

# Public Agency: Proactive Urban Design

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Worcester, Massachusetts, 1939 and 1968  
Images courtesy of Steve Mita



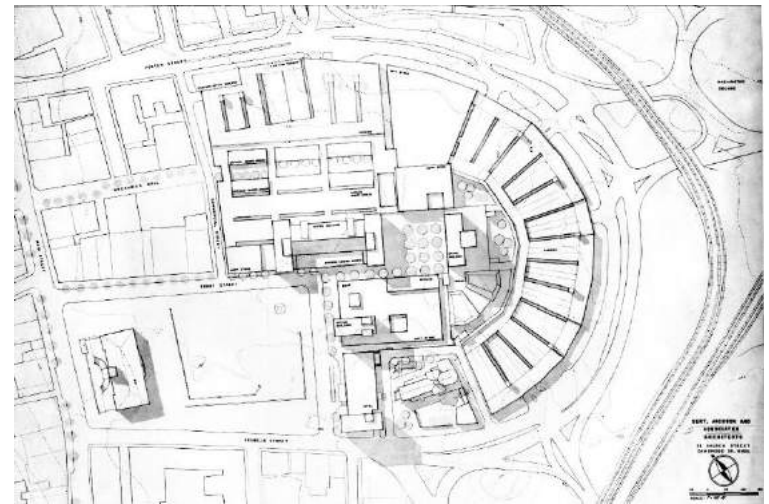
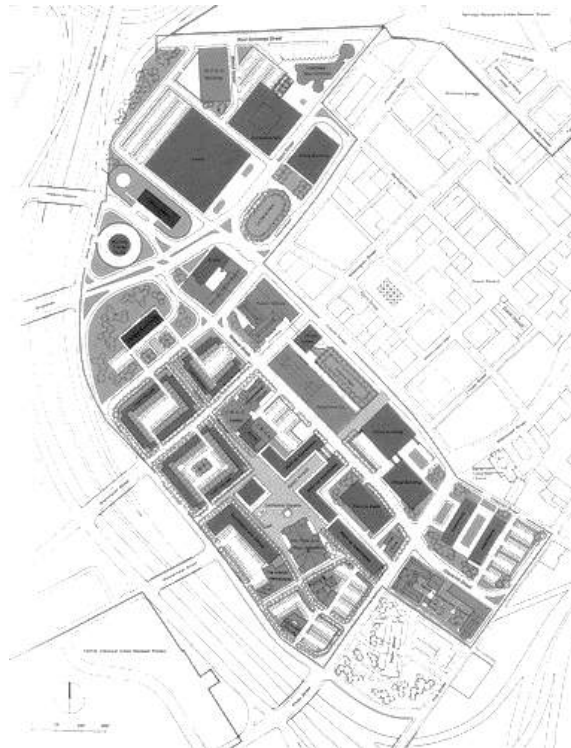
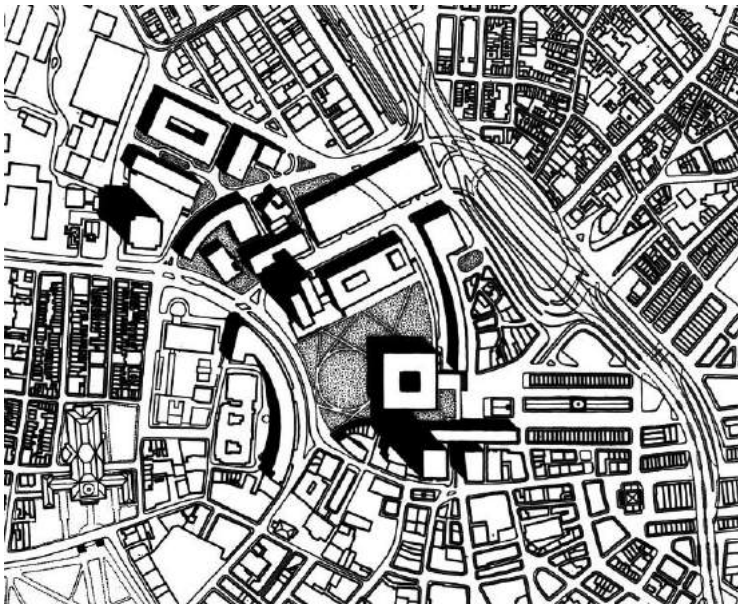
Boston, Government Center, I.M. Pei (Harry Cobb), 1961

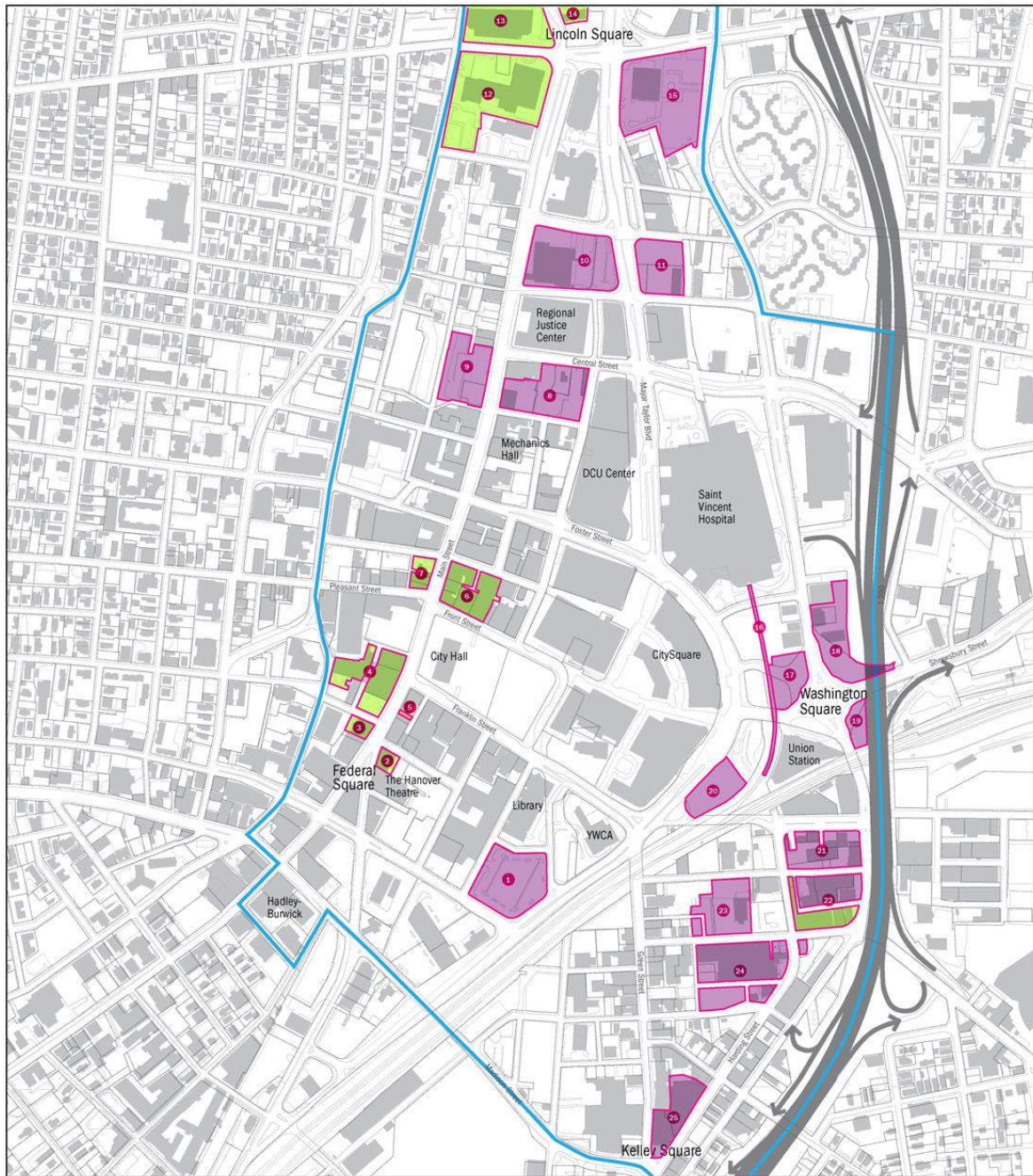


Providence, Weybossett Hill, I.M. Pei and Zion & Breen, 1969



Worcester, Sert, Jackson & Associates, 1965-1966





### Real Estate Development Opportunity Assessment Downtown Worcester, Massachusetts

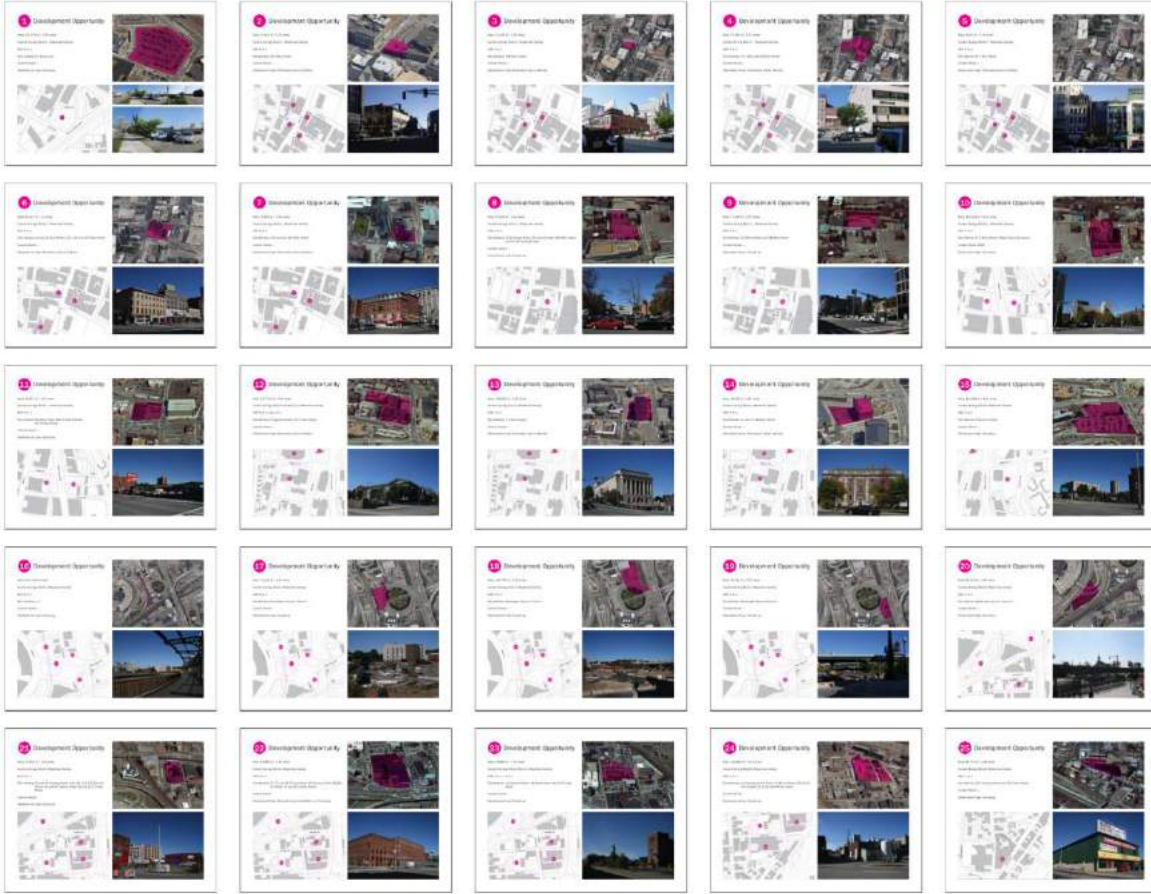
- Study Area Boundary
- Parcels
- Freeway Off-ramp
- Freeway On-ramp
- Development Opportunity

- Development Types**
- Building Renovation and/or Addition
  - Ground-up Development



Map developed by Utile, Inc. Architecture + Planning  
 Data sources: City of Worcester GIS maps, Google Maps aerial photographs, Live Local aerial photographs, site visits

# Development Catalogue



## 24 Development Opportunity

Area: 131,891 sf / 3.03 acres  
 Current Zoning: MG-2.0, Mixed-Use Overlay  
 FAR: 2 to 1  
 Site Address: 104 Harding Street; 8 and 12 Beach Street; 18 and 40 Pond Street; 51, 57 and 63 Winter Street  
 Current Owner: GKN Sinter Metals  
 Development type: Ground-up



# Real Estate Development Opportunity Assessment Downtown Worcester, Massachusetts



- Study Area Boundary
- Parcels
- Freeway Off-ramp
- Freeway On-ramp

- Desired Land Use Types**
- Primary Retail or Restaurant
  - Secondary Retail or Office
  - Office
  - Institutional/Cultural
  - Industrial
  - Transportation
  - Residential

- Pedestrian Realm**
- Existing Active Pedestrian Realm
  - Proposed Pedestrian Realm Improvements



Map developed by Utile, Inc. Architecture + Planning  
Data sources: City of Worcester GIS maps, Google Maps aerial photographs, Live Local aerial photographs, site visits

# Development Test-fit



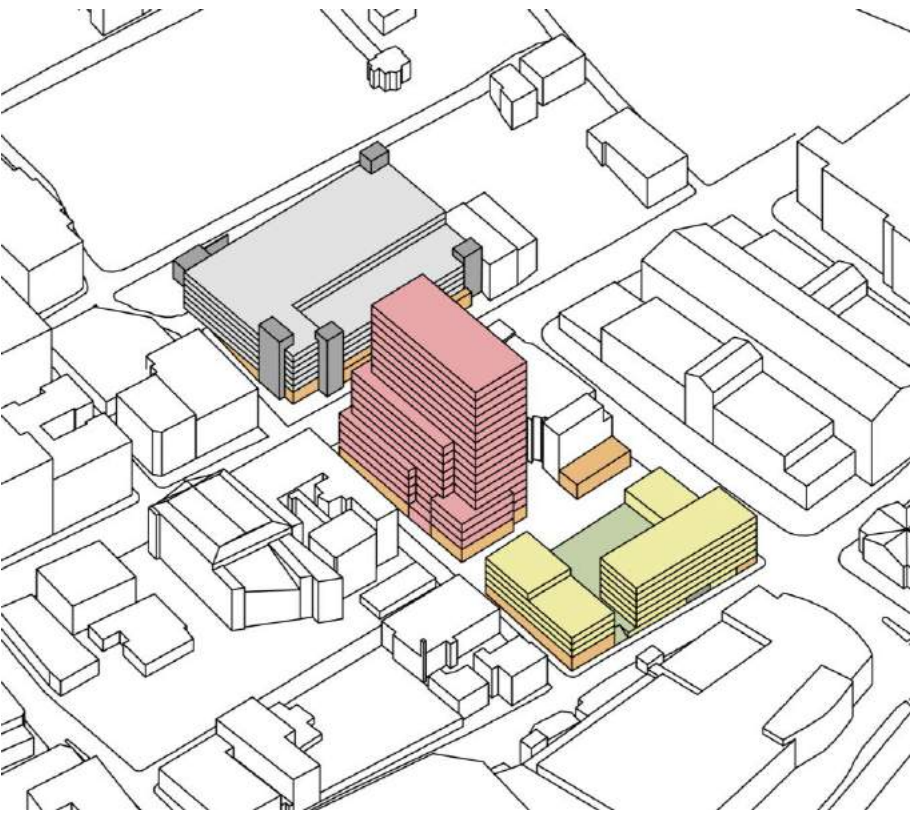
**2** Development Scenario 2  
SUPERMARKET, RETAIL + PARKING GARAGE

**The Palladium**  
CONCERT HALL

**1** Development Scenario 1  
MIXED-USE RETAIL, OFFICE + RESIDENTIAL

Exchange Street  
PEDESTRIAN-ORIENTED AND ENTERTAINMENT STREET

**DCU Center**  
ARENA + CONVENTION CENTER

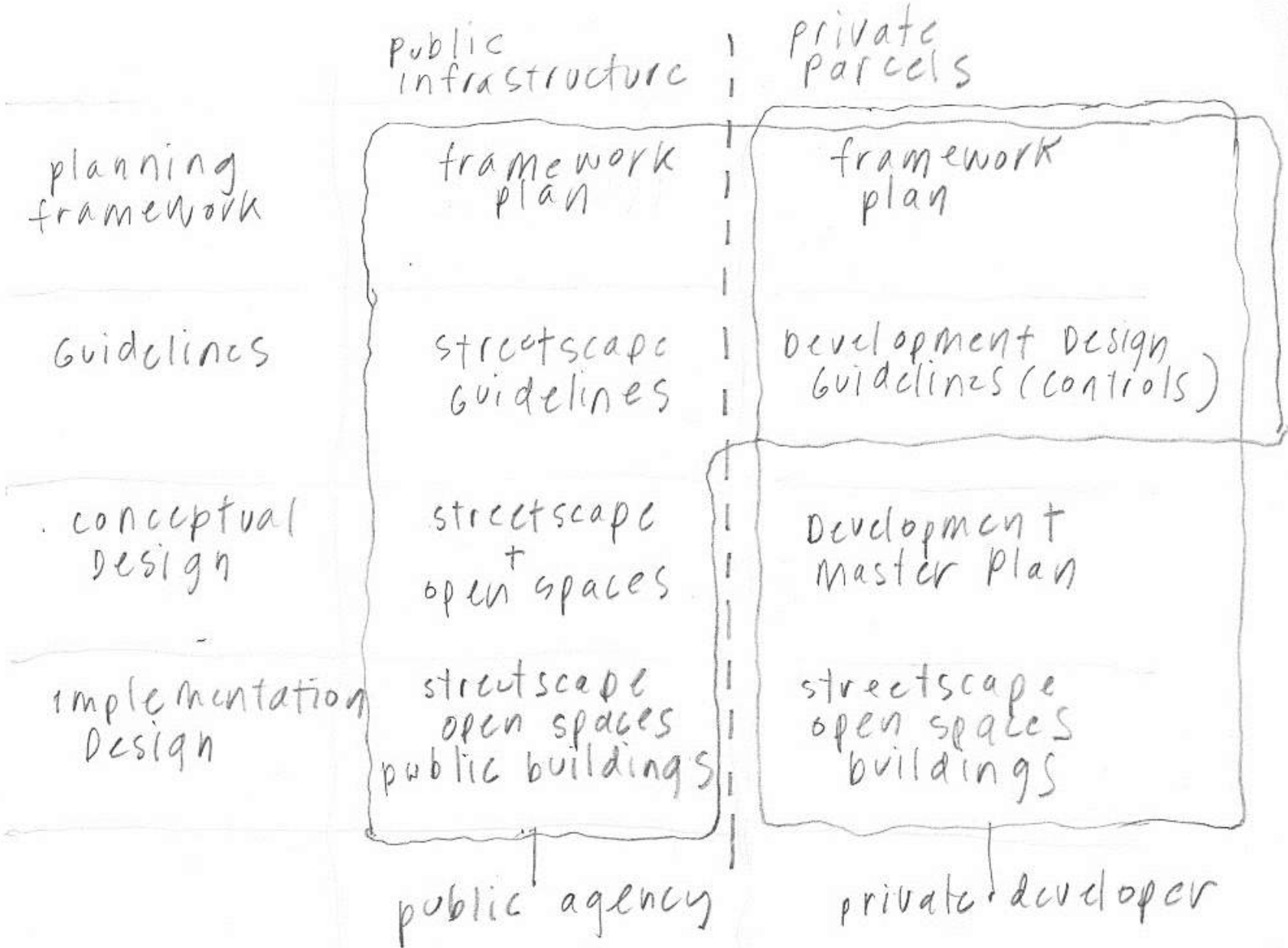


# Downtown Worcester

Real Estate Development Opportunity Assessment  
MassDevelopment Finance Agency  
City of Worcester Office of Economic Development  
DPA, Inc. Architecture + Planning

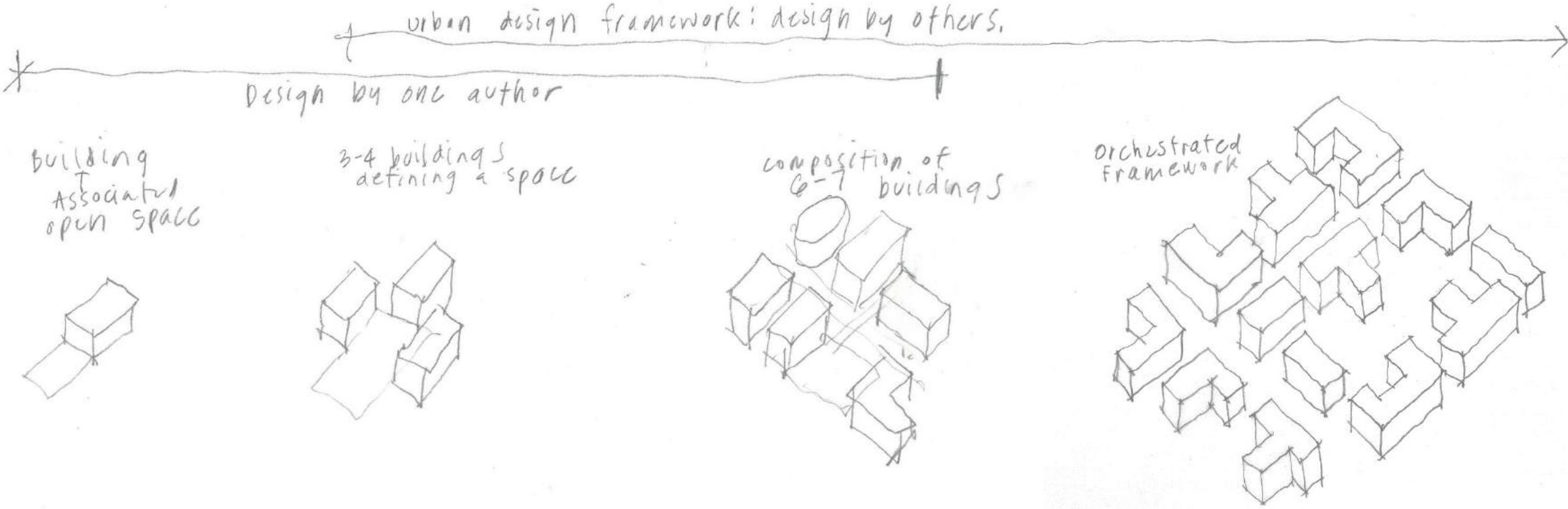
Smart CITY. Smart CHOICE.

