EXPANDED PROJECT NOTIFICATION FORM

44 North Beacon Street

PROPONENT
44 North Beacon, LLC

SUBMITTED TO
The Boston Planning and Development Agency

SUBMITTED BY

IN ASSOCIATION WITH
Francke | French Architects
The Strategy Group
Michael D'Angelo Landscape Architecture, LLC
Price Sustainability
Haycon Inc.
Smith Duggan Buell & Rufo LLP

March 5, 2018

BY EMAIL AND HAND DELIVERY

Mr. Brian P. Golden, Director
Boston Planning and Development Agency
Boston City Hall, Ninth Floor
Boston, Massachusetts 02201

Re: 44 North Beacon Street, Boston MA
Expanded Project Notification Form

Dear Director Golden:

On behalf of 44 North Beacon LLC and Boston Real Estate Collaborative LLC, and in accordance with the Executive Order relative to the provision of mitigation by development projects in Boston, we are pleased to submit this Expanded Project Notification Form ("EPNF") for Large Project Review under Article 80B of the Boston Zoning Code for a new residential development at 44 North Beacon Street in the Allston-Brighton neighborhood (the "Project").

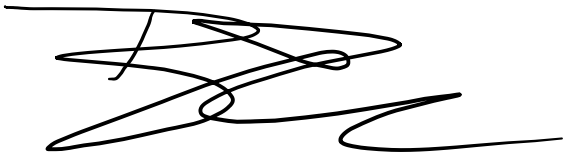
The Project will be located on an approximately 0.4 acre (17,640 SF) parcel fronting on North Beacon Street (the "Project Site"), within walking distance of the Boston Landing Commuter Rail Station and the Allston Street Station on the MBTA Green Line. The Project features approximately 54,000 square feet comprised of 54 residential units, approximately 60 covered bike parking spaces, 35 below grade vehicle parking spaces, a variety of indoor amenities and abundant open space and outdoor amenities, including a rooftop farm. The Project will incorporate a mix of rental and home ownership units through low-density, pedestrian scale massing with an open central courtyard facing North Beacon Street that features active resident space, mature plantings, local art installations and a public bicycle repair station. In addition, we look forward to working with neighbors, stakeholders and

community members through the Large Project Review process, to identify ways in which the Project can create other benefits for the surrounding area and residents.

We look forward to working collaboratively with you and your staff, other city agencies and members of the community to develop the best redevelopment plan for this location. We anticipate that the BPDA will issue public notice of the receipt of this EPNF within five days, as required by Section 80A-2(3). Requests for copies of the EPNF should be directed to Scott Kirkwood at 857-991-1105 or via email at scott@brec-llc.com.

If you have any questions, please do not hesitate to contact me.

Sincerely,



Brent Berc, Founding Partner
Boston Real Estate Collaborative LLC
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cc: Mark Ciommo, City Councilor
Sal DiDomenico, State Senator
Kevin Honan, State Representative

44 North Beacon Street

Boston, Massachusetts

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Project Description

44 North Beacon Street, LLC, ("the Proponent") submits this Expanded Project Notification Form ("EPNF") to initiate review by the Boston Redevelopment Authority, d/b/a Boston Planning & Development Agency (the "BPDA") under Article 80 of the Boston Zoning Code (the "Code") for the redevelopment of an existing ambulance service facility into a new transit-oriented multi-family residential project located at 44 North Beacon Street in the Allston neighborhood of Boston, Massachusetts (the "Project"). The Project will be located on an approximately 0.4-acre (17,640 square-foot) parcel (the "Project Site") within walking distance of the Boston Landing Station on the MBTA Framingham/Worcester Commuter Rail Line and the Allston Street Station on the MBTA Green Line. Refer to Figure 1.1 for a site location map and Figure 1.2 for site context.

The Project will be comprised of 54 total residential units. The unit mix consists of two studio units, 13 one-bedroom units, 11 one-plus bedroom units, 16 two and two-plus bedroom units and 12 three-bedroom units. It is intended that 16 units will be reserved for home-ownership and 38 will be available for rent. The Project will provide seven on-site, affordable units. The building will feature 35 parking spaces, 750 square feet of bicycle storage and maintenance space, 1,500 square feet of indoor amenity space and another 9,761 square feet of residential amenity and open space. Approximately 20 percent of the Project Site will remain as open space to maximize permeability and green space.

This EPNF presents details about the Project and provides a comprehensive transportation analysis and other potential environmental impacts, as well as infrastructure needs to inform reviewing agencies and the community about the Project, its potential impacts, and the mitigation measures proposed to address any potential impacts.

1.1 Site Context and Existing Conditions

The approximately 0.4-acre Project Site is located along North Beacon Street in a mixed-use neighborhood, and currently consists of an approximately 7,750-square foot single-story, concrete block commercial building, with approximately 14 parking spaces. The existing building currently supports an ambulance maintenance and service facility and is surrounded by a mix of single-story commercial buildings and residential buildings up to five-stories in height. Refer to Figure 1.3 for the existing conditions site plan and Figure 1.4 for photographs of the existing Project Site.

The Project Site lies 500 feet from Union Square in the growing neighborhood of Allston and is well served by existing infrastructure and walkable neighborhood

services as evidenced by its Walk score of "92," as calculated by Walk Score, an industry expert on the walkability of neighborhoods. Additionally, the Project Site's Bike Score is "78." The Project Site is near public transit, including multiple bus lines that stop along its frontage on North Beacon Street and along nearby Cambridge Street. The Project Site is also approximately one-half mile from the Boston Landing MBTA Commuter Rail Station on the Framingham/Worcester line as well as the Green Line stops along Commonwealth Avenue. Additionally, the Project Site is close to some of Boston's largest employers.

1.2 Project Description

The Project includes the demolition of the existing one-story concrete structure to clear the underutilized site for approximately 54,000 gross square feet of new residential development with an open-courtyard and below-grade parking. The building design utilizes the unique depth of the site to situate the highest density and height in the back of the site, off North Beacon Street, allowing the more pedestrian scale, three-story massing and open courtyard to abut North Beacon Street. Reflecting the sensitivity of scale and streetscape experience, the building footprint is U-shaped, which creates the prominent courtyard fronting North Beacon Street. The open courtyard, along with a planted street edge, will activate the streetscape and block with a vibrant, green interface between Project and the sidewalk.

The rooftop landscapes will employ both intensive and extensive plantings in conjunction with hardscaped occupiable areas. Much of the unoccupied roofs will feature green roofs, which will provide stormwater management and thermal benefits to the building and Project. The occupiable roof decks will feature an array of intensive green roofs, ranging from native and drought resistant grasses and shrubs to trees in large planter boxes.

The basement-level contains parking and a portion of the buildings mechanical equipment. While allowing for parking, the Project will include and promote various alternative means of transportation; including electric vehicle ("EV") as well as dedicated street-level bicycle storage and maintenance spaces. The Project will also promote use of public transportation by providing subsidies to residents who utilize public transit. The intent of the Project is to create and promote a sustainable and diverse community of residents that build on and contribute to the urban context and larger community.

1.2.1 Development Program

Table 1-1 summarizes the proposed development program for the Project. Refer to Figure 1.5 for the Proposed Site Plan.

Table 1-1 Proposed Development Program Summary

	Size[1]/ Quantity
Residential	54 units
Studio	*2 units*
1 Bedroom	*13 units*
1+ Bedroom	*11 units*
2 and 2+ Bedroom	*16 units*
3 Bedroom	*12 units*
Parking	35 spaces
Bicycles	750 SF of indoor repair space with storage for 60 bicycles
Project Total	**53,884 SF**

1- All areas are provided as Gross Floor Area as defined by the Boston Zoning Code.

1.2.2 Project Schedule and Phasing

It is anticipated that the Project will start in the Winter of 2019 and take approximately two years to complete in its entirety, with a target delivery date of January 1, 2021. It will be a single-phase project.

1.3 Summary of Public Benefits

The Project will substantially revitalize the underutilized Project Site and enhance the surrounding neighborhood through the creation of a vibrant appropriately-scaled development. The Project will deliver numerous public benefits, including considerable urban design and streetscape improvements.

Additional public benefits for the surrounding neighborhoods and the City of Boston are summarized in the following subsections and described in detail in the chapters that follow.

Public Realm/Open Space Activation

- The rejuvenation of an underutilized parcel previously used for high-traffic, commercial uses into a vibrant multi-family development with a strong home-ownership component to encourage residents to establish roots in the community.
- The construction of a new walkable development in an area well-served by existing transit, with a walk score of 92.

- The creation of a new landscaped courtyard along North Beacon Street featuring sustainable and native plantings to improve the North Beacon Street streetscape.
- Dedication area for local artists to display their work to the public including sculptures or murals.

Transportation

- A six and eight vehicle increase to peak hour traffic volumes compared to the existing conditions which will not adversely impact area traffic generation.
- Avoidance of excess on-site parking to encourage use of alternative modes of transportation such as walking, biking, and public transportation.
- The inclusion of indoor bicycle storage and maintenance facilities on-site, as well as guest bicycle racks to support visitors.
- The installation of a public bike repair station on or directly adjacent to the Project Site.
- The Proponent will provide an annual subsidy to residents of the building who utilize public transit via the MBTA / Commuter rail.

Environment/Sustainability

- Through the incorporation of a number of sustainable design measures and energy optimizing building design and systems, the Project is targeting an approximately 30 percent annual energy use reduction. Additionally, the Project Greenhouse Gas emissions will equate to an estimated 23 percent reduction in stationary source carbon dioxide emissions.
- The compliance with Article 37 (Green Buildings) of the Code by demonstrating compliance with the LEEDv4 program at the LEED Silver level.
- The improvement of water quality by collecting and treating stormwater runoff through a series of structural Best Management Practices.

Socioeconomic

- The introduction of new housing stock to assist in Mayor Walsh's initiative of adding 53,000 housing units by 2030 (*Housing a Changing City: Boston 2030*).
- The creation of one to two permanent local resident jobs relating to the maintenance and property management, as well as approximately 215 construction jobs in a variety of trades.

1.4 Community Outreach

As part of its ongoing community engagement, the Proponent and the Project Team have met with local city and state elected officials and staff, including the offices of Representative Kevin Honan, Senator Sal DiDomenico, and Councilor Mark Ciommo.

The Proponent has also held individual meetings with nearby residents and community advocates in the neighborhood, including the Allston Civic Association Executive Committee, and plans to meet with the Brighton Allston Improvement Association. In addition to working with Impact Advisory Group ("IAG"), the Proponent will continue to meet with local elected officials, community organizations, residents, and interested parties as the Project moves forward.

1.5 Regulatory Context

As described further below, the Project will require Large Project Review pursuant to Article 80B of the Code. This EPNF includes the required analysis of potential impacts under Large Project Review.

Brighton Guest Street Area Planning Study

The Project is located along the southern limit of the Guest Street Planning Study. The Guest Street Planning Study included a 100-acre area extending one-mile along the Turnpike. The Guest Street Planning Study resulted from coordinated efforts of multiple stakeholders and was approved by the BPDA in March 2012.

The long-term vision of the Guest Street Planning Study is to create an urban mixed-use district featuring vibrant community uses and residential development resulting in an area that will become a transit-oriented mixed-use destination with a blend of workplaces, homes, and neighborhood amenities.

The Project is consistent with the goals of the Guest Street Planning Study in that it provides new, appropriately scaled residential development, which promotes a healthy, active lifestyle through the creation of a number of open space opportunities, as well as new bicycle and pedestrian accommodations. The Project will also considerably improve the streetscape along North Beacon Street by increasing the area of greenspace and limiting building frontage along the adjacent public way.

City of Boston Zoning Controls

The Project Site is comprised of a single parcel located along North Beacon Street in the Neighborhood Business Subdistrict CC-1. The Table below compares the Project with the current zoning.

Table 1-2 Zoning Summary

	Allowed in CC-1	Proposed
Lot Size	-	17,640 SF
Far Adjusted GSF	-	53,884 SF
Max. Far	1	3.05*
Unbuilt Lot Percentage		
Max. Stories	-	7
Max. Height	35 FT	69 FT*

Min. Lot Size	-	17,640 SF
Min. Open Space (50 SF/Unit)	2,700 SF	9,761 SF (~180 SF/UNIT)
Min. Lot Width	-	105 FT
Min. Lot Frontage	-	105 FT
Min. Front Setback	-	6 FT
Min. Side Setback	-	6 FT
Min. Rear Setback	20 FT	15 FT*
Required Parking	98.9	35*
Loading Required?	TBD	TBD
Total Units	*54*	

* ZONING VARIANCE REQUIRED
- ARTICLE 51-17, TABLE E, CC-1
- OFF-STREET LOADING - ARTICLE 24

Uses

The use of the Project as a multi-family dwelling is conditional in the Allston-Brighton CC-1 Neighborhood Business Subdistrict and will require zoning relief.

Dimensional Requirements

Article 51, Table E of the Code imposes the following dimensional requirements upon the Project Site:

- A maximum Floor Area Ratio ("FAR") of 1, and a maximum height of 35 feet;
- Minimum open space of 50 square feet per dwelling unit, all or a portion of which "maybe met by suitably designed and accessible space on balconies of main buildings or on roofs of wings of main buildings"; [Footnote (2) of Table E] and
- A minimum rear setback of 20 feet.

Based on the current design of the Project, the Proponent anticipates zoning relief for exceeding the maximum permitted FAR, calculated to exclude the areas outlined in Article 2A of the Code, building height in excess of 35 feet and a rear-yard setback of less than 20 feet.

Off-Street Parking and Loading

The Project will require zoning relief for the off-street parking requirement specified in Article, 51 Table J, with a proposed ratio of 0.65 spaces per dwelling unit. Per Article 24 of the Code, it is anticipated that no off-street loading area may be required for uses specified as Group 1, listed in Table A, Section 8-7.

Article 80

The Project is subject to land use controls imposed through the City of Boston Zoning Code. Under Section 80B of the Code, Large Project Review by the BPDA is required for any new construction equal to or greater than 50,000 square feet of gross floor area. The Project proposes approximately 54,000 square feet of

development and therefore exceeds this threshold. The Proponent commenced Large Project Review under Article 80 by the filing of a Letter of Intent (the "LOI") with the BPDA on January 16, 2018. A copy of the LOI is provided in Appendix A, Letter of Intent.

This EPNF (a) aims to meet the requirements of Large Project Review, (b) presents details about the Project, and (c) provides an analysis of transportation, environmental protection, infrastructure, and other components of the proposed Project, in order to inform city agencies and neighborhood residents about the Project, its potential impacts, and mitigation proposed to address any potential impacts. Based on a comprehensive approach to address potential impacts similar to the level of information normally presented in a Draft Project Impact Report ("DPIR"), the Proponent requests that the BPDA, after reviewing public and agency comments on this EPNF and any further responses to comments made by the Proponent, issue a Scoping Determination Waiving Further Review pursuant to Section 80B-5(3)(d) of the Code.

Article 37

Article 37 of the Code requires that proposed projects subject to Large Project Review meet standards for certification under the US Green Building Council Leadership in Energy and Environmental Design ("LEED") program. A LEED Checklist and a Climate Change Preparedness and Resiliency Checklist will be submitted to the Interagency Green Building Committee as part of Large Project Review. A draft of this checklist is included in Appendix C. Additional details are provided in Chapter 3, *Sustainability/Green Building and Climate Change Resiliency*.

Article 85

Article 85 of the Code requires that existing structures that were constructed 50 or more years ago must undergo review by the Boston Landmarks Commission prior to demolition and may be subject to a demolition delay. The Proponent will submit an application to the Boston Landmarks Commission for review and approval prior to commencement of demolition of the existing building on-site, as further described in Section 5.11 of Chapter 5, *Environmental Protection and Historic Resources*.

Massachusetts Environmental Policy Act

The Project is not subject to environmental review by the Secretary of the Executive Office of Energy and Environmental Affairs, as the Project will not exceed any of the MEPA review thresholds set forth in 301 CMR 11.03.

1.5.1 List of Anticipated Permits and Approvals

Table 1-3 presents a preliminary list of permits and approvals from governmental agencies that are expected to be required for the Project, based on currently available information. It is possible that only some of these permits or actions will be required, or that additional permits or actions may be required.

Table 1-3 Anticipated Project Permits and Approvals

Agency/Department	Permit/Approval/Action
Federal	
Federal Aviation Administration	Determination of no hazard to air navigation (buildings and crane – *as applicable*)
State	
Massachusetts Department of Environmental Protection (MassDEP), Division of Air Quality	Emergency Generator Self-Certification
MassDEP, Bureau of Waste Prevention	Notice of Construction or Demolition
Massachusetts Architectural Access Board (MAAB)	Variances *(as needed/required)*
City	
Boston Fire Department	Approval of Fire Safety Equipment Fuel Oil Storage Permit Place of Assembly Permit(s) - (Amenity space egress drawing review; Place of Assembly compliance walk-through).
Boston Inspectional Services Department	Demolition Permits Building Permits Parking Garage Permit / Flammable Storage License Certificates of Occupancy
Boston Landmarks Commission (BLC)	Article 85 Demolition Delay Determination
Boston Planning and Development Agency	Article 80B Large Project Review
Boston Public Improvement Commission	Approvals for sidewalk and/or curb reconstruction or temporary construction encroachments
Boston Public Safety Commission Committee on Licenses	Garage License
Boston Public Works Department	Street Opening Permit Curb Cut Permit (*if required*) Sidewalk Occupancy Permit
Boston Transportation Department	Construction Management Plan (CMP) Transportation Access Plan Agreement (TAPA)
Boston Water and Sewer Commission	Site Plan Review/General Service Application Construction Dewatering Permit Cross-Connection Backflow Approval

1.6 Development Team

The following lists the key members of the development team for the Project (the "Project Team"):

Proponent	Boston Real Estate Collaborative, LLC 1904 Washington Street Boston, MA 02118 857-991-1105 Brent Berc brent@brec-llc.com Scott Kirkwood scott@brec-llc.com
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Landscape Architecture	Michael D'Angelo Landscape Architecture, LLC 84 H Street #2 Boston, MA 02127 203-592-4788 Michael D'Angelo michael@m-d-l-a.com
Permitting, Transportation, Cultural Resources, Air/Noise Consultant	VHB 99 High Street, 10th Floor Boston, MA 02110 617-607-2942 Seth Lattrell (Permitting) slattrell@vhb.com

	Sean Manning (Transportation) smanning@vhb.com Maureen Cavanaugh (Cultural Resources) mcavanaugh@vhb.com Heidi Richards (Air Quality/GHG) hrichards@vhb.com Quan Tat (Noise) qtat@vhb.com
Civil Engineer/Construction Manager	Haycon Inc. 794 Tremont Street Boston, MA 02116 617-652-0670 Patrick Hayden phaydon@haycon-inc.com
Sustainability Consultant	Price Sustainability 28 Walnut Street Maynard, MA 01754 978-760-2723 Mark Price Mark@PriceSustainability.com

1.7 Required Legal Information

1.7.1 Legal Judgments Adverse to the Project

The Proponent is not aware of any legal judgments in effect or legal actions pending that are adverse to the Project.

1.7.2 History of Tax Arrears on Property

The Proponent is not in tax arrears on any property owned within the City of Boston.

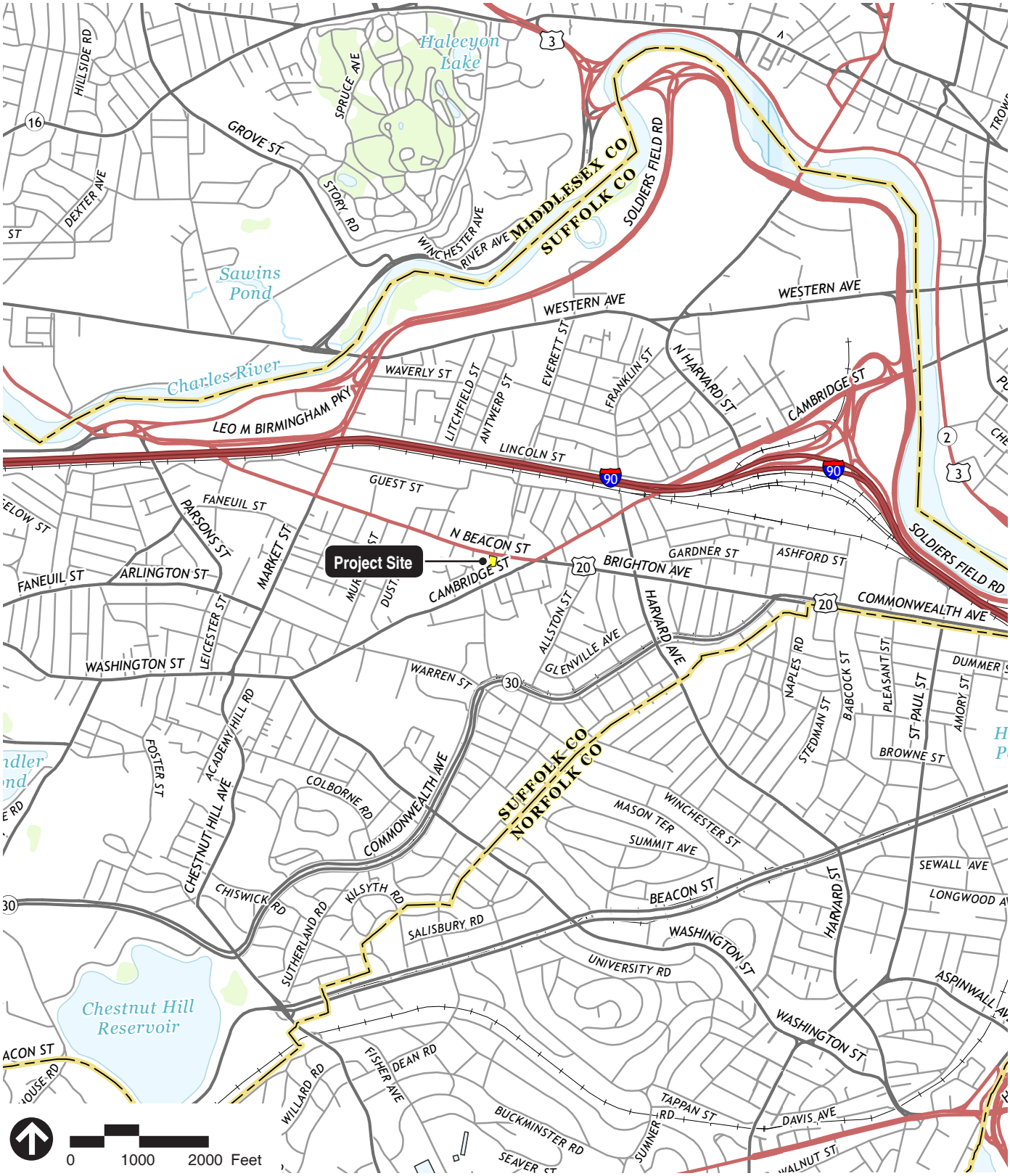
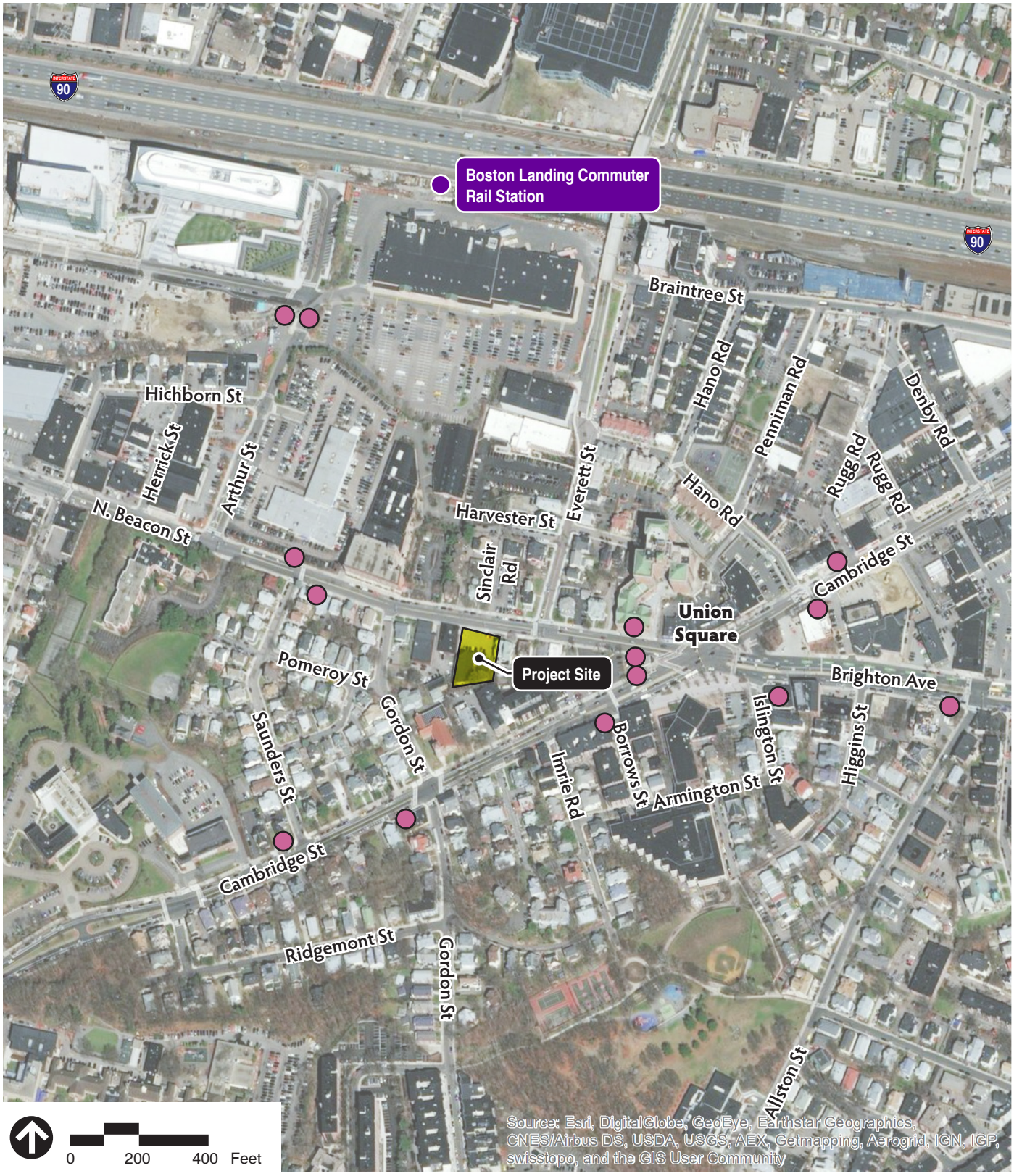


Figure 1.1

USGS Locus Map

44 North Beacon Street
Boston, Massachusetts



MBTA Bus Stop

Figure 1.2

Project Site Context

44 North Beacon Street
Boston, Massachusetts

Figure 1.3

Existing Site Conditions

44 North Beacon Street
Boston, Massachusetts

View of property looking southeast from North Beacon Street. Neighboring one-story commercial property to the east.

View of property looking south from North Beacon Street. Existing one story commercial property and parking lot.

View of property looking south from North Beacon Street. Neighboring three story multifamily residence to the west.

View of property looking southwest from North Beacon Street. Neighboring one-story commercial property to the east.

Back of property looking east. Back of existing building.

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Figure 1.4
Existing Site Conditions

44 North Beacon Street
Boston, Massachusetts

N

3/128" = 1' - 0"

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Figure 1.5

Proposed Site Plan

44 North Beacon Street
Boston, Massachusetts

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Figure 1.6a

View From North Beacon St.
Looking East

44 North Beacon Street
Boston, Massachusetts

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Figure 1.6b
View Into Courtyard

44 North Beacon Street
Boston, Massachusetts

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Figure 1.6c

View of Three-story Building Frontage On North Beacon St.

44 North Beacon Street
Boston, Massachusetts

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Figure 1.6d

View From North Beacon Street
Looking West

44 North Beacon Street
Boston, Massachusetts

2

Urban Design

This chapter provides detailed descriptions of the design of the Project, including public realm improvements.

2.1 Summary of Key Findings and Benefits

The key findings and benefits of the Project related to urban design include:

- The design is sensitive to the Project Site context, improving the current conditions of the streetscape, providing a green courtyard that is street-facing and respecting the scale of the neighborhood with its stepped height setback approach.
- The Project will create a walkable development in an area well-served by existing transit with a Walk Score of 92.
- There will be extensive landscape at the ground floor and rooftop levels, which will provide amenities/open space for the residents as well as present a vibrant green façade to the community.
- The landscape will feature sustainable and native plants, in addition to a planned rooftop farm for a hyper-local Community Supported Agriculture ("CSA") program.
- The central courtyard is open to the street, providing ground level outdoor spaces for the residents, areas for public display of local art installations and beautifying the streetscape on North Beacon Street.

2.2 Neighborhood Context

The Project Site is located 500 feet from Union Square, across the street from the corner of Sinclair and North Beacon Streets in the Allston/Brighton neighborhood of Boston. The area is home to a diverse and vibrant mix of residents as well an equally diverse mix of local businesses. Its proximity to Union Square provides access to the neighboring Allston Village Main Streets retail district and local transit routes to Brighton, Cambridge, Watertown, and downtown Boston.

The area streetscape is varied; ranging from a mix of local commercial components with harder edges and street-facing parking lots to planted edges with trees and vegetated growth that line the few residential parcels surrounding the Site. There is an eclectic mix of residential, retail, dining, entertainment and light industrial components.

The immediate and surrounding Allston/Brighton area is currently undergoing marked and significant evolution. Three blocks to the north, the Boston Landing

development is transforming formerly industrial property into a vibrant mixed-use development with residential, retail, and office components; along with the recently opened MBTA Commuter Rail station. Additional area projects include the planned redevelopment of the Boston Volvo Village dealership, Allston Yards, and numerous residential developments throughout the North Beacon Street corridor. These developments, along with others are indicative of the evolution of this area.

2.3 Planning Principles and Design Goals

2.3.1 Neighborhood Placemaking

The Project will contribute to and enhance the evolving character of the neighborhood, ensuring through its architecture and landscape, that the development creates a sense of place for both owners and renters. This will be implemented through the various scales of use and amenity, open courtyards, outdoor areas for residents, rooftop residential amenities and education opportunities and CSA programs structured around the roof-top farm and extensive use of green space. In addition, the unit layouts are intended to maximize functionality and use of space to provide value and amenities to promote long-term, stable residency within the building. Refer to Figures 2.1a-h for Project floorplans and Figures 2.2a-b for massing diagrams.

2.3.2 Green Space / Streetscape Improvements

Extensive use of green space in the Project Site serves as an amenity for the residents while beautifying the streetscape and enhancing the character of the community. Landscaping on both the ground level and rooftop will soften the interfaces between building to street and building to adjacent buildings. It will also activate the streetscape and bring vibrancy and life to an otherwise under-utilized site.

2.3.3 Proximity to Public Transit & Promoting Alternative Transportation

Already in a very walkable context, the Project seeks to further enhance and promote alternative means of transportation. The Project Site's proximity to Union Square will allow easy access to local transit within the surrounding communities thereby reducing car trips; and planned electric vehicle parking and car share programs will provide sustainable vehicular options. Dedicated, street-level bicycle storage and maintenance facilities will promote alternative transportation by emphasizing ease-of-use and access in the design development of programmed spaces. The bike room will provide ample space for storage and maintenance in an accessible and convenient location to promote use by the building's residents. The on-site public bike repair station will facilitate the use of bikes by the community as an alternative to vehicular use.

2.3.4 A Sustainable Approach, A Sustainable Community

The principles described above, applied through a holistic approach to both programmed use and the built environment, will create a sustainable community using sustainably built components and practices. The scale and mix of ownership and rental components, along with the various shared and dedicated amenities, will create a diverse community of people living and using the development. As further described in Chapter 3, *Sustainability/Green Building and Climate Change Resiliency*, the Project's commitment to sustainable practices in construction and maintenance will ensure the built environment is sustained for long term use.

2.4 Building Design Concept and Development

2.4.1 Height and Massing Strategy

The building employs a massing design that orients its U-shape opening to the street, creating an approachable, pedestrian streetscape presence, which also allows the surrounding neighborhood to appreciate the open green space of the courtyard. The building's setback from the street, along with the open courtyard that occupies one-third of the street frontage, allows for a dynamic mix of plantings of various scales, ranging from low-lying grass, to taller vegetated planters and mature trees.

The building design uses a stepped massing approach, which shifts the highest density and height to the back of site; allowing a three-story mass to face the street with an open courtyard, rising to five and seven stories in the rear. Refer to Figures 2.3a-d for building elevations and Figures 2.4a-d for sections.

2.4.2 Character and Exterior Materials

Historically, Boston has been a mix of brick and wood framed construction that are the core of the pleasant, approachable residential districts of Boston. The building design, along with the landscape, will provide a transitional interpretation of the brick and wood material palette that contributes to the place-making of the neighborhood and local context. The building incorporates setbacks, changes in wall plane, and sensible uses of different materials that creates a dynamic and approachable fenestration strategy.

The street facing three-story components will be comprised of a neutral- colored brick base with extensive use of warm, vertically oriented wood louvers on the second and third floors. Large windows in the second and third floors will be masked by the wood louvers, which not only create a dynamic façade from street view but also provide shading and privacy for the residents.

While wood and masonry provide a transitional vernacular to the streetscape, the mid-rise mass in the rear will employ a light, neutral-colored recessed metal panel system that mimics the vertical fenestration of the shorter three-story components. The metal panel system is extremely durable and subtle; providing a neutral

backdrop to the more expressive three and five story components. The wide range of readily available colors, textures, and shapes will allow the natural wood and masonry elements of the lower portion of the three and five story masses to come to the foreground, while the recessed design of the metal panel system will ensure that the mid-rise still provides an architectural quality to the fenestration. Refer to Figure 2.3 a-d for building elevations.

2.4.3 Signage

Signage in the Project will be limited to building identification and wayfinding and will be done in a tasteful, functional manner, so that the building can be identified easily by residents, guests, deliveries, car-share picks-up, etc.

2.5 Public Realm Improvements

2.5.1 Streetscape Improvements

In accordance with Boston Complete Streets Guidelines, the Project seeks to responsibly contribute to urban infill and enhance the existing streetscape by featuring a centralized open courtyard facing North Beacon Street. While the central courtyard is not designed for public use and will serve primarily as shared outdoor space for residents, it will benefit the area and existing residents through its use of native, large-scale shade trees, colorful new planters, local art installations, outdoor seating and the inclusion of a public bike repair station within the front yard setback. The openness of the central courtyard provides a strong visual connection to green space and will transform the existing commercial lot into a contributing resource to the neighborhood. Mature trees and shrubs planted along the sidewalk will establish continuity with plantings fronting abutting properties, specifically the three-story residential building located at 38 North Beacon Street, while also complimenting the existing flora present at residential properties located from 45-51 North Beacon Street. Additionally, the Project will improve pedestrian access and safety along the sidewalk by closing the existing curb cut along North Beacon Street. Refer to Figure 2.5 for streetscape improvements.

2.5.2 Pedestrian Access/Circulation

Pedestrian walkways, patios and open seating areas will be the among the Project's most prominent design features. By recessing tenant and owner access within the core of the Project Site, existing pedestrian circulation on the sidewalk fronting North Beacon Street will remain largely unchanged, but the experience will be enhanced with landscape improvements. There will be no additional curb cuts required to access underground parking and facilities and any adjacent sidewalk treatment will be continued. Access to the Project's rental units will be via a walkway running through the middle of the central courtyard, with private sub-courtyards and pathways leading to the home-ownership units. Planters and trees surrounding the private front yards and abutting the street-facing property line will provide

pedestrian-scale screening and contribute substantially to the reduction of environmental impacts.

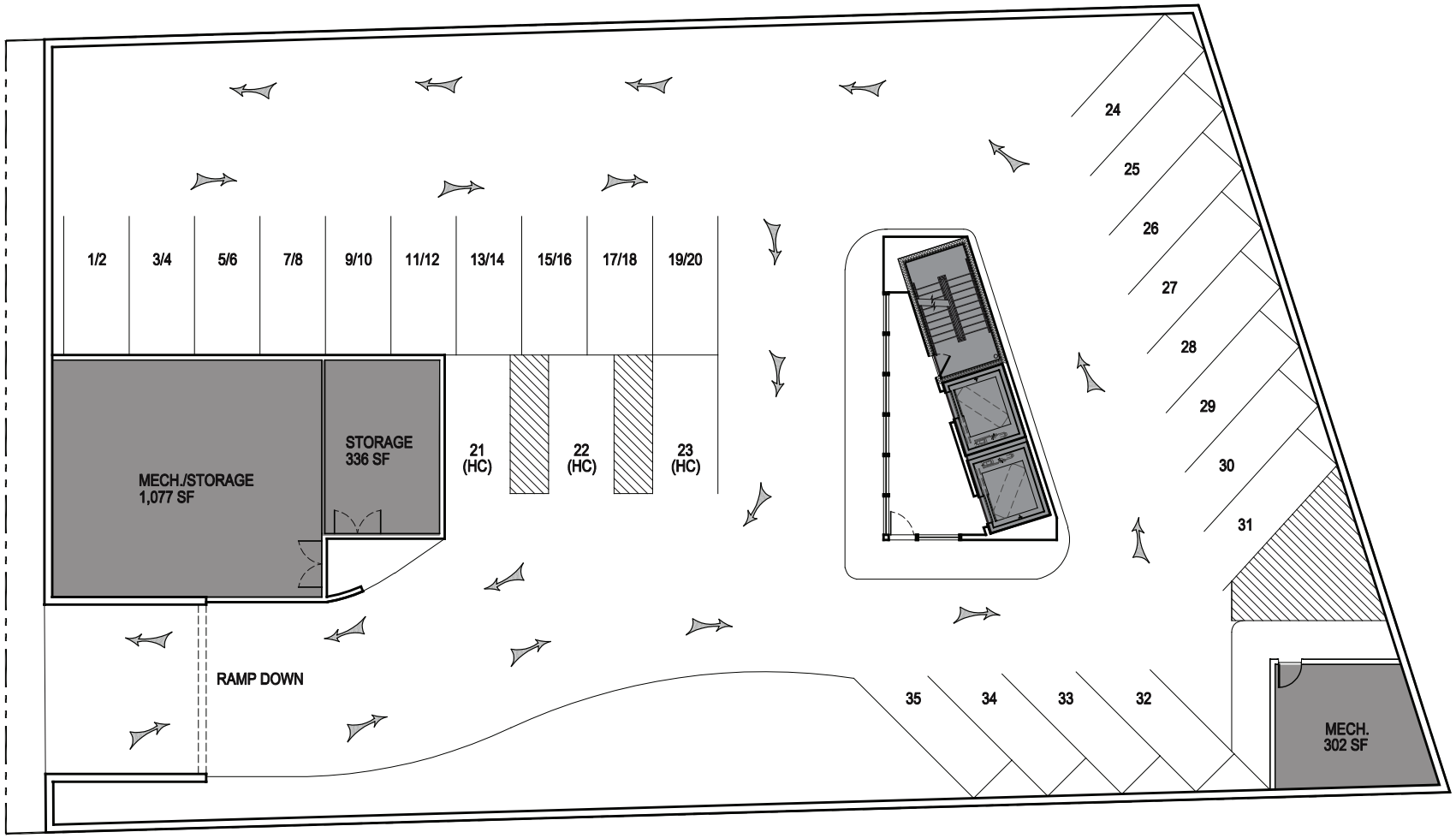
Consistent with local, state, and federal policies, the Project will include ADA accessible sidewalks, entrances, and amenity spaces, as well as three accessible units and three designated parking spaces located adjacent to the elevator providing access to the residential units. Site accessibility is shown on Figure 2.6. Refer to Appendix B for the BPDA Accessibility Checklist.

2.6 Site Landscaping

The site landscaping reflects the overall site design strategy, providing extensive green and open space for the residents and creating a vibrant, green streetscape for the community. A use of various scales of vegetation, from low lying grass to small and large bushes to mature, columnar trees, all enhance and contribute to the both building amenities and streetscape improvements.

A row of various sized trees and shrubs will be planted along North Beacon Street, set in beds to soften the interface between building and street. The open courtyard, which accounts for one-third of the street front, will further improve and soften the streetscape and add depth to the green buffer between the street and building.

Tree and shrubs to be planted will be non-invasive, selected from the City of Boston Parks Department's list of recommended species. The landscape design will incorporate native and adaptive plant materials with the goal of minimizing the Project's susceptibility to drought conditions. Additional landscape areas, which are situated in the back of site and on top of the roofs are intended for resident seating, gathering and/or dog-walking. The rooftop landscapes will employ both intensive and extensive plantings in conjunction with hardscaped occupiable areas. Much of the unoccupied roofs will feature intensive green roofs, which will provide stormwater management and thermal benefits to the building and Project. The occupiable roof decks will feature an array of intensive green roofs, ranging from native and drought resistant grasses and shrubs to trees in large planter boxes. Refer to Figures 2.7a-d for site landscape plans.



