PROJECT NOTIFICATION FORM

73-79 Essex Street

Submitted to:
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Submitted by:
ESXMA 72GL Owner, LLC.
c/o Westbrook Partners
1 Beacon Street
Boston, MA 02108

Prepared by:
Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Maynard, MA 01754

In Association with:
Group One Partners, Inc.
DLA Piper
Howard Stein Hudson
Nitsch Engineering
R.G. Vanderweil Engineers, LLP.

April 21, 2016

Epsilon
ASSOCIATES INC.

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Chapter 1.0

Introduction / Project Description

1.0 INTRODUCTION/PROJECT DESCRIPTION

1.1 Introduction

ESXMA 72GL Owner, LLC (the "Proponent") proposes the development of an approximately 137,000 square foot (sf) hotel with approximately 250 guest rooms at 73-79 Essex Street[1] in the Chinatown neighborhood of Boston (the "Project"). The Project will replace the underutilized existing eight-story, combined warehouse and office building with a new use that will energize the site and local area. The site is located within Chinatown, an area rich with shops and restaurants, and a short walk from the Theatre District, Boston Common, the Financial District, South Station, Fort Point Channel and the Inner Harbor. It is anticipated that the hotel will serve a variety of guests, including business travelers as well as those visiting colleges and tourists.

Boston and its surrounding area continue to be a desirable destination for both domestic and international travelers, with more than 16 million leisure and business visitors in 2014.[2] The continued increase in visitors has allowed for a hotel occupancy rate of more than 81% in the Boston and Cambridge area. The Project is ideally located and suited to continue to meet the needs of travelers, with its location in downtown Boston proximate to both many businesses and tourist attractions, and its proximity to South Station which provides access to the Boston area and the Northeast Corridor. The Project is also located within walking distance of several Massachusetts Bay Transportation Authority (MBTA) services, including the Orange Line, Red Line, Silver Line, Green Line and Blue Line, as well as numerous bus routes. In addition, the Project will positively improve an underutilized site and largely vacant building, and complement the other recently completed and planned projects in the area.

This Project Notification Form (PNF) is being submitted to the Boston Redevelopment Authority (BRA) to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code.

1.2 Project Identification

Address/Location: 73-79 Essex Street, Boston

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[1] Per the Boston Redevelopment Authority and Boston Transportation Department's request and upon approval by the Inspectional Services Department, the Proponent plans to change the address to Oxford Street.

[2] Greater Boston Convention and Visitors Bureau. http://www.bostonusa.com/partner/press/statistics/

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1.3 Project Description

1.3.1 Project Site

The Project site is an approximately 8,095 sf site in downtown Boston, and is bounded by Essex Street to the north, Oxford Street to the west and a building addressed 83 Essex Street to the east. The southern portion of the site is bordered by a new residential development. The site currently includes an eight-story building that includes restaurant and storage uses, but is mostly vacant. The building previously included a local market, office uses, and light manufacturing space. See Figure 1-1 for an aerial locus map and Figure 1-2 for photographs of the existing conditions. Appendix A includes a site survey.

1.3.2 Area Context

The Project site is located in the Chinatown neighborhood of Boston, an area rich in culture, restaurants, and shops. Within a short walk are the Financial District, Theatre District, Boston Common, various colleges, the State House and Boston City Hall, Faneuil Hall and Quincy Market, as well as the waterfront. The surrounding area includes a mix of residential and commercial space, as well as ground floor retail and small plazas and open spaces. The surrounding buildings range in height from five to forty stories.

The site is located within one half-mile of several MBTA stations providing service on the Orange, Green, Blue and Red lines, including Downtown Crossing Station, Chinatown Station, Boylston Station, State Street Station, Park Street Station and South Station. Several MBTA bus stops are also nearby, as well as the Silver Line. South Station also provides service on the Commuter Rail and Amtrak. This proximity to public transit makes the area an ideal location for a hotel serving a mix of visitors.

1.3.3 Proposed Project

The Project includes the development of a new, 17-story (approximately 181 feet[3] in height) limited service hotel containing approximately 137,000 sf of gross floor area with approximately 250 guest rooms. The new building will also include amenity spaces, including a fitness room, meeting rooms, and food service for hotel guests. The existing

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[3] As measured according to the Boston Zoning Code.

underutilized building will be demolished to allow for construction of the new building. Figure 1-3 is a section of the new building.

The primary access to the hotel and registration will be on Oxford Street (see Figures 1-4 and 1-5). The ground floor will include the hotel check-in area, seating areas and conservatory, as well as back of house areas. The basement will include the fitness room, as well as a laundry area and mechanical areas. A lounge and food service area will be located on the second floor. Floors three to 17 will include the guest rooms. Appendix B includes floor plans.

No parking will be provided on-site. As shown on Figure 1-4, a valet and drop-off area will be located on Oxford Street, close to the front entrance at the corner of Oxford Street and Essex Street.

The Project will provide needed hotel space to address the growing hotel needs of business travelers as well as demand related to the Boston Convention and Exhibition Center. As mentioned above, the site is well serviced by public transportation, and given the variety of uses, institutions and attractions in the immediate area, is anticipated to attract a variety of guests, including those visiting for business, tourists, and those visiting colleges.

While taller than the existing building and some of the older, existing buildings in the area, the Project will be similar in height or shorter than other new projects in the vicinity, including 120 Kingston Street, 45 Stuart Street, and Kensington Place.

1.4 Public Benefits

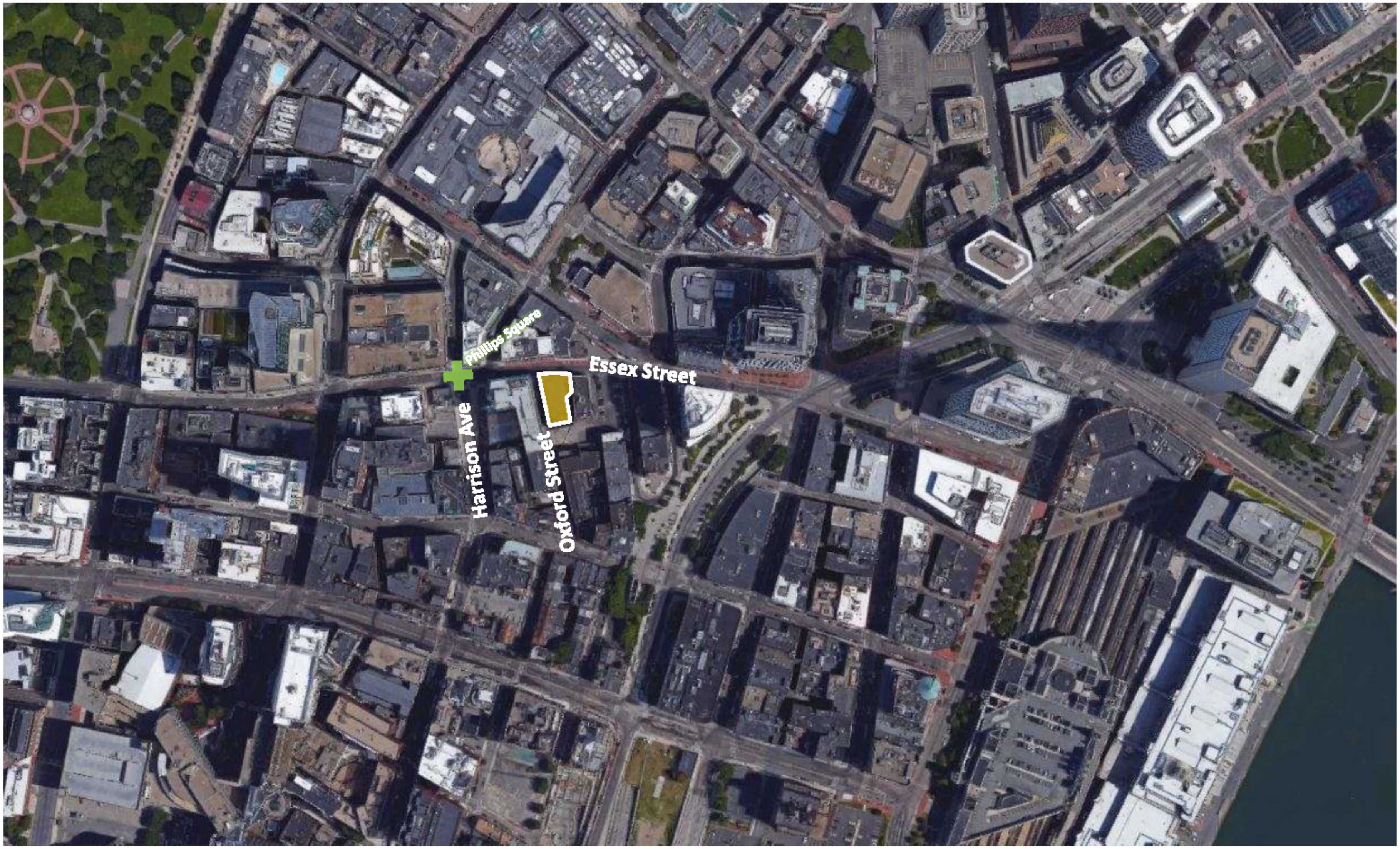
The Project will redevelop an underused site and create a sustainably designed building providing a hotel in the Chinatown neighborhood of Boston. The Project will include numerous benefits to the neighborhood and the City of Boston as described below.

- The Project will create a new hotel proximate to Downtown Boston and the surrounding neighborhoods, helping to meet the city's goal of creating additional hotel rooms.

- The Project will enliven and activate the local area and the streetscape by replacing an underused, largely vacant, aging building in need of substantial repair.

- The location will be ideal for visitors that arrive by train or other public transportation.

- The Project is in proximity to public transportation which will provide tourists with a viable mode of transit that can be used as an alternative to traveling by car while visiting the City.



73-79 Essex Street Boston, Massachusetts

Group One PARTNERS

Figure 1-1

Aerial Locus map

1- Views from Essex Street looking West

2 - Views from Phillips Square looking East on Essex Street

3 - Views from Oxford Street looking North

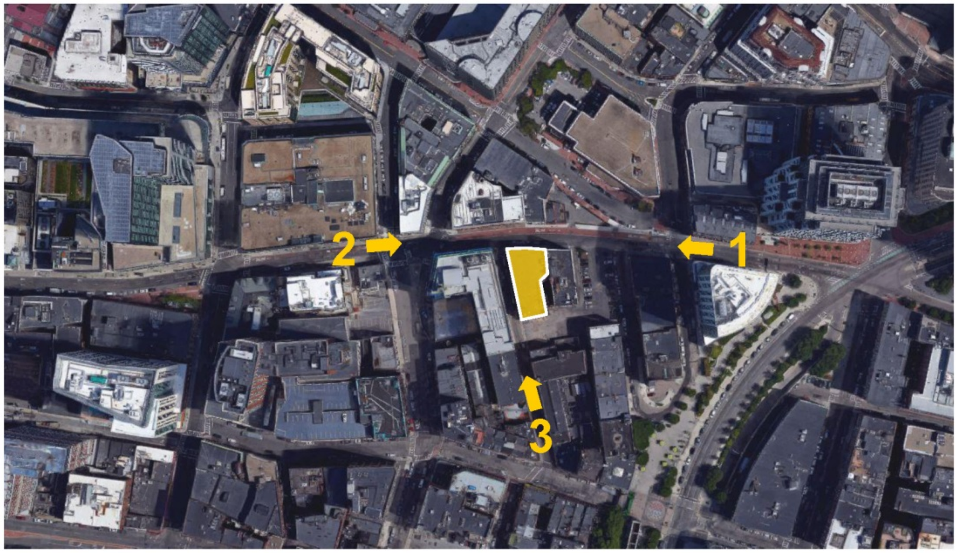


Photo Legend

Figure 1-2

Existing Conditions Photographs

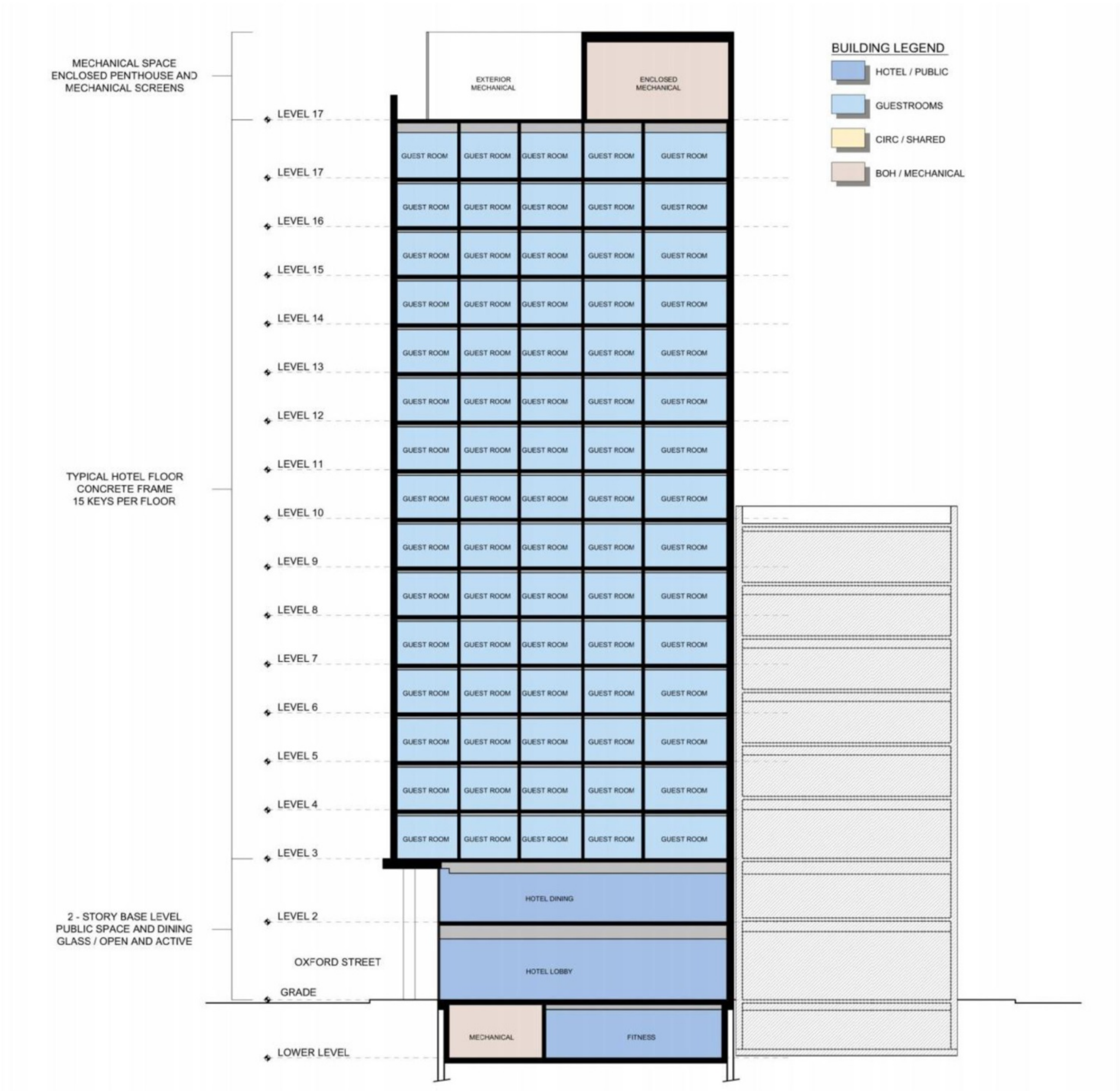
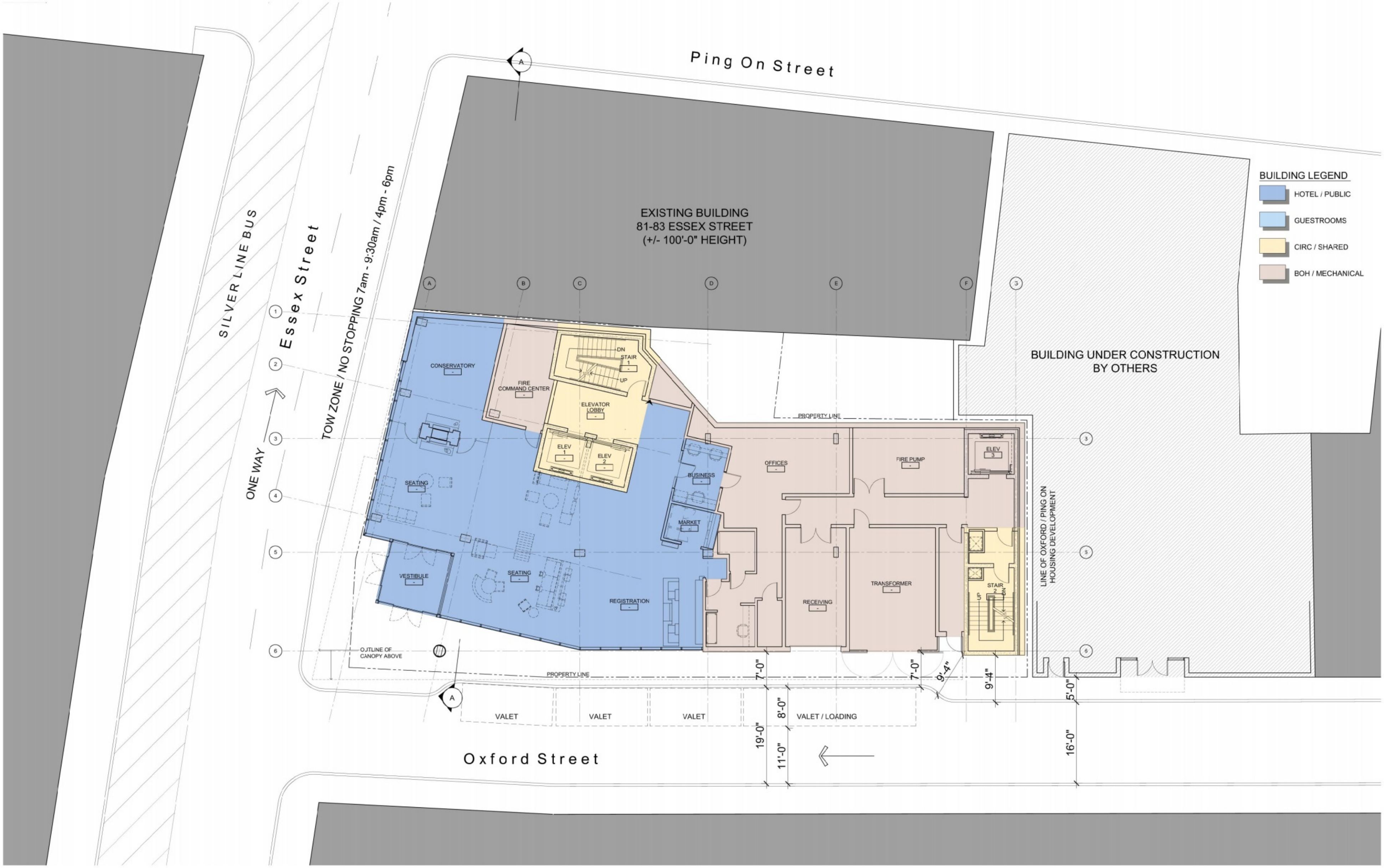


Figure 1-3

Building Section



73-79 Essex Street   Boston, Massachusetts

Figure 1-4

Ground Floor Plan

73-79 Essex Street **Boston, Massachusetts**

Figure 1-5

View of Front Entrance

- The Project is projected to create more than 500 construction jobs and 75 permanent full- and part-time jobs.

- The Project will increase annual property taxes over the tax levied on the existing Project site, and generate new hotel taxes.

- The Project will include contributions to the Neighborhood Housing Trust and Neighborhood Jobs Trust.

The Project will provide a variety of urban design benefits to the surrounding neighborhood, including:

- The Project will meet the requirements of Article 37 of the Boston Zoning Code with a goal of meeting the Silver level of the Leadership in Energy and Environmental Design (LEED) for New Construction rating system.

- Improved streetscapes will be created along the major streets abutting the site with widened sidewalks and lighting.

- Modern architectural design will enhance the façade of the neighborhood while also complementing the existing language of the streetscape.

- A new building that will complement the existing buildings in the area and the new construction that has recently been completed.

1.5 City of Boston Zoning

The Project is subject to land use controls contained in the City of Boston Zoning Code (the "Code"). The Project site is located in (i) the Commercial Chinatown Subdistrict of the Chinatown District under Article 43 of the Code, (ii) the Groundwater Conservation Overlay District, which is governed principally by Article 32 of the Code, and (iii) a Restricted Parking Overlay District. The Proponent intends to apply for conditional use approvals and variances from the Zoning Board of Appeals to permit construction of the Project.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

The Proponent is not aware of any legal judgments in effect or actions pending with respect to the Project.

1.6.2 History of Tax Arrears on Property

The Proponent does not have a history of tax arrears on any property owned within the City of Boston.

1.6.3 Site Control/Public Easements

The Proponent has a long-term ground lease for the Project site. The Proponent is permitted to proceed with the Project without further approvals from the ground landlord. The Proponent is not aware of any public easements into, through or affecting the Project site other than typical utility easements and adjacent public rights of way. Appendix A includes a site survey.

1.7 Anticipated Permits

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

Table 1-1 List of Anticipated Permits and Approvals

AGENCY	*APPROVAL*
Local	
Boston Redevelopment Authority	Article 80 Large Project Review; Article 80 Agreements; Certificate of Compliance
Boston Civic Design Commission	Design Review
Boston Committee on Licenses	Flammable Storage License
Boston Water and Sewer Commission	Water and Sewer Connection Permits; Temporary Construction Dewatering Permit; General Service Application; Site Plan Review
Boston Transportation Department	Construction Management Plan; Transportation Access Plan Agreement
Boston Public Improvement Commission/Boston Department of Public Works	Curb Cut Permit; Street/Sidewalk Repair Plan; Permits for street occupancy and opening permit; Canopy/Marquis approval
Boston Fire Department	Approval of Fire Safety Equipment; Fuel Oil Storage Permit
Boston Inspectional Services Department	Building Permit; Certificate of Occupancy
Boston Zoning Board of Appeal	Zoning Relief
Boston Landmarks Commission	Article 85 Demolition Delay Review

Table 1-1 List of Anticipated Permits and Approvals (Continued)

AGENCY	*APPROVAL*
State	
Department of Environmental Protection	Notification of Demolition and Construction; Asbestos Containing Material Notice
Massachusetts Water Resources Authority	Temporary Construction Dewatering Permit (as required)
Federal	
Federal Aviation Administration	Determination of No Hazard to Air Navigation

1.8 Public Participation

Since September 2015, the Proponent and its Project team have met with elected officials, the City of Boston, abutters, neighborhood groups and other interested parties to discuss the Project. The Project team will continue to meet with the community as the Project moves forward.

