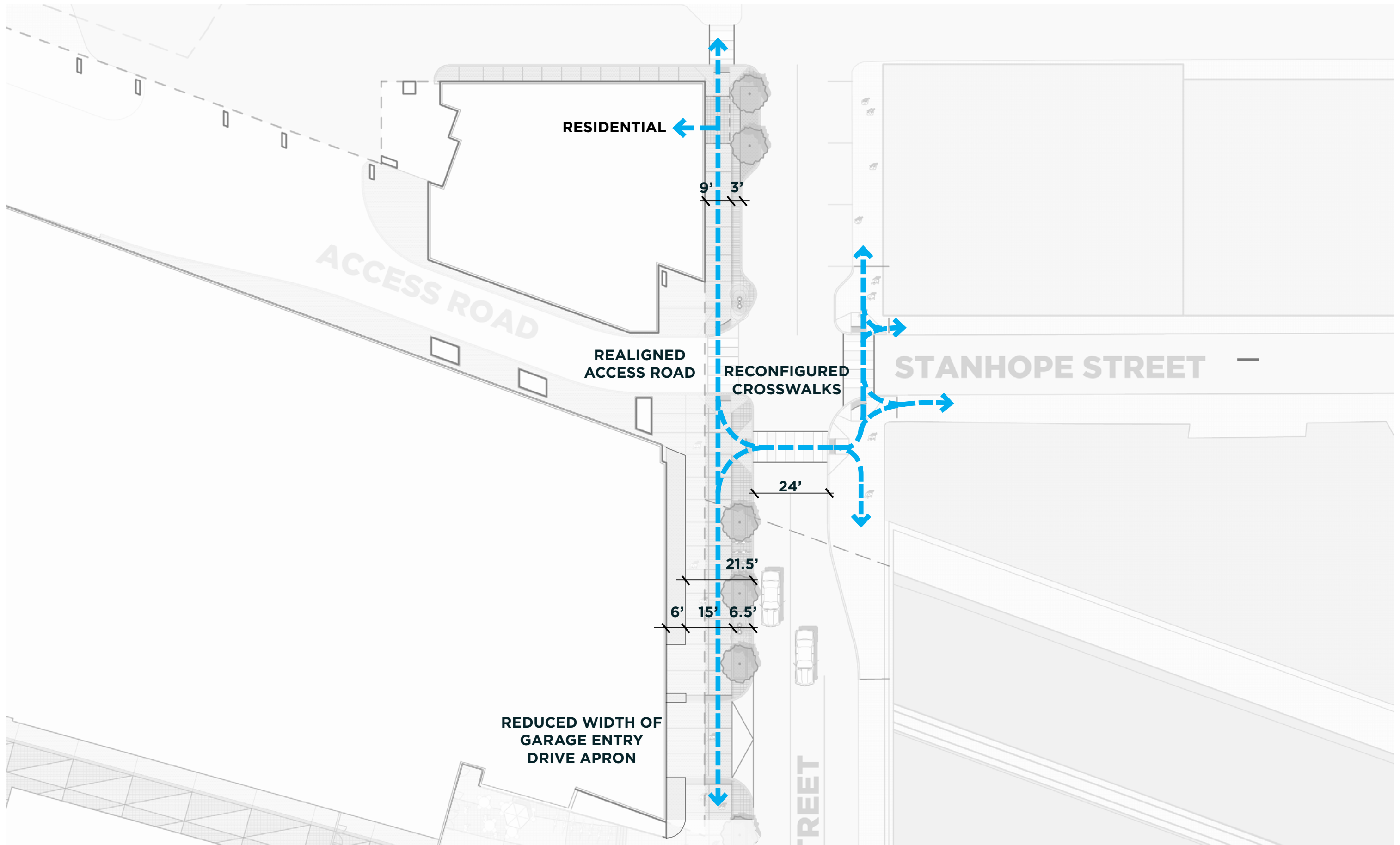
IMPROVED SIDEWALKS

REDUCED WIDTH OF GARAGE ENTRY DRIVE APRON

Source: OJB / PCPA / Arrowstreet / Parsons Brinkerhoff

SITE PLAN - CLARENDON STREET IMPROVEMENTS







EXISTING HEAD HOUSE
TO REMAIN

ADDED SCOPE

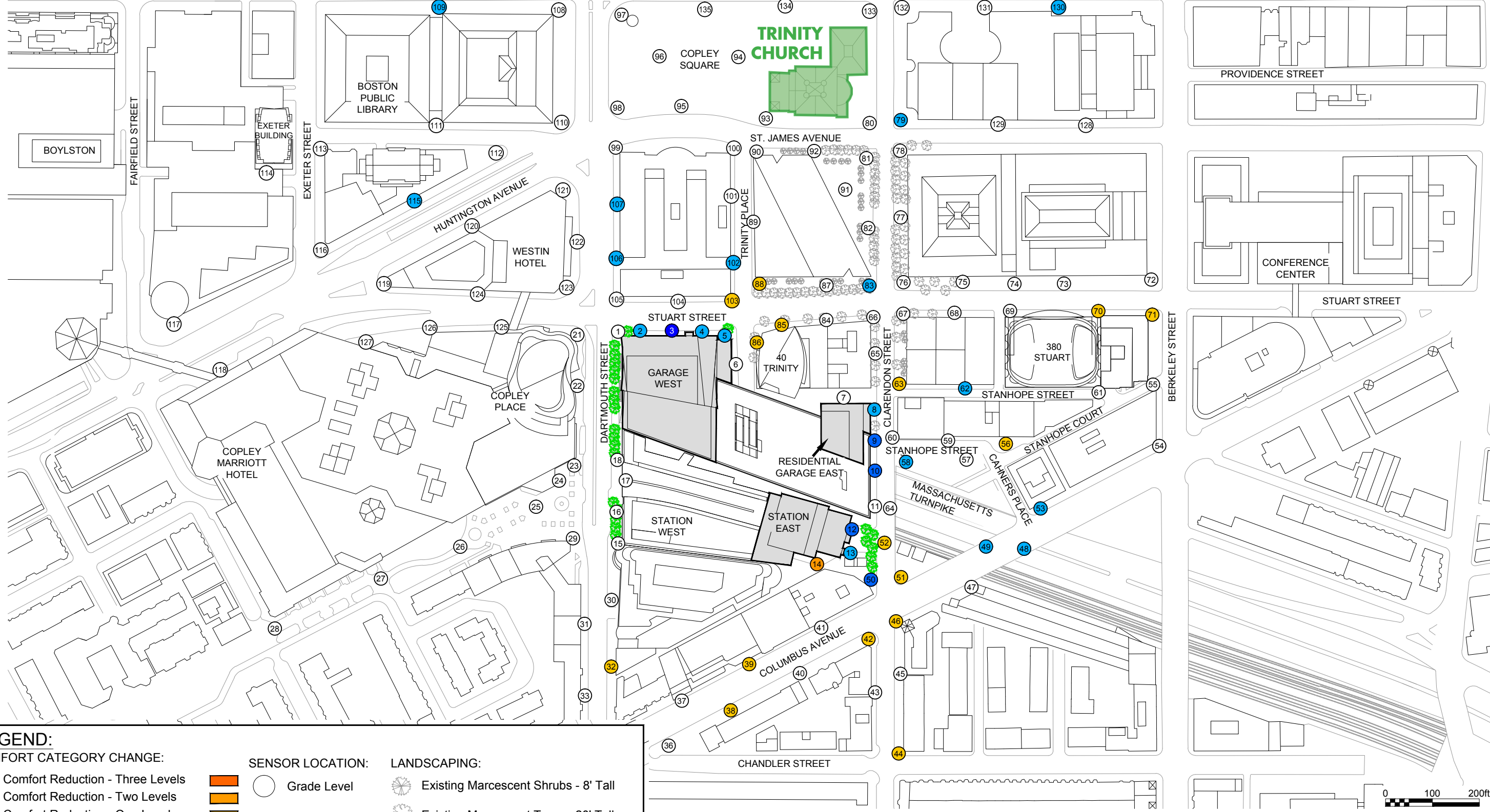


PEDESTRIAN LEVEL WIND STUDY



**NEW OLD
SOUTH CHURCH**

TRINITY CHURCH



LEGEND:

COMFORT CATEGORY CHANGE:		SENSOR LOCATION:		LANDSCAPING:	
Wind Comfort Reduction - Three Levels			Grade Level		Existing Marcescent Shrubs - 8' Tall
Wind Comfort Reduction - Two Levels					Existing Marcescent Trees - 20' Tall
Wind Comfort Reduction - One Level					Proposed Marcescent Trees - 20' Tall
No Comfort Category Change					
Wind Comfort Improvement - One Level					
Wind Comfort Improvement - Two Levels					
Wind Comfort Improvement - Three Levels					

PEDESTRIAN WIND CONDITIONS - CATEGORY CHANGE - NO-BUILD TO BASE SCHEME

Pedestrian Level Wind Speeds Around Trinity Church

Sensor Location	Annual Mean Wind Speed (mph)			Worst-Case Difference
	No Build	Base Scheme	Alternate Scheme	
80	19	19	19	0
93	25	24	24	-1
94	16	17	17	1
133	18	16	17	-1
134	17	16	16	-1



SHADOW STUDIES





Back Bay Historic District



Park Square-Stuart Street Historic District



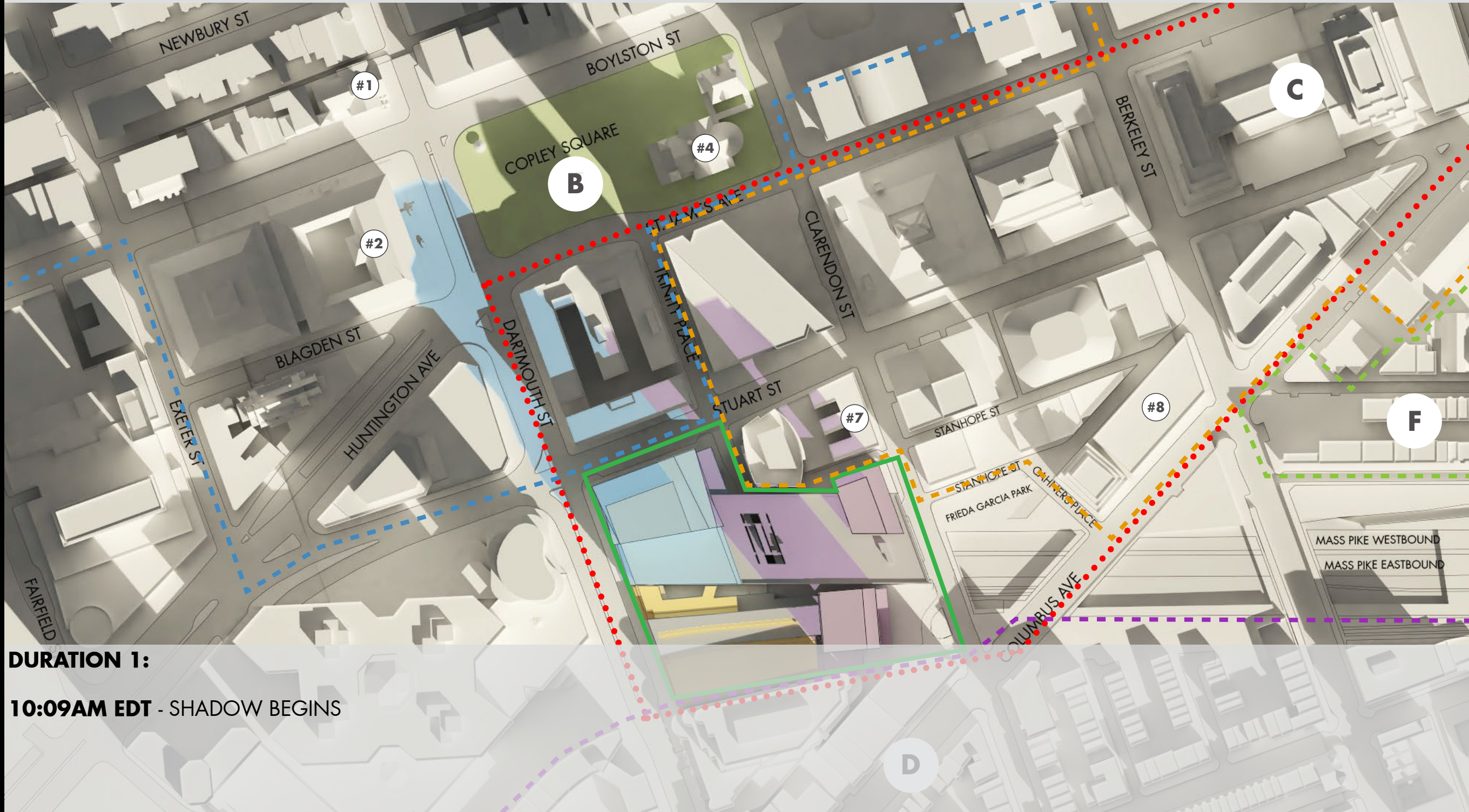
South End District/South End Landmark District



Bay Village Historic District

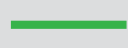


Stuart Street District



DURATION 1:

10:09AM EDT - SHADOW BEGINS



Project Site



New Old South Church



Boston Public Library (McKim Building)



Trinity Church



YWCA Building



Youth's Companion Building



Back Bay
Historic District



Park Square-Stuart Street
Historic District



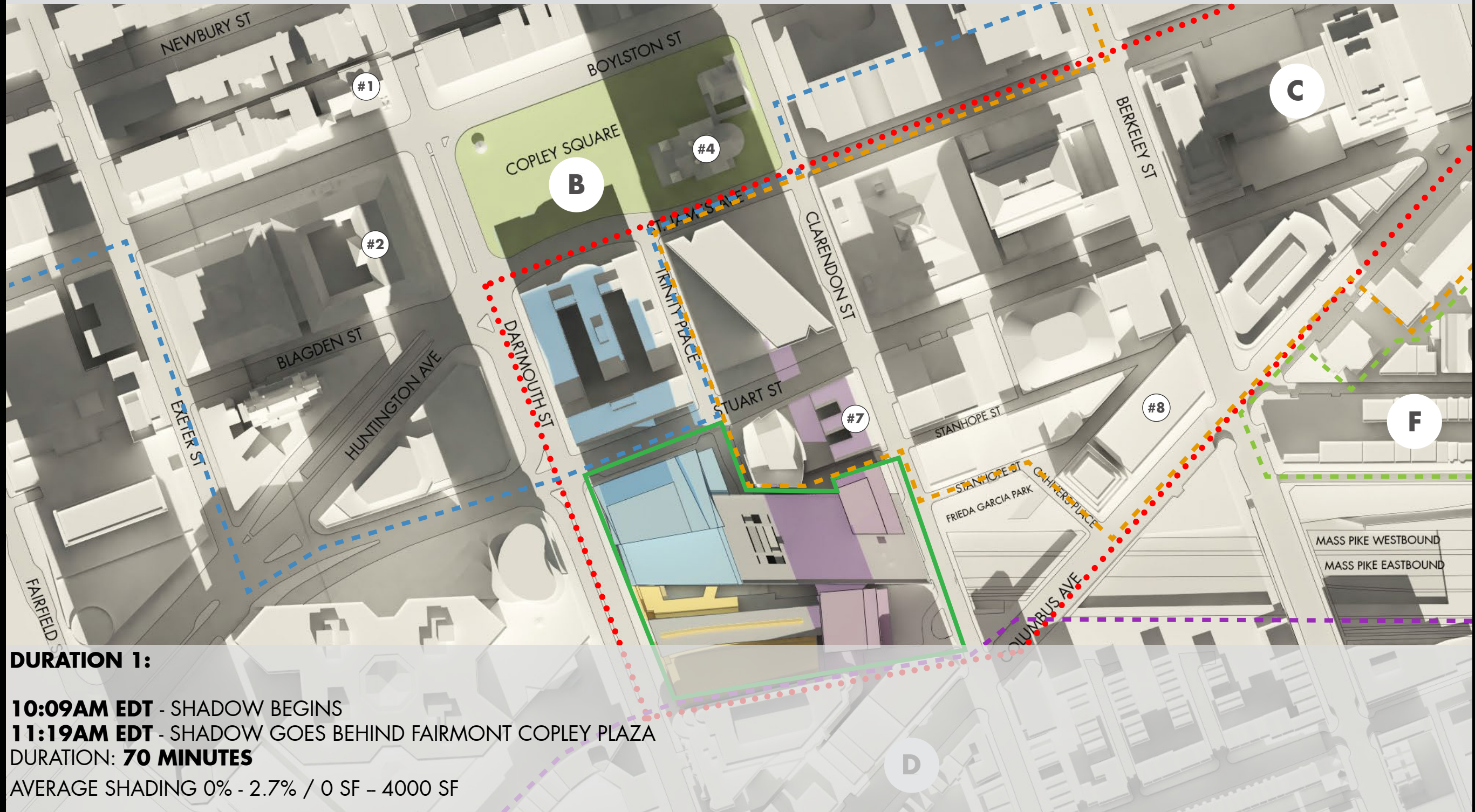
South End District/South End
Landmark District



Bay Village
Historic District



Stuart Street
District



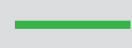
DURATION 1:

10:09AM EDT - SHADOW BEGINS

11:19AM EDT - SHADOW GOES BEHIND FAIRMONT COPLEY PLAZA

DURATION: 70 MINUTES

AVERAGE SHADING 0% - 2.7% / 0 SF - 4000 SF



Project Site



New Old South Church



Boston Public Library (McKim Building)



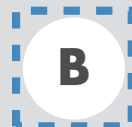
Trinity Church



YWCA Building



Youth's Companion Building



Back Bay Historic District



Park Square-Stuart Street Historic District



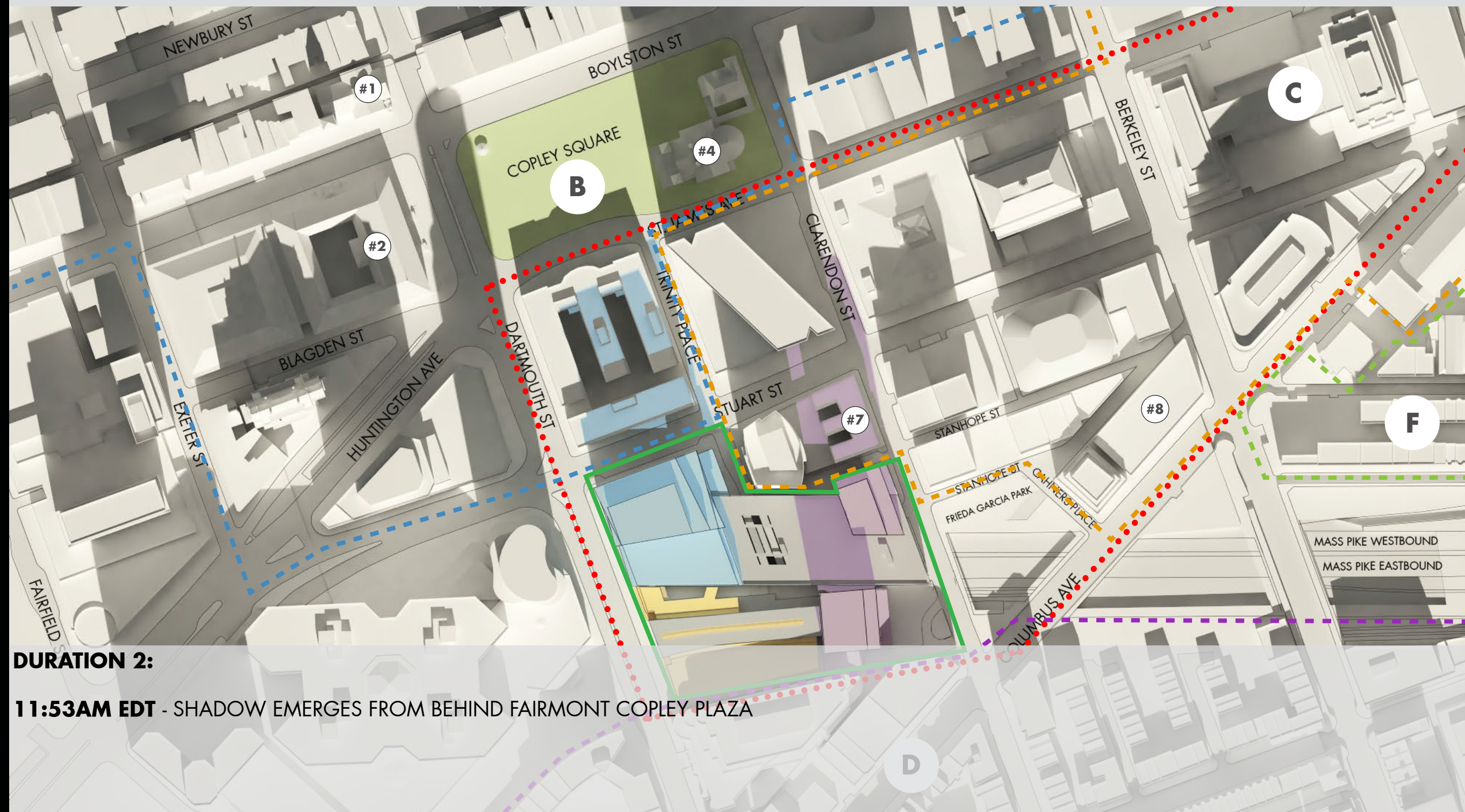
South End District/South End Landmark District