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

3/64" = 1' - 0"

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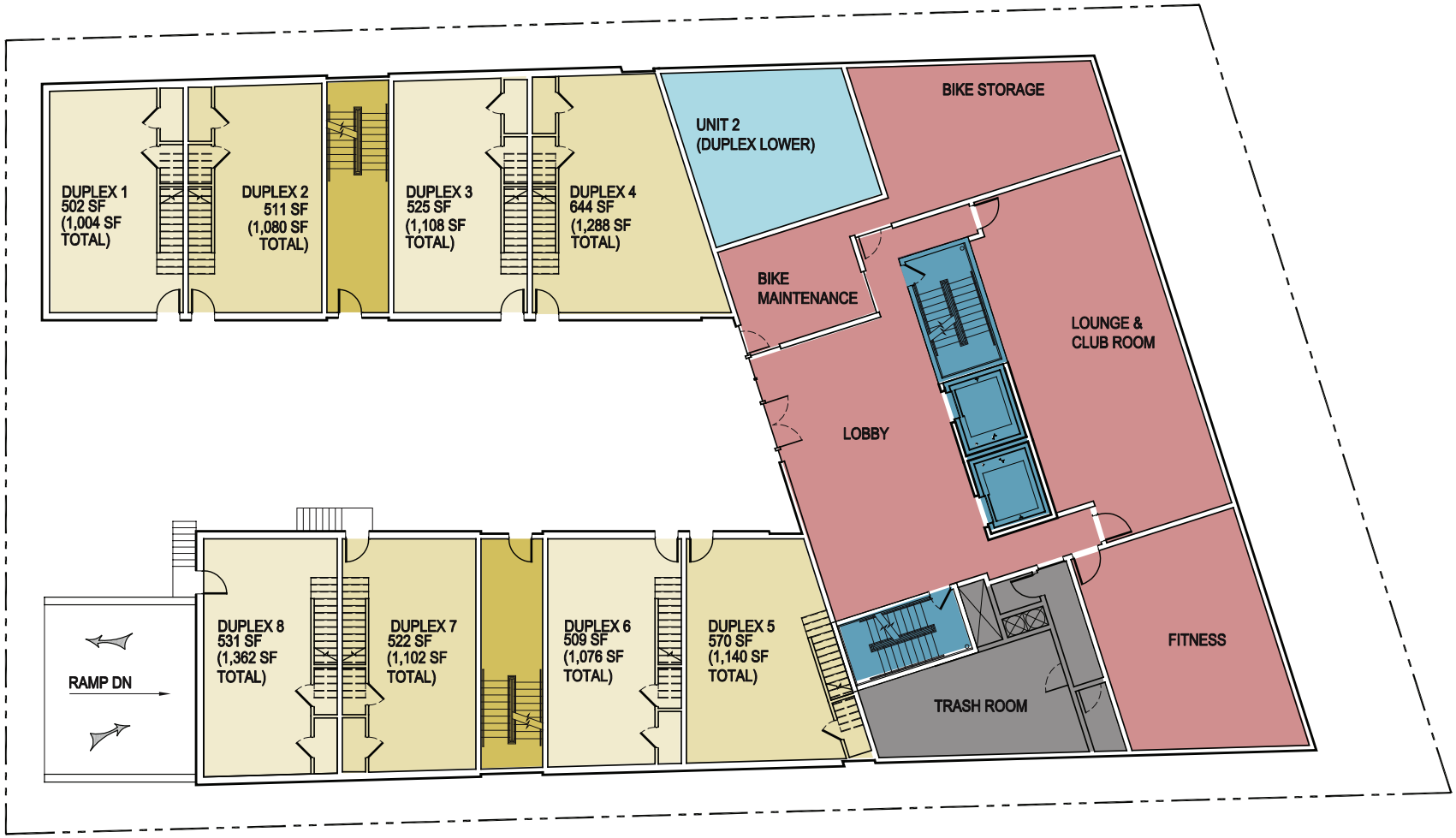
Figure 2.1a

Plan: Basement

44 North Beacon Street
Boston, Massachusetts



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

3/64" = 1' - 0"

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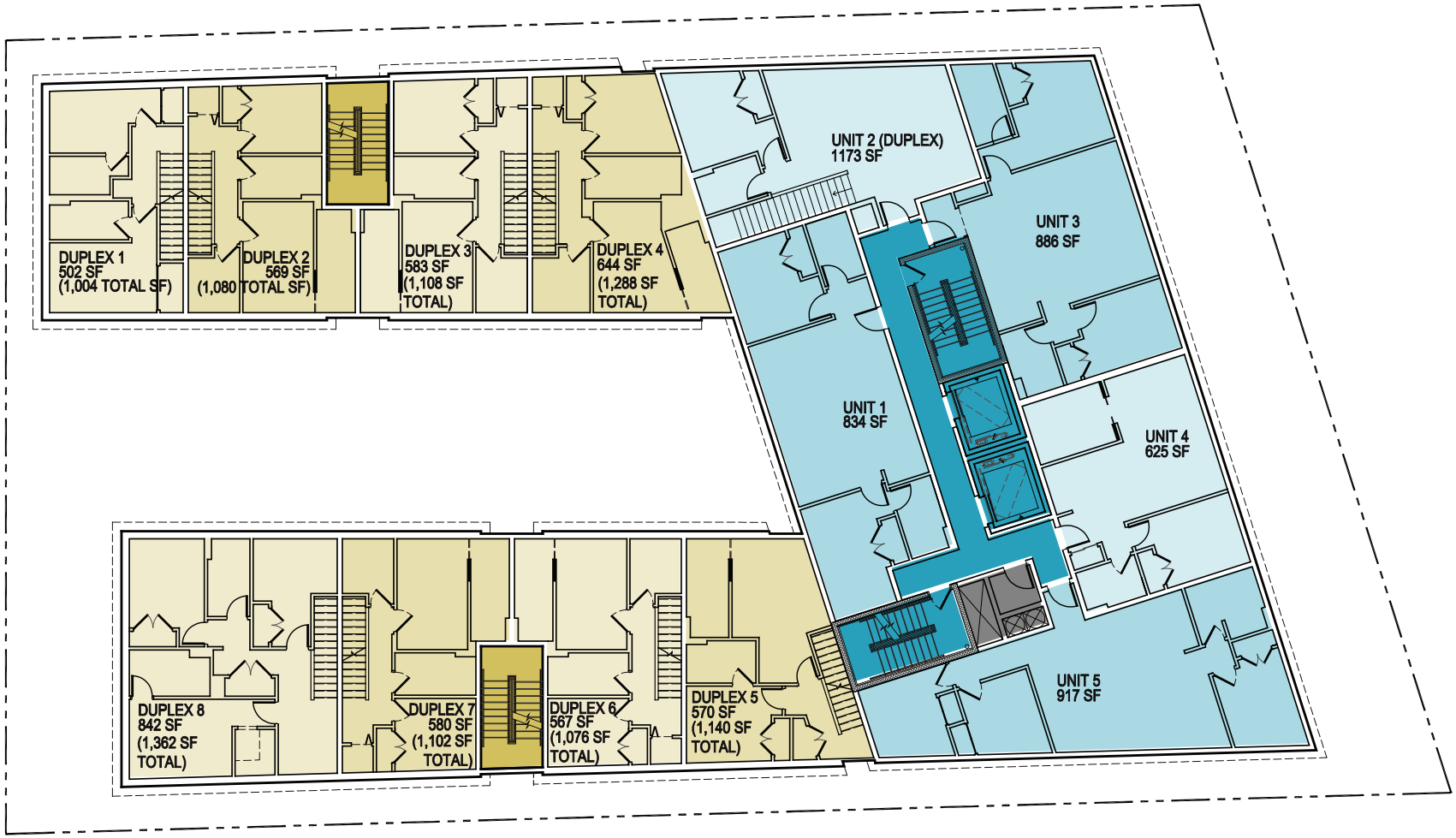
ARCHITECTS

Figure 2.1b

Ground Floor Plan

44 North Beacon Street
Boston, Massachusetts



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

3/64" = 1' - 0"

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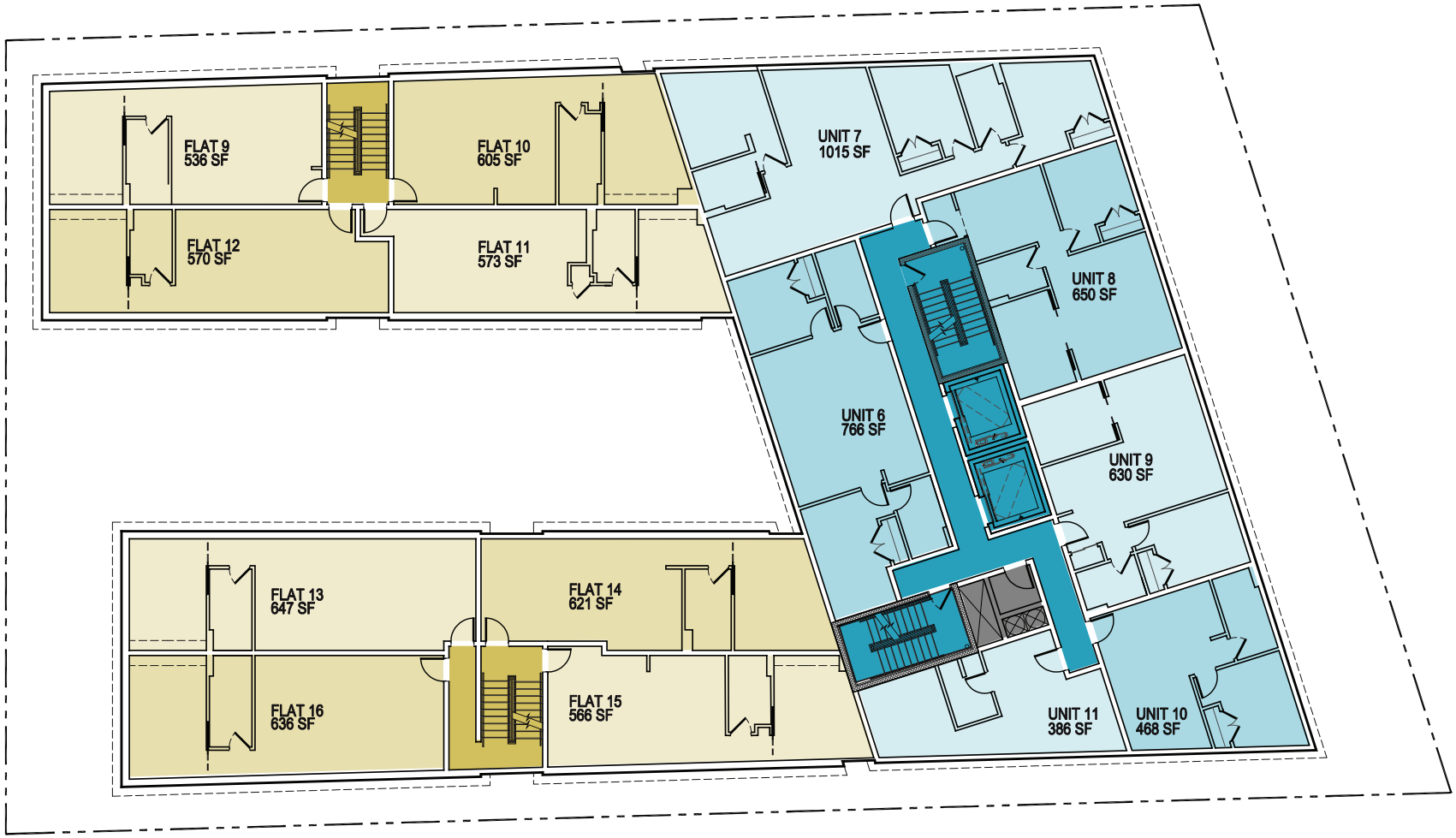
Figure 2.1c

Plan: Second Floor

44 North Beacon Street
Boston, Massachusetts



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

3/64" = 1' - 0"

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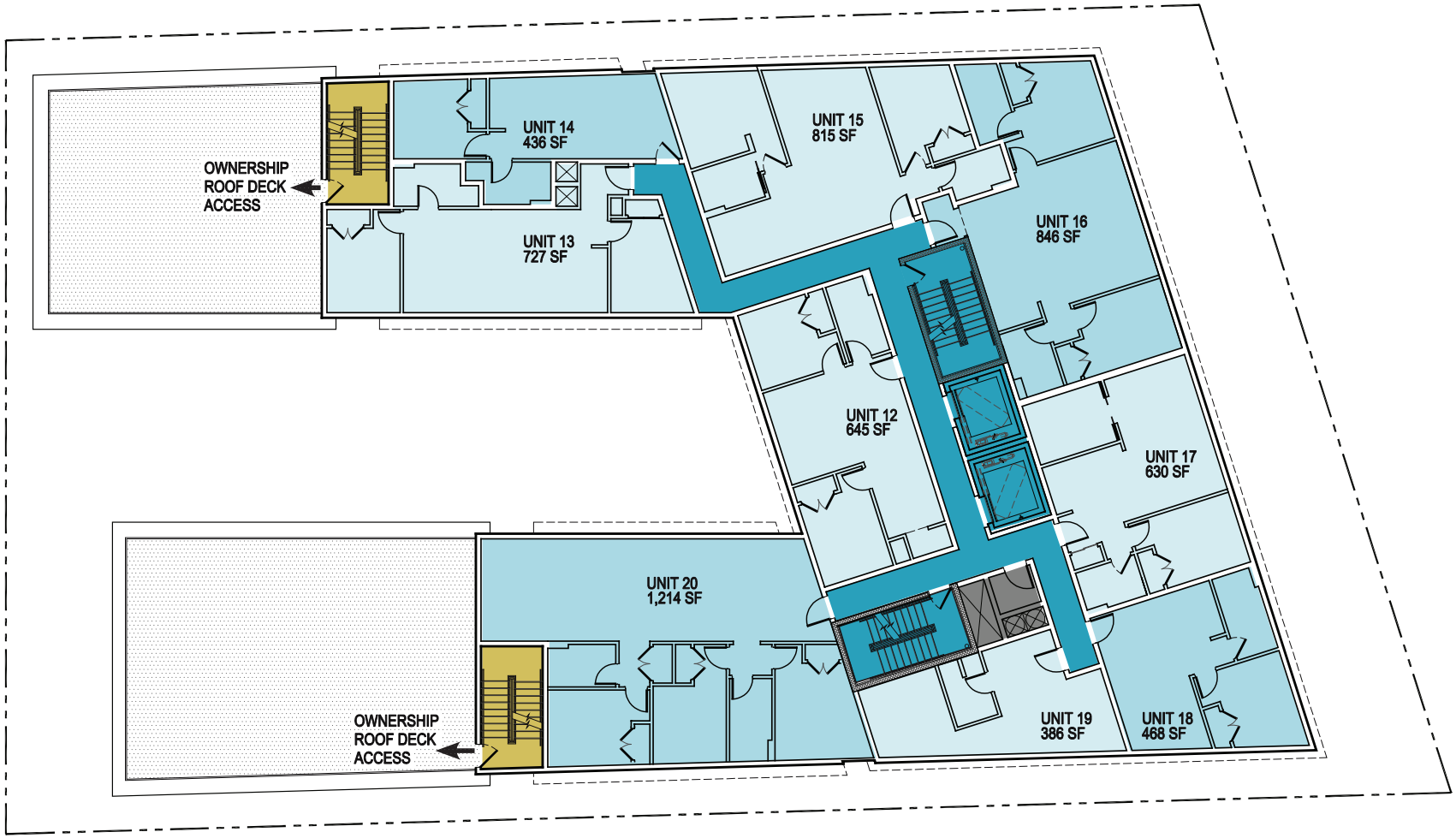
Figure 2.1d
Plan: Third Floor

44 North Beacon Street
Boston, Massachusetts



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

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3/64" = 1' - 0"

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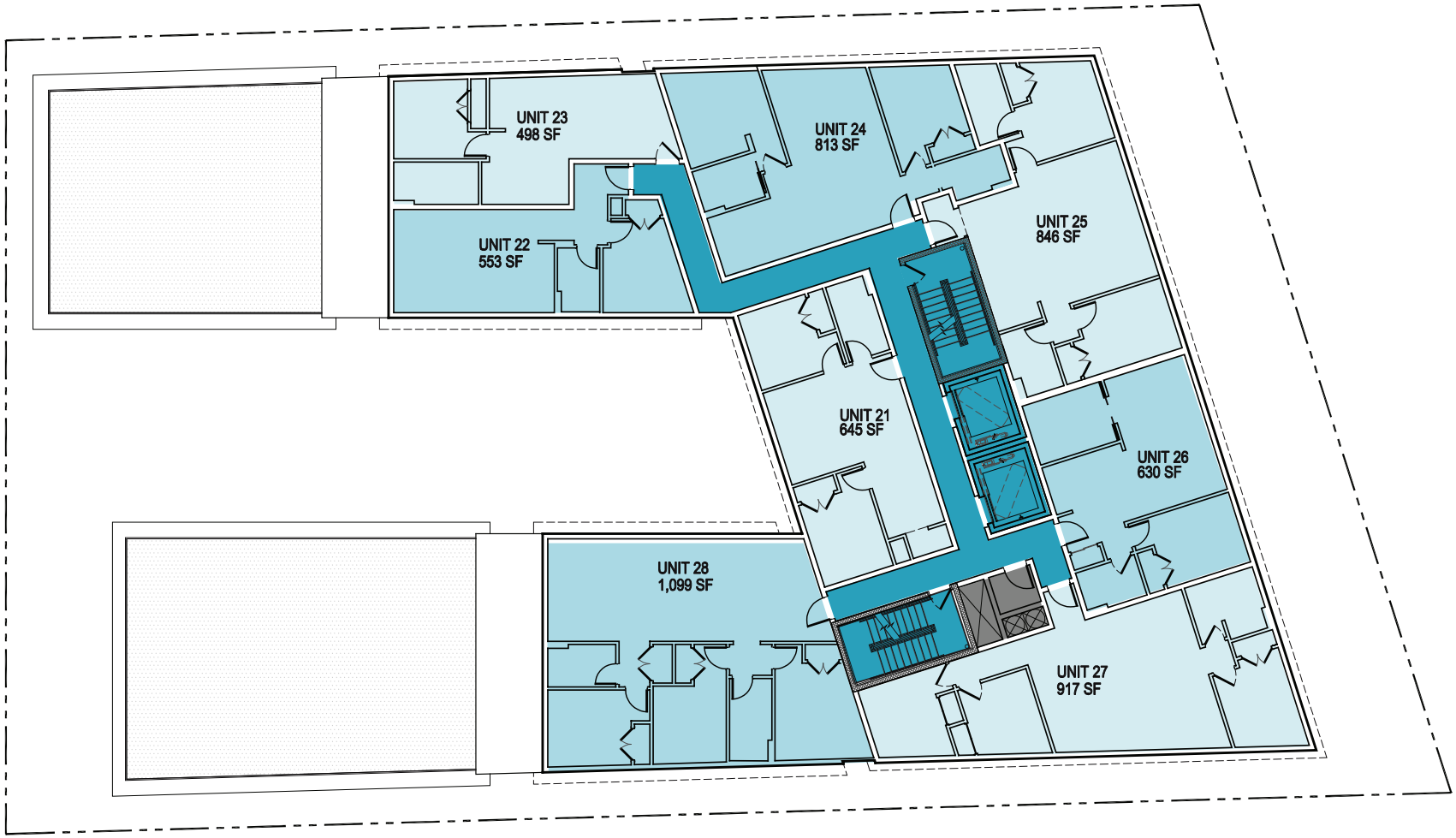
Figure 2.1e

Plan: Fourth Floor

44 North Beacon Street
Boston, Massachusetts



KEY

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- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

3/64" = 1' - 0"

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Figure 2.1f

Plan: Fifth Floor

44 North Beacon Street
Boston, Massachusetts

KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

3/64" = 1' - 0"

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Figure 2.1g

Plan: Sixth Floor

44 North Beacon Street
Boston, Massachusetts

KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

3/64" = 1' - 0"

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Figure 2.1h

Plan: Seventh Floor

44 North Beacon Street
Boston, Massachusetts

N

1 Neighboring Proposed 5 Story Development

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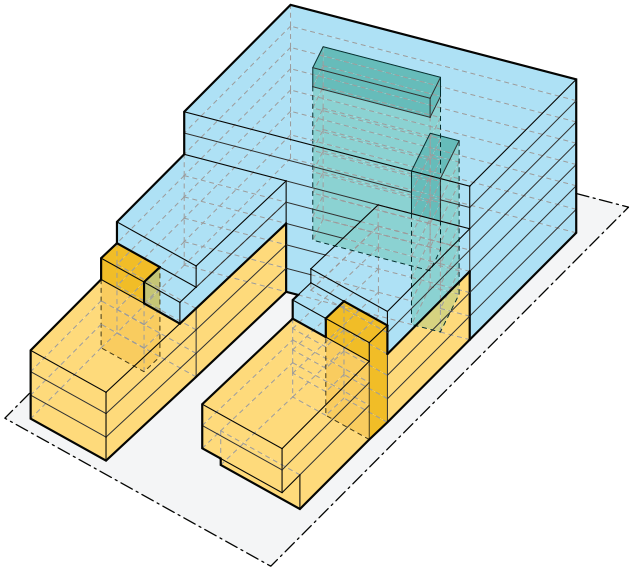
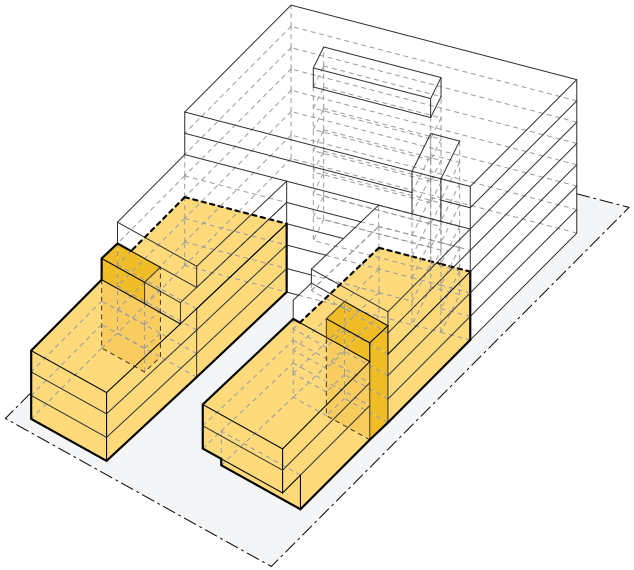
Figure 2.2a

Project Massing / Aerial View

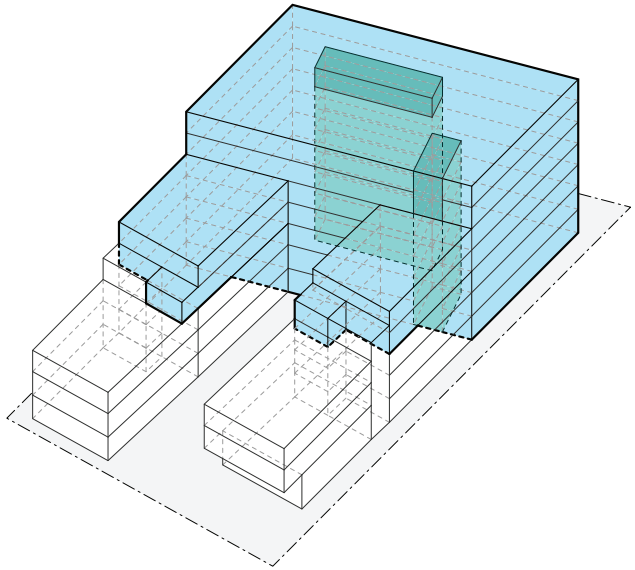
44 North Beacon Street
Boston, Massachusetts



AXONOMETRIC:
OWNERSHIP & RENTAL COMBINED



AXONOMETRIC:
OWNERSHIP UNITS & CIRCULATION



AXONOMETRIC:
RENTAL UNITS & CIRCULATION

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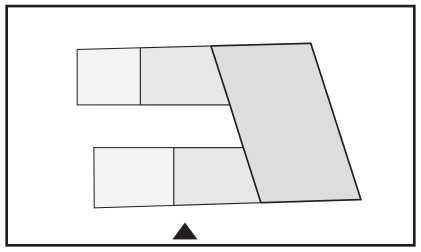
Figure 2.2b

Project Massing Diagram:
Ownership vs Rental

44 North Beacon Street
Boston, Massachusetts



Key Plan

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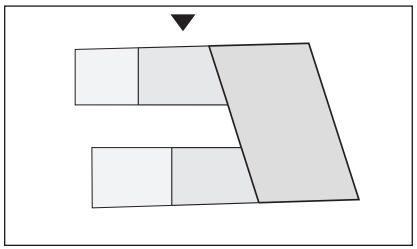
Figure 2.3a

Elevation - West
3/64" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts



Key Plan

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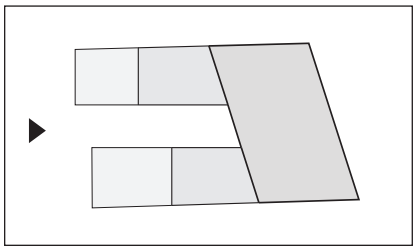
Figure 2.3b

Elevation - East
3/64" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts



Key Plan

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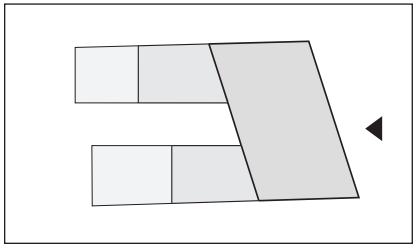
ARCHITECTS

Figure 2.3c

Elevation - North
3/64" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts



Key Plan

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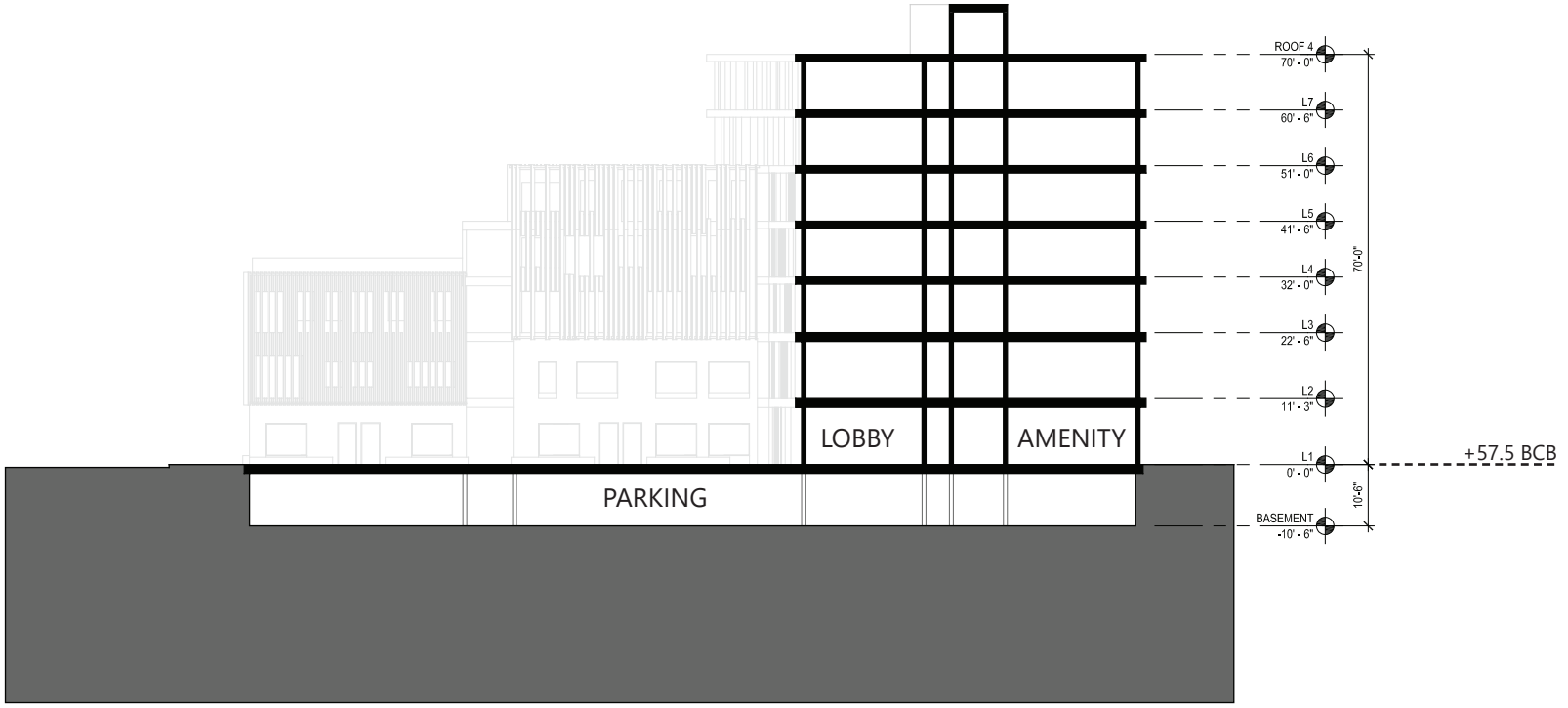
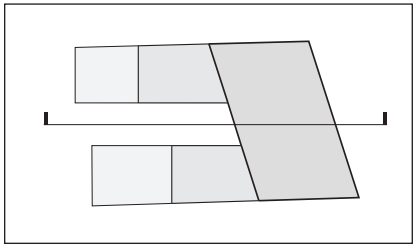
Figure 2.3d

Elevation - South
3/64" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts





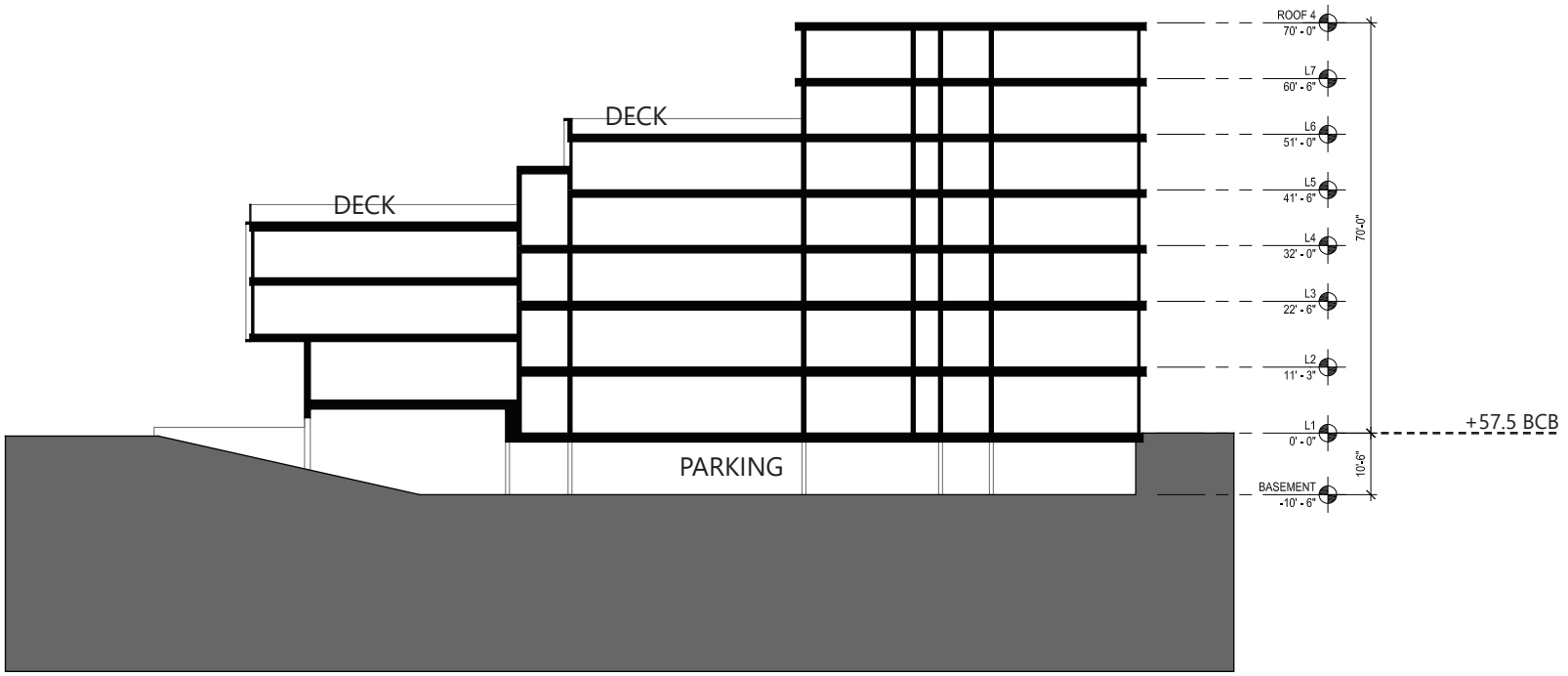
Key Plan

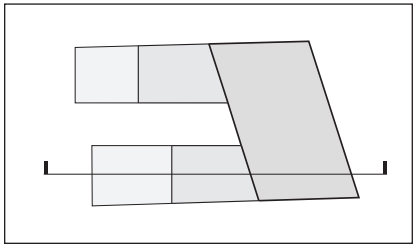
FRANCKE | FRENCH
ARCHITECTS

Figure 2.4a

Section: N-S Through Midrise
1/32" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts





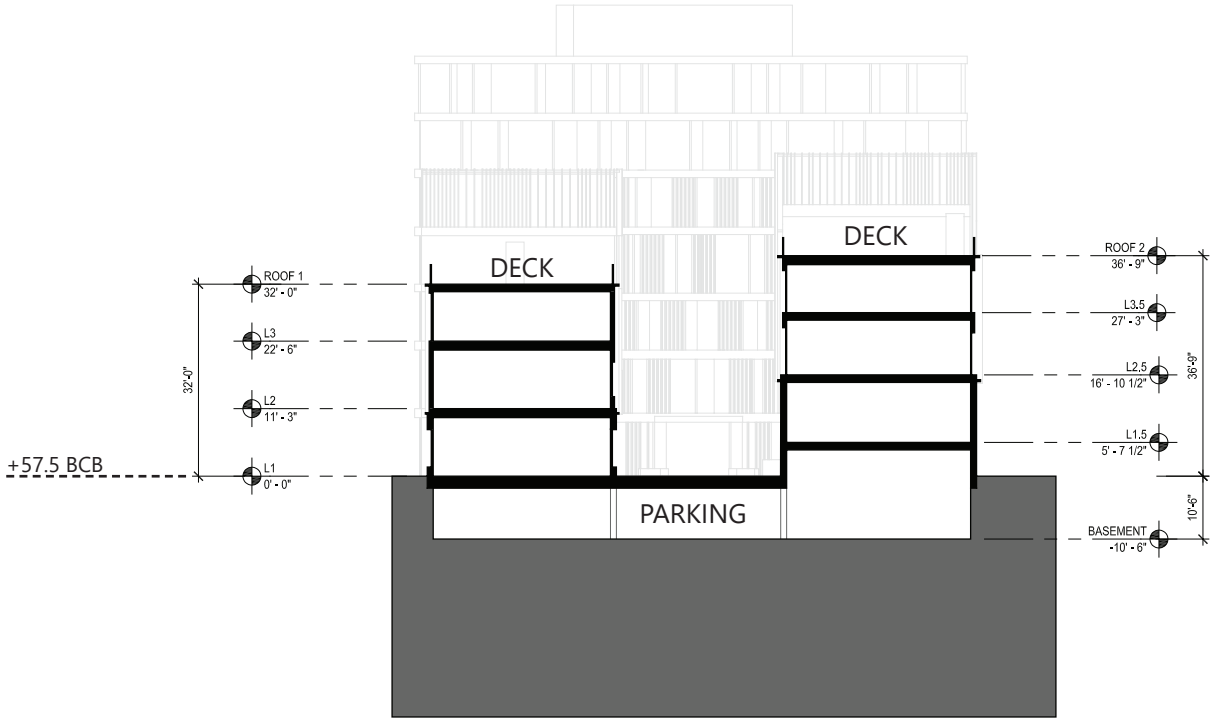
Key Plan

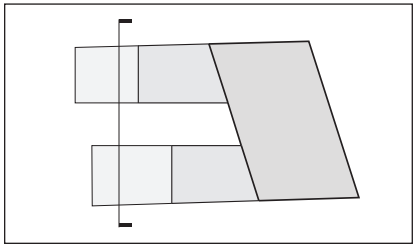
FRANCKE | FRENCH
ARCHITECTS

Figure 2.4b

Section: N-S Through Parking Ramp
1/32" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts





Key Plan

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Figure 2.4c

Section: E-W Through 3-Story Mass
1/32" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts

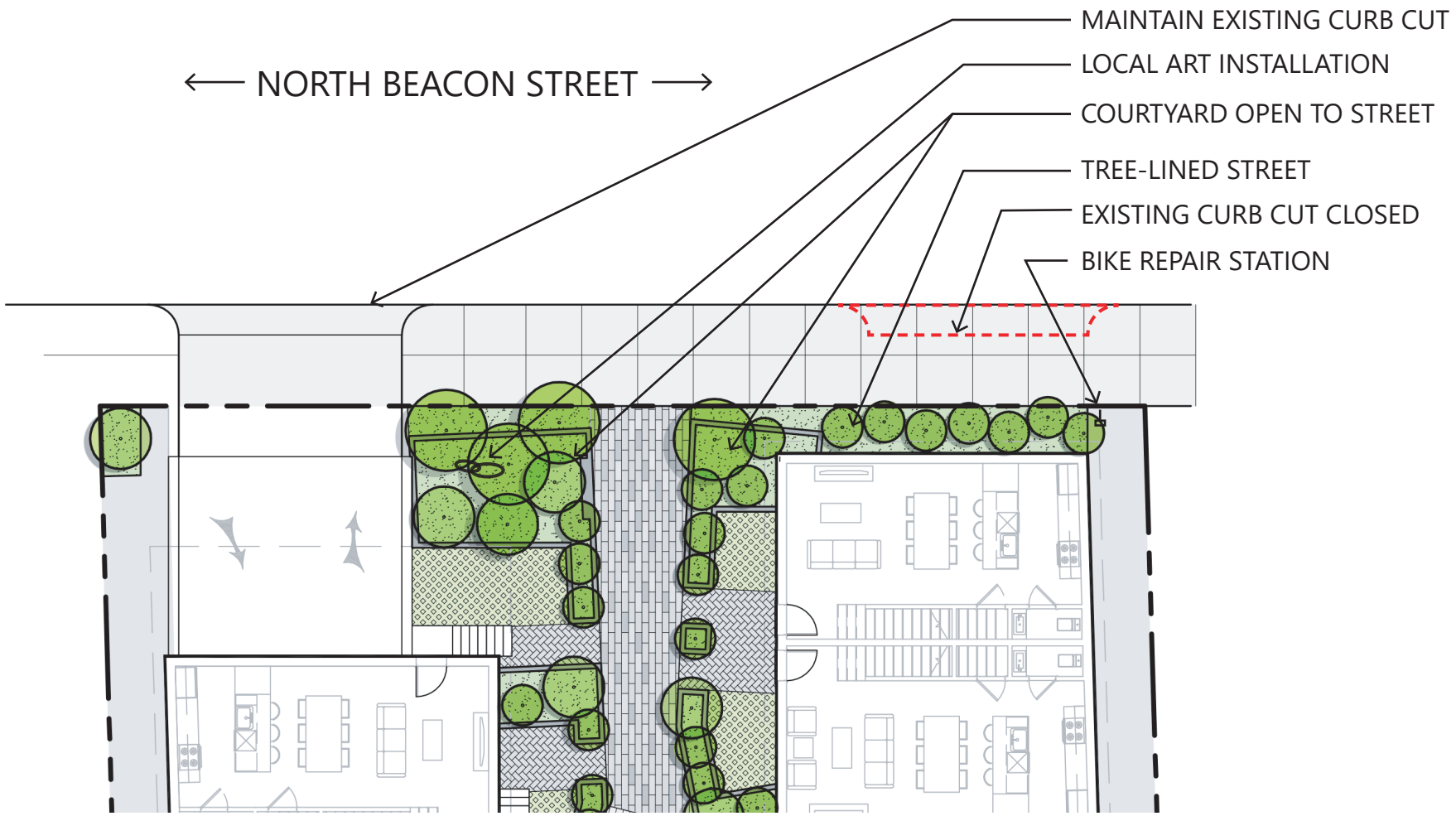

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Figure 2.5

Streetscape Improvement Plan
Not To Scale

44 North Beacon Street
Boston, Massachusetts

N

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Figure 2.6

Accessibility Plan
3/64" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts

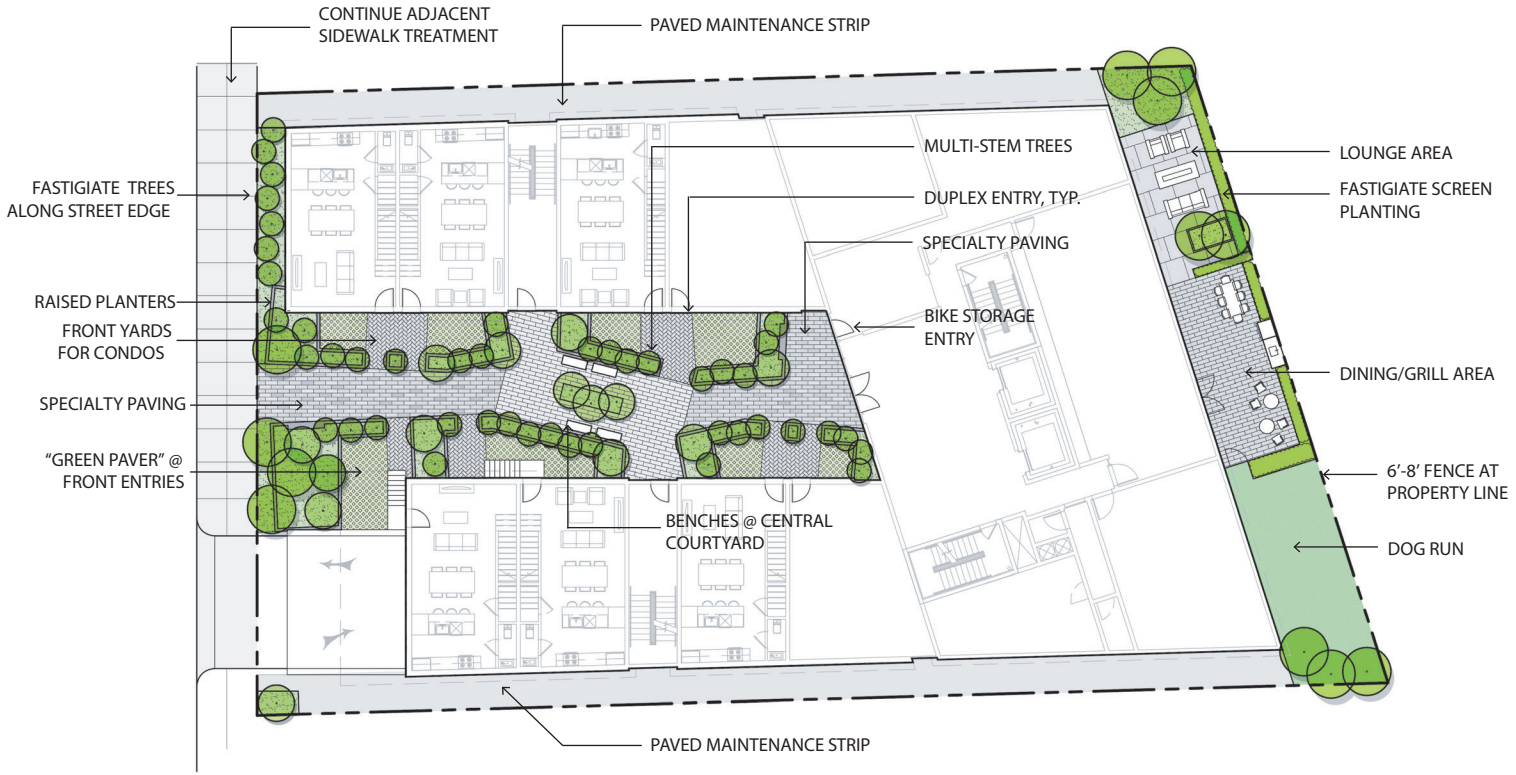

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Figure 2.7a

Landscape Plan: Ground
1/32" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts

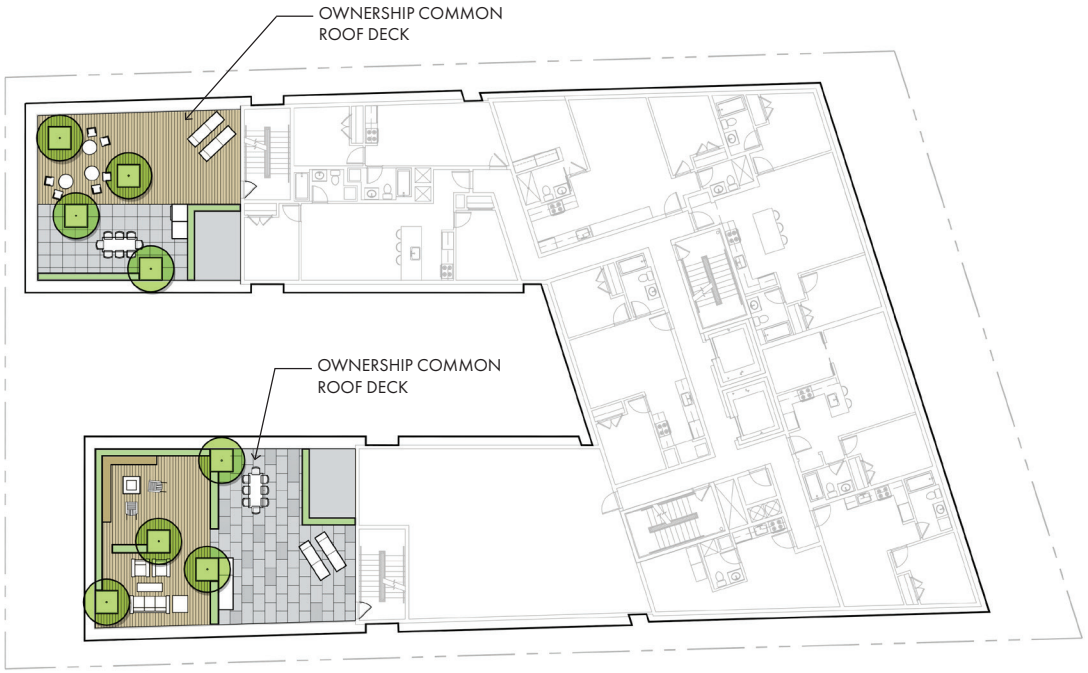

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Figure 2.7b

Landscape Plan: Third Floor
1/32" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts

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ARCHITECTS

Figure 2.7c

Landscape Plan: Sixth Floor
1/32" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts

N

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Figure 2.7d

Overall Landscape Plan
1/32" = 1' - 0"

44 North Beacon Street
Boston, Massachusetts

3

Sustainability/Green Building and Climate Change Resiliency

The following chapter describes the overall approach to sustainable design, construction, and operation for the Project. Included is a preliminary assessment of green building design, in compliance with the requirements of Article 37 of the Code relative to the City's Green Building policies and procedures ("Article 37"). This chapter also discusses the approach to preparing for predicted climate change, in accordance with the current BPDA Climate Change Preparedness and Resiliency Policy (the "Resiliency Policy"). The required Climate Change Preparedness and Resiliency Checklist (the "Resiliency Checklist") has been completed for the Project and is provided in Appendix C.

3.1 Summary of Key Findings and Benefits

Key findings and benefits related to sustainability/green building design and climate change preparedness include the following Project attributes:

- Complies with Article 37, Green Buildings of the Code by demonstrating compliance with the LEEDv4 program at a Silver certifiable level.
- Meets the Massachusetts Stretch Energy Code requirements to be 10 percent better than ASHRAE 90.1-2013.
- Building design will include high-efficiency building systems (mechanical, plumbing and electrical), and a high-performance building envelope.
- Sustainable design measures such as LED lighting within common areas and units, low flush and flow plumbing fixtures, building energy management systems and healthy interior environments are a few of the features that are being considered for inclusion in the Project.
- According to City of Boston sea level rise mapping, the Project Site is not located within a flood hazard area.

3.2 Regulatory Context

3.2.1 Stretch Energy Code

As part of the Green Communities Act of 2008, Massachusetts developed the optional Stretch Energy Code that gives municipalities the option to enact a more strenuous energy performance code for buildings than the conventional state building code. The Stretch Energy Code increases the energy efficiency code

requirements for new construction (both residential and commercial) and for major residential renovations or additions in municipalities that adopt it.

Effective January 1, 2017 the current Stretch Energy Code, as adopted by the City, requires projects to achieve, at minimum, a 10 percent energy efficiency improvement when compared to the state's base energy code (the "Base Energy Code"). Projects may demonstrate the energy use savings by either meeting the performance standard of 10 percent better than ASHRAE 90.1-2013, or using a prescriptive methodology based on IECC 2015.

3.2.2 Article 37 – Green Buildings

Article 37 submittal requirements include completing a LEED scorecard to demonstrate that a project meets the minimum requirements to achieve a LEED Certified level (all LEED prerequisites and achieve at least 40 points) ("LEED certifiable"). With the LEED version 4, or "v4," rating system effective as of October 31, 2016, the BPDA requires initial Article 80 Large Project Review submissions on or after November 1, 2016 to demonstrate LEED certifiable status using LEEDv4. This latest iteration of the LEED rating system standards is measurably higher and more stringent in many categories.

The Boston Interagency Green Building Committee ("IGBC") advises the BPDA on a proposed project's compliance with the provisions of the article. The Committee consists of representatives of city agencies including the BPDA, BED, BTD, the Inspectional Services Department and the Mayor's Office.

Boston Green Building Credits

Appendix A of Article 37 lists Boston Green Building Credits, which are credits that may be included in the calculation toward achieving a LEED certifiable project. These credits were developed by the City and are intended to address local issues unique to development within Boston. The credits include the following categories: Modern Grid, Historic Preservation, Groundwater Recharge, and Modern Mobility.

3.2.3 BPDA Climate Change Preparedness and Resiliency Policy

In conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the BPDA requires projects subject to Boston Zoning Article 80 Large Project Review to complete the Resiliency Checklist to assess potential adverse impacts that might arise under future climate conditions, and any project resiliency, preparedness, and/or mitigation measures identified early in the design stage. The Resiliency Checklist is reviewed by the IGBC.

3.3 Sustainability/Green Building Design Approach

The Project will be designed and built using construction industry best-practices for sustainability described within, and measure by, the LEED Building Design and + Construction ("BD+C"): Multifamily Midrise rating system. Sustainability is and will

remain a key theme for the Project as it advances through design. The Project proposes to develop an underutilized highly-walkable urban location, and incorporates measures to discourage single-occupancy vehicles and promote low-carbon emitting modes of transportation.

An Integrated Project Team and process have been established to leverage all professional expertise and seek every opportunity to employ Green Building techniques and practices. The Project's Preliminary Rating shows performance in range of LEED Silver Certification. Refer to Figure 3.1 for the draft LEED checklist for the Project.

The Project is targeting a variety of credits and points across the eight LEED categories as well as the Boston Green Building Credits under Article 37 as addressed further below.

Integrative Process (IP)

Preliminary Rating

The Project Team first met on January 3, 2018 to conduct the Preliminary Rating with the Green Rater and Integrative Project Team in attendance. The Preliminary Checklist was completed with the target of LEED Certified level achieved.

› *Option 1: Integrative Project Team, 1 point*

  The team includes all the requisite capabilities, has expertise for Mid-rise systems and experience modeling ASHRAE 90.1 energy simulation for LEED BD+C.

› *Option 2: Design Charrette, 1 point*

  The team plans to meet to conduct a Design Charrette and will continue to refine the sustainable design at ongoing meetings.

› *Option 3: Trades Training, 1 point*

  A training for the various trades, once hired, will take place in the field, on site, during the earliest stages of construction and as appropriate thereafter.

Location and Transportation (LT)

LT Prerequisite Floodplain Avoidance

All LEED criteria are met, Project is not in a flood hazard area.

LT Credit Site Selection, 8 points

› *Option 1: Sensitive Land Protection, Previously Developed*

  The site is 100 percent previously developed.

› *Option 2: Infill Development*

  The site is 100 percent bordered by previously developed land.

› *Option 3: Open Space*

The Project will be built within 1/2 mile of Ringer Playground, a 12.4-acre Olmsted-designed park in Allston featuring a Softball Field, an Urban Wilds Area, a Playground, 2 Basketball and 2 Tennis Courts.

› *Option 4: Street Network*

There are greater than 90 qualifying intersections in the surrounding area.

› *Option 5: Bicycle Network and Storage*

The Project is 'Very Bike-able' (78 Bike Score) and will be near rapid transit, schools, and employment. The Project will exceed the 1:1 bike storage ratio with over 60 bike storage spaces.

LT Credit Compact Development, 3 points

The Project will include over 130 units per acre and will receive exemplary performance.