1.9 Schedule

Construction is expected to begin in the third quarter of 2017 and will last approximately 24 months.

Chapter 2.0

Transportation

2.0 TRANSPORTATION

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the redevelopment of 73-79 Essex Street in the Chinatown neighborhood of Boston. This transportation study adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and BRA Article 80 Large Project Review process. This study includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity.

2.1 Project Description

The approximately 8,095 sf site currently consists of a mostly vacant eight story building. The proposed Project will consist of a new 17-story building containing approximately 137,000 sf. The Project includes approximately 250 hotel rooms. Parking will be provided in existing parking garages in and around Downtown Crossing and Chinatown.

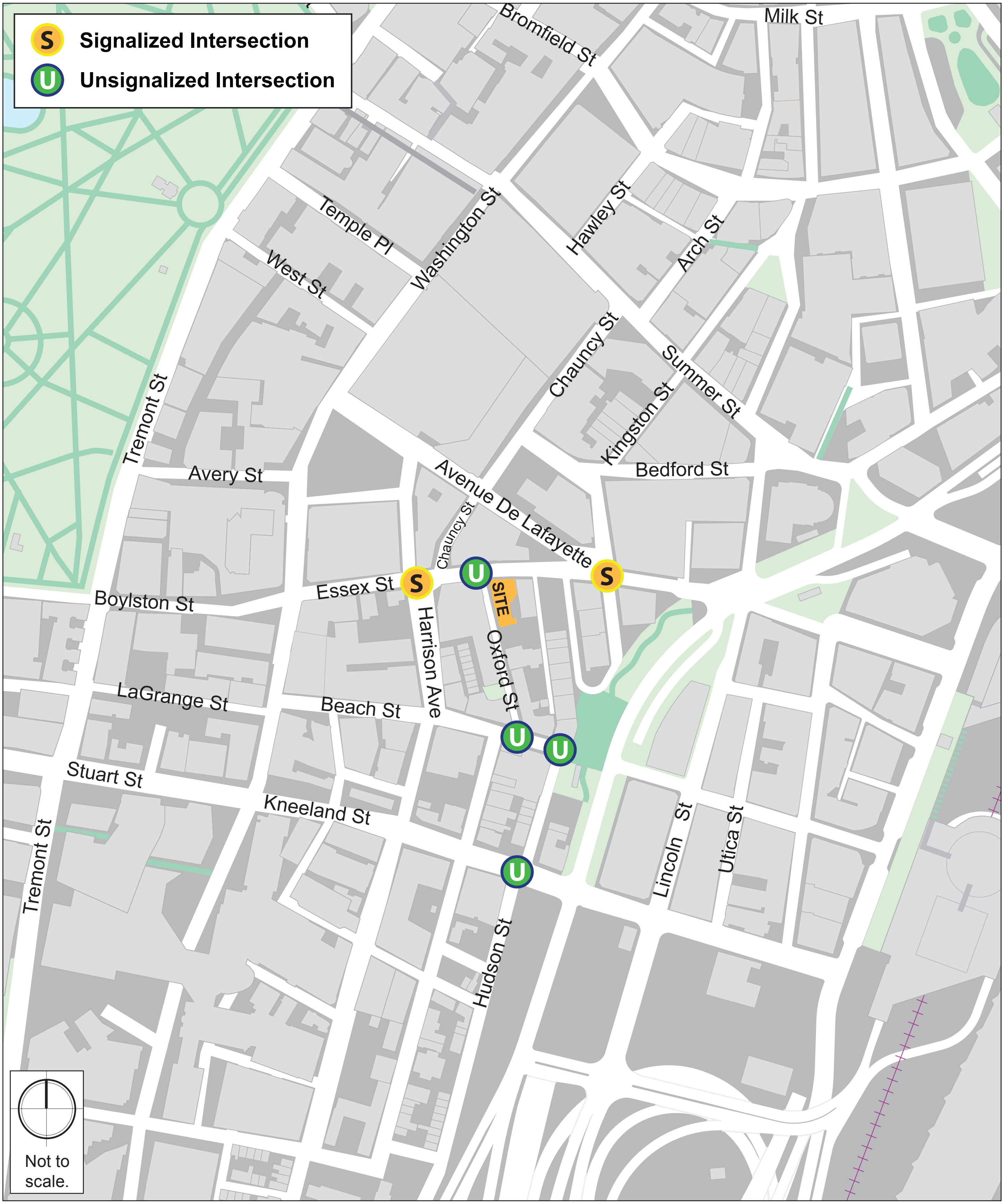
2.1.1 Study Area

The transportation study area runs along the Essex Street corridor, bounded by Surface Road to the east and Harrison Avenue to the west, as well as the roadways that will provide access to the garages in the area. The study area consists of the following intersections in the vicinity of the site, also shown on Figure 2-1:

- Essex Street/Harrison Avenue/Harrison Avenue Extension/Chauncy Street (signalized);
- Essex Street/Oxford Street (unsignalized);
- Essex Street/Kingston Street/Avenue de Lafayette (signalized);
- Kneeland Street/Hudson Street (unsignalized);
- Beach Street/Hudson Street (unsignalized); and
- Beach Street/Oxford Street (unsignalized).

2.1.2 Study Methodology

This transportation study and supporting analyses were conducted in accordance with BTD guidelines and are described below.



73-79 Essex Street Boston, Massachusetts

HOWARD STEIN HUDSON
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Figure 2-1
Study Area Intersections

The Existing (2016) Condition analysis includes an inventory of the existing transportation conditions such as traffic characteristics, parking, curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts for vehicles, bicycles, and pedestrians were collected at the study area intersections. The traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2021, based on a five-year horizon from the year of the filing of this traffic study.

The No-Build (2021) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the site.

The Build (2021) Condition analysis includes a net increase in traffic volume due to the addition of Project-generated trip estimates to the traffic volumes developed as part of the No-Build (2021) Condition analysis. Expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies, are identified.

The final part of the transportation study identifies measures to mitigate Project-related impacts and addresses any traffic, pedestrian, bicycle, transit, safety, or construction related issues that may be necessary to accommodate the Project.

An evaluation of short-term traffic impacts associated with construction activities is also provided.

2.2 Existing Condition

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak-hour vehicular and pedestrian volumes, average daily traffic volumes, public transportation availability, parking, curb usage, and loading conditions.

2.2.1 Existing Roadway Conditions

The study area includes the following roadways, which are categorized according to the Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning functional classifications:

Essex Street is a one-way eastbound roadway located on the north side of the Project site. Essex Street is classified as an urban minor arterial under BTD jurisdiction and runs between Washington Street to the west and Atlantic Avenue to the east. In the vicinity of the site, the roadway consists of a bus only lane, a travel lane, and a parking lane that restricts parking during the peak periods allowing travel during those times. Sidewalks are provided on both sides of Essex Street.

Harrison Avenue is a one-way southbound, one-lane roadway located to the west of the Project site. Harrison Avenue/Harrison Avenue Extension is classified as an urban minor arterial roadway, under BTD jurisdiction, and runs in a predominately north-south direction between Avenue de Lafayette to the north and Dudley Street to the south. In the vicinity of the site, on-street parking is provided along both sides of the roadway. Sidewalks are provided on both sides of Harrison Avenue/Harrison Avenue Extension.

Oxford Street is a one-way northbound, one-lane roadway located to the west of the Project site. Oxford Street is classified as a local road, under BTD jurisdiction, and runs in a predominately north-south direction between Beach Street to the south and Essex Street to the north. In the vicinity of the site, on-street parking is provided along the right side of the street for residents only, with some areas designated for pick-up and drop-off with a 20 minute limit. Sidewalks are provided on both sides of Oxford Street.

2.2.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

Essex Street/Harrison Avenue/Harrison Avenue Extension/Chauncy Street is a six-leg, signalized intersection with two approaches. The Essex Street eastbound approach is one-way and consists of a shared bus/bicycle lane/left-turn lane, a through lane, and a shared through/right-turn lane. The Harrison Avenue southbound approach is one-way and consists of a shared left-turn/through lane. Sidewalks are provided along both sides of all legs. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all legs of the intersection.

Essex Street/Oxford Street is a three-leg, unsignalized intersection with two approaches. The Essex Street eastbound approach is one-way and consists of a bus/bicycle lane and two through lanes. The Oxford Street northbound approach is one-way and consists of a right-turn only lane. Sidewalks are provided along both sides of all legs. Crosswalks and wheelchair ramps are provided across the Oxford Street leg of the intersection.

Essex Street/Kingston Street/Avenue de Lafayette is a four-leg, signalized intersection with two approaches. The Essex Street eastbound approach is one-way and consists of a shared bus/bicycle lane, one through lane, and a shared through lane/right-turn lane. The Kingston Street southbound approach is one-way and consists of a left-turn lane and a shared left-turn lane/through lane. Approximately 40 feet before the traffic signal on the southbound approach, there is a channelized right onto Avenue de Lafayette. Sidewalks are provided along both sides of all legs. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all legs of the intersection. On-street parking is metered and permitted only along both sides of Avenue de Lafayette and the south leg of Kingston Street on the east side.

Kneeland Street/Hudson Street is a four-leg, unsignalized intersection with only two approaches, both on Kneeland Street as Hudson Street is one-way on both legs, in opposite directions away from the intersection. Both the Kneeland Street eastbound and westbound approaches consist of one shared left-turn/through lane and one through/right-turn lane. Sidewalks are provided along both sides of all legs. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all legs of the intersection.

Beach Street/Hudson Street is a two-leg, unsignalized intersection with one approach. The Hudson Street northbound approach is one-way and consists of a single left-turn lane onto westbound Hudson Street. To the east of the intersection is a pedestrian thoroughfare that passes underneath the Chinatown Gate. Sidewalks and on-street two-hour parking are provided along both sides of both legs. A crosswalk and wheelchair ramps are provided across the northbound approach.

Beach Street/Oxford Street is a three-leg, unsignalized intersection with one approach. The Beach Street westbound approach is one-way and consists of one shared through/right-turn lane. Sidewalks are provided along both sides of all legs, and on-street two-hour parking is provided along both sides of the approach. Crosswalks and wheelchair ramps are provided across the north and west legs of the intersection.

2.2.3 Parking

An inventory of the on-street and off-street parking in the vicinity of the Project was collected. A description of each follows.

2.2.3.1 On-Street Parking and Curb Usage

On-street parking surrounding the site consists of predominately commercial parking, no-parking, metered parking, two-hour parking, handicapped-only parking, and resident permit parking. The existing on-street parking regulations within the study area are shown in Figure 2-2.

2.2.3.2 Off-Street Parking

There are more than 4,830 off-street public parking spaces within a five-minute walk, from the Project site. Of these, approximately 250 are found in parking lots and approximately 4,580 are in parking garages. Public surface lots and garages within a quarter-mile or five minute walk of the Project site are shown in Figure 2-3. A detailed summary of all parking lots and garages are shown in Table 2-1.

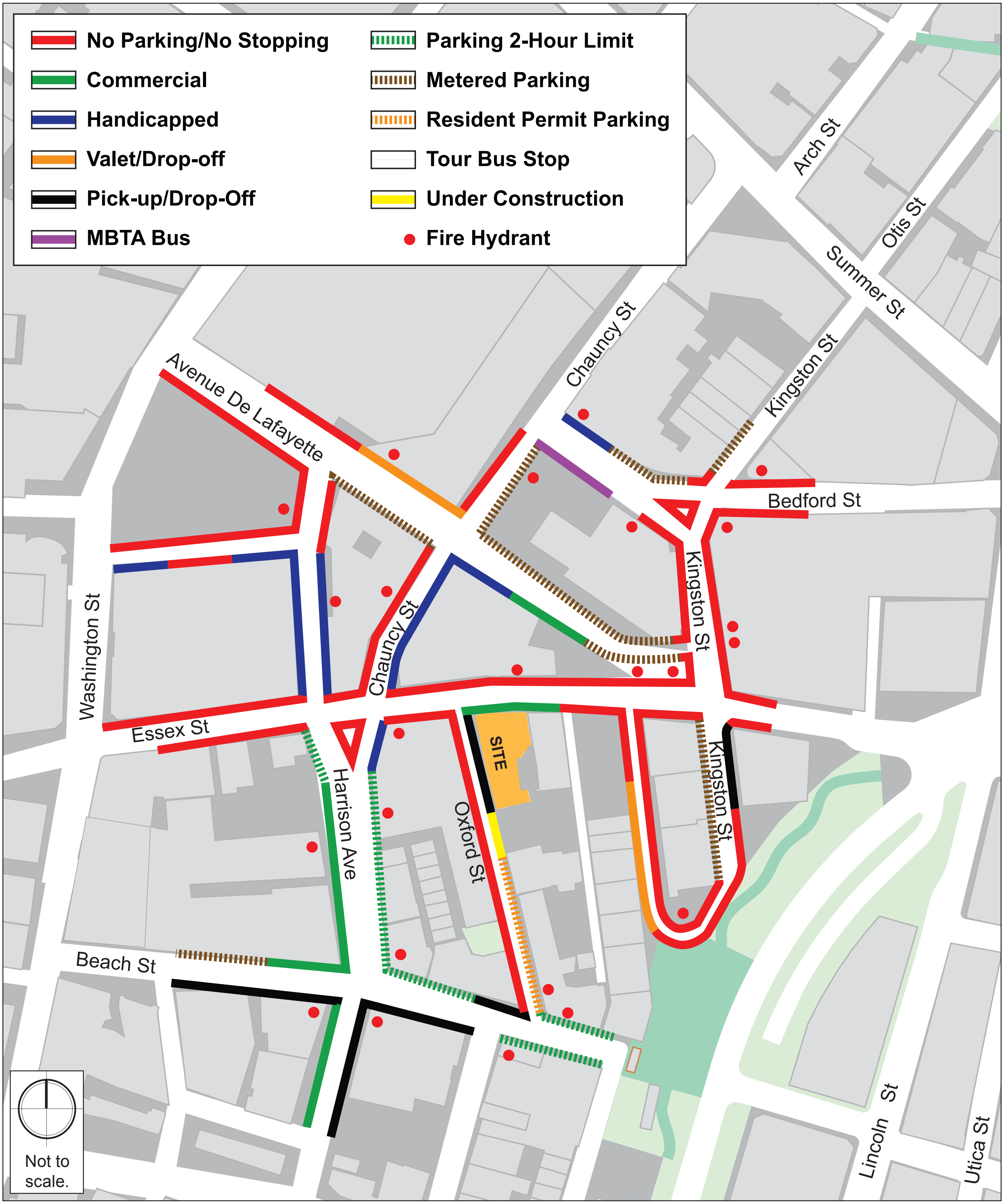

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Figure 2-2
On-Street Parking Regulations

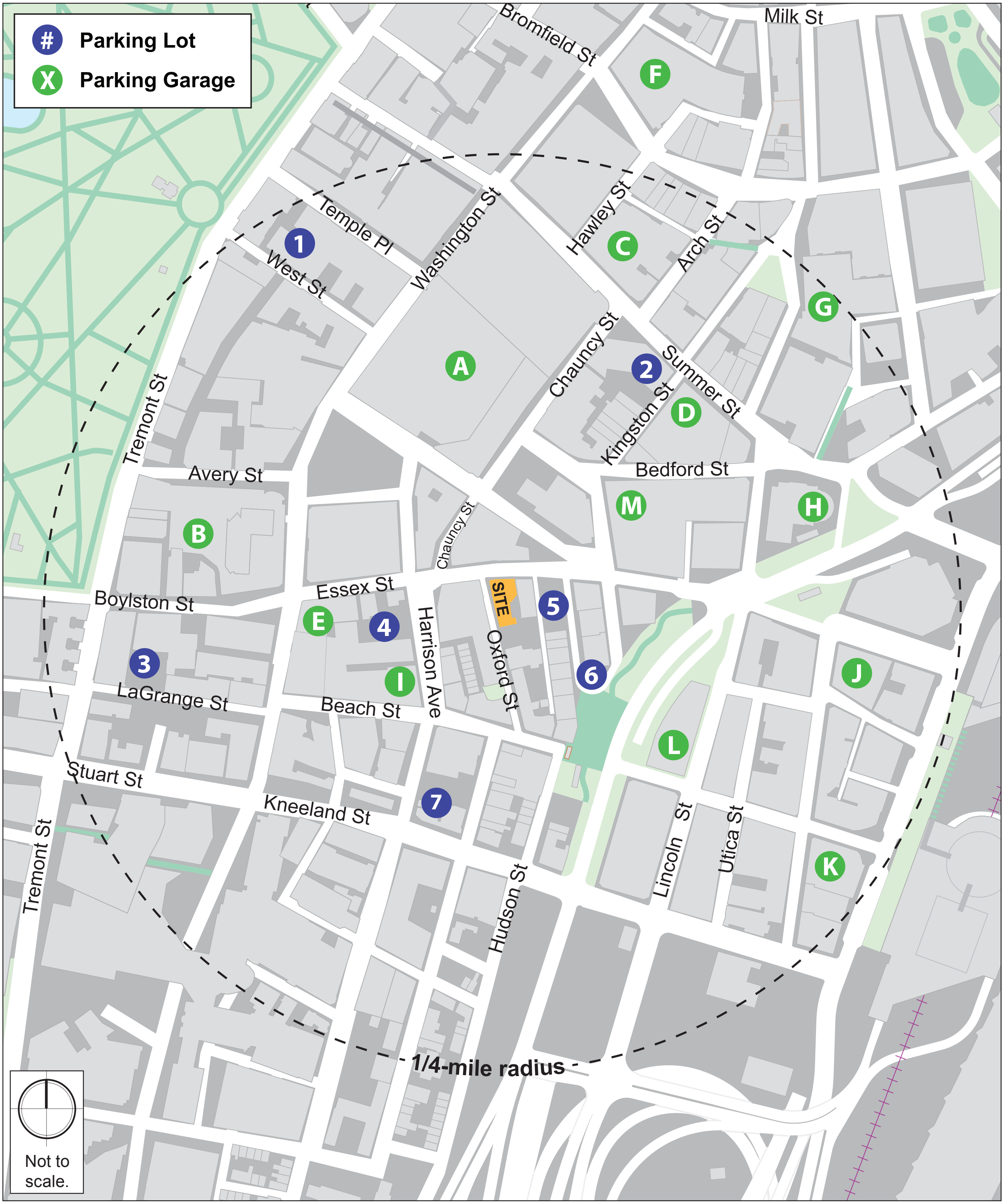

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Figure 2-3

Off-Street Parking in The Study Area

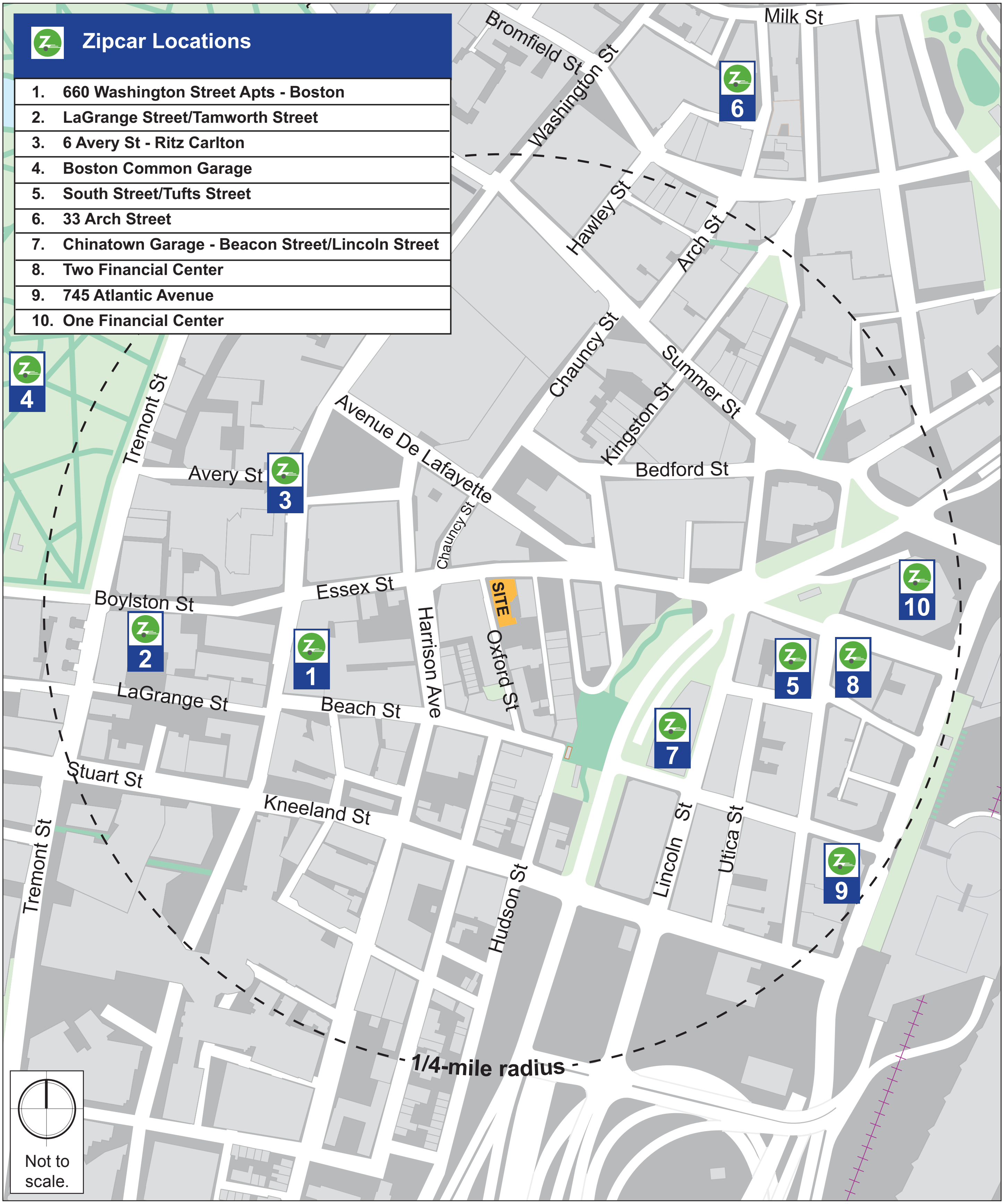
Table 2-1 Off-Street Parking Lots and Garages within a Five Minute Walk of the Site

Map ID	*Facility*	*Capacity (Public Spaces)*	*Map ID*	*Facility*	*Capacity (Public Spaces)*
Parking Garages			**Parking Lots**		
A	Lafayette Garage	1,276	1	West Street Lot	13
B	Millennium Place /Ritz Carlton	563	2	23 Kingston Street	9
C	101 Arch Street	80	3	47 LaGrange Street	50
D	99 Summer Street	130	4	5 Harrison Avenue	53
E	Archstone	177	5	Chau Chow City Parking	50
F	33 Arch Street	600	6	Bradford Auto Parks	11
G	75/101 Federal Street	150	7	78 Harrison Avenue	63
H	125 Summer Street	250			
I	40 Beach Street	500			
J	Two Financial Center	200			
K	745 Atlantic Avenue	137			
L	125 Lincoln Street	120			
M	State Street Financial	400			
Parking Garage Spaces Subtotal		**4,583**	**Parking Lot Spaces Subtotal**		**249**
Total Public Parking Spaces			**4,832**		

2.2.3.3 Car Sharing Services

Car sharing enables easy access to short-term vehicular transportation. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location.