# Clients and Projects





# Design vs. Design Framework



## Boston's Complete Streets

### Bus Lanes and Transit Prioritization

at intersections improve the reliability of routes with high passenger volumes. Shelters with amenities and next bus information improve convenience for passengers.



### Intelligent Signals and Traffic Cameras

manage traffic flow in real-time. They facilitate vehicle progression and reduce wait times, improving fuel efficiency and reducing GHG emissions.



**Bicycle and Car Share Stations** provide the convenience of personal transportation, low costs, and energy savings without the need for car ownership.



**Minimum Lane Widths** assist in the accommodation of pedestrians and bicyclists when the available public right-of-way is limited in width. Narrower roadways also result in safer vehicle speeds.

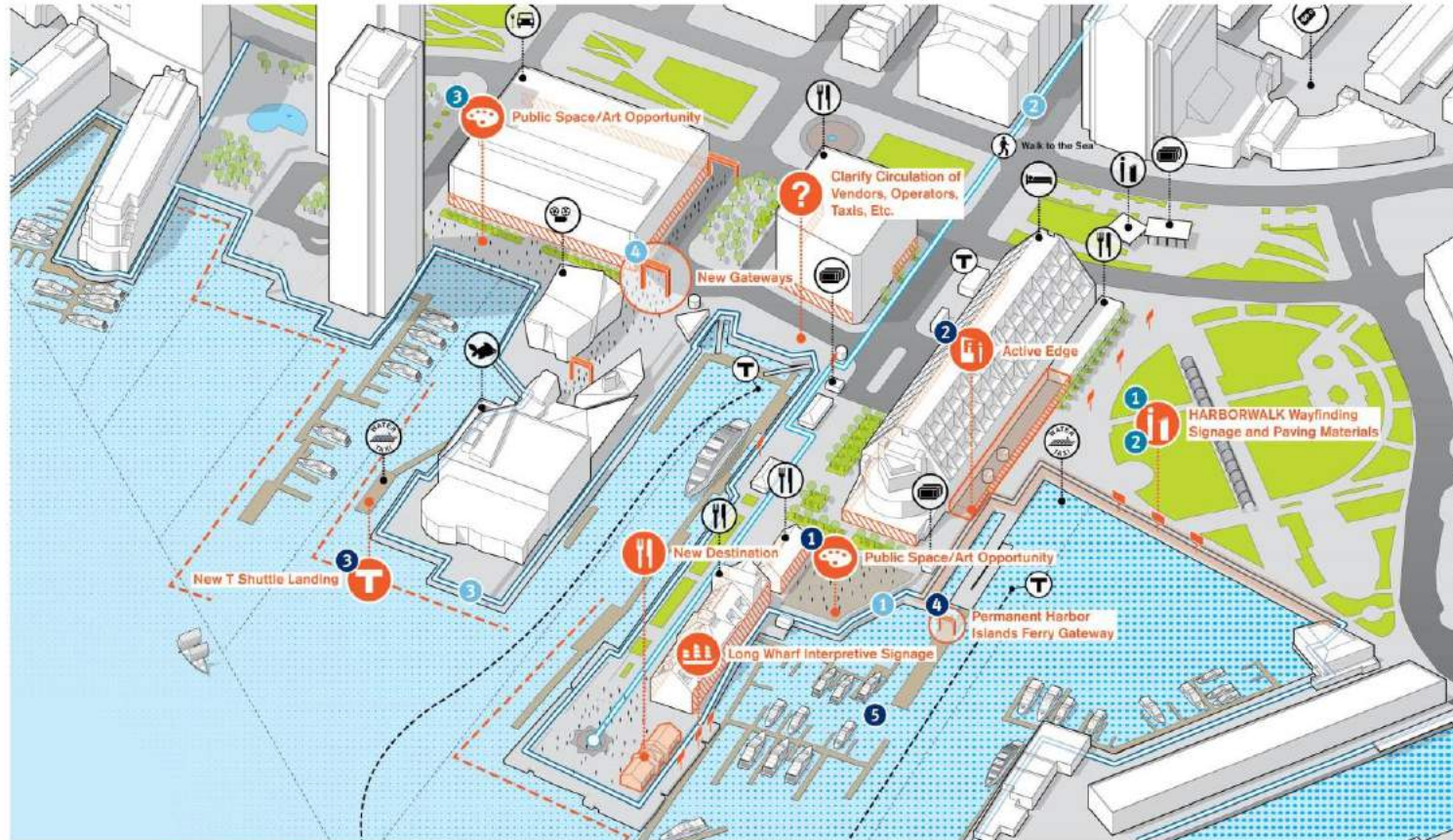


**Rain Gardens** and other greenscape elements at key locations divert stormwater directly to the soil. Maintainable rain gardens can filter pollutants, improve air quality, and provide greenery on the street.



**Street Trees** with sufficient rooting volume to thrive provide shade and beauty; support wildlife habitat and reduce air pollution; and energy consumption.





### Connectivity

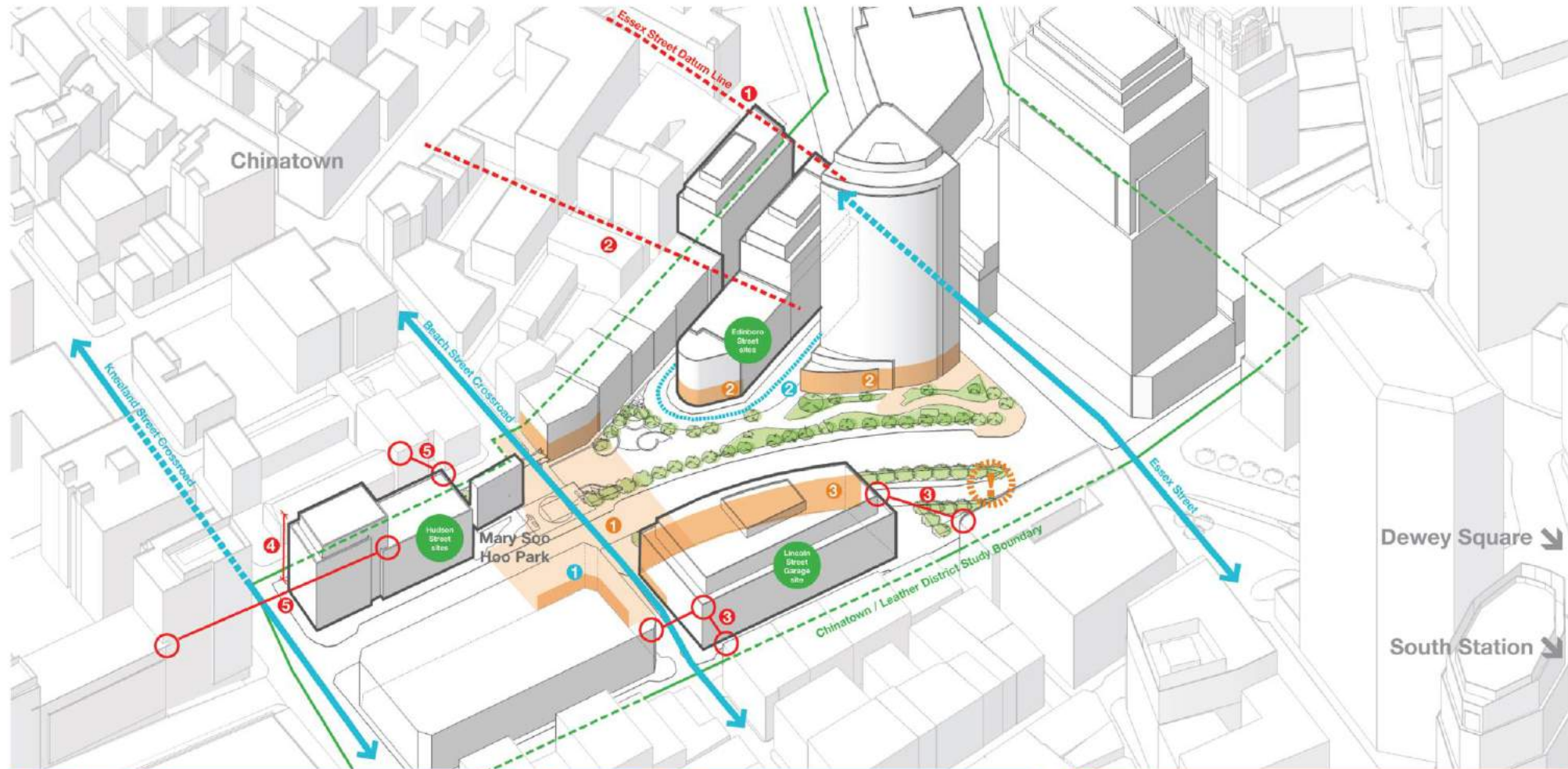
- 1 Strengthening the connection to the North End is critical. This can happen through encouraging passing through the Marriott lobby, and improving the quality of the paths around the Marriott.
- 2 The Walk to the Sea should be strengthened and promoted. Encouraging more to travel to the end of the wharf could relieve some of the pedestrian congestion during peak tourist season, and lead to a greater appreciation of the harbor and Boston's maritime history.
- 3 The HARBORWALK should be strengthened to encourage north-south movement through the study area and to draw visitors to the ends of the wharfs.
- 4 Gateway moments should be designed, such as one approaches the NEAq.

### Legibility

- 1 Signage should make clear both the HARBORWALK as well as HARBORWALK "shortcuts," such as around the Marriott. Overall maps of the HARBORWALK and the general district should be considered.
- 2 Coordinated signage can also make clear the ferry locations and schedules. This will alleviate confusion in the area. The overall area can be improved through coordinating paving materials, signage, etc. This will help clarify the public realm and direct people to the key amenities and open spaces.
- 3 Key landmarks, such as public art, large-scale signs, and digital displays, should be considered as navigation and wayfinding devices.

### Activation and Programming

- 1 Improving underutilized spaces, such as the hardscaped plaza between the Harbor Garage and the water, and parking lot and the end of Long Wharf, is a priority. Each should have a different character, ranging from quiet contemplative spots to very active.
- 2 Activating the edges of buildings is key to drawing people to this area and distributing foot traffic.
- 3 Expanding the water transit options, both in terms of destinations and regularity of service, is a key priority. Water transit can connect the Downtown Waterfront to other Boston neighborhoods, such as East Boston, as well as neighboring waterfront communities.
- 4 The Harbor Islands would benefit from a permanent gateway on the wharf.
- 5 The reconstruction of T Wharf and a reconfiguration of waterside on uses should be considered on the north side of Long Wharf.



**Dimensional Criteria**

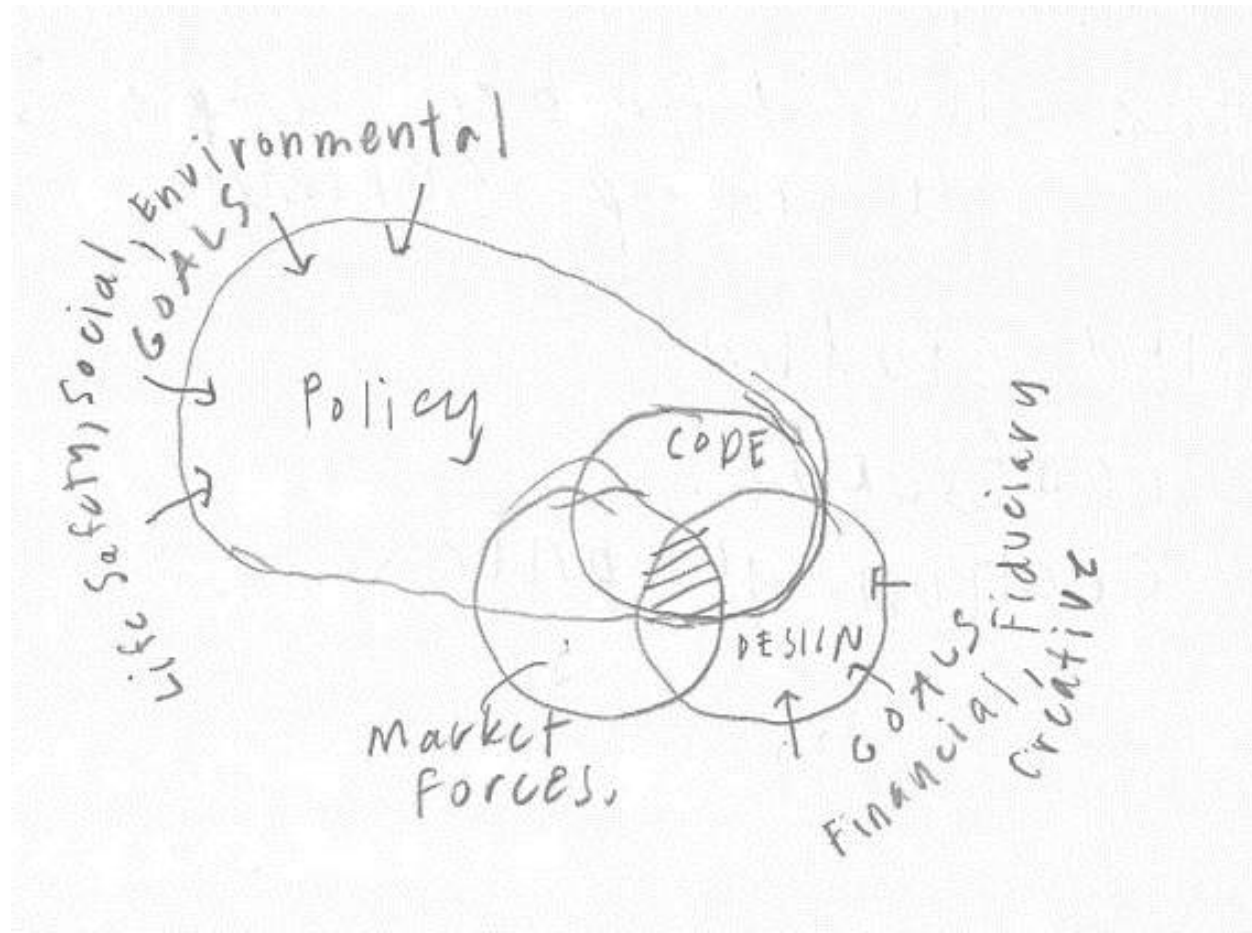
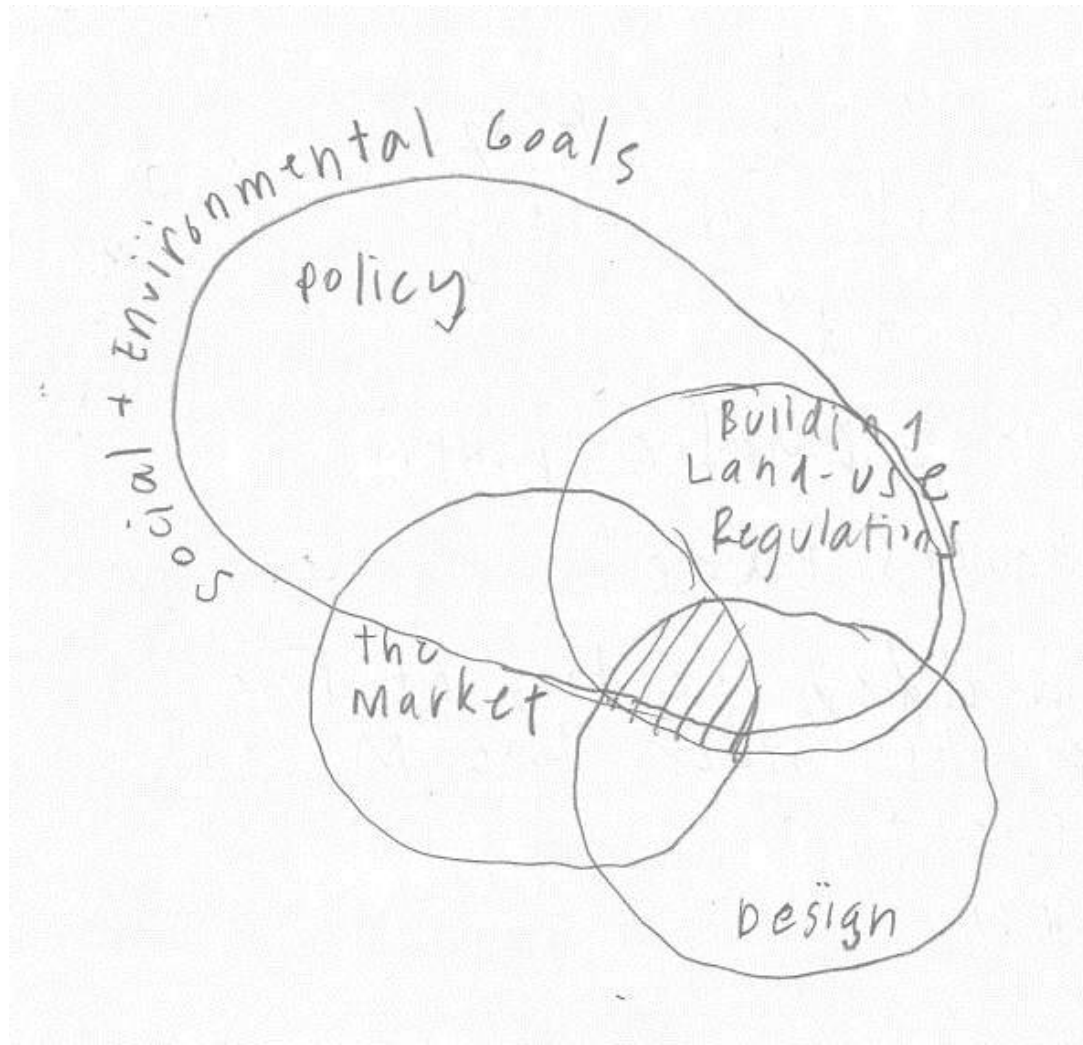
- 1 Edinboro Street sites - Maximum height 175'. Provide a 10' setback at a height aligning with the Oxford Place building fronting Essex Street (approximately 125').
- 2 Edinboro Street sites - Step down to the existing heights at the park-facing side to align with the step-down at the back sides of Oxford Place and 79 Essex Street. Encourage double street frontage on Edinboro and Kingston Streets in this location.
- 3 Lincoln Street Garage Site - 80' height at street edges to align with adjacent buildings, 100' maximum, to align with 66 Lincoln Street, or as limited by shadow impacts on the parks, with a 10' setback.
- 4 Hudson Street sites - 125' maximum height on Kneeland Street.
- 5 Hudson Street sites - Step down to the height of the adjacent Chinatown neighborhood scale and the low-rise portion of Parcel 24. Encourage double street frontage on Hudson Street and the Surface Artery.