LT Credit Community Resources, 3 points

The location is in an urban setting which is very dense with amenities and will receive exemplary performance with a Walk Score of 92.

LT Credit Access to Transit, 2 points

Public Transportation in this neighborhood is good (Transit Score 68) with many options available.

Credit Sustainable Sites (SS)

SS Prerequisite Construction Activity Pollution Protection

All measures will be met and the Project Team has created a conforming Erosion and Sedimentation Control Plan.

SS No Invasive Plants

No invasive plant species will be introduced via the landscape plan.

SS Credit Heat Island Reduction, 2 points

› *Options 1 & 2: Shading and non-absorptive materials*

50 percent of hardscapes will be shaded or built with non-absorptive materials.

SS Credit Rainwater management, 2 points

50 percent of the site qualifying area will use low impact development strategies and will infiltrate rainwater.

SS Credit Nontoxic Pest Control

Several pest control strategies will be employed including: landscape spaced 1.5 ft. from the buildings, non-cellulosic material for structural elements, building gaps will be sealed with insect resistant screens, and a robust Integrated Pest Management Policy will be developed.

Water Efficiency (WE)

WE Prerequisite Water Metering

Water meters will be installed for each unit.

WE Credit Indoor Water Use, 4 points

All water fixtures (showers, lavatory faucets, and toilets) will be WaterSense certified and high-limit thresholds will be met. Clothes Washers will be ENERGY STAR labeled.

WE Credit Outdoor Water Use, 2-3 points

Native and adaptive plantings will primarily be used in landscaping.

Energy and Atmosphere (EA)

EA Prerequisite Minimum Energy Performance

ENERGY STAR Multifamily Testing & Verification Protocols will be followed to commission the buildings prior to the project end. ENERGY STAR v3 checklists will be followed, qualified appliances will be installed, and duct runs will be fully ducted.

EA Prerequisite Energy Metering

Both electric and gas meters will be included for each Ownership unit, rental units will use a mixed-metering strategy.

EA Prerequisite Education of Tenant and Building Manager

An Operations & Maintenance Binder will be provided to each occupant and Building Management and a one-hour educational walk-through will be provided.

EA Credit Annual Energy Use, 3 points

The project is projected to achieve a 19 percent or greater, energy savings (cost) using ASHRAE 90.1-2010 baseline.

EA Credit Efficient Hot Water Distribution System, 2 points

R4 Pipe Insulation will be installed on all hot water lines.

EA Credit Advanced Utility Tracking, 1 point

The project has an automatic in-ground irrigation system and landscape irrigated area greater than 1,000 feet and has system monitoring components.

Material and Resources (MR)

MR Prerequisite Certified Tropical Woods

Any tropical woods used in the project will be FSC Certified, reused, or reclaimed.

MR Prerequisite Durability Management

A Durability Management Plan has been developed and all LEED requirements will be met for Building Durability Measures.

MR Credit Durability Management Verification, 1 point

Each measure will be third party verified by the verification team.

MR Credit Environmentally Preferable Products, 3 points

The project will select environmentally preferable products ("EPP") in accordance with the EPP table to earn a minimum of 3 credits.

MR Credit Construction Waste Management, 3 points

The team will limit the amount of construction waste that goes to landfill by a minimum of 60 percent.

MR Credit Material-Efficient Framing, 1 point

The team will employ Optimum Value Engineering ("OVE") framing and construction measures to reduce framing waste.

Indoor Environmental Quality (EQ)

EQ Prerequisite Ventilation

- Unit range hoods will meet the provisions of ASHRAE 62.2-2010, sections 5 and 7, and vent directly to outdoors.
- Bath exhaust systems will exhaust directly to outdoors and be ENERGY STAR labeled.
- Non-unit spaces will meet the provisions of ASHRAE 62.1-2010, sections 4 and 7.

EQ Prerequisite Combustion Venting

No unvented combustion appliances will be installed and CO monitors will be installed per LEED and MA code.

EQ Prerequisite Garage Pollutant Protection

No unit HVAC equipment will be installed in the garage. Shared garage surfaces and penetrations are to be sealed, doors weather-stripped, and CO detectors in adjacent rooms.

EQ Prerequisite Air Filtering

MERV 8 filters will be used at a minimum.

EQ Prerequisite Environmental Tobacco Smoke

Smoking will be prohibited in common areas and designated in outside areas with signage.

EQ Prerequisite Compartmentalization

Careful unit air-sealing measures will be implemented and units tested to comply with low LEED infiltration standards.

EQ Credit Enhanced Ventilation, 3 points

Balanced whole-house ventilation will be installed which will comply with ASHRAE 62.2 (no more than 10 percent over).

EQ Credit Contaminant Control, 1 point

Permanent walk-off mats will be installed and a preoccupancy flush conducted.

EQ Credit Low-Emitting Products

90 percent of components will meet the CA Section 01350 criteria.

3.3.1 Boston Green Building Credits

At this preliminary design stage, the Project will evaluate achieving two of the four available Boston Green Building credits (Appendix A of Article 37):

Groundwater Recharge

At a minimum, the Project will meet the requirements of the BWSC; at this early stage of design the Project has not fully assessed the quantity of rainwater that may be diverted from the municipal storm water system; the infiltration rates, seasonal high groundwater elevations, and locations of soil and/or groundwater contamination have not been evaluated. These factors may limit the Project from infiltrating in certain areas.

Modern Mobility

The Project may elect to pursue the Boston Green Building credit for Modern Mobility through compliance with the Transportation Demand Management ("TDM") prerequisites and project type credit requirements. As part of the transportation mitigation strategy, the Project provides ample access to multiple modes of public transportation and below grade parking with secure bike storage. Refer to Section 4.6 for more detail on the proposed comprehensive TDM plan.

3.4 Preliminary Energy Conservation/GHG Emissions Reduction Approach

In alignment with its regional efforts to reduce GHG emissions and in support of Boston's specific GHG emissions reduction targets, the team will continue to evaluate energy efficiency measures ("EEMs") for possible inclusion in the Project. The EEMs may include such measures as high-performance glazing, increased insulation, low lighting power densities, low flow plumbing fixtures, high-efficiency mechanical and ventilation systems equipment, and alternative energy sources. Preliminary energy modeling was used for an early analysis of the possible impacts of energy efficiency measures.

The buildings will meet the Stretch Code requirement to be a minimum of 10 percent below an ASHRAE 90.1-2013 baseline. Through the implementation of energy optimizing building design and systems the Project strives to achieve

approximately30 percent annual energy use reduction, as projected by the preliminary energy modeling analysis. Additionally, the Project GHG emissions will equate to at least a 23 percent reduction in stationary source CO_2 emissions. (Note that the percentages of energy use are different than emission reductions due to emissions conversion factors.) Estimated energy use demand and costs and GHG emissions are preliminary and subject to change upon further design of the Project. Please refer the energy modeling analysis report included in Appendix C.

3.5 Climate Change Preparedness and Resiliency

As required by the BPDA for Large Project Review, the Proponent has begun to consider the projected impacts related to climate change in early stages of planning and design by completing the Resiliency Checklist (Appendix C). Climate change is expected to result in rising sea levels, more frequent extreme storms, and more extreme weather events. The following sections describe what has been considered as it relates to climate change impacts as part of the early stages of project design.

3.5.1 Sea Level Rise and Extreme Storms/Flooding

The Project Site is located outside of the 100-year flood zone and is approximately 3,400 feet from the closest open body of water. Therefore, extreme flooding and sea level rise are not anticipated to impact the Project.

3.5.2 Extreme Weather Events

In addition to sea level rise, additional climate change issues predicted for Massachusetts (per the 2011 Massachusetts Climate Change Adaptation Report) include an increase in extreme weather events which could consist of drought, tropical rainfall patterns (i.e., increased precipitation) and extreme heat and cold stretches, an increase in the number of days with extreme heat (i.e., temperatures greater than 90°F and 100°F) and/or fewer days of snow despite increased winter precipitation. Project-related resiliency measures aimed at addressing these potential events are discussed below.

3.5.3 Potential Resiliency Measures

Site Resiliency Measures

To manage stormwater, the Project is anticipated to provide infiltration and storage that retains site runoff while providing treatment and peak flow mitigation in accordance with municipal stormwater standards. At the street level, the Proponent aims to reduce the heat island effect by using light-colored paving materials and integration of greenery, such as green and vegetated roofs and landscape features along the streetscape and common green space.

Any new utilities (i.e., gas, electrical) will be buried below ground to reduce the possibility of a localized power outage caused during extreme storm events.

Protective plantings throughout and at the edges of the Project Site will mitigate potential wind effects created by open spaces.

Building Resiliency Measures

The Project Site location was assessed for its vulnerability to sea level rise and/or extreme flooding. It was determined the Project Site does not fall within the projected 100-Year Floodplain (one-percent annual storm event), or the 100 Year Floodplain plus 40 inches of sea level rise as identified on the BPDA's Zoning Viewer.

The following design and planning measures will be explored to mitigate for rising temperature impacts:

- Employing reflective roof materials and/or vegetated roofs; and
- Designing the residential units with operable windows, which help mitigate power disruptions by reducing the reliance on mechanical ventilation systems providing fresh air when mechanical systems are down.

As part of the energy modeling process, climate files that reflect the predicted increase in temperature may be used to better understand how the buildings and their systems would perform under different climate conditions. (This understanding may then be considered when designing overall HVAC systems.)

LEED v4 for Building Design and Construction: Multifamily Midrise

Project Checklist

Project Name: 44 Beacon Street, Allston
Date: 1-Feb-18

Y	?	N			
2			Credit	Integrative Process	2

15	1	0	**Location and Transportation**		15
Y			Prereq	Floodplain Avoidance	Required
			PERFORMANCE PATH		
		0	Credit	LEED for Neighborhood Development Location	15
			PRESCRIPTIVE PATH		
8			Credit	Site Selection	8
3			Credit	Compact Development	3
2			Credit	Community Resources	2
1.5	0.5		Credit	Access to Transit	2

4	0	0	**Sustainable Sites**		7
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	No Invasive Plants	Required
2			Credit	Heat Island Reduction	2
1			Credit	Rainwater Management	3
1			Credit	Non-Toxic Pest Control	2

7	1	0	**Water Efficiency**		12
Y			Prereq	Water Metering	Required
			PERFORMANCE PATH		
		0	Credit	Total Water Use	12
			PRESCRIPTIVE PATH		
6			Credit	Indoor Water Use	6
1	1		Credit	Outdoor Water Use	4

13	2	0	**Energy and Atmosphere**		37
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Energy Metering	Required
Y			Prereq	Education of the Homeowner, Tenant or Building Manager	Required
11			Credit	Annual Energy Use	30
2			Credit	Efficieng Hot Water Distribution	5
	2		Credit	Advanced Utility Tracking	2

5	3	0	**Materials and Resources**		9
Y			Prereq	Certified Tropical Wood	Required
Y			Prereq	Durability Management	Required
1			Credit	Durability Management Verification	1
2	2		Credit	Environmentally Preferable Products	5
2	1		Credit	Construction Waste Management	3

7.5	2	0	**Indoor Environmental Quality**		18
Y			Prereq	Ventilation	Required
Y			Prereq	Combustion Venting	Required
Y			Prereq	Garage Pollutant Protection	Required
Y			Prereq	Radon-Resistant Construction	Required
Y			Prereq	Air FIltering	Required
Y			Prereq	Environmental Tobacco Smoke	Required
Y			Prereq	Compartmentalization	Required
1			Credit	Enhanced Ventilation	3
0.5			Credit	Contaminant Control	2
2			Credit	Balancing of Heating and Cooling Distribution Systems	3
	1		Credit	Enhanced Compartmentalization	3
2			Credit	Enhanced Combustion Venting	2
1			Credit	Enhanced Garage Pollutant Protection	1
	1		Credit	Low Emitting Products	3
1			Credit	No Environmental Tobacco Smoke	1

0	0	0	**Innovation**		6
Y			Prereq	Preliminary Rating	Required
			Credit	Innovation	5
			Credit	LEED AP Homes	1

0	0	0	**Regional Priority**		4
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

53	9	0	**TOTALS**	Possible Points:	110

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

Figure 3.1
LEED Scorecard

44 North Beacon Street
Boston, Massachusetts

4

Transportation

This Chapter provides a detailed and comprehensive evaluation of the existing and proposed transportation conditions in the study area, and identifies traffic impacts as a result of the Project. The analysis captures in detail the operational characteristics of the Project, and provides a basis for determining to what extent, if any, Project-related transportation demands are likely to affect the wider transportation network.

This study has been developed to conform with the Boston Transportation Department ("BTD") "Transportation Access Plans Guidelines" and uses standard methodologies, including the Institute of Transportation Engineers' Trip Generation Manual (10th Edition) and local travel characteristics as defined in *Access Boston 2000-2010*. The Study analyzes the following as part of the evaluation of 2018 Existing Conditions:

- Vehicle traffic on study area roadways and intersections;
- Parking conditions;
- Loading and service activities;
- Pedestrian and bicycle operations; and
- Public transportation services.

In addition, this study quantifies and assesses the transportation impacts that are expected under future conditions. The purposes of these analyses are to:

- Define and quantify existing transportation conditions in the Project study area;
- Estimate the transportation impacts that will be generated under future conditions based on the anticipated program for the Project; and
- Develop a set of mitigation strategies and improvement measures which will help lessen the transportation effects of the Project.

4.1 Summary of Key Findings and Benefits

The Project is a transit-oriented development which relies on its urban setting to encourage new residents to utilize alternative modes of transportation. As such, it is expected to have minimal and limited impacts on the area's peak period traffic operations. The Project is expected to generate only six net-new vehicle trips during the morning peak hour and eight net-new vehicle trips during the evening peak hour. The results of the analysis indicate that there will be no changes in level of service ("LOS") in the study area from Project-related traffic. The Project will also implement a proactive Transportation Demand Management ("TDM") program and host of site amenities to encourage use of alternative transportation modes.

Parking will first be offered to residents of the building and any excess spaces not leased or purchased by residents will be offered to the public for monthly rental. Secure, indoor storage and outdoor guest bike parking will be provided at the Project Site consistent with City of Boston Bike Parking Guidelines. The indoor bicycle storage and maintenance room will be easily accessible, located directly off the main entrance of the midrise building. By locating the bike room off the main entrance and making it accessible from both the inside and outside of the building, bike use will be convenient and efficient.

The Project will provide many key benefits to the Allston/Brighton area including:

- The removal of a private, under-utilized surface parking lot adjacent to the sidewalk along North Beacon Street, creating a more inviting environment for pedestrians.
- Elimination of one of the two curb cuts currently existing on the site; re-use of the other existing curb cut.
- The low generation of vehicle trips entering and exiting the site during the morning and evening peak hours.

4.2 Project Description

The Project Site is currently an ambulance service facility in the Allston/Brighton neighborhood of Boston. The Project is located along North Beacon Street between the intersections with Everett Street to the east and Gordon Street to the west. The Project includes the construction of a seven-story, approximately 54,000-square-foot residential building with 54 units and 35 off-street parking spaces. Refer to the site plan previously illustrated in Figure 1.5. A summary of the proposed uses for the Project are provided in Table 4-1.

Table 4-1 Project Development Program

Land Use	Size
Residential	54 units
Parking	35 spaces
Bicycle Parking	
Secured/Covered	60 spaces
Outdoor	11 spaces

4.2.1 Site Access and Circulation

The Project will be served by a single driveway with access via frontage along North Beacon Street, as it exists in the current conditions. The driveway will provide access to a single level of below-grade parking for residents with a single shared entry lane and exit lane.

4.3 Study Methodology

The analysis presented in this chapter provides a detailed description of the Project's transportation characteristics and evaluates key impacts to the transportation infrastructure. The transportation analysis presented in this chapter conforms to BTD Guidelines.

The transportation analysis includes the projection of Project-related trips based on the Institute of Transportation Engineers ("ITE") *Trip Generation Manual 10th* Edition and the application of local travel characteristics established through the *Access Boston 2000-2010* initiative. Synchro 9 software was used to facilitate the evaluation of traffic operations based on the Highway Capacity Manual ("HCM") methodologies.

4.3.1 Traffic Study Area

Based on the Project program and the surrounding vehicular network, four study intersections were determined. As shown in Figure 4.1, the following intersections were included in the study area for the analysis:

1. North Beacon Street at Gordon Street (unsignalized)
2. North Beacon Street at Site Driveway (unsignalized)
3. North Beacon Street at Everett Street/KFC Driveway (signalized)
4. North Beacon Street/Brighton Avenue at Cambridge Street (signalized)

4.3.2 Analysis Conditions

The transportation analysis considers the following analysis scenarios:

- **2018 Existing Condition** - Based on traffic data conducted within the study area in 2016 and grown by one-half (1/2) percent per year to reflect 2018 conditions.
- **2023 No-Build Condition** - Future conditions for the five-year time horizon as expected to occur if the Project was not constructed.
- **2023 Build Condition** - Future conditions for a five-year time horizon assuming construction and full occupancy of the Project.

4.4 2018 Existing Conditions

This section describes existing transportation conditions, including an overview of roadway conditions, transit, pedestrian and bicycle facilities, and general site conditions.

4.4.1 Roadways

The site is located along North Beacon Street and is surrounded by Everett Street to the east and Gordon Street to the west.

- **North Beacon Street** - North Beacon Street is adjacent to the Project Site and traverses the study area in a general east-west direction between Cambridge Street and Gordon Street. North Beacon Street is currently a two-lane roadway with additional turning lanes provided at major intersections. On-street parking is provided on both sides of North Beacon Street west of the Project Site, but only on the north side of the street in front of the Project Site. Sidewalks are provided on both sides of North Beacon Street and crosswalks are provided at most intersections. Land use along North Beacon Street consists of a mix of commercial, industrial, and residential uses.
- **Everett Street** - Everett Street is located to the east of the Project Site and traverses the study area in a general north-south direction between Western Avenue and North Beacon Street. Everett Street is currently a two-lane roadway. On-street parking is prohibited on both sides of Everett Street. Sidewalks are provided on both sides of Everett Street and crosswalks are provided at the intersections with North Beacon Street and Old Everett Street (south). Land use along Everett Street consists of a mix of commercial and residential uses.
- **Gordon Street** - Gordon Street is located to the west of the Project Site and provides access between North Beacon Street and Cambridge Street. Gordon Street is a two-way roadway with Allston/Brighton resident parking along the west side of the street and no parking allowed along the east side of the street. Crosswalks are provided at the intersections of North Beacon Street and Cambridge Street. Land use along Gordon Street consists of residential uses.

4.4.2 Study Area Intersections

The study area consists of four study intersections previously shown in Figure 4.1 and described below. Traffic operations and LOS analysis are presented later in this chapter.

- **North Beacon Street at Gordon Street** - North Beacon Street and Gordon Street intersect at a three-way unsignalized intersection. All approaches consist of one general purpose travel lane. The Gordon Street northbound approach is under stop control. Sidewalks are provided on both sides of all approaches and a crosswalk is provided across the Gordon Street northbound approach. On-street parking is provided on the north side of North Beacon Street and the west side of Gordon Street.
- **North Beacon Street at Site Driveway** - The intersection of North Beacon Street at the Project Driveway will be an unsignalized intersection with North Beacon Street traveling at free-flow and the Project Driveway stop-controlled. The Project Driveway will replace the existing driveway, so the access to the Project Site will remain off North Beacon Street.
- **North Beacon Street at Everett Street/KFC Driveway** - North Beacon Street and Everett Street/KFC driveway intersect at a four-way signalized

intersection with offset approaches on Everett Street and the KFC Driveway. The North Beacon Street eastbound approach consists of two general purpose lanes. The North Beacon Street westbound approach consists of one through lane and one right-turn lane. All left turns from the westbound approach of North Beacon Street into the KFC driveway are prohibited via signage. The Everett Street southbound approach consists of one general purpose lane. The KFC Driveway is one-way southbound away from the intersection, only providing access for vehicles entering the KFC parking lot. Sidewalks are provided on both sides of the North Beacon Street eastbound and westbound approaches and the Everett Street southbound approach. Crosswalks are provided across the North Beacon Street eastbound approach and the Everett Street southbound approach. On-street parking is provided on the north side of North Beacon Street west of the intersection.

- **North Beacon Street/Brighton Avenue at Cambridge Street** - North Beacon Street/Brighton Avenue and Cambridge Street intersect at a four-way signalized intersection known locally as Union Square. The North Beacon Street eastbound approach consists of two general purpose lanes. The Brighton Avenue westbound approach consists of one left-turn lane, one left-through lane, and one through lane. Right-turning traffic exits the westbound Brighton Avenue approach prior to the intersection via a channelized right-turn slip-ramp. The Cambridge Street northeast-bound approach consists of two through lanes and one right-turn lane. All left turns from the northeast-bound approach of Cambridge Street onto North Beacon Street are prohibited via signage. The Cambridge Street southwest-bound approach consists of one left-through lane, one through lane, and one right-turn lane. Sidewalks are provided on both sides of all approaches and crosswalks are provided across all approaches. On-street parking is provided on the north side of Cambridge Street. MBTA bus stops are located on both sides of North Beacon Street west of the intersection, the south side of Brighton Avenue east of the intersection, and the north side of Cambridge Street southwest of the intersection.

4.4.3 Data Collection

To assess the traffic conditions of the surrounding street network, manual turning movement counts ("TMCs") were collected at the study area intersections. The TMCs from the recently submitted Allston Yards Project PNF were used. The data were collected in late 2016 during a typical weekday morning commuter period (7:00 AM - 9:00 AM) and evening peak commuter period (4:00 PM - 6:00 PM). To reflect current 2018 conditions, these counts were grown by one-half (1/2) percent per year from 2016 to 2018. Additionally, to account for projects that have been completed and have become occupied since the counts were taken, vehicle trips from Boston Landing and New Balance HQ were added to the grown 2018 volumes to more accurately reflect current 2018 traffic conditions.

The TMCs were used to establish the study area network peak hour volumes for the 2018 Existing Condition analysis. The weekday morning peak hour was determined to be 8:00 AM to 9:00 AM and the weekday evening peak hour from 5:00 PM to 6:00 PM. The existing morning and evening peak hour volumes are shown in Figures 4.2a and 4.2b, respectively.

4.4.4 Pedestrian Environment and Accessibility

The study area has adequate pedestrian accommodations with sidewalks along the surrounding roadways and crosswalks provided at the intersections. Pedestrian volumes at the study area intersections were collected in conjunction with the TMCs from the Allston Yards Project. Figures 4.3a and 4.3b present the 2018 Existing Condition pedestrian volumes. The highest pedestrian volumes in the study area were observed at the intersection of North Beacon Street at Cambridge Street/Brighton Avenue with approximately 166 pedestrians crossing the intersection during the morning peak hour and 284 pedestrians crossing during the evening peak hour.

4.4.5 Bicycles

Bicycle volumes, shown in Figures 4.4a and 4.4b, at the study area intersections were collected simultaneously with the vehicle turning movement counts. Within the immediate study area, there are shared bicycle lanes along both sides of Cambridge Street and Brighton Avenue eastbound. Dedicated bicycle lanes are provided on Brighton Avenue westbound. The intersection of North Beacon Street at Cambridge Street/Brighton Avenue has approximately 79 cyclists pass through the intersection during the morning peak hour and 94 during the evening peak hour.

The closest Hubway Station is at Union Square - Brighton Avenue at Cambridge Street, approximately a two-minute walk east of the Project Site with 15 bicycle docks, as shown in Figure 4.5.

4.4.6 Public Transportation

Buses

The study area is currently well served by four MBTA bus routes within a half mile of the Project Site, as shown in Figure 4.5. Routes 51, 57/57A, 64, and 66 stop at North Beacon Street at Cambridge Street. The B Branch of the MBTA Green Line at the Warren Street station also is located one-half mile from the Project Site. Peak period frequencies/headways for MBTA bus services are summarized in Table 4-2.

Table 4-2 Project Area MBTA Service

Service	Origin / Destination	Peak-Hour Frequency (minutes)
Route 51	Reservoir Station – Forest Hills Station	18-33
Route 57/57A	Watertown Yard or Oak Square – Kenmore Station	4-12
Route 64	Oak Square – University Park or Kendall/MIT	13-30
Route 66	Harvard Square – Dudley Station	9-11
B Branch Green Line	Park Street – Boston College	6

Source: MBTA, Winter Schedule 2018

Commuter Rail

Construction of the Boston Landing MBTA Commuter Rail Station near the Project Site was recently completed and the station became operational in late May 2017. The new commuter rail station serves the MBTA Framingham/Worcester Commuter Rail Line, which operates between Union Station in Worcester and South Station in Boston. This new station provides commuter rail access to the Project Site to and from the Back Bay and downtown Boston, as well as points to the west. The new Boston Landing MBTA Commuter Rail Station has the same general frequency of service as most of the other stations along this line, including the nearby Auburndale, West Newton, and Newtonville stops. Specifically, the first of six-weekday morning peak-period inbound stops occurs at 6:42 AM, with subsequent trains arriving at approximate 35-minute intervals. Eight additional stops are scheduled throughout the day with the last train arriving at 7:42 PM. In the outbound direction, there are eleven total stops over the course of the day, with six occurring in the afternoon peak-period. The headways between trains during the weekday afternoon peak period ranges from 25 to 60 minutes. Weekend service also is offered at the Boston Landing MBTA Commuter Rail Station with the same number of stops and headways found at other stations along this line.

4.4.7 Existing Parking and Carshare Locations

The Project Site currently provides parking for ambulances and employees, and the access for this parking lot is directly off North Beacon Street with 14 parking spaces.

There are three carsharing locations near the site. The 26 Allston Street Zipcar location, approximately a quarter-mile to the east, provides three vehicles. The 75 Braintree Street Zipcar location, approximately a quarter-mile to the north, provides one vehicle. The 140 North Beacon Street Zipcar location, under a half-mile west of the site, provides four vehicles.

4.4.8 Crash Analysis

A detailed crash analysis was conducted to identify potential vehicle accident trends and/or roadway deficiencies in the traffic study area. The most current vehicle accident data for the traffic study area intersections were obtained from MassDOT for the years 2011 to 2015. The MassDOT database is comprised of crash data from the Massachusetts Registry of Motor Vehicles ("RMV") Division primarily for use in traffic studies and safety evaluations. Data files are provided for an entire city or town for an entire year, though it is possible that some crash records may be omitted either due to individual crashes not being reported, or the city crash records not being provided in a compatible format for RMV use. It also should be noted that the location for some accidents cannot be precisely determined from the database. These locations typically involve interchange intersections. A summary of the study intersections vehicle accident history based on the available RMV data is presented in Table 4-3.

Crash rates are calculated based on the number of accidents at an intersection and the volume of traffic traveling through that intersection daily. Rates that exceed MassDOT's average for accidents at intersections in the district in which the town or city is located could indicate safety or geometric issues for an intersection. As Boston is in MassDOT's District 6, the calculated crash rates were compared to those of MassDOT District 6, which are 0.70 for signalized intersection and 0.53 for unsignalized intersections. These rates imply that, on average, 0.70 accidents occurred per million vehicles entering signalized intersections throughout District 6, and 0.53 accidents occurred per million vehicles entering unsignalized intersections.

Review of the accident data indicates that all study area intersections are below the district crash rate averages. The intersection of North Beacon Street/Brighton Avenue at Cambridge Street has the highest number of crashes in the study area with a total of 11 crashes occurring at the intersection over the five-year period. The most common type of crashes at the intersection was single vehicle crashes. Three of the 11 crashes at the intersection of North Beacon Street/Brighton Avenue at Cambridge Street involved non-motorists (pedestrians, bicyclists).

Table 4-3 Vehicular Crash Summary (2011-2015)

	North Beacon Street/ Brighton Avenue and Cambridge Street	North Beacon Street at Gordon Street	North Beacon at Everett Street
Signalized?	Yes	No	Yes
MassDOT Average Crash Rate	0.70	0.53	0.70
Calculated Crash Rate	0.21	0.03	0.09
Exceeds Average?	No	No	No
Year			
2011	3	0	1
2012	4	0	1
2013	3	0	1
2014	1	0	0
2015	0	1	0
Total	11	1	3
Collision Type			
Angle	1	0	0
Head-on	1	0	1
Rear-end	1	0	0
Sideswipe, same direction	2	0	0
Single Vehicle Crash	4	1	1
Not reported	2	0	1
Severity			
Fatal Injury	0	0	0
Non-Fatal Injury	5	1	1
Property Damage Only	4	0	1
Not Reported	2	0	1
Time of Day			
Weekday, 7:00 AM - 9:00 AM	0	1	1
Weekday, 4:00 – 6:00 PM	2	0	0
Saturday 11:00 AM – 2:00 PM	1	0	0
Weekday, other time	5	0	1
Weekend, other time	3	0	1
Pavement Conditions			
Dry	7	1	2
Wet	3	0	0
Not reported	1	0	1
Non-Motorist (Bike, Pedestrian)	3	1	1

According to the MassDOT Top Crash Locations interactive map, the study area intersection of North Beacon Street/Brighton Avenue and Cambridge Street was identified as a 2006-2015 Highway Safety Improvement Program (HSIP) Bicycle Cluster due to a high number of bicycle related crashes at this intersection. From 2006-2015, this intersection experienced 12 bicycle-related crashes with eight injured and four non-injured reported.

4.5 Future Transportation Conditions

Two future conditions scenarios were evaluated for a five-year time horizon (2023) to assess the potential Project-related traffic impacts: the No-Build and Build Conditions. These future conditions are summarized in the sections below.

4.5.1 2023 No-Build Condition

The 2023 No-Build Condition was developed to evaluate future transportation conditions in the traffic study area without consideration of the Project. In accordance with BTD guidelines, this future analysis year represents a five-year horizon (2023) from existing conditions (2018). The No-Build Condition provides insight into future traffic conditions resulting from regional growth and traffic generated by specific planned projects that are expected to affect the local roadway network.

General Background Growth

A background growth rate of one-half percent per year was applied to the 2018 Existing Condition traffic volumes to account for population growth and smaller projects that cannot be specifically identified. This background growth rate is consistent with other traffic studies in the area.

Area Development Projects

In addition to the background growth rate, traffic projections for several specific planned or approved projects were also incorporated into the development of the 2023 No-Build Condition. These include the following development projects:

- **37 North Beacon Street –** involves the proposed construction of 83 residential units in the Allston neighborhood. A five-story building containing 74 apartment residences would be located at the intersection of North Beacon and Everett Streets, and a four-story building containing nine condominium residences would be located next door on Sinclair Road. The construction will result in 72 net-new residential units based on the existing residential units on the parcel.
- **Allston Yards –** involves the redevelopment of a 10.6-acre Project Site currently occupied by a supermarket and adjoining retail stores with a mixed-use, transit-oriented development ("TOD") consisting of residential,

office, restaurant, fitness, and retail uses, including a flagship grocery store, and a new approximately 0.5-acre community green, activated with programming to enhance use and enjoyment, such as an outdoor health and wellness events, public art exhibits, music concerts and holiday festivals. Allston Yards is located north of the Project Site just south of I-90 and west of Everett Street.

- **125 Guest Street** – involves the construction of 295 residential units and 16,000 sf of ground-floor retail, which was permitted by the Third Amendment to the Boston Landing Master Plan approved in 2014. This site is located northwest of the Project Site on Guest Street across from the New Balance World Headquarters, with construction ongoing.
- **31 North Beacon Street** – involves the construction of 20 residential units and 2,170 square feet of ground-floor retail adjacent to the intersection of North Beacon Street and Everett Street, northeast of the Project Site.
- **61 – 83 Braintree Street** – involves the construction of 80 residential units and 2,550 square feet of ground-floor retail northeast of the Project Site on Braintree Street adjacent to the Turnpike and MBTA commuter rail tracks. This project has recently been completed with residents now occupying this building.
- **26 Hichborn Street –** consists of 20 residential units and 1,774 square feet of ground-floor retail. This site is located northwest of the Project Site on Hichborn Street.
- **159 – 201 Washington Street** – involves the construction of 680 residential units on an 11.6-acre site currently occupied by St. Gabriel's Church and Monastery, a cemetery, and a Shrine to Our Lady Fatima, among other uses. This project will preserve and rehabilitate the Monastery and shrine while demolishing the rest of the site. This site is located south of the Project Site adjacent to St. Elizabeth's Medical Center.
- **139 – 149 Washington Street** – consists of approximately 180 apartments and 30 condominiums. This site is located south of the Project Site adjacent to the proposed development at 159-201 Washington Street.
- **Western Ave. Residences** – involves the construction of 132 residential units and 5,180 square feet of ground-floor retail. This site is located northwest of the Project Site on the corner of Western Avenue and Leo M. Birmingham Parkway.
- **61 North Beacon Street –** as part of the original "District 9 at 61 North Beacon Street" development proposal, this site was approved to consist of 71 condominium units to be located within an historic five-story, 71,000-square-foot building. The building program has since been modified to include the relocation of the existing Boston Volvo Village dealership to the west, with approximately 28,000 square feet of office and/or research and development space.

- **40 Rugg Road –** proposed residential development is planned on a 1.89-acre site located between Rugg Road, Penniman Road, and Braintree Street to the north-east of the Project Site. A 265-unit development is proposed, with 2,700 square feet of supporting retail space.

In addition to the projects listed above, additional development sites recently have been proposed within the study area since the development of this study. These developments mostly replace existing land uses already generating traffic volumes similar to those projected with the new developments. Accordingly, the studies for these projects reveal that any associated traffic increases should be limited to ten or fewer additional peak-hour trips. That nominal level of increased traffic is sufficiently accounted for through the annual growth rate used in this study.

The 2023 No-Build Condition peak-hour traffic volumes were developed by increasing the 2018 Existing Condition volumes to include general background traffic growth as previously described and adding traffic volumes associated with known traffic forecasts projected for other development projects in the area. As summarized above, this background traffic includes both the adjacent Boston Landing development as well as the other nearby projects described above.

Figures 4.7a and 4.7b present the 2023 No-Build Condition traffic volumes for the weekday morning and evening, respectively.

4.5.2 2023 Build Condition

The 2023 Build Condition includes the 2023 No-Build Condition background traffic growth with the addition of the Project-generated trips. The Project will improve the Project Site driveway off North Beacon Street. Figure 1.5, presented previously, illustrates the site plan for the Project.

Project-Generated Trips

To assess the traffic impacts of the Project, trip estimates were based on standard rates from the latest ITE Trip Generation Handbook[1]. Trip generation for the proposed residential building was estimated based on the ITE Land Use Codes as shown in Table 4-4 below.

Table 4-4 Trip Generation Land Use Codes

Land Use	ITE Land Use Code (LUC)	Independent Variable
Residential	221-Multifamily Housing, Midrise	Dwelling Units

Source: Trip Generation; Tenth Edition, Institute of Transportation Engineers; Washington, D.C.; 2017.

To account for alternative modes of transportation, mode shares for the area, based on BTD guidelines for Area 17, were applied to the unadjusted ITE trip results. Mode shares are presented in Table 4-5.

[1] Trip Generation; Tenth Edition, Institute of Transportation Engineers; Washington, D.C.; 2017.

Table 4-5 Residential Mode Split

Mode	Daily	AM Peak		PM Peak	
		IN	OUT	IN	OUT
Automobile	47%	37%	43%	43%	37%
Public Transit	22%	30%	21%	21%	30%
Walk/Bike/Other	31%	33%	36%	36%	33%

Source: BTD Area 17 Mode Split

Vehicle Occupancy Rates ("VOR") were also applied to the ITE trip generation to convert the ITE estimated unadjusted vehicle trips to person trips. A VOR of 1.13 persons per vehicle for residential land use was based on the 2009 National Household Travel Survey. After VOR is applied to the ITE unadjusted vehicle trips to produce person trips, these trips are split into modes based on the mode splits shown previously in Table 4-5. The VOR is again applied to the person trips to produce adjusted vehicle trips. The Project trips for all modes are shown in Table 4-6.

Table 4-6 Project-Generated Trips

Time Period/ Direction	Public Transportation	Walk/Bike/ Other	Vehicle	Existing Site Vehicle Trips[1]	Net-New Vehicle Trips
Daily					
Enter	36	51	**69**	n/a	69
Exit	36	51	**69**	n/a	69
Total	**72**	**102**	**138**	**n/a**	**138**
AM Peak					
Enter	2	2	**2**	(-1)	1
Exit	4	6	**7**	(-2)	5
Total	**6**	**8**	**9**	**(-3)**	**6**
PM Peak					
Enter	4	6	**7**	(-2)	5
Exit	4	4	**4**	(-1)	3
Total	**8**	**10**	**11**	**(-3)**	**8**

Source: Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington D.C. (2017).
Notes: Land Use Code (LUC) 221 – Multifamily Housing, Midrise (regression formula). The base trip generation estimates were subsequently categorized into transit, walk, bike or vehicular trips following BTD's guidelines for Area 17.
[1] Existing Site Vehicle Trips were estimated based on peak hours; daily estimates were not made.

Vehicle Trip Distribution

Trip distribution was based on BTD's guidelines for Area 17 (where the Project is located) and the distribution used for the nearby Allston Yards Project. The Area 17 trip distribution rates are based on the 2000 Census data about where residents work and where employees live. The Project-generated vehicle trips were assigned to the roadway network accordingly. A summary of the regional trip distribution results is presented in Table 4-7 and shown graphically in Figure 4.8.

Table 4-7 Project Trip Distribution

Corridor	In	Out
North Beacon Street (to/from West)	32%	32%
Cambridge Street (to/from North)	29%	29%
Everett Street (to/from North)	20%	20%
Gordon Street (to/from South)	11%	11%
Brighton Street (to/from East)	8%	8%
Total	**100%**	**100%**

Source: BTD Area 17 Trip Distribution

The Project-generated vehicle trips were added to the 2023 No-Build Condition traffic networks using the local trip distribution patterns described above. The Project-generated trips are shown in Figure 4.9a and 4.9b for the weekday morning and evening peak hours, respectively.

Pedestrian Environment and Accessibility

The main residential pedestrian access is from North Beacon Street. The landscape at the front of the development will greatly improve the existing conditions of the surface parking lot for the ambulances. The Project Site will be designed with a courtyard entrance that cuts through the center of the development and leads the residents to the buildings' doors, providing some separation from North Beacon Street.

Bicycle Access

The Project will provide an indoor bicycle storage and maintenance room, and the Project will also provide outdoor bike racks for the use of guests visiting the building. All bicycle parking will conform to the City of Boston's Bicycle Parking Guidelines, and Table 4-8 shows the necessary bicycle parking for the Project according to these guidelines. A total of 60 secured/covered bicycle parking spaces and 11 outdoor bicycle parking spaces will be provided.

Table 4-8 Project Bicycle Parking Spaces

Land Use	Secured/Covered Bicycle Parking		Outdoor Bicycle Parking	
	Ratio	Spaces	Ratio	Spaces
Residential	1 per unit	54 (required) 60 (proposed)	1 per 5 units	11

Source: City of Boston Bicycle Parking Guidelines

Loading and Service

The Project will service trash pickup on-street with rolling trash and recycling containers stored within the development, as indicated previously in Figure 2.1a. Move-in/move-out loading will be accommodated along North Beacon Street during off-peak hours to limit the disruptions to the surrounding traffic network.

4.6 Transportation Demand Management

Consistent with the City's goals to reduce auto-dependency, the Project and its Proponent will incorporate proactive TDM measures to encourage alternative modes of transportation. Building management will provide transit information (schedules, maps, fare information) in the building lobbies for residents. Management will also work with tenants as they move in to raise awareness of public transportation options.

The following discusses an array of TDM measures that could be implemented. A description of the TDM elements is presented in this section along with information on how those elements aid Project residents. Measures being considered as part of the Project include:

- The Proponent will designate a Transportation Coordinator to oversee move-in/move-out operations as well as promote the use of alternative transportation measures and carpooling.
- The Proponent will provide real-time transit information displayed on-screen in the entry of the mid-rise, as well as provide maps and schedules in the resident orientation package.
- The Project includes both indoor/secure bicycle storage and public outdoor bicycle spaces. These bicycle spaces will be provided in accordance with the BTD guidelines. The Proponent will provide 11 outdoor bicycle spaces (one per five units) and 60 secure storage spaces (one per unit plus six additional spaces). Bicycle racks, signs and parking areas will conform to BTD standards and be sited in safe, secure locations.

- The Proponent will work with the City to provide safe pedestrian access to the Project from the surrounding area.
- The Proponent will provide an annual subsidy to residents of the building who utilize public transit via the MBTA / Commuter rail.

4.7 Parking

The parking needs for the Project will be accommodated by approximately 35 total spaces. Due to the nearby availability of public bus and train service, and amenities within the Project Site that will promote bicycle and pedestrian travel, the need for parking will be reduced. Additionally, alternate means of travel such as taxi, private ride services (Uber, Lyft, and others) should continue to reduce the parking needs for this area.

4.8 Traffic Operations Analysis

Consistent with BTD Guidelines, Synchro 8 software was used to model LOS operations at the study area intersections. LOS is a qualitative measure of control delay at an intersection providing an index to the operational qualities of a roadway or intersection.

LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS D is considered acceptable. LOS E indicates vehicles experience significant delay while LOS F suggests unacceptable delay for the average vehicle. LOS thresholds differ for signalized and unsignalized intersections. Longer delays at signalized intersections than at unsignalized intersections are perceived as acceptable.

Table 4-9 below presents the level of service delay threshold criteria as defined in the 2000 Highway Capacity Manual ("HCM").

Table 4-9 Level of Service Criteria

Level of Service	Unsignalized Intersection Control Delay (sec/veh)	Signalized Intersection Control Delay (sec/veh)
LOS A	≤ 10	≤ 10
LOS B	> 10-15	> 10-20
LOS C	> 15-25	> 20-35
LOS D	> 25-35	> 35-55
LOS E	> 35-50	> 55-80
LOS F	> 50	> 80

Source: 2000 Highway Capacity Manual (HCM)

Adjustments were made to the Synchro model to include characteristics of the study area such as heavy vehicles, bus operations, parking activity and pedestrian crossings. The capacity analysis results are summarized in the following sections.

4.8.1 Signalized Capacity Analysis

The LOS results of the signalized capacity analyses are summarized in Table 4-10 and Table 4-11 for the 2018 Existing, 2023 No-Build, and 2023 Build Condition peak hours.

Table 4-10 Signalized Intersection Level of Service (LOS) Summary – Morning Peak Hour

	2018 Existing Condition			2023 No-Build Condition			2023 Build Condition		
Location	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
North Beacon Street/Everett Street	**0.78**	**61.7**	**E**	**0.82**	**72.9**	**E**	**0.83**	**73.6**	**E**
North Beacon Street EB Left/Thru/Right	3.67dl	103.4	F	4.70dl	126.2	F	4.71dl	127.8	F
North Beacon Street WB Thru	0.88	38.5	D	0.91	41.8	D	0.91	42.0	D
North Beacon Street WB Right	0.18	17.2	B	0.19	17.3	B	0.19	17.3	B
Everett Street SB Left/Thru/Right	0.53	28.8	C	0.56	29.5	C	0.56	29.5	C
North Beacon Street/Brighton Street/Cambridge Street	**0.99**	**67.8**	**E**	**1.03**	**72.9**	**E**	**1.03**	**73.0**	**E**
North Beacon Street EB Left/Thru/Right	0.88	52.3	D	0.91	55.4	E	0.91	55.2	E
Brighton Avenue WB Left	0.47	45.9	D	0.49	46.4	D	0.49	46.4	D
Brighton Avenue WB Left/Thru/Right	1.06	101.2	F	1.10	112.5	F	1.10	112.5	F
Cambridge Street NEB Thru	0.41	37.8	D	0.50	39.4	D	0.50	39.4	D
Cambridge Street NEB Right	0.14	34.9	C	0.15	34.9	C	0.15	34.9	C
Cambridge Street SWB Left/Thru	0.59	34.3	C	0.65	36.1	D	0.65	36.3	D
Cambridge Street SWB Right	1.15	143.0	F	1.20	159.5	F	1.20	160.8	F

1 volume to capacity ratio
2 delay in seconds
3 level of service

Table 4-11 Signalized Intersection Level of Service (LOS) Summary – Evening Peak Hour

	2018 Existing Condition			2023 No-Build Condition			2023 Build Condition		
Location	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
North Beacon Street/Everett Street	**0.98**	**79.6**	**E**	**1.02**	**89.1**	**F**	**1.02**	**89.5**	**F**
North Beacon Street EB Left/Thru/Right	2.23dl	158.6	F	3.22dl	179.0	F	3.27dl	180.1	F
North Beacon Street WB Thru	0.83	15.6	B	0.88	17.1	B	0.88	17.2	B
North Beacon Street WB Right	0.18	7.0	A	0.20	6.5	A	0.20	6.5	A
Everett Street SB Left/Thru/Right	0.82	43.7	D	0.86	47.5	D	0.87	47.6	D
North Beacon Street/Brighton Street/Cambridge Street	**1.06**	**100.0**	**F**	**1.12**	**112.2**	**F**	**1.13**	**112.6**	**F**
North Beacon Street EB Left/Thru/Right	1.27	152.6	F	1.32	176.2	F	1.32	176.7	F
Brighton Avenue WB Left	0.59	49.8	D	0.61	50.7	D	0.61	50.7	D
Brighton Avenue WB Left/Thru/Right	1.17	137.3	F	1.21	154.3	F	1.21	155.0	F
Cambridge Street NEB Thru	0.42	38.0	D	0.48	38.9	D	0.48	38.9	D
Cambridge Street NEB Right	0.15	35.0	D	0.15	35.1	D	0.15	35.1	D
Cambridge Street SWB Left/Thru	0.76	40.7	D	0.89	50.7	D	0.89	50.7	D
Cambridge Street SWB Right	0.83	63.4	E	0.89	72.6	E	0.90	73.2	E

1 volume to capacity ratio
2 delay in seconds
3 level of service

The signalized intersection of North Beacon Street at Everett Street operates at a LOS E both during the morning and evening peak hour in the 2018 Existing Conditions. The signalized intersection of North Beacon Street at Brighton Street and Cambridge Street operates at a LOS E during the morning and LOS F during the evening peak hour in the 2018 Existing Conditions. The intersections are minimally affected by the additional traffic volumes due to background growth and surrounding projects. During the evening peak hour, North Beacon Street at Everett Street experiences a slight decrease in performance from LOS E to LOS F due to increased volumes from the 2018 Existing Condition to 2023 No-Build Condition. The study area intersections show no change in performance from the 2023 No-Build Condition to the 2023 Build Condition, and all the LOS outcomes remain constant for both the morning and evening peak hours. The traffic volumes generated from the Project will not noticeably affect the surrounding area intersections.

4.8.2 Unsignalized Capacity Analysis

The LOS results of the unsignalized capacity analyses are summarized in Table 4-12 and Table 4-13 for the 2018 Existing, 2023 No-Build, and 2023 Build Condition peak hours.