Bay Village Historic District



Stuart Street District



DURATION 2:
11:53AM EDT - SHADOW EMERGES FROM BEHIND FAIRMONT COPLEY PLAZA

- Project Site
- #1 New Old South Church
- #2 Boston Public Library (McKim Building)
- #4 Trinity Church
- #7 YWCA Building
- #8 Youth's Companion Building

SHADING ON COPLEY SQUARE ON OCTOBER 21st, 11:53AM EDT



Back Bay
Historic District



Park Square-Stuart Street
Historic District



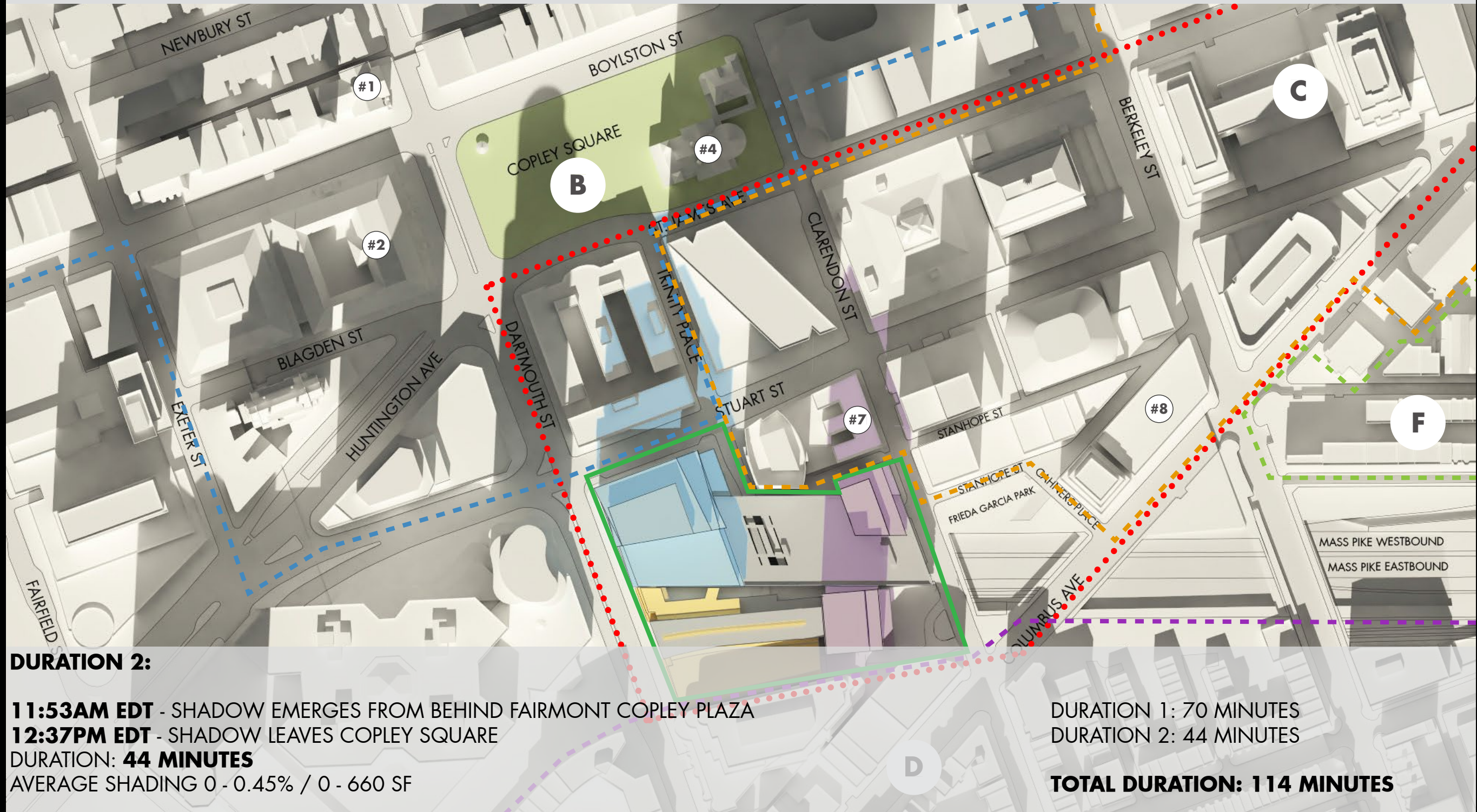
South End District/South End
Landmark District



Bay Village
Historic District



Stuart Street
District



— Project Site

#1 New Old South Church

#2 Boston Public Library (McKim Building)

#4 Trinity Church

#7 YWCA Building

#8 Youth's Companion Building



NEWBURY ST

BOYLSTON ST

COREY SQUARE

BERKELEY ST

ST. JAMES AVE

CLARENDON ST

BLAGDEN ST

TRINITY PLACE

15 WILKINSON ST

HUNTINGTON AVE

DARTMOUTH ST

STUART ST

SEA WOLF ST

STARBUCKS ST

PIEDRA GARCIA PARK

COLUMBUS AVE

MASS FINE WESTBOL PARK
MASS FINE EASTBOL PARK

9:00am

NEW OLD SOUTH CHURCH

MARCH 21 AND SEPTEMBER 21 (Equinox)

No net new shadow impact



9:00am EDT



12:00pm EDT



3:00pm EDT

JUNE 21 (Solstice)

No net new shadow impact.



9:00am EDT



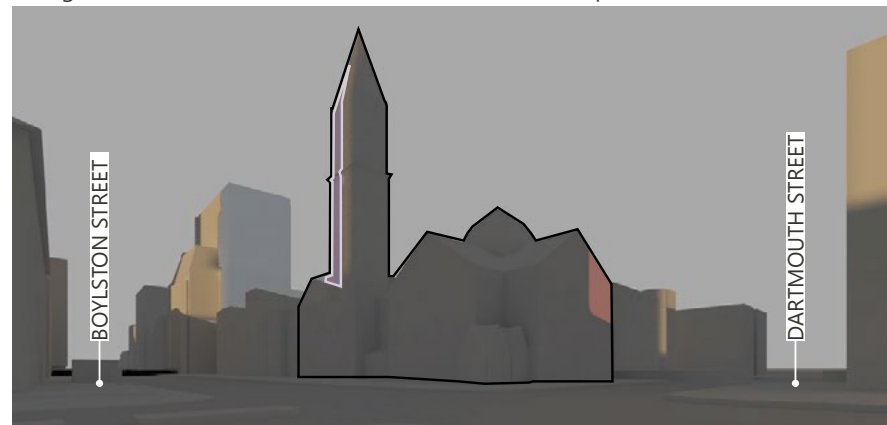
12:00pm EDT



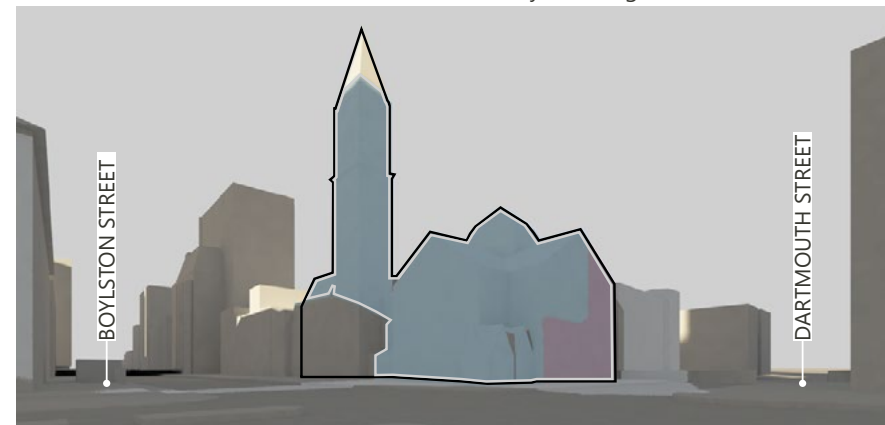
3:00pm EDT

DECEMBER 21 (Solstice)

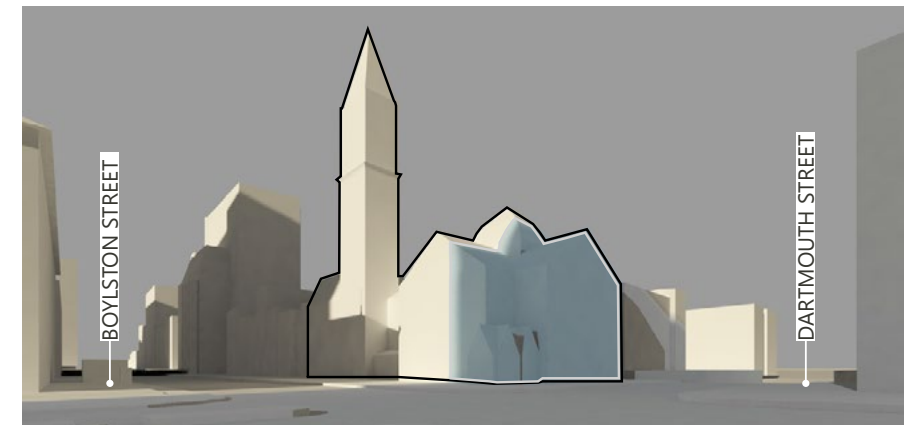
Garage West and Station East cast net new shadow on portions of the South and East Facades of the New Old South Church in the early morning from 7:45am to 9:55am for a total of 130 Minutes.



8:00am EST



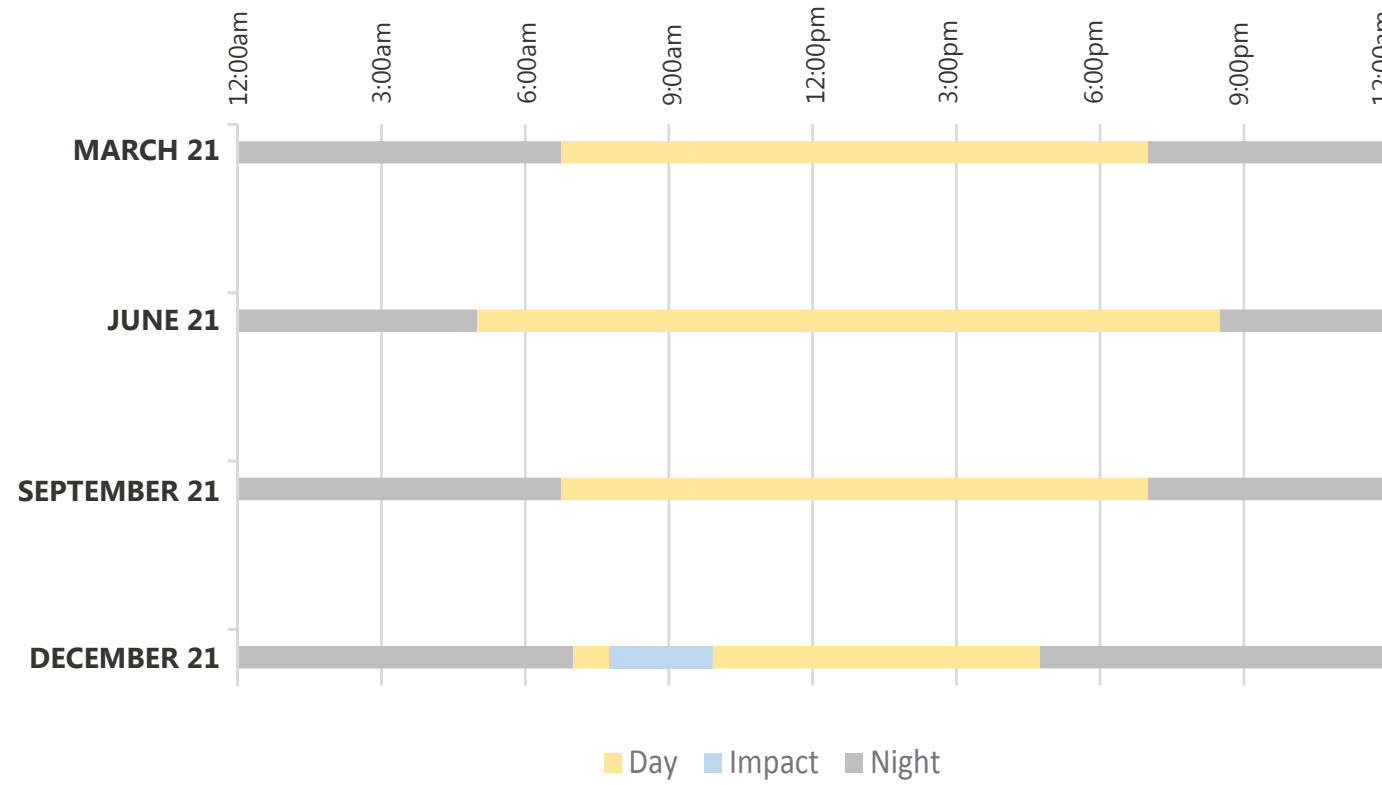
8:50am EST



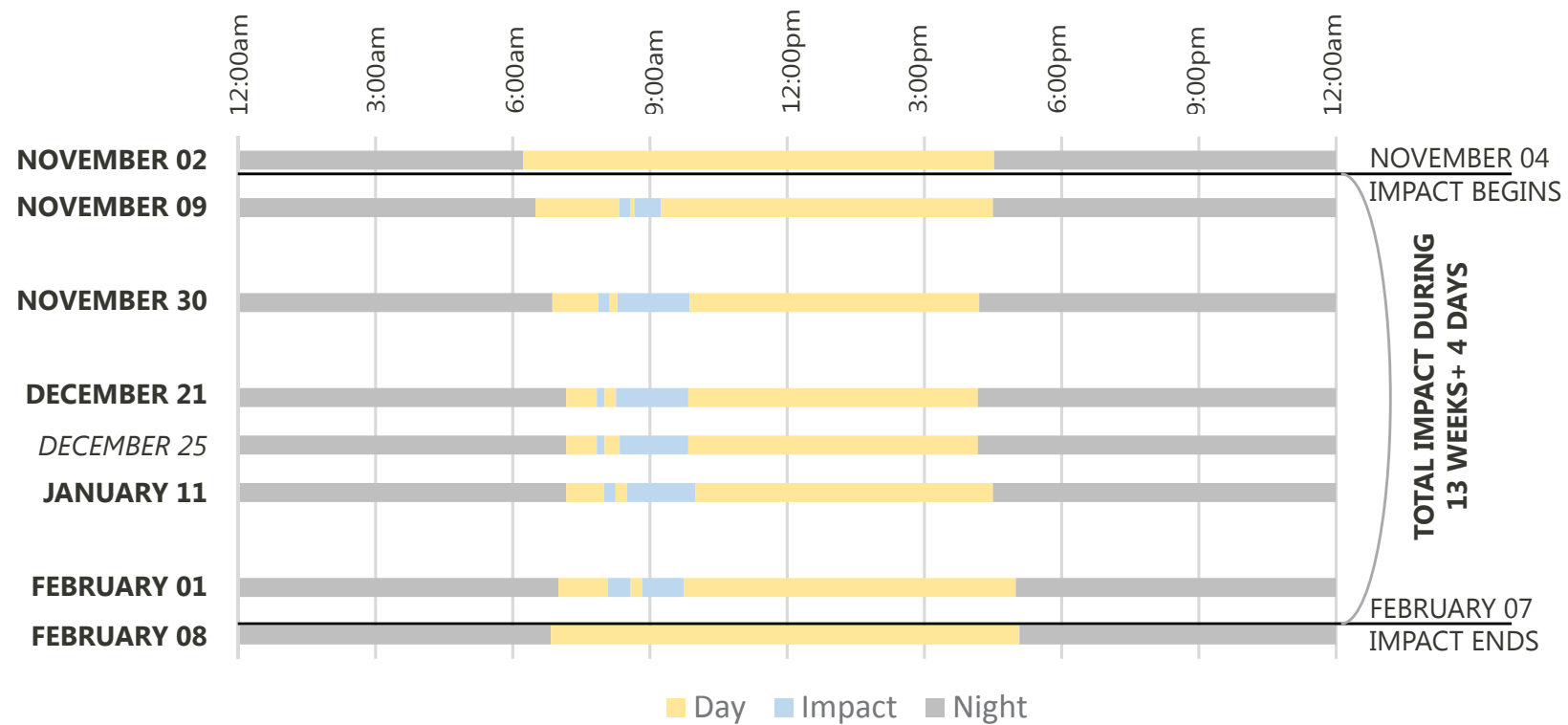
9:40am EST

Legend Area Of Existing Shadow Area Of Net New Shadow From Garage West Area Of New New Shadow From Garage East Area Of Net New Shadow From Station East

NEW OLD SOUTH CHURCH WINDOWS - YEARLY SOLAR IMPACT CHART



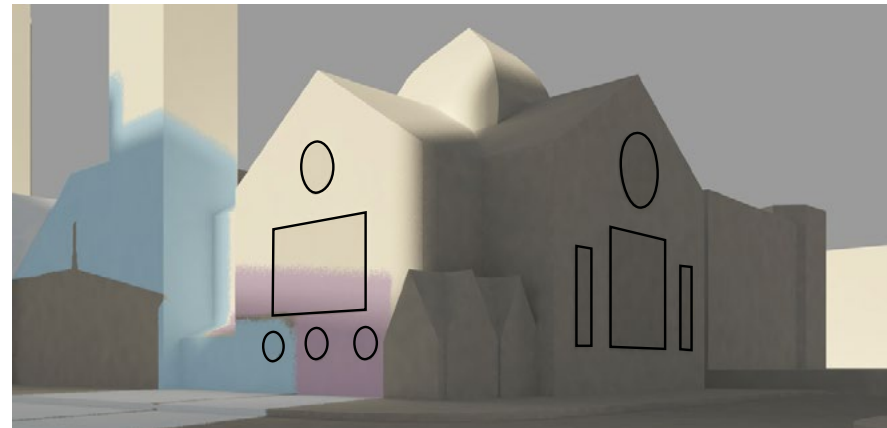
NEW OLD SOUTH CHURCH WINDOWS - WINTER SOLAR IMPACT CHART



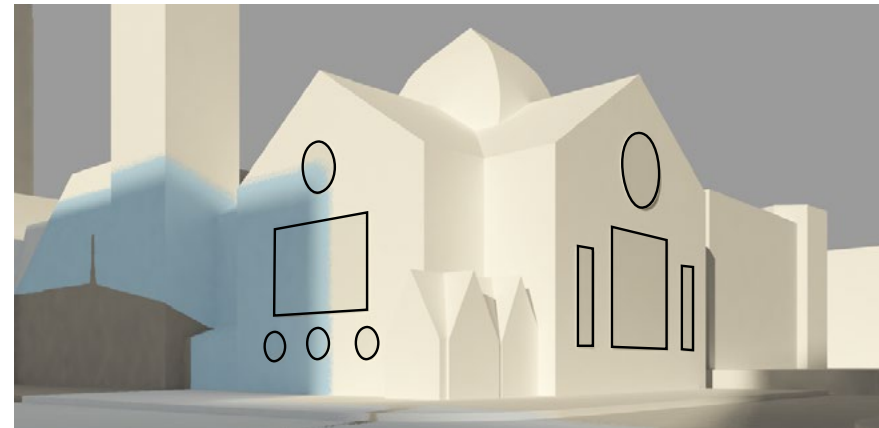
NEW OLD SOUTH CHURCH WEST AND SOUTH FACADE RESTORED WINDOWS, PAGE 1

NOVEMBER 04 • IMPACT START • The project casts new shadow from **7:39am to 7:51am for 12 minutes**

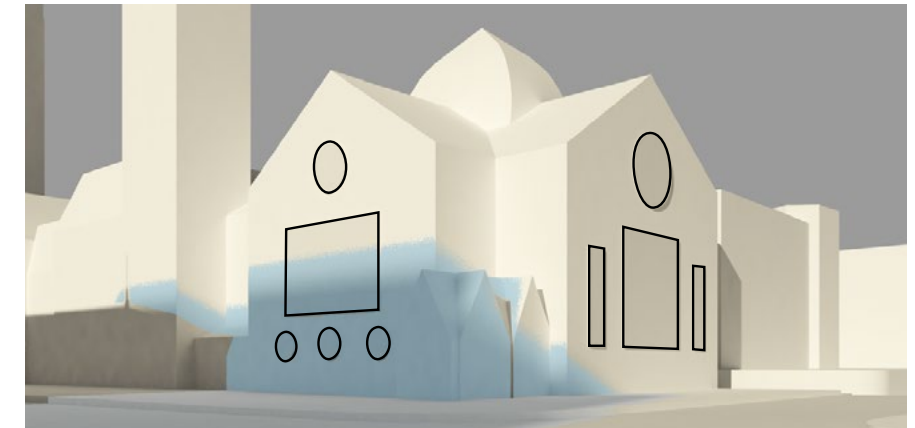
NOVEMBER 09 • The project casts new shadow from **8:20am to 8:35am for 15 minutes**, and from **8:40am to 9:15am for 35 Minutes**, for a total of **50 minutes**.