Zipcar is the primary company in the Boston car-sharing market. There are currently eight Zipcar locations within a quarter-mile walk of the Project site with two additional locations just outside of a quarter mile. The nearby car sharing locations are shown in Figure 2-4.



73-79 Essex Street Boston, Massachusetts

Figure 2-4

Car Sharing Services

2.2.4 Existing Traffic Data

Traffic volume data was collected at the study area intersections on July 14, 2015. The intersection of Washington Street/Avenue de Lafayette was collected on May 14, 2014. A one-half percent per year growth factor was applied to the traffic volumes to estimate 2016 volumes. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and weekday p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The traffic classification counts included car, heavy vehicle, pedestrian, and bicycle movements. The detailed traffic counts are provided in Appendix C.

2.2.4.1 Seasonal Adjustment

To account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT was reviewed. The most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the May 2014 TMCs and July 2015 TMCs. The seasonal adjustment factor for roadways similar to the study area (Group 6) is 0.91 for May and 0.92 for June. This indicates that average month traffic volumes are approximately eight to nine percent less than the traffic volumes that were collected. Therefore, the traffic counts were not adjusted downward to reflect average month conditions and provide a conservatively high analysis consistent with the peak season traffic volumes. The MassDOT 2011 Weekday Seasonal Factors table is provided in Appendix C.

2.2.5 Existing Vehicular Traffic Volumes

The existing traffic volumes that were collected were used to develop the Existing (2016) Condition traffic volumes. The Existing (2016) Condition weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown in Figure 2-5 and Figure 2-6, respectively.

2.2.6 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston. The site is conveniently located in close proximity to several bicycle facilities. The City of Boston's "Bike Routes of Boston" map indicates that the Washington Street pedestrian zone is designated as a beginner route. Beginner routes are suitable for all riders including children and people with no on-road experience. Washington Street and Essex Street are designated as intermediate routes. Intermediate routes are suitable for riders with some on-road experience. Tremont Street and Boylston Street are designated as advanced routes. Advanced routes are suitable for more traffic-confident cyclists.

Bicycle counts were conducted concurrent with the vehicular TMCs, and are presented in Figure 2-7. As shown in the figure, during the peak periods bicycle volumes are heaviest along Essex Street.

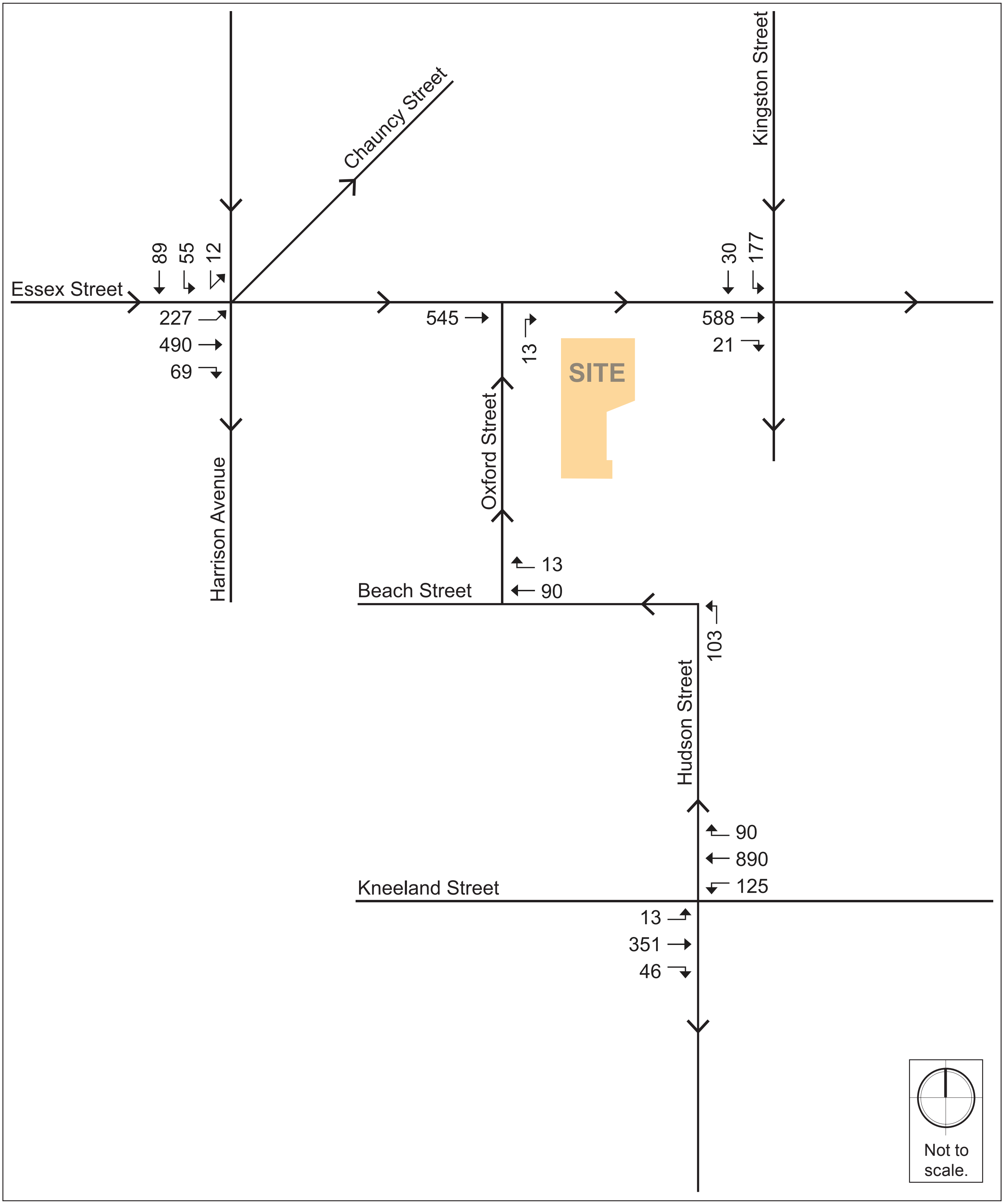


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Figure 2-5
Existing (2016) Condition Vehicular Traffic Volumes, a.m. Peak Hour

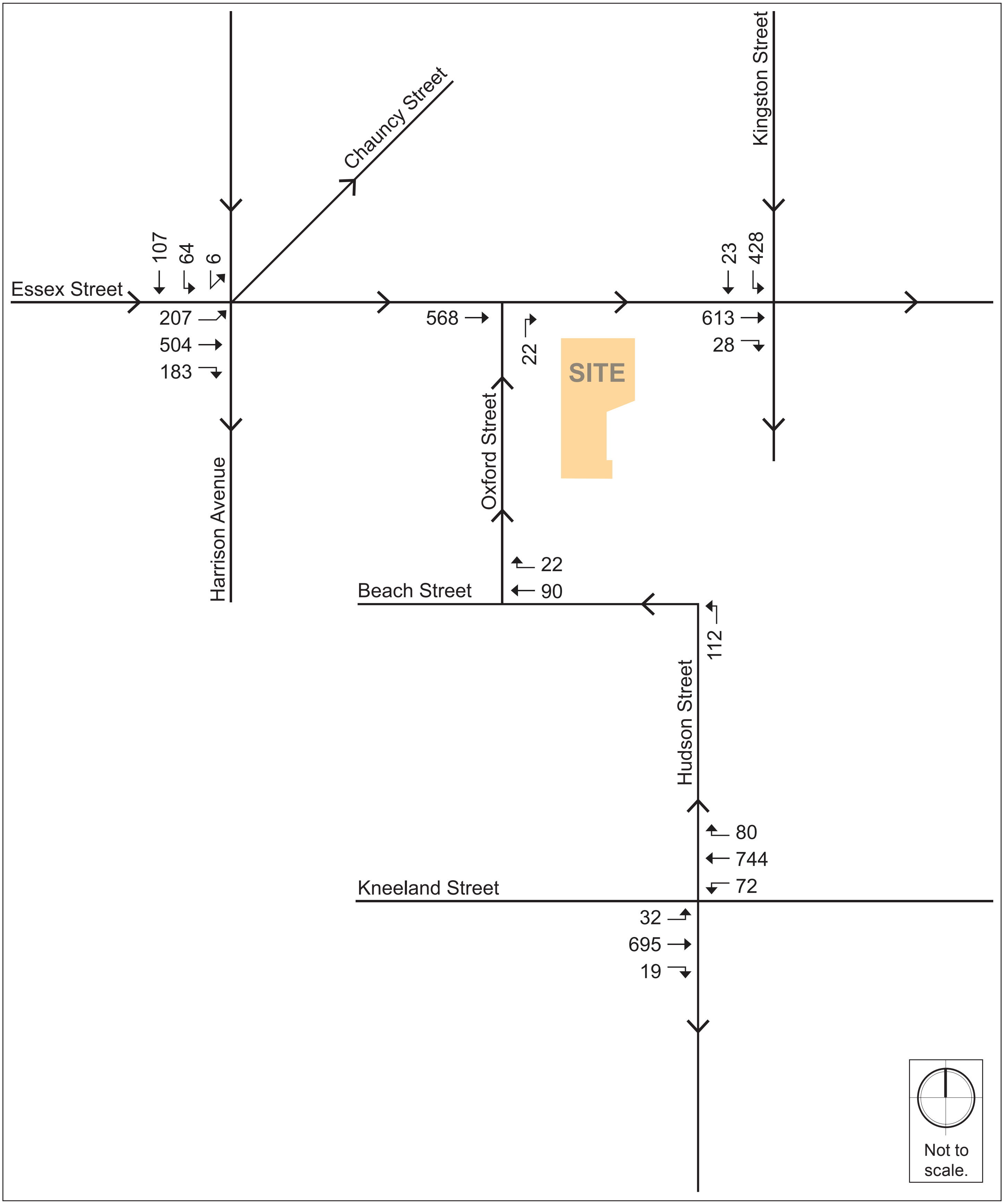

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Figure 2-6

Existing (2016) Condition Vehicular Traffic Volumes, p.m. Peak Hour

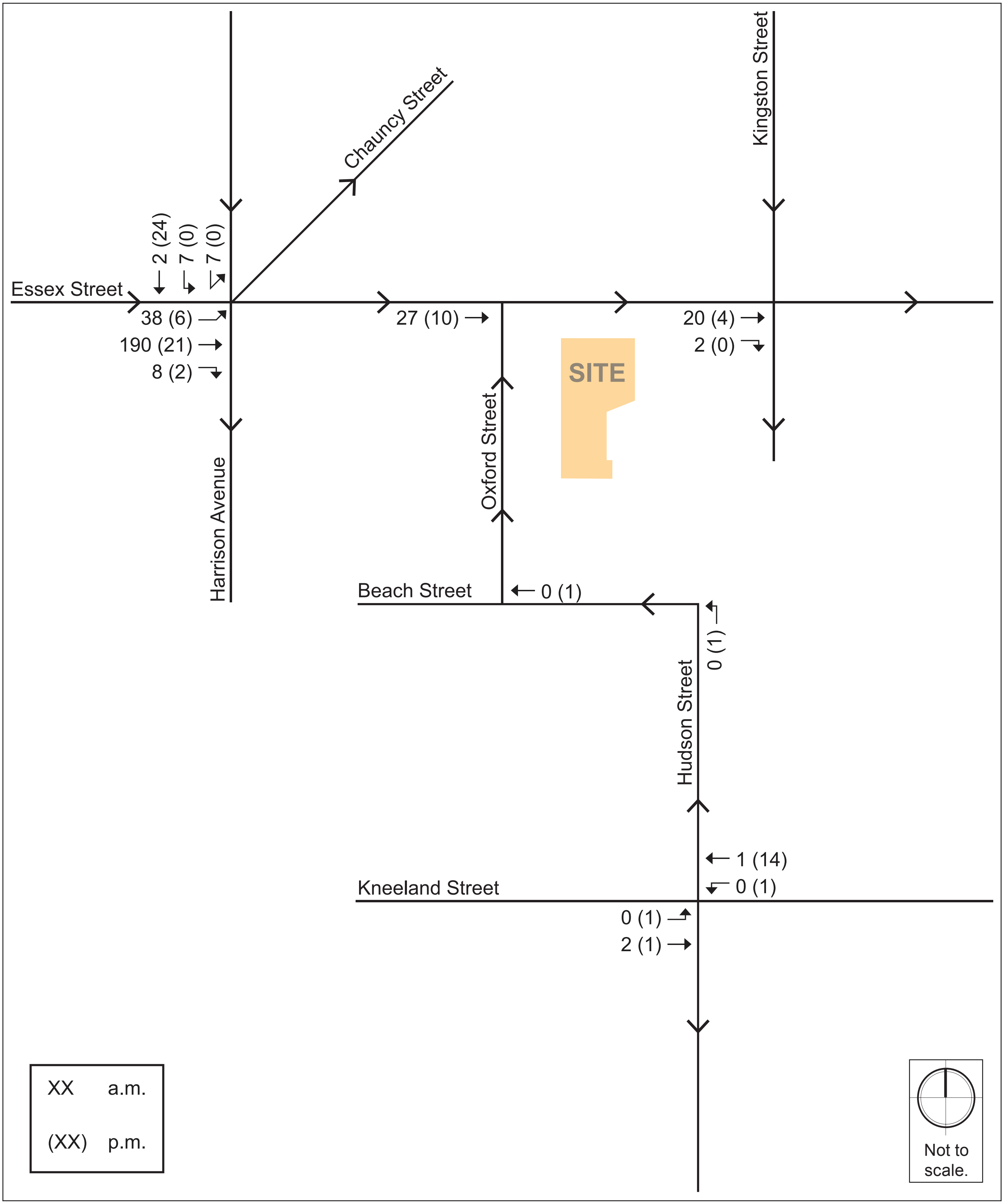

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Figure 2-7

Existing (2016) Condition Bicycle Volumes, a.m. and p.m. Peak Hours

2.2.6.1 Bicycle Sharing Services

The site is located proximate to a bicycle sharing station provided by Hubway. Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 140 stations and 1,300 bicycles. The nearest Hubway station is located near the intersection of Washington Street and Boylston Street. Figure 2-8 shows the five Hubway stations within roughly a quarter-mile radius of the Project site.

2.2.7 Existing Pedestrian Volumes and Accommodations

In general, sidewalks are provided along all roadways in the vicinity of the Project and generally are in good condition. Crosswalks are provided at all study area intersections. Pedestrian signal equipment is provided at the signalized study area intersections.

To determine the amount of pedestrian activity within the study area, pedestrian counts were conducted concurrent with the TMCs at the study area intersections and are presented in Figure 2-9. As shown in the figure, pedestrian activity is heavy throughout the study area.

2.2.8 Existing Public Transportation Services

The Project site is located in the Chinatown neighborhood of Boston where there are several public transportation opportunities provided by the Massachusetts Bay Transportation Authority (MBTA, or the "T"). The Project site is located in walking distance to the Chinatown Station on the Orange Line (approximately 520 feet away), South Station with access to the Red Line, Silver Line, and Commuter Rail (approximately a quarter-mile away), the Downtown Crossing Station with Red and Orange Line service (approximately 0.3 miles away); Boylston Station on the Green Line (approximately a quarter-mile away); and State Street Station with access to the Blue and Orange Lines is less than one-half mile away.

Additionally, the MBTA operates five bus routes, including two of the rapid transit Silver Line routes, in close proximity to the Project. Figure 2-10 maps all of the public transportation services located within a quarter-mile of the Project site, and Table 2-2 provides a brief summary of those routes.

Figure 2-8
Bicycle Sharing Locations

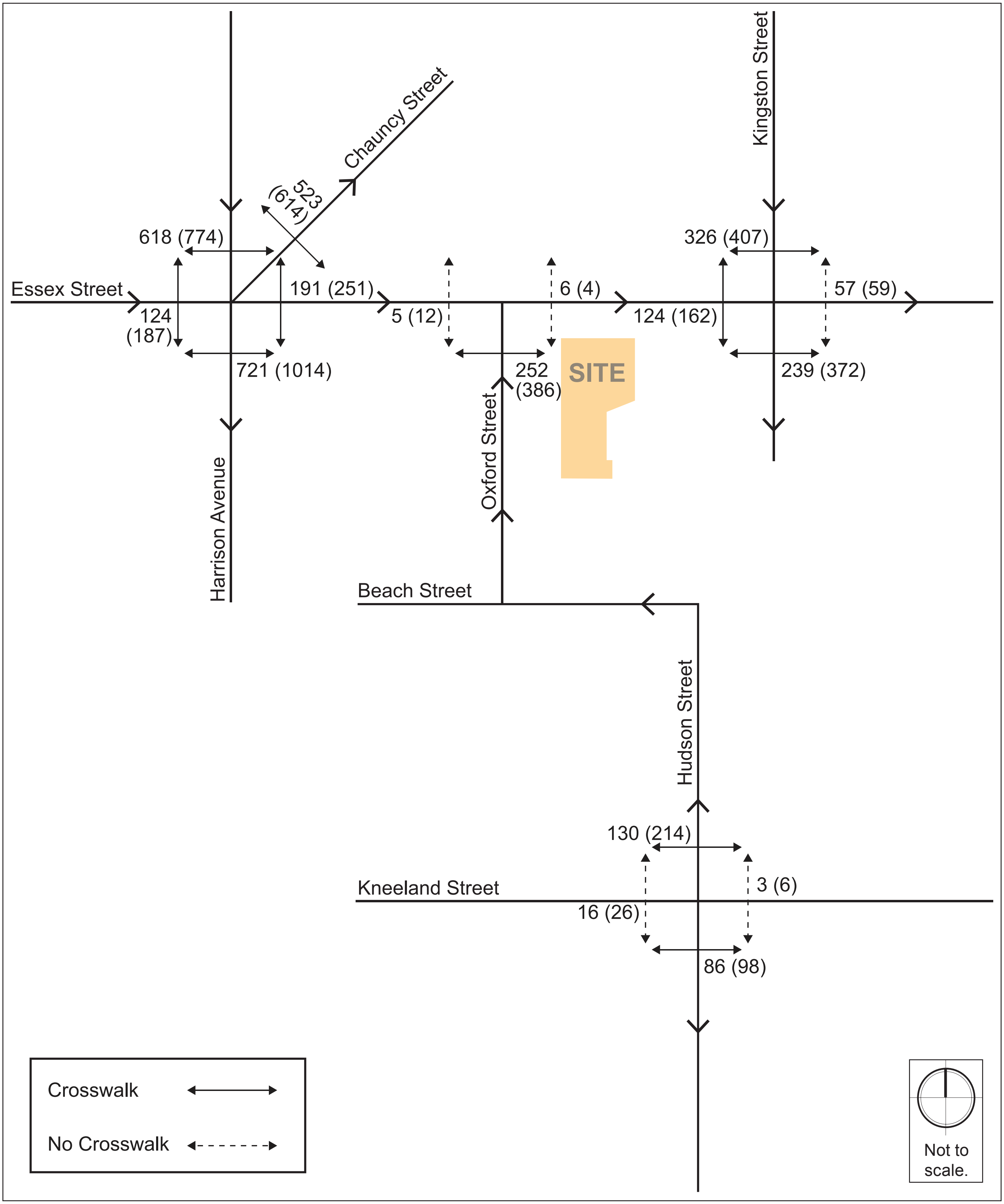

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Figure 2-9

Existing (2016) Condition Pedestrian Volumes, a.m. and p.m. Peak Hours

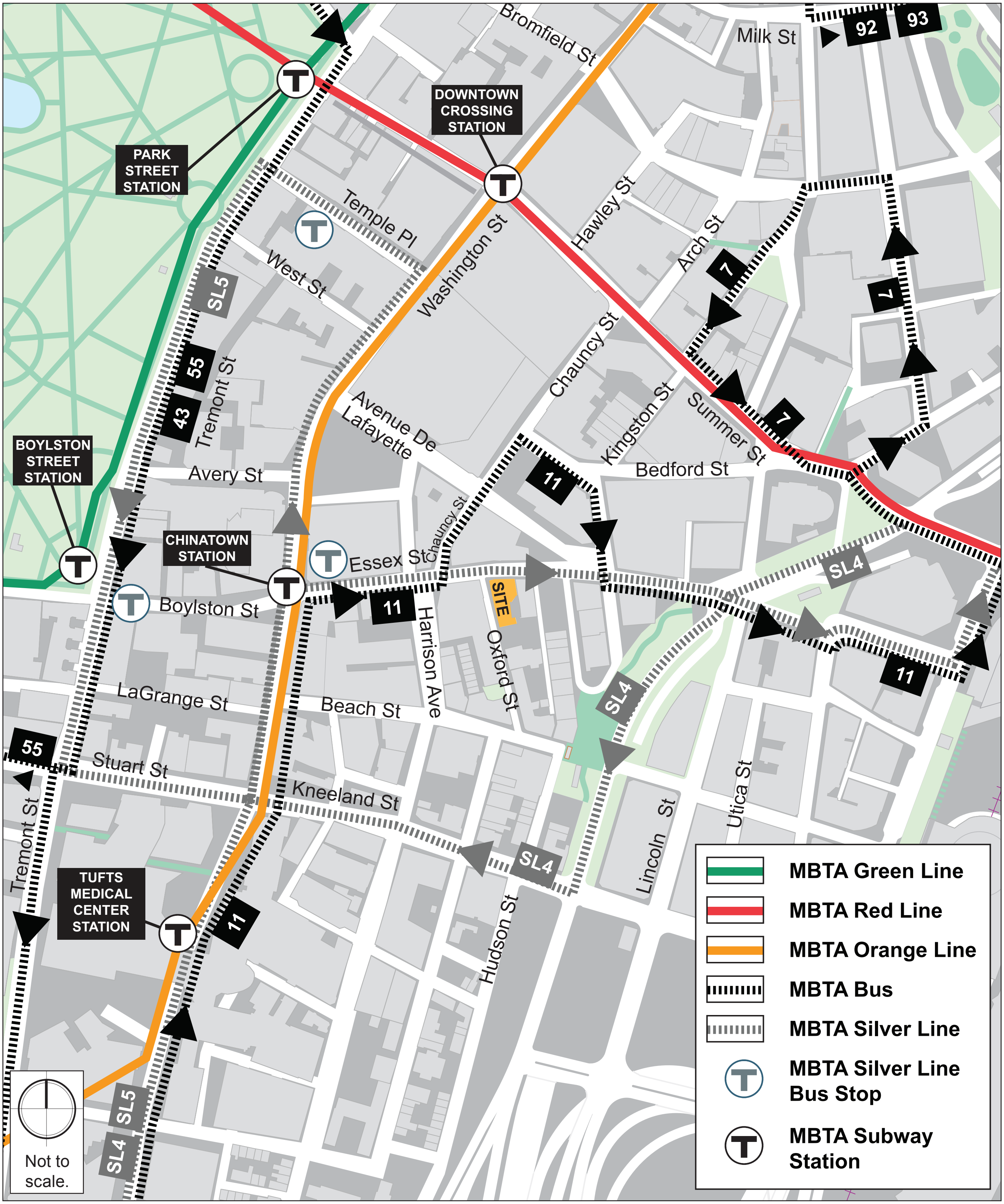

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Figure 2-10
Public Transportation