Table 4-12 Unsignalized Intersection Level of Service (LOS) Summary – Morning Peak Hour

	2018 Existing Condition			2023 No-Build Condition			2023 Build Condition		
Location	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
North Beacon Street/Gordon Street									
Gordon Street NB Left/Right	0.51	19.1	C	0.57	21.9	C	0.57	22.1	C
North Beacon Street/Site Driveway									
Site Driveway NB Left/Right	0.0	9.0	A	0.0	9.0	A	0.01	12.9	B

1 volume to capacity ratio
2 delay in seconds
3 level of service

Table 4-13 Unsignalized Intersection Level of Service (LOS) Summary – Evening Peak Hour

	2018 Existing Condition			2023 No-Build Condition			2023 Build Condition		
Location	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
North Beacon Street/Gordon Street									
Gordon Street NB Left/Right	0.46	20.5	C	0.53	24.6	C	0.53	24.8	C
North Beacon Street/Site Driveway									
Site Driveway NB Left/Right	0.0	13.5	B	0.01	14.6	B	0.01	12.8	B

1 volume to capacity ratio
2 delay in seconds
3 level of service

The unsignalized intersection of North Beacon Street at Gordon Street operates at a LOS C both during the morning and evening peak hour in the 2018 Existing Conditions. The unsignalized intersection of North Beacon Street at the 44 North Beacon Street site driveway operates at a LOS A during the morning and LOS B during the evening peak hour in the 2018 Existing Conditions. The study area intersections show no change in performance from the 2018 Existing Condition to the 2023 No-Build Condition, and all of the LOS outcomes remain constant for both the morning and evening peak hours. The intersections are minimally affected by the

Project Generated trips added to the study area intersections in the 2023 Build Condition. During the morning peak hour in the 2023 Build Condition, the 44 North Beacon Street site driveway experiences a slight decrease in performance from LOS A to LOS B due to increased volumes in the out of the site driveway. The traffic volumes generated from the Project will not noticeably affect the surrounding area intersections.

4.9 Construction Management

The Proponent will develop a detailed evaluation of potential short-term construction-related transportation impacts including construction vehicle traffic, parking supply and demand, and pedestrian access. Detailed Construction Management Plans ("CMP") will be developed and submitted to the BTD for their approval. These plans will detail construction vehicle routing and staging.

Construction vehicles will be necessary to move construction materials to and from the Project Site. Every effort will be made to reduce the noise, control fugitive dust and minimize other disturbances associated with construction traffic. Truck staging and laydown areas for the Project will be carefully planned. The need for street occupancy (lane closures) along roadways adjacent to the Project Site is not known at this time.

Contractors will be encouraged to devise access plans for their personnel that de-emphasize auto use (such as seeking off-site parking, provide transit subsidies, on-site lockers, etc.) Construction workers will also be encouraged to use public transportation to access the Project Site because no new parking will be provided for them. Because of the construction workers' early arrival/departure (typically 7:00 AM – 3:00 PM) schedule, a conflict for on-street parking is not anticipated.

During the construction period, pedestrian activity adjacent to the site may be impacted by sidewalk closures. A variety of measures will be considered and implemented to protect the safety of pedestrians. Temporary walkways, appropriate lighting, and new directional and informational signage to direct pedestrians around the construction sites will be provided. After construction is complete, finished pedestrian sidewalks will be permanently reconstructed to meet ADA standards around the new facilities. Any damage as a result of construction vehicles or otherwise will be repaired per City standards.

4.10 Transportation Access Plan Agreement

A Transportation Access Plan Agreement (TAPA) will be entered into between the Proponent and BTD. The TAPA will codify the specific measures and agreements between the Proponent and the City of Boston.

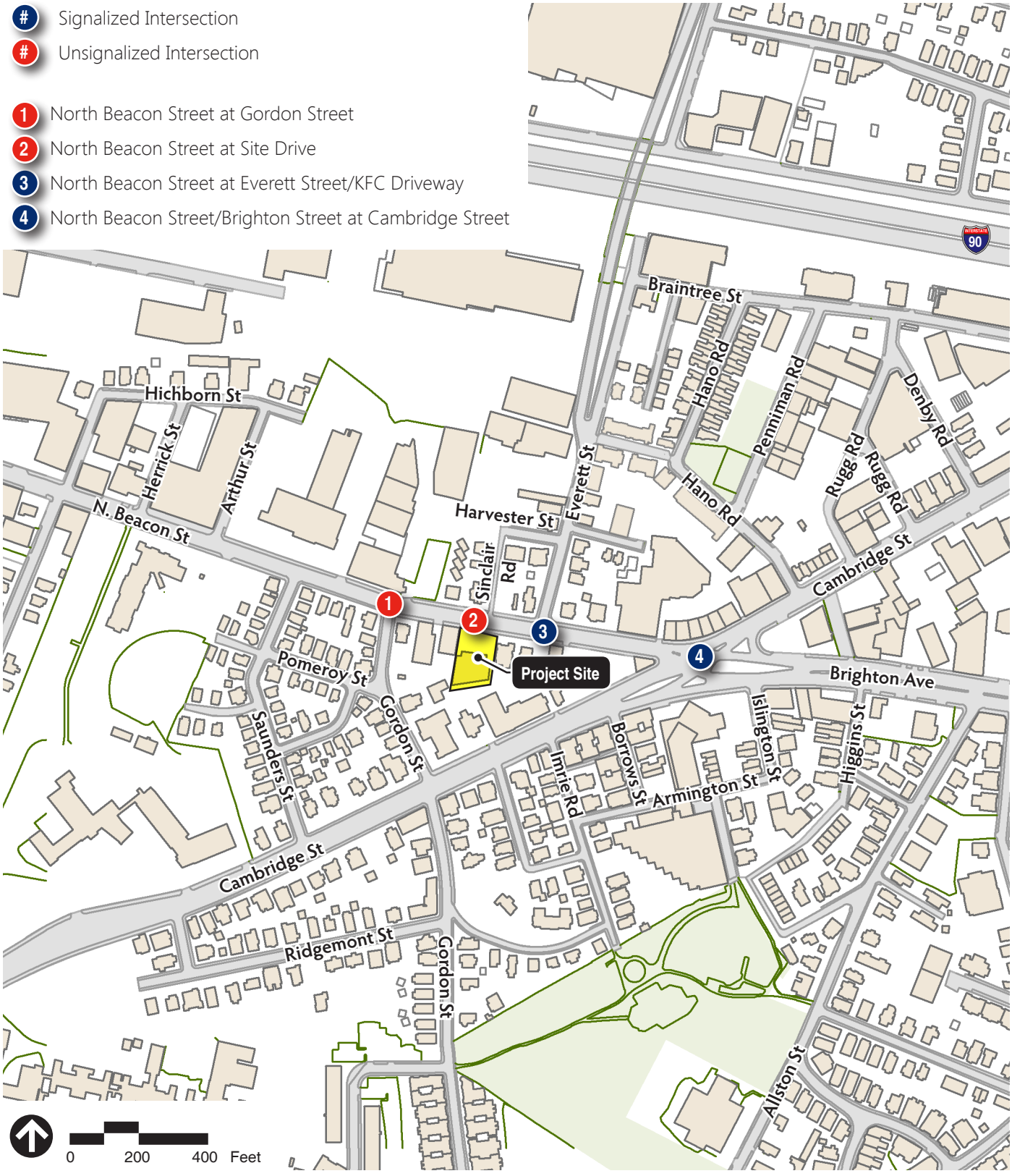

Figure 4.1

Study Area Intersections

44 North Beacon Street
Boston, Massachusetts

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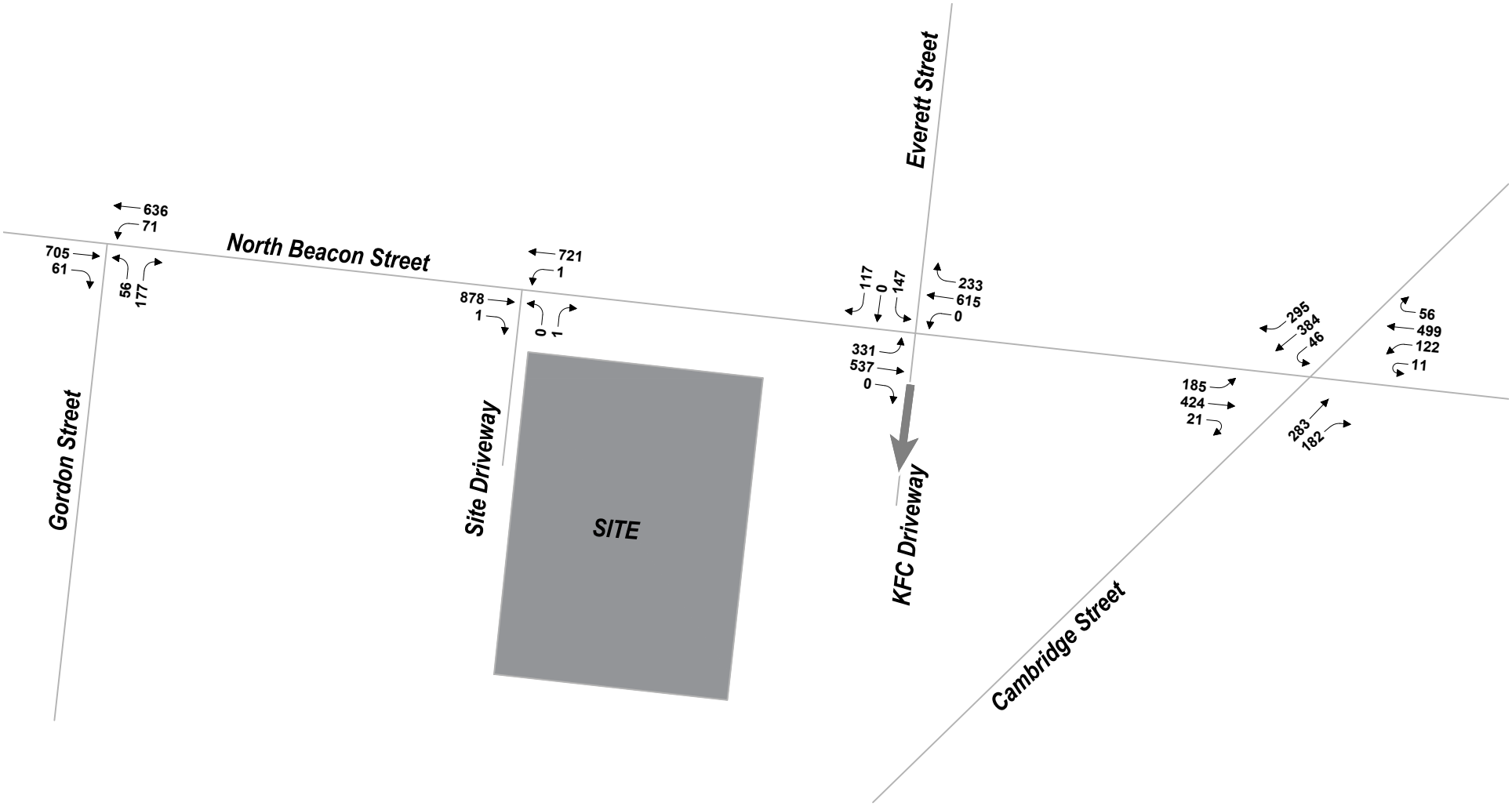

Figure 4.2a

2018 Existing Condition
Morning Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

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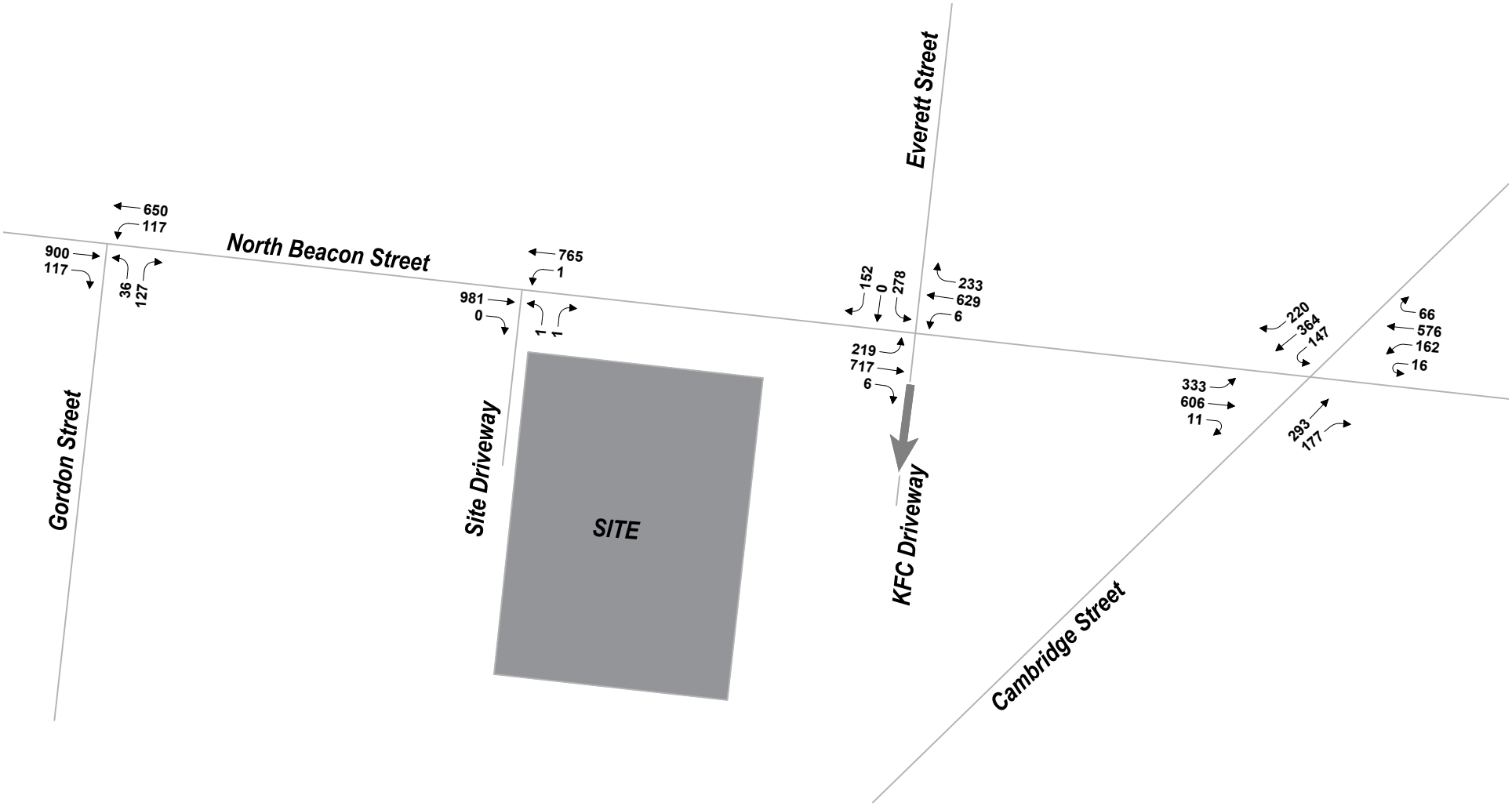

Not to Scale

Figure 4.2b

2018 Existing Condition
Evening Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

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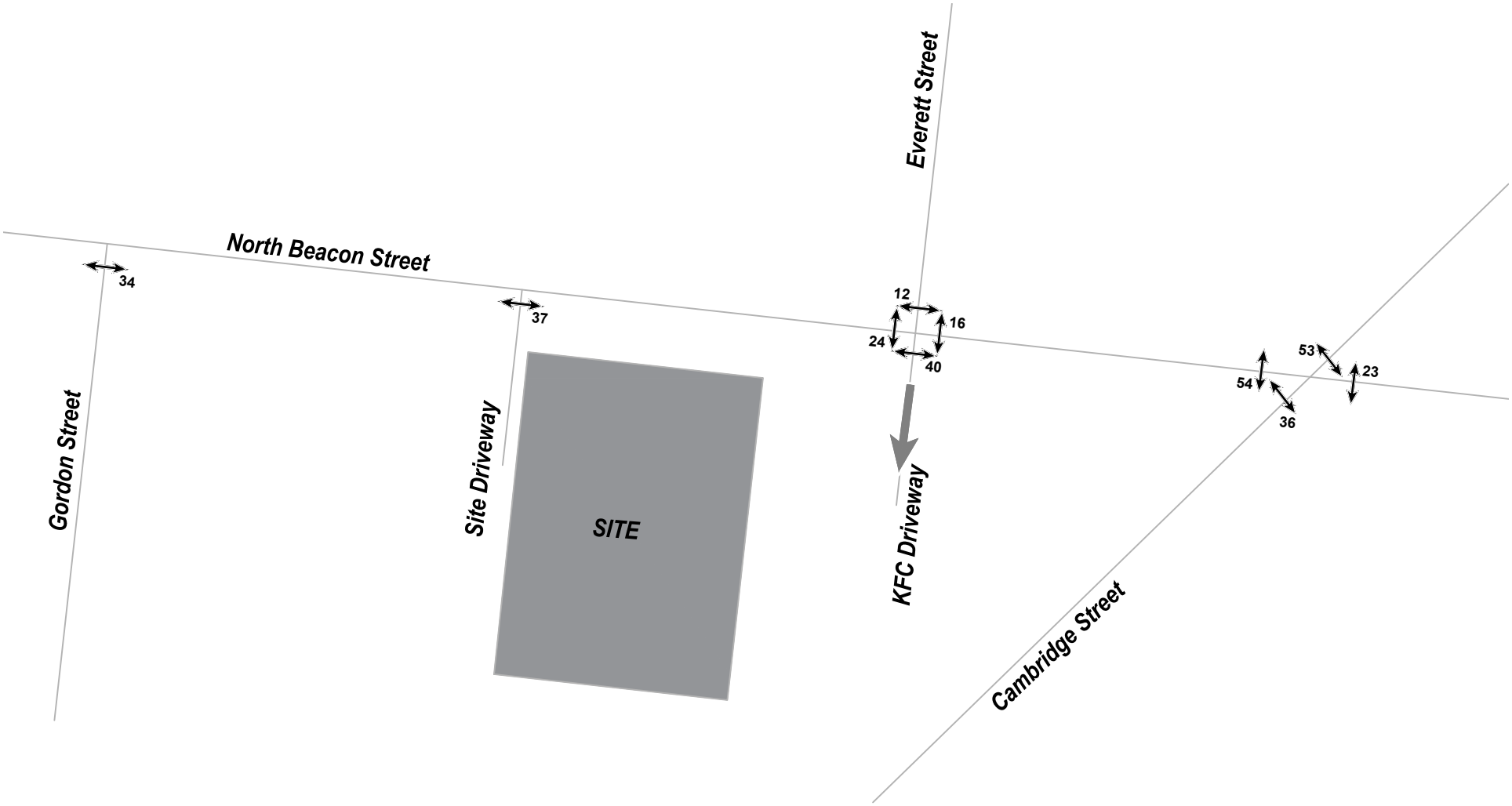

Figure 4.3a

2018 Existing Condition
Morning Peak Hour Pedestrian Volumes

44 North Beacon Street
Boston, MA

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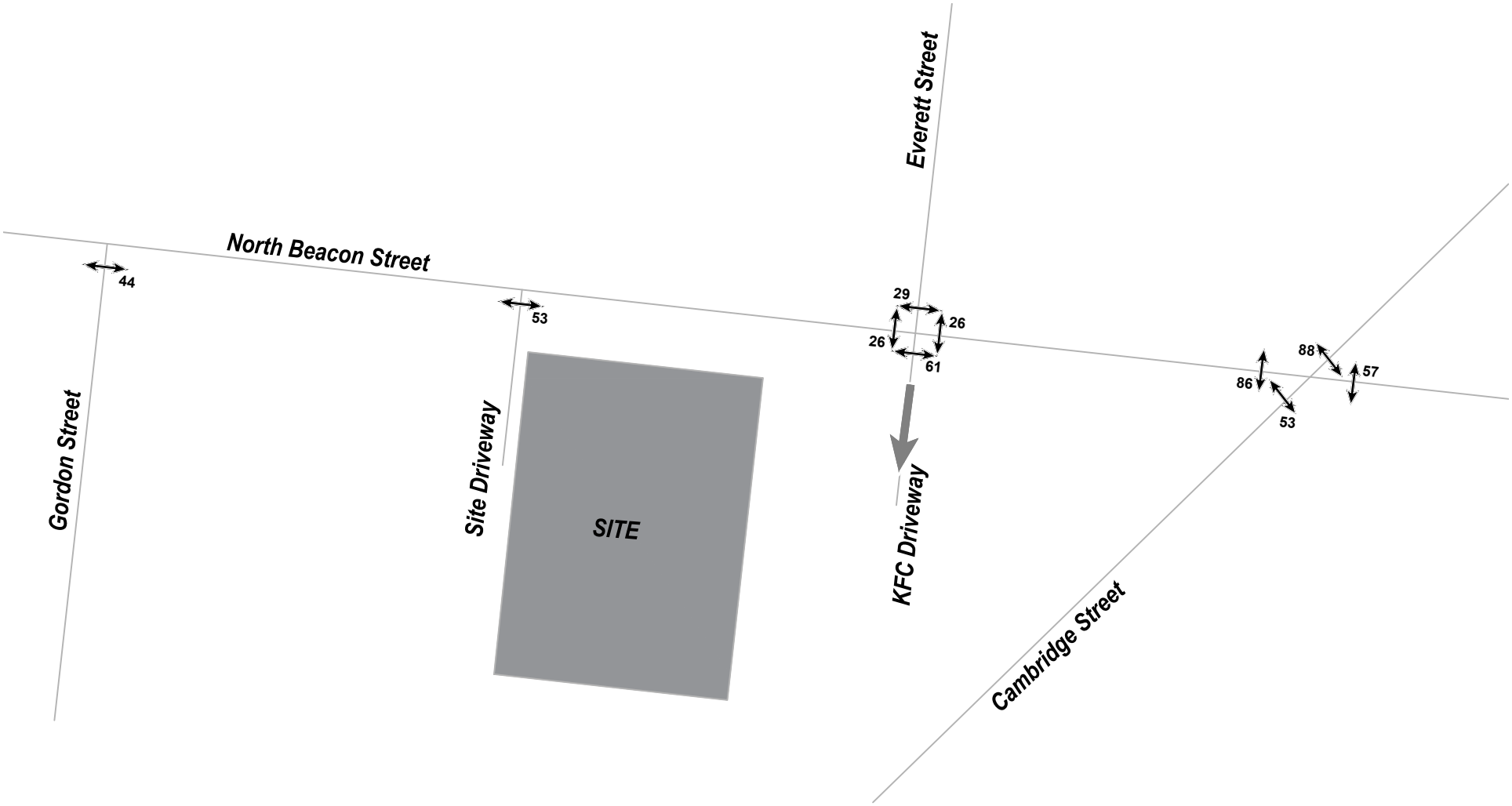

Figure 4.3b

2018 Existing Condition
Evening Peak Hour Pedestrian Volumes

44 North Beacon Street
Boston, MA

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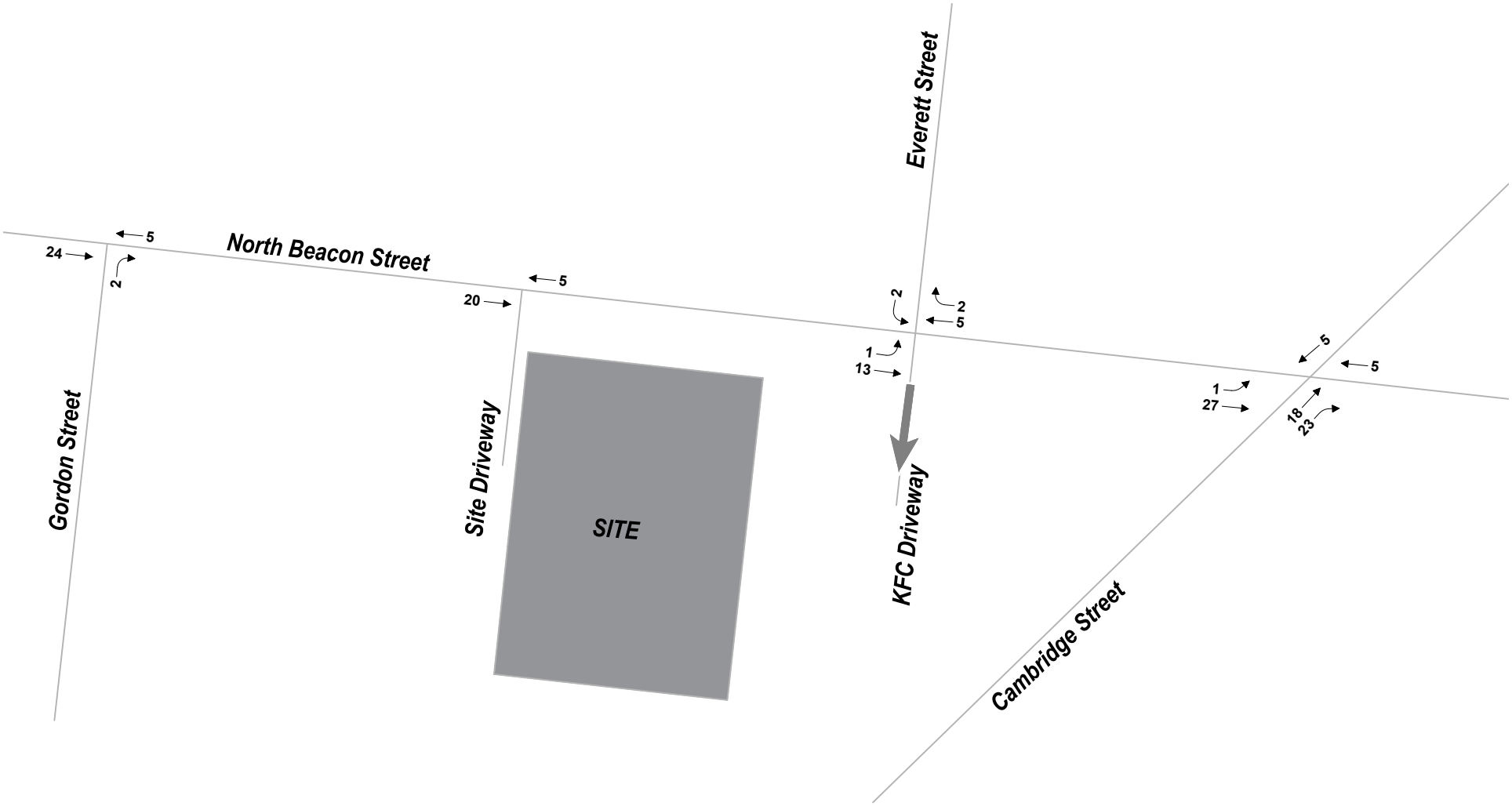

Figure 4.4a

2018 Existing Condition
Morning Peak Hour Bicycle Volumes

44 North Beacon Street
Boston, MA

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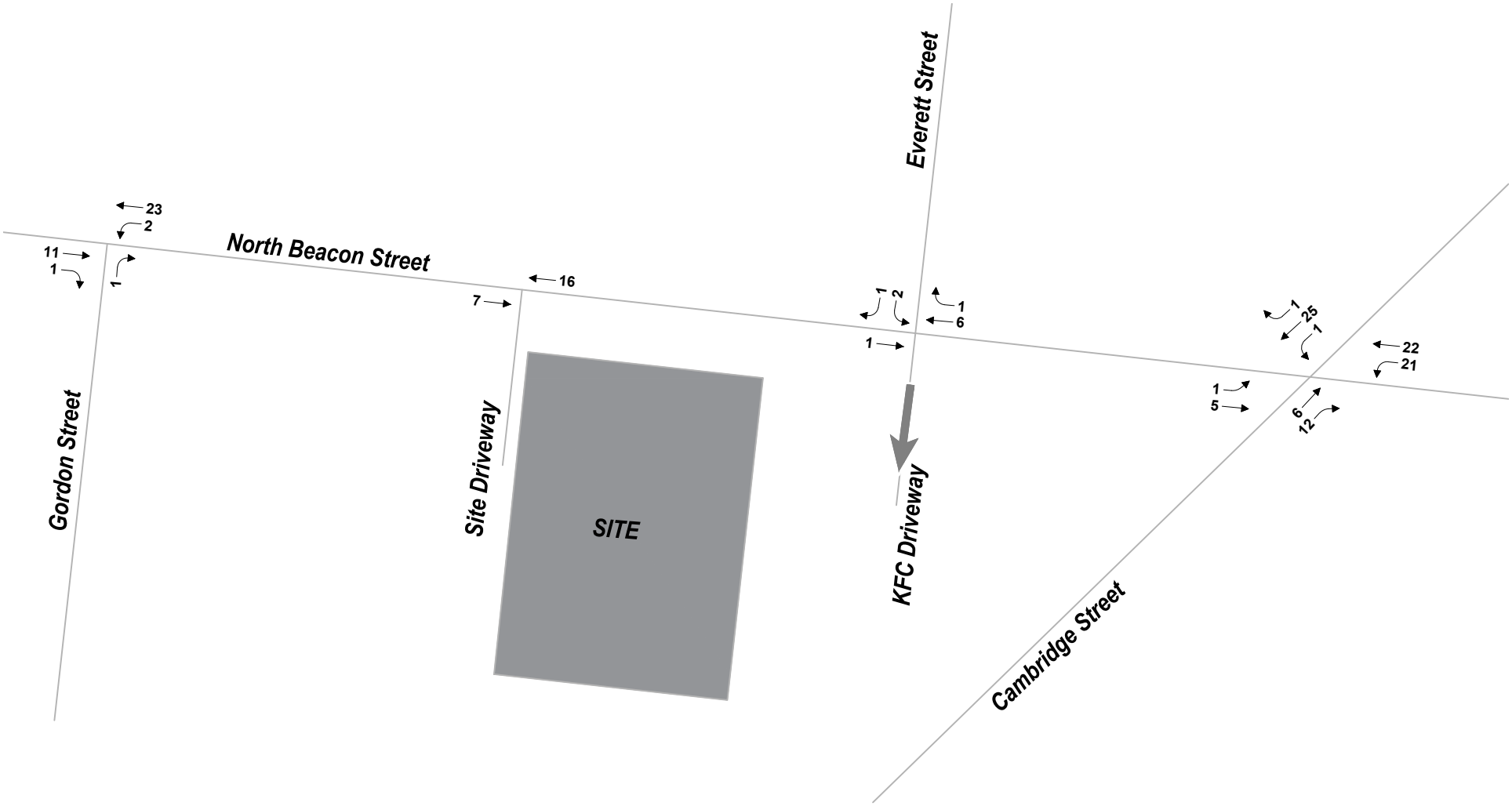

Figure 4.4b

2018 Existing Condition
Evening Peak Hour Bicycle Volumes

44 North Beacon Street
Boston, MA

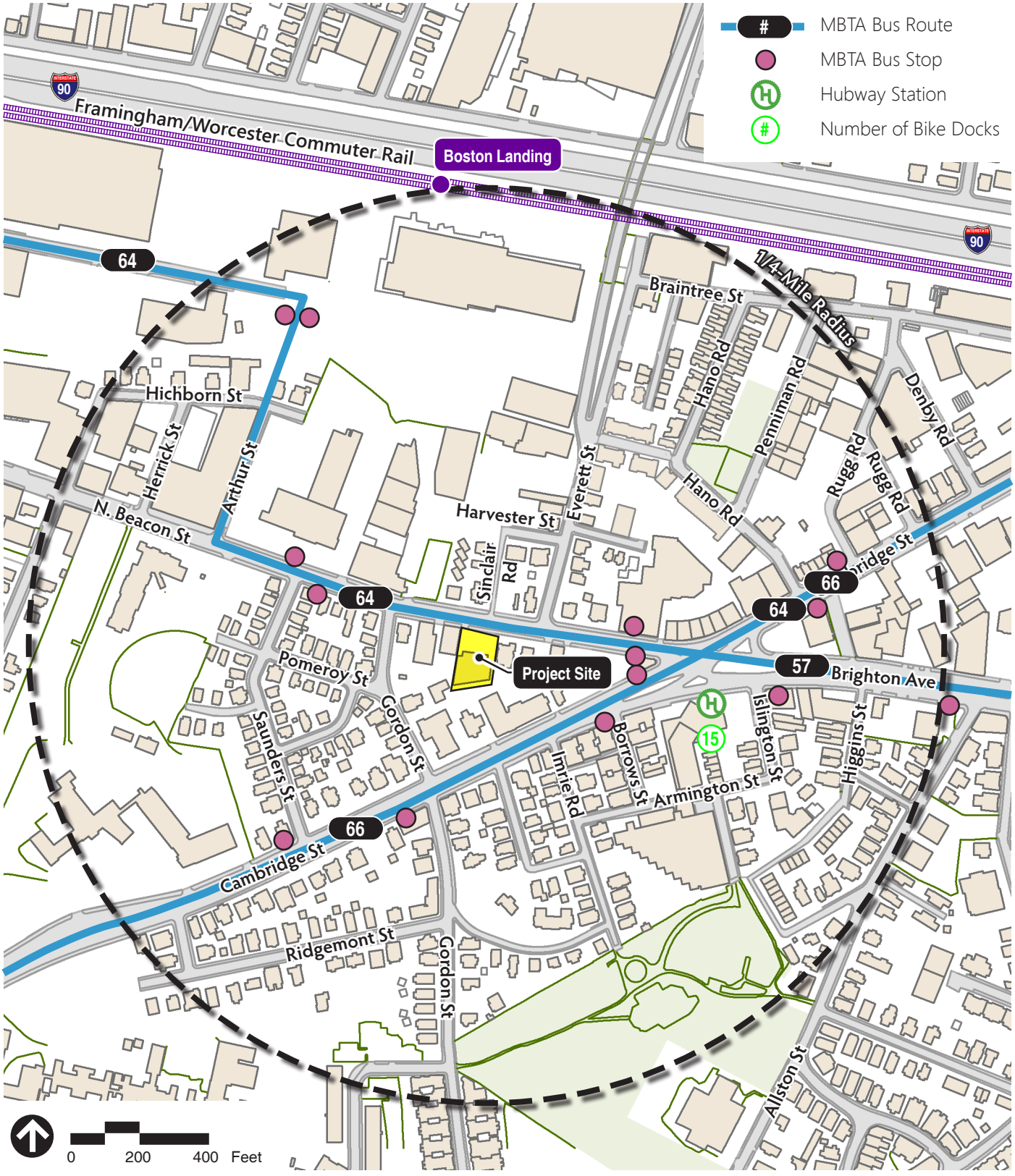

Figure 4.5

Existing Public Transit Services

44 North Beacon Street
Boston, Massachusetts

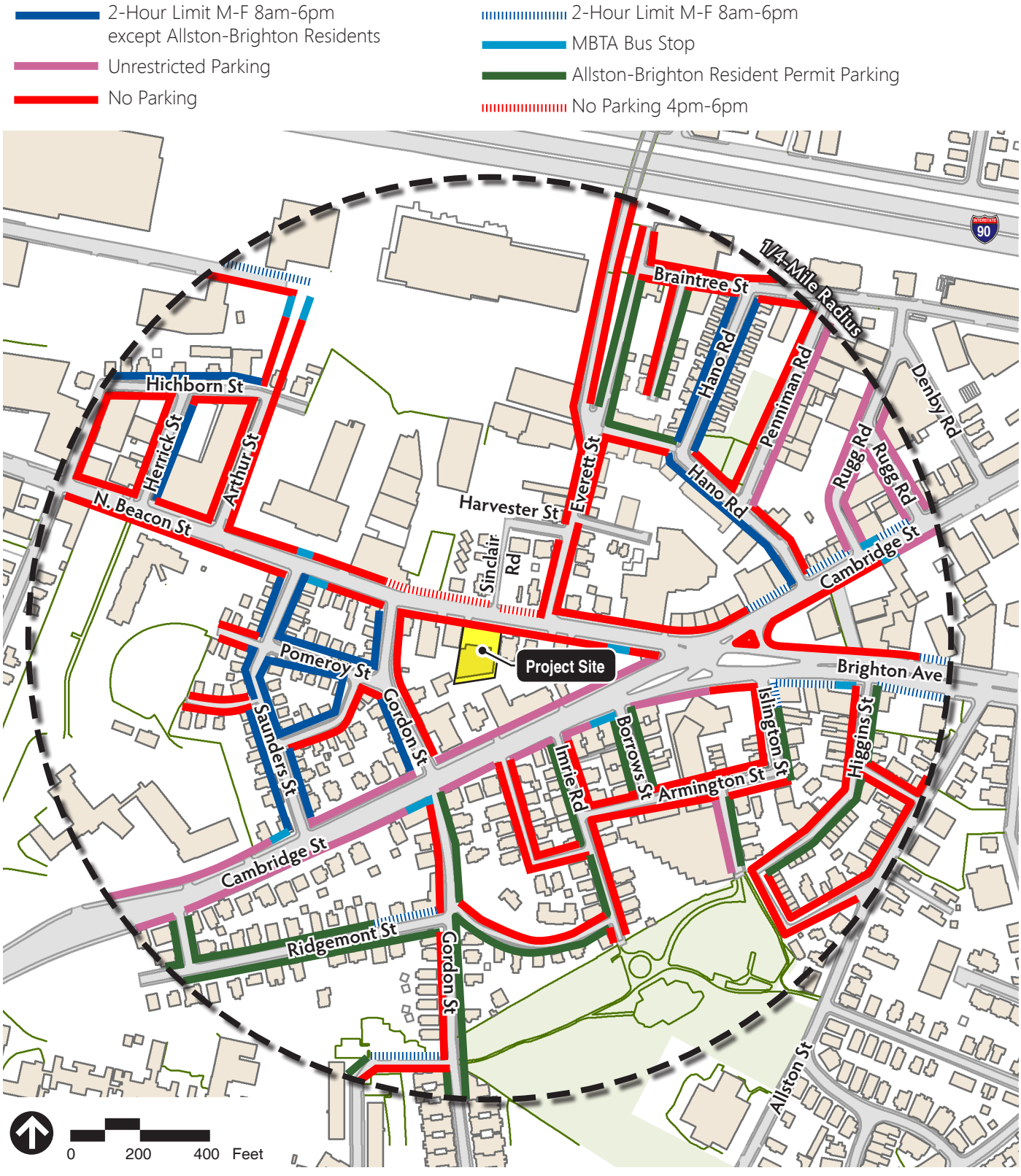

Figure 4.6

Existing Curb Use

44 North Beacon Street
Boston, Massachusetts

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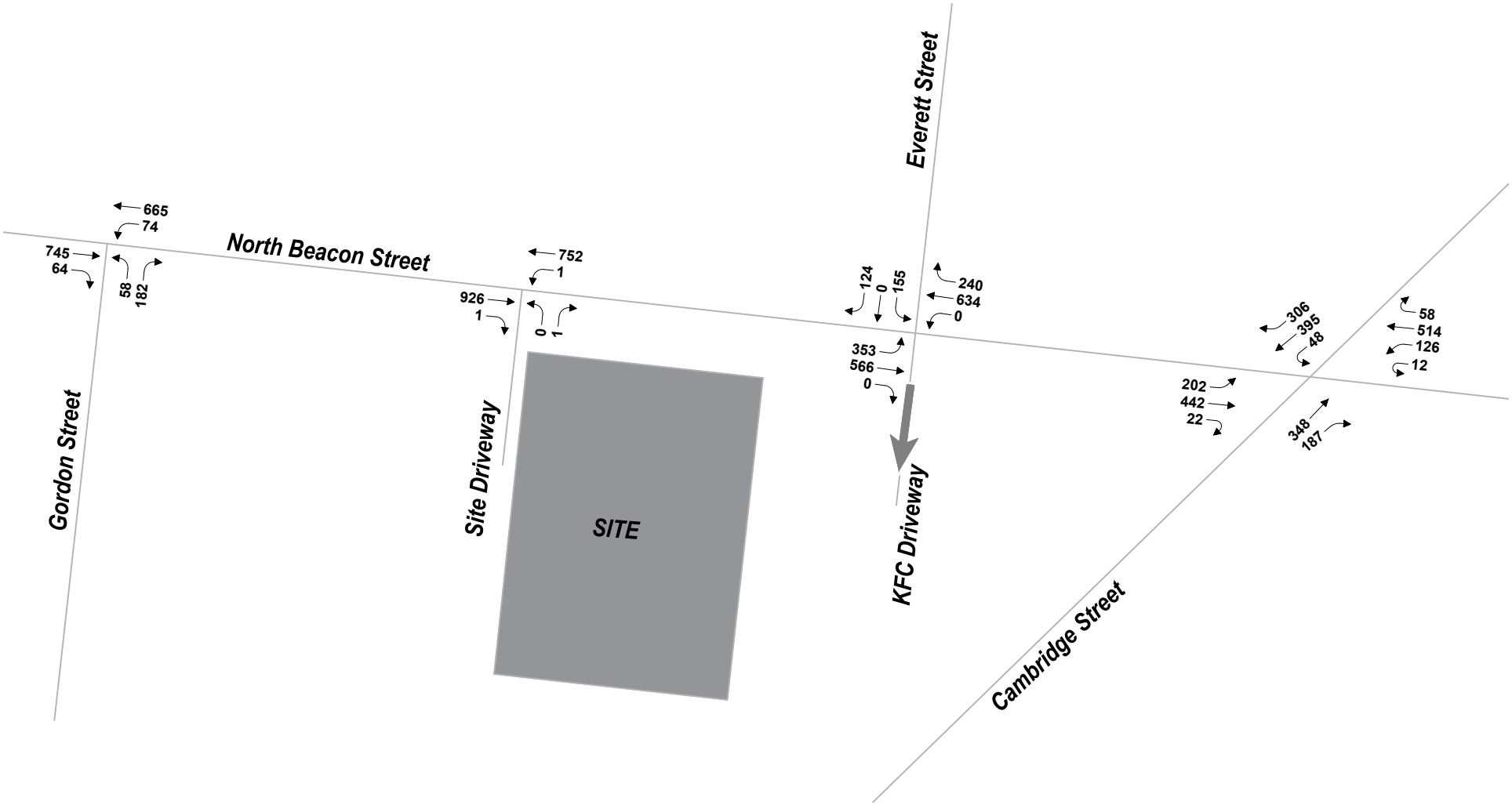

Figure 4.7a

2023 No-Build Condition
Morning Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

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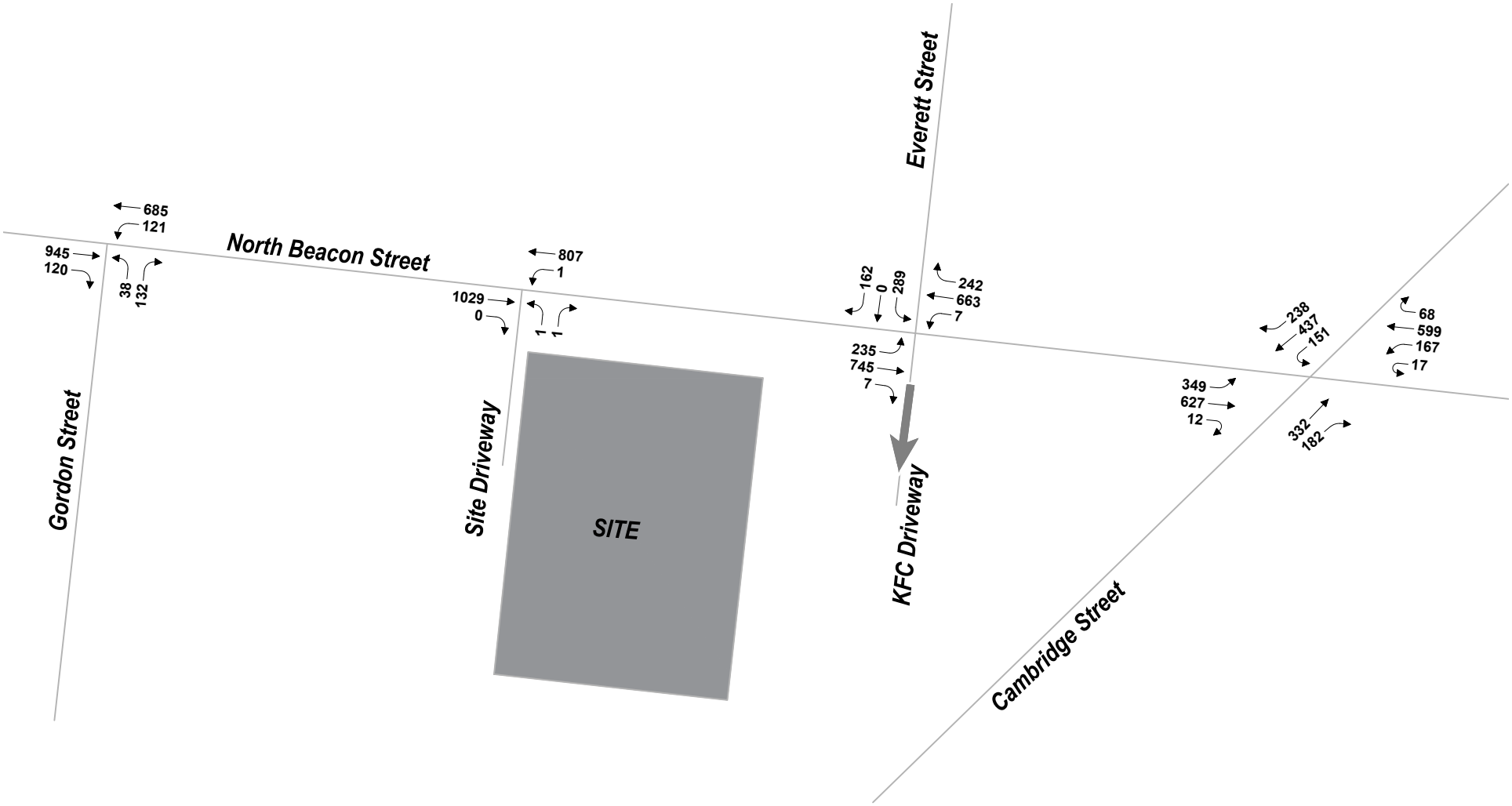