8:30am EST

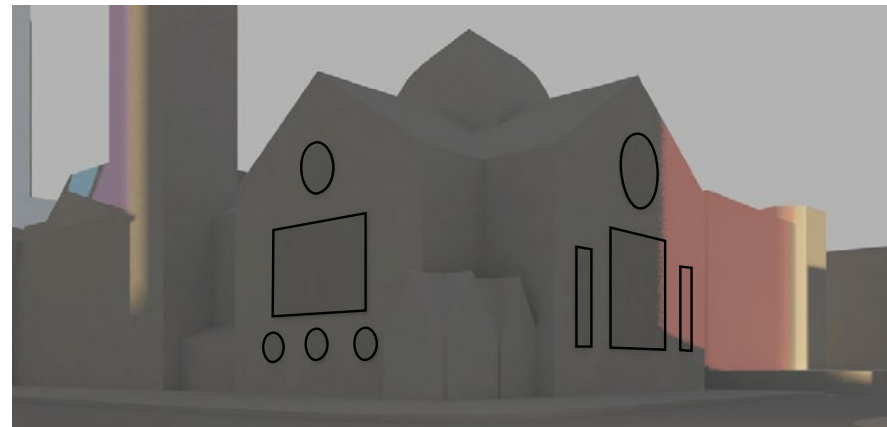


8:45am EST

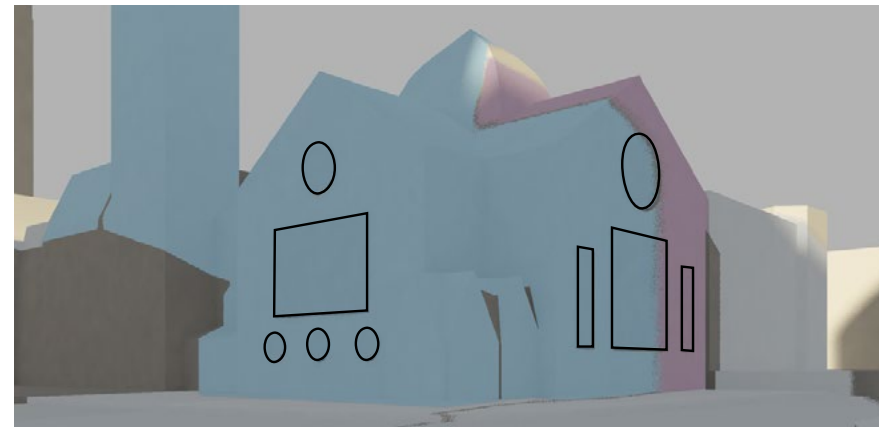


9:05am EST

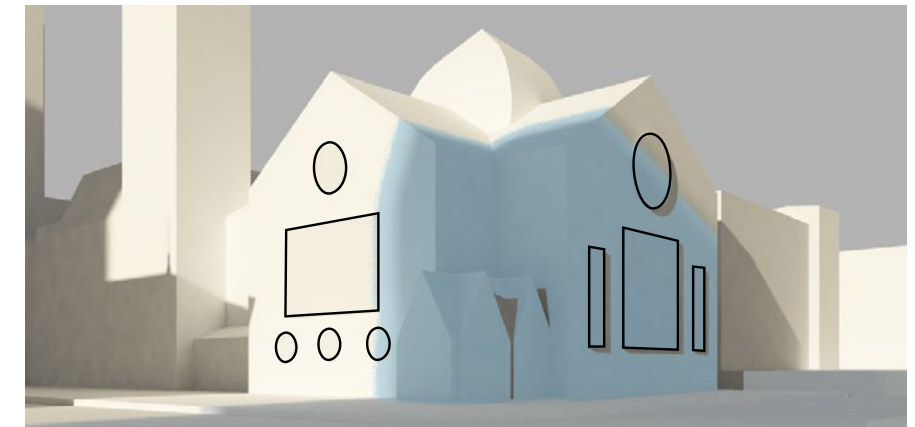
NOVEMBER 30 • The project casts new shadow from **7:45am to 8:00am for 15 minutes**, and from **8:10am to 9:45am for 70 minutes**, for a total of **85 minutes**.



7:55am EST

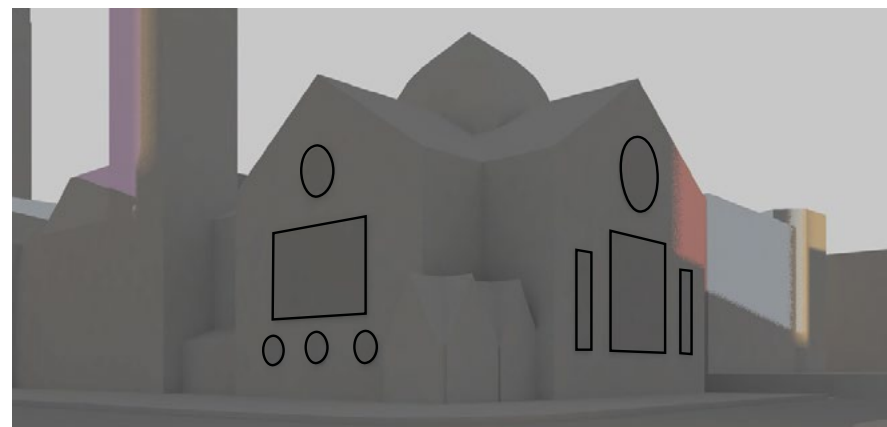


8:45am EST



9:35am EST

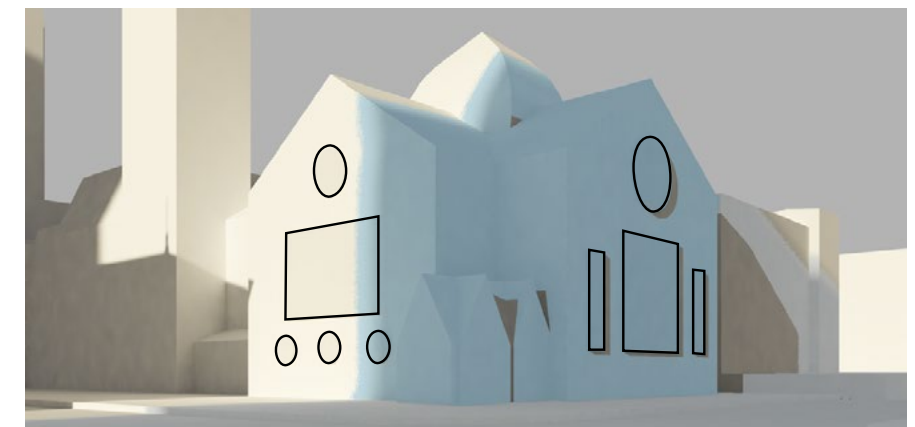
DECEMBER 21 • The project casts new shadow from **7:50am to 8:00am for 10 min**, and from **8:15am to 9:50am for 95 minutes**, for a total of **105 minutes**.



8:00am EST



8:50am EST

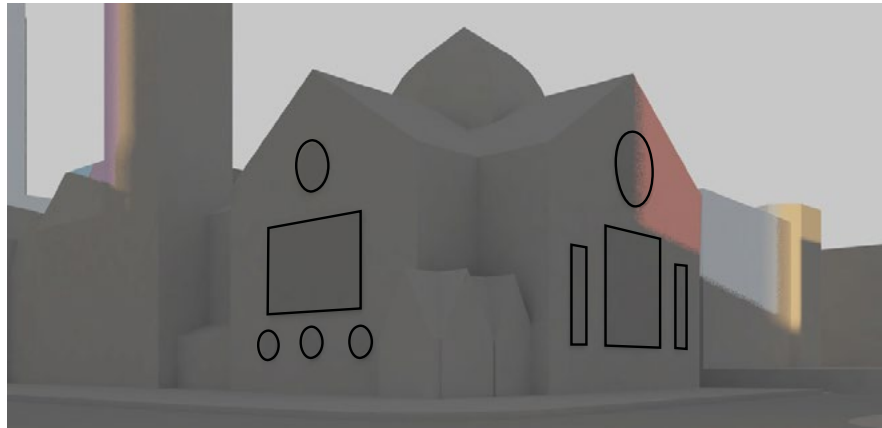


9:40am EST

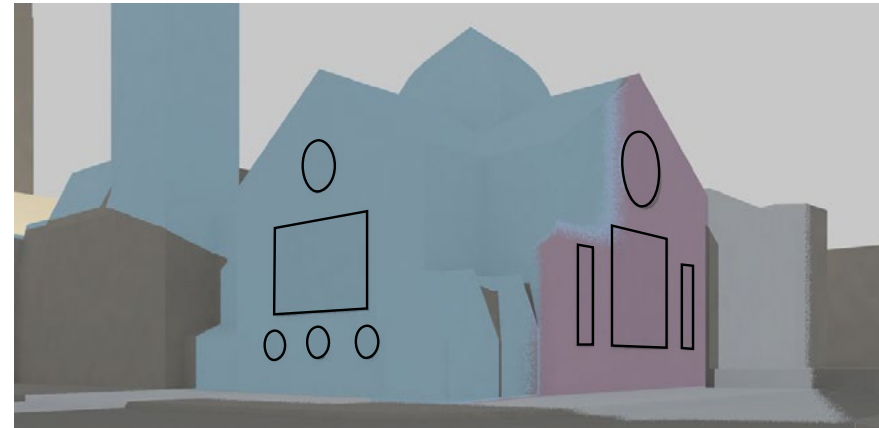
Legend Area Of Existing Shadow Area Of Net New Shadow From Garage West Area Of New New Shadow From Garage East Area Of Net New Shadow From Station East

NEW OLD SOUTH CHURCH WEST AND SOUTH FACADE RESTORED WINDOWS, PAGE 2

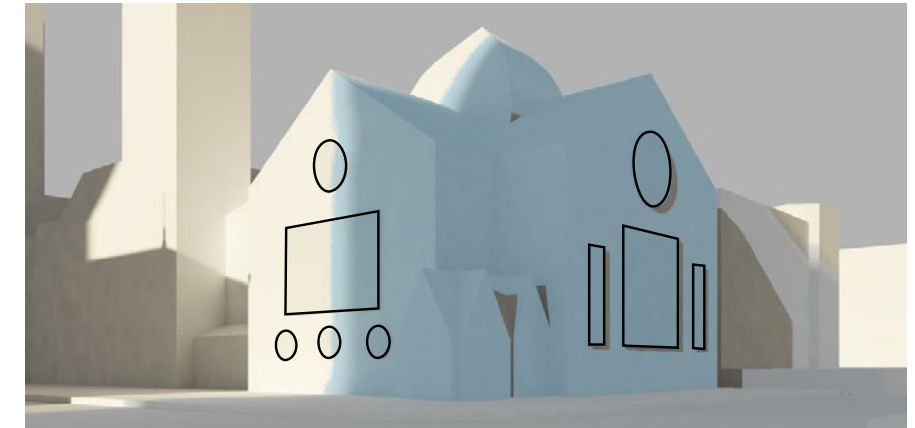
DECEMBER 25 • The project casts new shadow from **7:50am to 8:00am for 10 minutes**, and from **8:20am to 9:50am for 90 minutes**, for a total of 100 minutes.



8:00am EST

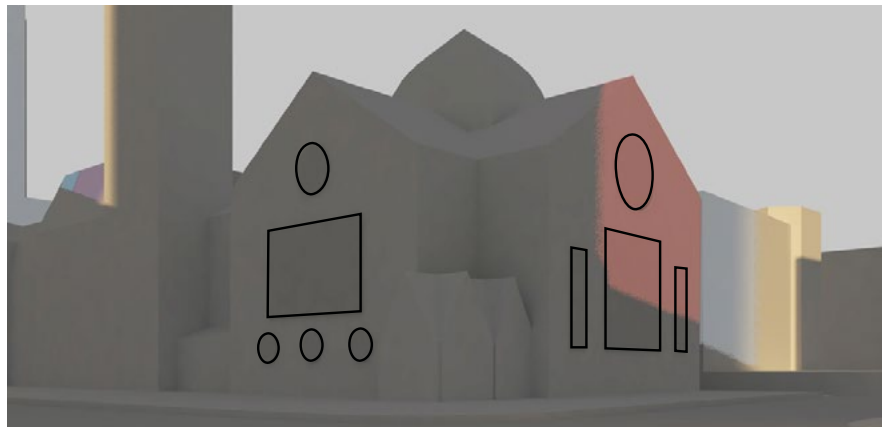


8:50am EST

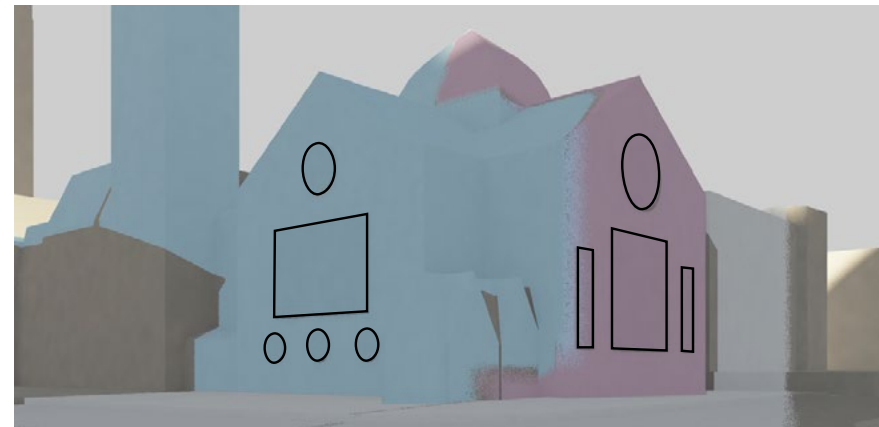


9:40am EST

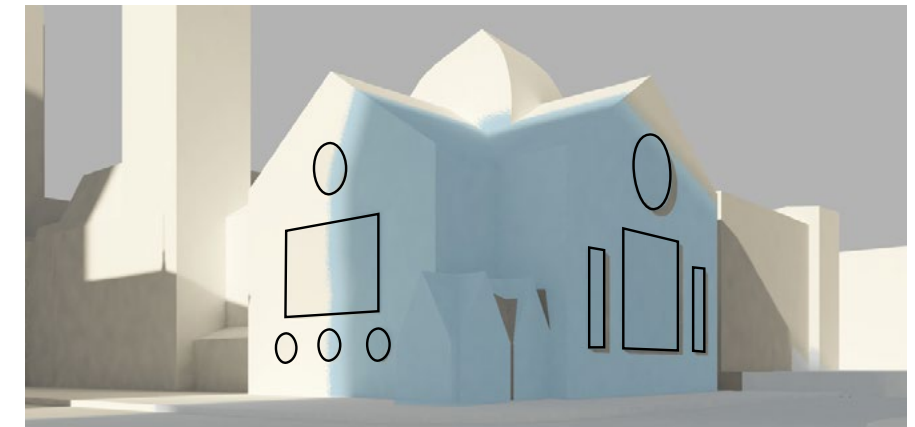
JANUARY 11 • The project casts new shadow from **8:00am to 8:15am for 15 minutes**, and from **8:30am to 10:00am for 90 minutes**, for a total of 105 minutes.