**Programmatic Goals**

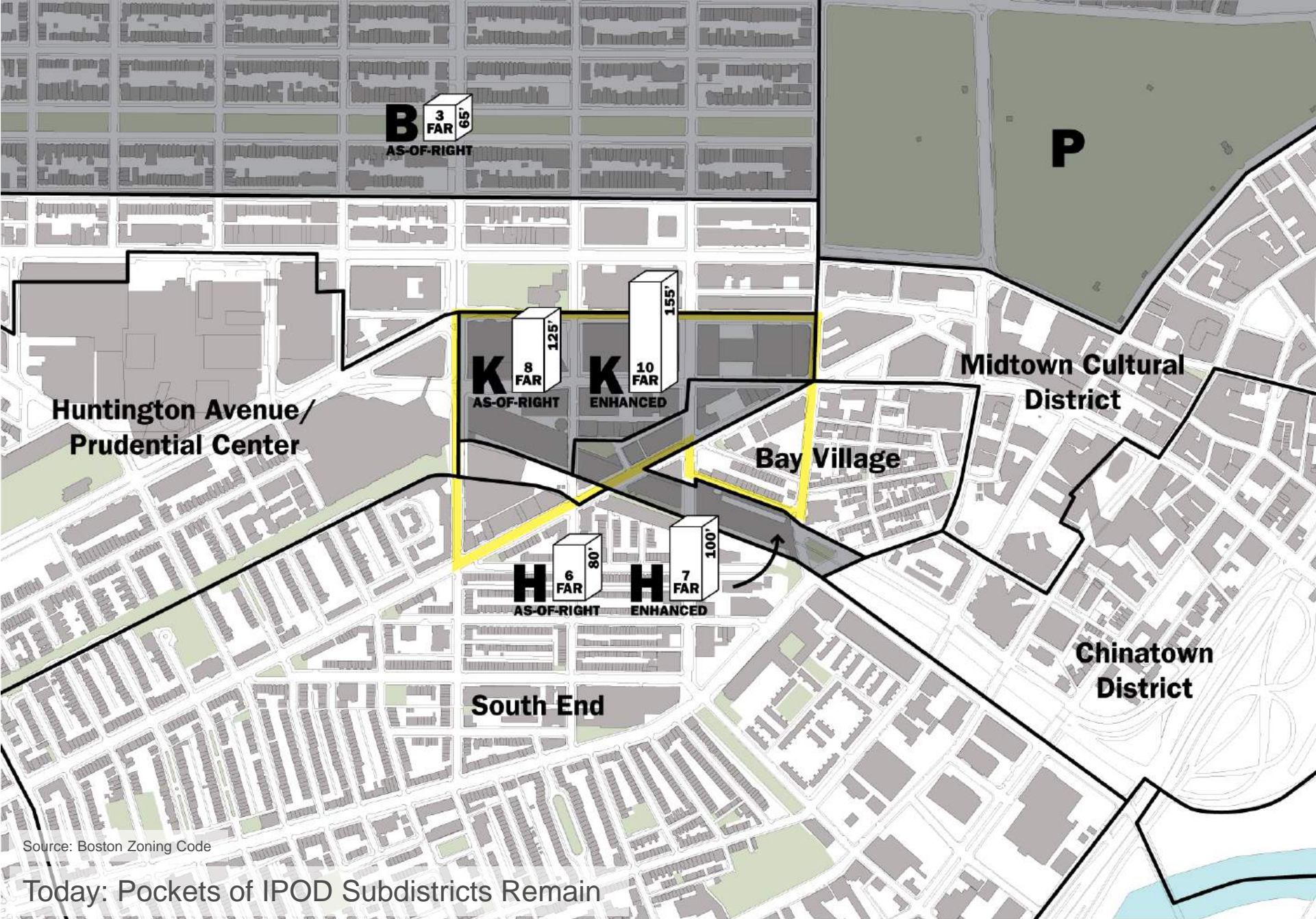
- 1 Concentrate active ground floor uses at the Beach Street Crossroads intersection.
- 2 Provide transparency and active uses at park edge and locate major building entries facing the park.
- 3 Mitigate the negative impacts on the pedestrian realm created by the I-93 on-ramp. Consider building over portions of it to bring active uses closer to Surface Artery.

**Connectivity**

- 1 The continuity of the Beach Street Crossroad should be made more legible through the concentration of active uses along its edges and at the Surface Artery intersection.
- 2 Pedestrian traffic from the Financial District through Edinboro and Kingston Streets should be enhanced by redevelopment on the Edinboro Street sites.
- 3 Kneeland and Essex Streets provide clear southern and northern boundaries which delineate the district. These important thoroughways also link the area to important points both East and West such as the Common and South Station.





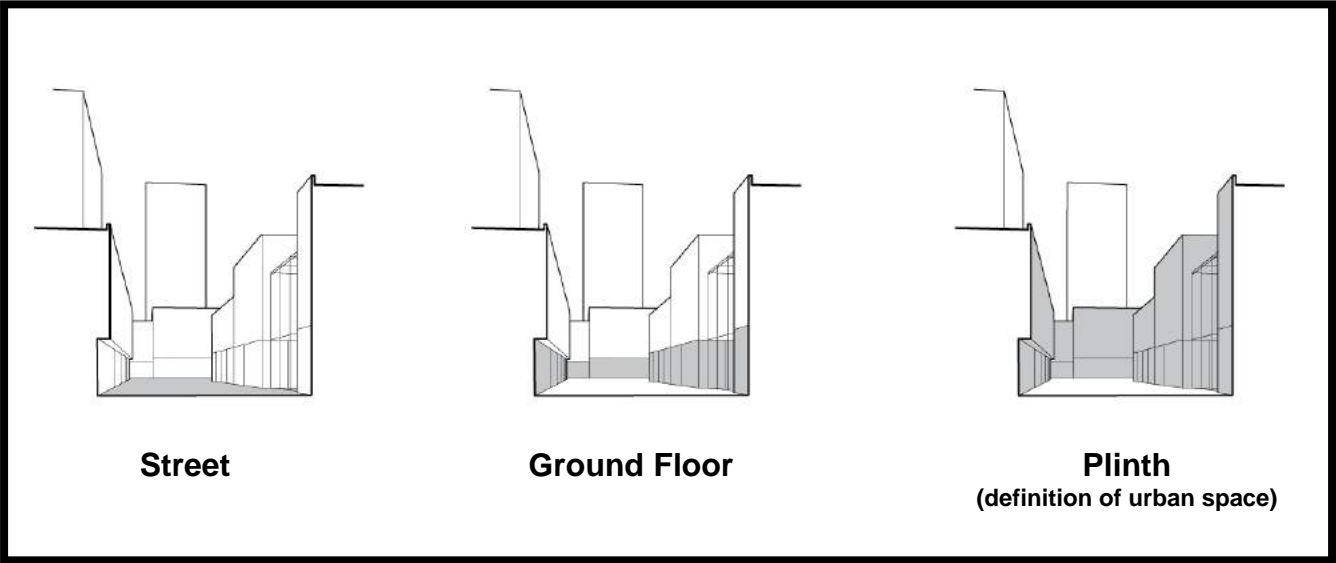


Source: Boston Zoning Code

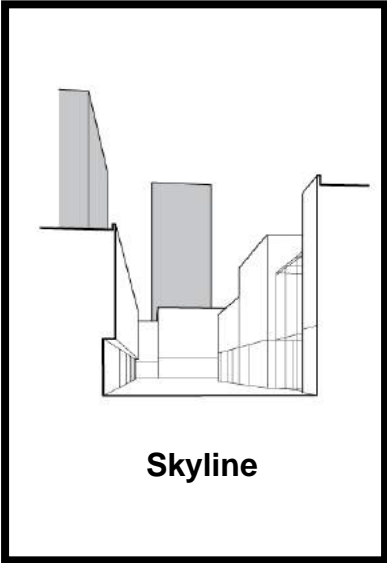
Today: Pockets of IPOD Subdistricts Remain

# Base, Plinth and High-rise

## Public Realm



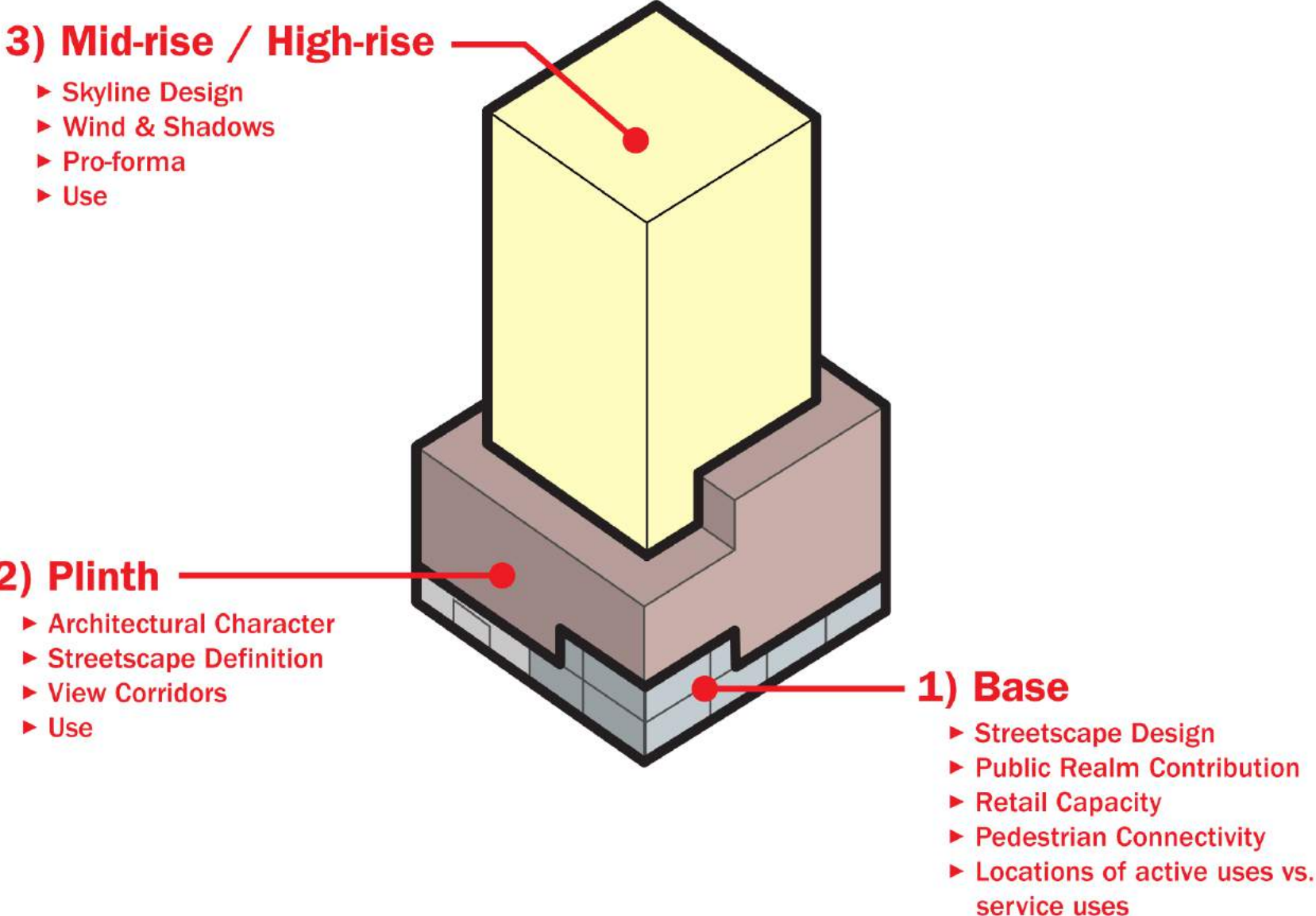
## City Form



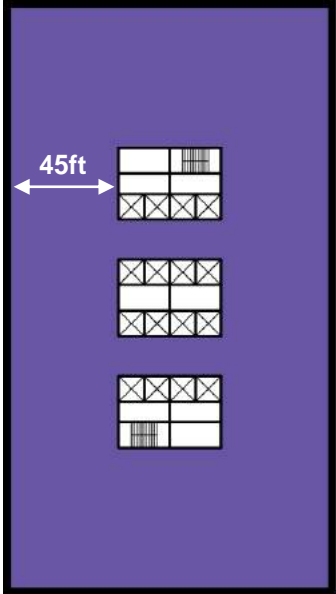
Utile, Back Bay Planning Initiative, Boston Redevelopment Authority, 2007