Figure 4.7b

2023 No-Build Condition
Evening Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

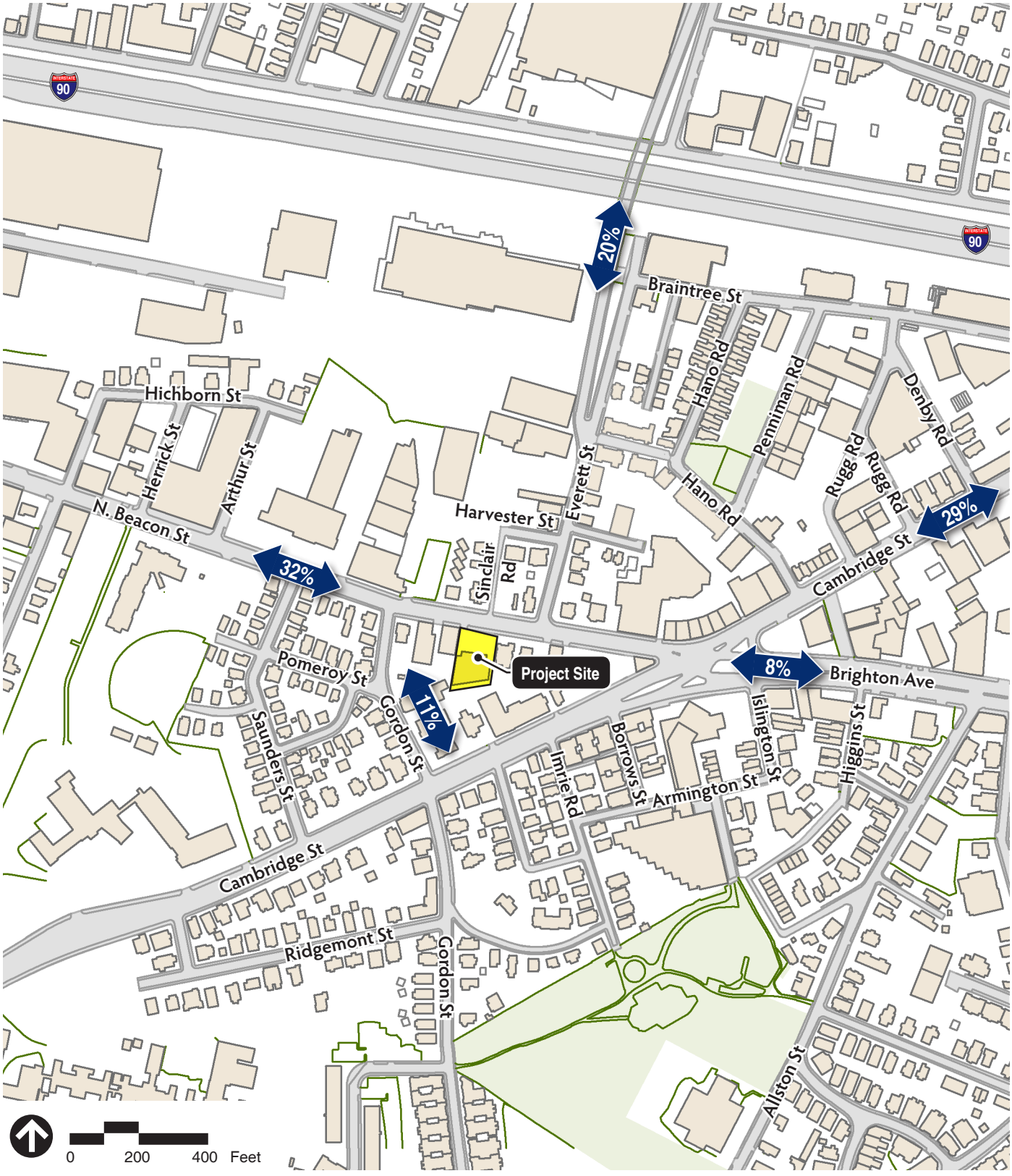

Figure 4.8

Trip Distribution

44 North Beacon Street
Boston, Massachusetts

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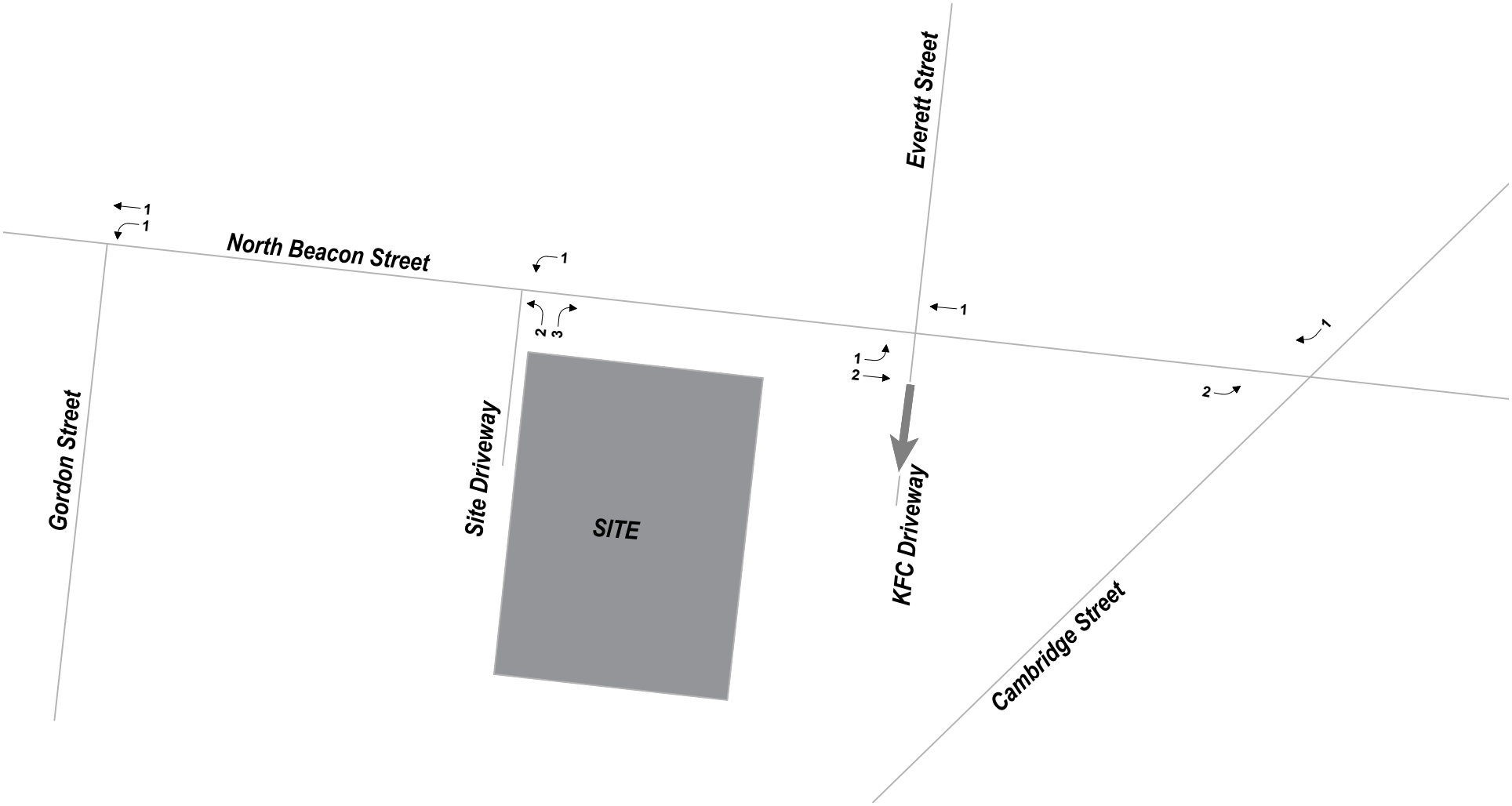

Figure 4.9a

Project Generated Trips
Morning Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

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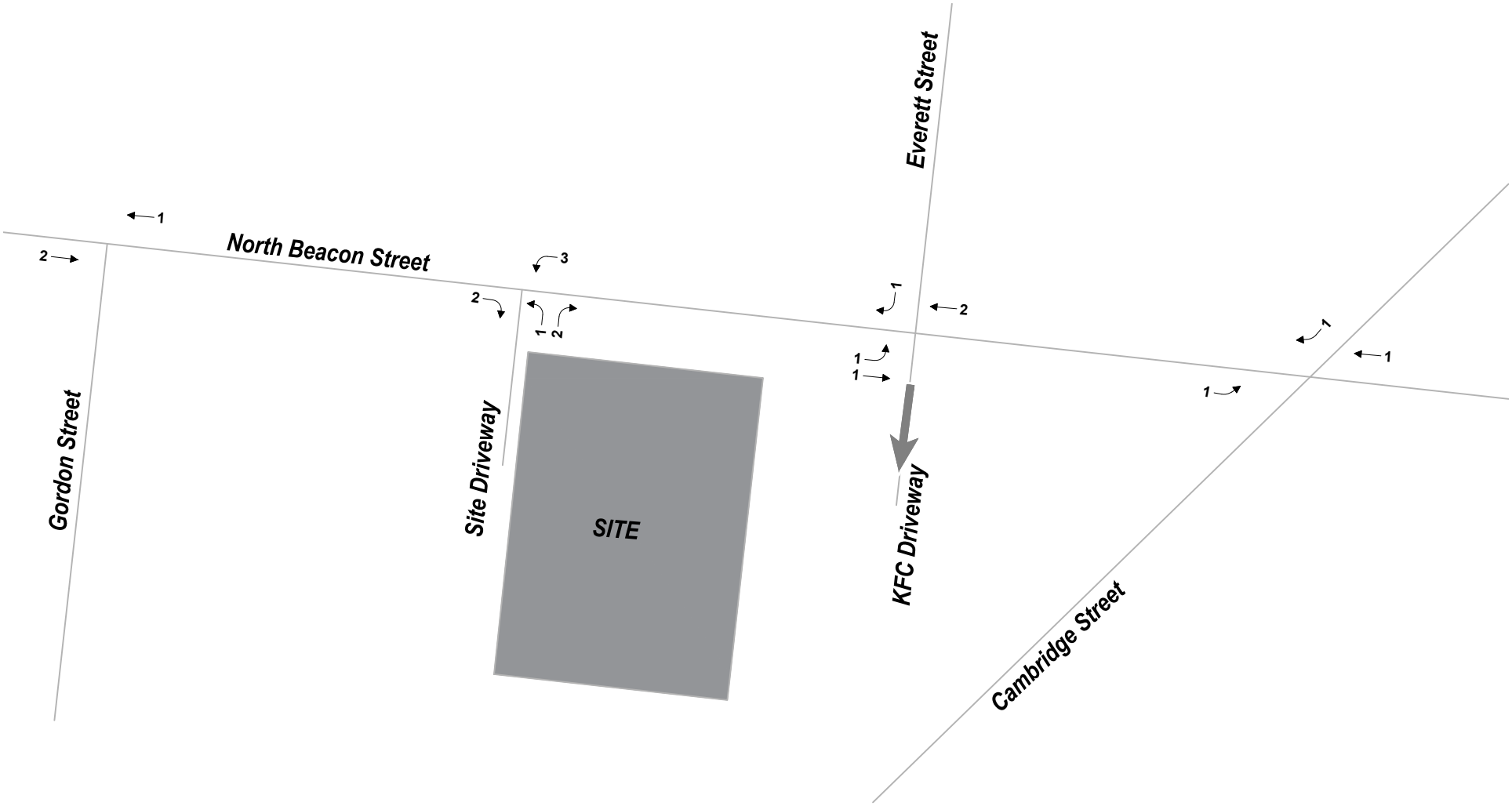

Figure 4.9b

Project Generated Trips
Evening Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

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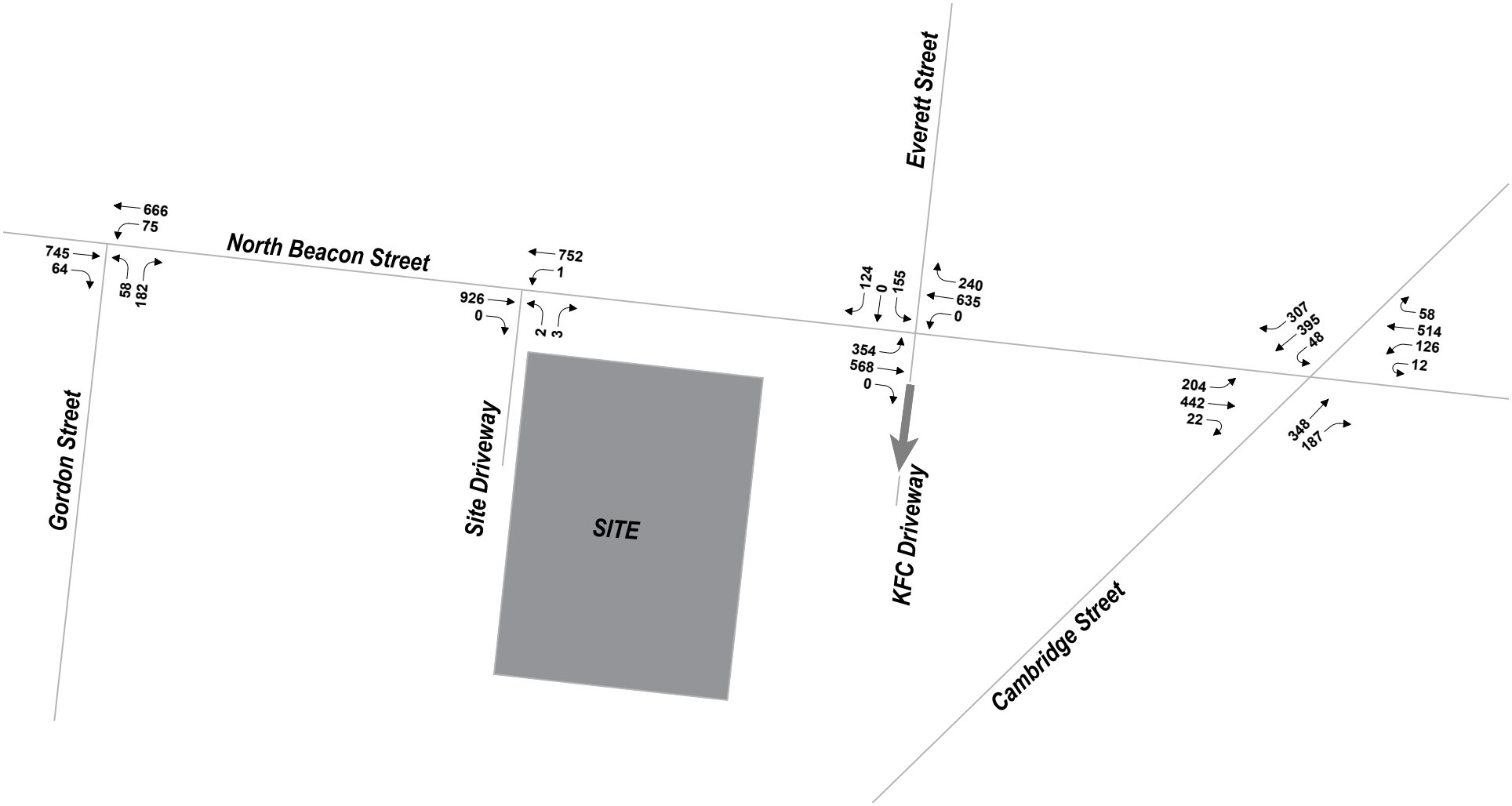

Not to Scale

Figure 4.10a

2023 Build Condition
Morning Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

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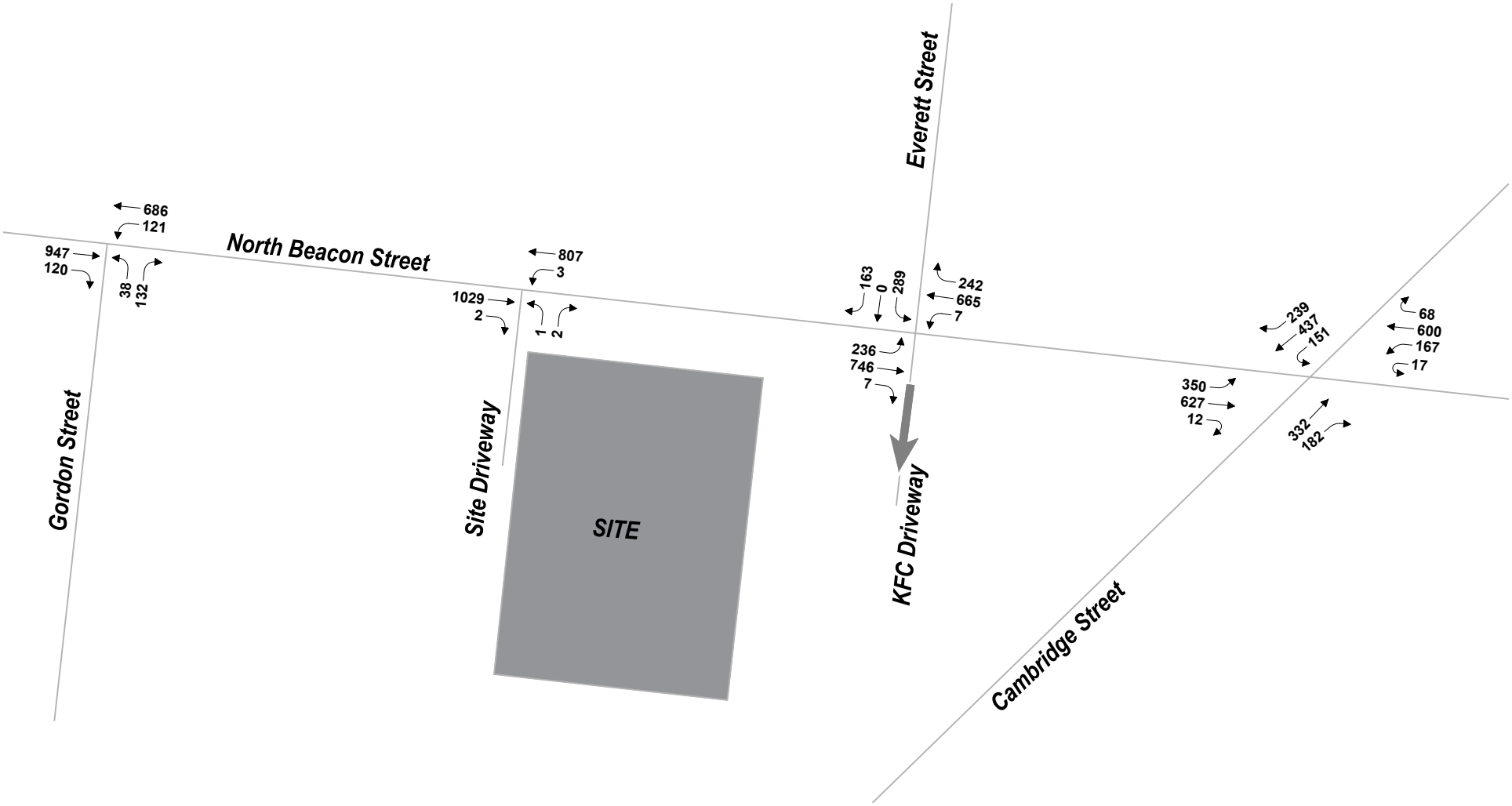


Figure 4.10b

2023 Build Condition
Evening Peak Hour Vehicle Volumes

44 North Beacon Street
Boston, MA

5

Environmental Protection and Historic Resources

This chapter provides information on existing environmental conditions at the Project Site and the potential changes that may occur as a result of the Project; it also identifies properties located within and in the vicinity of the Project Site that are listed in the National and State Registers of Historic Places, and/or are included in the Inventory of Historic and Archaeological Assets of the Commonwealth (the "Inventory"). The following sections identify impacts and discuss steps that have been or will be taken through design and management to avoid, minimize, and/or mitigate adverse effects. Temporary construction-period impacts associated with the Project will be managed to minimize disruption to the surrounding neighborhoods.

In compliance with Article 80, this chapter will address potential environmental impacts in the following categories:

- *Shadow*
- *Daylight*
- *Solar Glare*
- *Air Quality*
- *Noise*
- *Water Quality*
- *Geotechnical/Groundwater*
- *Solid Waste & Hazardous Materials*
- *Construction*
- *Historic*

The following sections describe the environmental conditions and potential changes as a result of the Project. As demonstrated below, impacts have been avoided, minimized and/or mitigated through design and/or management while addressing local, state and federal requirements.

5.1 Summary of Key Findings and Benefits

The analysis of potential environmental impacts resulting from the Project include the following conclusions:

- **Shadow** – Shadow impacts have been minimized to the extent practicable to avoid noticeable effects on pedestrian use patterns. Due to the massing and orientation of the buildings, new shadows are anticipated to be minimal and will avoid public parks and historic sites.
- **Daylight** – When viewed from the adjacent sidewalk, the Project will result in an increase in visible skydome. Such changes are consistent with the Project's urban context and the replacement of single-story structures with a multi-story residential building.

- **Solar Glare** – The exterior building materials have not yet been finalized, however, it is not anticipated that highly reflective glass will be employed in any of the building facades.
- **Air Quality** – The air quality analysis demonstrates that the Project will conform to the National Ambient Air Quality Standards and will not have a substantial impact on surrounding air quality.
- **Noise** – The Project will comply with the City of Boston noise standards.
- **Water Quality** – The Project will improve water quality by collecting and treating stormwater runoff through a series of structural Best Management Practices.
- **Hazardous Materials** – There are no previously documented releases of oil and/or hazardous materials on the Project Site. If undocumented releases are encountered during construction, they will be managed in accordance with applicable regulatory requirements including a Release Abatement Measure Plan under the Massachusetts Contingency Plan.
- **Groundwater** – Significant groundwater impacts associated with construction activities are not anticipated because excavations below the groundwater table are not proposed. The Project Site is not located within an Overlay Area of the Groundwater Conservation Overlay District.
- **Geotechnical** – The surface materials generally consist of a layer of asphalt, underlain by approximately four to five feet of shallow fill and organic laden soils. These soils vary in composition and include black, loamy, silty sand, little gravel to a sand and gravel, little silt; the latter being re-worked site soils. Glacial outwash deposits were encountered below the fill and consisted of a gravelly sand or sandy gravel with trace silt.
- **Construction** – The team will work to reduce potential construction period impacts, and detailed construction management plans will be developed and submitted to BTD for their approval.

5.2 Shadow

This section describes the anticipated changes to shadows in the Project area as a result of the Project. See Figures 5.1a-d for Shadow Study diagrams.

5.2.1 Summary of Key Findings

As is to be expected when building on a previously underutilized site, the Project will result in moderate increases in new shadow impacts within the surrounding area. New shadows are generally limited to roads, sidewalks, parking areas, and rooftops and will not significantly impact any public green space. The presence of these new shadows is consistent with the urban environment and planning objectives of the neighborhood, and the stepped massing strategy and orientation of the building mitigates the effect of the seven-story massing shadows, as the taller portion will mostly cast shadow onto the Project itself. This, when combined with the

Proponent's proposed enhancements, will not discourage the use of sidewalk or public areas in the vicinity of the Project Site.

5.2.2 Regulatory Context

The Proponent has completed a shadow study as part of this EPNF to ascertain the potential new shadow impacts resulting from the Project. The shadow impact study has been conducted in accordance with Section 80B-2 of the City of Boston Zoning Code with particular emphasis on sidewalks, public plazas, and other public open spaces as well as nearby buildings of historical importance. The study was completed using standard sun altitude and azimuth data for each study date estimated to occur at latitude and longitude 42° 21' 13.0'' N, 71° 8' 23.2'' W. Times were adjusted for daylight savings time as appropriate. The conditions were compared for the spring and fall equinoxes and the summer solstice at 9:00 AM, 12:00 Noon, 3:00 PM and 6:00 PM and for the winter solstice at 9:00 AM, 12:00 Noon and 3:00 PM.

5.2.3 Potential Effects

The results of the shadow studies are presented in Figures 5.1a-d

March 21

March 21 is the spring equinox on which Boston experiences roughly equal length day and night. Figure 5.1a illustrates the Project-related net new shadow for this condition. On March 21 at 9:00 AM, the Project casts a new shadow west onto the neighboring commercial property, with minimal shadow cast onto North Beacon Street. At 12 PM the shadow moves north and casts no shadow onto neighboring properties, while casting a minimal shadow onto North Beacon Street due to the low three-story mass that faces the street. At 3 PM, the Project casts new shadow onto the neighboring residential property to the east, and across a portion of North Beacon Street.

June 21

June 21 is the summer solstice with the longest day of the year and the smallest shadows expected. Figure 5.1b illustrates the Project-related net new shadow for this condition. At 9 AM, the Projects casts minor new shadow on the southern portion of the neighboring commercial property to the west. At 12 PM, the sun is very high in the sky, casting no shadow onto neighboring properties. There is some minor shadow cast on a portion of sidewalk along North Beacon Street, while the street receives no shadow from the Project. At 3 PM, the Project casts new shadow onto the neighboring residential property to the east, and across a portion of sidewalk along North Beacon Street, while casting no shadow on the street itself. By 6pm, the sun is low in the sky and creates longer shadows for all structures in the area. New shadow is created to the east, onto the two neighboring properties east of the Project site.

September 21

September 21 is the fall equinox on which Boston experiences roughly equal length day and night. Figure 5.1c illustrates the Project-related net new shadow for this condition. On September 21 at 9:00 AM, the Project casts a new shadow west onto the neighboring commercial property, with minimal shadow cast onto North Beacon Street. At 12 PM the shadow moves north and casts no shadow onto neighboring properties, while casting a minimal shadow onto North Beacon Street due to the low three-story mass that faces the street. At 3 PM, the Project casts new shadow onto the neighboring residential property to the east, and across a portion of North Beacon Street. At 6 PM, the low setting sun creates long shadows for all structures. The Project creates very little new shadow as most of the surrounding area is already in shade.

December 21

December 21 is the winter solstice and the shortest day of the year. Boston experiences long shadows throughout the day in most locations. Figure 5.1d illustrates the Project-related net new shadow for this condition. At 9 AM, the sun is low in the southeast sky resulting shadows to the northwest. Under this condition, the Project casts new shadow across the neighboring property to the west and onto North Beacon Street. At 12 PM, the Project casts new shadow across North Beacon Street and across a minor portion of the property across the street. By 3 PM, the Project creates very little new shadow as most the surrounding area is already in shade. The Project casts new shadow onto North Beacon Street.

5.3 Daylight Analysis

The following section describes the anticipated effect on daylight coverage at the Project Site as a result of the Project. An analysis of the percentage of skydome obstructed under the No-Build and Build Conditions is a requirement of Article 80 (Section 80B-2(c)). The daylight analysis was prepared using the BPDA's Daylight Analysis Program ("BRADA") and has been completed in accordance with the requirements of Article 80. The results of the analysis are presented in Figure 5.2.

5.3.1 Methodology

The daylight analysis was conducted using the BRADA program developed in 1985 by the Massachusetts Institute of Technology to estimate the pedestrian's view of the skydome taking into account building massing and building materials used. The software approximates a pedestrian's view of a site based on input parameters such as: location of viewpoint; length and height of buildings and the relative reflectivity of the building façades. The model typically uses the midpoint of an adjacent right-of-way or sidewalk as the analysis viewpoint. Based on these data, the model calculates the perceived skydome obstruction and provides a graphic depicting the analysis conditions.

The model inputs used for the study presented herein were taken from a combination of the BPDA's City of Boston model data, an existing conditions survey and schematic design plans prepared by the Project Architect. As described above, the BRADA software considers the relative reflectivity of building façades when calculating perceived daylight obstruction. Highly reflective materials are thought to reduce the perceived skydome obstruction when compared to non-reflective materials. For the purposes of this daylight analysis, the building façades are considered non-reflective, resulting in a conservative estimate of daylight obstruction.

Viewpoints

The following viewpoint was studied in the daylight analysis:

› **North Beacon Street –** This viewpoint is located on the centerline of North Beacon Street centered on the northern façade of the proposed building.

This point represents the proposed building façades when viewed from the adjacent public ways.

5.3.2 Daylight Study Findings

The Project-related daylight impacts for the viewpoint are presented in Figure 5.2. Under the proposed condition, the viewpoints along the roadway are expected to experience an increase in skydome obstruction from three percent to 26.4 percent due to the increased height and massing of the new building. This effect is to be expected when replacing a single-story building with a taller multi-story building. This change has been minimized by the orientation of the building massing and the stepped back U-shaped design.

5.4 Solar Glare Analysis

The City of Boston BPDA Development Review Guidelines require projects undergoing Large Project Review to analyze the potential impacts from solar glare if there is a potential for visual impairment or discomfort due to reflective spot glare on:

› Potentially affected streets;

› Public open spaces; and

› Pedestrian areas.

Furthermore, projects must consider the potential for solar heat buildup in any nearby buildings receiving reflective sunlight from the building, if applicable.

The exterior building materials have not yet been finalized for the Project, however, it is not anticipated that highly reflective glass will be employed in any of the building facades. The Project will be designed to minimize the potential for solar glare that could adversely impact traffic safety along nearby roadways and solar heat gain in nearby buildings through the consideration of low/non-reflecting exterior

building materials as design progresses. The absence of solar glare impacts will be confirmed during the design review process in connection with the selection of façade materials.

5.5 Air Quality

This section presents an overview of and the results for the preliminary mobile source assessment conducted for the Project. The purpose of the air quality assessment is to demonstrate that the Project satisfies applicable regulatory requirements, and whether it complies with the 1990 Clean Air Act Amendments ("CAAA") following the local and the EPA policies and procedures.

The air quality assessment conducted for the Project includes a qualitative localized (microscale), or "hot spot", analysis of carbon monoxide ("CO") concentrations in accordance with BPDA screening guidance. The microscale analysis evaluated potential CO impacts from vehicles traveling through congested intersections in the Project Site area under the existing conditions, as well as considering site-specific impacts under the future conditions. The results from this evaluation are subject to the National Ambient Air Quality Standards ("NAAQS"). A review of the mesoscale/regional air quality impacts is also qualitatively discussed below.

5.5.1 Background

The CAAA resulted in states being divided into attainment and non-attainment areas, with classifications based upon the severity of their air quality problems. Air quality control regions are classified and divided into one of three categories: attainment, non-attainment and maintenance areas depending upon air quality data and ambient concentrations of pollutants. Attainment areas are regions where ambient concentrations of a pollutant are below the respective NAAQS; non-attainment areas are those where concentrations exceed the NAAQS. A maintenance area is an area that used to be non-attainment, but has demonstrated that the air quality has improved to attainment. After 20 years of clean air quality, maintenance areas can be re-designated to attainment.

The Project is located in Boston, which is a CO Maintenance area (although not officially designated on the Greenbook[1], the area is beyond the 20-year maintenance timeframe and therefore could be designated as attainment). Projects located in a CO maintenance area are required to evaluate their CO concentrations with the NAAQS. As such, CO concentrations need to be considered for this Project. Suffolk County is in attainment for the remainder of the criteria pollutants.

[1] *Nonattainment Areas for Criteria Pollutants*, Greenbook (as of September 30, 2017), https://www.epa.gov/green-book. Accessed January 22, 2018.

5.5.2 Air Quality Standards

The EPA has established the NAAQS to protect the public health. Massachusetts has adopted similar standards as those set by the EPA for CO. Table 5-1 presents the NAAQS for CO.

Table 5-1 National Ambient Air Quality Standards

	Primary Standards		
Pollutant	**Level**	**Averaging Time**	**Form**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour	Not to be exceeded more than once per year
	35 ppm (40 mg/m^3)	1-hour	

DEP maintains a network of air quality monitors to measure background CO concentrations. Background concentrations are ambient pollution levels from all stationary, mobile, and area sources. Background CO concentrations are determined by choosing the maximum of the second-highest annual values from the previous three years. Looking at the air quality monitor closest to and most representative of the Project Site (the Kenmore Square monitor for the years 2014-2015 and Harrison Ave for 2016)[2], the CO background values are 2.4 ppm for the 1-hour averaging time and 1.2 ppm for the 8-hour averaging time. These values are much less than the 1-hour and 8-hour NAAQS. The background values are presented in Table 5-2.

Table 5-2 Air Quality Background Concentrations

	Background Concentrations		NAAQS	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	1.2 ppm	8-hour	9 ppm	8-hour
	2.4 ppm	1-hour	35 ppm	1-hour

Monitoring Location: Kenmore Square and Harrison Avenue, Boston, MA. Years 2014-2016.

The potential CO concentrations from motor vehicle traffic related to the Project will be considered in conjunction with these background concentrations to demonstrate that the Project will comply with the NAAQS Standards.

5.5.3 BPDA Development Review Guidelines

The BPDA Development Review Guidelines require "a microscale analysis predicting localized carbon monoxide concentrations should be performed, including identification of any locations projected to exceed the National or Massachusetts Ambient Air Quality Standards, for projects in which:

[2] The Kenmore Square monitoring station ceased CO monitoring in 2016. Harrison Avenue is the next closest station.

- Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; or
- Project traffic would increase traffic volumes on nearby roadways by 10 percent or more (unless the increase in traffic volume is less than 100 vehicles per hour); or
- The Project will generate 3,000 or more new average daily trips on roadways providing access to a single location."

5.5.4 Traffic Data

The air quality study uses traffic data (volumes, delays, and speeds) developed for the analysis conditions based upon the traffic analysis. The traffic study area includes the following intersections:

- North Beacon Street at Gordon Street;
- North Beacon Street at Proposed Site Driveway;
- North Beacon Street at Everett Street; and
- North Beacon Street at Cambridge Street/Brighton Avenue.

Based on the traffic study presented in Chapter 4, *Transportation*, the Project is expected to generate six vehicle trips in the morning peak hour and eight vehicle trips in the evening peak hour.

5.5.5 Microscale Screening Analysis

An evaluation of the traffic data was conducted under the review guidelines developed by the BPDA for determination of the potential for CO impacts. It was determined that:

- The Project would not cause a decline in LOS at any intersection in the study area in both the morning and evening peak hours. Thus, the Project would not substantially impact any intersections operating at a LOS of D, E or F. The results of the transportation analysis indicate that there will be no changes in LOS in the study area as a result of the Project.
- Project generated traffic is not expected to exceed 100 vehicles per hour during the peak hours. The Project is estimated to generate six vehicles in the morning peak hour and eight vehicles in the evening peak hour. Since volume increases will be less than 100 vehicles per hour, it is not necessary to consider the percentage increase of traffic volumes on nearby roadways.
- The Project will generate far less than 3,000 or more new average daily trips on the study area roadways. The Project is estimated to generate 138 weekday vehicle trips, well under the 3,000 vehicles per day threshold.

Based on the microscale screening results discussed above, it has been determined that a quantitative CO hotspot analysis is not necessary for the Project, as the BPDA thresholds are not exceeded. No microscale air quality impacts are anticipated.

5.5.6 Mesoscale Air Quality Analysis

The purpose of the mesoscale analysis is to estimate the area-wide emissions of VOC and NOx during a typical day in the peak ozone season (summer) consistent with the requirements of the State Implementation Plan ("SIP"). A mesoscale analysis evaluates the change in VOC and NOx emissions from average daily traffic volumes and vehicle emission rates. To demonstrate compliance with the SIP criteria, the air quality study must show the Project's change in daily (24-hour period) VOC and NOx emissions.

The BPDA requires a mesoscale air quality analysis if a project produces 10,000 or more vehicle trips per day. The Project is not anticipated to generate over 10,000 or more vehicle trips per day (138 vehicle trips on an average weekday are projected), therefore this analysis is not required for the BPDA and no mesoscale air quality impacts are anticipated.

5.6 Noise

The noise assessment evaluated the potential noise impacts associated with the Project's activities, including potential mechanical equipment and service activities. This section discusses the fundamentals of noise, noise impact criteria, noise analysis methodology, and potential noise impacts. Noise measurements were conducted for determining existing ambient conditions near the Project Site. A qualitative analysis demonstrates that the Project will comply with City of Boston noise regulations.

5.6.1 Fundamentals of Noise

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, communication, work, or recreation. How people perceive sound depends on several measurable physical characteristics, which include the following:

- Intensity - Sound intensity is often equated to loudness.
- Frequency - Sounds are comprised of acoustic energy distributed over a variety of frequencies. Acoustic frequencies, commonly referred to as tone or pitch, are typically measured in Hertz. Pure tones have all their energy concentrated in a narrow frequency range.

Sound levels are most often measured on a logarithmic scale of decibels (dB). The decibel scale compresses the audible acoustic pressure levels which can vary from the threshold of hearing (zero dB) to the threshold of pain (120 dB). Because sound levels are measured in dB, the addition of two sound levels is not linear. Adding two equal sound levels creates a 3 dB increase in the overall level. Research indicates the following general relationships between sound level and human perception:

- A 3-dB increase is a doubling of acoustic energy and is the threshold of perceptibility to the average person.

› A 10-dB increase is a tenfold increase in acoustic energy but is perceived as a doubling in loudness to the average person.

The human ear does not perceive sound levels from each frequency as equally loud. To compensate for this phenomenon in perception, a frequency filter known as A-weighted [dB(A)] is used to evaluate environmental noise levels. Table 5-3 presents a list of common outdoor and indoor sound levels.

Table 5-3 Common Outdoor and Indoor Sound Levels

Outdoor Sound Levels	Sound Pressure (μPa)*		Sound Level dB(A)**	Indoor Sound Levels
	6,324,555	-	110	Rock Band at 5 m
Jet Over Flight at 300 m		-	105	
	2,000,000	-	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		-	95	
	632,456	-	90	Food Blender at 1 m
Diesel Truck at 15 m		-	85	
Noisy Urban Area—Daytime	200,000	-	80	Garbage Disposal at 1 m
		-	75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	-	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		-	65	Normal Speech at 1 m
	20,000	-	60	
Quiet Urban Area—Daytime		-	55	Quiet Conversation at 1 m
	6,325	-	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		-	45	
	2,000	-	40	Empty Theater or Library
Quiet Suburb—Nighttime		-	35	
	632	-	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		-	25	Empty Concert Hall
Rustling Leaves	200	-	20	
		-	15	Broadcast and Recording Studios
	63	-	10	
		-	5	
Reference Pressure Level	20	-	0	Threshold of Hearing

Source: Highway Noise Fundamentals. Federal Highway Administration, September 1980.

* μPA – MicroPascals, which describe pressure. The pressure level is what sound level monitors measure.

** dB(A) – A-weighted decibels, which describe pressure logarithmically with respect to 20 μPa (the reference pressure level).

A variety of sound level indicators can be used for environmental noise analysis. These indicators describe the variations in intensity and temporal pattern of the sound levels. The following is a list of common sound level descriptors used for environmental noise analyses:

- L90 is the sound level which is exceeded for 90 percent of the time during the time period. The L90 is generally considered to be the ambient or background sound level.
- Leq is the A-weighted sound level, which averages the background sound levels with short-term transient sound levels and provides a uniform method for comparing sound levels that vary over time.

5.6.2 Methodology

The noise analysis evaluated the potential noise impacts associated with the Project's operations, which include mechanical equipment and service activities. The noise analysis included measurements of existing ambient background sound levels and a qualitative assessment of potential noise impacts associated with the proposed mechanical equipment (e.g., HVAC units, exhaust ventilation systems) and service activities. The study area was evaluated and sensitive receptor locations near the Project were identified and examined. The site layout and building design, as it relates to the service area and management of deliveries at the Project Site were also considered. The analysis considered sound level reductions due to distance, proposed building design, and obstructions from surrounding structures.

5.6.2.1 Receptor Locations

The noise assessment included an evaluation of the study area to identify nearby sensitive receptor locations, which typically include areas of sleep and areas of outdoor activities. The noise assessment identified nine sensitive receptor locations near the Project. As shown on Figure 5.3, the sensitive receptor locations include the following:

- R1 – 38-40 North Beacon Street;
- R2 – 36 North Beacon Street;
- R3 – 31 North Beacon Street;
- R4 – 37-43 North Beacon Street;
- R5 – 45-47 North Beacon Street;
- R6 – 51 North Beacon Street;
- R7 – 14-16 Gordon Street;
- R8 – 541 Cambridge Street; and
- R9 – 533 Cambridge Street.

These receptor locations, selected based on land use considerations, represent the most sensitive locations near the Project Site.

5.6.3 City of Boston Noise Impact Criteria

The City of Boston has developed noise standards that establish noise thresholds deemed to result in adverse impacts. The noise analysis for the Project used these standards to evaluate whether the proposed development will generate sound levels that result in potential adverse impacts.

Under Chapter 40 Section 21 of the General Laws of the Commonwealth of Massachusetts and Title 7 Section 50 of the City of Boston Code, the Air Pollution Control Commission of the City of Boston has adopted Regulations for the Control of Noise in the City of Boston. These regulations establish maximum allowable sound levels based upon the land use affected by the proposed development. Table 5-4 summarizes the allowable sound levels that should not be exceeded.

Table 5-4 City of Boston Noise Standards by Zoning District, dB(A)

Land Use Zone District	Daytime (7:00 AM – 6:00 PM)	All Other Times (6:00 PM – 7:00 AM)
Residential	60	50
Residential/Industrial	65	55
Business	65	65
Industrial	70	70

Source: Regulations for the Control of Noise in the City of Boston, Air Pollution Control Commission.

For a residential zoning district, the maximum noise level affecting residential uses shall not exceed the Residential Noise Standard. The residential land use noise standard is 60 dB(A) for daytime periods (7:00 AM to 6:00 PM) and 50 dB(A) for nighttime conditions (6:00 PM to 7:00 AM).

5.6.4 Existing Noise Conditions

Noise measurements were conducted to establish existing ambient sound levels in vicinity of the Project Site. The existing sound levels were measured using Type 1 sound analyzer (Larson Davis 831). Measurements were conducted between January 18, 2018 and January 19, 2018 to capture sound levels representative of typical existing ambient conditions. Short-term measurements (20 minutes) during the daytime period was conducted between 11:00 AM to 12:00 PM. The nighttime period measurements were conducted between 11:30 PM to 12:30 AM. The existing measured sound level data are summarized in Table 5-5.

Table 5-5 Existing Ambient Sound Levels, dB(A)

	City of Boston Residential District Noise Standard		Measured L90 Sound Levels	
Monitoring Location	**Daytime**	**Nighttime**	**Daytime**	**Nighttime**
M1 – North Beacon Street	60	50	58	**54**

Source: VHB, Jan 18 & 19, 2018
Note: Refer to Figure 5.3 for monitoring locations.
* Measured sound levels represent average of hourly L90 levels during each period.
Bold values exceed City of Boston noise standards.

The measured L90 sound level was approximately 58 dB(A) during the daytime period in the surrounding neighborhood. During the nighttime period, the neighborhood experience sound level of approximately 54 dB(A). The results of the noise measurements indicate that the daytime sound levels in the surrounding neighborhood adjacent to the Project Site are currently below the City of Boston's standards for a Residential District. During the daytime period, the measured sound levels data were composed of noise primarily from vehicles traveling on the North Beacon Street. During the nighttime period, existing sound levels exceed the City's nighttime standards in the Project area. The nighttime period sound levels were generally associated with traffic on North Beacon Street as well.

5.6.5 Future Noise Conditions

The noise analysis evaluated the potential noise impacts associated with the Project's proposed mechanical equipment and service activities. The analysis assessed the potential sound level impacts at the nearby sensitive receptor locations.

5.6.5.1 Mechanical Equipment

Since the Project is in the early stages of the design process, the specific details related to the final selection of the mechanical equipment are unknown at the time of this noise assessment. Based on preliminary plans, the anticipated mechanical equipment associated with the Project are expected to potentially include:

- wall-units for make-up air in each residential unit with A/C likely be delivered to the units via ductless mini-splits that function using a centralized rooftop or ground condensing unit;
- heat and hot-water for condominium units in the three and five-story portions of the building will be supplied via individual in-unit hydro air systems, although space constraints on the fourth and fifth floors may require locating utilization of a centrally located, gas-fired domestic boiler system;
- cooling for condominium units furnished via air-cooled condensing units mounted either on roof tops or at ground level, as close as possible to indoor units in order to minimize loss due to piping lengths, with conditioned air to be distributed via a typical fan coil system;

- hot water generation for rental units within the mid-rise furnished via a centrally located, gas-fired domestic water boiler system;
- apartment heating and cooling for rental units within the mid-rise furnished via a VRF or "all-electric heat-pump" system" with indoor ducted air handlers;
- bathroom, dryer, and kitchen hood exhausts through building façade; and
- ventilation system for exhaust from the garage.

During the design and selection process, the appropriate low-noise mechanical equipment will be selected, including potential noise mitigation measures, such as acoustical enclosures and/or acoustical silencers. The Project will incorporate noise attenuation measures necessary to comply with City of Boston's noise criteria at the sensitive receptor locations.

The Project may require an emergency generator for life safety purposes, such as emergency exit lighting. The determination of specific generator parameters, such as the size and location will be made during the building design process. The Project will be required to adhere to DEP regulations that require such equipment to be certified and registered. As part of the air permitting process, the Project will be required to meet additional noise requirements described in DEP regulations under the Codes of Massachusetts Regulations (310 CMR 7.00). When the details of the emergency generator are developed, the proponent will submit the appropriate permit application to DEP, which would include noise mitigation measures (such as acoustic enclosures and exhaust silencers) that are necessary to DEP's noise criteria.

5.6.5.2 Service Activities

Due to the nature of the proposed residential use, deliveries and service activities associated with the Project are expected to consist of small delivery and service vehicles such as vans and single panel vehicles used by FedEx and UPS deliveries. As such, potential noise impacts to nearby sensitive receptor locations are expected to be negligible.

5.6.6 Conclusion of Noise Impact Assessment

The noise analysis determined that the sensitive receptor locations in the vicinity of the Project Site currently experience exterior sound levels exceeding the City of Boston's nighttime noise standard. The dominant noise source contributing to the existing sound levels in the study area is traffic traveling along North Beacon Street. The Project will be designed to incorporate abatement measures to minimize impacts on the proposed residential units.

With the primary noise sources (condenser/compressor units) located on the rooftop, the sound levels associated with the Project's mechanical equipment are expected to have no adverse noise impacts at nearby sensitive receptor locations. While potential noise impacts associated with the emergency generators, if required, are also expected to be negligible, a separate DEP permitting process will allow for further review of this equipment at a later date. Service activities are expected to be

conducted with small delivery vehicles, which are currently traveling along the local roadways in the vicinity of the Project area. As a result of the preliminary design, the Project's operations will have no adverse noise impacts at nearby sensitive receptor locations.

5.7 Water Quality

The Project will improve the quality of stormwater runoff from the Project Site as compared to existing conditions. Refer to Chapter 6, *Infrastructure*, for additional detail regarding quality of stormwater runoff.

5.8 Geotechnical/Groundwater

The subsurface conditions described herein are based on the recent explorations conducted by KMM Geotechnical Consultants, LLC ("KMM") in October 2017. Four test borings were advanced to refusal depths of 17 to 22 feet. At the exploration locations, the surface materials generally consisted of a layer of asphalt, underlain by approximately four to five feet of shallow fill and organic laden soils. These soils vary in composition and include black, loamy, silty sand, little gravel to a sand and gravel, little silt; the latter being re-worked site soils. Glacial outwash deposits were encountered below the fill and consisted of a gravelly sand or sandy gravel with trace silt. These granular soils are present at shallower depths and include embedded cobbles and boulders. These soils are clean, granular and well-drained. At depth, this is a brown to rust brown, fine sand, some silt, trace gravel. These finer-grained soils are present at depths of eight to 12 feet. They are moisture-sensitive, poor-draining and frost susceptible. The glacial overburden soils are stable, dense and compact. Refusal, presumably bedrock, was encountered at depths of 17 to 20 feet below grade. Weathered rock was encountered at depths of 12 feet and 15 feet at two of the borings. Bedrock in the area is characteristically hard and stable. Groundwater was not encountered in the test borings during the explorations.

It should be noted that groundwater levels will vary depending on seasonal variations in temperature and precipitation, and may also be influenced by nearby utilities and structures.