8:10am EST

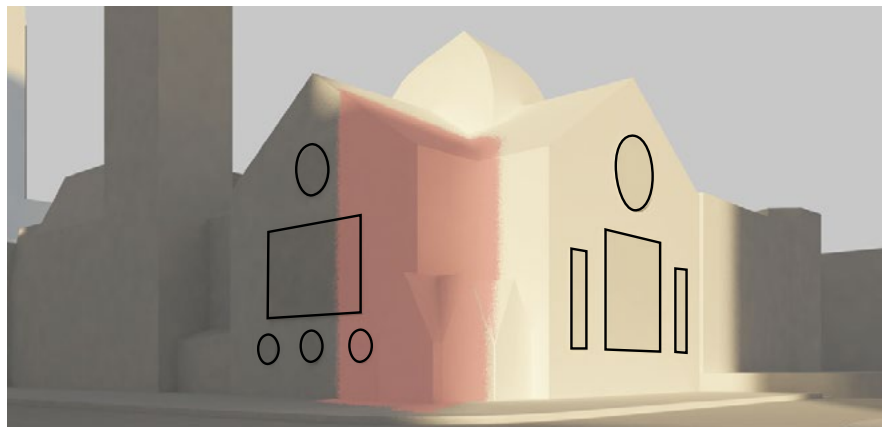


9:00am EST

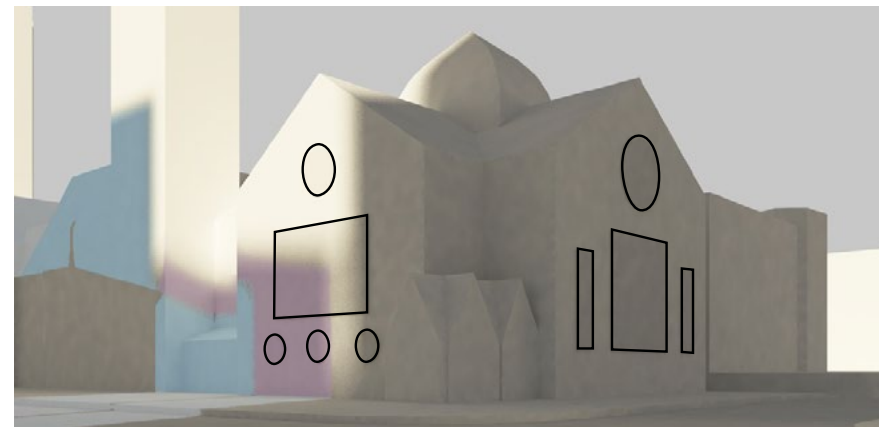


9:50am EST

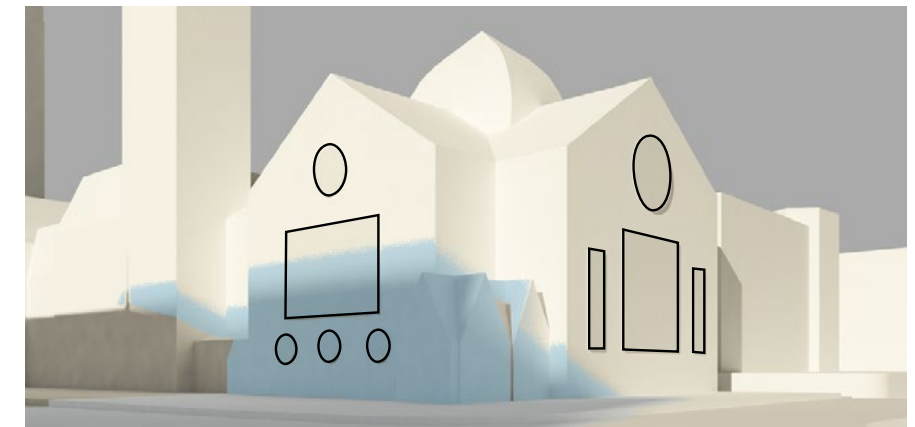
FEBRUARY 01 • The project casts new shadow from **8:05am to 8:35am for 30 minutes**, and from **8:50am to 9:45am for 55 Minutes**, for a total of 85 minutes



8:15am EST



8:55am EST



9:35am EST

FEBRUARY 07 • IMPACT END • The project casts new shadow from **8:10am to 8:21am for 11 minutes**

Legend Area Of Existing Shadow Area Of Net New Shadow From Garage West Area Of New New Shadow From Garage East Area Of Net New Shadow From Station East

TRINITY CHURCH

MARCH 21 AND SEPTEMBER 21 (Equinox)

No Net New Shadow Impact.



9:00am EDT



12:00pm EDT



3:00pm EDT

JUNE 21 (Solstice)

No Net New Shadow Impact.



9:00am EDT



12:00pm EDT



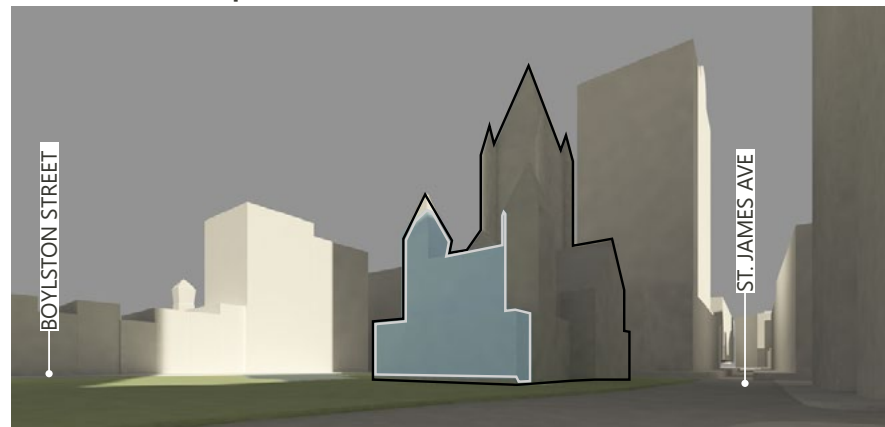
3:00pm EDT

DECEMBER 21 (Solstice)

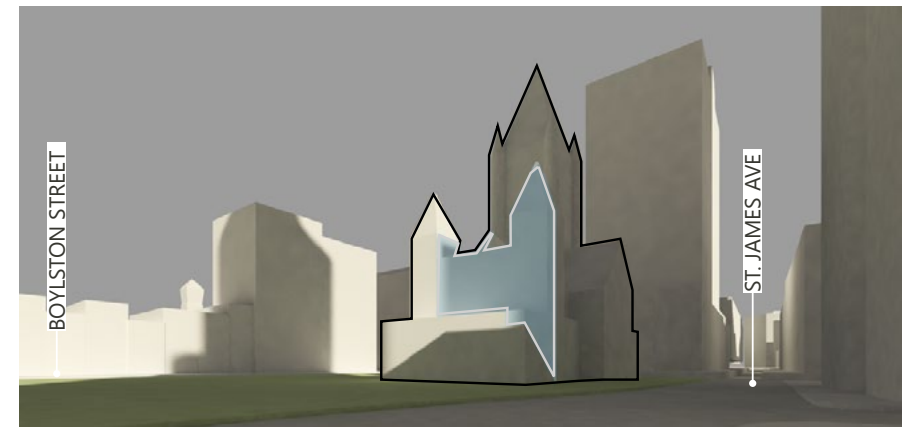
Garage West casts net new shadow on portions of the West Facade of Trinity Church from **11:15am to 12:45pm for a total of 90 Minutes.**



11:30am EST



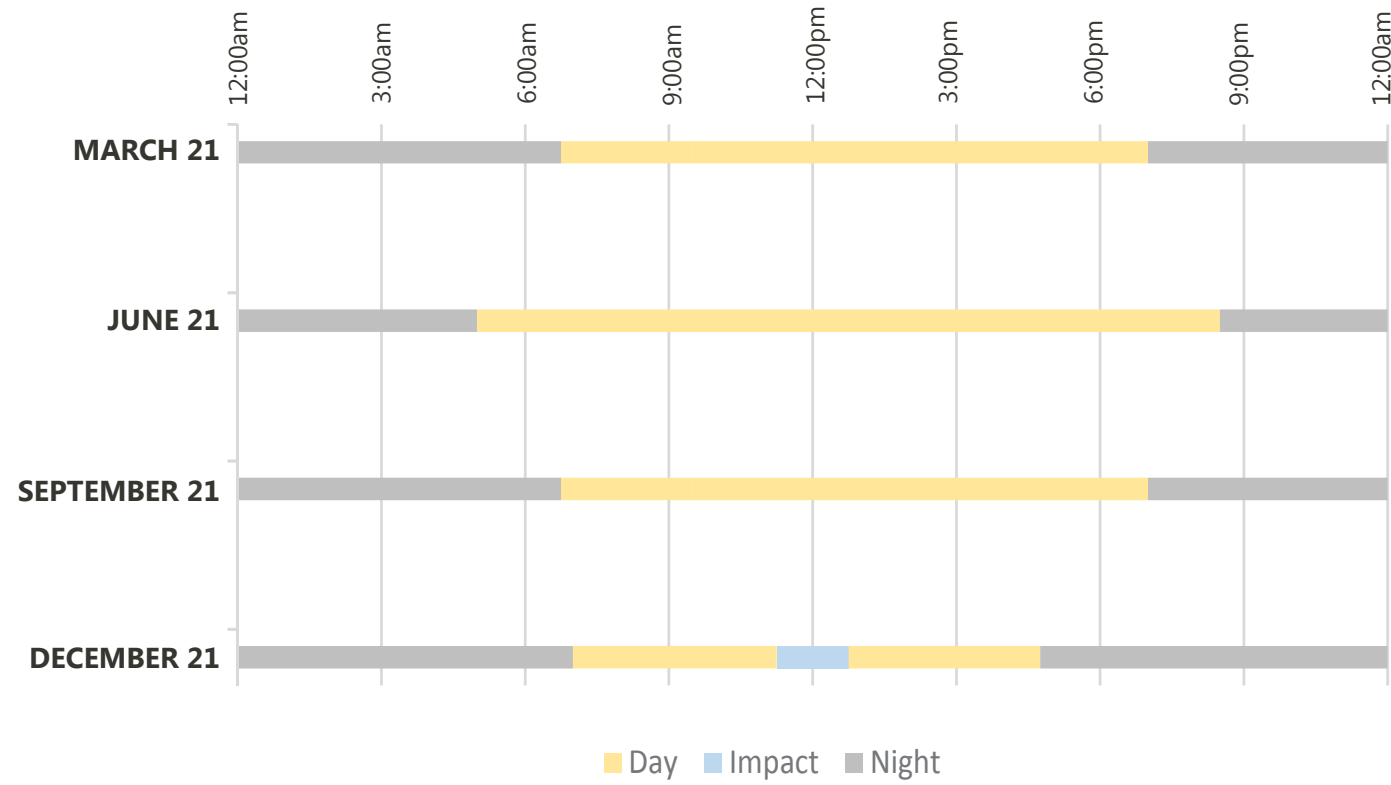
12:00pm EST



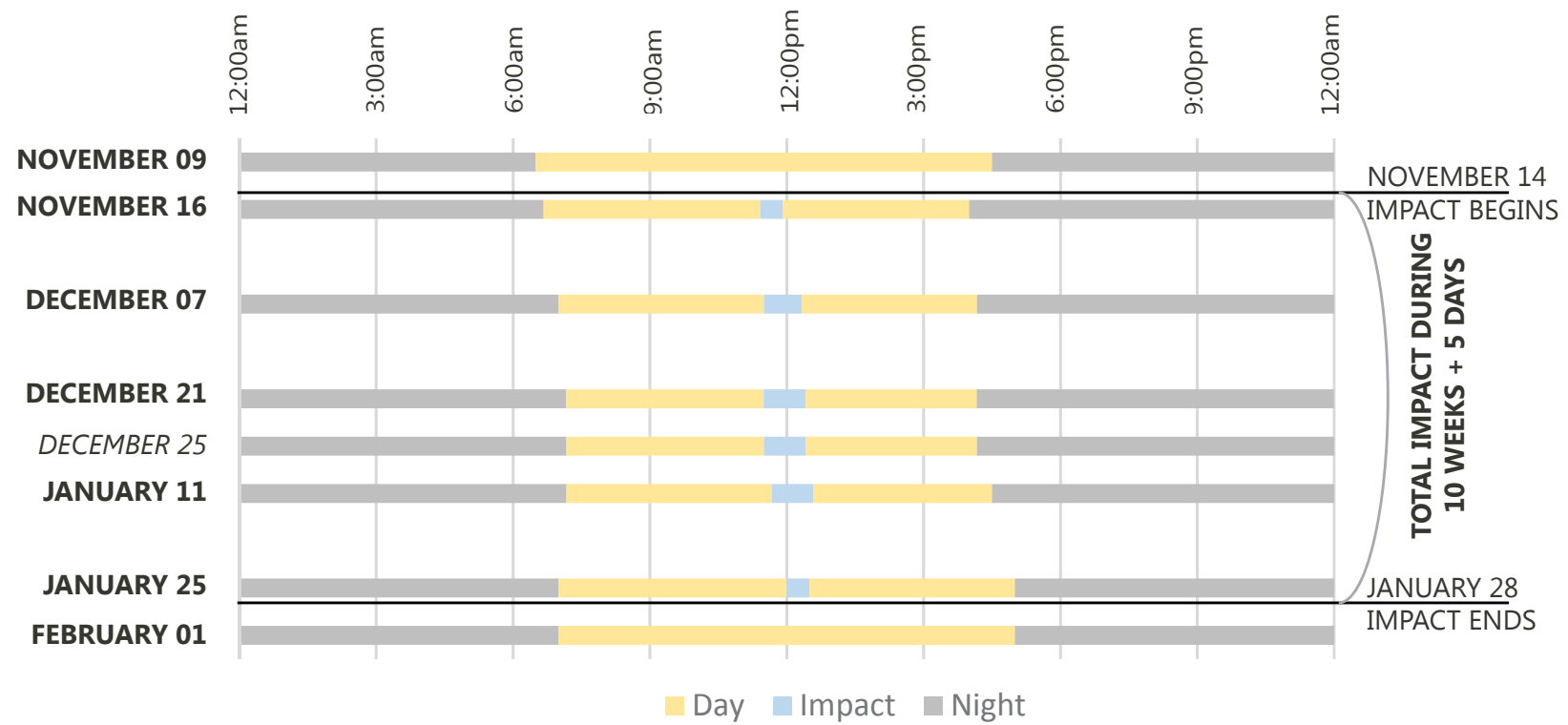
12:30pm EST

Legend Area Of Existing Shadow Area Of Net New Shadow From Garage West Area Of New New Shadow From Garage East Area Of Net New Shadow From Station East

TRINITY CHURCH WINDOWS - YEARLY SOLAR IMPACT CHART



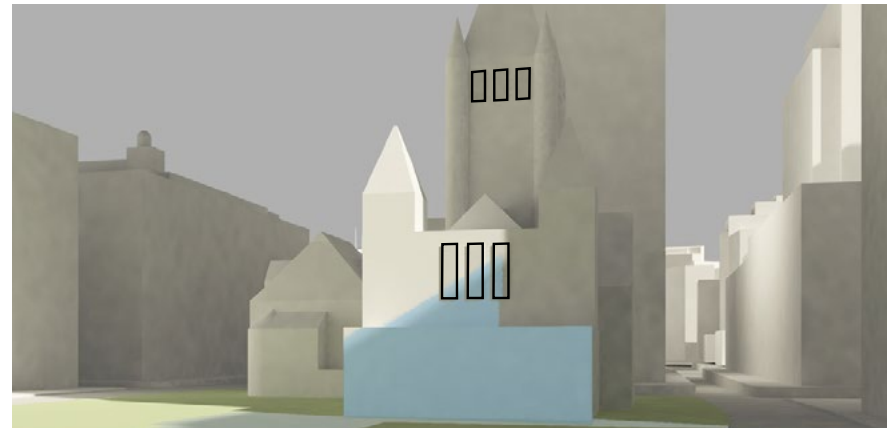
TRINITY CHURCH WINDOWS - WINTER SOLAR IMPACT CHART



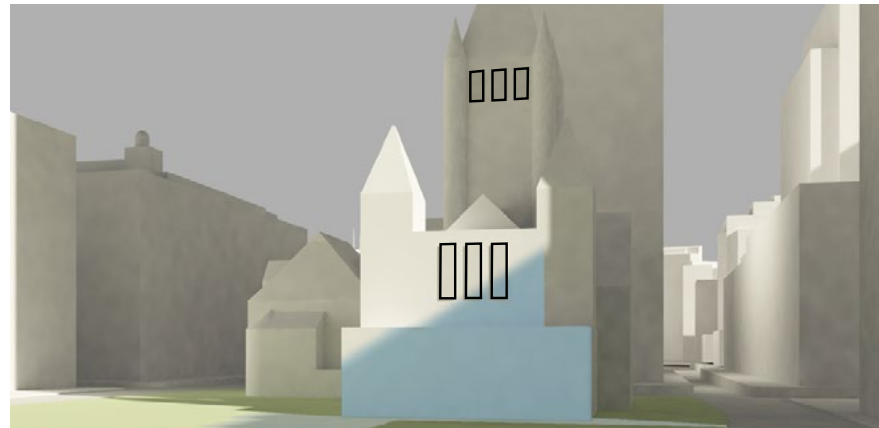
TRINITY CHURCH CHRIST PREACHING WINDOWS IMPACT, PAGE 1

NOVEMBER 14 • IMPACT START • The project casts new shadow from **11:24am to 11:37am for 13 minutes**

NOVEMBER 16 • The project casts new shadow from **11:25am to 11:55am for a total of 30 Minutes**

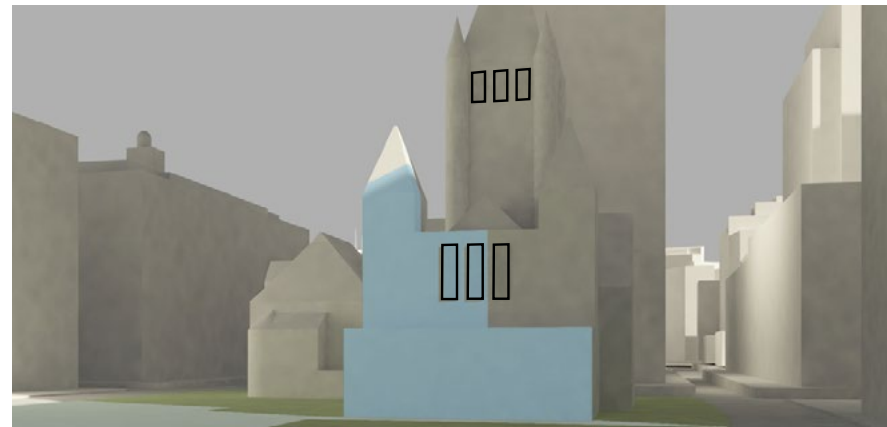


11:35am EST

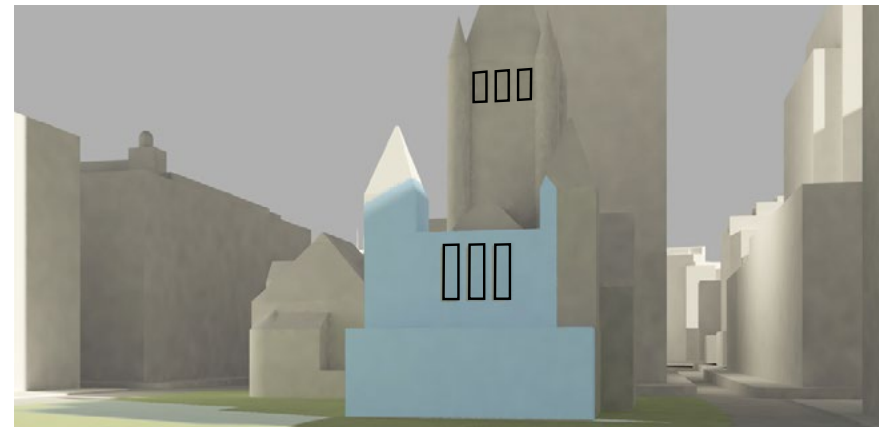


11:45am EST

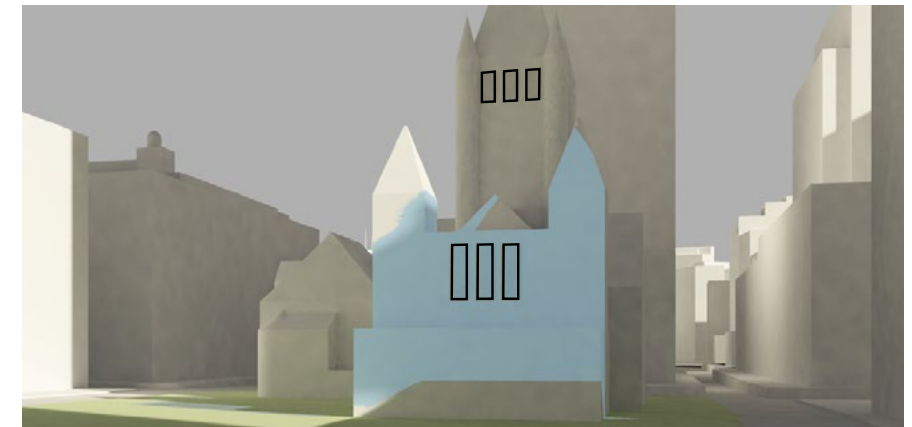
DECEMBER 07 • The project casts new shadow from **11:30am to 12:20pm for a total of 50 Minutes**