Table 2-2 Existing Public Transportation Service Summary

Transit Service	*Description*	*Rush-Hour Headway (in minutes)*[*]
Subway		
Orange Line	Oak Grove Station – Forest Hills Station	6
Red Line	Alewife Station – Braintree Station Alewife Station – Ashmont Station	9 9
Green Line	"B" Branch – Boston College – Park Street Station "C" Branch – Cleveland Circle – North Station "D" Branch – Riverside – Park Street Station "E" Branch – Heath Street – Lechmere Station	7 6 7 6
Blue Line	Wonderland – Bowdoin Station	5
Bus Routes		
SL4[**]	Dudley Station – South Station at Essex Street via Washington Street	10
SL5[**]	Dudley Station – Downtown Crossing at Temple Place via Washington Street	7
7	City Point – Otis & Summer Streets via Summer Street & South Station	6-11
11	City Point – Downtown BayView Route	6
43	Ruggles Station – Park & Tremont Streets	9-20
55	Jersey & Queensberry Streets – Copley Square or Park & Tremont Streets	15

[*] Headway is the time between trains or buses.

[**] SL# denotes Silver Line bus rapid transit route.

2.2.9 Existing (2016) Condition Traffic Operations Analysis

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay experienced by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 9) software package was used to calculate average delay and associated LOS at the study area intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2000 Highway Capacity Manual (HCM).

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 2-3 displays the HCM intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition, with significant traffic delay. LOS D or better is typically considered desirable during the peak hours of traffic in urban and suburban settings.

Table 2-3 Vehicle Level of Service Criteria

Level of Service	*Average Stopped Delay (sec/veh)*	
	Signalized Intersections	*Unsignalized Intersections*
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: 2000 Highway Capacity Manual, Transportation Research Board.

In addition to delay and LOS, the operational capacity and vehicular queues are calculated and used to further quantify traffic operations at intersections. The following describes these other calculated measures.

The volume-to-capacity (v/c) ratio is a measure of congestion at an intersection approach. A v/c ratio below one indicates that the intersection approach has adequate capacity to process the arriving traffic volumes over the course of an hour. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

The 95th percentile queue, measured in feet, denotes the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line. This maximum queue occurs five percent, or less, of the time during the peak hour and typically does not develop during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a “worst case” condition. Queues at an intersection are generally below the 95th percentile length throughout most of the peak hour. It is also unlikely that 95th percentile queues for each approach to an intersection occur simultaneously.

Tables 2-4 and 2-5 summarize the Existing (2016) Condition operations analysis for the study area intersections during the a.m. and p.m. peak hours, respectively. The study area intersections of Kneeland Street/Hudson Street, Beach Street/Hudson Street, and Beach Street/Oxford Street do not contain a stop controlled approach. Therefore no delay is incurred at these intersections. The detailed analysis sheets from the Synchro model are provided in Appendix C.

Table 2-4 Existing (2016) Condition Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Essex St/Harrison Ave/Harrison Ave Ext/Chauncy St	**B**	**16.5**	-	-	-
Essex St EB bear left/thru |thru	B	15.3	0.48	106	146
Harrison Avenue SB hard left/left/thru	C	22.4	0.54	35	100
Essex St/Kingston St/ Avenue de Lafayette	**B**	**17.3**	-	-	-
Essex Street EB thru | thru | thru/right	B	16.9	0.26	113	160
Kingston Street SB left	B	13.6	0.47	0	42
Kingston Street SB left/thru	C	22.6	0.52	23	67
Unsignalized Intersections					
Essex Street/Oxford Street	-	-	-	-	-
Essex Street EB Thru	A	0.3	-	-	-
Oxford Street NB Right	A	9.7	0.02	-	2

Table 2-5 Existing (2016) Condition Operations Analysis Summary, p.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Essex St/Harrison Ave/Harrison Ave Ext/Chauncy St	**B**	**19.1**	-	-	-
Essex St EB bear left/thru |thru	B	17.1	0.61	129	193
Harrison Avenue SB hard left/left/thru	C	28.2	0.63	60	116
Essex St/Kingston St/ Avenue de Lafayette	**B**	**19.0**	-	-	-
Essex Street EB thru | thru | thru/right	C	21.9	0.31	145	177
Kingston Street SB left	B	12.5	0.61	0	72
Kingston Street SB left/thru	B	16.3	0.64	14	90
Unsignalized Intersections					
Essex Street/Oxford Street	-	-	-	-	-
Essex Street EB Thru	A	0.5	-	-	-
Oxford Street NB Right	A	9.7	0.04	-	3

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

As shown in Tables 2-4 and 2-5, under the Existing (2016) Condition:

- The signalized intersection of **Essex Street/Harrison Avenue/Harrison Avenue Extension/ /Chauncy Street** operates at LOS B during both the a.m. and p.m. peak hours. The longest queues at the intersection occur at the Essex Street eastbound approach during both the a.m. and p.m. peak hours.

- The signalized intersection of **Essex Street/Kingston Street/Avenue de Lafayette** operates at LOS B during both the a.m. and p.m. peak hours. The longest queues at the intersection occur at the Essex Street eastbound approach during both the a.m. and p.m. peak hours.

- The **Oxford Street** stop controlled approach to **Essex Street** operates at LOS A during both the a.m. and p.m. peak hours.

2.3 No-Build (2021) Condition

The No-Build (2021) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area. These infrastructure improvements include roadway, public transportation, pedestrian, and bicycle improvements.

2.3.1 Background Traffic Growth

The methodology to account for general future background traffic growth, independent of this Project, may be affected by changes in population demographics in the area, smaller scale development projects (such as the Ping On residential project, the Godfrey Hotel, and the Parcel 7A hotel), or projects unforeseen at this time. Based on a review of recent and historic traffic data collected recently, and to account for any additional unforeseen traffic growth, a traffic growth rate of one-half percent (0.5%) per year, compounded annually, was used.

2.3.2 Specific Development Traffic Growth

Traffic volumes associated with the larger or closer known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. Four such projects were specifically accounted for in the traffic volumes for future scenarios, while others were included in the general background traffic growth. The site-specific background projects are mapped on Figure 2-11 and are as follows:

533 Washington Street – This project consists of the construction of a 30-story mixed-use building on the site of the former Felt night club. The proposed building is anticipated to include 94 residential units, ground and second floor restaurant space (approximately 4,716 square feet), and incubator office space on the third and fourth floors (approximately 3,882 square feet).

Millennium Tower – This project includes the rehabilitation of the historic Burnham Building and the construction of an adjacent tower. The project will contain 1.2 million sf of residential, office space, and ground floor commercial space including a grocery store, a health center, a restaurant, and a retail tenant. Additionally the project will include parking for 550 vehicles in a below-grade garage. Currently, the grocery store and office space have been completed and are occupied; however, the residential component is still under construction.

45 Stuart Street – This project includes the construction of 404 residential units in a 29-story building with approximately 198 parking spaces. This project has completed construction but was not fully occupied at the time of data collection.

Parcel 24 (One Greenway) – This project is located at 0 Kneeland Street in Chinatown and consists of the construction of 312 mixed-income residential units with 125 below-grade parking spaces. This project is currently constructed but was not occupied when all traffic counts were conducted.

2.3.3 Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby improvement projects in the vicinity of the study area. Based on this review, it was determined that there is a proposed plan to provide a bus lane and bicycle lane along Washington Street between Kneeland Street to the south and West Street to the north. The existing three-lane cross-section (two through lanes and a turning lane at each intersection) will be modified to include one through lane, a shared bus and turning lane, and a bicycle lane.

2.3.4 No-Build Traffic Volumes

The 0.5 percent per year annual growth rate, compounded annually, was applied to the Existing (2016) Condition traffic volumes, then the traffic volumes associated with the background development projects listed above were added to develop the No-Build (2021) Condition traffic volumes. The No-Build (2021) Condition weekday morning and evening peak hour traffic volumes are shown on Figures 2-12 and Figure 2-13, respectively.

2.3.5 No-Build (2021) Condition Traffic Operations Analysis

The No-Build (2021) Condition analysis uses the same methodology as the Existing (2016) Condition operations analysis. Tables 2-6 and Table 2-7 present a summary of the No-Build (2021) Condition operations analysis for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

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Figure 2-11

Specific Background Project Locations

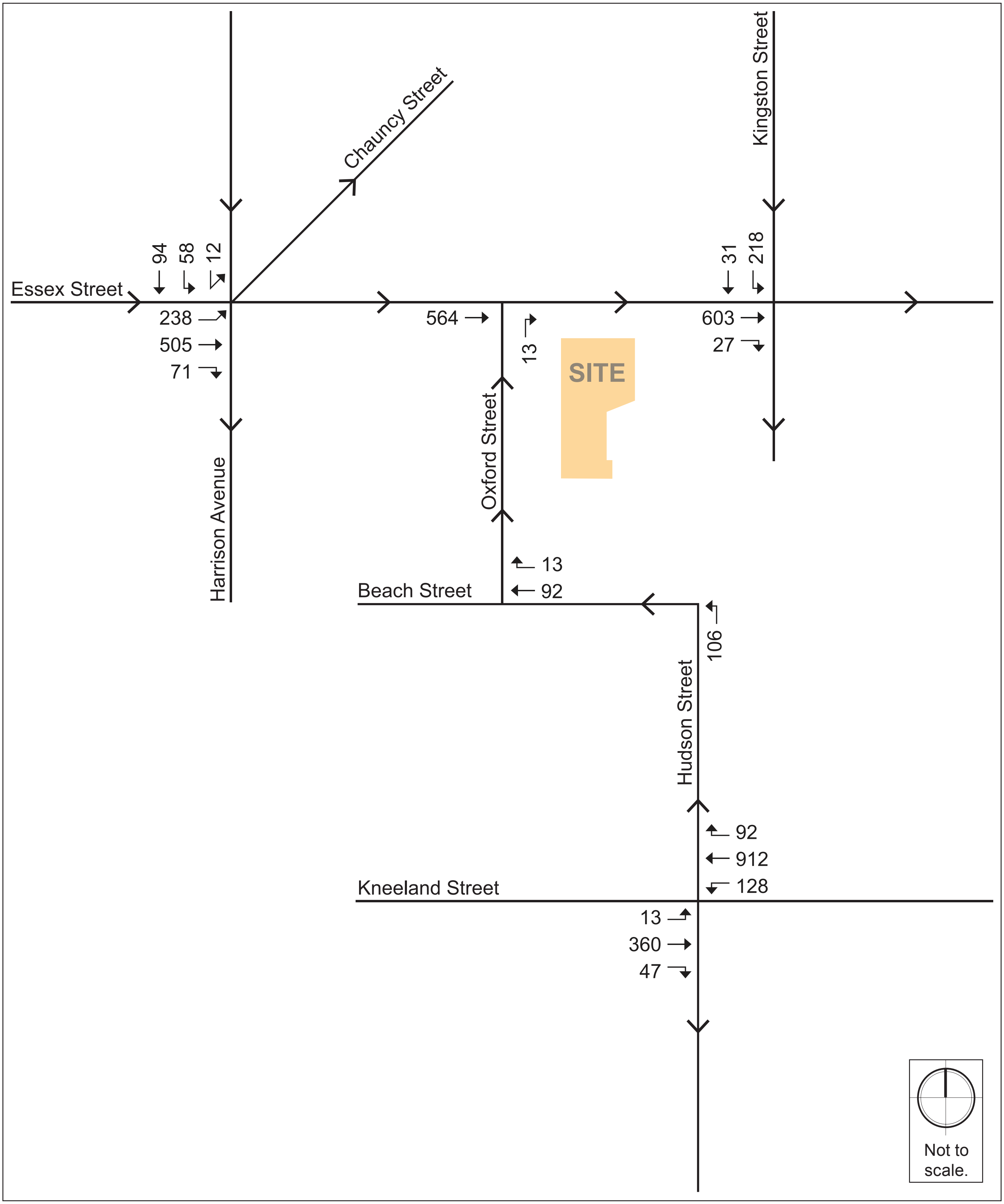

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Figure 2-12
No-Build (2021) Condition Vehicular Traffic Volumes, a.m. Peak Hour

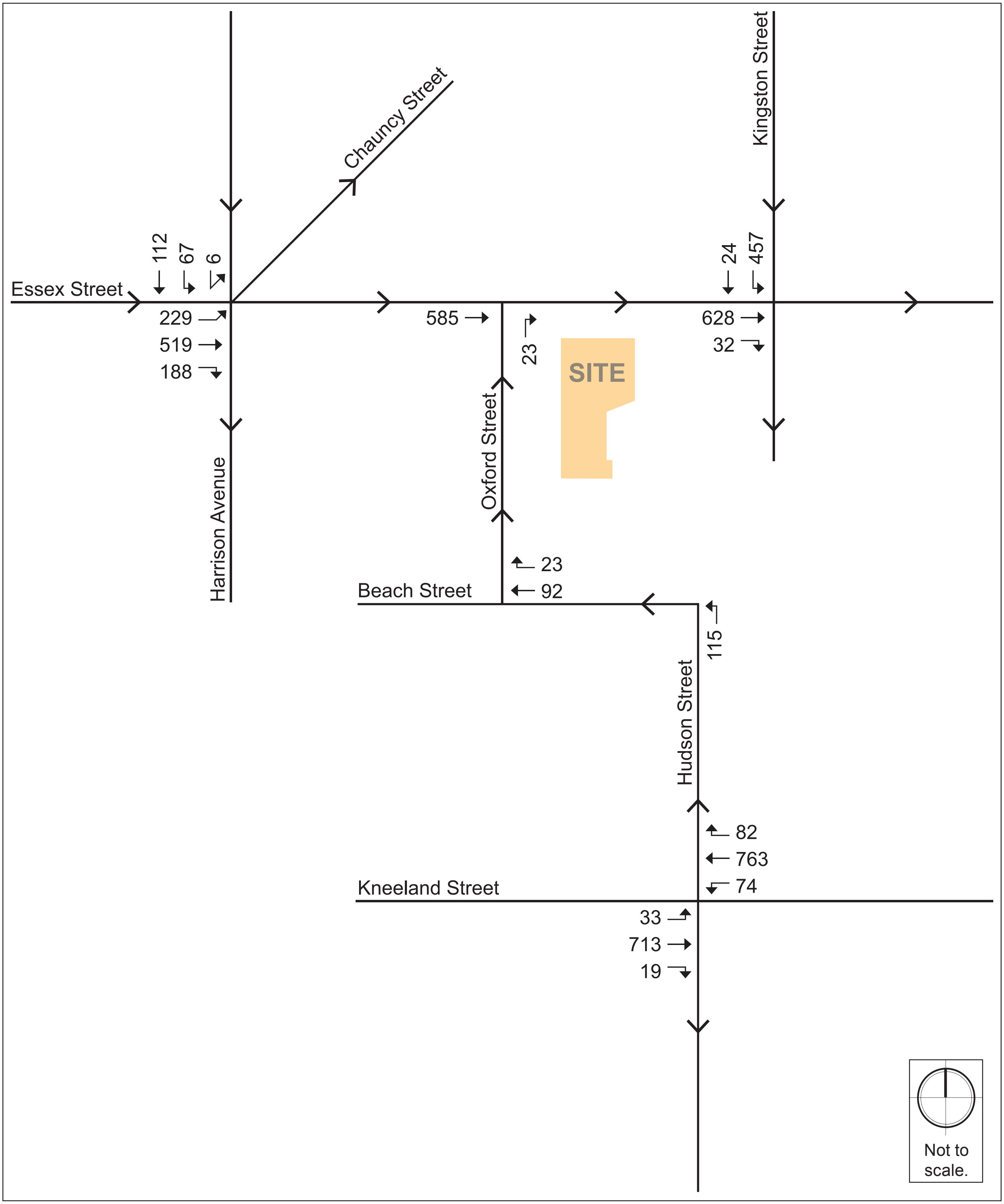

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Figure 2-13

No-Build (2021) Condition Vehicular Traffic Volumes, p.m. Peak Hour

Table 2-6 No-Build (2021) Condition Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Essex St/Harrison Ave/Harrison Ave Ext/Chauncy St	**B**	**17.1**	-	-	-
Essex St EB bear left/thru |thru	B	15.7	0.50	112	156
Harrison Avenue SB hard left/left/thru	C	23.8	0.56	40	106
Essex St/Kingston St/ Avenue de Lafayette	**B**	**17.2**	-	-	-
Essex Street EB thru | thru | thru/right	B	17.1	0.27	117	168
Kingston Street SB left	B	13.5	0.52	0	44
Kingston Street SB left/thru	C	21.7	0.57	23	70
Unsignalized Intersections					
Essex Street/Oxford Street	-	-	-	-	-
Essex Street EB Thru	A	0.2	-	-	-
Oxford Street NB Right	A	9.8	0.02	0	2

Table 2-7 No-Build (2021) Condition Operations Analysis Summary, p.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Essex St/Harrison Ave/Harrison Ave Ext/Chauncy St	**C**	**20.4**	-	-	-
Essex St EB bear left/thru |thru	B	18.4	0.65	141	213
Harrison Avenue SB hard left/left/thru	C	29.4	0.65	66	121
Essex St/Kingston St/ Avenue de Lafayette	**B**	**18.8**	-	-	-
Essex Street EB thru | thru | thru/right	C	21.7	0.32	150	182
Kingston Street SB left	B	12.4	0.62	0	72
Kingston Street SB left/thru	B	16.2	0.66	15	93
Unsignalized Intersections					
Essex Street/Oxford Street	-	-	-	-	-
Essex Street EB Thru	A	0.5	-	-	-
Oxford Street NB Right	A	9.7	0.04	-	3

As shown in Tables 2-6 and 2-7, under the No-Build (2021) Condition:

- The signalized intersection of **Essex Street/Harrison Avenue/Harrison Avenue Extension/Chauncy Street** continues to operate at LOS B during the a.m. and p.m. peak hours, but will operate at LOS C during the p.m. peak hour. The longest queues at the intersection continue to occur at the Essex Street eastbound approach during both the a.m. and p.m. peak hours.

2.4 Build (2021) Condition

As previously mentioned, the site currently is mostly vacant and consists of an eight-story building. The proposed Project will consist of a new 17-story building, expected to be approximately 137,000 sf. The Project proposes approximately 250 hotel rooms. Parking will be provided in the existing parking garages in and around Downtown Crossing and Chinatown.

2.4.1 Site Access and Vehicle Circulation

Pedestrians will be able to enter the building via the main entrance at the corner of Oxford Street and Essex Street. The main vehicular access point will be along Oxford Street where curbside access for valet operations will be provided. The site access plan is shown in Figure 2-14.

2.4.2 Parking

The Project will not provide any on-site parking. Parking for hotel guests will rely on local-area off-street parking. Current trends indicate that parking demand in downtown Boston is decreasing across all land uses. This is due to a variety of reasons, but primarily involves shifting demographics, cost of parking and auto ownership, access to improved transit service, aggressive implementation by the City of on-street bicycle facilities (bike lanes, cycle tracks), the advent of both car sharing (Zipcar) and bicycle sharing (Hubway), rise in ride sharing services (Uber, Lyft), and the general social and environmental concerns of car ownership and use.

As mentioned previously, there are over 4,500 garage parking spaces within a quarter mile of the Project site. Sufficient capacity exists at local garages to meet the parking demand of this Project.

The development has committed to enter into an agreement with one (or more) of the several large parking garages in proximity to the site. An agreement between the Proponent and either a valet company or a garage will be a requirement of the Transportation Access Plan Agreement (TAPA) between the Proponent and BTD.