The subgrade conditions appear favorable for supporting the proposed building on a conventional spread footing foundation. The granular outwash soils are suitable for re-use as structural fill or backfill around the foundation. The subsurface conditions were reviewed with respect to seismic criteria set forth in the Massachusetts State Building Code (Eighth Edition). Based on the relative density of the soils and the depth to groundwater, the site does not appear to be susceptible to liquefaction in the event of an earthquake (Section 1804.6). The site Classification (Section 9.4.1.2.1) is "C" (Very Dense Soil Profile).

The excavation will require removal of soil to be excavated and disposed of off-site. Groundwater dewatering is anticipated to be required during construction to maintain a dry and stable excavation.

5.9 Solid Waste and Hazardous Materials

In order to evaluate potential hazardous materials impacts for the Project, a desktop review of DEP records pertaining to oil and/or hazardous materials ("OHM") was conducted via the Online Searchable Sites Database. The DEP Underground Storage Tank ("UST") Query website was searched to determine whether any active or closed USTs have been registered at the Site. In addition, the DEP database of permitted active and closed solid waste landfills was searched in order to determine whether solid waste may have been historically disposed on-site. The results of this desktop review, as well as findings related to the Project, are presented in the following sections.

5.9.1 DEP Online Database Review Results

Based on a review of the DEP database, no documented releases of OHM were identified on the site or adjacent parcels. There are also no records of closed or open USTs for the site address on the DEP UST Query website. Based on a review of the DEP solid waste data layers, there have been no active or closed permitted solid waste facilities located within the Project Site.

5.9.2 Construction Impacts

Due to the developed nature of the Project Site, undocumented releases and non-native urban fill may be present within the Project Site. Urban fill can be impacted with residual OHM, including metals, pesticides, and petroleum constituents such as polycyclic aromatic hydrocarbons ("PAHs"), as well as debris such as coal, coal ash, and coal slag. The presence of these contaminants may increase soil disposal costs and necessitate appropriate soil management procedures.

Should a previously undocumented release of OHM be identified during construction that requires notification to the DEP, excavation activities that occur within the new release area (i.e. disposal site) boundaries would need to be conducted under a preliminary Response Action such as a Release Abatement Measure ("RAM") and/or Immediate Response Action ("IRA") in accordance with the Massachusetts Contingency Plan ("MCP", 310 CMR 40.0000). The RAM/IRA process includes the submittal of a plan, status reports, and completion report to DEP, as well as public notices. Additional subsurface investigations would likely be required in order to properly characterize risk at the disposal site prior to, during, and/or following construction. All disposal sites must eventually achieve regulatory closure (i.e. Permanent Solution); therefore, a new reportable release, if identified, would need to be managed under this MCP regulatory process.

Any soil or groundwater that requires disposal during construction must be properly characterized and managed in accordance with the applicable regulations and with the appropriate documentation such as Material Shipping Records, Bills of Lading, manifests, etc.

5.10 Construction

5.10.1 Overview

Most construction activities will be accommodated within current Project Site boundaries. Details of the overall construction schedule, work hours, number of construction workers, worker transportation and parking, number of construction vehicles and routes will be addressed in the Construction Management Plan ("CMP") to be filed with BTD in accordance with the City's transportation maintenance plan requirements.

5.10.2 Air Quality

No adverse air quality impacts from the construction of the Project are anticipated. Fugitive dust mitigation measures may include, as necessary:

- Wet suppression to minimize the generation of dust from excavation operations and on-site vehicle traffic, with provisions for any runoff control;
- Spraying any piles of excavation materials with soil cement or calcium chloride overnight and on weekends, and securely covering long-term material stock piles;
- Compacting of the soil or the use of gravel to stabilize the Site access points;
- Washing vehicle wheels before leaving the Project Site, as necessary, with provisions for runoff control;
- Periodic cleaning of paved streets near the entrances to the Project Site to minimize vehicle mud/dirt carryout;
- Installing fencing around the perimeter of the Project Site to assist in containing wind-blown dust;
- Requiring that trucks hauling excavated material from the Project Site install secure covers over their loads; and,
- Encouraging the construction contractors for the Project to implement the Massachusetts Diesel Retrofit Program control measures for heavy-duty diesel equipment.

5.10.3 Noise

The construction of the Project will be performed in a manner that complies with the DEP and City of Boston noise regulations. To ensure compliance with these regulations during construction, the Proponents, to the extent practicable, will seek to incorporate into the general construction contract the following mitigation measures:

- Limited vehicle idling to five minutes;
- Limited construction vehicle warm-up to ten minutes;
- Insuring construction vehicles have ambient leveling sensors on the back up alarms, and
- Limiting construction to the hours allowable by City of Boston regulations.

5.10.4 Traffic

To minimize impacts to abutters and the local community, the Proponent will consider all available measures, including information on construction activities, specific construction mitigation measures, and construction materials access and staging area plans. Barricades, walkways, lighting and signage will be used to ensure public safety throughout the construction period.

Refer to Chapter 4, *Transportation,* for additional detail on construction management relative to traffic and roadway access.

5.10.5 Odor

Odor issues are not anticipated due to the lack of organic soils on the Project Site; however, if such soils are encountered, the Project Team will undertake appropriate mitigation measures to control the odor associated with their removal, such as:

- Cut and cover utility trenches whenever possible;
- Protection of excavated materials with plastic sheathing to encapsulate odors; and
- Removal of excavated materials from the Site in a covered vehicle on a frequent basis.

5.10.6 Rodents

The City of Boston has declared that the infestation of rodents in the city as a serious problem. To control this infestation, the City enforces the requirements established under the Massachusetts State Sanitary Code, Chapter 211, 105 CMR 410.550 and the State Building Code, Section 108.6. Policy Number 87-4 (City of Boston) established that preparation of a program for the extermination of rodents shall be required for issuance of permits for demolition, excavation, foundation, and basement rehabilitation. The Proponent will prepare and adhere to a rodent control program prior to demolition and on a regular basis throughout the duration of construction.

5.10.7 Construction Staging – Public Safety

Prior to the beginning of construction, the Construction Manager will produce a Site-Specific Safety Plan to be reviewed and approved by the City as well as all other agencies impacted in conjunction with the CMP.

The entire perimeter of the construction site will be protected with a construction fence with debris net on top of concrete barriers to separate the construction activities and general public. Vehicular gates will be provided for construction traffic in alignment with the flow of traffic on perimeter roads to allow safe entrance and exiting for construction vehicles. Sidewalks around the Project Site perimeter will be maintained during construction, and overhead protection will be utilized in areas where the new construction is in close proximity to the general public.

Post-construction during building operations, trash and solid waste removal will be handled by building management. A service contract with a professional pest control firm will be maintained to address rodent/pest control during the operational phase of the Project, as needed. In addition, no open top dumpsters will be allowed as an additional precaution to deter infestation.

5.11 Historic Resources

This section identifies properties located within and in the vicinity of the Project Site that are listed in the National and State Registers of Historic Places and/or are included in the Inventory of Historic and Archaeological Assets of the Commonwealth (the "Inventory"), and evaluates potential Project effects on those properties.

5.11.1 Overview

A survey was undertaken to identify historic resources within and in the vicinity of the Project Site. There are no historic resources within the Project Site. Within a one-quarter-mile radius of the Project Site is one property individually listed in the State Register of Historic Places and multiple properties and areas included in the Inventory. The properties are listed in Table 5-6 and depicted in Figure 5.4. A brief description of the historic resources follows.

Table 5-6 Historic Resources in the Vicinity of the Project Site

No.	Resource Name	Location	MHC Inventory No.	Designation
1	Englewood Diner	808 Washington Street	BOS.5952	SR
2	Hano Street Area	Hano Street	BOS.KM	INV
3	International Harvester New England Branch Headquarters	61 North Beacon Street	BOS.ADJ	INV
4	Mount Saint Joseph Academy	637 Cambridge Street	BOS.KH	INV
5	Allston Heights	NA	BOS.KI	INV
6	2-15 Guildford Street	2-15 Guildford Street	BOS.LD	INV
7	Washington-Warren Street Institutional Area	NA	BOS.KG	INV
8	13-17 Allston Street and 1-8 Griggs Place	13-17 Allston Street & 1-8 Griggs Place	BOS.KR	INV
9	Thomas Sinclair House	1 Sinclair Street	BOS.8310	INV
10	Jedediah Troy House	2 Sinclair Street	BOS.8311	INV
11	Residence	19 Everett Street	BOS.8143	INV
12	Col. Thomas Gardner House	26-28 Higgins Street	BOS.8230	INV

SR State Register of Historic Places
INV Inventory of Historic and Archaeological Assets of the Commonwealth; no designation

5.11.2 Historic Resources within One-Quarter-Mile Radius of Project Site

See Figure 5.4 for a location map of historic resources within a one-quarter mile radius of the Project Site.

Englewood Diner, 69 North Beacon Street, BOS.5952

The Englewood Diner, constructed ca. 1935, was once located in the Dorchester's Peabody Square neighborhood. It was moved to North Beacon Street from Salisbury in 2012 and renamed "Red Line." The diner was determined eligible for listing in the National Register by the Massachusetts Historical Commission (MHC) and is listed in the State Register of Historic Places.

Hano Street Area, BOS.KM

The Hano Street area is small neighborhood of ca. 1890, attached two-family houses located in an industrial/warehouse district. The area was surveyed by the BLC in 1996.

International Harvester New England Branch Headquarters, 61 North Beacon Street, BOS.ADJ

Constructed in the early 20th century, the International Harvester New England Branch Headquarters is a small area that encompasses the branch headquarters building, truck storage facility, and service station. Surveyed in 2017, the area is recommended as National Register eligible by the MHC and BLC.

Mount Saint Joseph Academy, 637 Cambridge Street, BOS.KH

Mount Saint Joseph Academy encompasses nine structures, constructed between ca. 1900 and the 1970s. The rear of the site, fronting on North Beacon Street was originally open space/playing fields. It has been redeveloped as nursing home and rehabilitation center. The property was surveyed by the BLC in 1996.

Allston Heights, BOS.KI

Allston Heights is a residential neighborhood noted for its late-19th-century Queen Anne and Shingle Style houses. The area, that encompasses Area BOS.LI (below), was surveyed by the BLC in 1996.

2-15 Guildford Street, BOS.LI

The Guildford Street area is a small residential area of predominantly Queen Anne style single family houses, surveyed in 1978.

Washington-Warren Street Institutional Area, BOS.KG

The Washington-Warren Street Institutional Area encompasses five significant late 19th and early 20th century institutional complexes – William Howard Taft School, Brighton High School, Brighton Marie Hospital, Kennedy Memorial Hospital (now Franciscan Children's Hospital), and Saint Gabriel's Church and Monastery, all sited far south of the project site. The area was surveyed by the BLC in 1996.

13-17 Allston Street and 1-8 Griggs Place. BOS.KR

The Allston Street and Griggs Place area is a small residential area of with a mix of Federal, Greek Revival, Italianate, and Mansard style houses, surveyed in 1978.

Thomas Sinclair House, 1 Sinclair Street, BOS.8310 and Jedediah Troy House, 2 Sinclair Street, BOS.8311

These two substantially renovated Greek Revival residences at 1 and 2 Sinclair Street were surveyed in 1978.

19 Everett Street, BOS.8143

19 Everett Street is a substantially renovated ca. 1830 single-family residence, surveyed in 1978.

Col. Thomas Gardner House, 26-28 Higgins Street, BOS.8230

The Colonel Thomas Gardner House, constructed ca. 1740, is a Georgian style residence that moved to its current location in ca. 1870. The property was surveyed in 1978.

5.11.3 Archaeological Resources

Review of the Massachusetts Cultural Resource Information System (MACRIS) site file indicates there are no previously inventoried or State or National Register listed archaeological sites or districts within the Project Site or in immediate adjacent areas.

5.12 Potential Impacts to Historic Resources

Potential impacts related to demolition, urban design, and visual aspects of the project are described in the following sections.

5.12.1 Demolition of Historic Resources

The Project includes the demolition of a small commercial building, constructed in 1966. The property is not listed in the National or State Register of Historic Places or included in the Inventory. The building does not appear to meet the criteria of eligibility for listing in the National Register. Demolition of the buildings will not have any direct impacts on historic resources.

5.12.2 Urban Design and Visual

As described in Chapter 2, Urban Design, the Project Site is surrounded by an eclectic mix of older and contemporary residential, commercial, and mix-used development. The Project has been designed to be responsive to its diverse context, improving the current conditions of the streetscape, providing a green courtyard that is street-facing, and respecting the scale of the neighborhood with its stepped

height setback approach. The proposed materials, consisting of a contemporary interpretation of a brick, wood, and metal palette contributes to the place-making of the neighborhood and local context.

The new development will complement the neighborhood and will not introduce any visual elements that are out of character with historic resources in the vicinity of the Project Site.

March 21 9am

March 21 12pm

March 21 3pm

New Building
New Shadows
Existing Building
Existing Shadows

N

FRANCKE | FRENCH
ARCHITECTS

Figure 5.1a

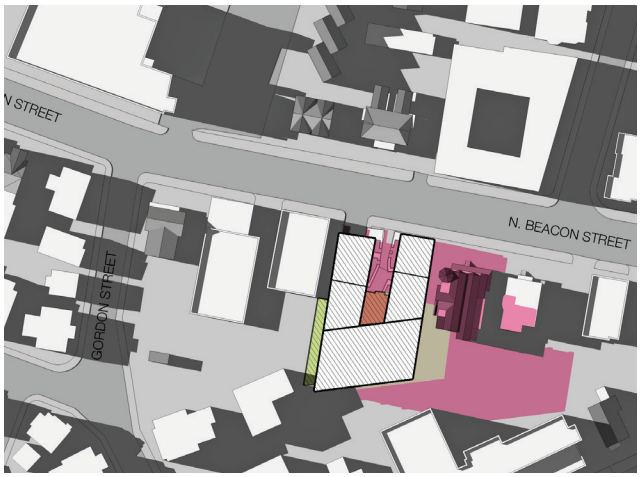
Shadow Studies
March 21

44 North Beacon Street
Boston, Massachusetts

June 21 9am

June 21 12pm

June 21 3pm



June 21 6pm

New Building
New Shadows
Existing Building
Existing Shadows

N

FRANCKE | FRENCH
ARCHITECTS

Figure 5.1b

Shadow Studies
June 21

44 North Beacon Street
Boston, Massachusetts

September 21 9am

September 21 12pm

September 21 3pm

September 21 6pm

New Building
New Shadows
Existing Building
Existing Shadows

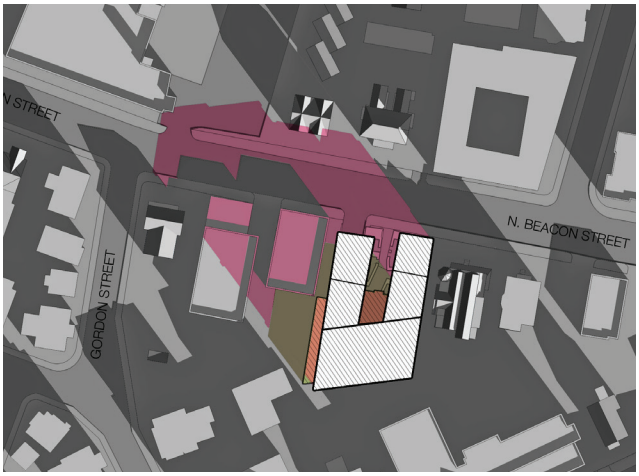
N

FRANCKE | FRENCH
ARCHITECTS

Figure 5.1c

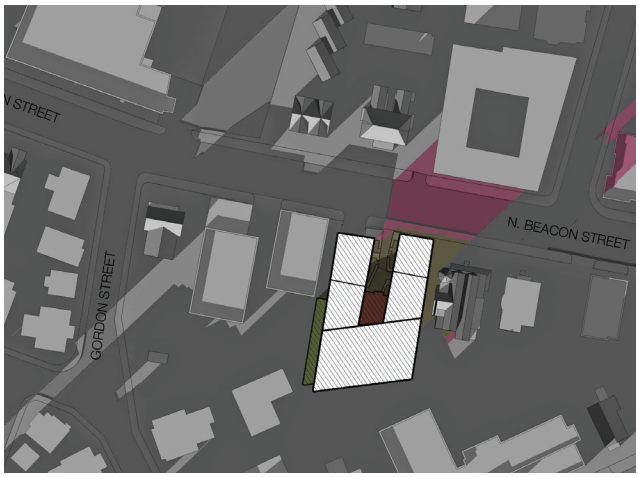
Shadow Studies
September 21

44 North Beacon Street
Boston, Massachusetts



December 21 9am

December 21 12pm



December 21 3pm

New Building
New Shadows
Existing Building
Existing Shadows

N

FRANCKE | FRENCH
ARCHITECTS

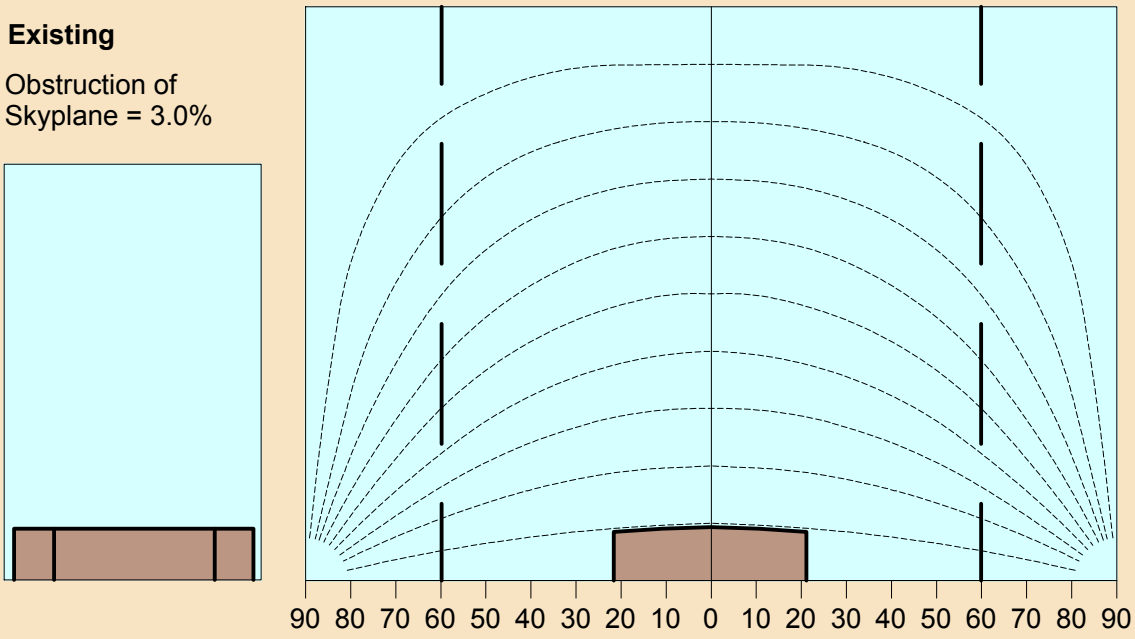
Figure 5.1d

Shadow Studies
December 21

44 North Beacon Street
Boston, Massachusetts

Existing

Obstruction of
Skyplane = 3.0%



Proposed

Obstruction of
Skyplane = 26.4%

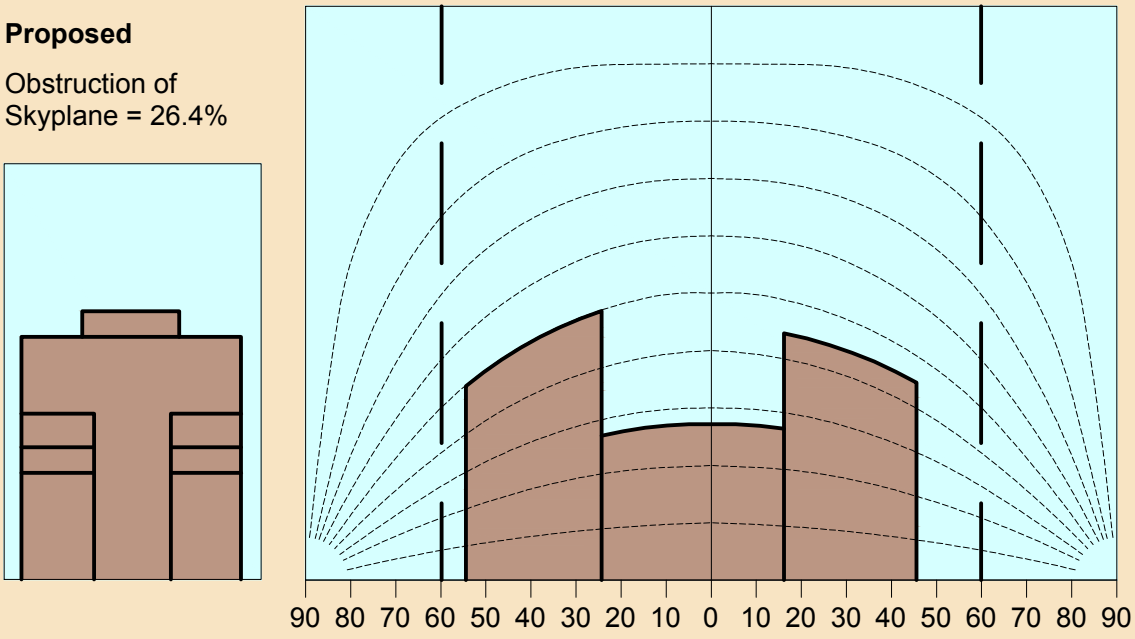


Figure 5.2

Daylighting Analysis
Center of North Beacon Street

44 North Beacon Street
Boston, Massachusetts

\\vhb\proj\Boston\14095.00\tech\Noise\GIS\Figure Noise Monitoring and Receptor Locations.mxd

Source: Bing Aerials

M# Monitoring Location

R# Receptor Locations

Figure 5.3

Noise Monitoring and Receptor Locations

44 North Beacon Street
Boston, Massachusetts

Properties included in the State Register of Historic Places

1. Englewood Diner

Properties Included in the Inventory of Historic and Archaeological Assets of the Commonwealth

2. Hano Street Area
3. International Harvester New England Branch Headquarters
4. Mount Saint Joseph Academy
5. Allston Heights
6. 2-15 Guildford Street
7. Washington-Warren Street Institutional Area
8. 13-17 Allston Street & 1-8 Griggs Place
9. Thomas Sinclair House
10. Jedediah Troy House
11. Residence
12. Col. Thomas Gardner House

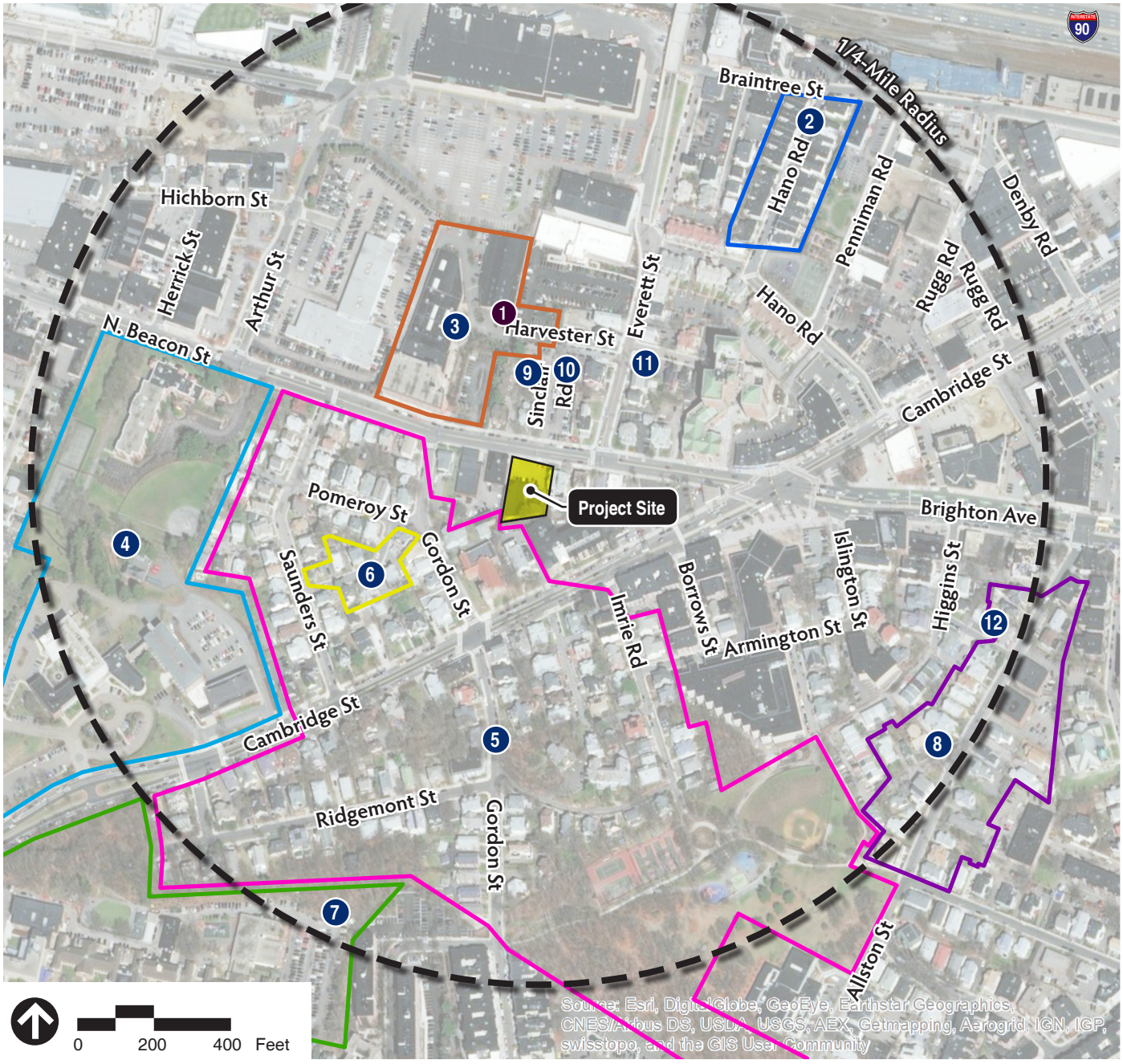


Figure 5.4

Historic Resources

44 North Beacon Street
Boston, Massachusetts

6

Infrastructure

This chapter describes the infrastructure that will support the Project, namely stormwater management, water, wastewater, natural gas, electricity and telecommunications. It discusses the impact of the development on the current infrastructure and identifies mitigation measures to address these potential impacts. It has been established that adequate infrastructure facilities and services are available within the Project Site frontage to serve the development. Figure 6.1 shows the current utilities available to the Project Site, including their size and location. A more comprehensive design of the utility systems will be undertaken as the project moves through the design phase.

Additionally, consideration is given to the incorporation of sustainable infrastructure elements, as the development will strive to meet the requirements for LEED Certification as discussed in Chapter 3, *Sustainability/Green Building and Climate Change Resiliency*.

6.1 Summary of Key Findings and Benefits

The key findings upon assessment of the related infrastructure systems can be summarized as follows:

- The existing infrastructure at the Project Site is expected to be adequately designed to accept the additional demand imposed by the Project. Water, sewer, drain, gas and electricity utilities are all available at the site frontage.
- Under the existing condition, the site is approximately 88 percent impervious with no drainage infrastructure. The majority of surface water leaves site in a northerly direction in the form of sheet flow and flows to the Charles River Basin via catch basins on North Beacon Street and the BWSC service network.
- The Project is projected to require a total domestic water supply of approximately 10,406 gallons per day ("GPD"). The existing building is serviced by the BWSC network. There is currently no fire protection system.
- The Project is projected to generate 9,460 GPD of sanitary sewage. The existing building is currently serviced by the BWSC network for sanitary sewage conveyance.
- The Project will, through green roof solutions and strategic landscaping, serve to treat and reduce peak flow rates of all surface water on-site. By incorporating these with a subsurface stormwater management and treatment system, runoff volume will be reduced, water quality improved

and peak runoff rates controlled dramatically in comparison to existing conditions. As a result, there is a significant decrease in demand to the BWSC network.

- Reduced flow and reduced consumption plumbing fixtures will be installed in the units to achieve a reduction in water usage of at least 20 percent over the baseline as set out by USGBC.

6.2 Regulatory Context

The following outlines the regulatory framework surrounding the anticipated infrastructure elements of the development. All connections and associated systems will be designed and constructed to meet or exceed the applicable city, state and federal standards. A complete list of the necessary permits associated with said infrastructure elements is included in Chapter 1, *Project Description*, Table 1-2. The Project requires the following infrastructure reviews and approvals:

- BWSC approval for all water, sewer and stormwater systems.
- The Boston Fire Department ("BFD") to review the Project with respect to fire protection measures such as siamese connections, hydrants and standpipes.
- Boston Public Works Street opening permits, allowing excavation for new utility service installations as well as the cut, cap and/or removal of existing services.
- All applicable federal, state and local safety codes will be followed throughout the construction process including but not limited to *"Massachusetts General Laws Chapter 82a"*, also referred to as *"Jackie's Law"*, as detailed in section 520 CMR 14.00 of the code of Massachusetts Regulations, OSHA Construction Regulations and the DigSafe program.

Additional information regarding the regulatory framework for each of the utility systems is included in subsequent sections of this chapter.

6.3 Stormwater Management

Stormwater management will be established in compliance with BWSC Site Plan Review requirements. The Project will not only attenuate the quantity of stormwater runoff discharged to BWSC storm drain network but serves to increase the quality of said runoff. This will be achieved through landscaping, subsurface infiltration and an oil/water separator.

6.3.1 Existing Drainage Conditions

The Project Site consists of a single story commercial building with a paved (bituminous concrete) parking lot in the front and a landscaped area behind. As it

stands the site is approximately 88 percent impervious and does not contain any stormwater management infrastructure. Runoff from the building's roof can infiltrate into the landscaped area to the rear while runoff from the parking lot, via surface sheet flow, makes its way to North Beacon Street.

The BWSC owns and maintains two storm drains in front of the Project Site, both of which are 12-inch diameter located below each sidewalk of North Beacon Street. All surface water onsite ultimately drains to Charles River Basin. Figure 6.2 shows the location of the BWSC drainage infrastructure.

6.3.2 Proposed Drainage Approach

The drainage approach is expected to substantially mitigate the impact of the Project in relation to the existing conditions. Water quantity is anticipated to be reduced and controlled through infiltration and storage, while quality is to be improved through the removal of phosphorous and suspended solids. Peak flow rates are also anticipated to be reduced via storing stormwater, creating a lag time to the BWSC network.

The Project anticipates a subsurface infiltration facility capable of storing at least one-inch of stormwater runoff - excluding runoff captured via floor drains in the parking garage. (This runoff will be discharged through an oil/water separator as discussed in Section 6.4.2 below). The specific type and size of groundwater recharge facility will be detailed during the BWSC site plan review process. An overflow is proposed to the 10-inch drain line in the nearest sidewalk complete with a clean out and backflow valve.

Development drainage analysis along with a stormwater management plan will be completed to confirm that the Project impacts are unchanged or significantly mitigate those of the existing conditions. The stormwater management plan will summarize the BMP's for the Project before, during and after construction in relation to erosion, sediment control and pollution. These BMP's will be designed constructed and installed according to the," Massachusetts Erosion and Sediment Control Guidelines for Urban and Sub-Urban Areas" (DEP, 2003).

6.4 Sanitary Sewage

6.4.1 Existing Sewer System

The BWSC owns and maintains the 12-inch sewer main in North Beacon Street. This is the only sanitary sewer line and flows west following the roadway. The existing service is six-inch cast iron running from the foundation wall to the 12-inch sewer main in North Beacon immediately in front at an approximate average depth of approximately eight feet. This service will be cut and capped prior to demolition and a new line installed. Based on its uses the total existing sewer flow has been estimated to generate approximately 410 GPD of wastewater as shown in Table 6-1.

6.4.2 Proposed Sewage Flow and Connection

The Project is entirely residential and consists of 54 units that vary from studios to 3-bedroom duplexes. This generates a total flow estimation of approximately 9,460 GPD, and is expected to increase the daily flow by approximately 9,049 GPD. Table 6-1 summarizes the estimated sanitary sewage flow for the Project.

It is anticipated that sanitary sewage will discharge to the 12-inch sewer main in North Beacon Street via a six-inch pipe, subject to review and approval by BWSC. In addition, drainage of the underground parking garage shall pass through a Massachusetts Water Resources Authority ("MWRA") approved oil/water separator in accordance with MWRA requirements and the BWSC site plan approval process prior to its discharge to the sewer network.

Table 6-1 Existing and Proposed Sewer Flow Estimation

	Units	Generation Rate	Total Flow Estimation
Existing Condition			
Office/Retail[A]	9,460 ft^2	50 GPD/1000ft^2	410 GPD[B]
Proposed Condition			
Residential (54 Units)	86 Bedrooms	110 GPD/Bedroom	9,460 GPD
Total Sewer Flow			9,460 GPD
Net New Sewer Flow			9,049 GPD

Note: The sewer flow estimation is based on State Environmental Code 310CMR15.000, "*Title 5: Standard Requirements for The Siting, Construction, Inspection, Upgrade, and Expansion of On-Site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage.*"

6.5 Domestic Water and Fire Protection

6.5.1 Existing Water Supply System

The BWSC owns and maintains the water main in North Beacon (see Figure 6.1), a 12-inch DICL (Ductile Iron Cement Lined) pipe re-laid in 2006. It is anticipated that this will be sufficient for the Project's water service requirements. There is a domestic service at the existing building which connects to the 12-inch DICL Pipe that will be cut and capped before the structure is razed. There is no existing fire protection system. Additionally, there is a fire hydrant (H24) proximate to the site, and hydrant flow tests will be obtained from the BWSC for use in the design phase.

6.5.2 Proposed Water Demand and Connection

Domestic water demand is based on the estimated sewer flow with a 10 percent factor for consumption, system losses and other miscellaneous uses. Based on this sewer flow estimation in Table 6-1 the Project will require 10,406 GPD of water. This

review typically includes sizing of the domestic water and fire protection services, calculation of meter sizing, backflow prevention design and locations of siamese connections and any hydrants to conform to BWSC and BFD regulations. Figure 6.2 shows the Project water service installations and connections. It is anticipated that both the Project domestic and fire protection services will be four-inch DICL pipe complete with gate valves and connected using tapping sleeves.

Appropriate reduced flow and reduced consumption plumbing fixtures will be installed in all the 54 units to achieve a reduction in water usage of at least 20 percent over the baseline. Methods to conserve water will be further considered throughout the design and construction phases.

6.6 Other Utilities

6.6.1 Natural Gas Service

The estimated natural gas demand for the Project is approximately 8,311 therms. Coordination with the local gas provider is required to determine the best means for obtaining the necessary system connections. There is an existing gas service that runs to the building that will be cut and capped prior to demolition. There are two gas mains in North Beacon Street: a 24-inch and a six-inch. As a result, no capacity issues are anticipated for the development.

6.6.2 Electrical Service

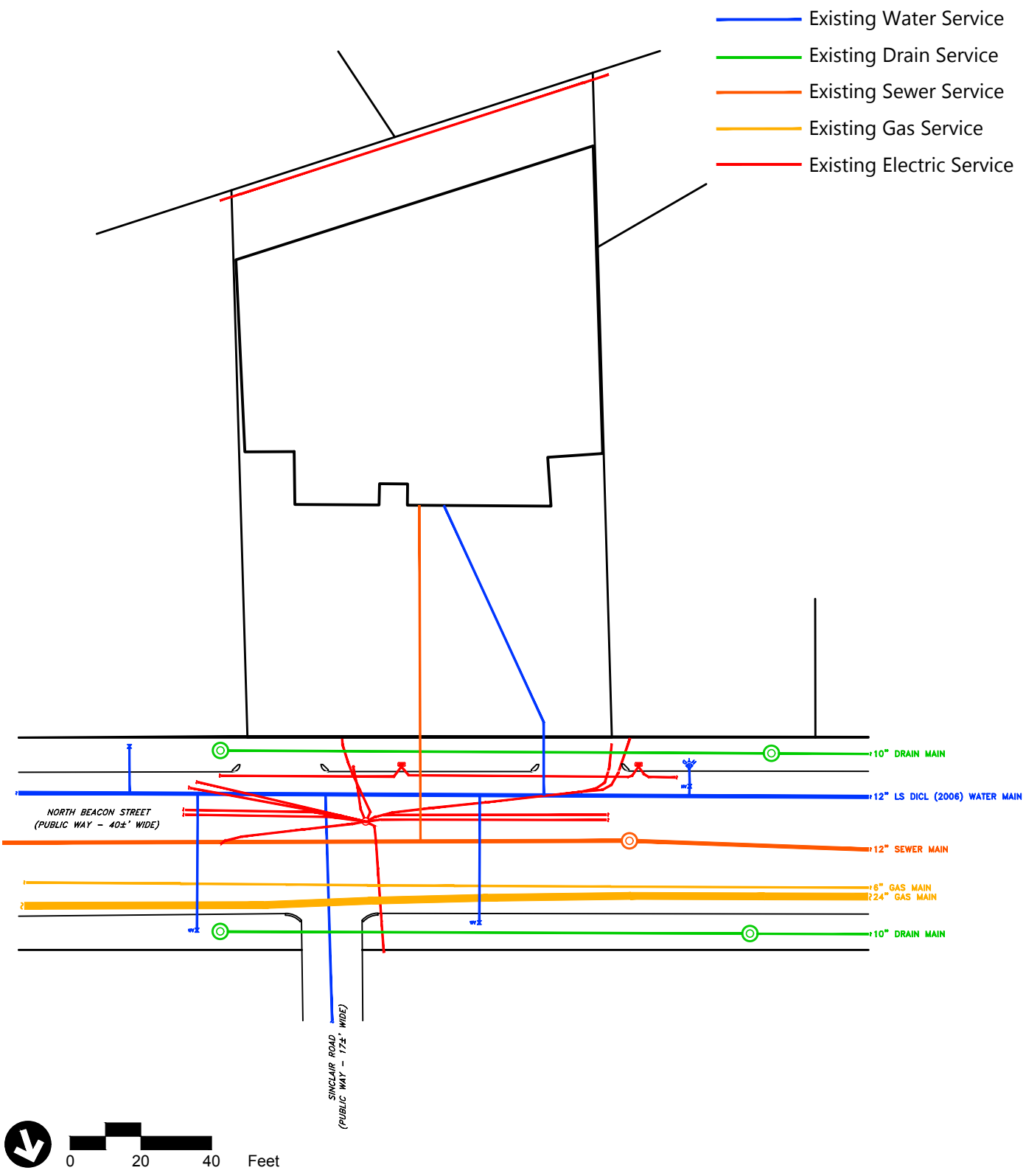
The estimated electricity demand for the Project is approximately 435,731 kWh. Coordination with Eversource is required to determine the best means for obtaining the necessary system connections.

6.6.3 Telephone and Telecommunications

There appears to be sufficient telecommunications conduits and overhead wires proximate the Project Site. Coordination with the applicable telecommunication companies is required to determine whether their infrastructure can meet the needs this Project and the best means for obtaining the necessary system connections.

6.6.4 Protection of Utilities During Construction

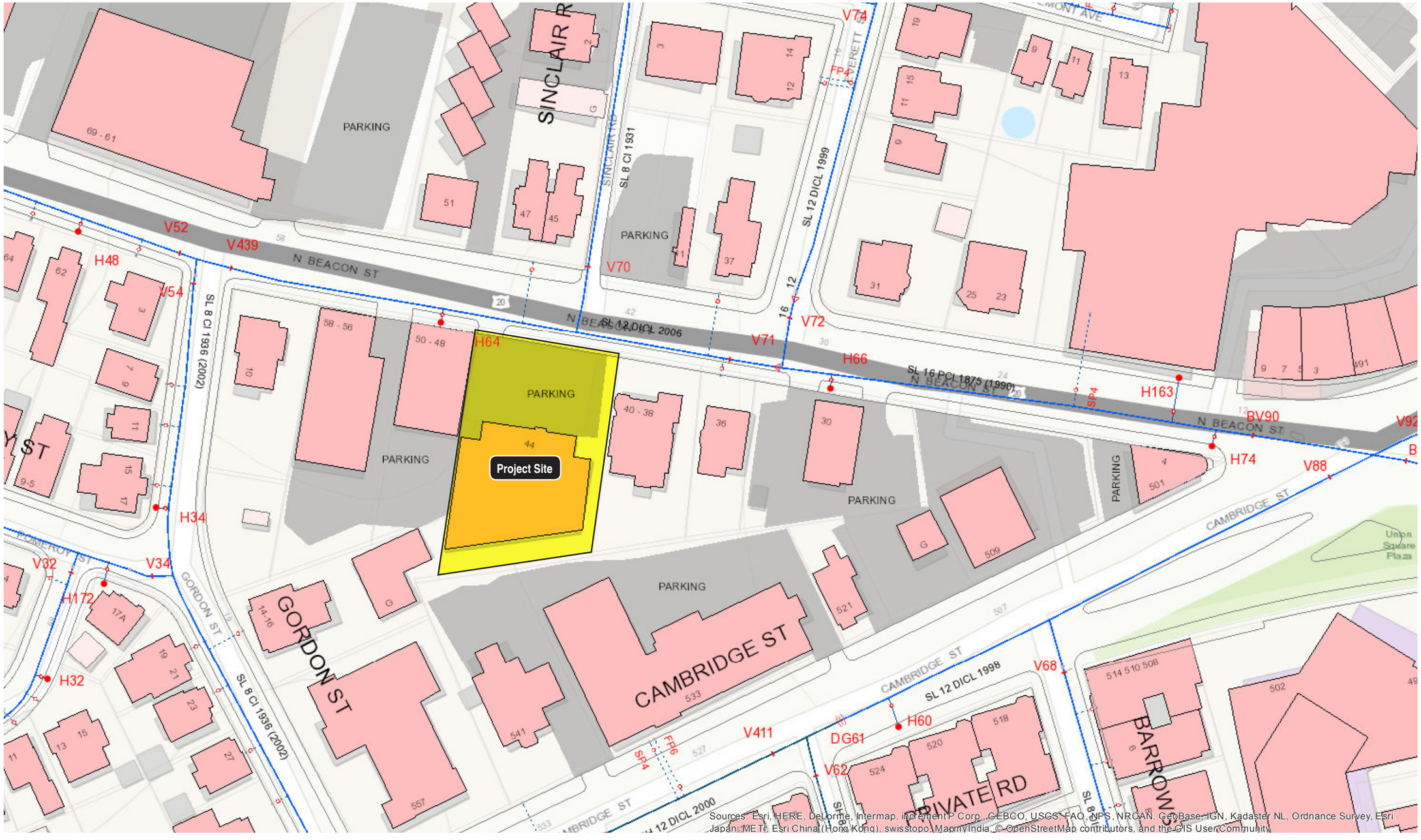
All existing public and private infrastructure that is to remain will be protected throughout construction with special effort made to reduce unnecessary disturbance of the development site or public right-of-way. The installations and connections of proposed utilities within the public way will be in accordance with the BWSC site plan review process, Boston Public Works Department permitting process, the DigSafe program, and governing utility company requirements. All necessary permits will be obtained, and sufficient notice given prior to the commencement of work.



*Exact locations of existing utilities to be confirmed by the contractor in the field.

Figure 6.1
Existing utilities

44 North Beacon Street
Boston, Massachusetts

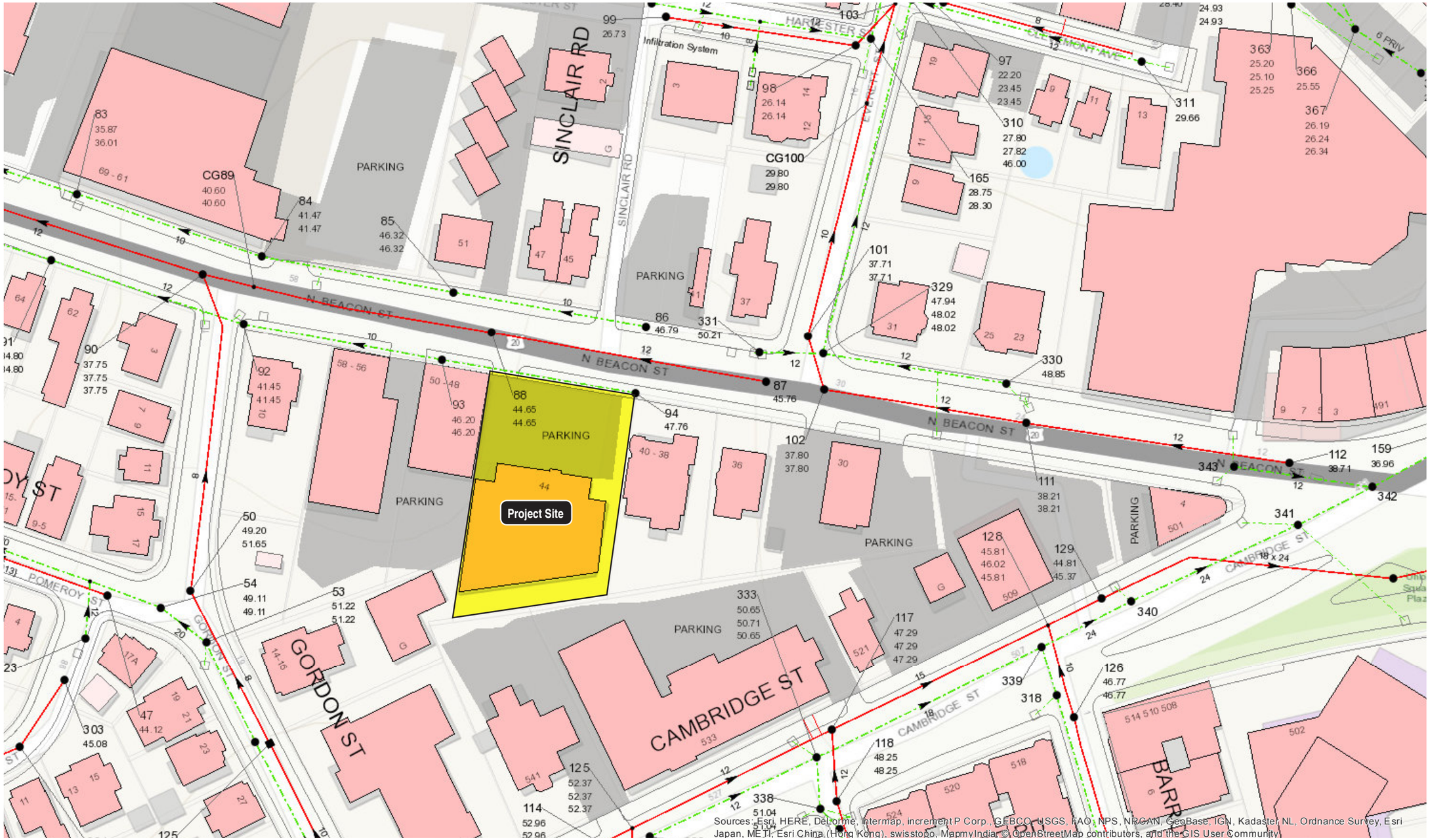


Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Source: BWSC

Figure 6.2a
BWSC Water Service

44 North Beacon Street
Boston, Massachusetts



Source: BWSC

Figure 6.2b
BWSC Sewer Service

44 North Beacon Street
Boston, Massachusetts

Appendix A: Letter of Intent

January 16, 2018

Brian P. Golden, Director
Boston Redevelopment Authority
d/b/a Boston Planning & Development Agency
One City Hall Square
Boston, MA 02201

Re: Letter of Intent to File Expanded Project Notification Form ("EPNF")
44 North Beacon Street, Allston-Brighton Neighborhood District

Dear Director Golden,

On behalf of 44 North Beacon LLC and Boston Real Estate Collaborative LLC, under provisions of Article 80 B of the Boston Zoning Code and in accordance with the Mayor's Executive Order relative to the provision of mitigation by development projects in Boston, we are pleased to submit this Notice of Intent to File an Expanded Project Notification Form initiating a Large Project Review for the development of one residential building (the "Project") at 44 North Beacon Street in Allston-Brighton.