11:40am EST

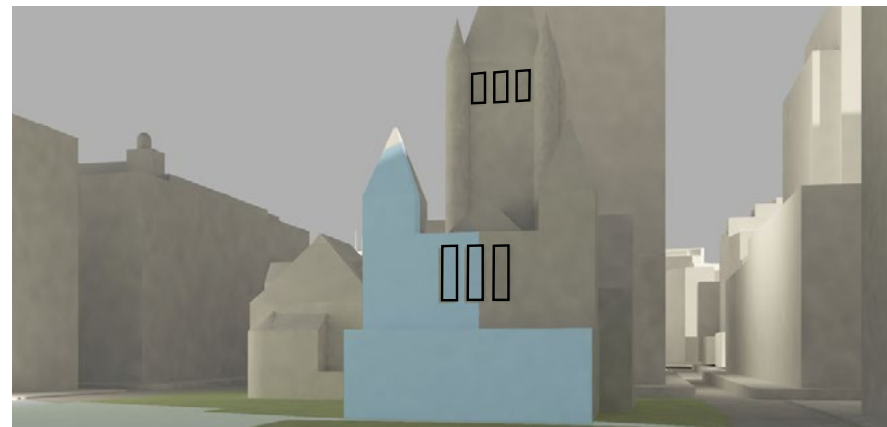


11:55am EST

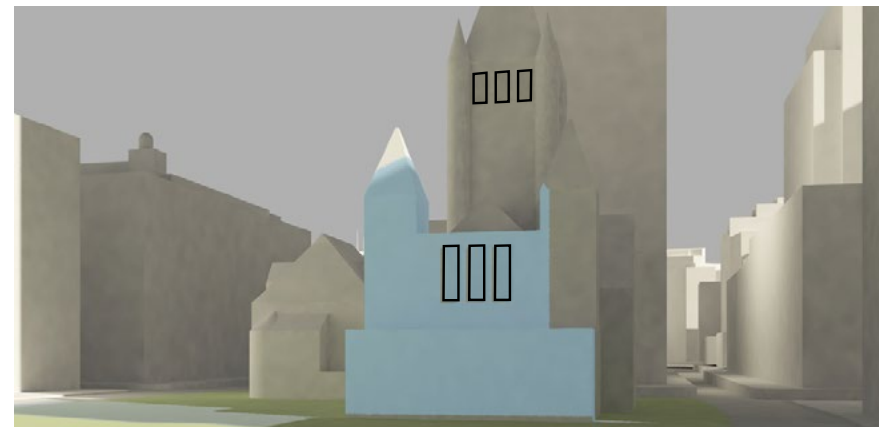


12:10pm EST

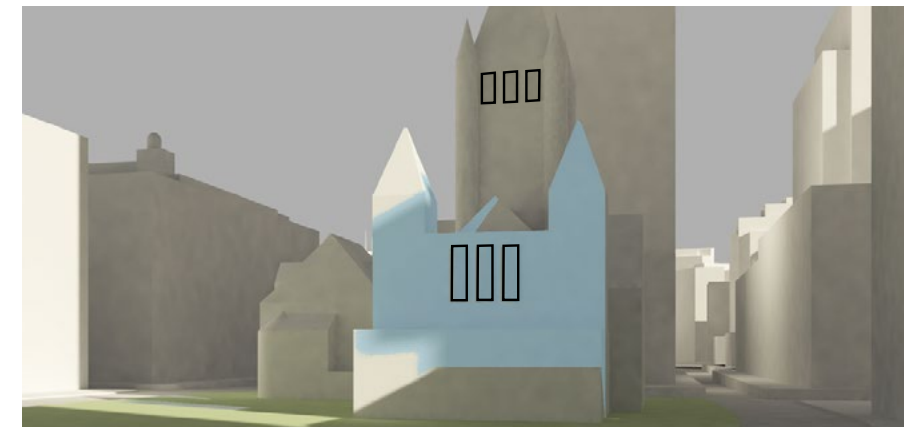
DECEMBER 21 • The project casts new shadow from **11:35am to 12:30pm for a total of 55 Minutes.**



11:45am EST



12:00pm EST

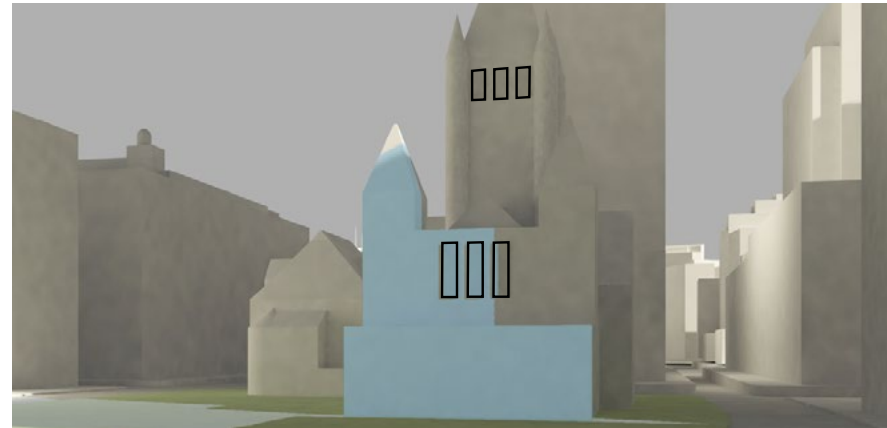


12:20pm EST

Legend Area Of Existing Shadow Area Of Net New Shadow From Garage West Area Of New New Shadow From Garage East Area Of Net New Shadow From Station East

TRINITY CHURCH CHRIST PREACHING WINDOWS IMPACT, PAGE 2

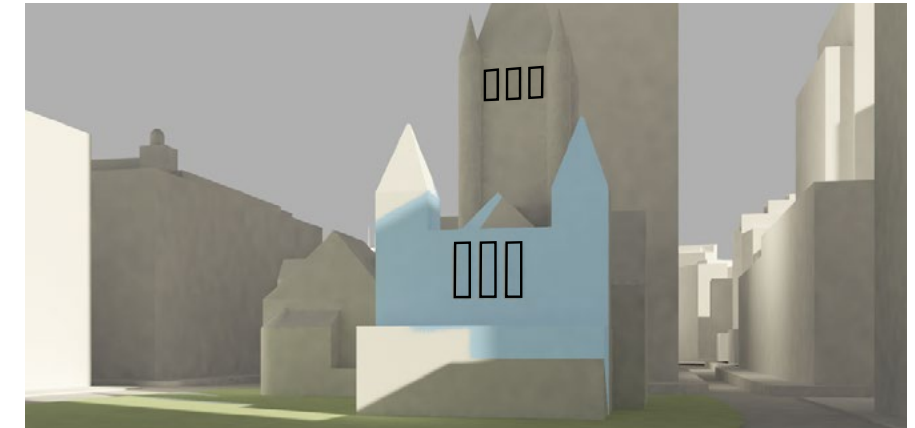
DECEMBER 25 • The project casts new shadow from **11:40am to 12:35pm** for a total of **55 Minutes**



11:50am EST

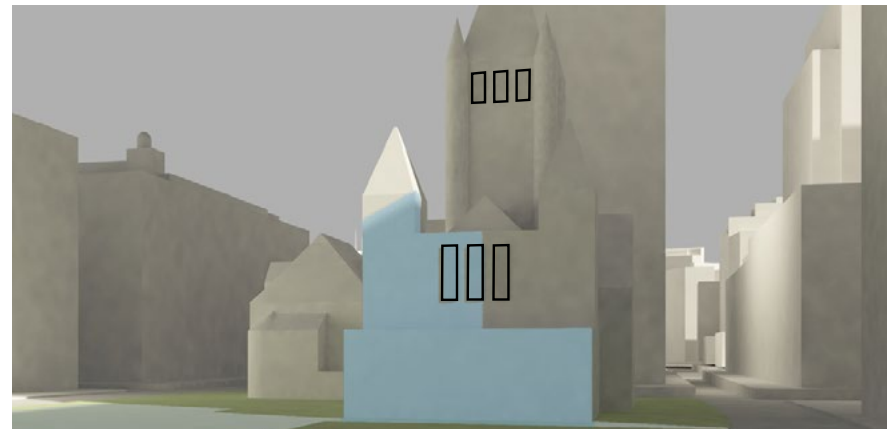


12:05pm EST

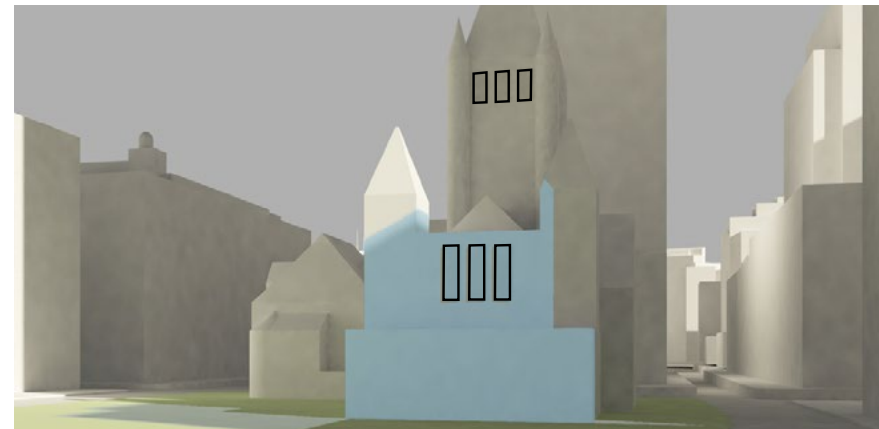


12:25pm EST

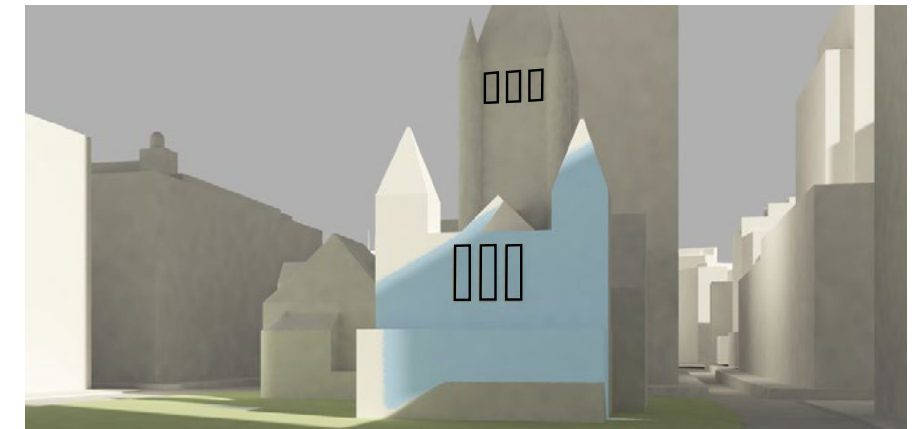
JANUARY 11 • The project casts new shadow from **11:45am to 12:40pm** for a total of **55 Minutes**



11:55am EST



12:10pm EST



12:30pm EST

JANUARY 25 • The project casts new shadow from **11:55am to 12:25pm** for a total of **30 Minutes**.



12:05pm EST



12:15pm EST

JANUARY 28 • IMPACT END • The project casts new shadow from **12:00pm to 12:12pm** for **12 minutes**

Legend Area Of Existing Shadow Area Of Net New Shadow From Garage West Area Of New New Shadow From Garage East Area Of Net New Shadow From Station East

Days with clear skies in Boston **					
	Sunny	Partly Sunny	Total Days With Sun	% Sun*	Total Sun (Hours)
January	9	7	16	53	163
February	8	7	15	56	168
March	8	8	16	57	214
April	7	8	15	56	227
May	6	10	16	58	267
June	7	10	17	63	287
July	7	12	19	65	301
August	9	11	20	65	277
September	10	8	18	63	237
October	11	8	19	60	206
November	8	7	15	50	143
December	9	7	16	52	142
Annual	98	103	201	58	2634

* % Sun measures the percentage of time between sunrise and sunset that sunshine reaches the ground. These amounts are averages based on decades of weather observations.

** Massachusetts National Centers for Environmental Information (formerly the National Climatic Data Center) www.ncdc.noaa.gov/

	NOSC Windows	Trinity Church Windows
Total Annual Hours	134	58
Total Statistical Hours	78	33
% Annual Impact	2.9%	1.3%

An architectural rendering of a modern multi-story building with a glass facade and a ground-level plaza. The building features a prominent glass facade with a grid pattern and a central section with a more textured, perforated facade. The ground level is a bustling plaza with people walking, sitting at outdoor tables, and shops. A sign for "SHOPS AT BACK BAY" is visible on the building's facade. The scene is set in a city environment with other buildings and trees in the background.

HOWARD L. ZIMMERMAN ARCHITECTS, P.C.

HISTORIC PRESERVATIONISTS
ARCHITECTS & ENGINEERS



LYNDHURST MANSION



BROOKLYN GENERAL POST OFFICE & BANKRUPTCY COURT



HEARST TOWER



GRANT'S TOMB



YALE - KLINE BIOLOGY TOWER

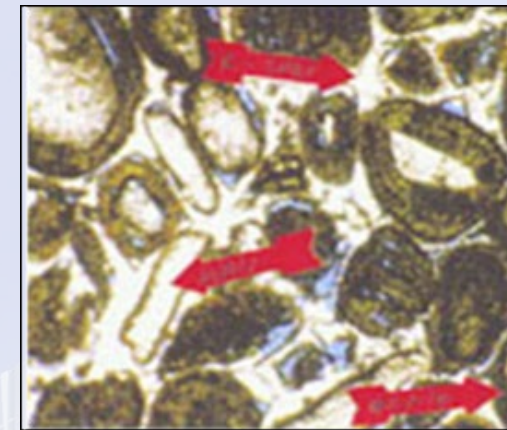
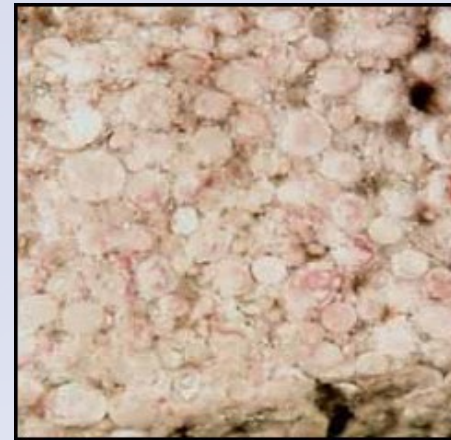
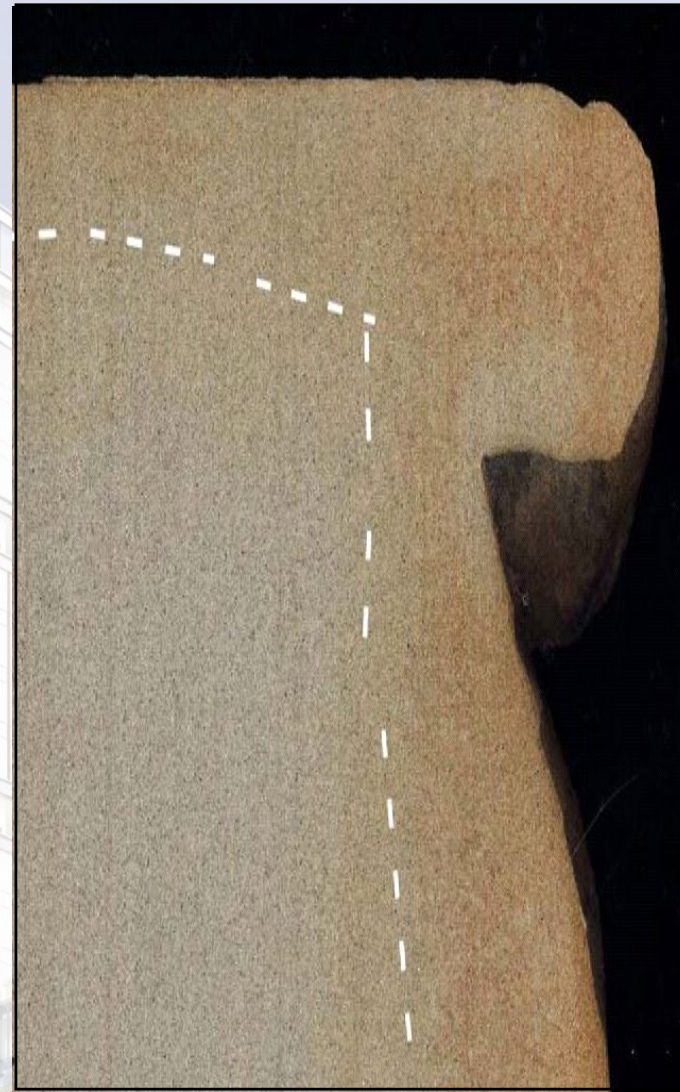