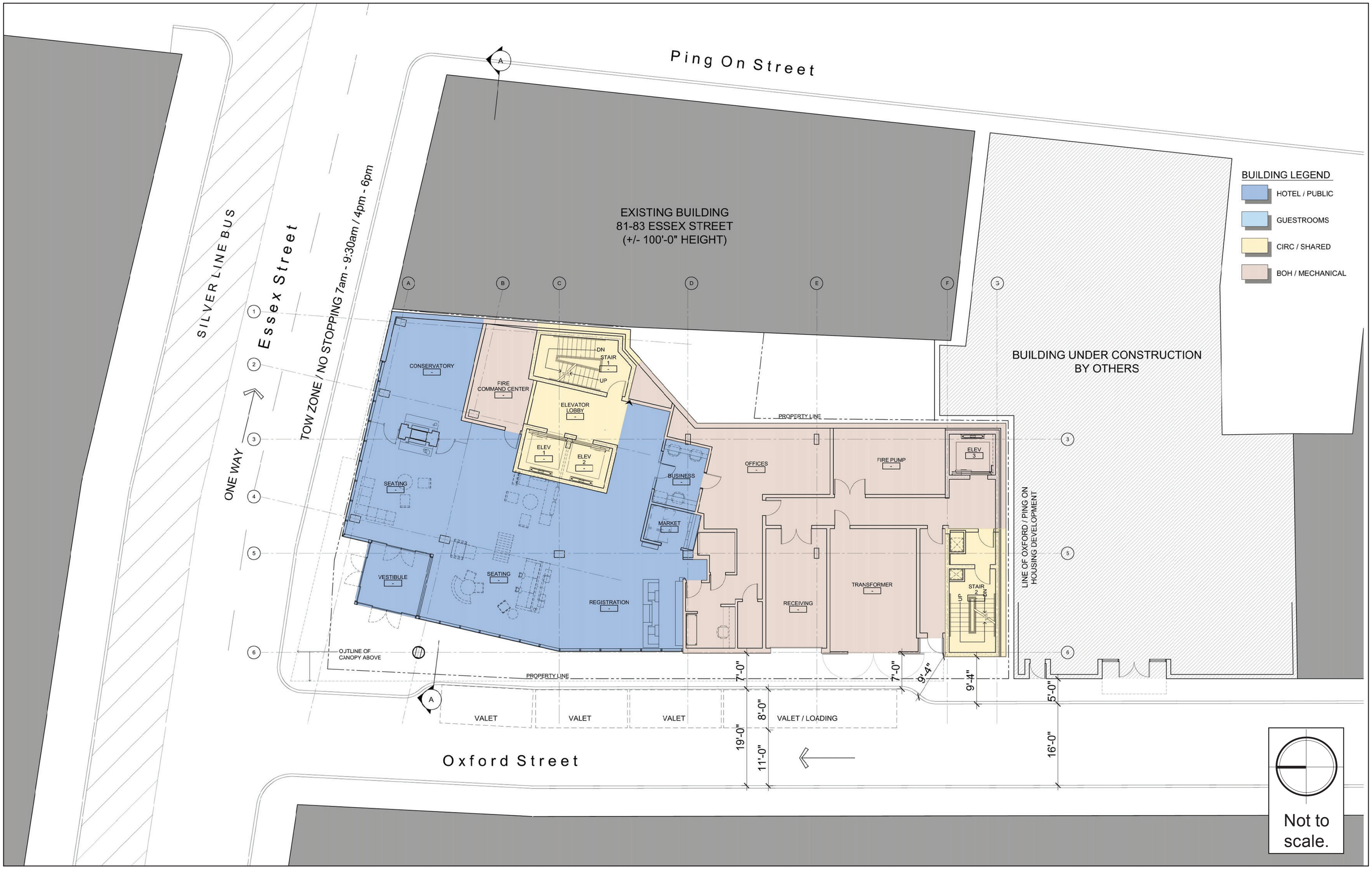

Figure 2-14
Site Access Plan

2.4.3 Loading and Service Accommodations

Truck trip estimates for the Project were based on data provided in the Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area report[1]. Deliveries to the Project site will be limited to SU-36 trucks and smaller delivery vehicles.

Based on the CTPS data, the Project is expected to generate approximately five deliveries per day. The CTPS numbers do not include trash truck trips. It is anticipated that the majority of these deliveries will occur between 7:00 a.m. and 1:00 p.m. The low number of anticipated deliveries will have minimal impact on the vehicular operations in the study area.

2.4.4 Trip Generation Methodology

Determining the future trip generation of the Project is a complex, multi-step process that produces an estimate of vehicle trips, transit trips, and walk/bicycle trips associated with a proposed development and a specific land use program. A project's location and proximity to different travel modes determines how people will travel to and from a site.

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[2] were evaluated. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

To estimate the unadjusted number of vehicular trips for the Project, the following ITE land use code (LUCs) was used:

Land Use Code 310 – Hotel. Hotel is defined as places of lodging that provide sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room), and/or other retail and service shops.

In addition to the ITE data, local data was also collected at two hotels in Boston during the peak hours. Vehicle data was collected at the Ames Hotel located on Court Street and the Wyndham Hotel located on Blossom Street. This data show that the peak hour vehicle trip generation of hotels without parking in downtown Boston are much lower than suggested by ITE. Therefore, the peak hour vehicle trip generation is based on the locally collected data rather than the unadjusted trips calculated using the ITE land use code.

---

[1] Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area; Central Transportation Planning Staff; September 1993.

[2] Trip Generation Manual, 9th Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

2.4.5 Mode Share

The BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located in the westerly portion of designated Area 3. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[3]. The person trips were then distributed to different modes according to the mode shares shown in Table 2-8.

Table 2-8 Travel Mode Shares

		Walk/Bicycle Share	*Transit Share*	*Auto Share*	*Vehicle Occupancy Rate*
Daily					
Hotel	In	39%	30%	31%	1.84
250 Rooms	Out	39%	30%	31%	1.84
a.m. Peak Hour					
Hotel	In	27%	39%	34%	1.84
250 Rooms	Out	69%	11%	20%	1.84
p.m. Peak Hour					
Hotel	In	69%	11%	20%	1.84
250 Rooms	Out	27%	39%	34%	1.84

2.4.6 Project Trip Generation

The mode share percentages shown in Table 2-8 were applied to the number of person trips to develop walk/bicycle and transit trip generation estimates. As stated previously, locally collected data was used to estimate the vehicle trip generation. The trip generation for the Project by mode is shown in Table 2-9. The detailed trip generation information is provided in Appendix C.

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[3] Summary of Travel Trends: 2009 National Household Travel Survey; FHWA; Washington, D.C.; June 2011.

Table 2-9 Project Trip Generation

Land Use		*Walk/Bicycle Trips*	*Transit Trips*	*Vehicle Trips*
Daily				
Hotel	In	733	562	317
250 rooms	Out	733	562	317
a.m. Peak Hour				
Hotel	In	39	56	12
	Out	68	11	12
p.m. Peak Hour				
Hotel	In	98	16	21
	Out	37	53	21

As shown in Table 2-9, 1,466 pedestrian/bicycle trips, 1,124 transit trips, and 634 vehicle trips are expected throughout the day. During the a.m. peak hour, 107 pedestrian/bicycle trips (39 in and 68 out), 67 transit trips (56 in and 11 out), and 24 vehicle trips (12 in and 12 out) are expected. During the p.m. peak hour, 135 pedestrian/bicycle trips (98 in and 37 out), 69 transit trips (16 in and 53 out), and 42 vehicle trips (21 in and 21 out) are expected. If the trips associated with the existing uses were deducted from the Project trip generation numbers, the net new numbers would be even lower.

2.4.7 Trip Distribution

The trip distribution identifies the various travel paths for vehicles associated with the Project. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 3, and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated in Figure 2-15.

2.4.8 Build Traffic Volumes

The vehicle trips were distributed through the study area. The Project-generated trips for the weekday a.m. and weekday p.m. peak hours are shown in Figures 2-16 and 2-17, respectively. The trip assignments were added to the No-Build (2021) Condition vehicular traffic volumes to develop the Build (2021) Condition vehicular traffic volumes. The Build (2021) Condition a.m. and p.m. peak hour traffic volumes are shown on Figures 2-18 and 2-19, respectively.

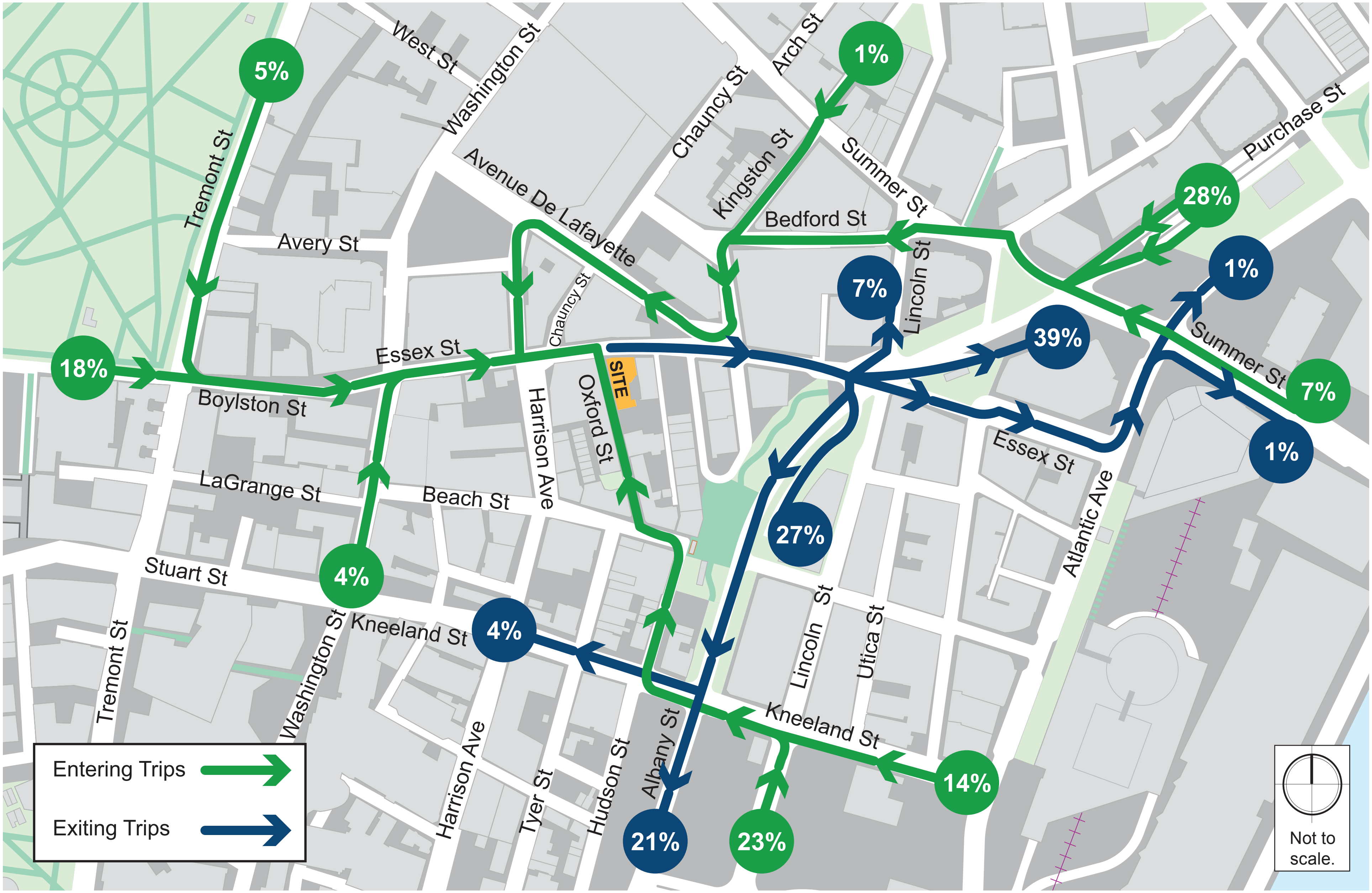

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Figure 2-15
Trip Distribution