The Project will be located on an approximately 0.4 acre (17,640 SF) parcel fronting on North Beacon Street (the "Property"), within walking distance of the Boston Landing station on the MBTA Framingham/Worcester Commuter Rail Line and the Allston Street Station on the Green Subway Line. The transit-oriented Project contemplates the demolition of an under-utilized single-story, concrete block commercial structure, and the construction of a single residential building consisting of approximately 53,800 GSF, with height ranging from approximately thirty-one feet along North Beacon Street, to approximately sixty-nine feet in the deepest pocket of the site, furthest from North Beacon Street. The Project consists of approximately 54 residential units and approximately 35 below-grade parking spaces. The building will contain a mix of 2 studio units, 5 one-bedroom units, 11 one-plus bedroom units, 16 two/two plus-bedroom units and 12 three-bedroom units. The building will feature 750 SF of bicycle-related space at the main entry level along with over 1,500 SF of indoor amenity space and another 3,850 SF of outdoor amenity and open space. Approximately 20% of the site will remain unbuilt on, maximizing permeable area and open space on the ground level.

The Property is located in the Allston-Brighton Neighborhood Community Commercial Sub-district (CC-1). A preliminary review of the Project indicates zoning relief being required for the conditional residential use, rear yard setback, building height, FAR and parking requirements, pursuant to Article 51 of the Boston Zoning Code. The Project will conform to Article 37 of the Boston Zoning Code - Green Building and Climate Resiliency Guidelines, and will seek LEED qualifications. In conformance with the Mayor's Inclusionary Development Policy the project will contain a total of 7 on-site affordable units, including both homeownership and rental units.

Additionally, the homeownership component will be anchored on North Beacon Street and will consist of 16 total units (roughly 30% of the total unit count) with a mix of townhouse style two, two-plus and three-bedroom units, as well as one-bedroom flats.

The Project will incorporate low-density, pedestrian scale massing at the street level with an open, central courtyard facing North Beacon Street that features active resident space, mature plantings and local art installations, among other features. There will be additional green and open space on the various roof tops of the building.

We have met with BPDA representatives on several occasions already, as well as many elected officials, abutters and community stakeholders to obtain feedback prior to filing this LOI. We anticipate filing an Expanded Project Notification Form for the Project in February of 2018, or soon thereafter as the process dictates. We greatly look forward to working with your staff, in conjunction with the community at large and those appointed to the Impact Advisory Group, as the Project progresses.

Thank you for your consideration and please do not hesitate to contact me with any questions.

Sincerely,

Brent A. Berc, Founding Partner
Boston Real Estate Collaborative LLC

Cc: Mark Ciommo, City Councilor
Sal Di DiDomenico, State Senator
Kevin Honan, State Representative

Appendix B: Preliminary BPDA Checklists

Article 80 – Accessibility Checklist

A requirement of the Boston Planning & Development Agency (BPDA)
Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities strives to reduce architectural, procedural, attitudinal, and communication barriers that affect persons with disabilities in the City of Boston. In 2009, a Disability Advisory Board was appointed by the Mayor to work alongside the Commission in creating universal access throughout the city's built environment. The Disability Advisory Board is made up of 13 volunteer Boston residents with disabilities who have been tasked with representing the accessibility needs of their neighborhoods and increasing inclusion of people with disabilities.

In conformance with this directive, the BDPA has instituted this Accessibility Checklist as a tool to encourage developers to begin thinking about access and inclusion at the beginning of development projects, and strive to go beyond meeting only minimum MAAB / ADAAG compliance requirements. Instead, our goal is for developers to create ideal design for accessibility which will ensure that the built environment provides equitable experiences for all people, regardless of their abilities. As such, any project subject to Boston Zoning Article 80 Small or Large Project Review, including Institutional Master Plan modifications and updates, must complete this Accessibility Checklist thoroughly to provide specific detail about accessibility and inclusion, including descriptions, diagrams, and data.

For more information on compliance requirements, advancing best practices, and learning about progressive approaches to expand accessibility throughout Boston's built environment. Proponents are highly encouraged to meet with Commission staff, prior to filing.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
   http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Massachusetts State Building Code 780 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
4. Massachusetts Office of Disability – Disabled Parking Regulations
   http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
5. MBTA Fixed Route Accessible Transit Stations
   http://www.mbta.com/riding_the_t/accessible_services/
6. City of Boston – Complete Street Guidelines
   http://bostoncompletestreets.org/
7. City of Boston – Mayor's Commission for Persons with Disabilities Advisory Board
   www.boston.gov/disability
8. City of Boston – Public Works Sidewalk Reconstruction Policy
   http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
9. City of Boston – Public Improvement Commission Sidewalk Café Policy
   http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf

Glossary of Terms:

1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
3. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 8.4
4. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities, in the City. For more information visit: http://www.bostonplans.org/housing/overview
5. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way. For more information visit: https://www.boston.gov/pic
6. ***Visitability*** – A place's ability to be accessed and visited by persons with disabilities that cause functional limitations; where architectural barriers do not inhibit access to entrances/doors and bathrooms.

1. Project Information:

If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.

Project Name:	**44 North Beacon Street Residences**
Primary Project Address:	**44 North Beacon Street Boston, 02134**
Total Number of Phases/Buildings:	**One/One**
Primary Contact (Name / Title / Company / Email / Phone):	**Brent Berc/ Founding Partner/ Boston Real Estate Collaborative/ brent@brec-llc.com / 857.991.1105**
Owner / Developer:	**Boston Real Estate Collaborative**
Architect:	**Francke French Architects**
Civil Engineer:	**Haycon**
Landscape Architect:	**Michael D'Angelo Landscape Architecture, LLC**
Permitting:	**VHB**
Construction Management:	**Haycon**

At what stage is the project at time of this questionnaire? Select below:

PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BPDA Board Approved
BPDA Design Approved	Under Construction	Construction Completed:

Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? ***If yes,*** identify and explain.	Yes: 1) – The common roof decks for the tri-level condominium structures are not accessible by code and will require a variance from 521 CMR for accessibility and second means of egress. If the roof decks were made private, no variance would be required, but it is our intent to make the amenity available to all owners. 2) - Because of the design of the building and the various construction types involved, four units will require a variance for lack of elevator access. Functionally, these units are in alignment with a single means of egress.

2. Building Classification and Description:

This section identifies preliminary construction information about the project including size and uses.

What are the dimensions of the project?

Site Area:	***17, 640 SF***	Building Area:	***Approx. 54 KSF***
Building Height:	***69 FT.***	Number of Stories:	***3-7 Flrs.***
First Floor Elevation:	**+57.5 Elev**	Is there below grade space:	***Yes / 1***

What is the Construction Type? (Select most appropriate type)

	Wood Frame	Masonry	Steel Frame	Concrete
What are the principal building uses? (IBC definitions are below – select all appropriate that apply)				
	Residential – One - Three Unit	**Residential - Multi-unit, Four +**	Institutional	Educational
	Business	Mercantile	Factory	Hospitality
	Laboratory / Medical	Storage, Utility and Other		
List street-level uses of the building:	**Amenity/Lobby/Bike Storage/Services**			

3. Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and institutions, such as (but not limited to) hospitals, elderly & disabled housing, and general neighborhood resources. Identify how the area surrounding the development is accessible for people with mobility impairments and analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The Project will be located on a 17,640sf infill site accessed from North Beacon Street with a primarily flat topography. The neighborhood has a majority of older stock of multi-family residential, light commercial buildings, and single family buildings. The buildings in the immediate area average in height from two to five stories along North Beacon Street and Cambridge Street. The existing sidewalks along North Beacon Street are approximately 9 ft 6 inces wide. In order to provide a better pedestrian experience, the building footprint on the ground level has been set back 6 ft to allow for a landscaped buffer between the sidewalk and the proposed building.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	Bus stops: 64 (430ft), 501 & 503 (500ft), 51 & 57& 66 (830ft), 66 (2200ft) Subway stations: Allston Street Station (2000ft) Commuter rail station: Boston Landing (1300ft)
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	Franciscan Children's, St Elizabeth's Medical Center, Kindred Hospital - Boston, Wingate at Brighton Rehab Senior Care Services, Commonwealth Eldery, Washington Street Federal Family, Saint Joseph Preparatory High School, Brighton High School, Horace Mann School for the Deaf, Kennedy Hope Academy, Saint Columbkille Partnership School,
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	BPL – Honan-Allston Branch, BPL – Brighton Branch, Jackson Mann Community Center, Josephine A. Fiorentino Community Center

4. Surrounding Site Conditions – Existing:

This section identifies current condition of the sidewalks and pedestrian ramps at the development site.

Is the development site within a historic district? ***If yes,*** identify which district:	No
Are there sidewalks and pedestrian ramps existing at the development site? ***If yes***, list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	Concrete sidewalk along 103ft property line on North Beacon Street, 9ft wide, in good condition. Approximately 4% slope from back of sidewalk abutting property to street curb. Two 23ft curb cuts located at northeast and northwest corners of property along North Beacon Street.
Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos:	No
5. Surrounding Site Conditions – Proposed *This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.*	
Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.	The Project sidewalks will be developed consistent with the Boston Complete Street Guidelines to the extent practicable, and to the extent they need to tie into adjacent sidewalks.
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	Less than 2% slope. Frontage: 4'-8" Pedestrian: (9ft total currently)
List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?	Frontage zone TBD (likely cast concrete) Pedestrian zone(CoB): cast concrete Furnishing zone(CoB): TBD (likely cast concrete)
Will sidewalk cafes or other furnishings be programmed for the	No

pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	N/A
Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	The Project will go before PIC for approvals for sidewalk and/or curb reconstruction or temporary construction encroachments.
6. Accessible Parking: *See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability – Disabled Parking Regulations*.	
What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	35 parking spaces in an underground garage
What is the total number of accessible spaces provided at the development site? How many of these are "Van Accessible" spaces with an 8 foot access aisle?	3 total, 1 van accessible
Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need?	No
Where is the accessible visitor parking located?	TBD
Has a drop-off area been identified? ***If yes,*** will it be accessible?	TBD
7. Circulation and Accessible Routes: *The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors*.	

Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	All primary public entrances will be a flush condition.
Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no,*** what is the reason?	Yes.
If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	Large Project Review

8. Accessible Units (Group 2) and Guestrooms: (If applicable)

In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.

What is the total number of proposed housing units or hotel rooms for the development?	54 housing units
If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units?	16 for sale. 38 for rent. 7 on-site affordable units.
If a residential development, how many accessible Group 2 units are being proposed?	The number of accessible units at the Project will be determined as the Project advances and comply with 521 CMR.
If a residential development, how many accessible Group 2 units will also be IDP units? ***If none***, describe reason.	One at least one of the accessible units will be income restricted per the city's IDP.
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? ***If yes,*** provide amount and location of equipment.	N/A

Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes,*** provide reason.	It is not anticipated that either residential units or common spaces will have any architectural barriers.
Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? ***If yes,*** describe:	It is not anticipated that either residential units or common spaces will have any architectural barriers.
9. Community Impact: *Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community.*	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	Sidewalk improvements will be part of the project, including new landscaping and amenities. The development team is also working with the neighborhood and stakeholders to determine how best to allocate funding toward various improvement projects within the surrounding neighborhood.
What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility?	All ground floor public and common spaces will be designed with universal accessibility in mind.
Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not.	One, single-stall ADA compliant restroom will be built within the ground floor program space of the rental building. The restroom will be designated as "Family"/ "Companion."
Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments?	The Project has not yet been presented to the City of Boston Mayor's Commission for Persons with Disabilities Advisory board. The Project Team will meet with the Board as the Project design advances and is fully committed to delivering a Project that is ADA compliant.

Has the proponent presented the proposed plan to the Disability Advisory Board at one of their monthly meetings? Did the Advisory Board vote to support this project? ***If no,*** what recommendations did the Advisory Board give to make this project more accessible?	The Project has not yet been reviewed by the Advisory Board

10. Attachments

Include a list of all documents you are submitting with this Checklist. This may include drawings, diagrams, photos, or any other material that describes the accessible and inclusive elements of this project.

Refer to Figure 2.6.

This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

For questions or comments about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability, or our office:

The Mayor's Commission for Persons with Disabilities
1 City Hall Square, Room 967,
Boston MA 02201.

Architectural Access staff can be reached at:

accessibility@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov | 617-635-3682

boston planning & development agency

Climate Resiliency Checklist

NOTE: Project filings should be prepared and submitted using the online Climate Resiliency Checklist.

A.1 - Project Information

Project Name:	**44 North Beacon Street**			
Project Address:	**44 North Beacon Street, Boston, MA**			
Project Address Additional:				
Filing Type (s*elect*)	***Initial*** *(PNF,* ***EPNF****, NPC or other substantial filing)* *Design / Building Permit (prior to final design approval), or* *Construction / Certificate of Occupancy (post construction completion)*			
Filing Contact	*Brent Berc*	*Boston Real Estate Collaborative, LLC*	*brent@brec-llc.com*	*857-991-1105*
Is MEPA approval required	*Yes/****No***			

A.3 - Project Team

Owner / Developer:	**Boston Real Estate Collaborative, LLC**
Architect:	**Francke | French Architects**
Engineer:	**Haycon Inc.**
Sustainability / LEED:	**Price Sustainability**
Permitting:	**VHB**
Construction Management:	**Haycon Inc.**

A.3 - Project Description and Design Conditions

List the principal Building Uses:	**Residential / Condominium**
List the First Floor Uses:	**Residential / Amenity**
List any Critical Site Infrastructure and or Building Uses:	

Site and Building:

Site Area:	*17,640 SF*	Building Area:	*Approx. 54,000 SF*
Building Height:	*69 Ft*	Building Height:	*3-7 Stories*
Existing Site Elevation – Low:	*54.5 Ft BCB*	Existing Site Elevation – High:	*59 Ft BCB*
Proposed Site Elevation – Low:	*54.5 Ft BCB*	Proposed Site Elevation – High:	*57.5 Ft BCB*
Proposed First Floor Elevation:	*57.5 Ft BCB*	Below grade levels:	*1 Story*

Article 37 Green Building:

LEED Version - Rating System :	V4 Multifamily Midrise	LEED Certification:	*Yes / **No***

Proposed LEED rating:	*Certified/**Silver**/ Gold/Platinum*	Proposed LEED point score:	*53 Pts.*

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined	Preliminary Energy Model based on LEED BD+C Multifamily Midrise v4 simulation guidelines		
Annual Electric:	*435,700 kWh*	Peak Electric:	*112 kW*
Annual Heating:	*157.3 MMbtu*	Peak Heating:	*0.79 MMbtu/h*
Annual Cooling:	*36,300 ton·hrs*	Peak Cooling:	*81.1 ton·hrs*
Energy Use - Below ASHRAE 90.1 - 2013:	*40%*	Have the local utilities reviewed the building energy performance?:	*Yes / **no***
Energy Use - Below Mass. Code:	*40%*	Energy Use Intensity:	*34.3 kBtu/SF*

Back-up / Emergency Power System

Electrical Generation Output:	*TBD*	Number of Power Units:	*TBD*
System Type:	*TBD*	Fuel Source:	*TBD*

Emergency and Critical System Loads (in the event of a service interruption)

Electric:	*TBD*	Heating:	*TBD*
		Cooling:	*TBD*

B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Reducing GHG emissions is critical to avoiding more extreme climate change conditions. To achieve the City's goal of carbon neutrality by 2050 new buildings performance will need to progressively improve to net carbon zero and positive.

B.1 – GHG Emissions - Design Conditions

For this Filing - Annual Building GHG Emissions: *(TBD)*

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:

Projects design strategy will be discussed and aligned with the performance goals to meet code compliance and energy efficiency requirements

Describe building specific passive energy efficiency measures including orientation, massing, envelop, and systems:

Design team will study Project's envelope, window wall ratio and other passive design elements to improve energy performance

Describe building specific active energy efficiency measures including equipment, controls, fixtures, and systems:

Building insulation and window performance will exceed code-minimum requirements, all units will be air-sealed and tested for compartmentalization to improve comfort and energy efficiency. Water use will be minimized with low-flow fixtures. High-efficacy lighting will be used throughout. Heating systems will use a

combination of VRF, all-electric systems, and high-efficiency boilers & fan coils, and include MERV 8 filtration. DHW will be produced with high-efficiency gas fired boilers. Roof mounted, high-SEER condensers will provide cooling. Space ventilation via HRV and garage ventilation will ensure air quality.

Describe building specific load reduction strategies including on-site renewable, clean, and energy storage systems:

The design team will assess feasibility of on-site renewable, clean, and energy storage systems

Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:

TBD

Describe any energy efficiency assistance or support provided or to be provided to the project:

TBD

B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

TBD

C - Extreme Heat Events

Annual average temperature in Boston increased by about 2˚F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low:	*7 Deg.*	Temperature Range - High:	*91 Deg.*
Annual Heating Degree Days:	TBD	Annual Cooling Degree Days	TBD

What Extreme Heat Event characteristics will be / have been used for project planning

Days - Above 90°:	*10*	Days – Above 100°:	*0*
Number of Heatwaves / Year:	-	Average Duration of Heatwave (Days):	-

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

Substantial green roofs, shade trees and shrubs, and non-reflective glazing will be part of the project to reduce heat-island effect.

C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

The project will be designed based on ASHRAE'1 Climatic Design Conditions for the 99.6% Heating design temperature and 0.4% cooling design temperature. This takes into account the current weather patterns. In addition, the project will include high performance building envelope and high performance HVAC equipment which would be able to address near term future extreme temperatures and longer heatwaves. The HVAC systems estimate life span is 20-25 years.

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

The project will be studying emergency generators to understand what critical systems will be on the emergency generators and will require un-interrupted power supply to maintain critical life conditions.

D - Extreme Precipitation Events

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25". There is a significant probability that this will increase to at least 6" by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

D.1 – Extreme Precipitation - Design Conditions

10 Year, 24 Hour Design Storm: *8.83 Inches*

Describe all building and site measures for reducing storm water run-off:

The proposed stormwater system will be collecting and infiltrating the first inch of run-off on site to meet Boston Water and Sewer Commission (BWSC) requirements.

D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

The proposed stormwater system hasn't been designed, but we will be collecting and infiltrating the first inch of run-off on site to meet Boston Water and Sewer Commission (BWSC) requirements, and will incorporate green roofs to help treat and reduce stormwater.

E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, sea levels in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

Is any portion of the site in a FEMA SFHA? *Yes / **No*** What Zone: N/A

Current FEMA SFHA Zone Base Flood Elevation: *N/A*

Is any portion of the site in a BPDA Sea Level Rise - Flood Hazard Area? Use the online BPDA SLR-FHA Mapping Tool to assess the susceptibility of the project site.	*Yes / **No***

If you answered YES to either of the above questions, please complete the following questions.
Otherwise you have completed the questionnaire; thank you!

A pdf and word version of the Climate Resiliency Checklist is provided for informational use and off-line preparation of a project submission. NOTE: Project filings should be prepared and submitted using the online Climate Resiliency Checklist.

For questions or comments about this checklist or Climate Change best practices, please contact:
John.Dalzell@boston.gov

Appendix C: Preliminary Energy Model

44 N Beacon St, Allston, MA

Preliminary Energy Modeling Report

January 31, 2018

Hourly simulation modeling has been performed to estimate the potential energy consumption intensity patterns and total energy use for the proposed apartment building at 44 N Beacon St, Allston. The intent of this exploration is to determine how the design compares to a similar building conforming to the Massachusetts stretch energy code (IECC 2015) and the requirements of LEED BD+C: Multifamily Midrise v4. It is important to note the following:

- The baseline for LEED v4 is the more stringent of ASHRAE 90.1-2010 Appendix G or the local energy code. This analysis uses IECC 2015 as the baseline (equivalent to ASHRAE 90.1-2013).
- The design is preliminary in nature, and this analysis is based on rough floor layouts and system narratives developed by the design team to date.

Modeling results presented in Figure 1 below indicate the project savings. It appears that the project will be able to satisfy the stretch energy code via the performance path (10% site energy use reduction), that the 5% minimum energy cost reduction required by the minimum energy performance pre-requisite will be satisfied, and the the project could potentially qualify for 14 points under the annual energy use credit.

Figure 1
Preliminary Estimate of Energy Performance

	Baseline	Design	Savings		% Redux
Electricity	439,258	435,731	3,527	kWh	1%
Natural Gas	23,529	8,311	15,218	therms	65%
Site Energy	3,852	2,318	1,533.9	MBtu	40%
Utility Costs	$81,786	$66,205	$15,581		19%

$0.133 per kWh and $0.993 per therm

The baseline assumes a building envelope and lighting design conforming to the prerequisite attributes of IECC, standard efficiency central DHW heating source, Federal standard water fixtures, packaged terminal air conditioning units providing cooling and ventilation, and a central gas-fired hot water system. Elevator energy use and process exhaust systems for the subgrade garage are modeled identically in both cases; exterior lighting is excluded. Ventilation rates are based on ASHRAE 62.1-2013 for non-apartment/condo spaces and 85 cfm per dwelling unit (25 cfm for one bathroom and 60 cfm per kitchen).

Energy conserving attributes of the proposed design include the following:

- Exterior Walls: R-10 continuous XPS insulation, R-19 infill batt to achieve a thermally bridged R-24 assembly (code is R-15.6).
- Roof: 7 inches of polyisocyanurate insulation to achieve an assembly R-39 (code is R-31.3).
- Window units: assembly performance of U-0.28 (code is U-0.45 for operable window).
- Lighting design: 30% reduction in LPD results in 0.60 W/ft² (baseline is 0.86 W/ft²).
- Circulation and garage lighting controls: LPD is reduced from 0.60 W/ft² to 0.58 W/ft².
- Reduced flow shower heads: 1.5 gpm versus Federal standard 2.5 gpm based on Energy Star MFHR Performance Path Calculator.
- Energy Star appliances: 6.5% reduction in appliance average peak power demand based on Energy Star MFHR Performance Path Calculator.
- Condensing gas-fired water heaters: 95% thermal efficiency (80% baseline).

- DOAS for Apartments: 75% sensible heat recovery for ventilation, high efficiency cooling in DOAS units (baseline has fresh air delivered directly to PTACs, supply fans operate continuously). This approach allows zone fans to cycle with space sensible loads while maintaining equivalent ventilation rates as the baseline.
- Centralized heat recovery VRF systems for apartments: High performance all-electric systems capable of simultaneous heating and cooling. Model is based on performance of Trane VRF 4TH/R equipment (3.72 COP cooling, 4.10 COP heating). Heat recovery capability allows simultaneous heating and cooling loads to cancel one another.
- High Performance Condo Condensing Units: SEER 16.0 condensing units for PTACs (baseline is 13.0 SEER).
- Condensing Boilers in Condo Units: 92% thermal efficiency (baseline is 80%).

The baseline site EUI is 57.0 kBtu/ft² while the design case site EUI is 34.3 kBtu/ft². Most site energy use is associated with the use of heat recovery and the transfer of apartment heating from gas-fired boilers to electrically powered VRF compressors. Figure 2 illustrates the distribution of energy cost savings by end use group and month for the case without heat recovery.

Figure 2
Monthly Sources of Cost Savings and Penalties

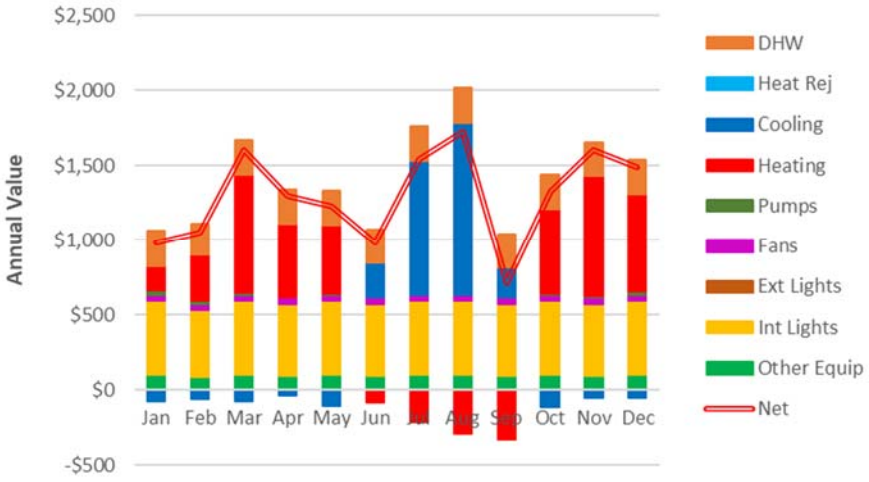
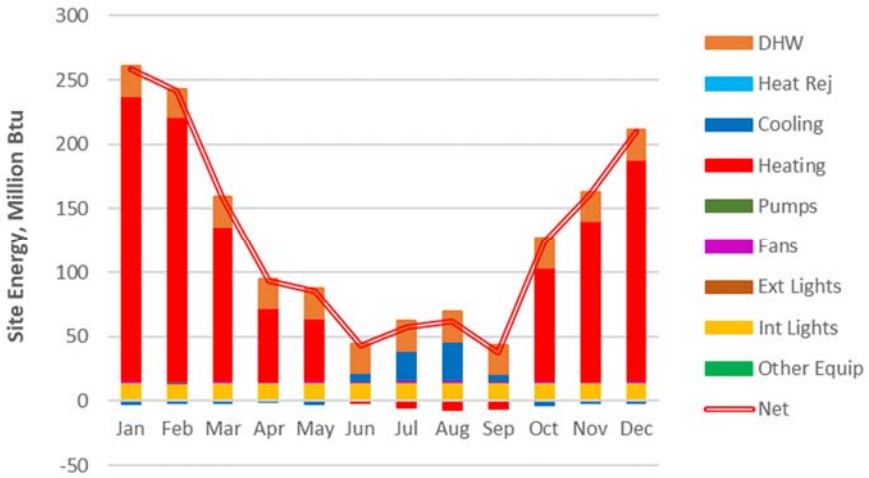


Figure 3
Monthly Sources of Site Energy Savings and Penalties



Basis of Analysis

The building model is based on the following information sources:

- Architectural drawings dated 1/12/18
- IECC 2015 and ASHRAE 90.1-2013 Appendix G
- LEED v4 Multifamily Energy Model Simulation Guidelines, current online version
- Dwelling unit electricity, gas, and DHW loads as calculated by the USGBC-issued v4 Minimum Energy Performance Calculator v05.
- Default Mass Save screening tool electricity and gas rates
- Discussions with the design team regarding systems and equipment

Energy consumption is most heavily driven by ventilation rates, the building layout, the choice of HVAC and DW heating systems, and shower head flow rates.

Baseline Energy Use

Figures 4, 5, and 6 below illustrate the distribution of electricity consumption, natural gas consumption, and energy use by end use group. The baseline model has an energy use intensity (EUI) of 57.0 kBtu/ft² based on the floor area of 67,600 ft². The gas use density is 34.8 kBtu/ft², which is typical of a non-optimized building with fairly high water heating requirements.

Figure 4
Base Building Electricity Consumption Distribution

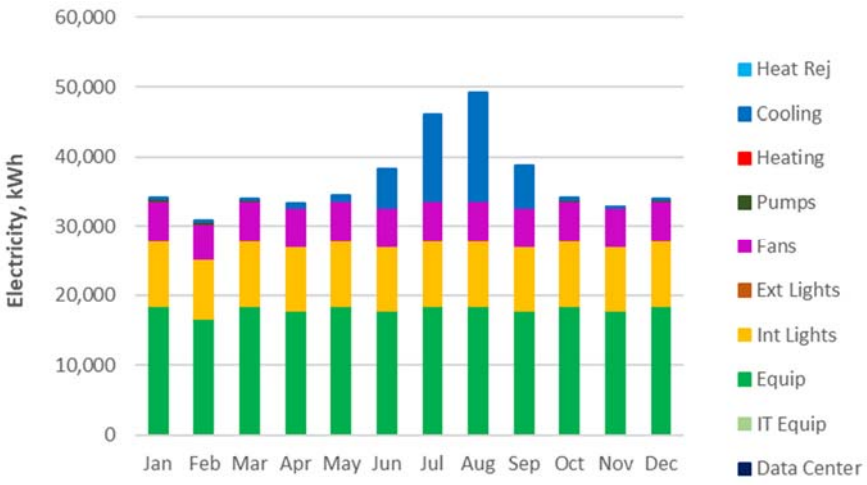


Figure 5
Base Building Natural Gas Consumption Distribution

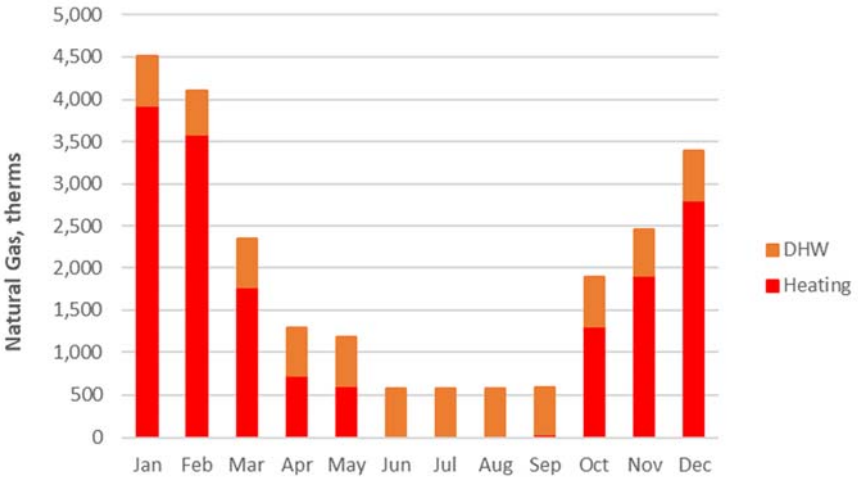
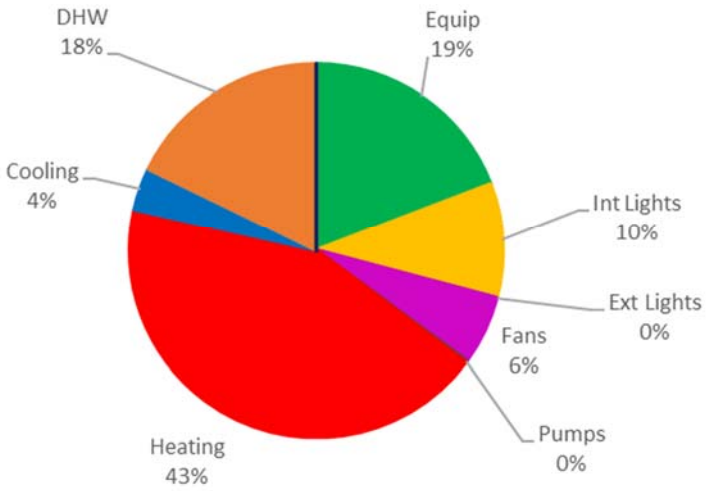


Figure 6
Base Building Distribution of Site Energy Use



Design Case Energy Use

Figures 7, 8, and 9 below illustrate the distribution of electricity consumption, natural gas consumption, and energy use by end use group. The design case model without heat recovery has an energy use intensity (EUI) of 34.3 kBtu/ft² based on a floor area of 67,600 ft². Site energy use is reduced by 38.7% and primarily results from fuel switching.

Figure 7
Electricity Consumption Distribution

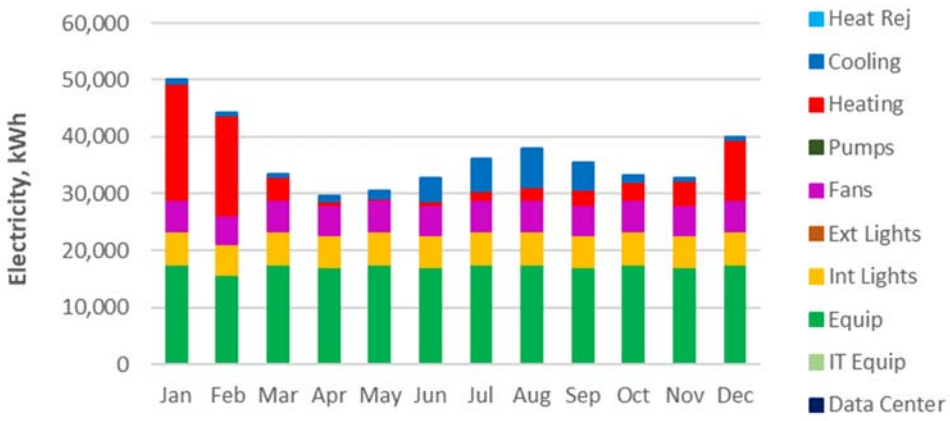


Figure 8
Natural Gas Consumption Distribution

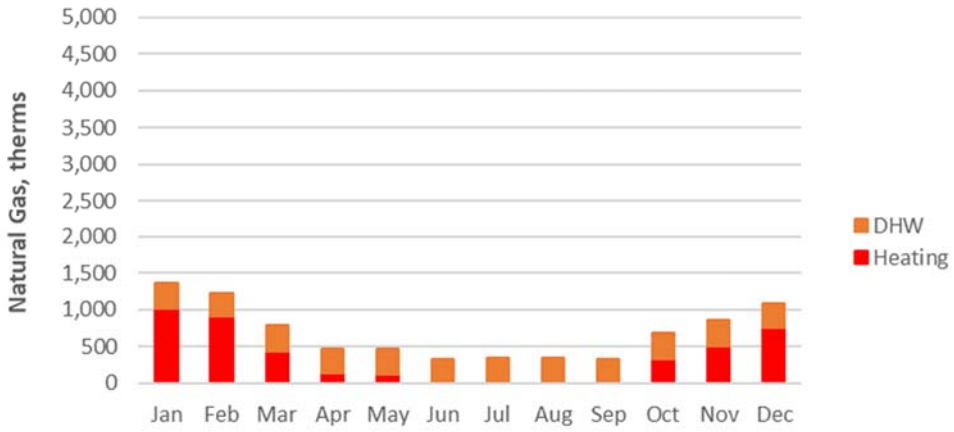
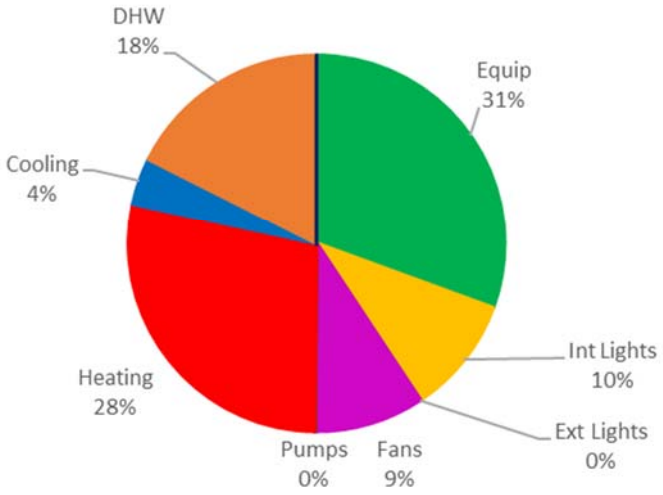


Figure 9
Design Case Distribution of Energy Use



Peak Loads

The energy model reports the peak loads presented in Figure 10 below. Peak loads predicted in energy models tend to be lower than what a design engineer may estimate. The DOAS unit may have a heating coil, but the model estimates that it will not be required to operate if the sensible heat recovery performance is ≥75%.

The design team will need to determine which systems are considered to be critical in the event of a service outage. Use of electric heat (e.g. VRF) does create vulnerability that needs to be considered during design.

Figure 10
Design Case Peak Heating and Cooling Loads

HW Coil Capacity	0.285	MBtu	PTAC Cooling Capacity	23.81	tons
VRF Heating Capacity	0.701	MBtu	VRF Cooling Capacity	58.43	tons
DOAS Heating Capacity	0	MBtu	DOAS Cooling Capacity	11.02	tons
Total Capacity	0.987	MBtu	Total	93.26	tons
Sizing Factor	1.25		Sizing Factor	1.15	
Peak Load	0.79	MBtu	Peak Load	81.10	tons
Avg Heating Load	11.68	Btu/ft²	Avg Cooling Density	834	ft²/ton

Next Steps

This report has been developed to provide an estimate of the potential degree of savings that can be achieved through fairly standard design optimization strategies. The final design may not achieve the presented savings if the design upgrades are not fully implemented. Final ventilation rates will have the greatest impact on final energy savings.

Please feel free to call to discuss any comments or questions associated with this report.

Eric Studer
President

Appendix A: Modeling Assumptions

Energy simulation is a powerful tool that can provide projections of energy consumption for a specific set of input assumptions. This appendix describes the assumptions used in the modeling process and should be understood by anyone wishing to understand the context for the modeling results.

Geometry

The physical layout of the building was modeled based on the January 2018 presentation materials provided by the design team.

Figure A1
North Elevation

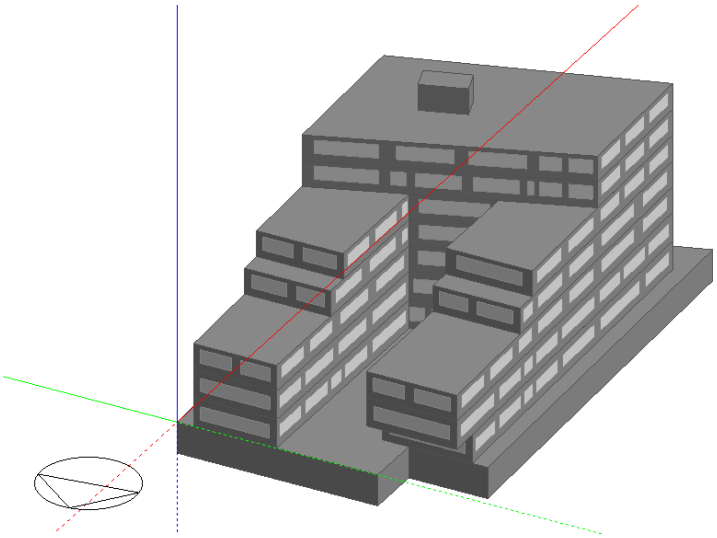
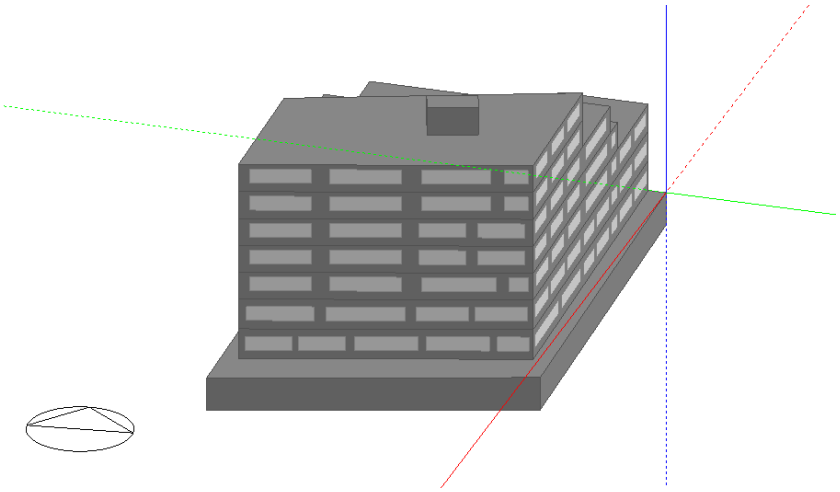


Figure A2
South Elevation



Weather and Site

The model uses TMY3 weather data for Norwood Airport, Massachusetts. Logan Airport is not used since this weather station is located in the harbor and does not accurately reflect weather in Allston. Autosizing in the model is based on a summer condition of 87°F db and 71°F wb and a winter condition of 7°F db.

Envelope Constructions

Envelope and interior constructions are modeled using layers to account for the impact of varying material densities. Infiltration is modeled using the Energy Plus airflow network approach and a crack template reflecting 'good' air sealing. The same infiltration basis is used in the base and proposed cases.

Wall and roof constructions with infill insulation include derating factors for bridging at framing elements. All insulation thermal resistance properties are 'aged' values.

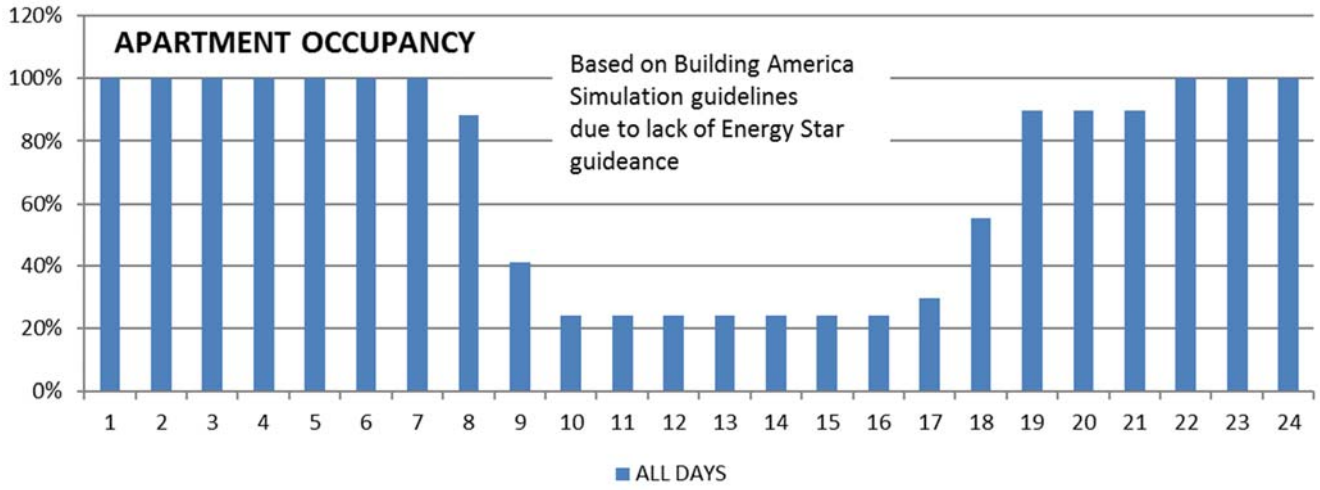
Window systems are modeled using a simplified entry approach (U-value, SHGC, VT), no setback from the face of exterior walls, no internal shading (per ASHRAE 90.1 Appendix G), and no external shading.

Space Loads

Space load schedules are taken from Energy Star Simulation Guidelines v1, rev3 (January 2015) for residential spaces and typical support spaces. Load intensities are taken from the v4 Minimum Energy Performance Calculator v05.

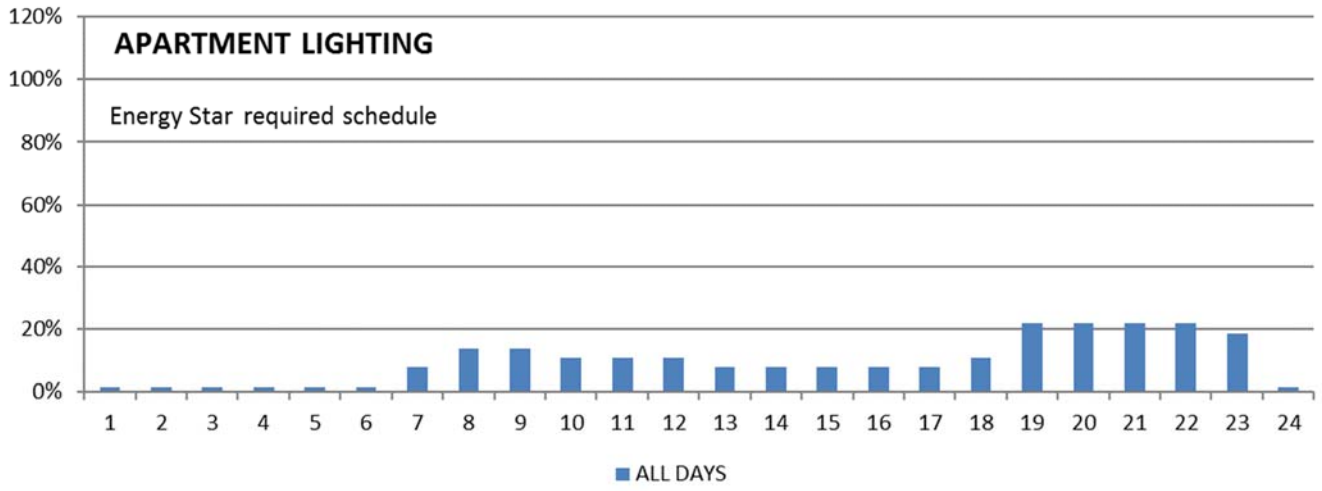
Occupancy

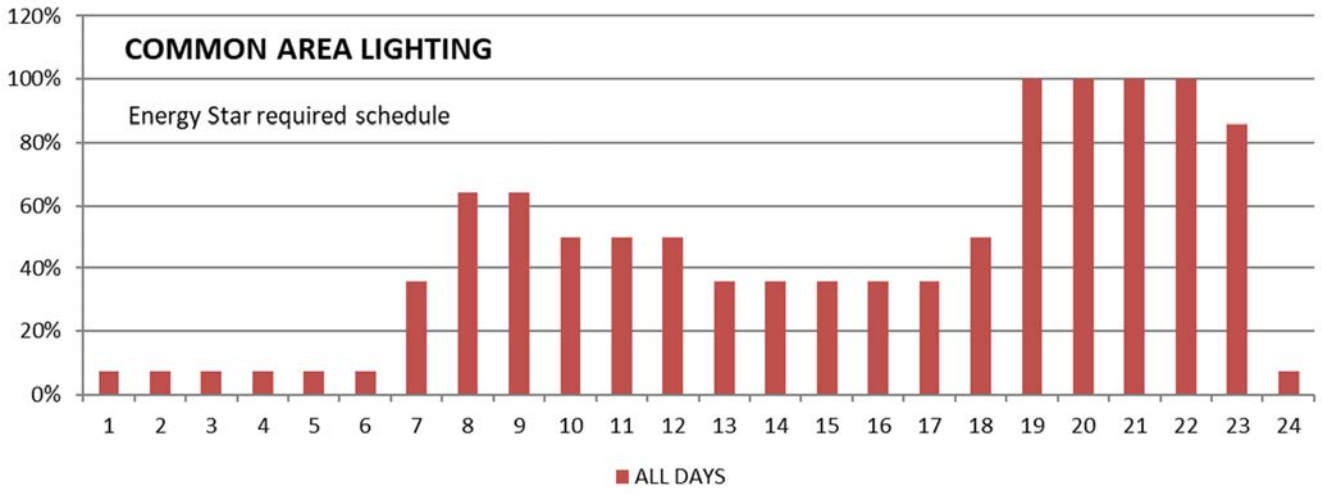
Hourly occupancy in the model is determined by multiplying peak occupancy by a diversity schedule. Derivation of the peak values is described below and plots of the diversity schedules follow. Occupancy intensity and patterns are modeled the same in base and proposed cases.