FORMER NYC CANCER HOSPITAL



JEFFERSON MARKET LIBRARY

PREVIOUS FIRMS - COMPLETED PAST PROJECTS





**EAST
LONGMEADOW
SANDSTONE**

**MONSON
GRANITE**

**MONSON
GRANITE**

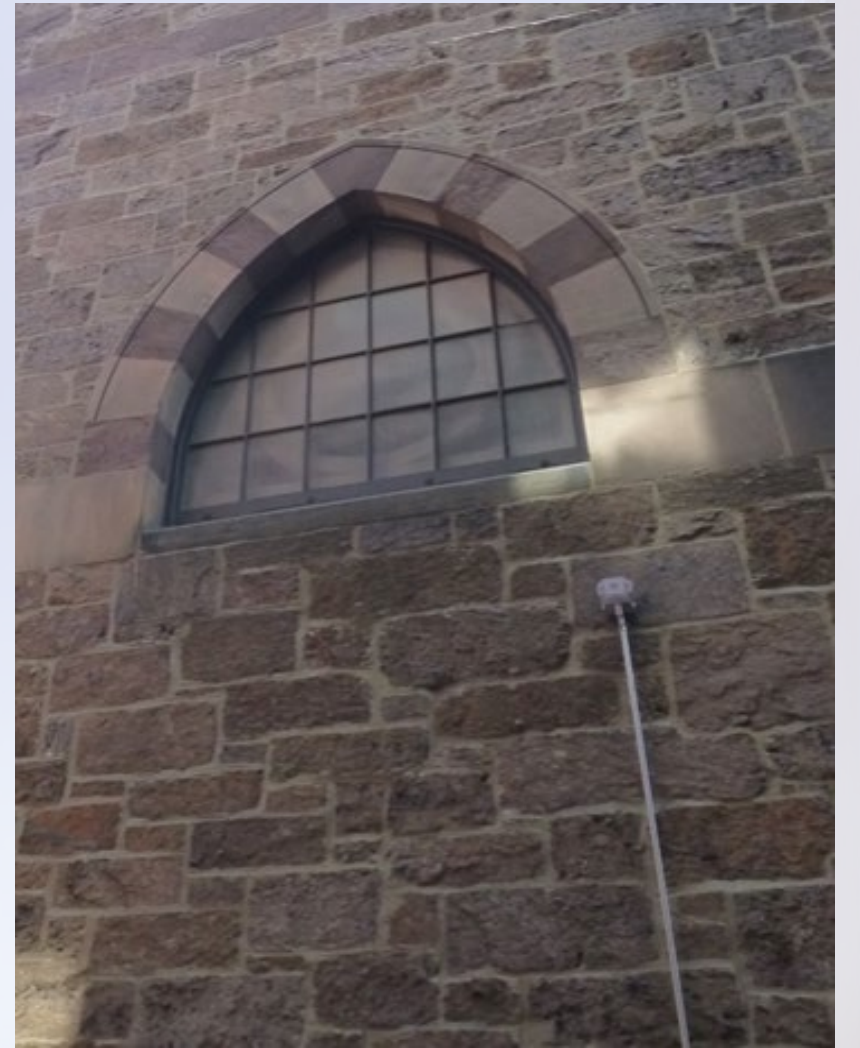
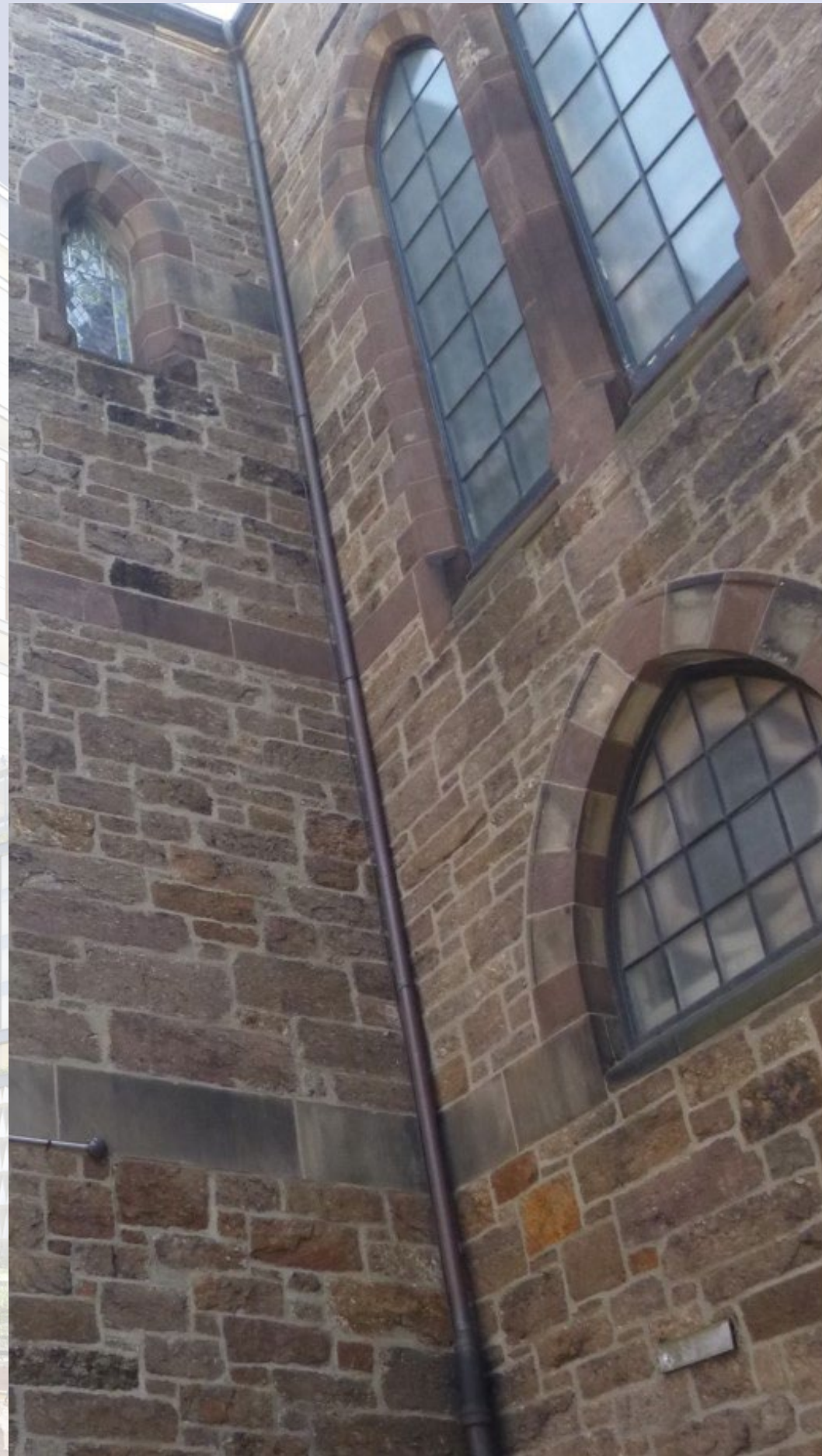
**ROXBURY
CONGLOMERATE**

**SANDSTONE "TYPE 1"
(TAN)**

**SANDSTONE "TYPE 2"
(RED)**

**ROXBURY
CONGLOMERATE**





NEW OLD SOUTH CHURCH EXTERIOR NORTH FACADE



TRINITY CHURCH



NEW OLD SOUTH CHURCH



An architectural rendering of a modern city street scene. The central focus is a multi-story glass skyscraper with a stepped, tiered design. To its right is another tall, slender glass building. The ground level features a pedestrian plaza with people walking, outdoor seating with yellow umbrellas, and storefronts including 'SHOPS AT BACK BAY' and 'Tasty Burgers'. The sky is a clear, light blue.

BUILDING ENVELOPE TECHNOLOGIES, INC.

FACADE/BUILDING MATERIALS SCIENTISTS
HYGROTHERMAL ANALYSIS



PEABODY ESSEX MUSEUM – RESTORATION



PEABODY ESSEX MUSEUM – RESTORATION



ISABELLA STEWART GARDNER MUSEUM



ISABELLA STEWART GARDNER MUSEUM



ISABELLA STEWART GARDNER MUSEUM



27 STATE STREET



27 STATE STREET



134 MASSACHUSETTS AVENUE



134 MASSACHUSETTS AVENUE



134 MASSACHUSETTS AVENUE



133 FEDERAL - WEATHER



YWCA - BOSTON



YWCA - BOSTON



YWCA - BOSTON



TENT CITY - BOSTON



TENT CITY - BOSTON



TENT CITY - BOSTON



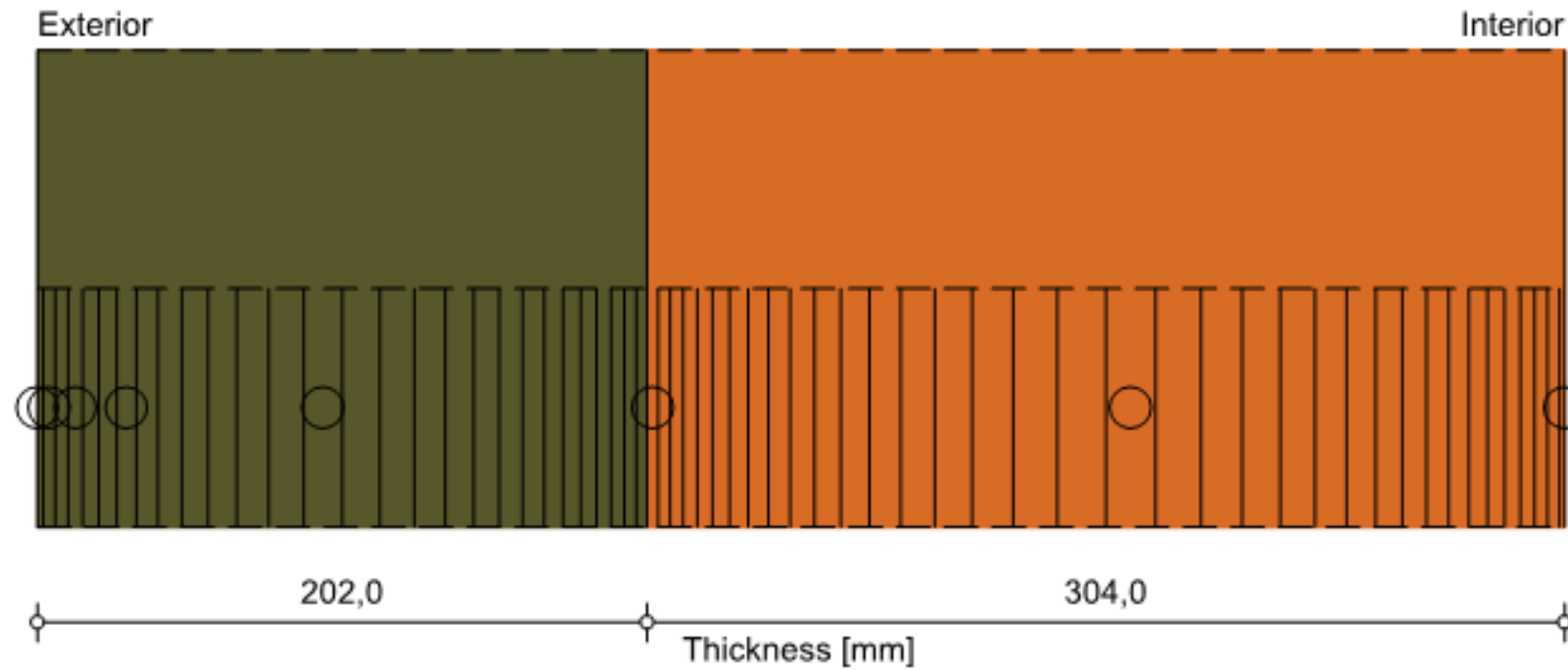
5 CHANNEL STREET



5 CHANNEL STREET

HYGROTHERMAL ANALYSIS - EXAMPLE CASE


Component Assembly



○ - Monitor positions

Materials :

 - Rütthener Sandstone

 - Solid Brick, historical

Total thickness: 0,51 m
R-Value: 0,6 m²K/W
U-Value: 1,274 W/m²K

Project/Case: Gateway/#1 North

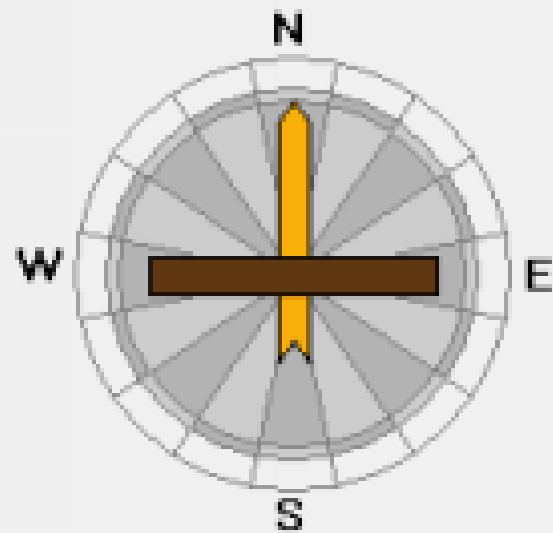
Assembly/Monitor Positions

Orientation/Inclination/Height

Surface Transfer Coeff.

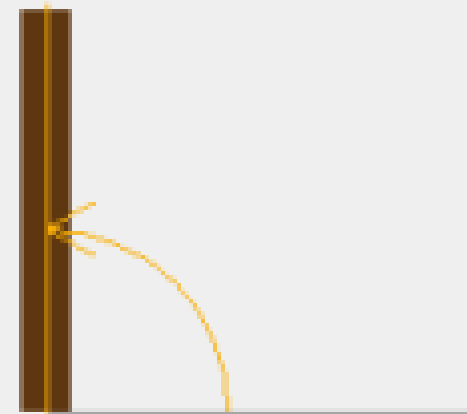
Initial Conditions

Orientation



North

Inclination

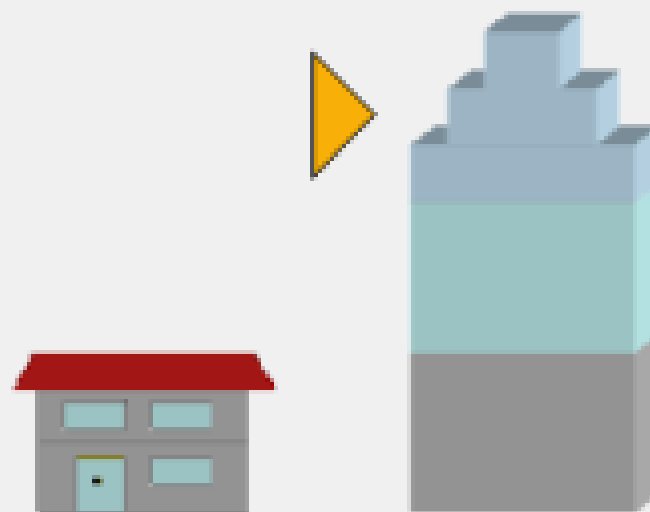


Inclination [°]

90

Building Height/Driving Rain Coefficients

Rain load calculation according to ASHRAE Standard 160P



R1 [-]

0

R2 [s/m]

0.2

Note:

Rain Load =

$\text{Rain} \cdot (R1 + R2 \cdot \text{Wind Velocity})$

Tall Building, upper part, more than 20 m

Project/Case: Gateway/#1 North

Outdoor Climate (Left Side) | Indoor Climate (Right Side)

Map/File | Sine Curves | EN 13788 | EN 15026 | ASHRAE 160

Climate File: Boston; cold year | Details... | Browse...

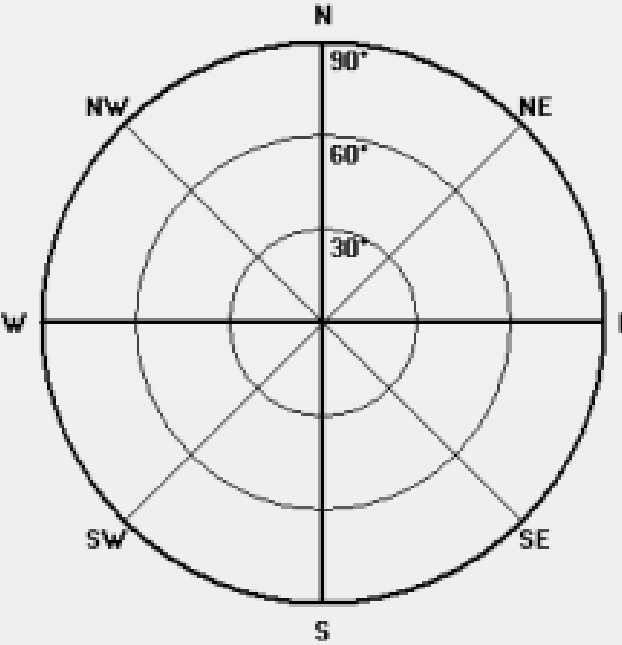
Temperature / Relative Humidity | Climate Analysis

Mean Temperature [°C]: -
 Max. Temperature [°C]: -
 Min. Temperature [°C]: -

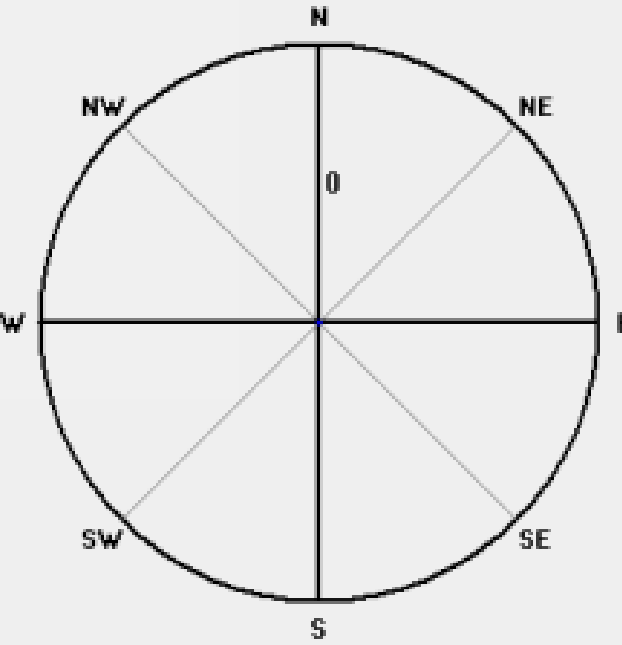
Analyze

Mean Relative Humidity [%]: -
 Max. Relative Humidity [%]: -
 Min. Relative Humidity [%]: -
 Normal Rain Sum [mm/a]: -

Solar Radiation Sum [kWh/m²a]



Driving Rain Sum [mm/a]



Project/Case: Gateway/#1 North

Outdoor Climate (Left Side) | Indoor Climate (Right Side)

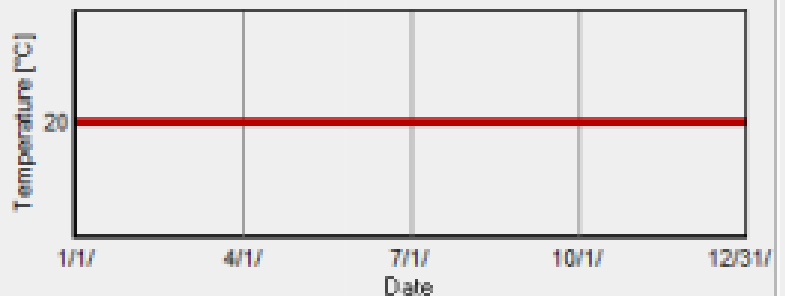
Map/File | Sine Curves | EN 13788 | EN 15026 | ASHRAE 160

derived from: Boston; cold year | Details... | Browse... | Use Left Climate

Temperature / Relative Humidity

Temperature

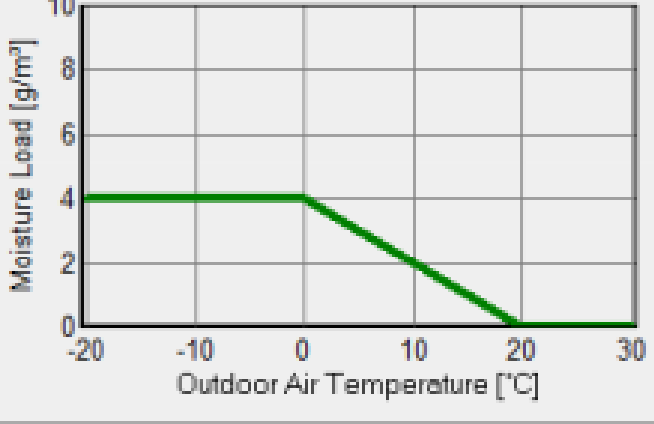
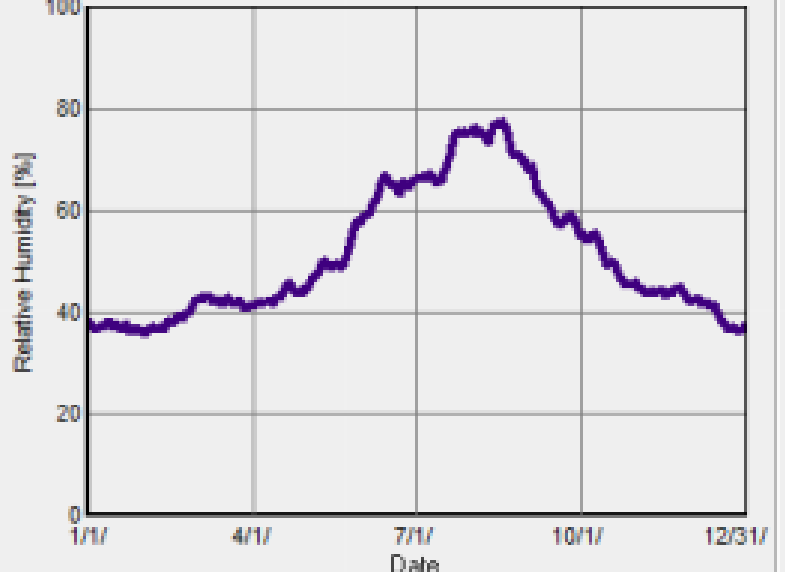
Indoor Temp. [°C] 20