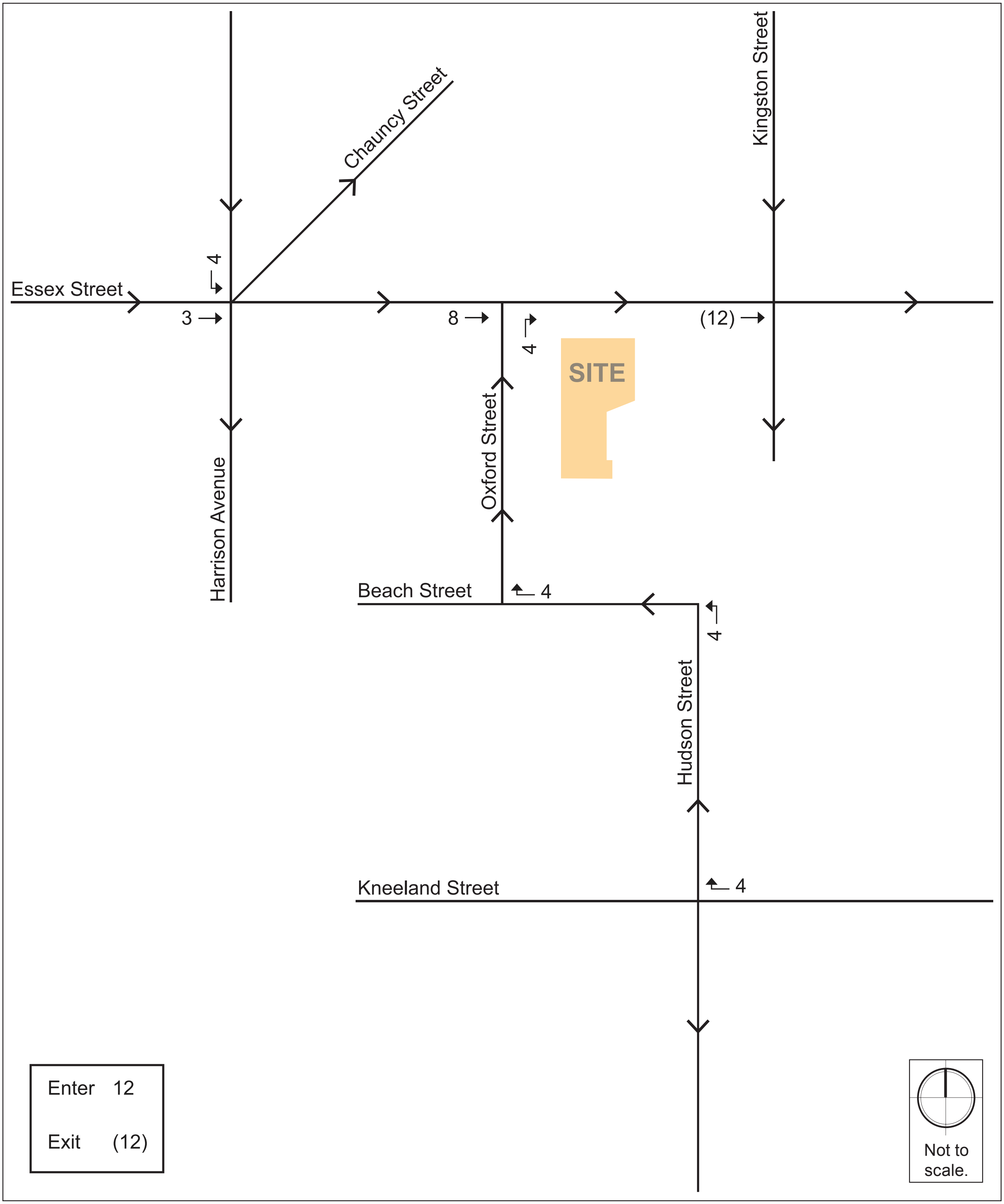

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Figure 2-16

Vehicle Trip Assignment, a.m. Peak Hour

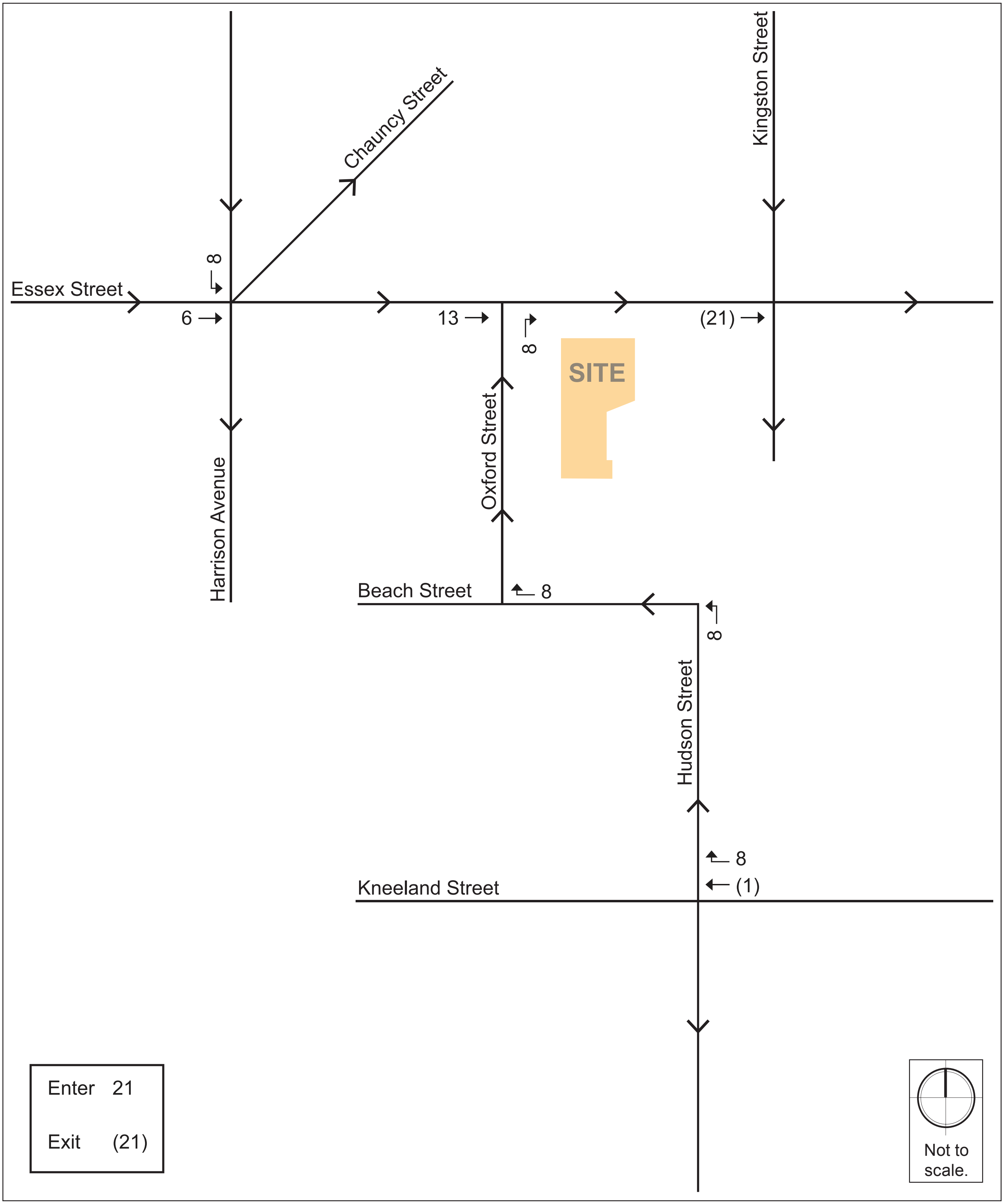

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Figure 2-17

Vehicle Trip Assignment, p.m. Peak Hour

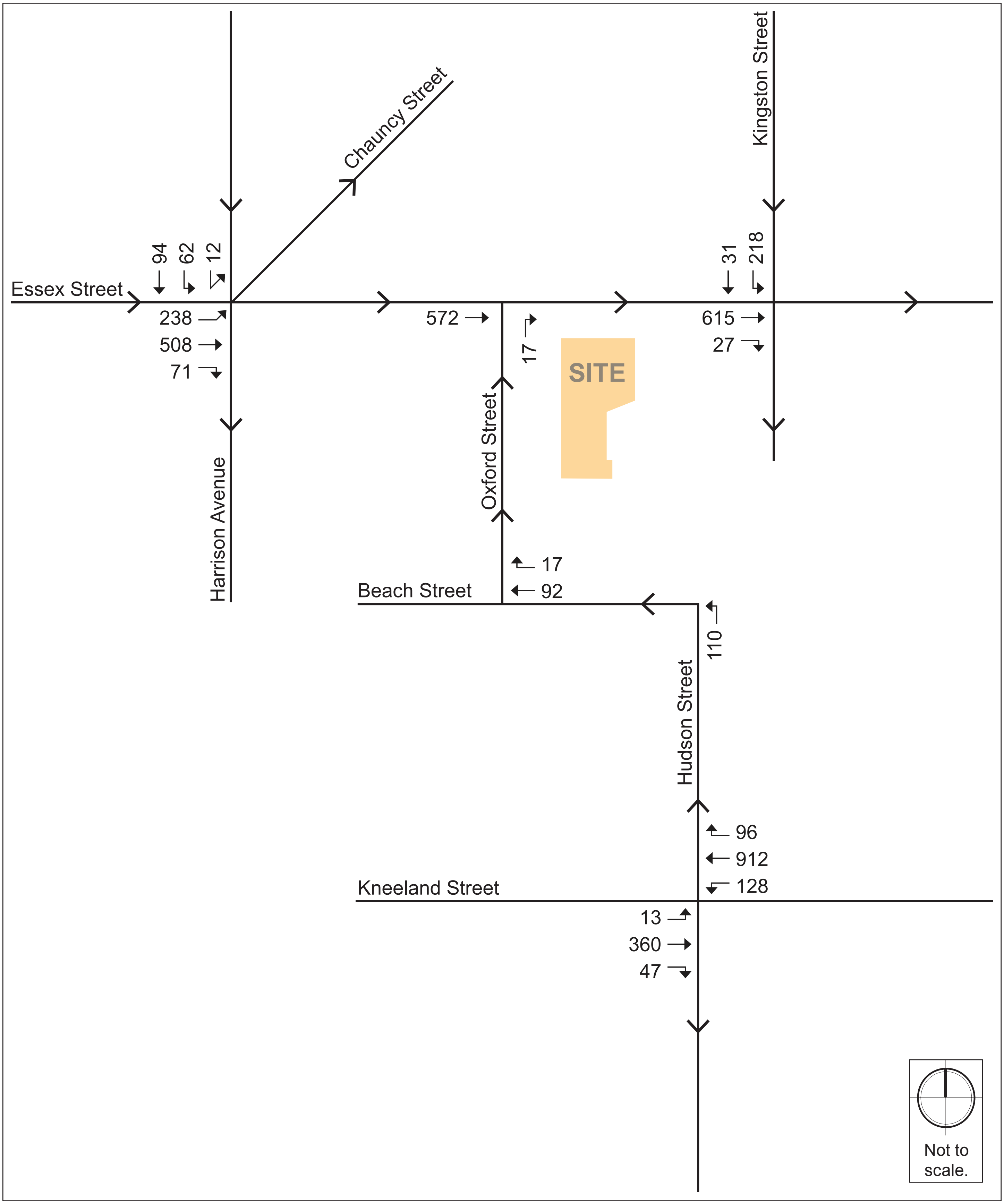

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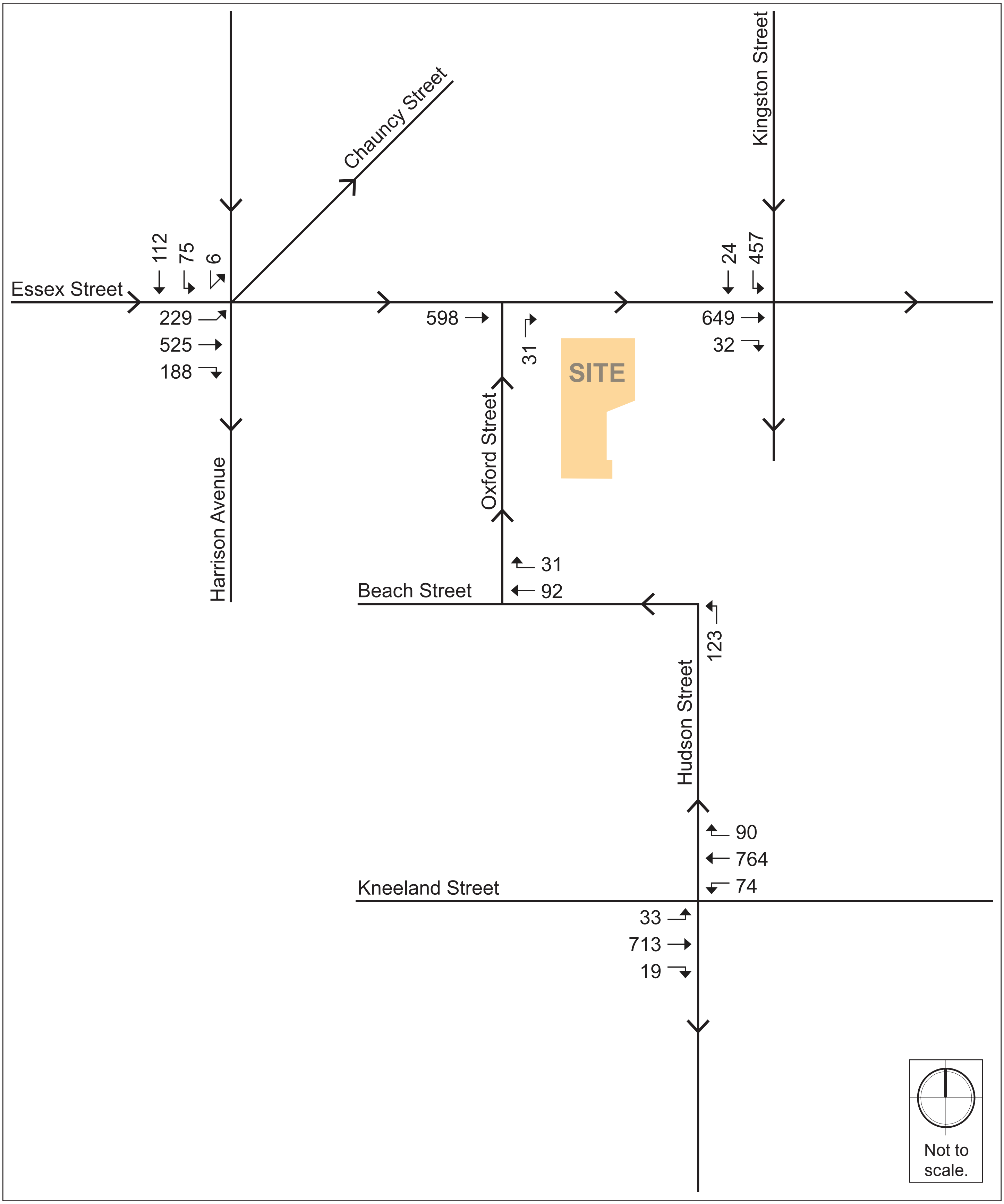
Figure 2-18

Build (2021) Condition Vehicular Traffic Volumes, a.m. Peak Hour



73-79 Essex Street Boston, Massachusetts

Figure 2-19

Build (2021) Condition Vehicular Traffic Volumes, p.m. Peak Hour

2.4.9 Build Condition Traffic Operations Analysis

The Build (2021) Condition analysis uses the same methodology as the Existing (2016) Condition and No-Build (2021) Condition analysis. Tables 2-10 and 2-11 present the Build (2021) Condition operations analysis for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

Table 2-10 Build (2021) Condition Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Harrison Ave/Essex St/Chauncy St	**B**	**17.4**	-	-	-
Essex St EB bear left/thru |thru	B	15.8	0.50	112	157
Harrison Avenue SB hard left/left/thru	C	24.4	0.57	43	110
Essex St/Kingston St/ Avenue de Lafayette	**B**	**17.2**	-	-	-
Essex Street EB thru | thru | thru/right	B	17.1	0.28	119	171
Kingston Street SB left	B	13.5	0.52	0	44
Kingston Street SB left/thru	C	21.7	0.57	23	70
Unsignalized Intersections					
Essex Street/Oxford Street	-	-	-	-	-
Essex Street EB Thru	A	0.3	-	-	-
Oxford Street NB Right	A	9.8	0.03	-	2

Table 2-11 Build (2021) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Harrison Ave/Essex St/Chauncy St	**C**	**21.0**	-	-	-
Essex St EB bear left/thru |thru	B	18.8	0.66	142	219
Harrison Avenue SB hard left/left/thru	C	30.5	0.67	72	128
Essex St/Kingston St/ Avenue de Lafayette	**B**	**18.7**	-	-	-
Essex Street EB thru | thru | thru/right	C	21.4	0.33	154	186
Kingston Street SB left	B	12.4	0.62	0	72
Kingston Street SB left/thru	B	16.2	0.66	15	93

Table 2-11 Build (2021) Condition, Capacity Analysis Summary, p.m. Peak Hour (Continued)

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Unsignalized Intersections					
Essex Street/Oxford Street	-	-	-	-	-
Essex Street EB Thru	A	0.6	-	-	-
Oxford Street NB Right	A	9.8	0.06	-	5

As shown in Table 2-10 and Table 2-11, under the Build (2021) Condition:

- None of the study area intersections will have a degradation in LOS due to the proposed Project.

2.5 Transportation Demand Management

The Proponent is committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage and Project-related traffic impacts. TDM will be facilitated by the nature of the Project (which does not generate significant peak hour trips) and its proximity to numerous public transit alternatives.

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the guests and patrons of the site. The Proponent will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact.

The Proponent is prepared to take advantage of good transit access in marketing the site to future guests by working with them to implement the following TDM measures to encourage the use of non-vehicular modes of travel.

The TDM measures for the Project may include but are not limited to the following:

- Transportation Coordinator: The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries, and will work with guests to raise awareness of public transportation, bicycling, and walking opportunities;

- Orientation Packets: The Proponent will provide orientation packets to new employees containing information on available transportation choices, including transit routes/schedules and nearby vehicle sharing and bicycle sharing locations;

- Secure bicycle parking for building employee/guests;
- Bicycle parking on sidewalks and near main building entrances where possible; and
- Provide information on travel alternatives for employees and guests via the Internet and in the building lobby.

2.6 Transportation Mitigation Measures

While the traffic impacts associated with the new trips are minimal, the Proponent will continue to work with the City of Boston to create a Project that efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

The Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, TDM measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed. The proposed measures listed above and any additional transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

The Proponent will also produce a Construction Management Plan (CMP) for review and approval by BTD. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project.

2.7 Evaluation of Short-term Construction Impacts

Most construction activities will be accommodated within the current site boundaries. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a CMP to be filed with BTD in accordance with the City's transportation maintenance plan requirements.

To minimize transportation impacts during the construction period, the following measures will be considered for the CMP:

- Limited construction worker parking on-site;
- Encouragement of worker carpooling;
- Consideration of a subsidy for MBTA passes for full-time employees; and

- Providing secure spaces on-site for workers' supplies and tools so they do not have to be brought to the site each day.

The CMP to be executed with the City prior to commencement of construction will document all committed measures.

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

3.1.1 Introduction

A pedestrian wind tunnel study was conducted by Rowan Williams Davies & Irwin (RWDI) for the proposed Project. The objective of the study was to assess the impact that the new Project may have on existing local pedestrian conditions around the study site and to provide recommendations for minimizing adverse effects.

The analysis was completed using physical modeling of a 1:400 scale model of the Project and surroundings. The wind conditions were compared against the BRA criteria. Below is a description of the methodology and a summary of the results of the wind tunnel simulations. The addition of the Project is not expected to negatively impact the mean wind speeds in the area surrounding the Project site. Results of the wind tunnel analysis indicate that conditions will continue to be suitable for walking or better in all locations with the Project in place.

3.1.2 Overview

Major buildings, especially those that protrude above their surroundings, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to the pedestrian level. The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel.

The consideration of wind in planning outdoor activity areas is important since high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafes or playgrounds. For bus stops and other locations where people would be standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind comfort criteria can be relaxed even further. The actual effects of wind can range from pedestrian inconvenience, due to the blowing of dust and other loose material in a moderate breeze, to severe difficulty with walking due to the wind forces on the pedestrian.

3.1.3 Methodology

The scale model of the Project was constructed using information provided by the Project team. As shown in Figures 3.1-1 and 3.1-2, the wind tunnel model included the proposed development and all relevant surrounding buildings and topography within a 1,500 foot radius of the study site. Two configurations were modeled:

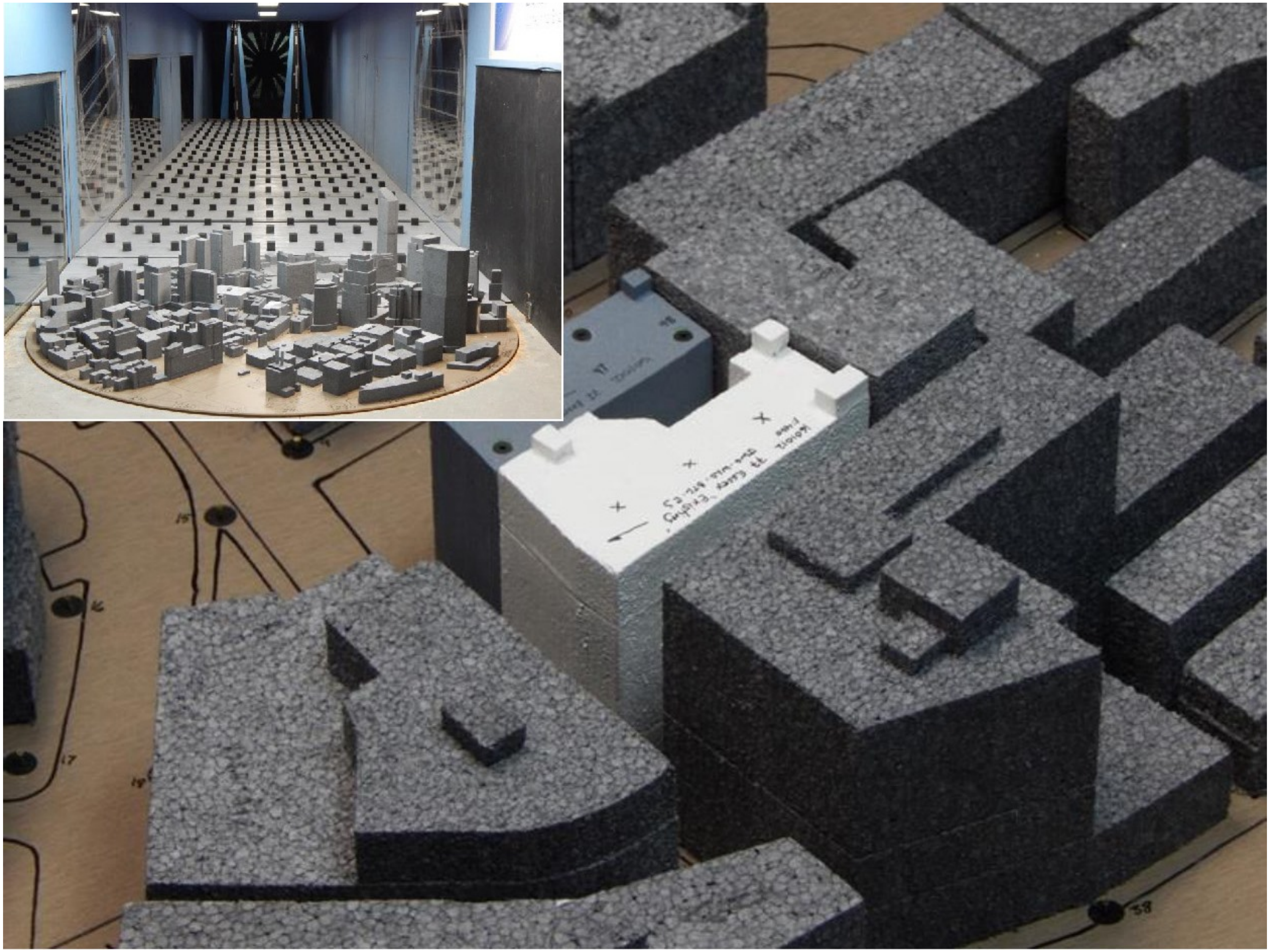
- No Build Configuration: Includes the existing site and approved and in-construction surroundings.
- Build Configuration: Includes the Project and all existing, approved and in-construction surroundings.

The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel. The scale model was equipped with 45 specially designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full-scale height of five feet above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions, in 10 degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model.

The results were combined with long-term meteorological data, recorded during the years from 1986 through 2015 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year. Figures 3.1-3 through 3.1-5 present wind roses that summarize the annual and seasonal wind climates in the area. The left wind rose in Figure 3.1-3, for example, summarizes the spring (March, April, and May) wind data. In general, the prevailing winds at this time of year originate from the west-northwest, northwest, west, south-southwest and east-southeast. In the case of strong winds, however, the most common wind directions are northeast, west and west-northwest. Figure 3.1-4 presents the wind roses for the fall and winter months.

On an annual basis (Figure 3.1-5), the most common wind directions are those between south-southwest and northwest. Winds from the east and east-southeast are also relatively common. In the case of strong winds, northeast and west-northwest are the dominant wind directions.

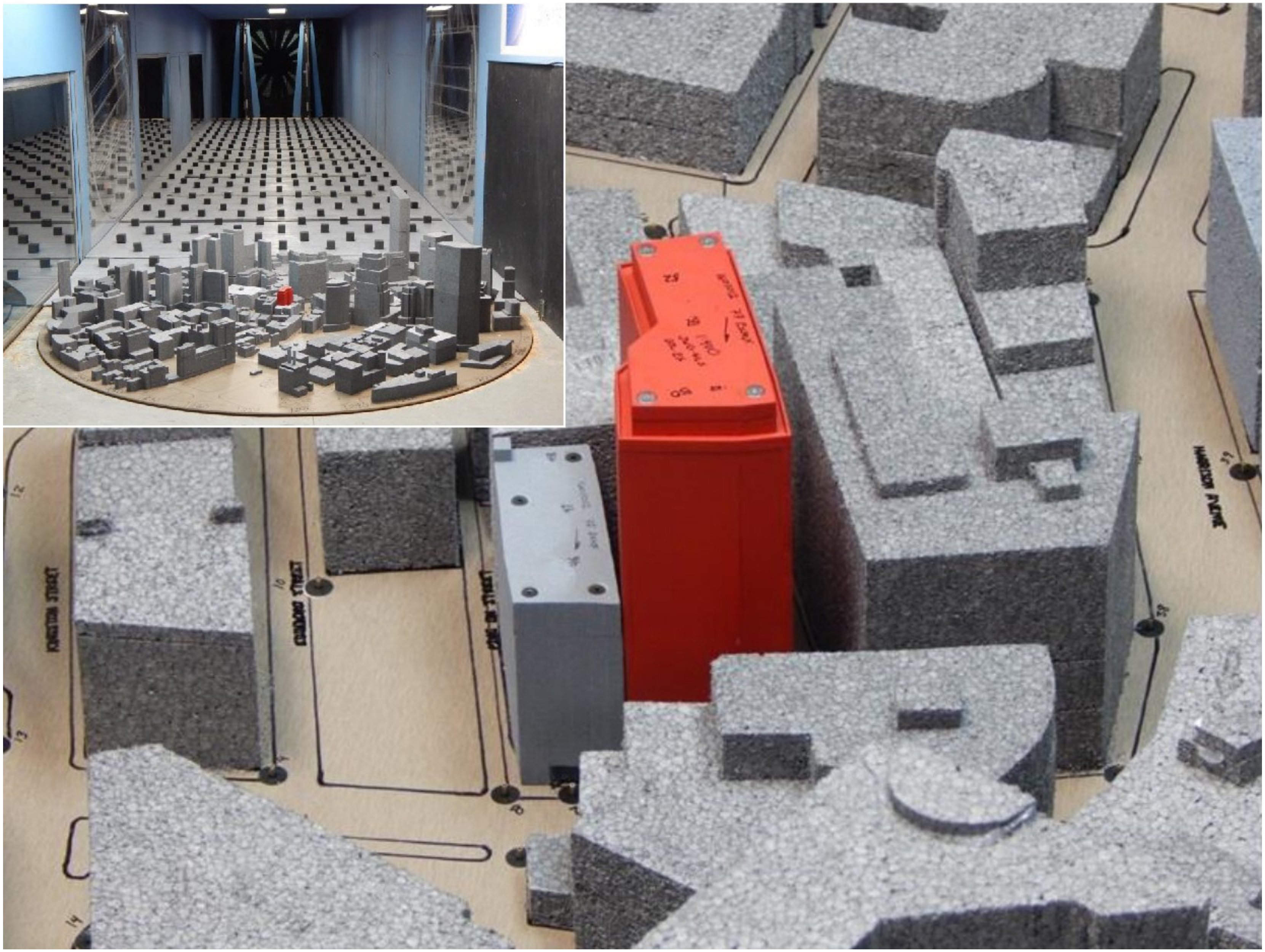
The study involved state-of-the-art measurement and analysis techniques to predict wind conditions at the study site. Nevertheless, some uncertainty remains in predicting wind comfort. For example, the sensation of comfort among individuals can be quite variable.



73-79 Essex Street   **Boston, Massachusetts**

Figure 3.1-1

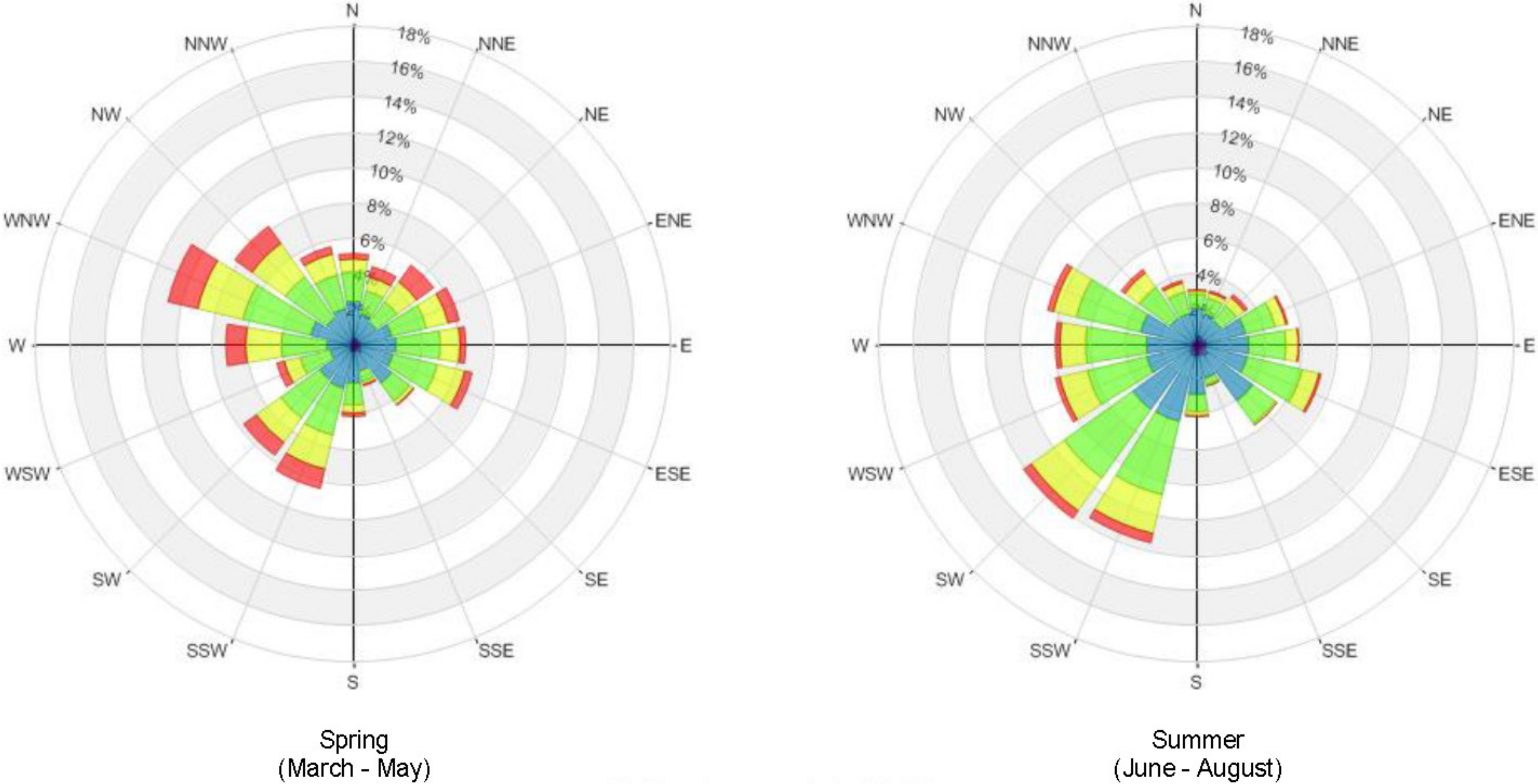
Wind Tunnel Study Model, No Build Configuration