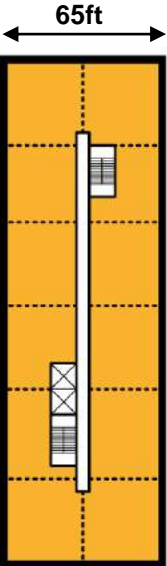
# Base, Plinth and High-rise



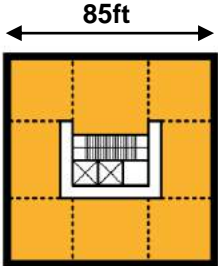
# Typical Floorplates



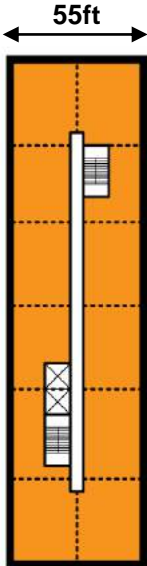
**Office**  
30,000 gsf



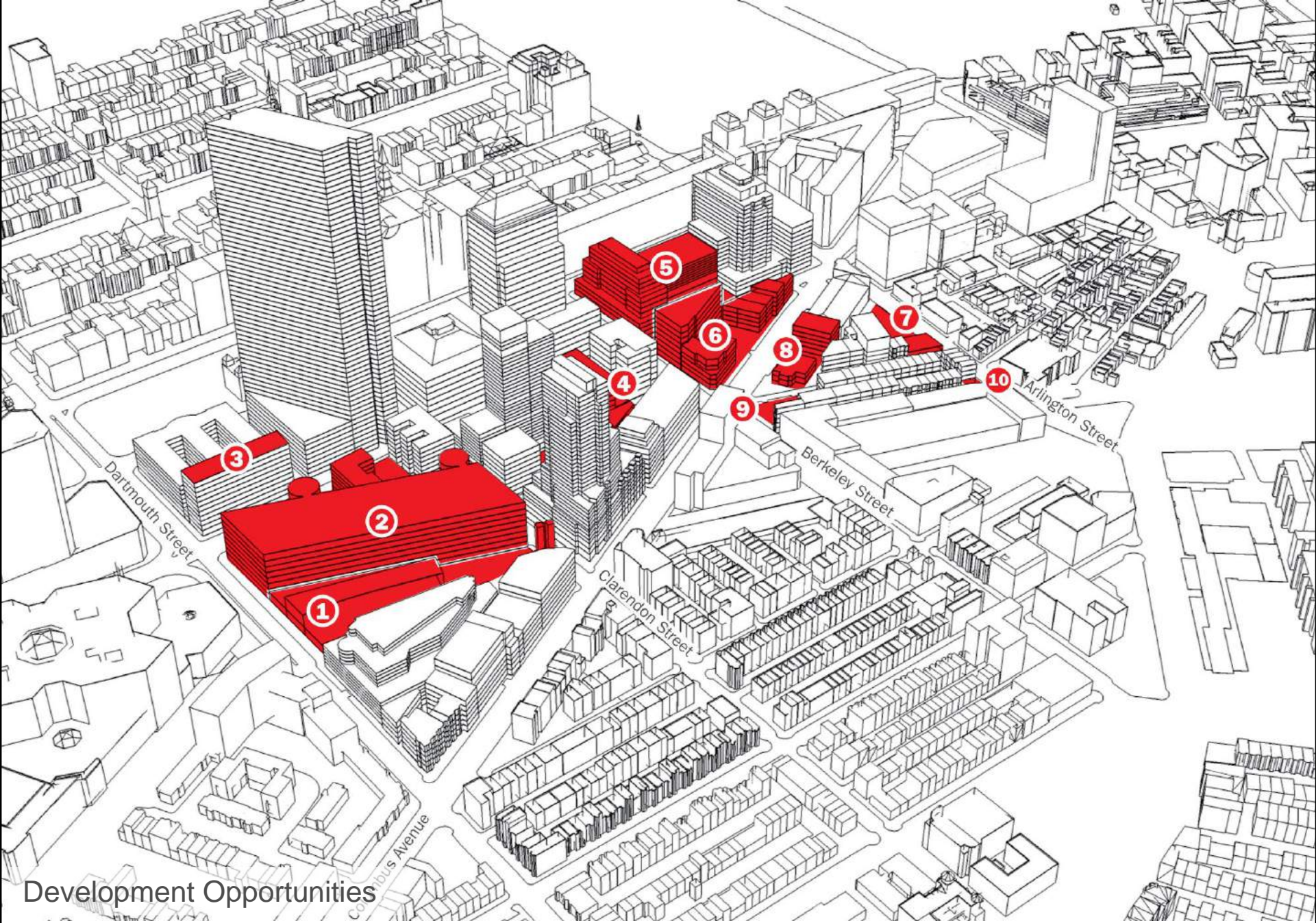
**Residential**



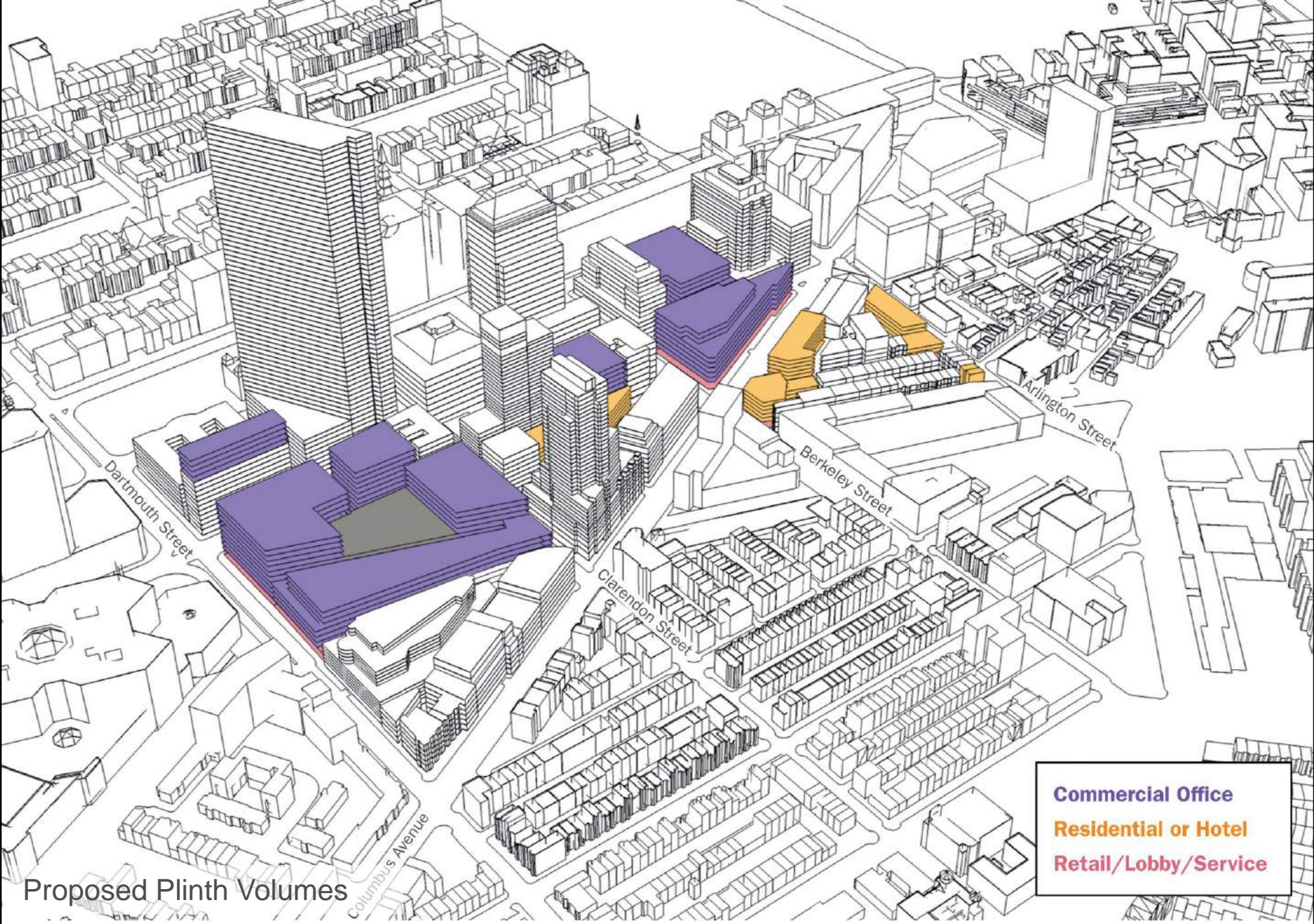
**Residential  
Point Tower**



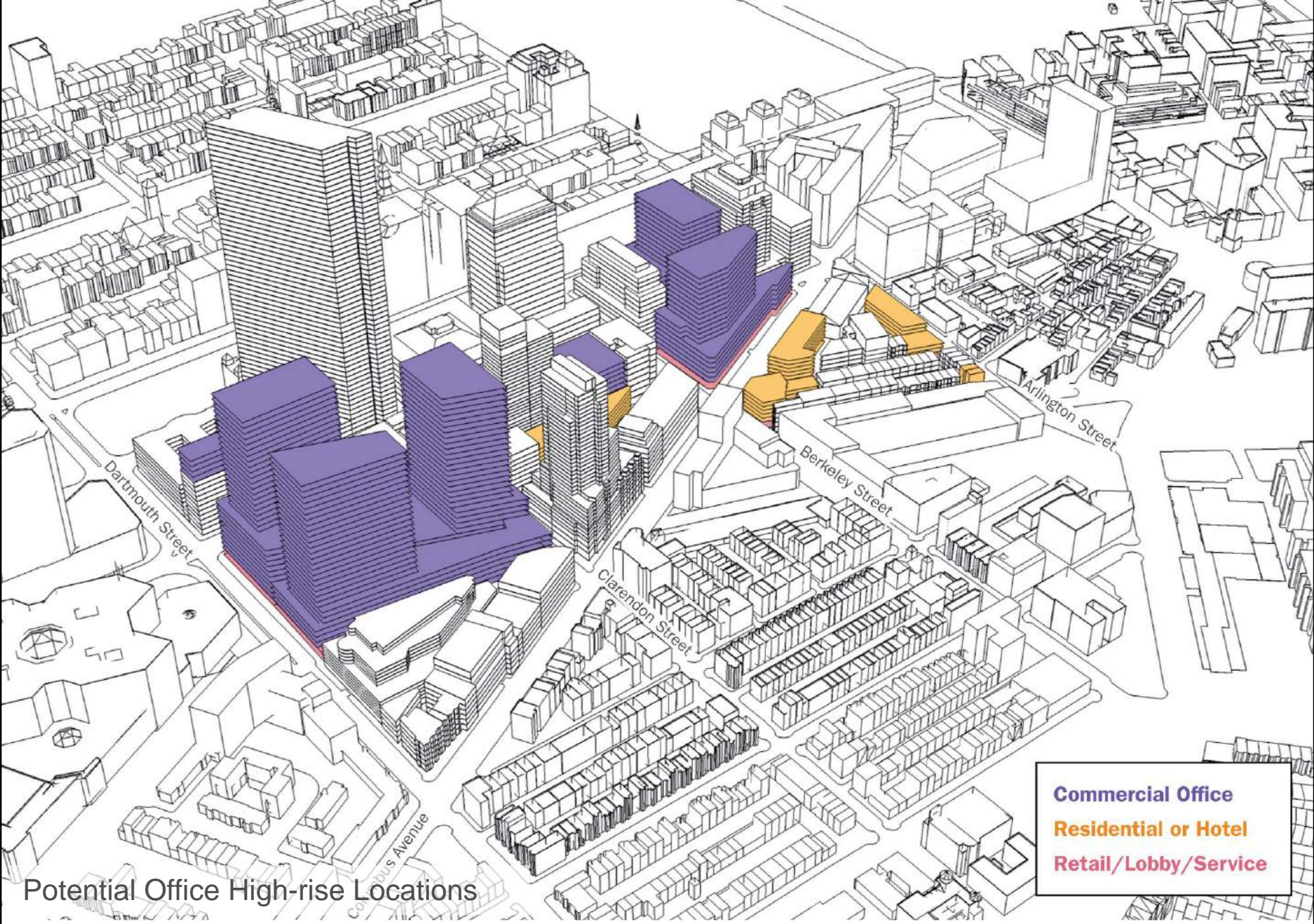
**Hotel**



Development Opportunities

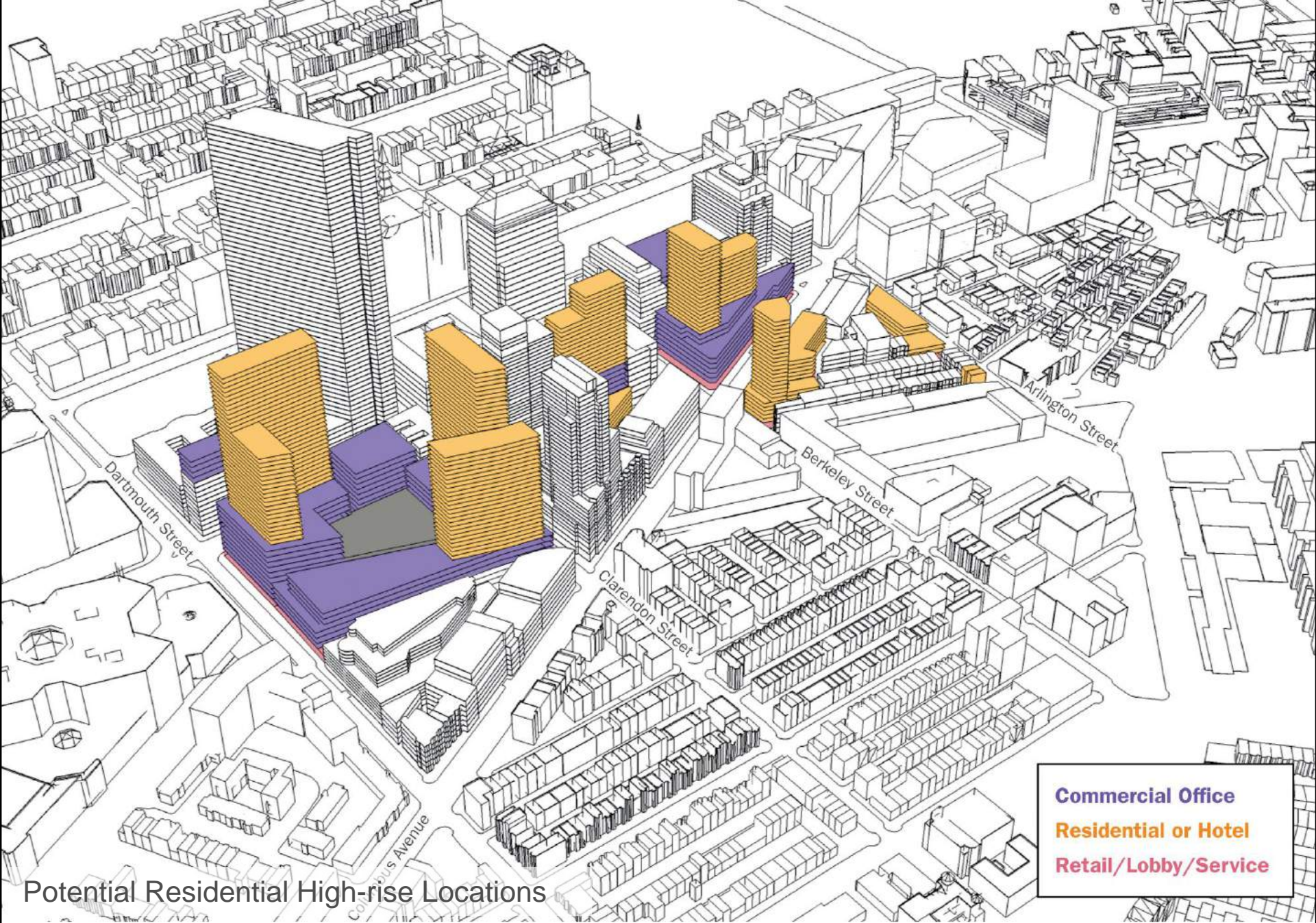


Proposed Plinth Volumes



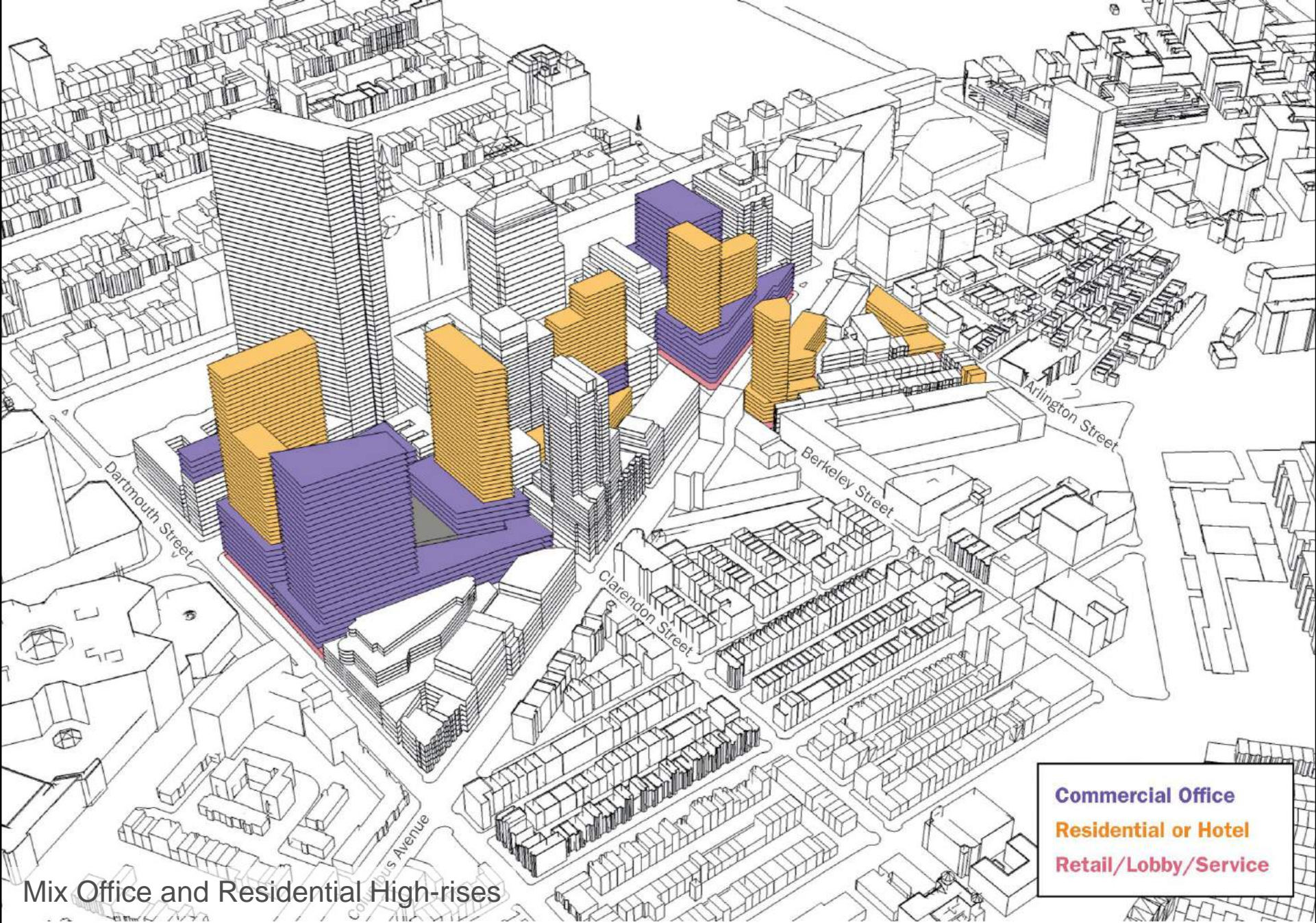
Potential Office High-rise Locations

**Commercial Office**  
**Residential or Hotel**  
**Retail/Lobby/Service**



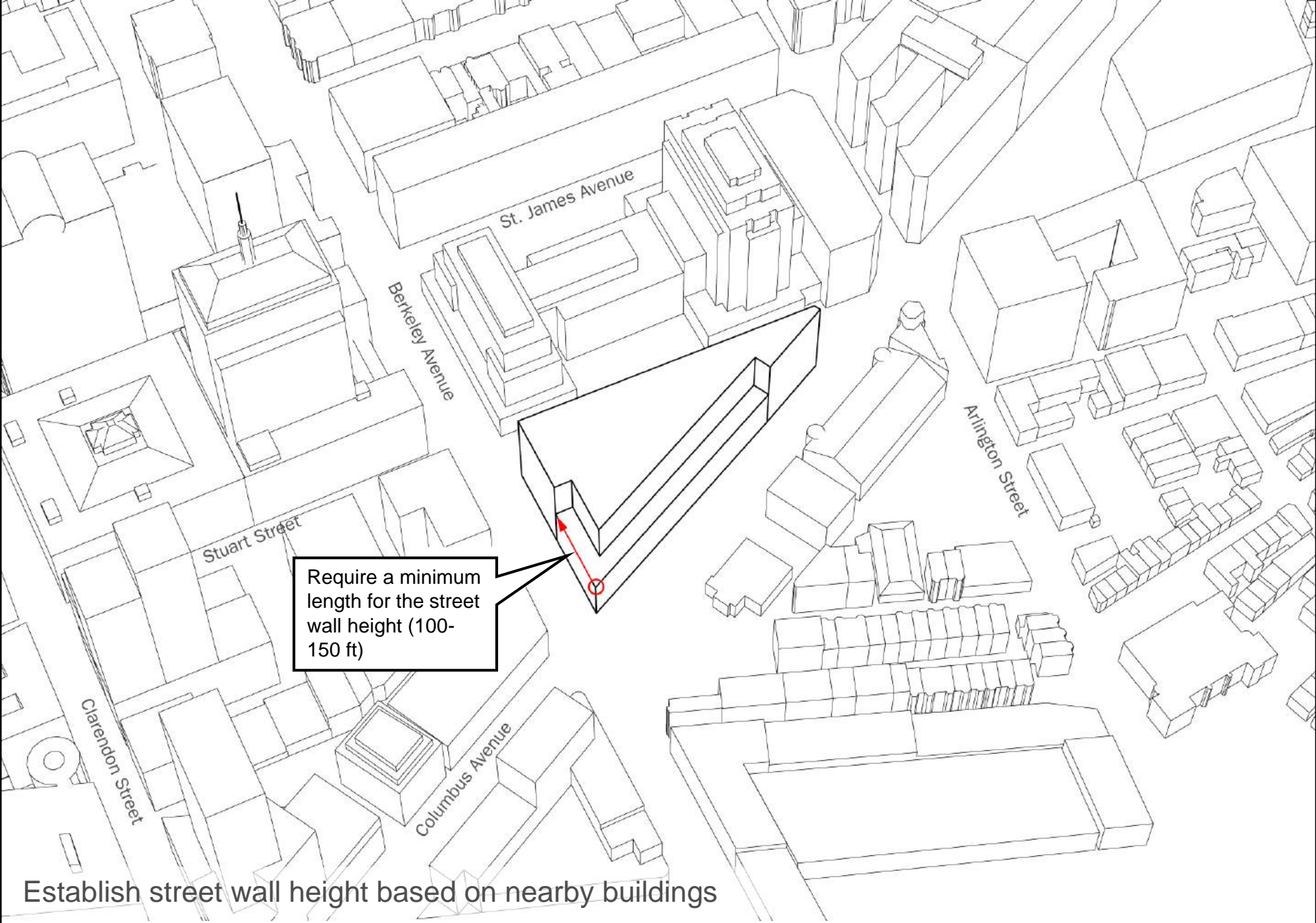
Potential Residential High-rise Locations

**Commercial Office**  
**Residential or Hotel**  
**Retail/Lobby/Service**



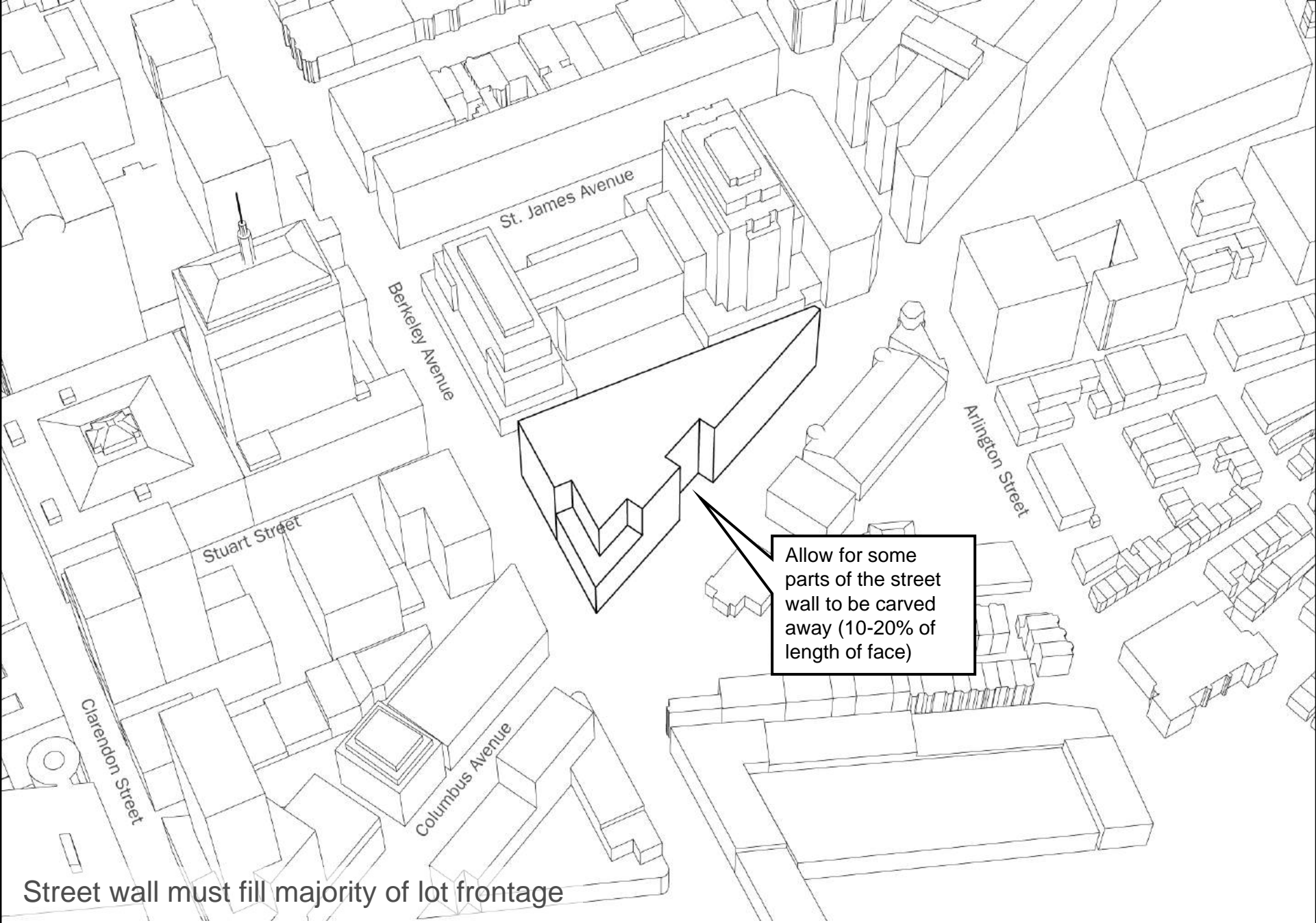
Mix Office and Residential High-rises

**Commercial Office**  
**Residential or Hotel**  
**Retail/Lobby/Service**



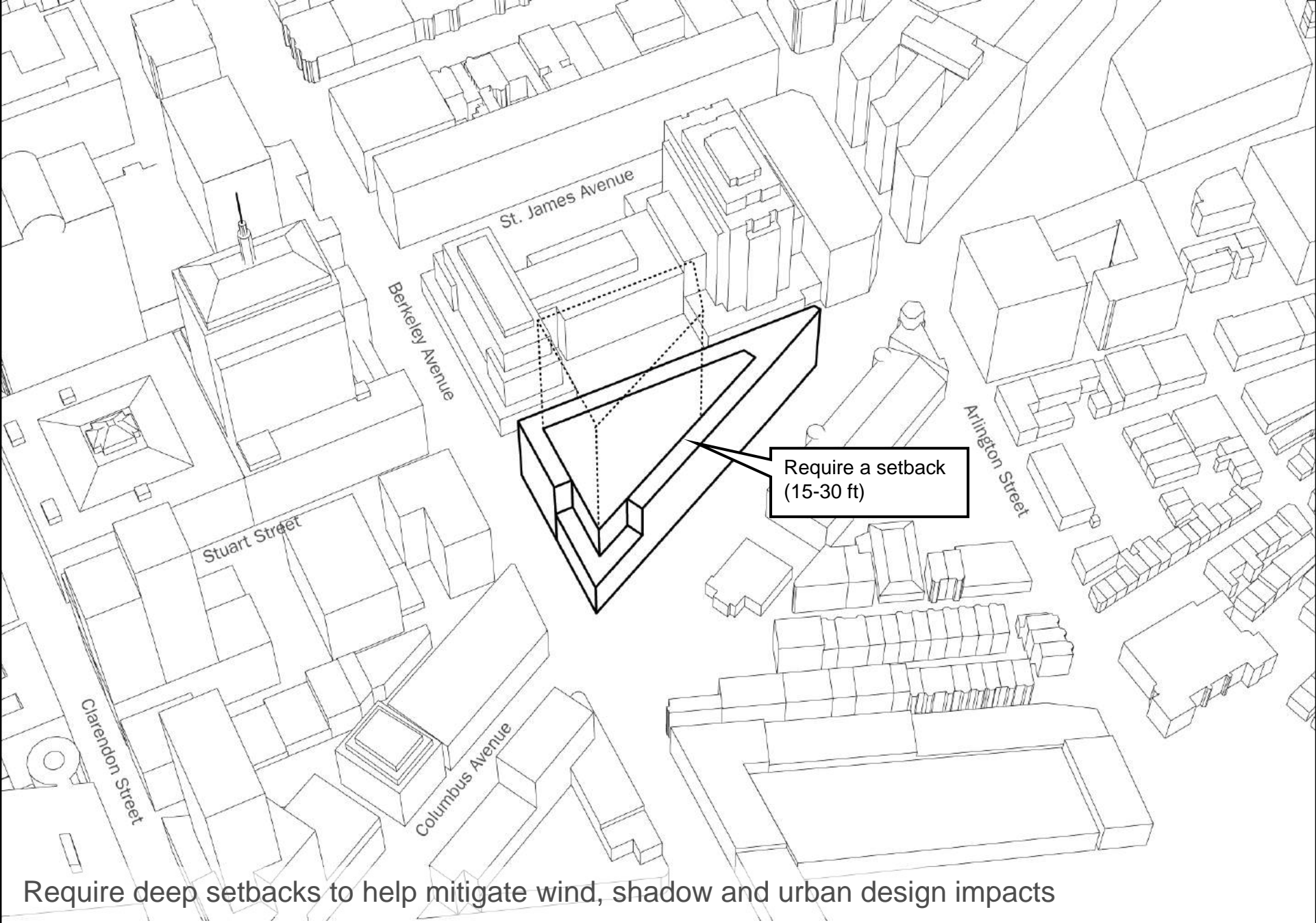
Establish street wall height based on nearby buildings