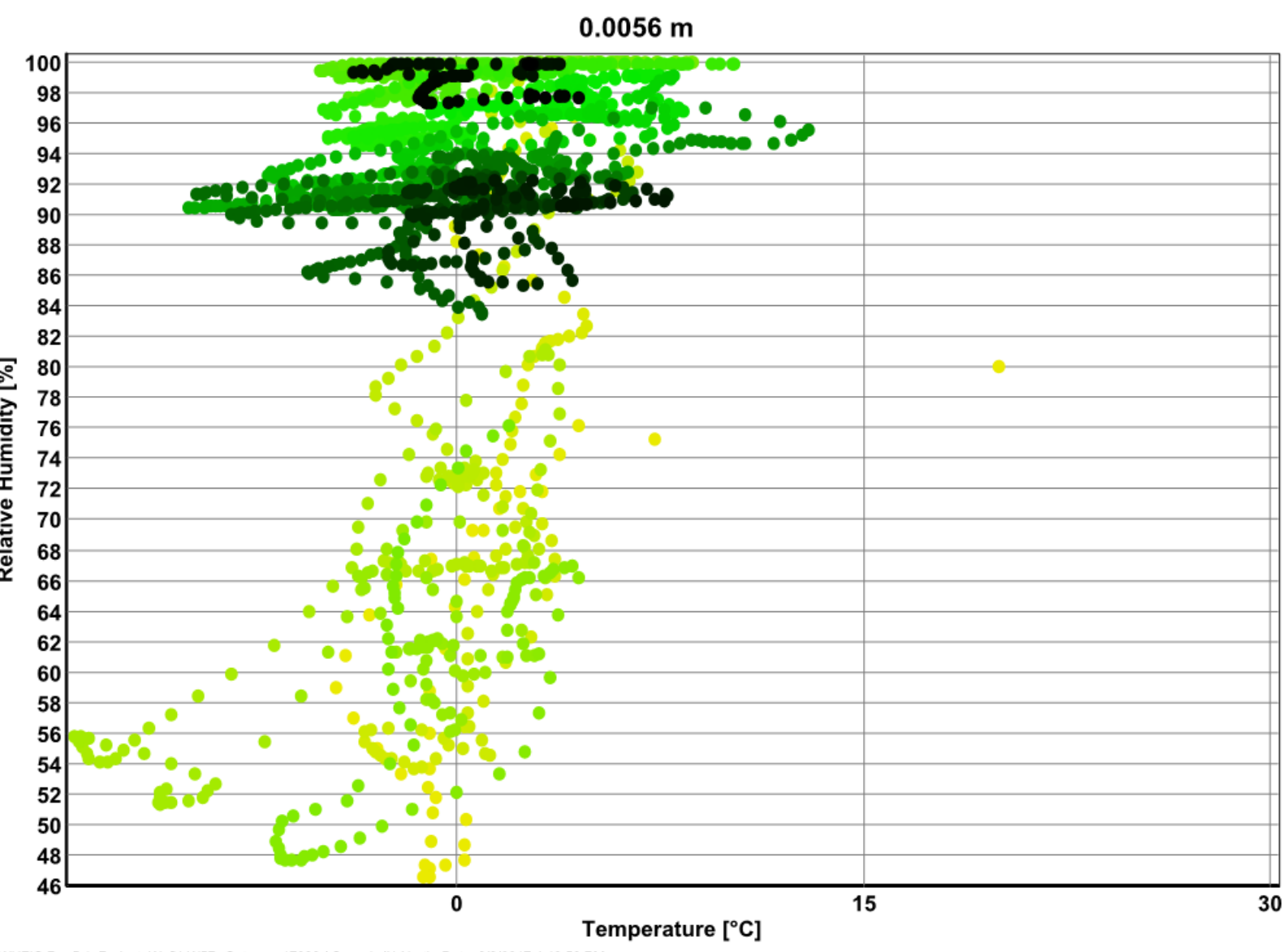
Relative Humidity

Humidity Class 2

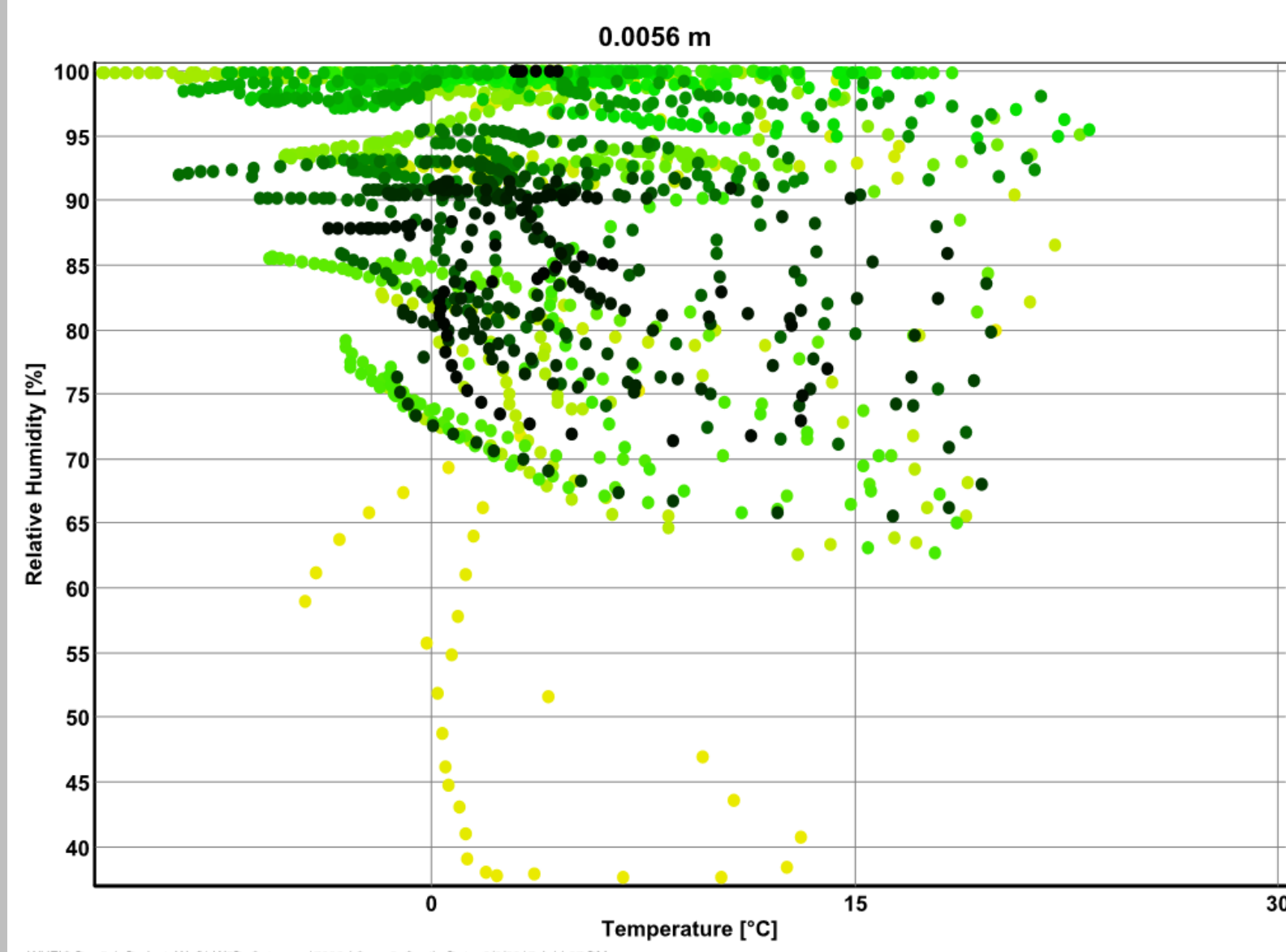
Graph

HYGROTHERMAL ANALYSIS



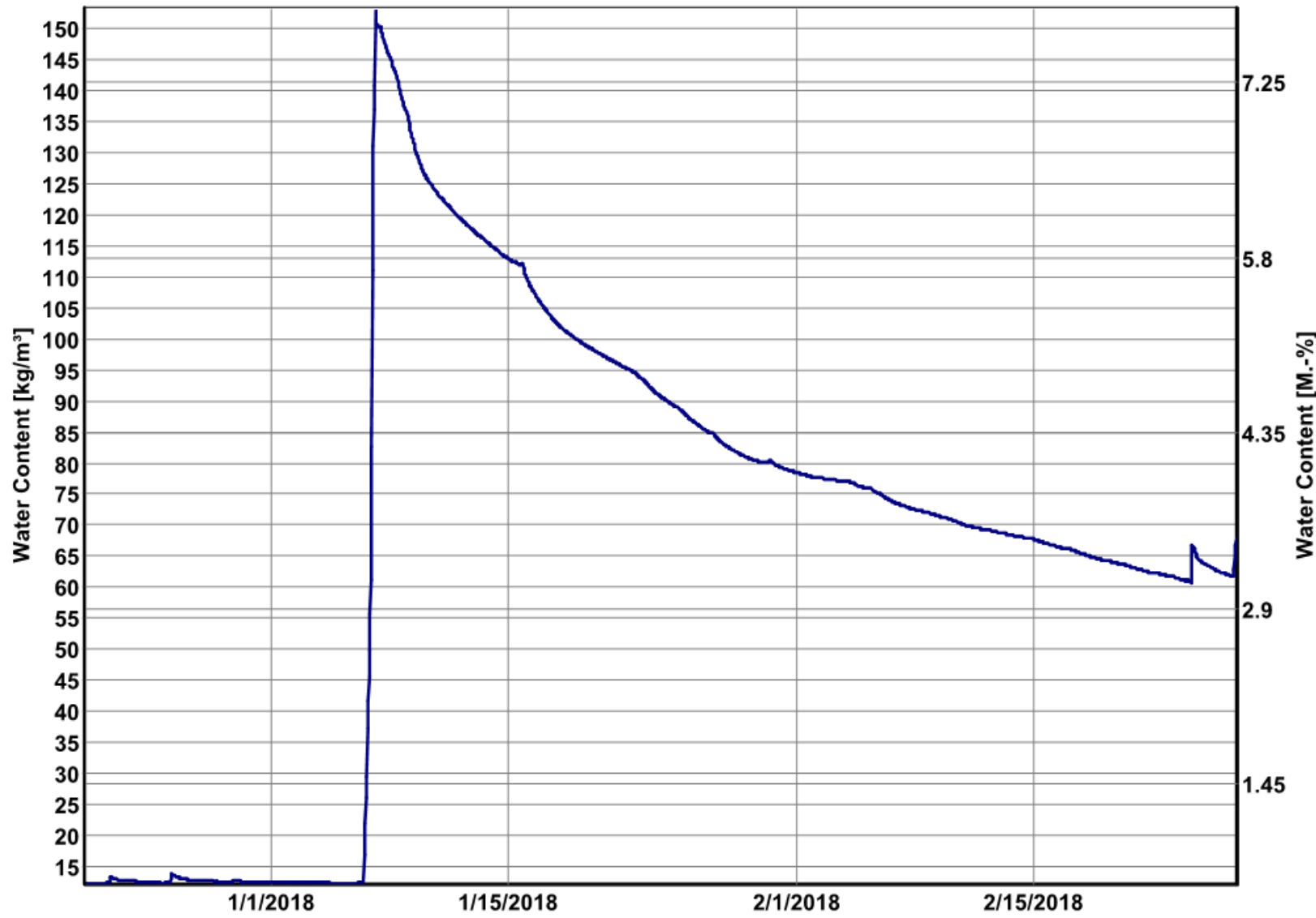
NORTH FACADE



SOUTH FACADE

HYGROTHERMAL - WUFI

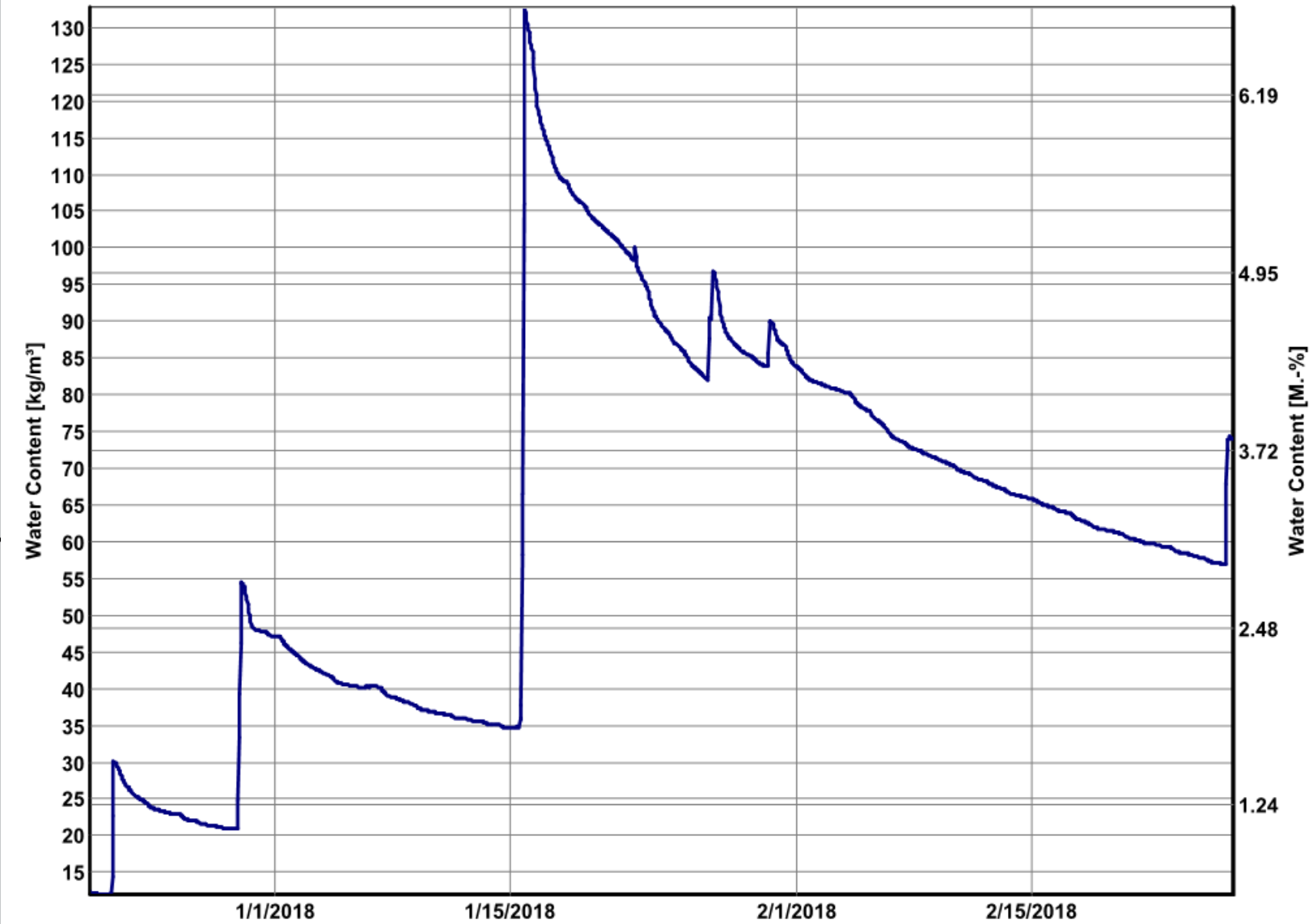
Rüthener Sandstone



WUFI® Pro 5.1; Project: Wufi1.W5P; Gateway,17036 / Case 1: #1 North; Date: 9/9/2017 4:37:24 PM

NORTH FACADE

Rüthener Sandstone



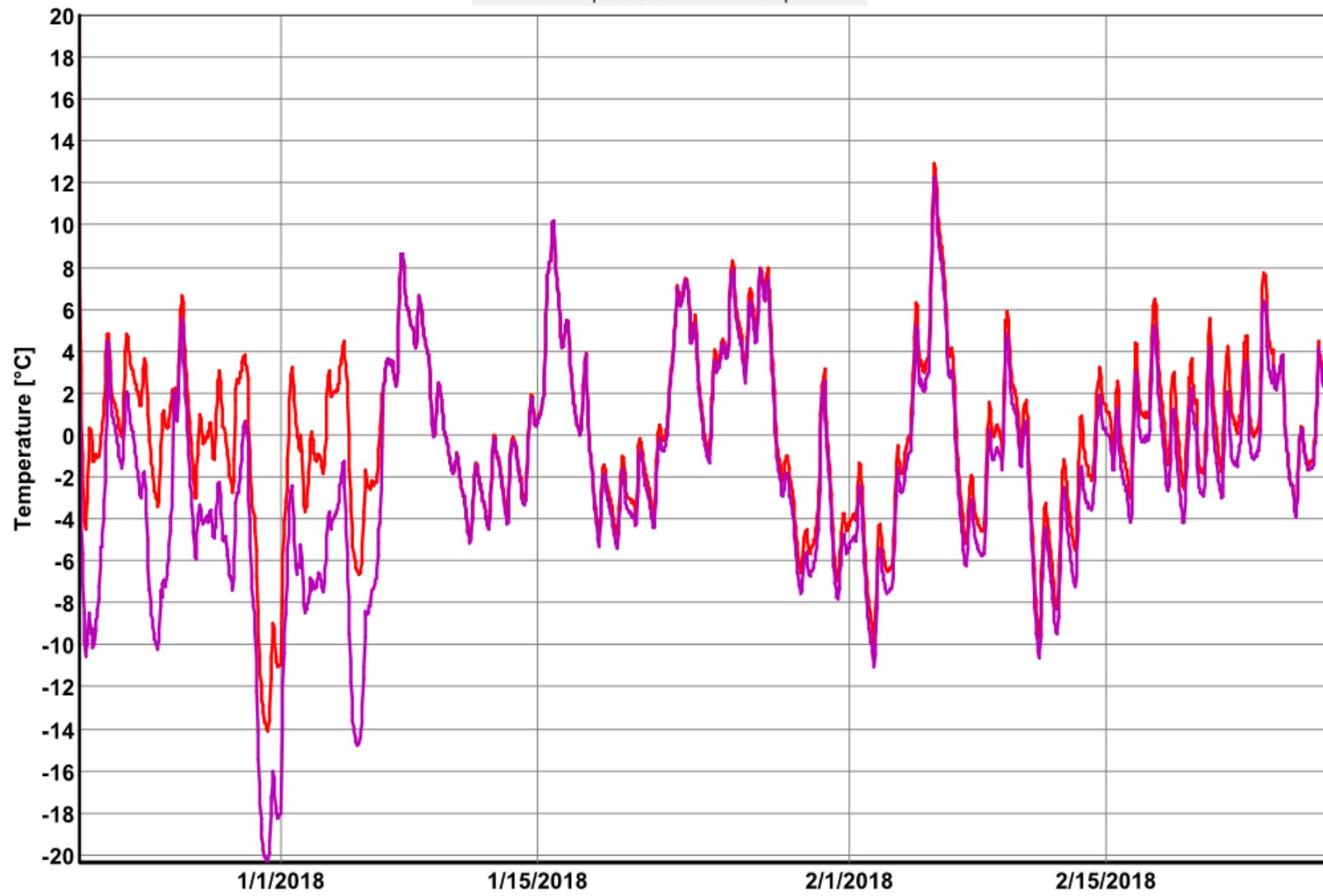
WUFI® Pro 5.1; Project: Wufi1.W5P; Gateway,17036 / Case 2: South; Date: 9/11/2017 9:54:20 AM