73-79 Essex Street **Boston, Massachusetts**

Figure 3.1-2

Wind Tunnel Study Model, Full Build Configuration)



Spring
(March - May)

Summer
(June - August)

	Wind Speed (mph)	Probability (%)	
		Spring	Summer
	Calm	2.1	2.3
🟪	1-5	5.5	7.5
🟦	6-10	27.9	37.1
🟩	11-15	33.2	35.9
🟨	16-20	20.6	14.3
🟥	>20	10.7	3.0

Figure 3.1-3

Directional Distribution (%) of Winds (Blowing From): Boston Logan International Airport (1993-2013), Spring and Summer

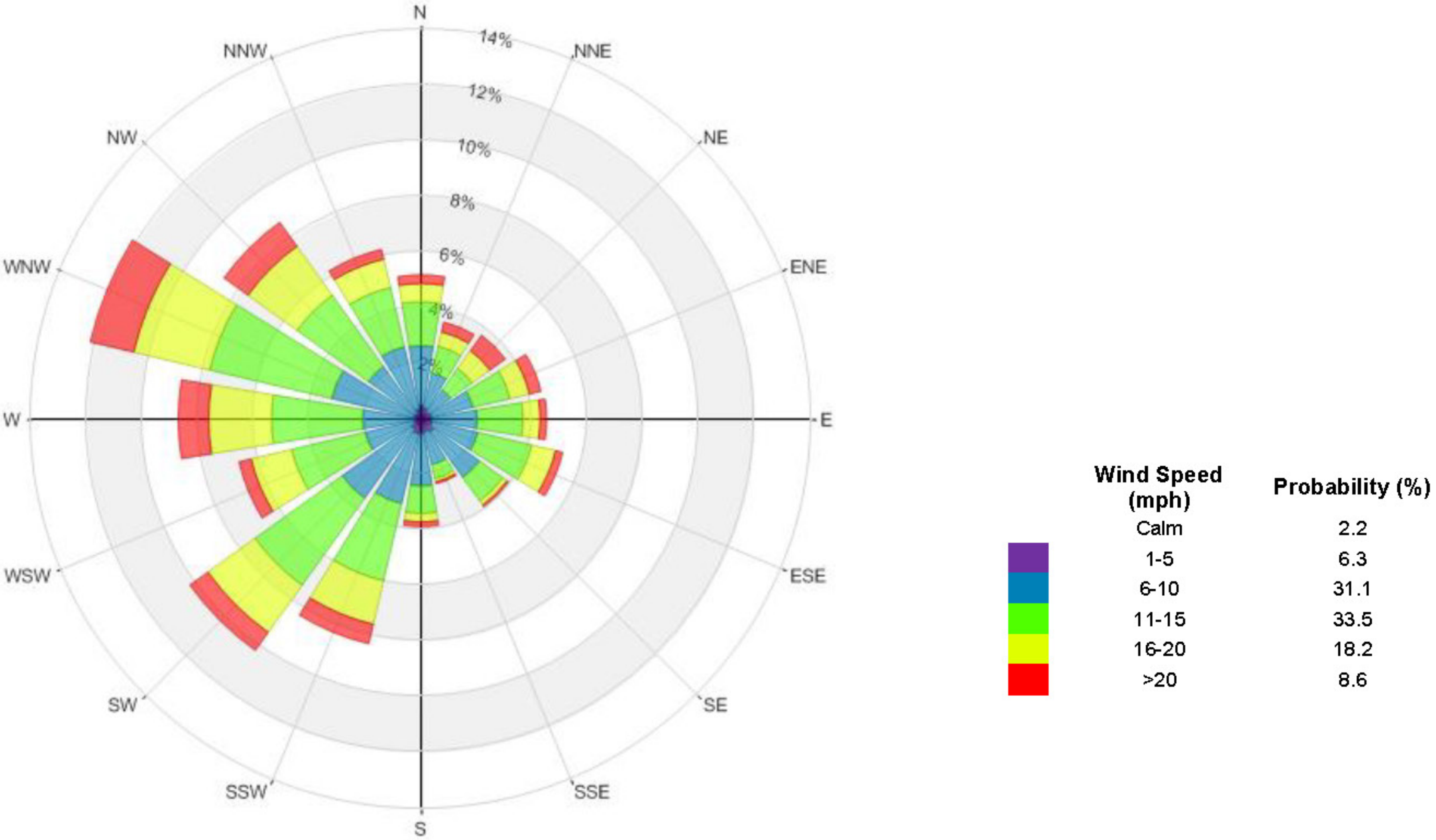
Fall
(September - November)

Winter
(December - February)

	Wind Speed (mph)	Probability (%)	
		Fall	Winter
	Calm	2.5	2.0
🟪	1-5	6.8	5.3
🟦	6-10	33.1	26.3
🟩	11-15	33.5	31.5
🟨	16-20	16.5	21.5
🟥	>20	7.6	13.4

Figure 3.1-4

Directional Distribution (%) of Winds (Blowing From): Boston Logan International Airport (1993-2013), Fall and Winter



Annual Winds

Figure 3.1-5

Directional Distribution (%) of Winds (Blowing From): Boston Logan International Airport (1993-2013), Annual

Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits used represent an average for the total population. Also, unforeseen changes in the Project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds reported are for the frequency of occurrence stated (one percent of the time). Higher wind speeds will occur, but on a less frequent basis.

3.1.4 Pedestrian Wind Comfort Criteria

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second set of criteria used by the BRA to determine the acceptability of specific locations is based on the work of Melbourne.[1] This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the one-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed) and are described below.

Table 3.1-1 Boston Redevelopment Authority Mean Wind Criteria*

Level of Comfort	*Wind Speed*
Dangerous	> 27 mph
Uncomfortable for Walking	>19 and <27 mph
Comfortable for Walking	>15 and <19 mph
Comfortable for Standing	>12 and <15 mph
Comfortable for Sitting	<12 mph

* Applicable to the hourly mean wind speed exceeded one percent of the time.

The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BRA effective gust velocity criterion of 31 mph. However, without any mitigation measures, the wind climate may be uncomfortable for more passive activities such as sitting.

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[1] Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions," Journal of Industrial Aerodynamics, 3 (1978) 241-249.

3.1.5 Test Results

Table 1 in Appendix D presents the mean and effective gust wind speeds for each season, as well as those on an annual basis. Table 2 in Appendix D presents the change in mean wind speed categories from the No Build to Build conditions for each test location. Figures 3.1-6 through 3.1-9 graphically depict the annual mean and gust wind conditions from Table 1 in Appendix D at each wind measurement location. Figure 3.1-10 is a graphical representation of the mean speed category changes from No Build to Build configuration presented in Table 2 in Appendix D. Typically the summer and fall winds tend to be more comfortable than the annual winds, while the winter and spring winds are less comfortable than the annual winds. The following discussion of pedestrian wind comfort is based on the annual winds for each configuration tested, except where noted in the text.

3.1.5.1 Mean Speed Criterion

A mean speed categorization of walking is considered appropriate for sidewalks. Lower wind speeds conducive to standing are preferred at building entrances.

No Build Configuration

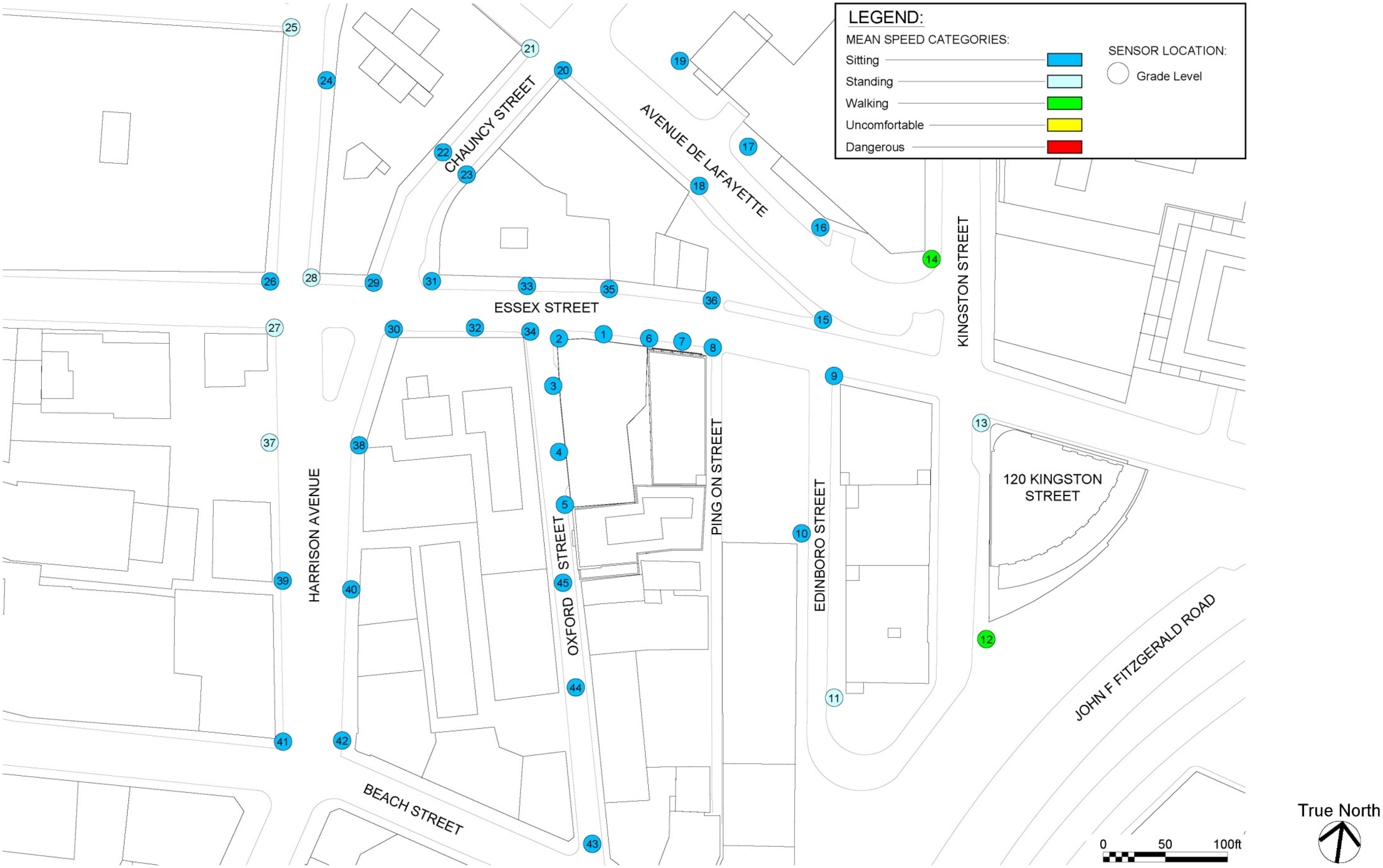
Wind conditions are expected to be comfortable for sitting in the vicinity of the entrances to the existing building (Locations 1 through 5 in Figure 3.1-6). Wind conditions at offsite locations (Locations 6 through 45 in Figure 3.1-6) are also expected to be comfortable for sitting in general, with some locations comfortable for standing or walking. These wind conditions are considered appropriate.

Build Configuration

The addition of the Project is not expected to negatively impact the mean wind speeds in the area surrounding the Project site (Figure 3.1-7). Annual wind speeds are expected to continue to be considered appropriate and to be comfortable for standing or better at locations in the immediate vicinity of building entrances (Locations 1 through 5 in Figure 3.1-7). As shown in Figure 3.1-10 and Table 2 in Appendix D, on an annual basis, wind comfort categories are unchanged for almost all 45 measurement locations, except one (Location 21) which improves by one category and two (Locations 2 and 44) that worsen by one category. The wind conditions will continue to be suitable for walking or better in all locations.

3.1.5.2 Effective Gust Criterion

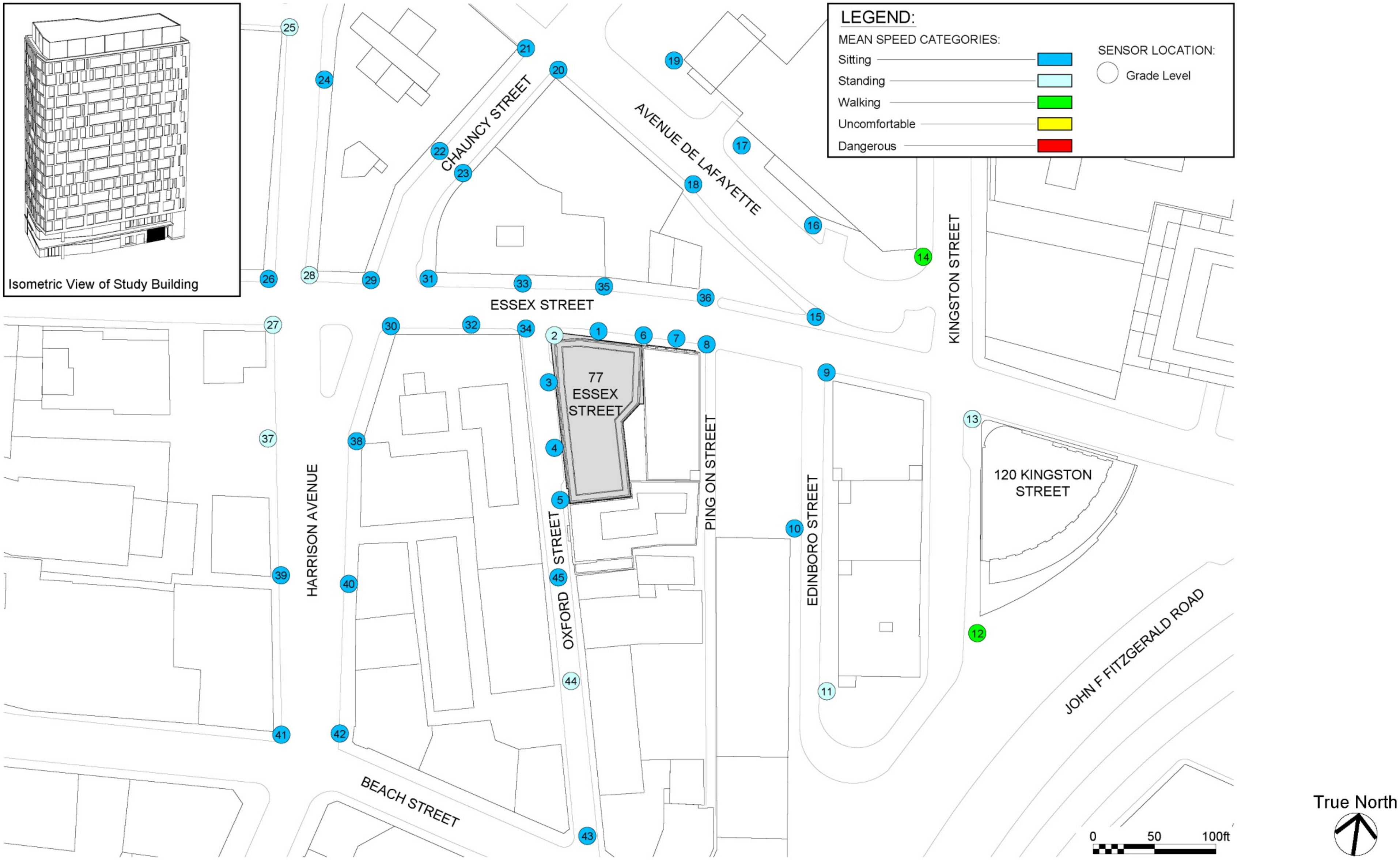
The effective gust criterion is met at all locations on and around the Project site (Table 1 in Appendix D) in both the Build and No Build conditions.



73-79 Essex Street   Boston, Massachusetts

Figure 3.1-6

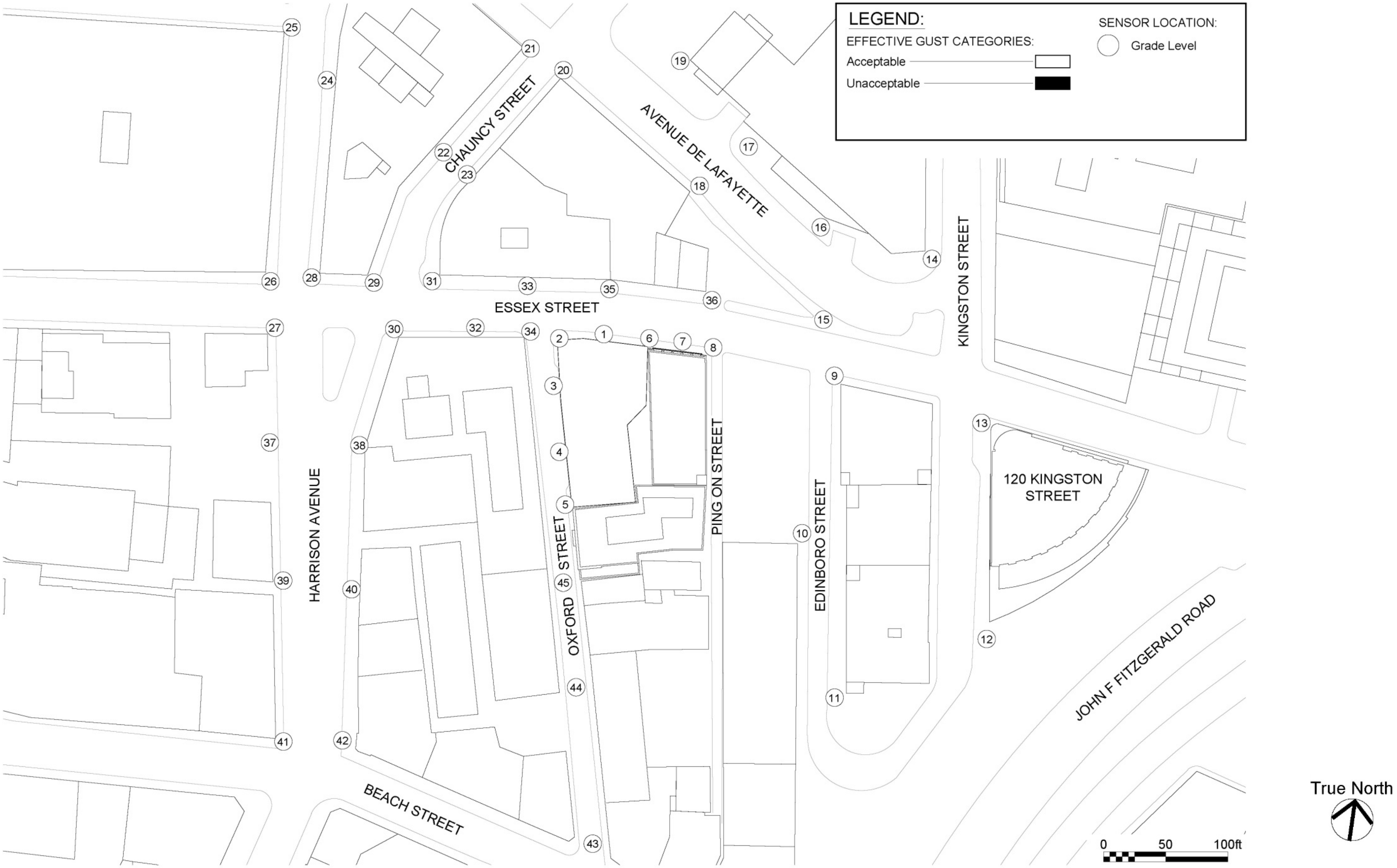
Pedestrian Wind Conditions – Mean Speed (Annual), No Build



73-79 Essex Street   Boston, Massachusetts

Figure 3.1-7

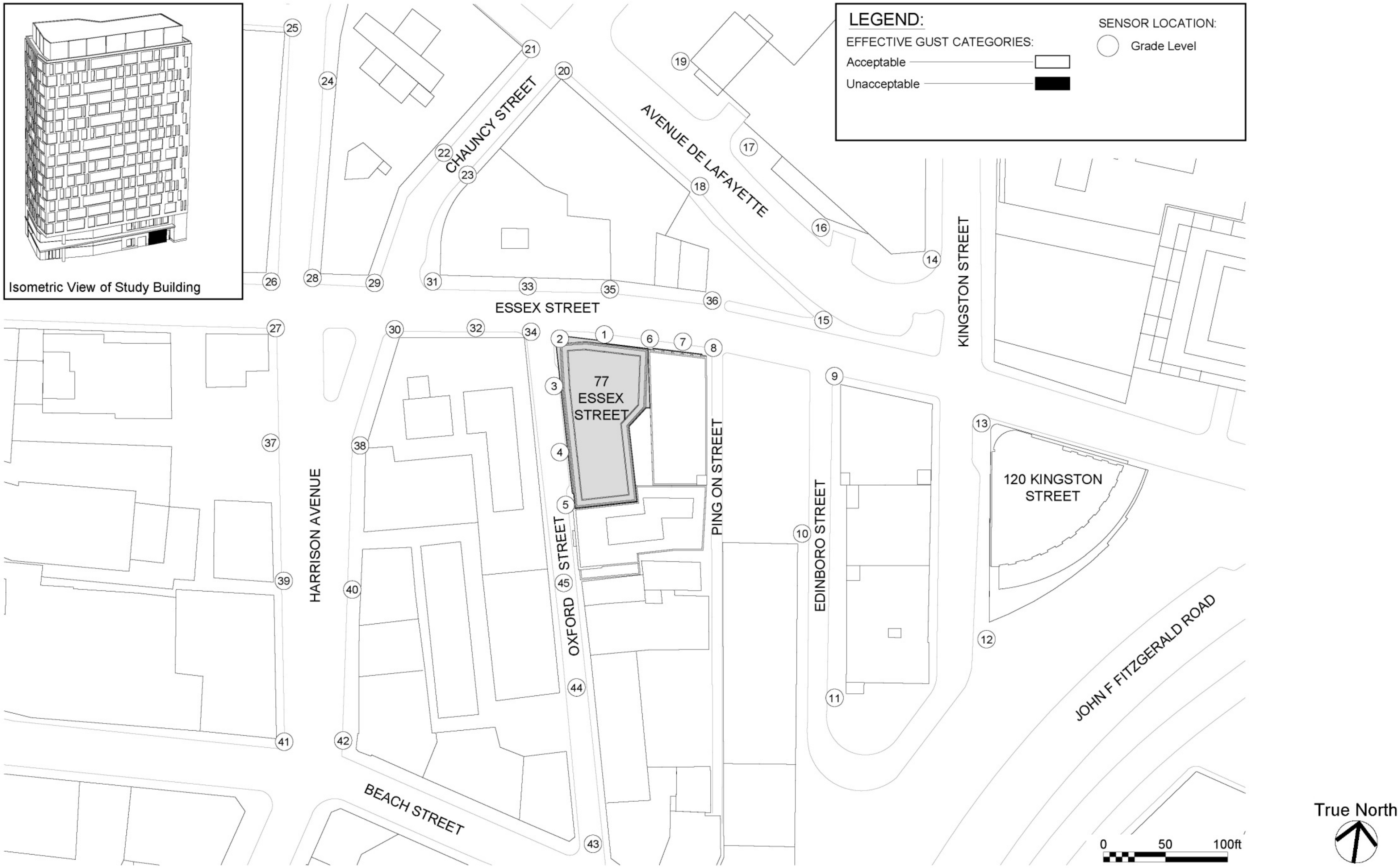
Pedestrian Wind Conditions – Mean Speed (Annual), Full Build