Allow for some parts of the street wall to be carved away (10-20% of length of face)

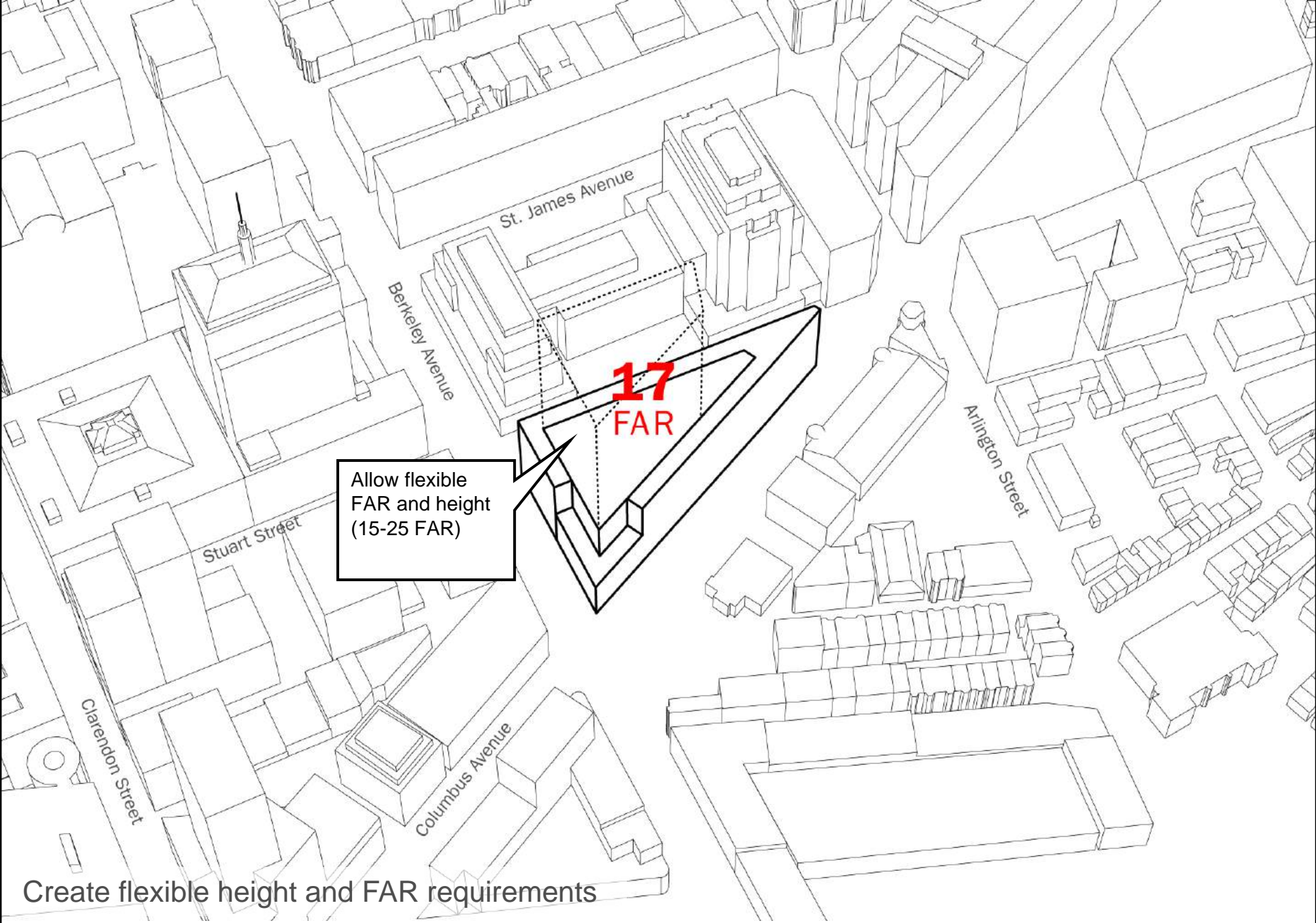
Street wall must fill majority of lot frontage



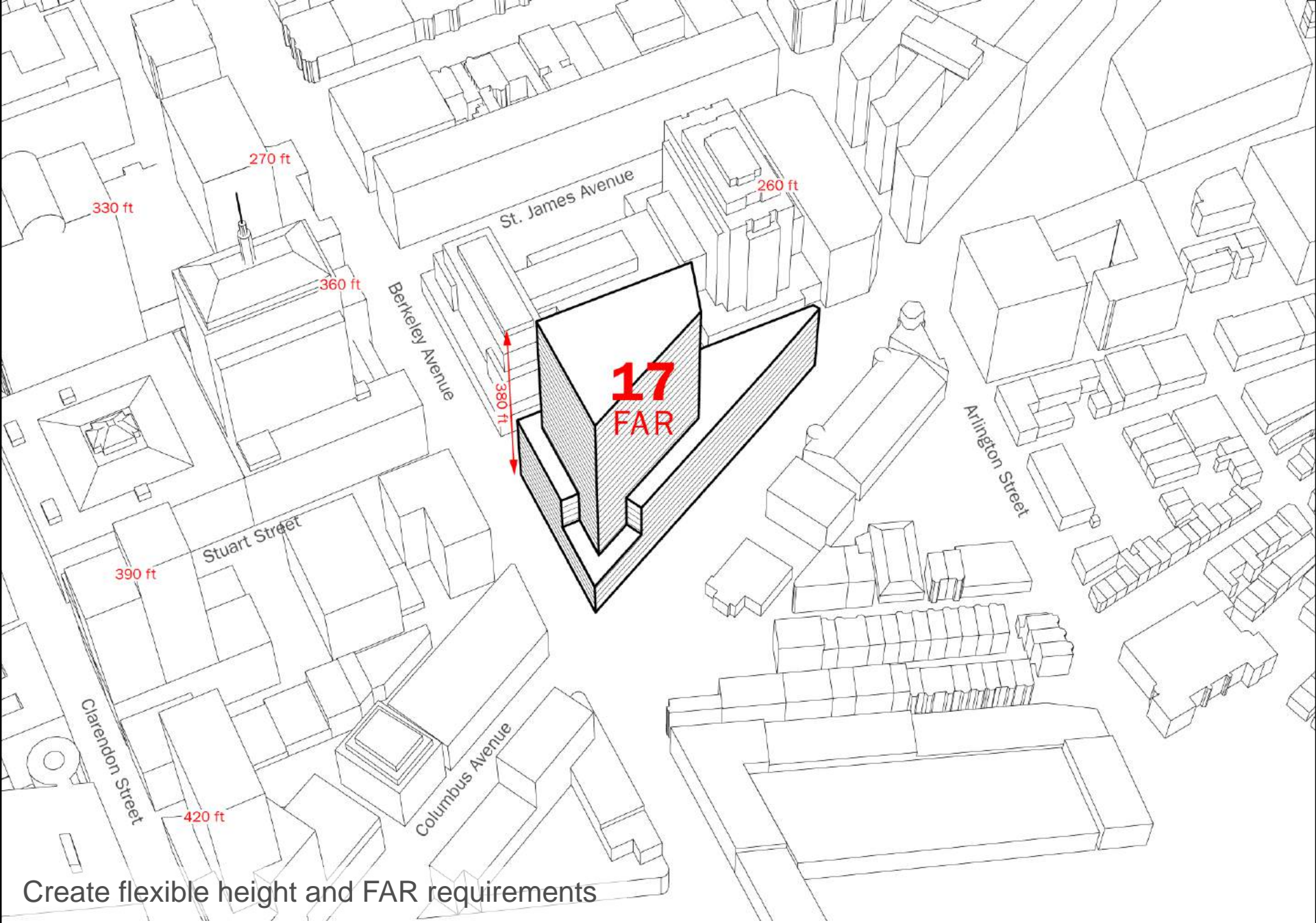
Require deep setbacks to help mitigate wind, shadow and urban design impacts



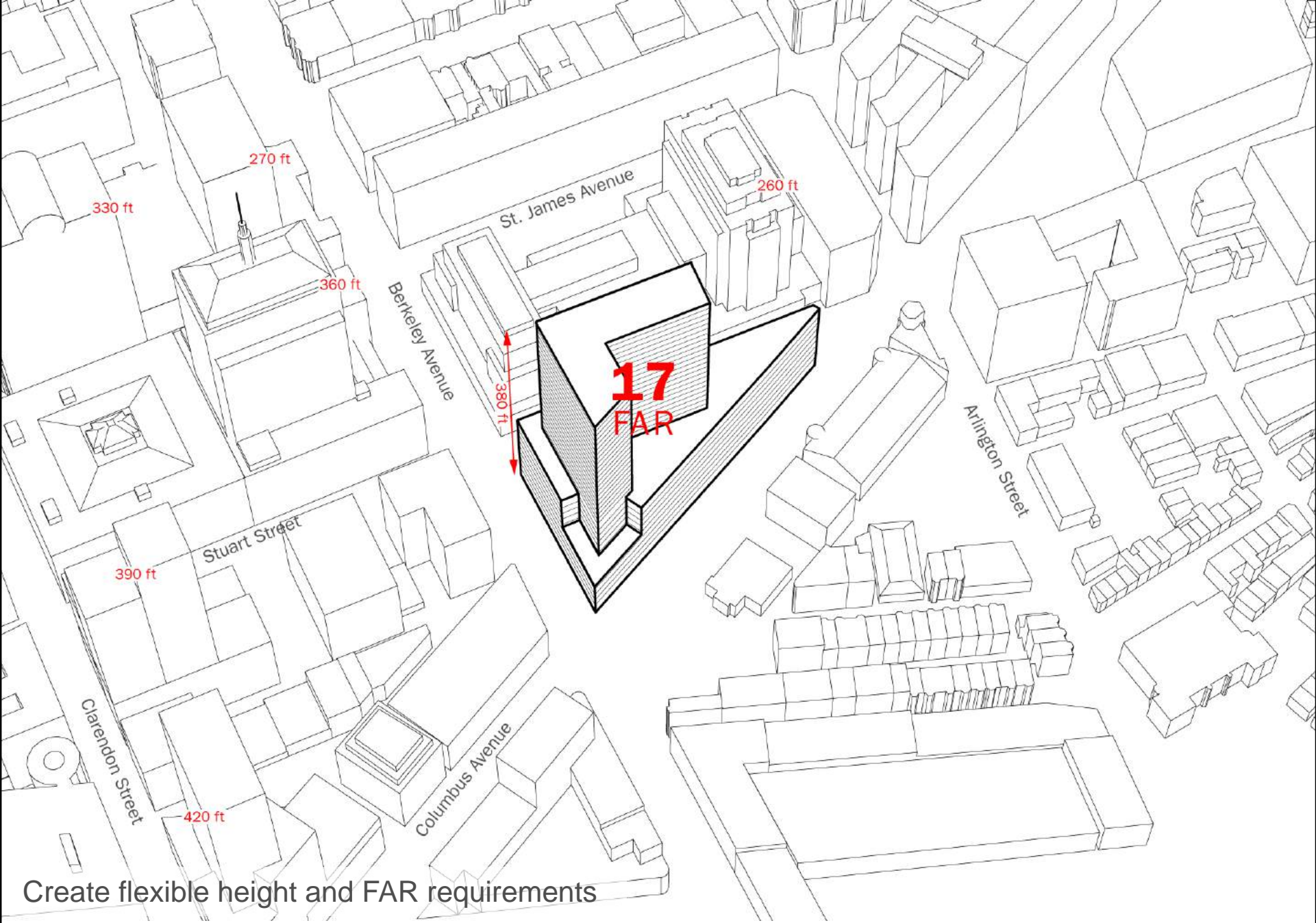
Limit length of towers to help mitigate wind, shadow and urban design impacts



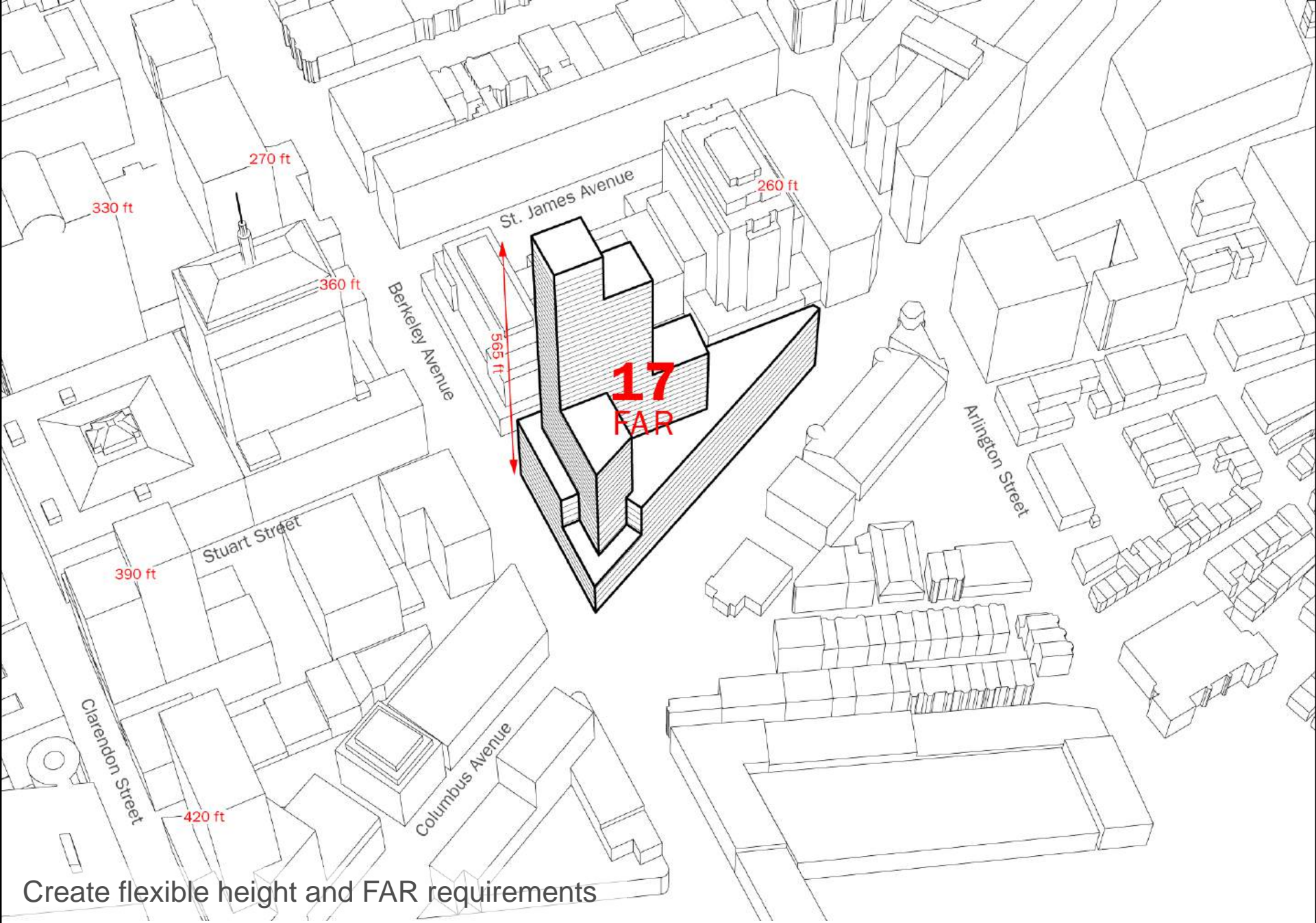
Create flexible height and FAR requirements



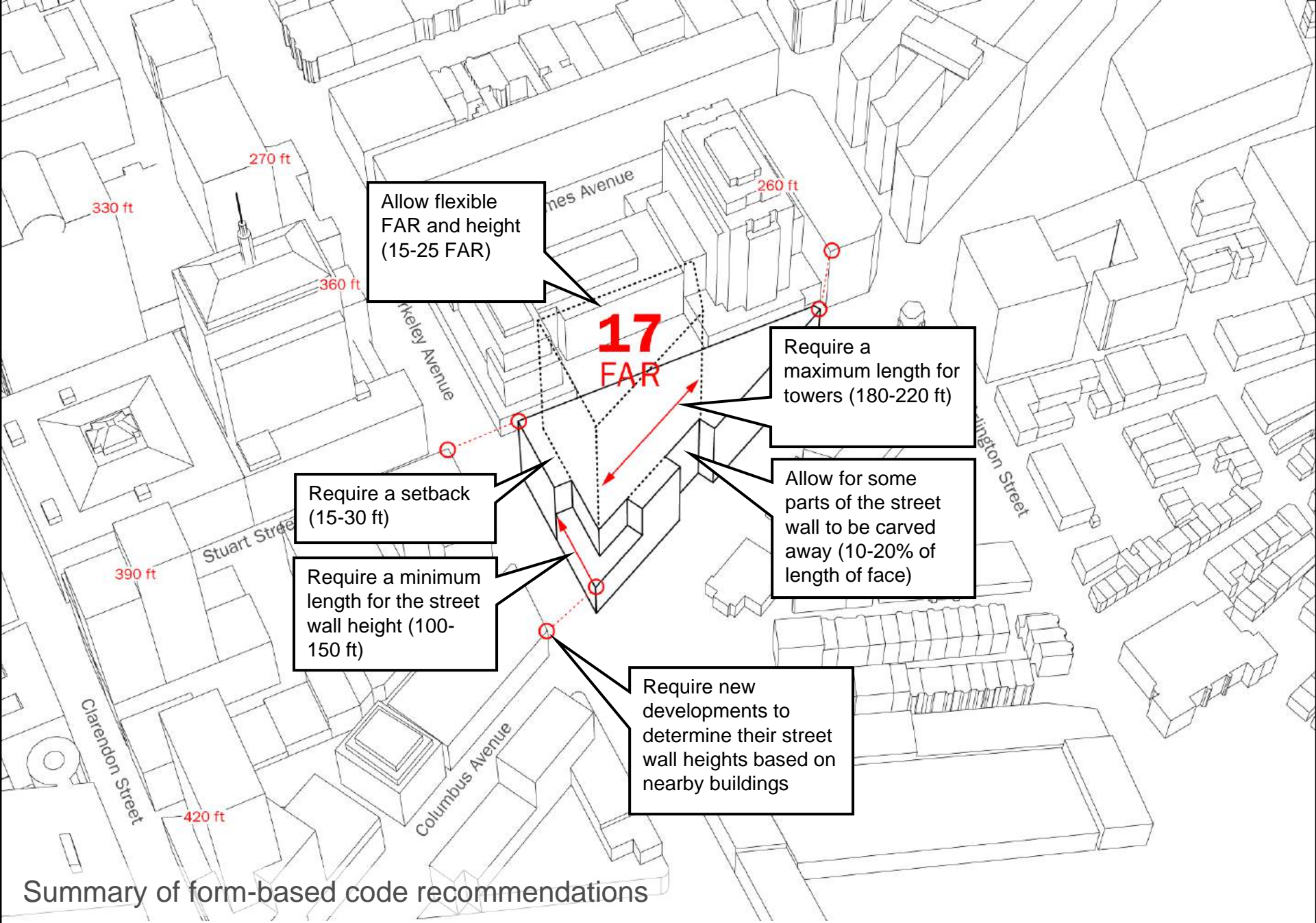
Create flexible height and FAR requirements