Lighting

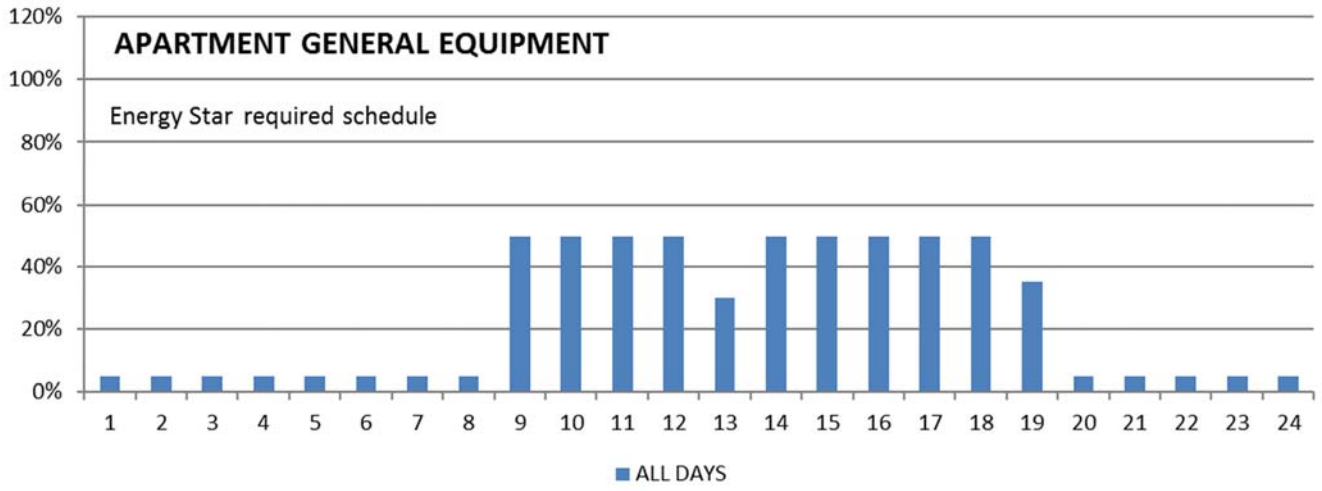
Lighting is modeled based on a space-by-space basis with lighting power densities listed in IECC 2015. Diversity schedules are illustrated in the figures that follow. Corridor, stairway, lobby, and garage lighting is modeled as being constantly on. Lighting in support and storage spaces is assumed to be active for 15% of each hour.

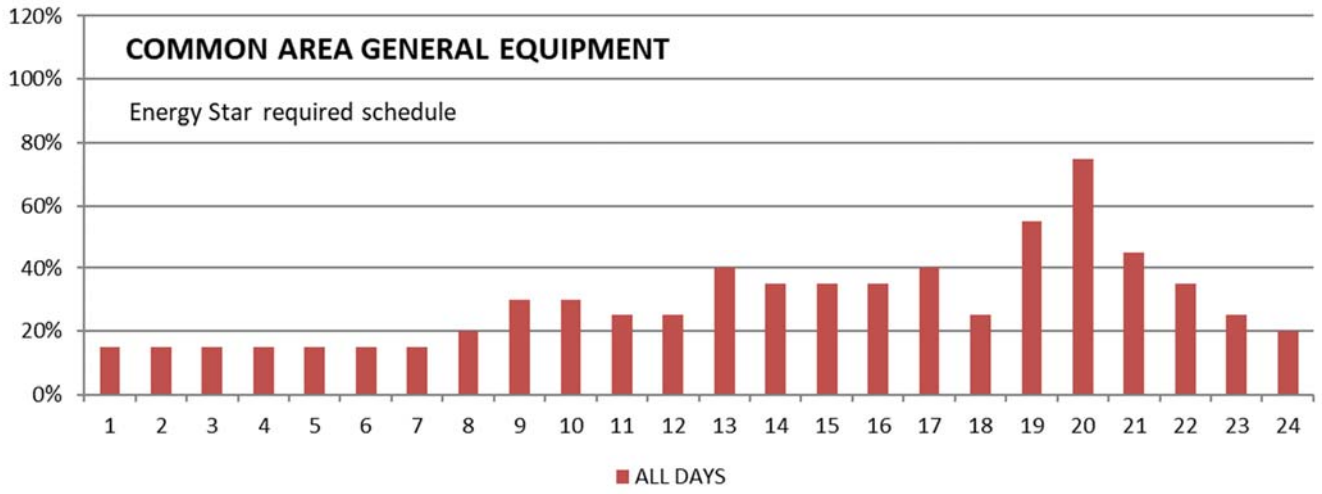




General Plug Loads

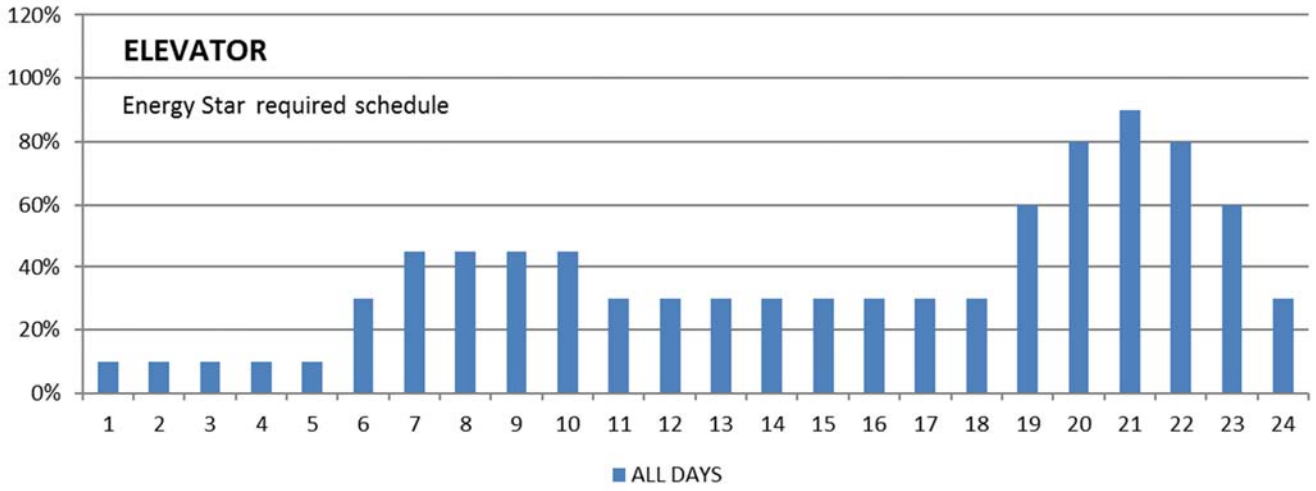
Plug loads are modeled the same in base and design cases with the exception of Energy Star appliances. An aggregate density of 1.457 W/ft² is developed by the v4 Minimum Energy Performance Calculator for the base case. The proposed case density is 1.361 W/ft². The apartment schedule is taken from Energy Star MFHR simulation guidelines. Plug loads in non-apartment and non-garage spaces are assumed to be 0.08 W/ft² operating continuously throughout the year. There are no loads assumed in the parking garage. Fitness room loads are 1.918 W/ft² and common lounge loads are 0.50 W/ft².





Elevators

Elevator energy use is assumed to be 2,150 kWh per year based on Energy Star MFHR guidelines and the number of floors and apartments in this project. The schedule equivalent full load hours is 3,285 EFLH, resulting in a peak elevator power demand of 0.655 kW. This load is applied to the elevator shaft with 10% of the input energy becoming a sensible heat load. The elevator is assumed to be machineroom-less since an EMR is not shown in the drawings.

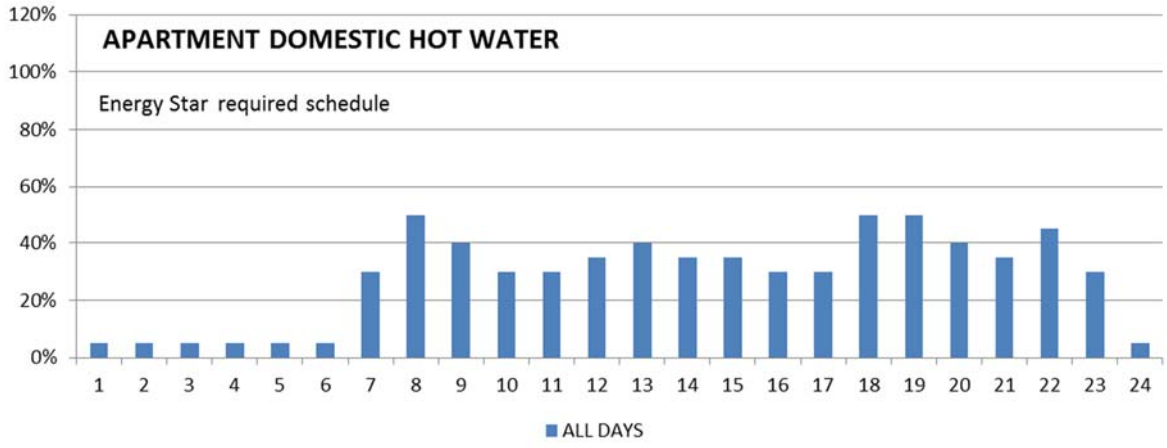


Domestic Hot Water Loads

DHW loads are calculated using the v4 Minimum Energy Performance Calculator v05 with shower flow rates of 1.5 gpm and faucet flow rates of 1.5 gpm.

- Baseline peak flow: 7.0278 gpm
- Proposed peak flow: 4.9667 gpm

Monthly average incoming line temperatures are developed by Energy Plus based on monthly average air and ground temperatures.



Ventilation Flow Rates

Ventilation rates are reported to still be in flux. The energy model is based on ASHRAE 62.1-2007 Table 6.1.

- Apartments: 20 cfm/bathroom + 60 cfm/kitchen
- Corridors: 0.06 cfm/ft²
- Storage (e.g. Bike Room): 0.12 cfm/ft²
- Garage: 0.75 cfm/ft²

Ventilation to the apartments and garage is assumed to be continuous throughout the year.

BASELINE HVAC

Fan Power (ASHRAE 90.1-2010 6.5.3.1.1)

	Credit "w.g.	PTACs cfm						
Fully Ducted Exhaust	0.00	350	350					
Exhaust Airflow Devices	0.00	350	350					
MERV 13 through 15	0.00	350	350					
Energy Recovery	0.00	0	0					
Fume Hood Exhaust System	0.00	350	350					
Value of 'A'		0	0					
Total Shaft Horespower, bhp		0.46	0.46					
Fan Efficiency		50%	50%					
Motor Efficiency		80.0%	80.0%					
Input W/cfm		0.424	0.424					
Total Static Allowance		4.13	4.13					
Supply Fan		3.13	3.13					
Exhaust Fan		1.00	1.00					

Split Systems

	Base	Prop	
Capacity	2.5	2.5	tons
Perf	13.0	16.0	SEER
	10.56	11.74	EER
Model	3.09	3.44	COP

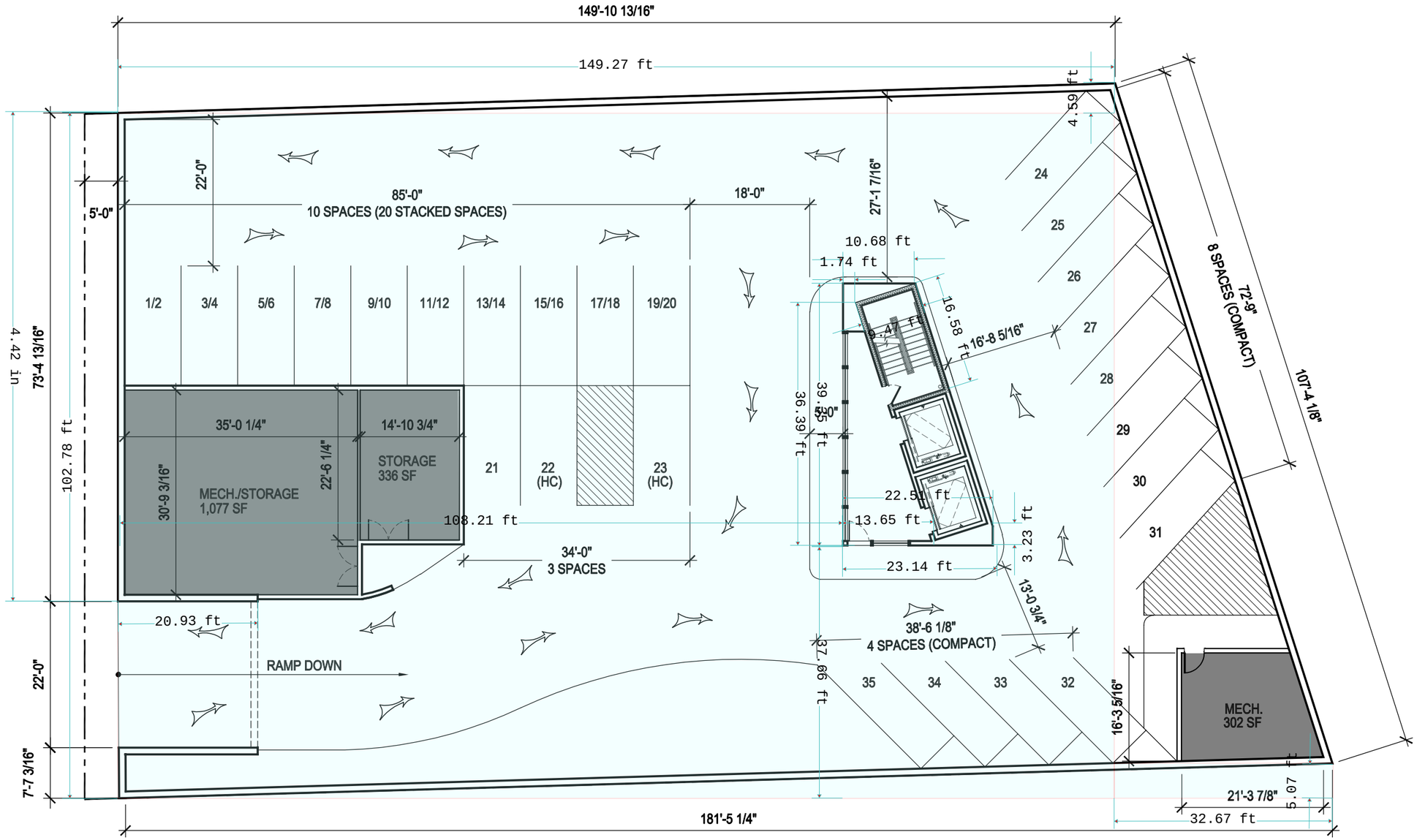
PTAC Fans

Fan Perf	0.3	W/cfm
Motor Eff	80%	
Fan Eff	50%	
Static	1.022	"w.g.

HW Pumps

Perf	19	W/gpm
Motor Eff	89.5%	
Pump Eff	75.0%	
TDP	67.70	ft

Modeling Guidance for MFMR: https://www.usgbc.org/node/9462224?view=resources



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

1 **BASEMENT**

SCALE: 1/16" = 1'-0"

N

44 North Beacon Street

Basement - 1/16"= 1'-0"

01.12.2018

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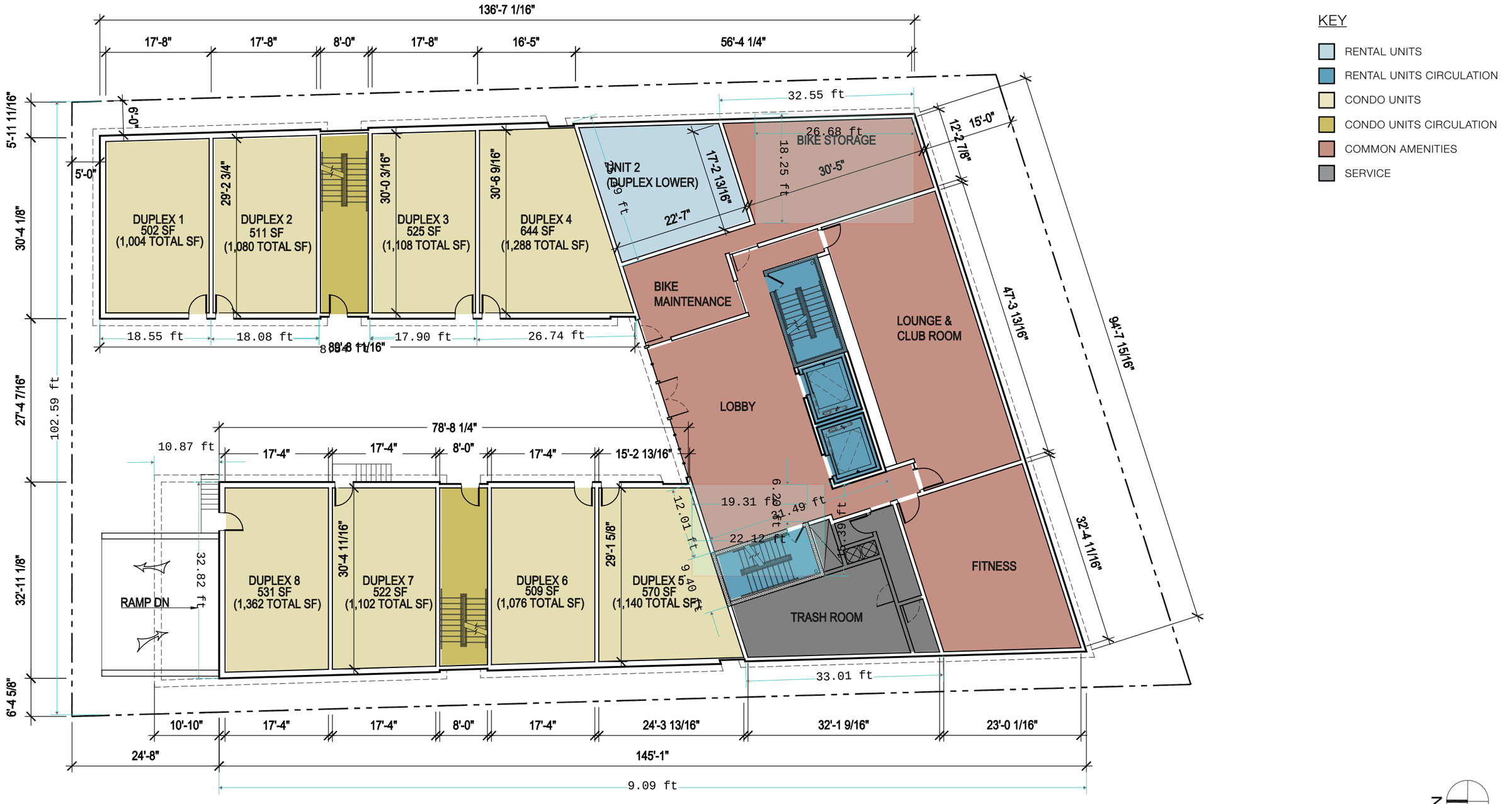

1 GROUND/FIRST FLOOR

SCALE: 1/16" = 1'-0"

44 North Beacon Street

Ground/First Floor - 1/16"= 1'-0"

01.12.2018

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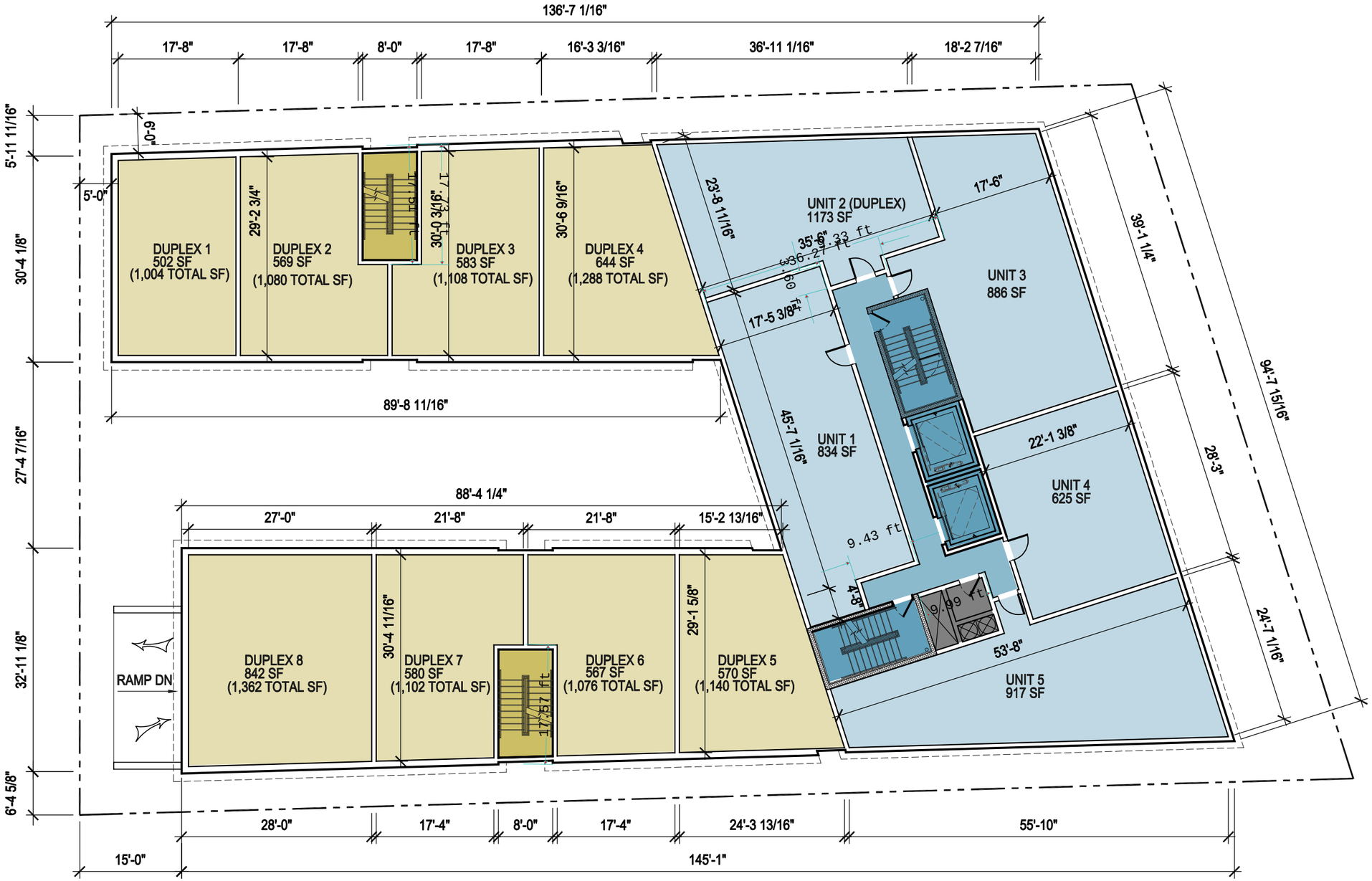

KEY

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- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

44 North Beacon Street

Second Floor - 1/16”= 1’-0”

01.12.2018

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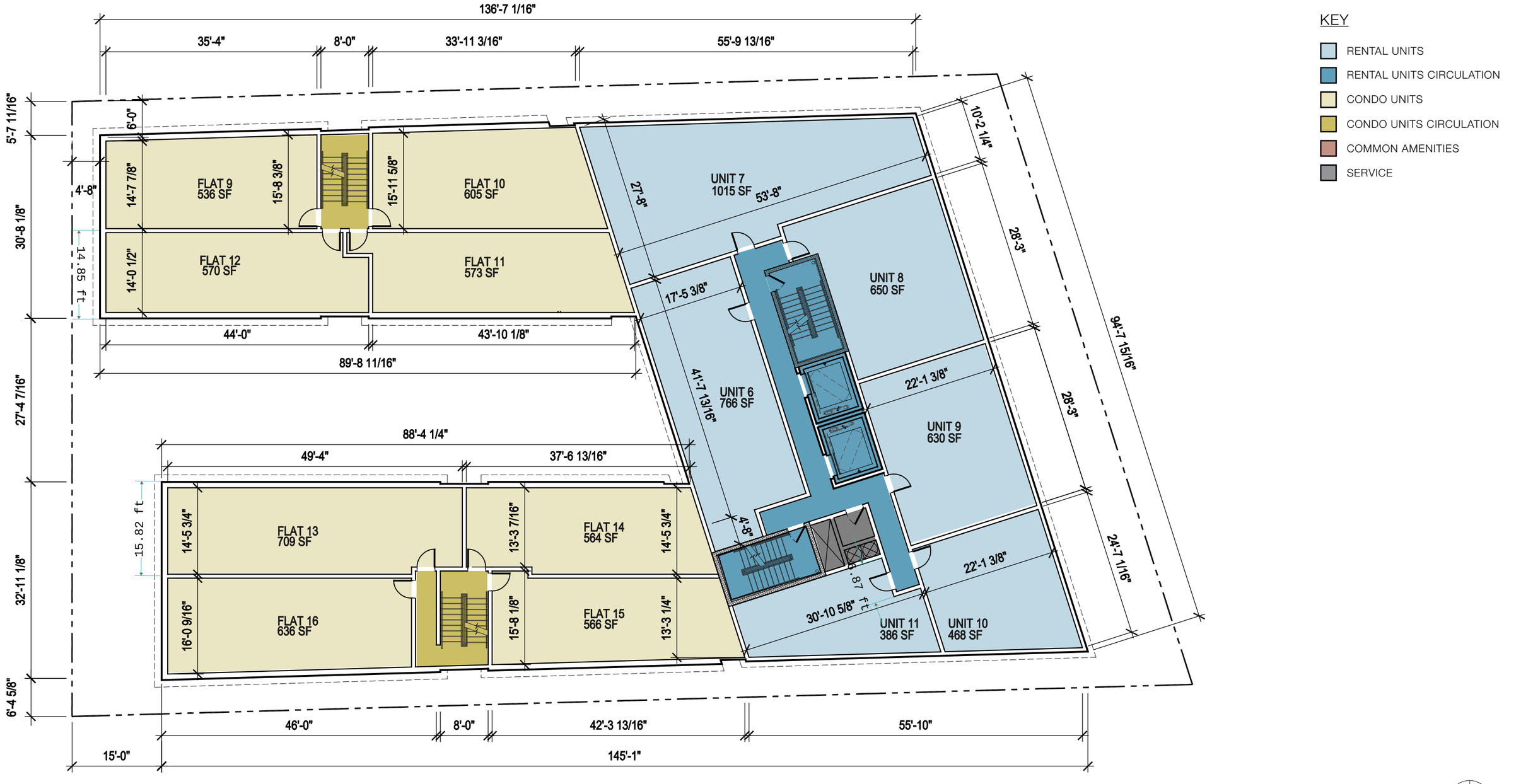

KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

44 North Beacon Street

Third Floor - 1/16"= 1'-0"

01.12.2018

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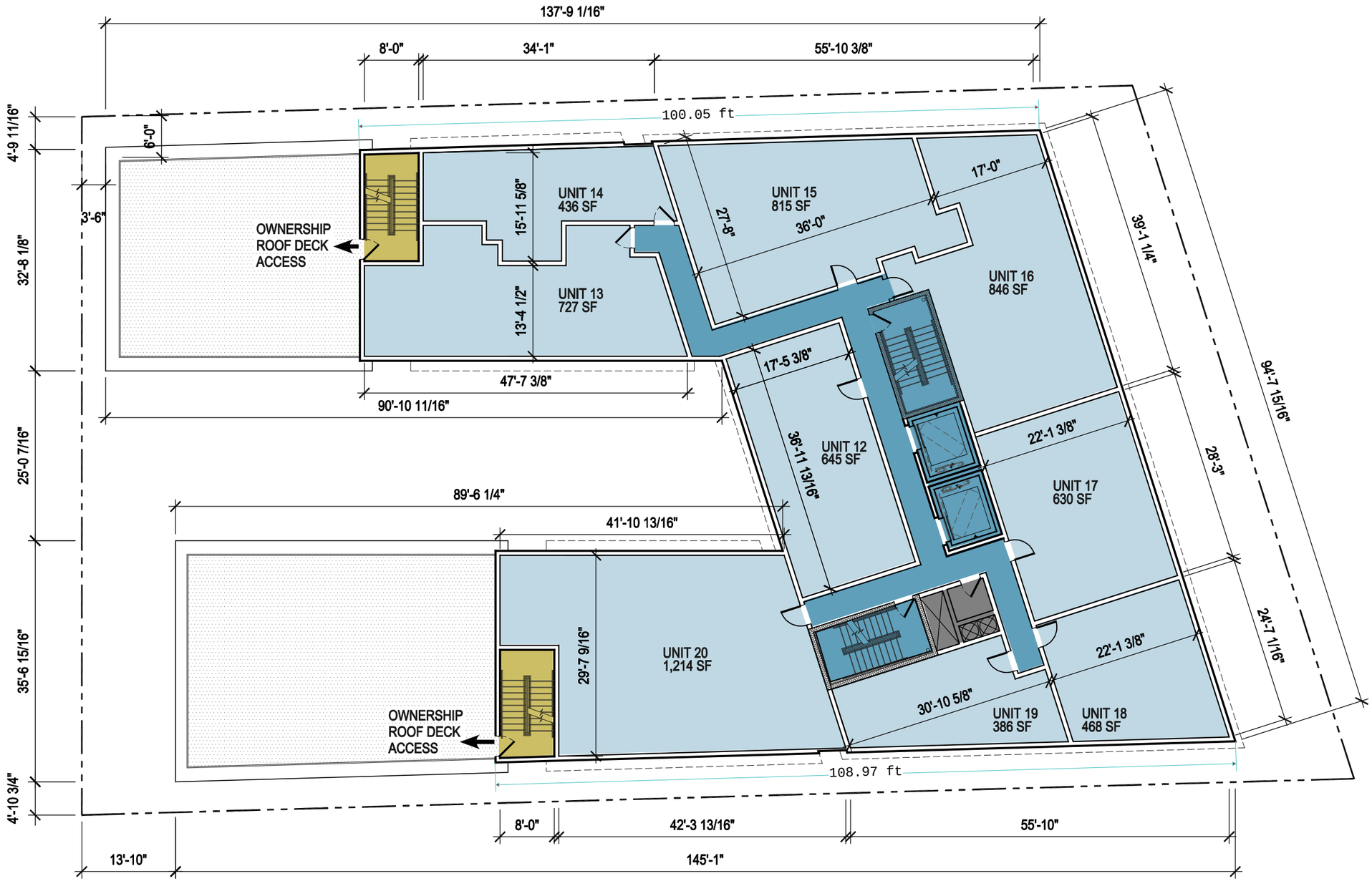

KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

44 North Beacon Street

Fourth Floor - 1/16”= 1’-0”

01.12.2018

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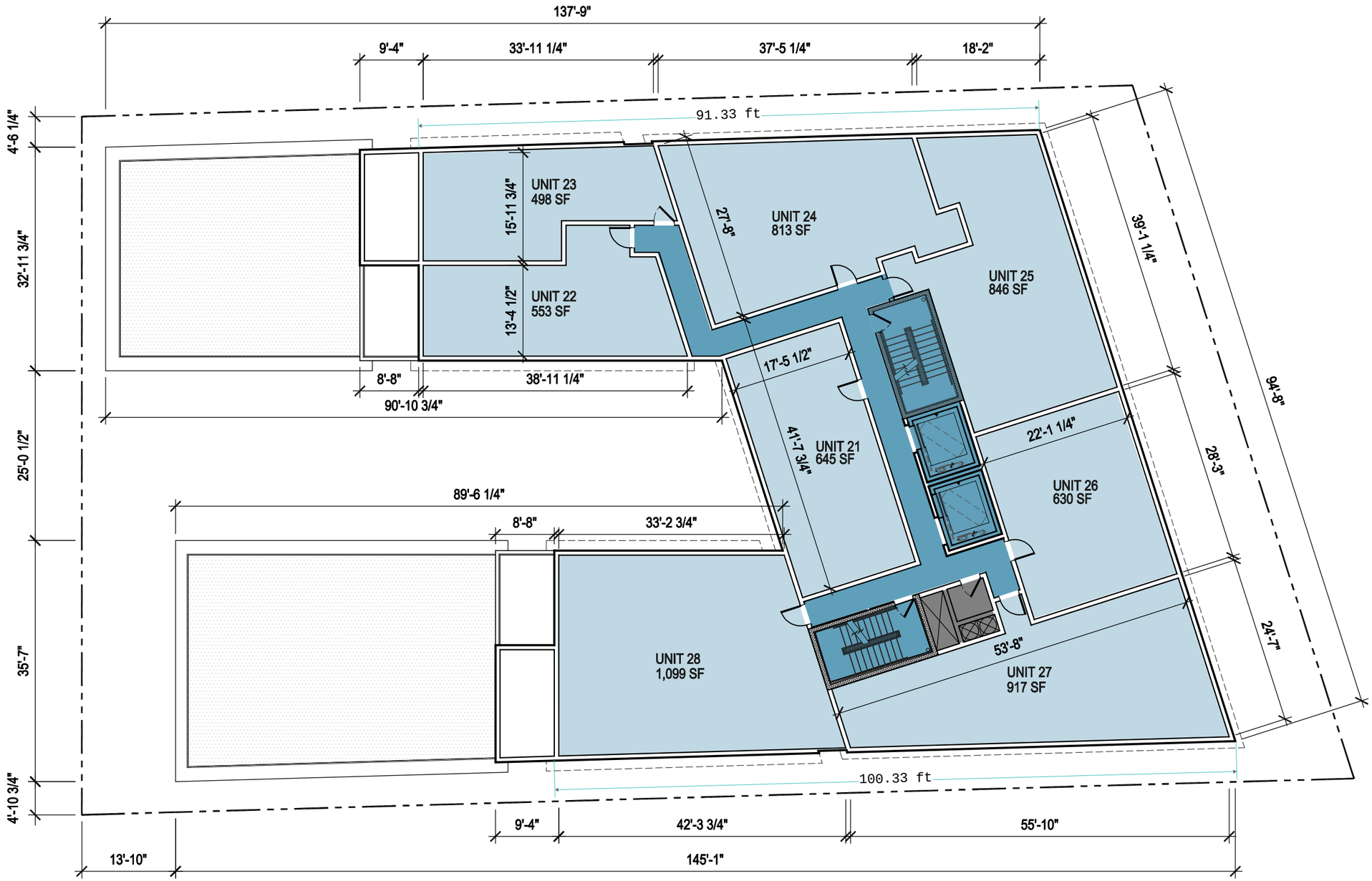
ARCHITECTS



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

44 North Beacon Street

Fifth Floor - 1/16”= 1’-0”

01.12.2018

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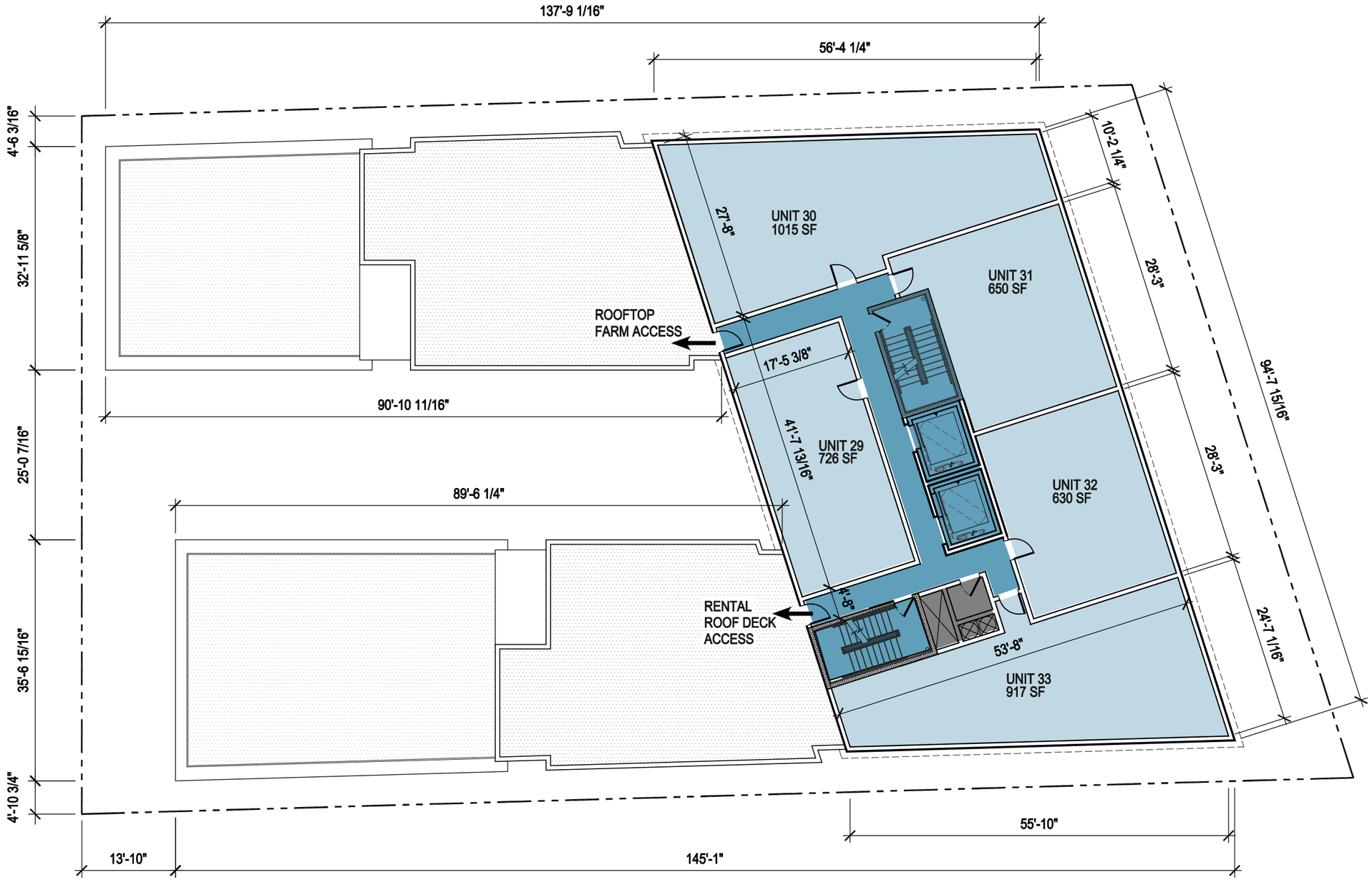
ARCHITECTS



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

44 North Beacon Street

Sixth Floor - 1/16”= 1’-0”

01.12.2018

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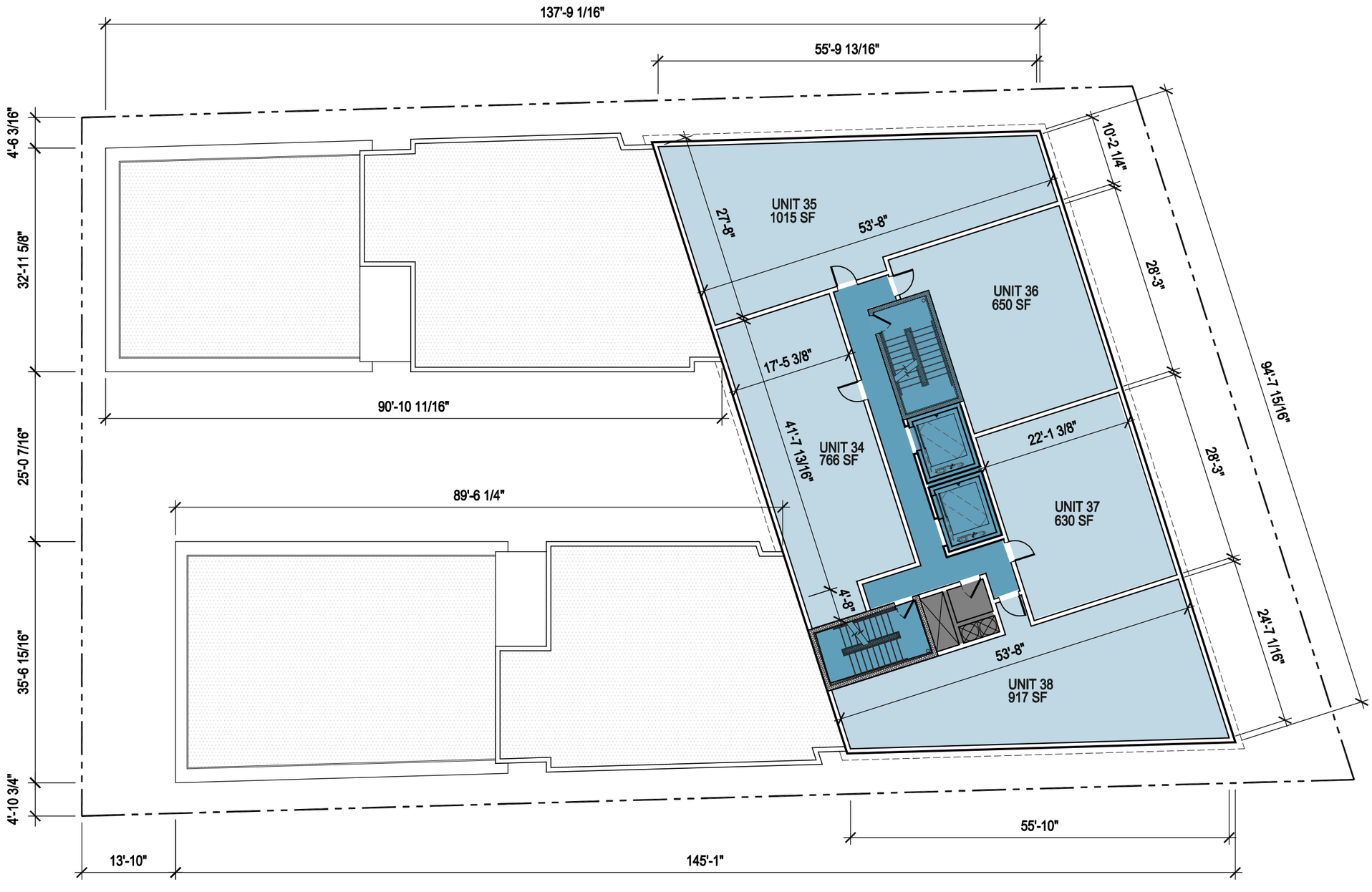
ARCHITECTS



KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

44 North Beacon Street

Seventh Floor - 1/16”= 1’-0”

01.12.2018

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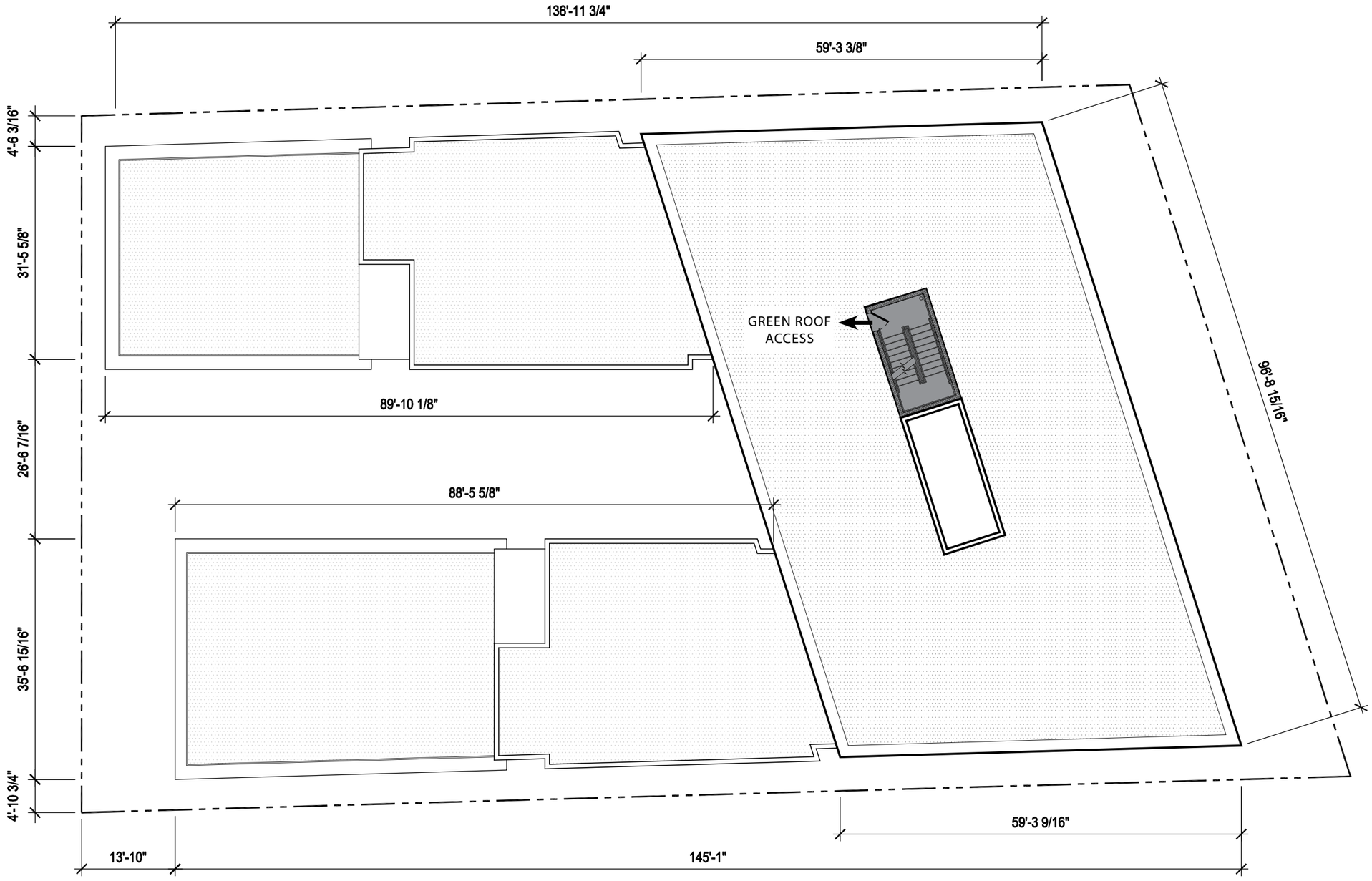

KEY

- RENTAL UNITS
- RENTAL UNITS CIRCULATION
- CONDO UNITS
- CONDO UNITS CIRCULATION
- COMMON AMENITIES
- SERVICE

N

44 North Beacon Street

Roof - 1/16”= 1’-0”

01.12.2018

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