SOUTH FACADE

HYGROTHERMAL ANALYSIS

0.0056 m

Temperature Dewpoint

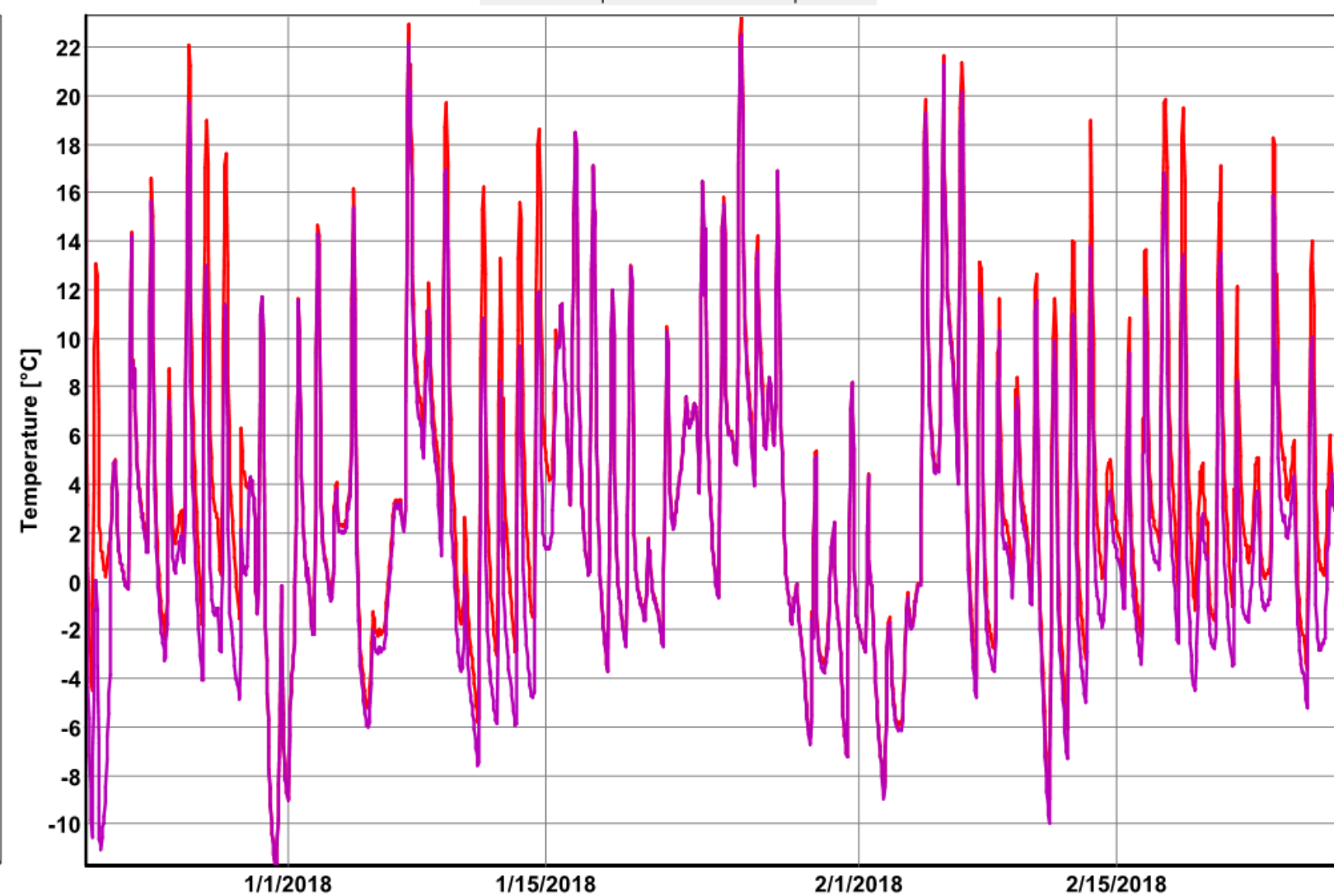


WUFI® Pro 5.1; Project: Wufi1.W5P; Gateway,17036 / Case 1: #1 North; Date: 9/9/2017 4:39:51 PM

NORTH FACADE

0.0056 m

Temperature Dewpoint



WUFI® Pro 5.1; Project: Wufi1.W5P; Gateway,17036 / Case 2: South; Date: 9/9/2017 4:41:22 PM

SOUTH FACADE

HYGROTHERMAL ANALYSIS



VIDARIS

ENVELOPE, SUSTAINABILITY, ENERGY EFFICIENCY CONSULTANTS

EVALUATING HEAT & MOISTURE TRANSPORT IN BUILDING ENVELOPES

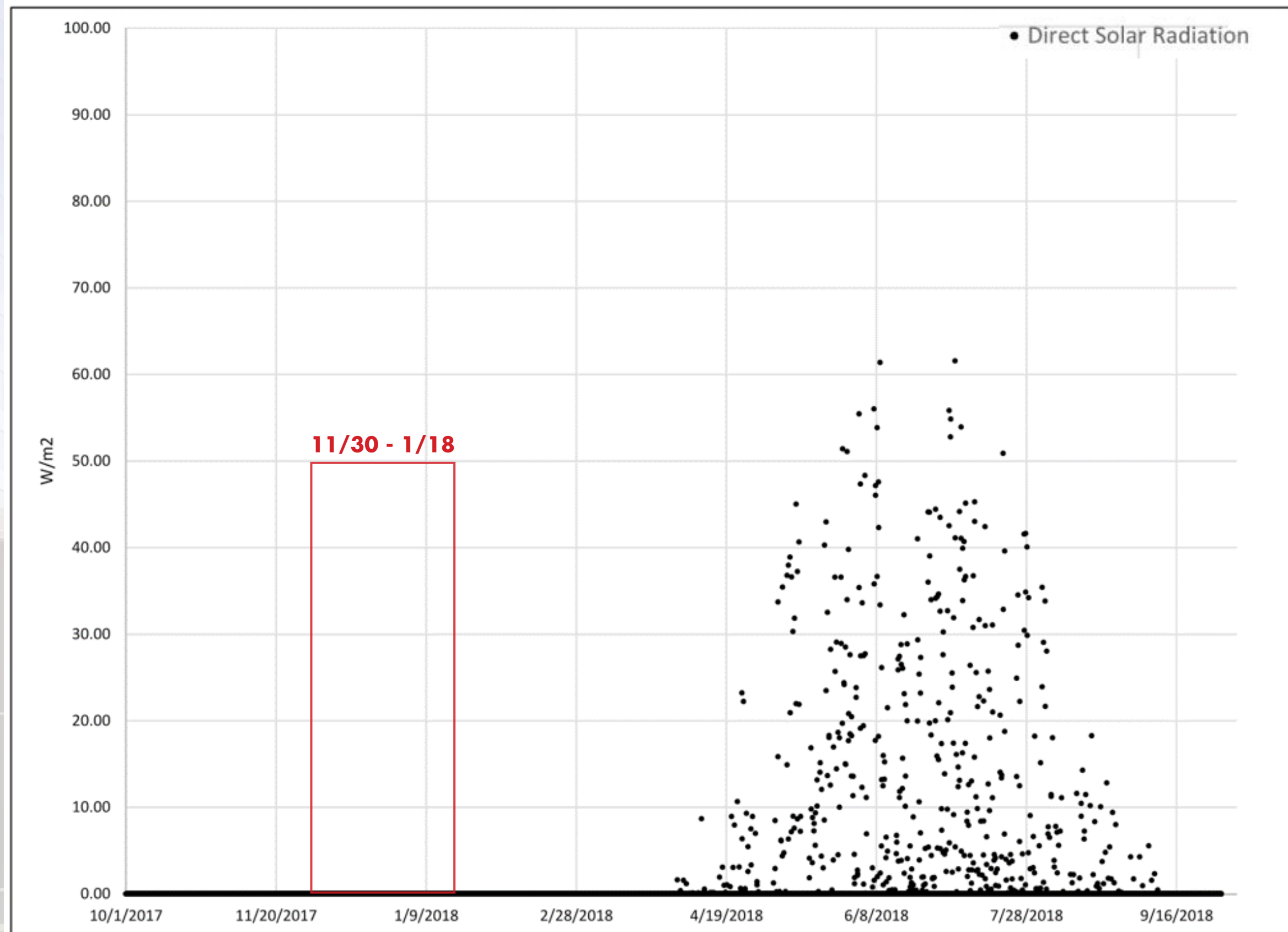
Primary Factors:

- Materials
 - Density, Porosity, Heat Capacity, Conductivity, Permeability
 - Moisture Storage -Vs- Humidity, Liquid Transport -Vs- Water Content
 - Permeability -Vs- Water Content
- Orientation, Inclination, Driving Rain Coefficients
- Surface Transfer Coefficients
 - Heat Resistance, Permeance, Radiation Absorptivity, Ground Reflectivity, Adhering Fraction Of Rain
- Initial Conditions
 - Moisture, Temperature, Relative Humidity
- Indoor And Outdoor Climate
 - Outdoor Data: Rain, Radiation (Direct, Diffuse, Reflected), Temperature, Humidity

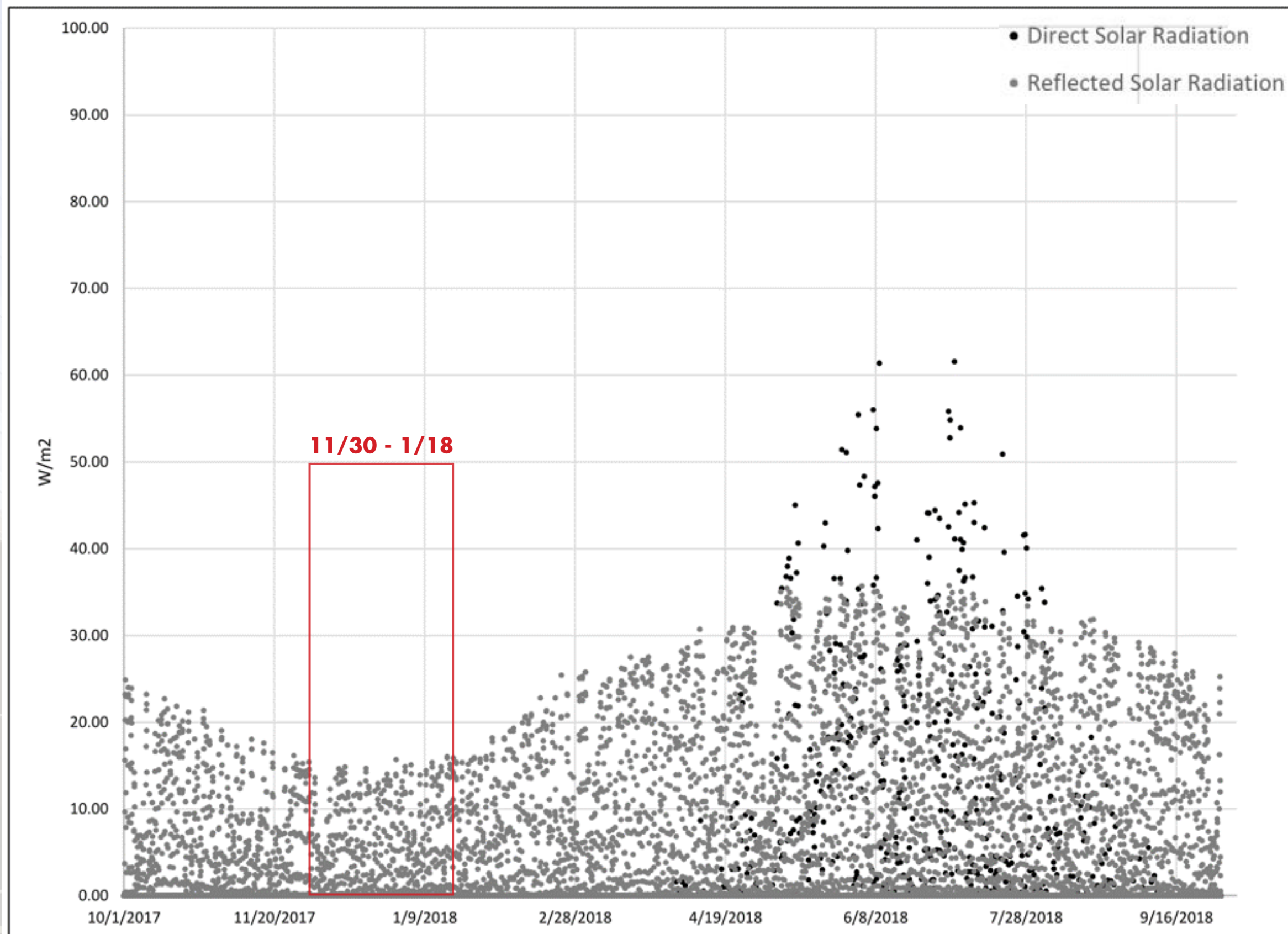
SUNLIGHT AND SHADOWS

- Solar Radiation = Direct + Diffuse + Reflected
 - Direct Radiation: Straight Line Sunlight From The Sun Down To Earth's Surface
 - Diffuse Radiation: Sunlight Scattered By Air And Clouds
 - Reflected Radiation: Sunlight Reflected Off Of Non-Atmospheric Things (Such As The Ground)
- Transient Shadows = Short-Term Reduction In Solar Radiation Intensity

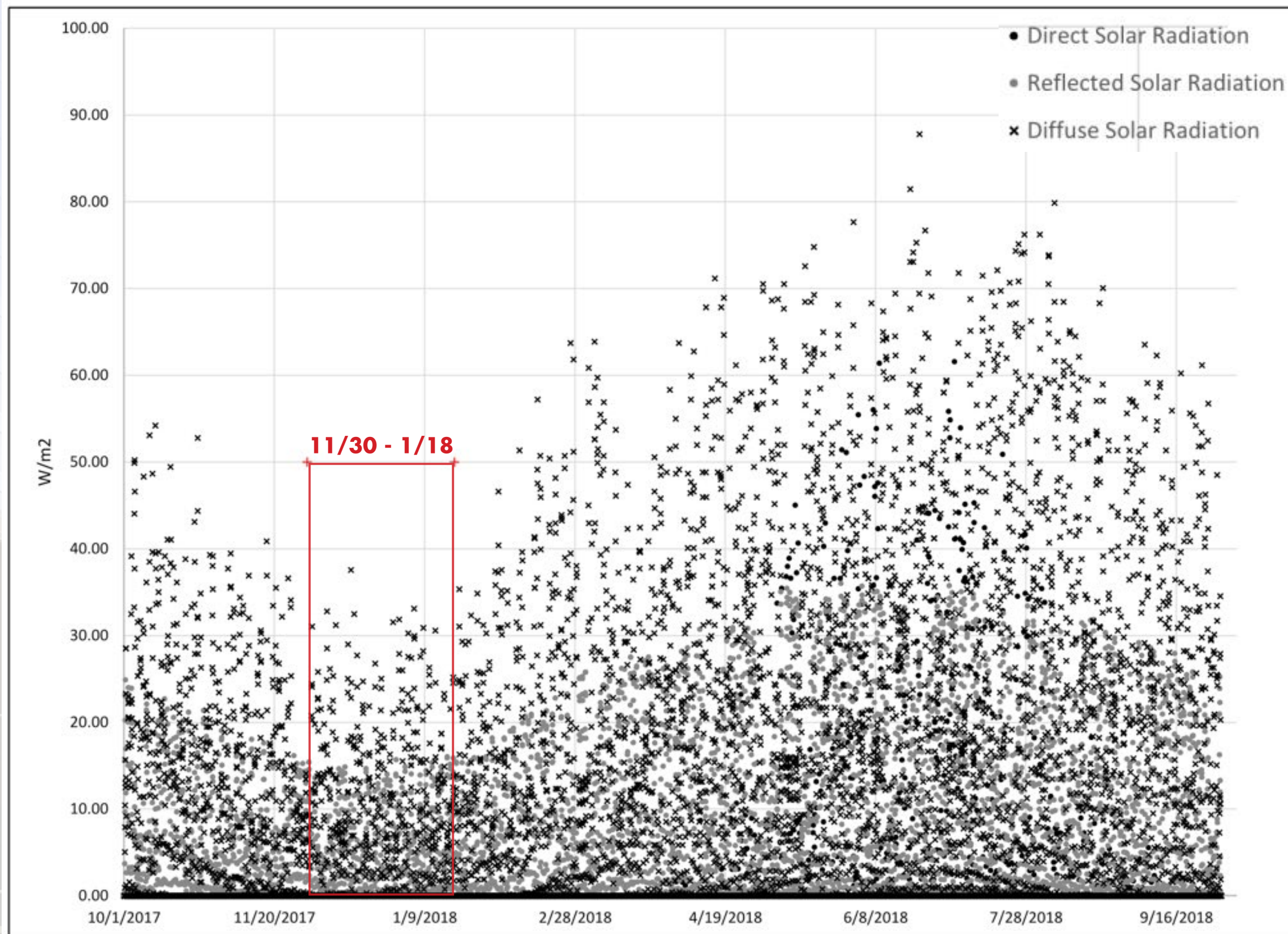
SOLAR RADIATION FOR A TYPICAL YEAR (BOSTON)



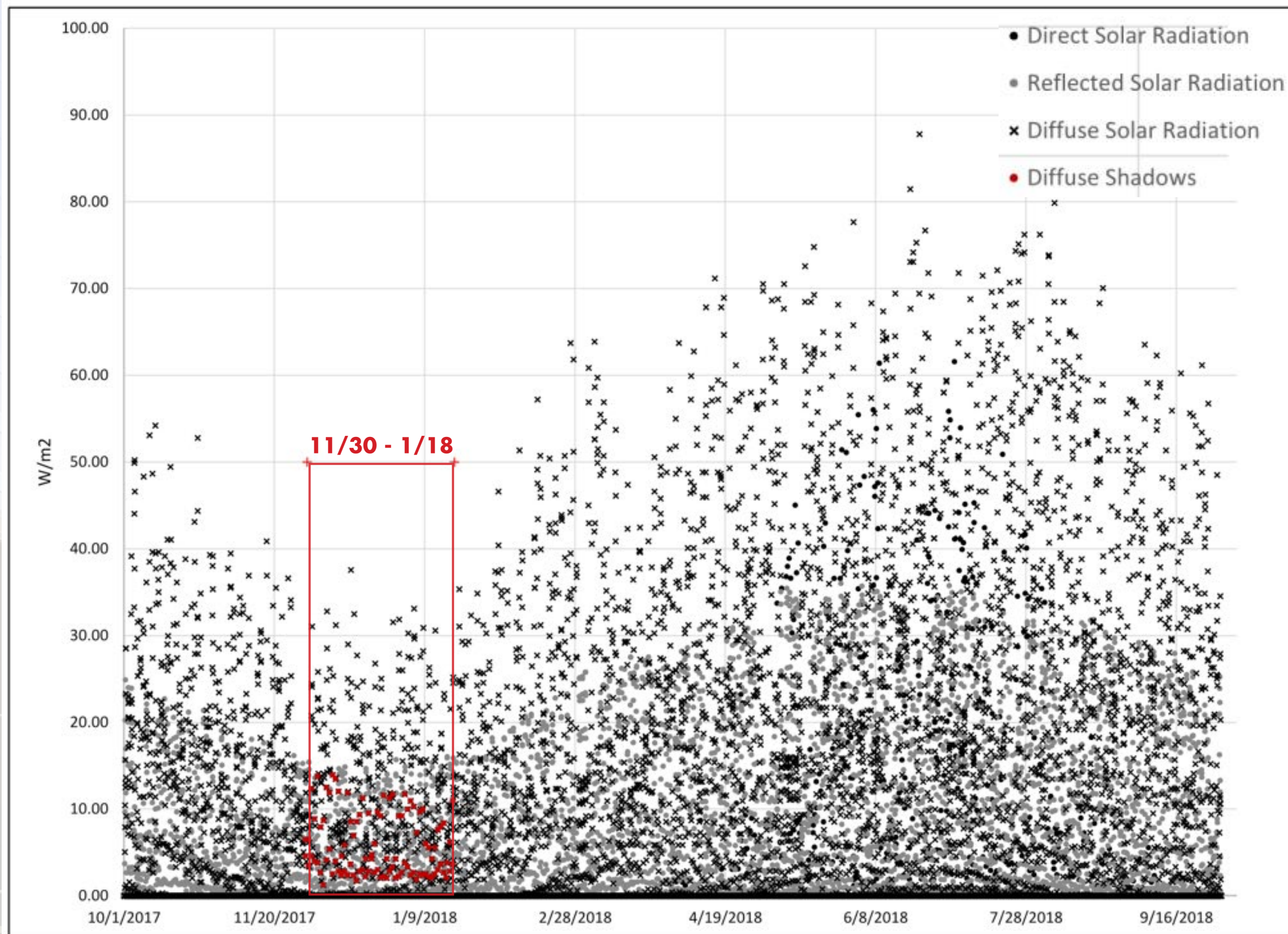
SOLAR RADIATION FOR A TYPICAL YEAR (BOSTON)



SOLAR RADIATION FOR A TYPICAL YEAR (BOSTON)



SOLAR RADIATION FOR A TYPICAL YEAR (BOSTON)





THANK YOU!

Q&A

NEXT STEPS

- Public Meeting • September 13, 2017
- **CAC #13 • September 18, 2017**
- BPDA Comment Period Closes • October 2, 2017

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