Create flexible height and FAR requirements

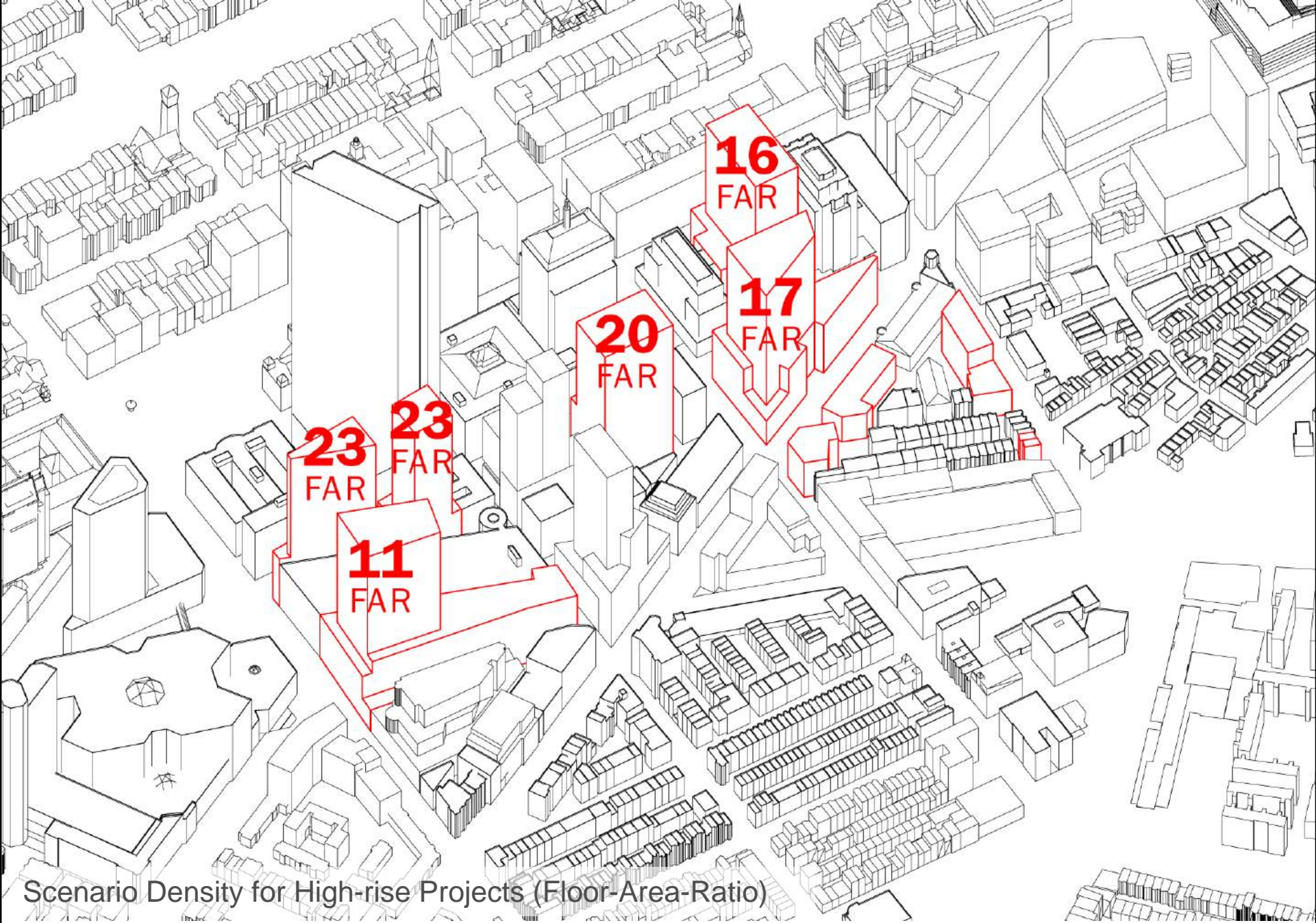


Create flexible height and FAR requirements



Summary of form-based code recommendations





Scenario Density for High-rise Projects (Floor-Area-Ratio)

### Historic Building Performance

New development that preserves one bay of a building (or its facades) that is rated III or IV by the Boston Landmarks Commission +25 ft +2

New development that preserves a building (or its facades) that is rated III or IV by the Boston Landmarks Commission +50 ft +4

### Sustainable Building Performance

LEED Silver Rating is required of all new development

### Energy Performance

New development achieves 75% energy optimization (as per LEED)  
+25 ft +2 FAR

### Sustainable Building Performance

LEED Gold Rating +25 ft +2 FAR  
LEED Platinum Rating +50 ft +4 FAR

Base Zoning: 17 FAR/400 ft height limit

### Historic Building Performance

New development may not replace buildings that the Boston Landmarks Commission has rated I or II. New development may not replace buildings that are Boston Landmarks.

### Public Space

New development with a street frontage that is 200 ft or longer must include a publicly-accessible through-block connection if such a connection is possible. The connection may be indoors or outdoors. If a through-block connection is not possible, a minimum 15,000 GSF publicly-accessible space must be provided. The space may be indoors or outdoors.

### Street Wall Performance

New development must infill a minimum of 85% of the street frontage. The street frontage must either meet the property line or be aligned to adjacent buildings. The height of the street frontage must match buildings within 125 ft. (see attached for diagrammatic explanation)

### Ground Level Performance

The maximum distance between ground-level pedestrian entrances in new development projects is 75 ft.

### Ground Level Performance

In order to help ensure active, diverse ground floor uses, for every 50,000 GSF of ground floor leasable retail space, a 2,000 GSF or smaller leasable retail space must be provided.

### Tower Setback

For portions of new development that extend above the street wall height, massing must setback from the property line at least 15 ft.

### Tower GSF

For portions of new development that extend above the street wall height, maximum residential floorplate GSF is 15,000 and maximum commercial GSF is 30,000.

### Tower Length

For portions of new development that extend above the street wall height, maximum length is 200 ft.

### Wind Performance

New development should be required to minimize adverse wind effects that may be exacerbated by new construction. Wind analysis should be incorporated into the conceptual design of all projects qualifying for Article 80 large project review. Proposals should seek to ameliorate existing wind problems where feasible through the use of stepped building facades, plinths and building orientation.

### Shadow Performance

The shadow impact of New development should conform to the requirements of new construction around the Common and Public Garden (zoning article 38, section 16), which limit shadows between 8AM and 2:30 PM between March 21 and October 21. These standards would apply to the Common, the Public Garden as well as Copley Square.

### Parking/Service Access

Maximum entrance width = 30 ft. Minimum distance between entrances = 60 ft.

### Parking/Service Location

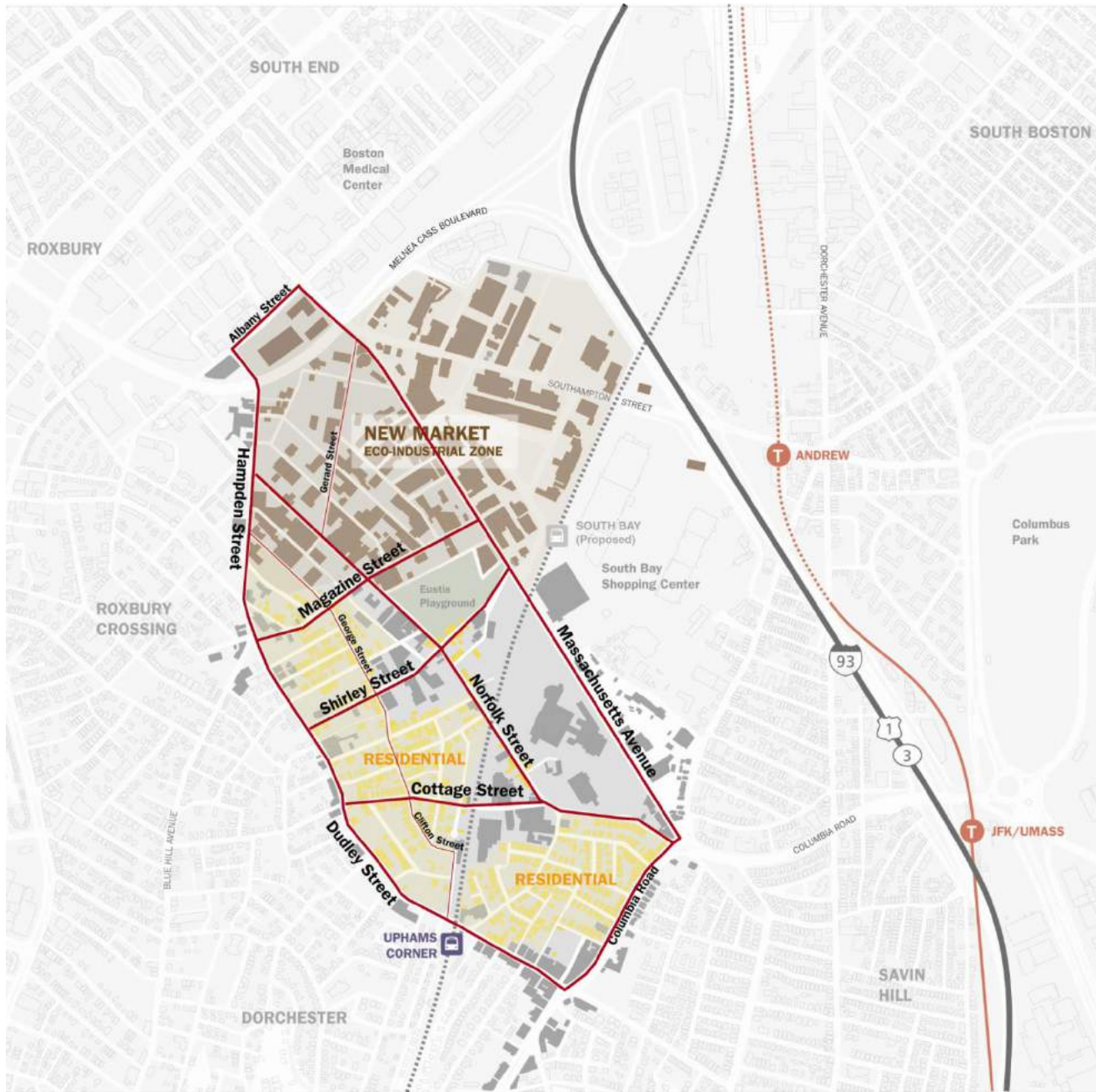
Except for access, parking and service areas must be setback a minimum of 20 ft from the building face.

### Parking Ratio

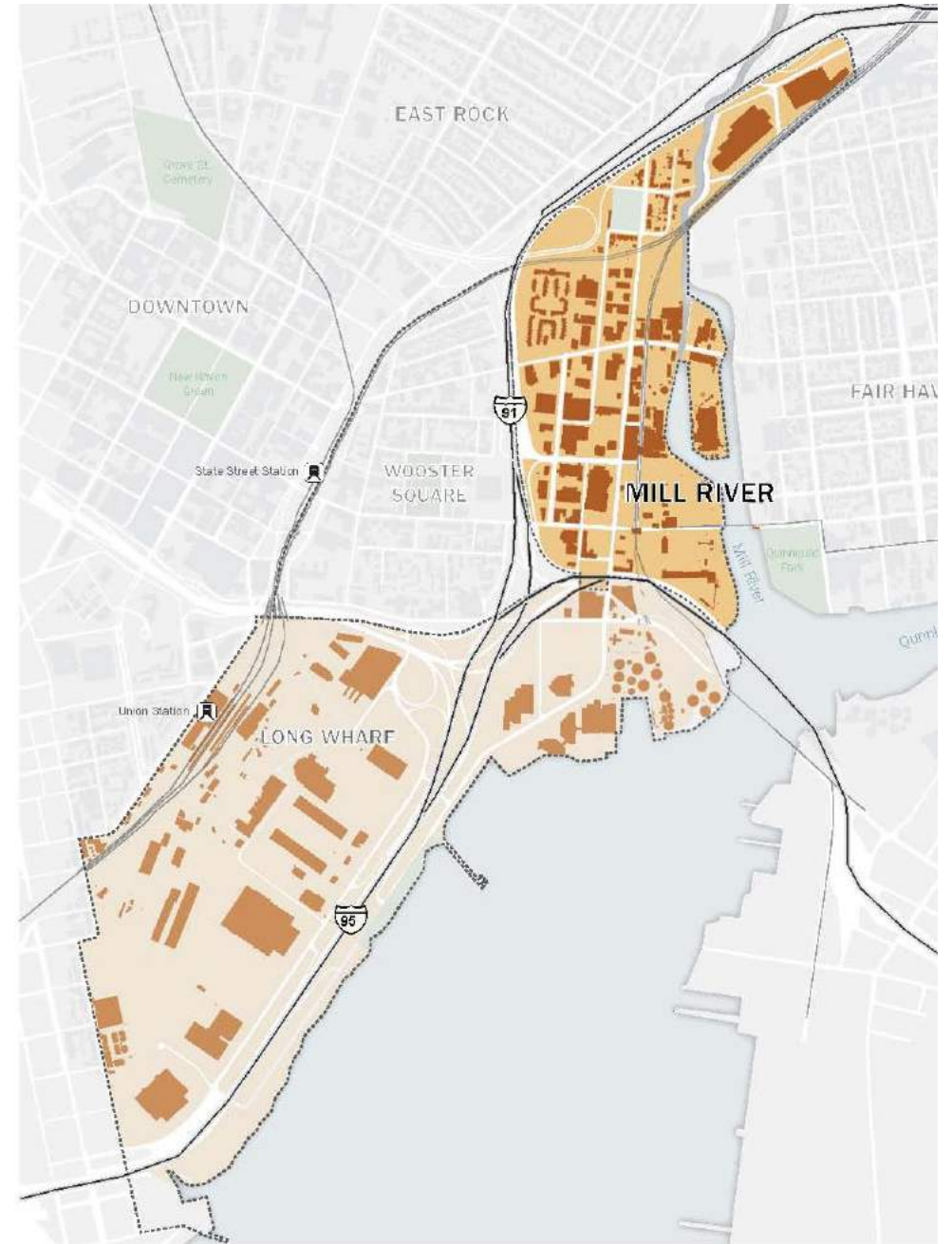
Maximum of 1 space per residential unit or .75 spaces per 1000sf of commercial development. No parking minimum.



Utile, Back Bay Planning Initiative, Boston Redevelopment Authority, 2007



New Market Planning Initiative, The American Cities Coalition, Utile, 2010-11



Mill River District Plan, New Haven EDC, Utile, 2011-13

What role should industrial districts play in the central city?



# The Relationship between Logistics, Site Planning, and Buildings

### APRON SPACE

The transportation of pallets into and out of the building moves via the truck. The type of truck that is used will determine the loading length with 4 a clear set of standards that must be understood when designing the loading dock. One critical dimension to be considered is an adequately dimensioned apron space. This zone of service must be provided immediately adjacent to the loading docks as trucks can be difficult to maneuver into the designated bay.

Apron Space Depth = (Length of Truck + Tower) + 10'

This rule of thumb will provide a good working dimension for planning, but the final configuration of the Apron Space should be determined by testing the turning radius of the range of trucks that are likely to access the loading docks at a specific facility. The right wheel drive, entry of truck maneuverability should be weighed against other factors.

**Semi**  
The Semi truck has an overall length of 60'. The apron space required is 130' + 20' + 50' = 10'

**Container**  
The Container truck has an overall length of 55'. The apron space required is 120' + 20' + 40' = 10'

**Low Boy**  
The Low Boy truck has an overall length of 47'. The apron space required is 104' + 20' + 30' = 10'

**City**  
The City truck has an overall length of 30'. The apron space required is 62' + 20' + 10' = 10'

### PALLET ENTRY

The loading dock and truck into the threshold conditions between truck and industrial building are determined by the length, stacked dimensions of trucks. As a result, standard truck height is 10' tall, measured from the loading dock level, typically 2' above grade. This makes the unloading of pallets, manageable and gives truck drivers some maneuvering flexibility when backing into a bay.

The loading dock can either be exterior or an enclosed space. An exterior loading is the most common because it is cost effective. Interior docks may be necessary due to security concerns and/or in northern climates where there is a large volume of shipments and a large number of employees.

**10 FOOT**  
The 10' high door provides the best access. If the truck bay is to be used for a variety of vehicle sizes, a 10' door is preferred. In urban areas with multiple docks, at least one dock should be 10' to allow for 10x44 stacked pallets to be moved from the building to the truck.

**9 FOOT**  
The 9' high door is the second best, feasible door height - still allowing for access to a double stacked trailer - but it does not allow for a 10x44.

**8 FOOT**  
The 8' high door is able to accommodate most single stacked pallet arrangements, but it does not provide access to trailers that are double stacked with pallets.

**11 FOOT**  
The width of the dock bay door is critical in making the process of unloading pallets, manageable. An 11' bay width allows for an amount of flexibility of truck alignment when backing into a designated bay.

**9 FOOT**  
A 9' bay is the standard truck bay width. It is 6" wider than the minimum legal truck width (without a special permit).

**7 FOOT**  
When available, a 7' wide door is not recommended because it is not deep enough to efficiently unload pallets from the trailer of a truck.

**DAY DISPLACEMENT**  
This minimum spacing between loading docks is 12' (6' center). This allows for a truck 10' in width to have room to unload. The greater spacing, the easier the process.

The Loading Step is the concrete surface found outside of the doors. Asphalt, in certain temperatures, is not safe for standing pallets of considerable weight, thus concrete must be used.

# The Relationship between Logistics, Site Planning, and Buildings

### WAREHOUSE DESIGN

**A MODEL FOR EFFICIENCY**

Warehouse design is driven by the dimensional constraints of the pallet and the pallet lift. In plan, a 48' x 48' column grid optimizes the efficiency of shelf and aisle layouts. Assuming a standard aisle width of 12', each structural bay can accommodate 24 pallet racks. The standard ceiling height is determined using a similar logic. The most common pallet lift, the counterbalanced lift, has a vertical reach of 15.5', making the 16-level racking system ideal. The total height of such a system is 18', with each individual vertical segment being 6" tall. An additional 10' above the topmost pallet is recommended to ensure sufficient space is reserved for decking, lighting, and refrigeration units.

Credit: D. OEBR. Pallet rack structure. Retrieved from <http://www.bimwiki.com/wiki/warehouse>

### AISE WIDTH

Pallet rack layout is largely dependent on the type of lift truck. The aisle width is defined as the dimension between pallets stored in the aisle. This is typically 6" narrower than the "back to rack" aisle dimension. Each truck varies in its dimensions, number of wheels, turning radius, and lift height. The necessary aisle width for a specific truck is equal to the sum of the head length, the load length, 12" for maneuverability, plus the 6" pallet overhang.

The most common lift truck, the counterbalanced lift, requires an aisle width of approximately 12'. Although this is wider than average, this model boasts a load capacity of up to 6000 pounds.

#### COUNTERBALANCED

Max. Lift Height: 16'-0"  
Min. Aisle Width: 12'-0"  
Load Capacity: 6000 Lbs

**MINIMUM AISLE WIDTH**

**NUMBER OF PALLET PER 1000 SF**

Aisle Width: 12'  
Building Height: 39'  
Pallet Load: 72  
Cost/SF: \$160  
Cost/Pallet: \$2,240

#### ORDER PICKER

Max. Lift Height: 30'  
Min. Aisle Width: 5'-0"  
Load Capacity: 3000 Lbs

**MINIMUM AISLE WIDTH**

**NUMBER OF PALLET PER 1000 SF**

Aisle Width: 5'  
Building Height: 40'  
Pallet Load: 72 + 10B  
Cost/SF: \$170  
Cost/Pallet: \$930

#### DEEP REACH

Max. Lift Height: 43'-0"  
Min. Aisle Width: 9'-0"  
Load Capacity: 3000 Lbs

**MINIMUM AISLE WIDTH**

**NUMBER OF PALLET PER 1000 SF**

Aisle Width: 9'  
Building Height: 46'  
Pallet Load: 72 + 10B  
Cost/SF: \$190  
Cost/Pallet: \$1,070

#### TURRET STOCKPIPER

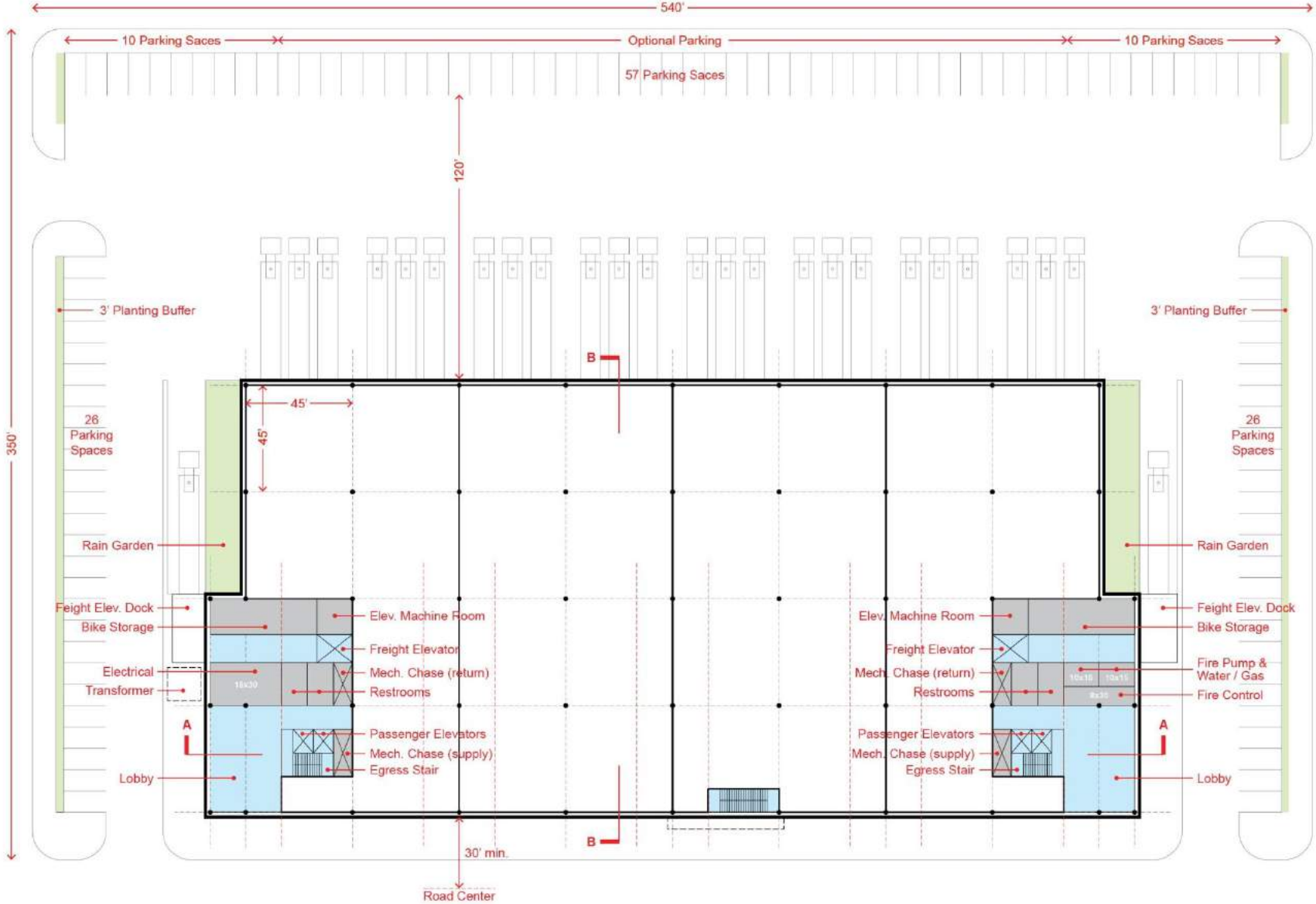
Max. Lift Height: 41'-0"  
Min. Aisle Width: 5'-0"  
Load Capacity: 3000 Lbs

**MINIMUM AISLE WIDTH**

**NUMBER OF PALLET PER 1000 SF**

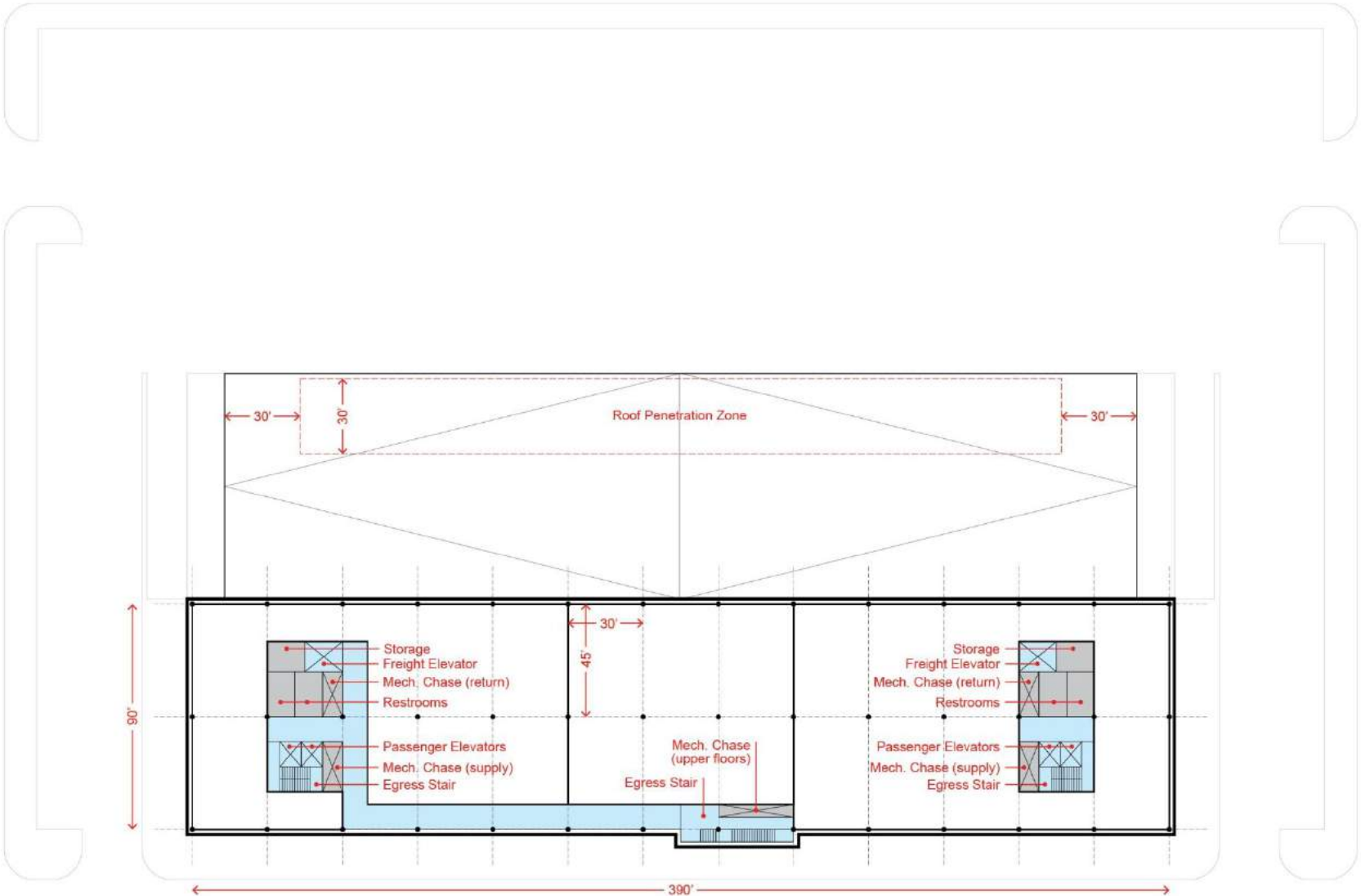
Aisle Width: 5'  
Building Height: 46'  
Pallet Load: 72 + 144  
Cost/SF: \$190  
Cost/Pallet: \$890

# Mixed Industrial Building Prototype

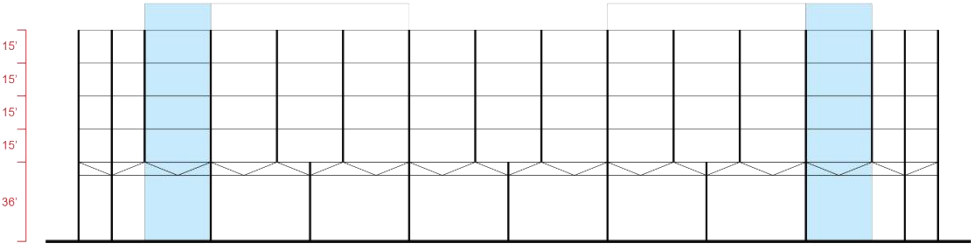




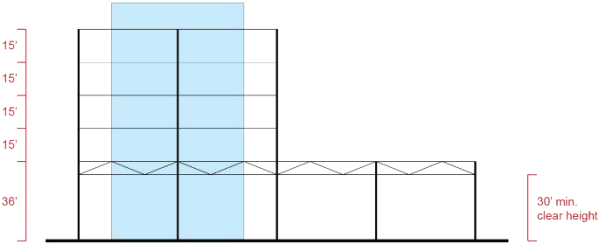
# Mixed Industrial Building Prototype



# Mixed Industrial Building Prototype



Section A-A



Section B-B

Prototype Test-fit

Parcel T Industrial – 56,000 GSF

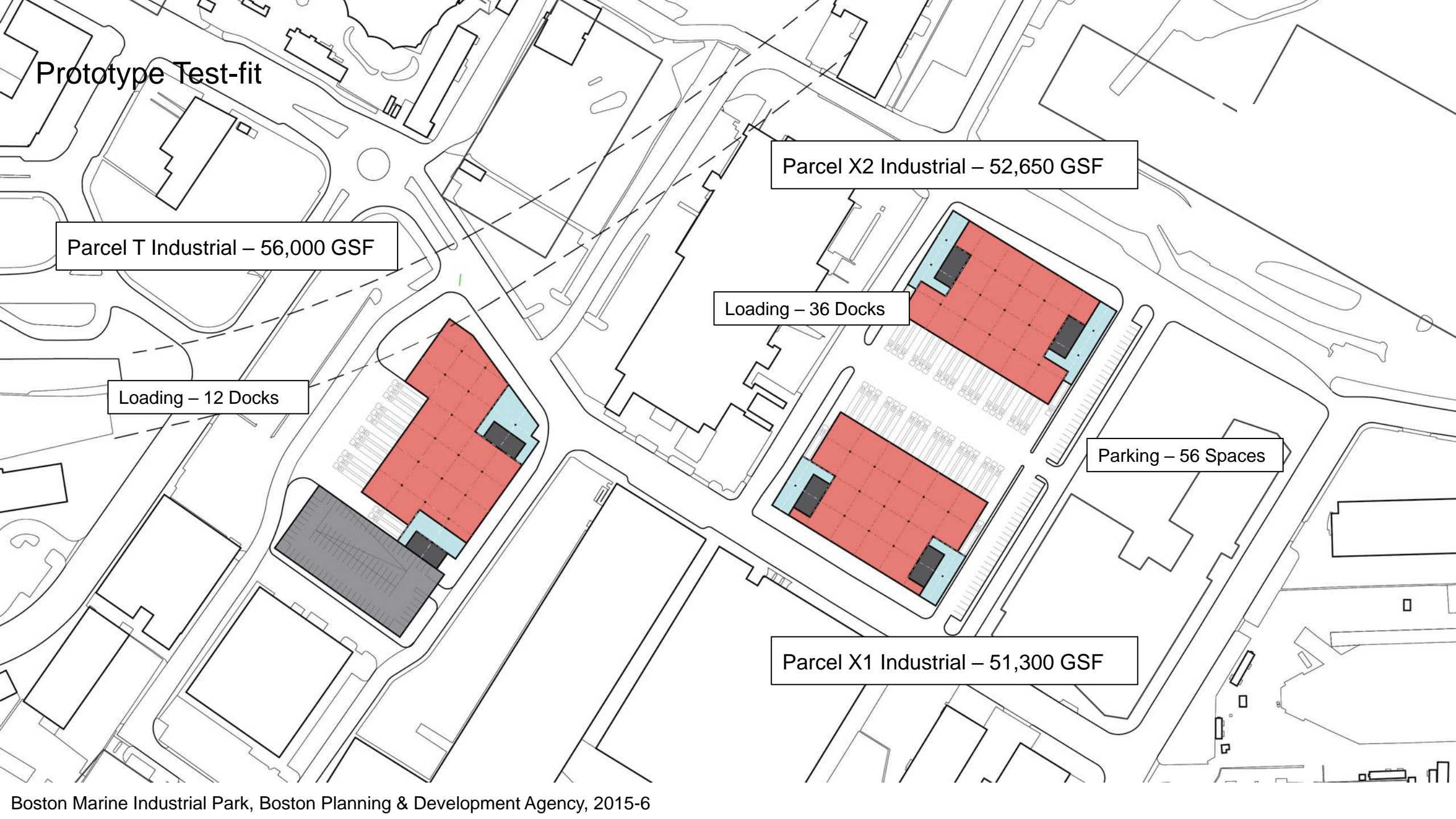
Loading – 12 Docks

Parcel X2 Industrial – 52,650 GSF

Loading – 36 Docks

Parking – 56 Spaces

Parcel X1 Industrial – 51,300 GSF



Prototype Test-fit

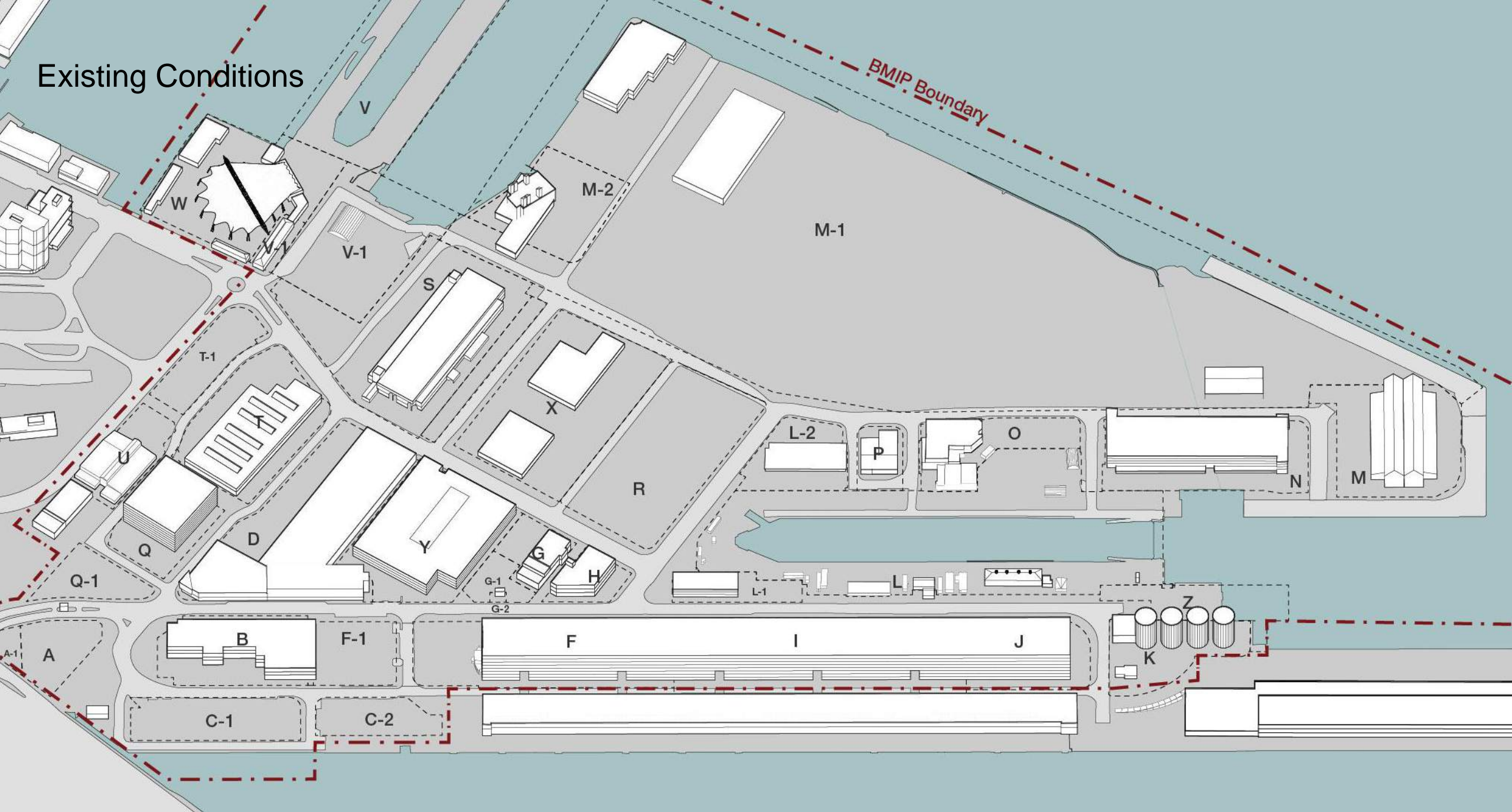
- Industrial
- Mixed Industrial

Parcel X2 Industrial – 40,500 GSF

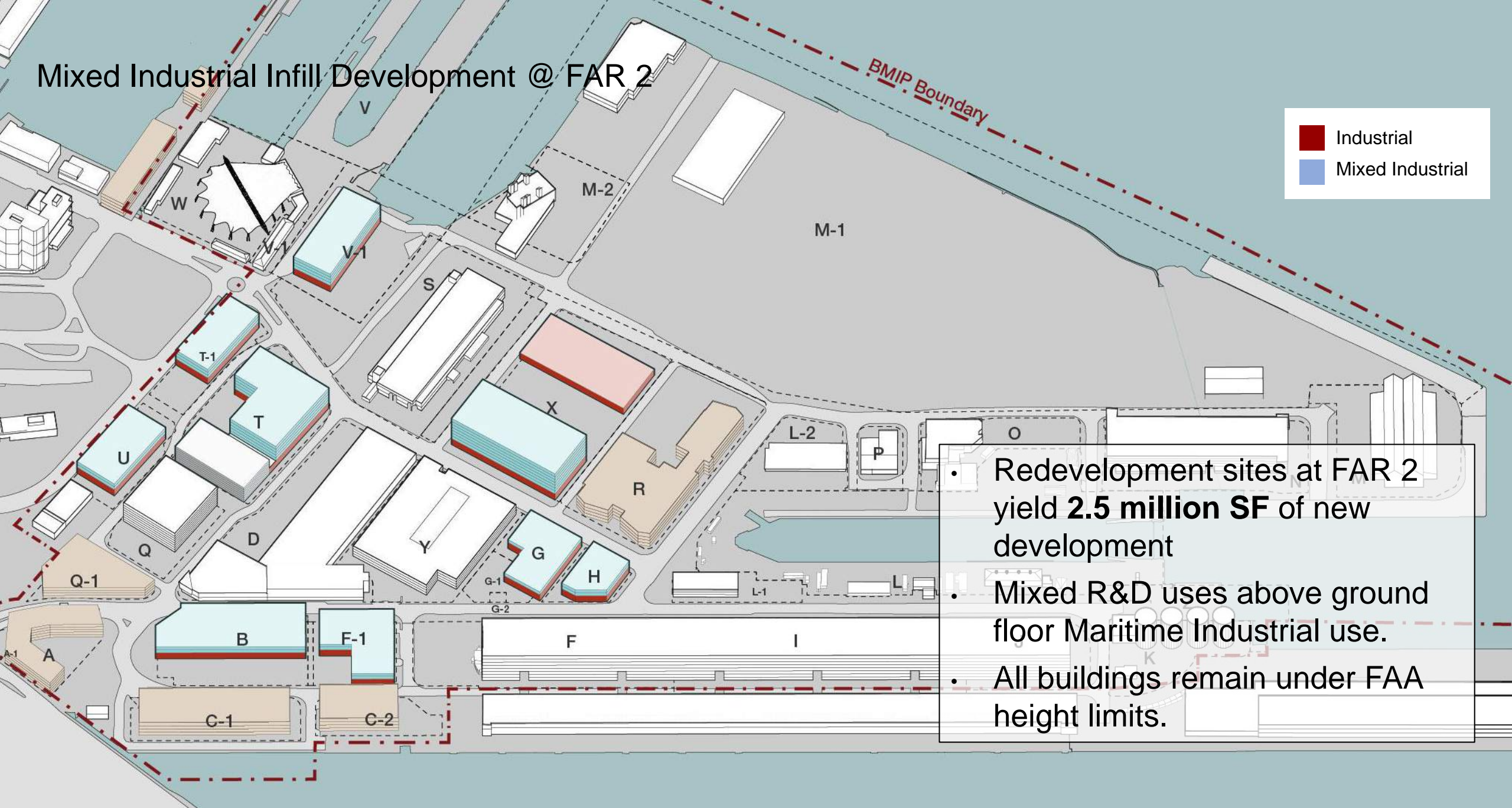
Parcel T Office – 25,000 GSF per floor

Parcel X Office – 27,000 GSF per floor

# Existing Conditions



# Mixed Industrial Infill Development @ FAR 2

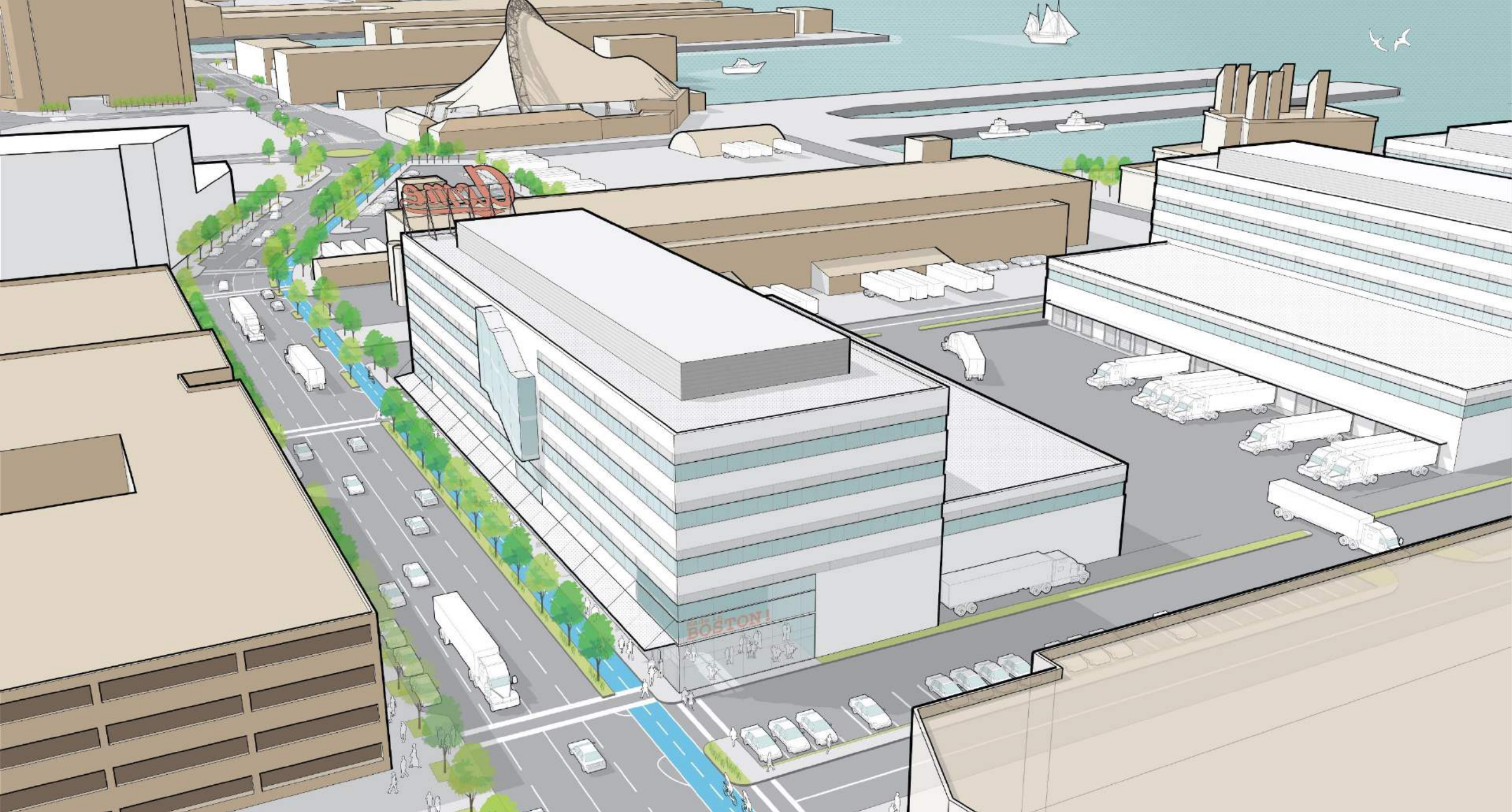


Industrial  
Mixed Industrial

• Redevelopment sites at FAR 2 yield **2.5 million SF** of new development

• Mixed R&D uses above ground floor Maritime Industrial use.

• All buildings remain under FAA height limits.

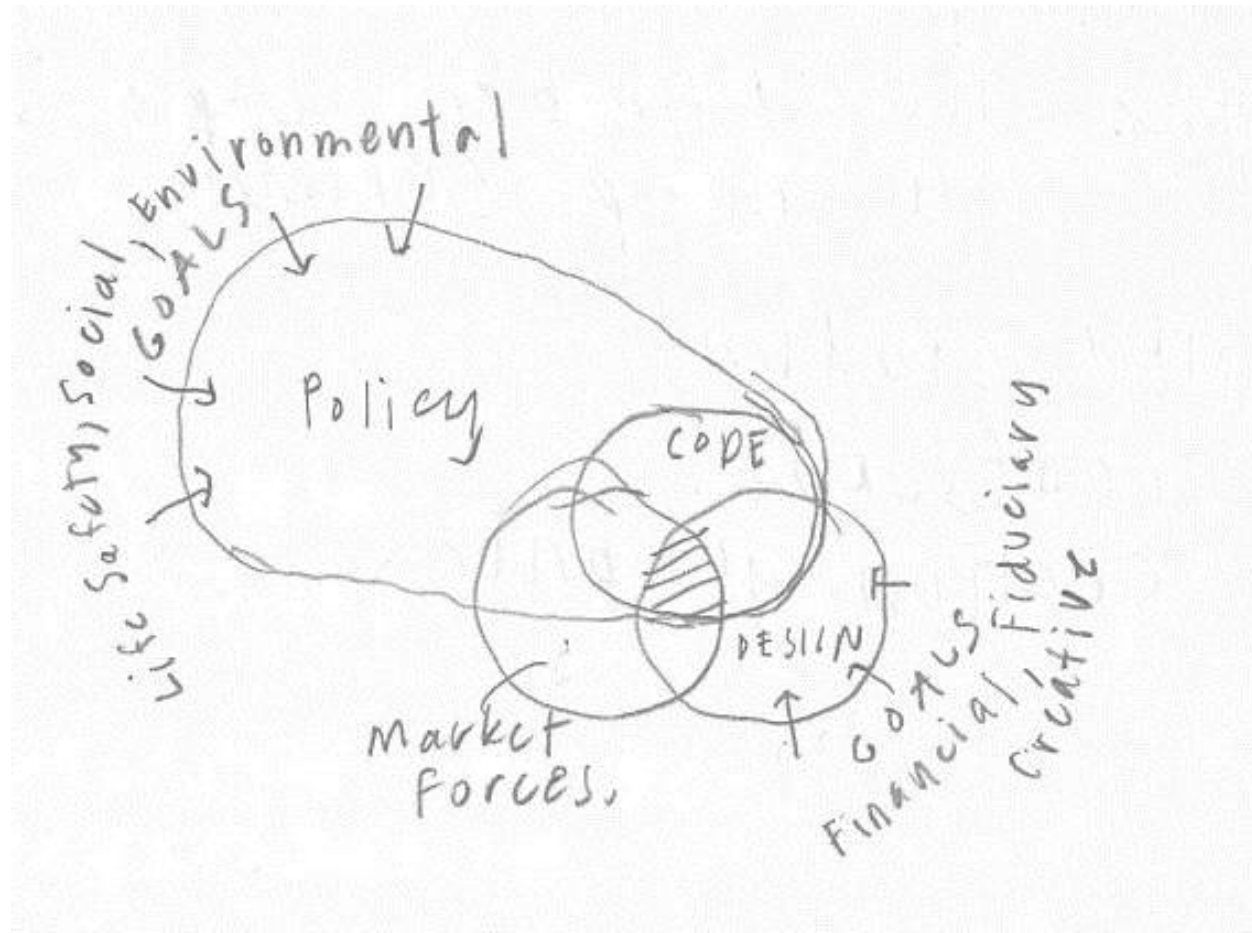
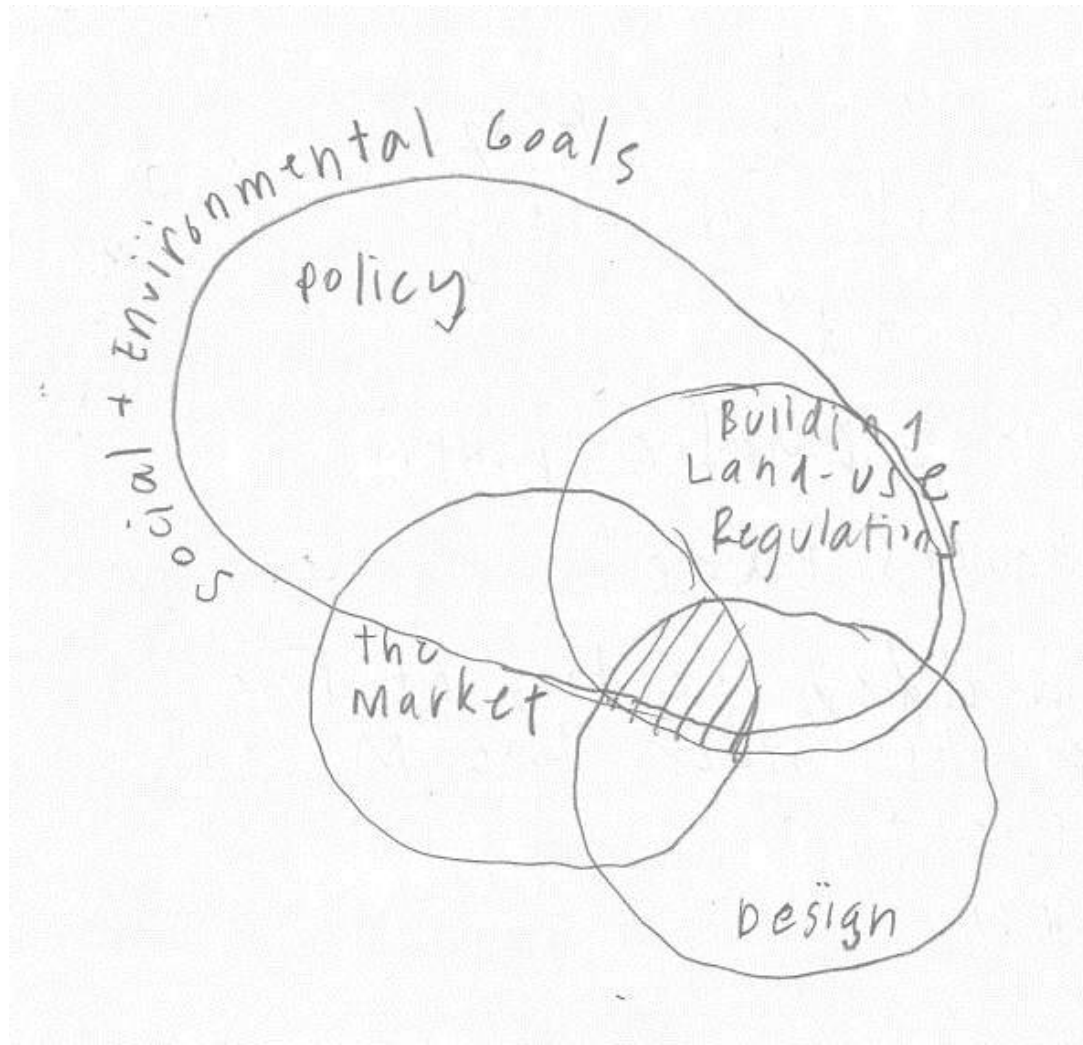


Boston Marine Industrial Park, Boston Planning & Development Agency, 2015-6



Alewife Plan, Envision Cambridge, City of Cambridge, 2016-present





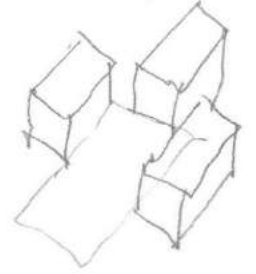
# Design vs. Design Framework



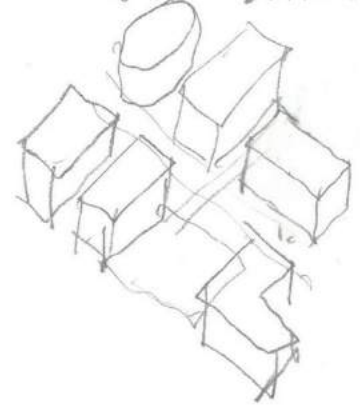
building  
Associated  
open space



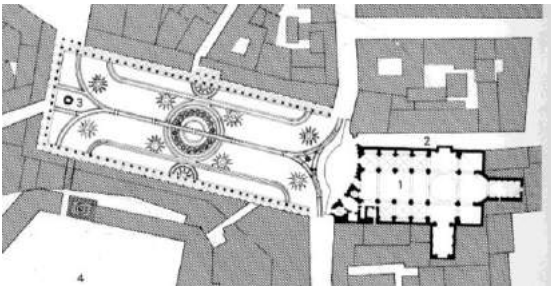
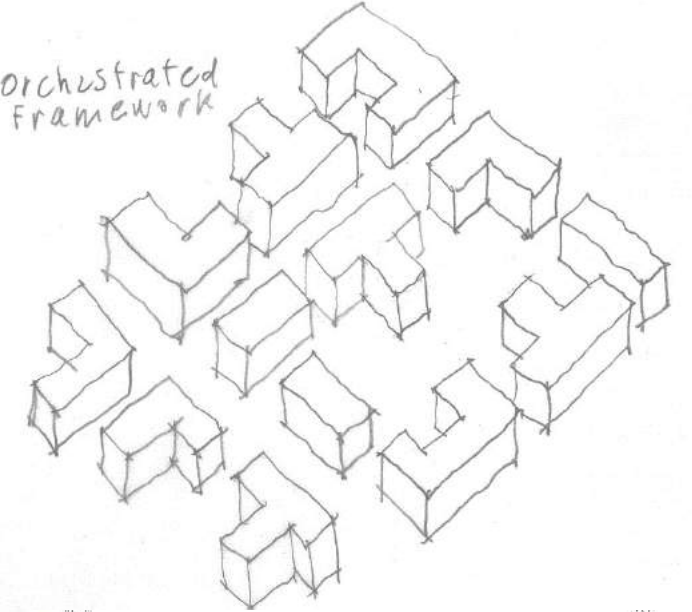
3-4 buildings  
defining a space



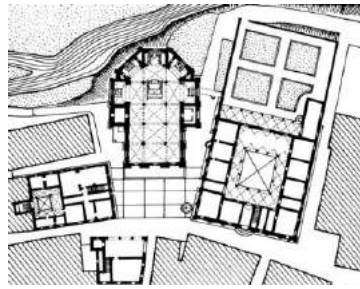
composition of  
6-7 buildings



Orchestrated  
Framework



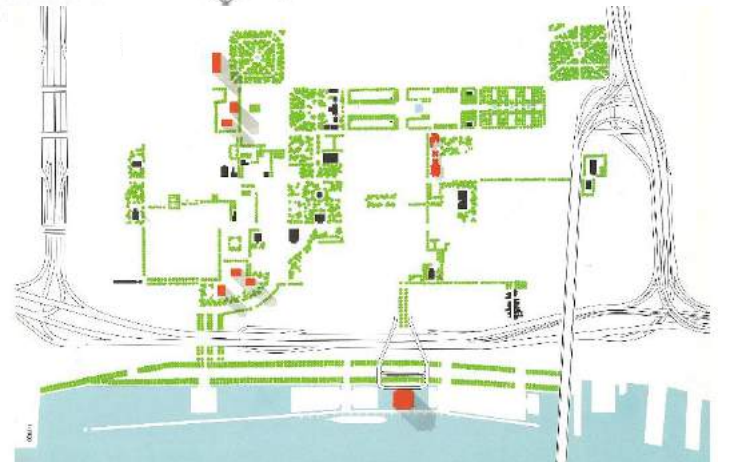
Vigevano, Italy



Pienza, Italy



Venice\*



Philadelphia\*

\* From *Design of Cities*, Edmund N. Bacon, 1967

# Everett Square: Proposed Urban Design Interventions

- Consolidate and expand open space
- Improve circulation



## Strategy 1: Extend Union Ave

Formalize current parking access as a new street between Norwood Street and School Street

Potential development site for small scale retail along Everett Square and School Street



## Strategy 2: Reconfigured Plaza

Extend new street to connect Union Ave to Broadway and School Street

Extend open space to form continuous plaza from Norwood street to Parlin Library

Use “shared space” approach at School/Broadway intersection



Existing Plaza = 16,840 SF  
Proposed Plaza = 20,700 sf  
Additional Plaza space = ~3,860 SF



# Shared Space



# Sites 2 and 3: Relocate RiteAid, extend Marlboro to Broadway

- Generates two development parcels facing library and reconfigured plaza
- Requires phased demolition and redevelopment of Rite-Aid
- Consolidates parking at rear of block (Victoria Street)



- Development Parcel 02 ~25,450SF
- Development Parcel 03 ~7,900SF

## Sites 2 and 3: Mixed-use with shared parking

- Two 6 story buildings
- Retail: 30,700 SF (Site 2 replaces existing 24,567 SF)
- Residential: 120 units
- Shared Parking: 205 space



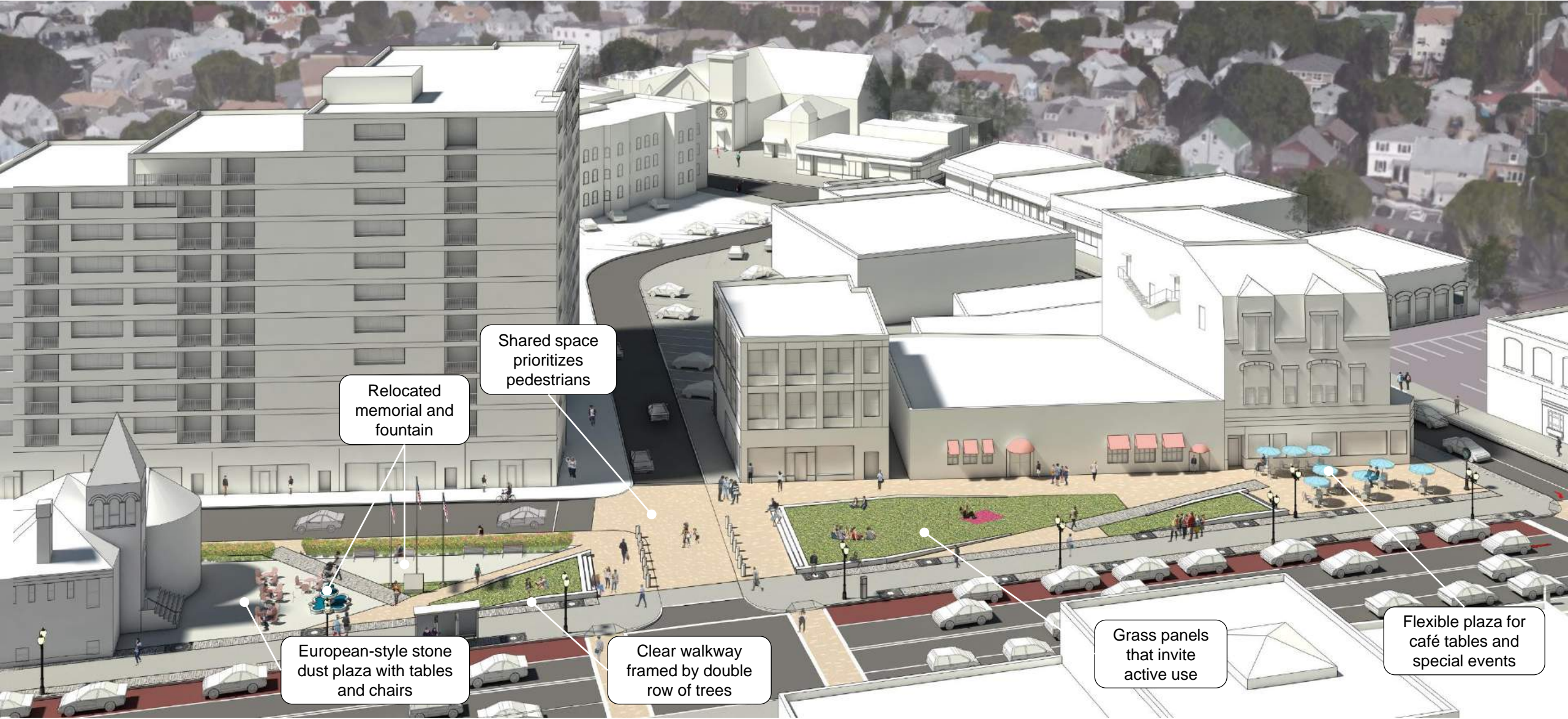


# Reimagined Square



Everett Square, Utile with Klopfer Martin and Nelson Nygaard, City of Everett, 2016-17

# Reimagined Square



Shared space prioritizes pedestrians

Relocated memorial and fountain

European-style stone dust plaza with tables and chairs

Clear walkway framed by double row of trees

Grass panels that invite active use

Flexible plaza for café tables and special events

Everett Square, Utile with Klopfer Martin and Nelson Nygaard, City of Everett, 2016-17

# Union Square, Somerville, MA



# Union Square, Somerville, MA







# Clients and Projects