73-79 Essex Street Boston, Massachusetts

Figure 3.1-8

Pedestrian Wind Conditions – Effective Gust Speed (Annual), No Build

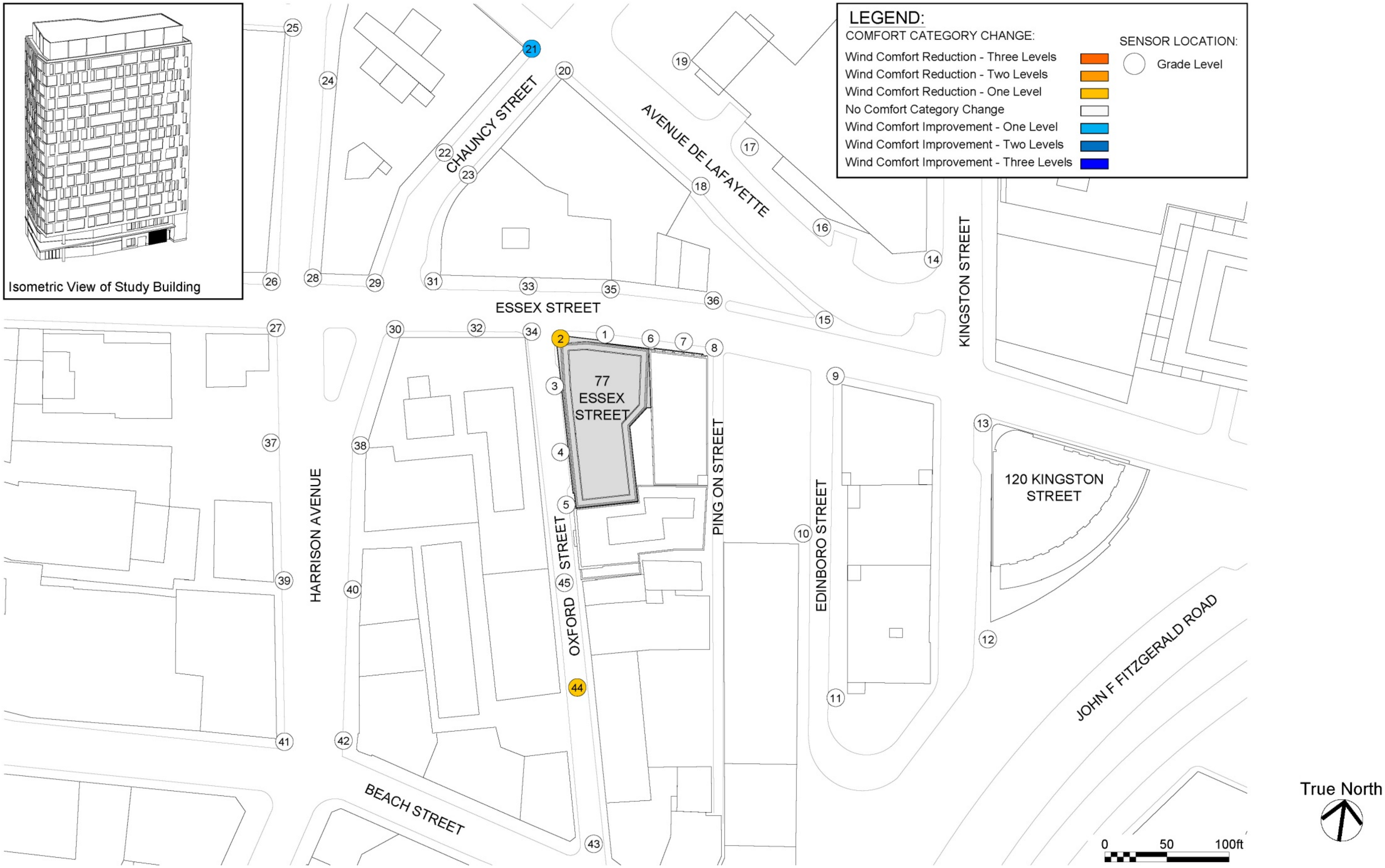


73-79 Essex Street   Boston, Massachusetts

Figure 3.1-9

Pedestrian Wind Conditions – Effective Gust Speed (Annual, Full Build

RWDI
CONSULTING ENGINEERS & SCIENTISTS



73-79 Essex Street   Boston, Massachusetts

Figure 3.1-10

Pedestrian Wind Conditions – Comfort Category Change

3.1.6 Conclusion

The addition of the Project is not expected to negatively impact the mean wind speeds in the area surrounding the Project site. Results of the wind tunnel analysis indicate that conditions will continue to be suitable for walking or better in all locations with the Project in place.

3.2 Shadow

3.2.1 Introduction and Methodology

A shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21), as well as 6:00 p.m. during the summer solstice and autumnal equinox.

The shadow analysis presents the existing shadow and new shadow that would be created by the Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces and sidewalks adjacent to and in the vicinity of the Project site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 to 3.2-14.

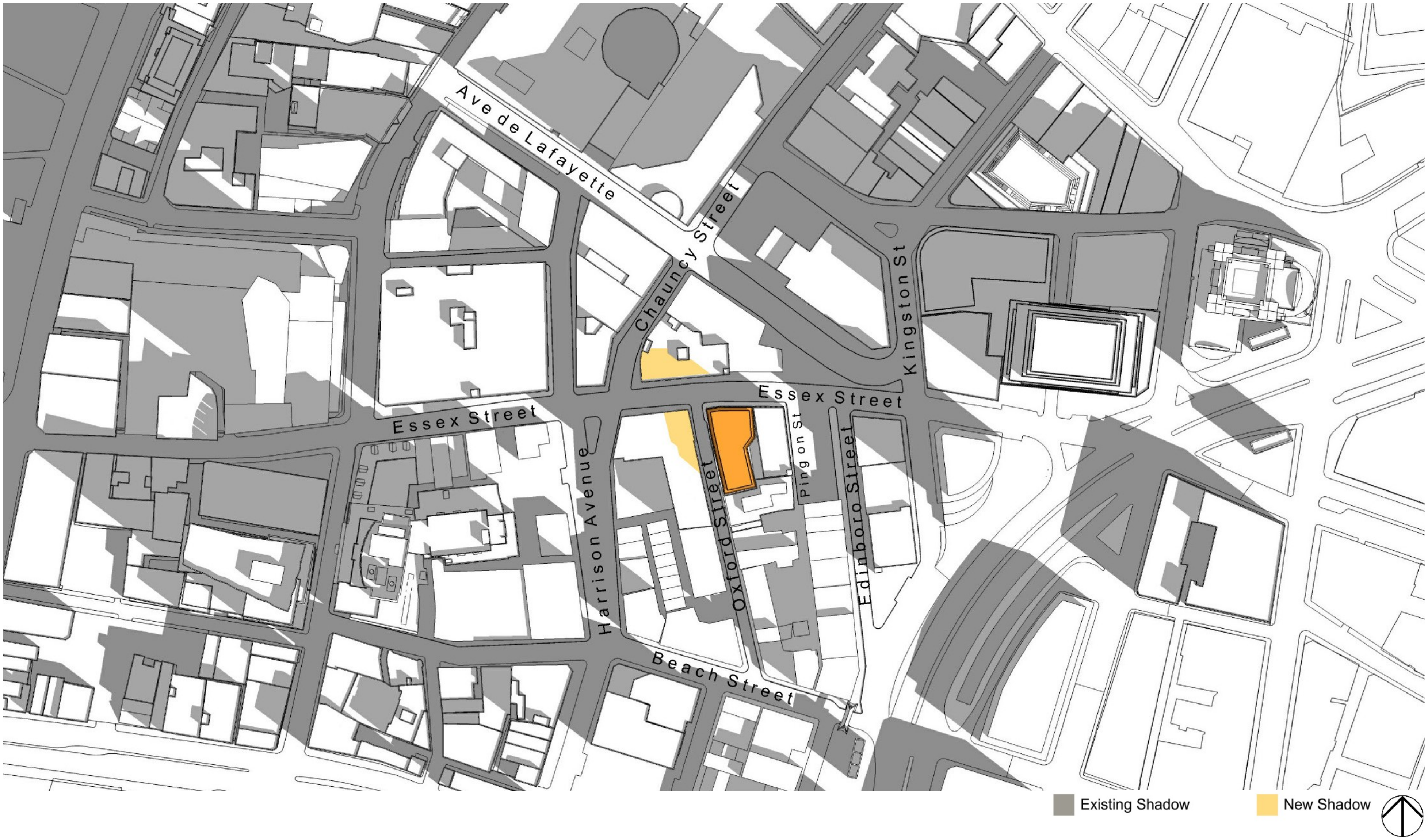
The area is dense and the surrounding streets and sidewalks are currently under shadow during most times of the year. The shadow analysis shows that no new shadow will be cast onto nearby open spaces or bus stops, and limited shadow will be cast onto nearby streets and sidewalks.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the Project will be cast to the northwest. No new shadow will be cast onto nearby streets, sidewalks, bus stops or public open space.

At 12:00 p.m., new shadow from the Project will be cast to the north onto nearby rooftops. No new shadow will be cast onto nearby streets, sidewalks, bus stops or public open space.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow will be cast onto a portion of Kingston Street and its sidewalks, and onto a sliver of Avenue de Lafayette and its northern sidewalk. No new shadow will be cast onto nearby bus stops or public open space.

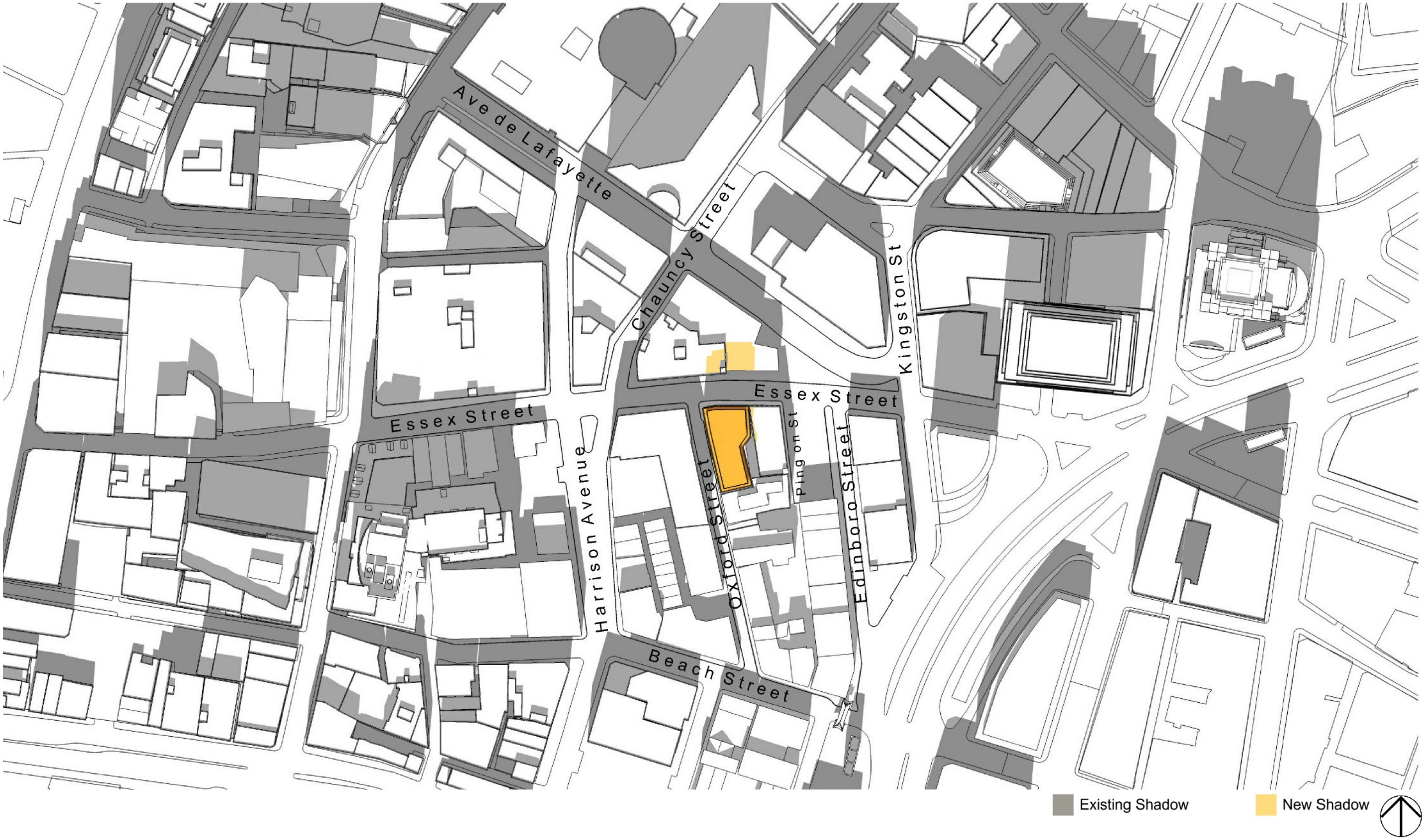


73-79 Essex Street **Boston, Massachusetts**

Group One PARTNERS

Figure 3.2-1

Shadow Study: March 21, 9:00am

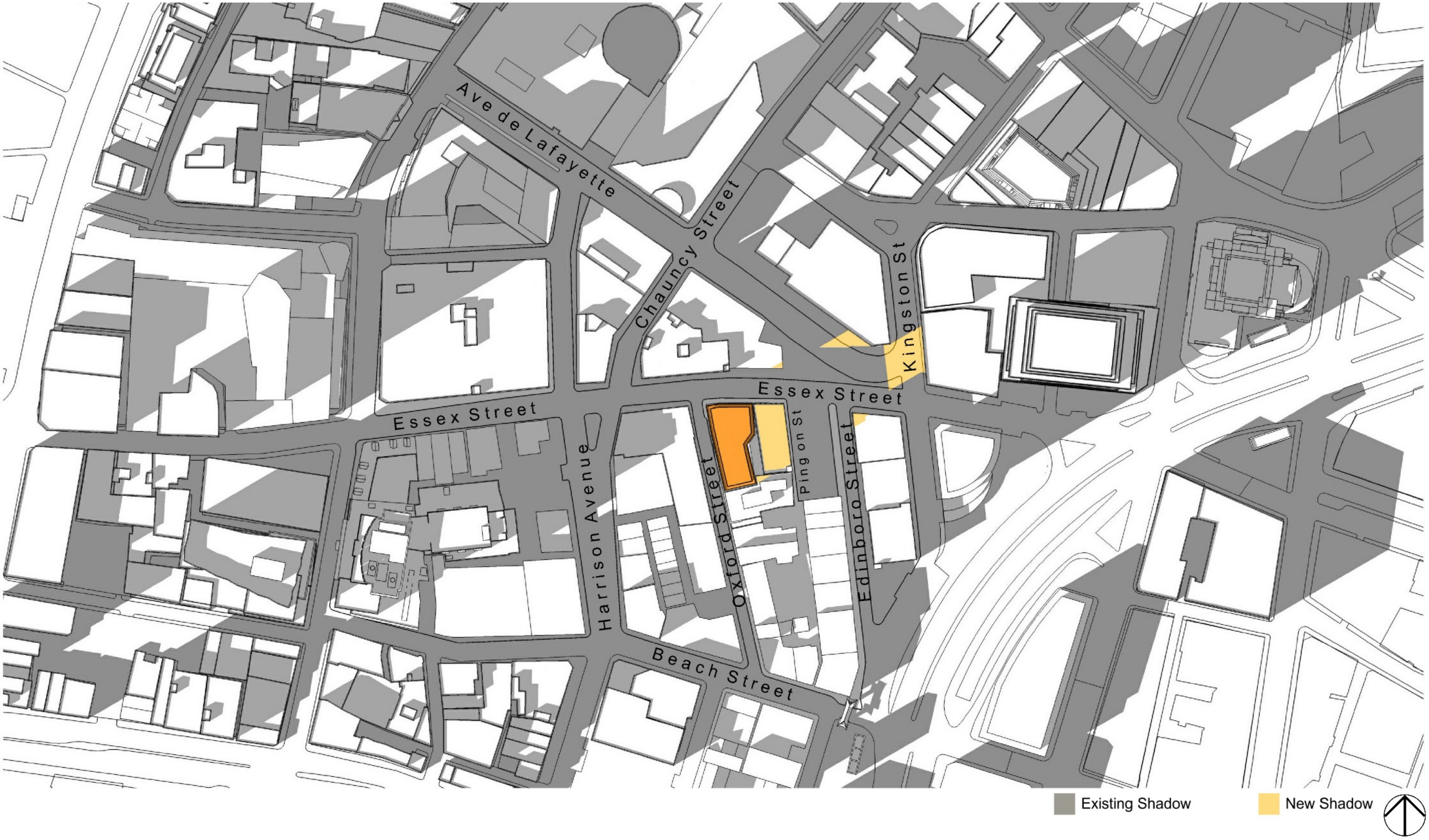


73-79 Essex Street Boston, Massachusetts

Group One PARTNERS

Figure 3.2-2

Shadow Study: March 21, 12:00pm



73-79 Essex Street   Boston, Massachusetts

Figure 3.2-3

Shadow Study: March 21, 3:00pm

73-79 Essex Street   Boston, Massachusetts

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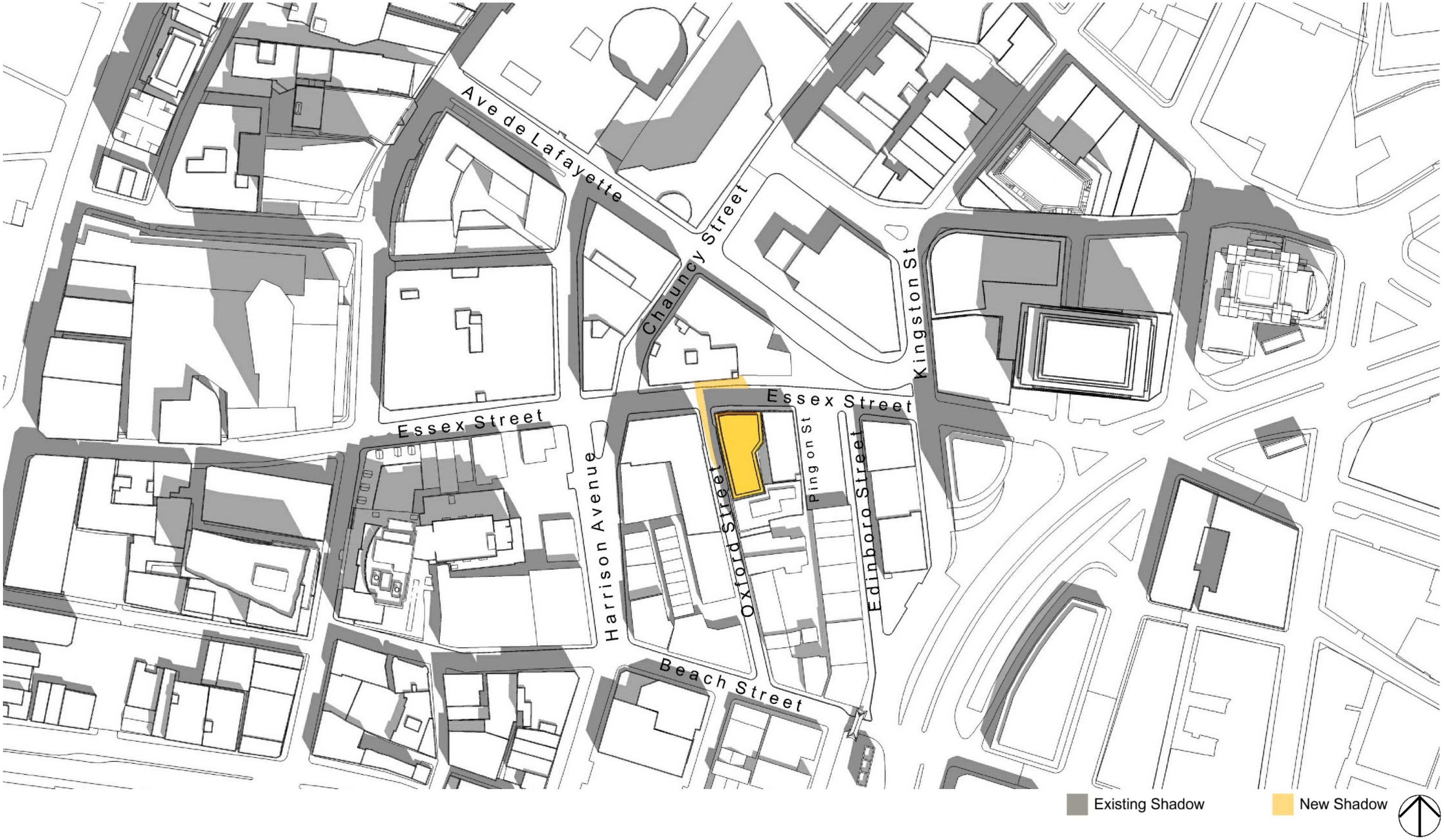
Figure 3.2-4

Shadow Study: June 21, 9:00am

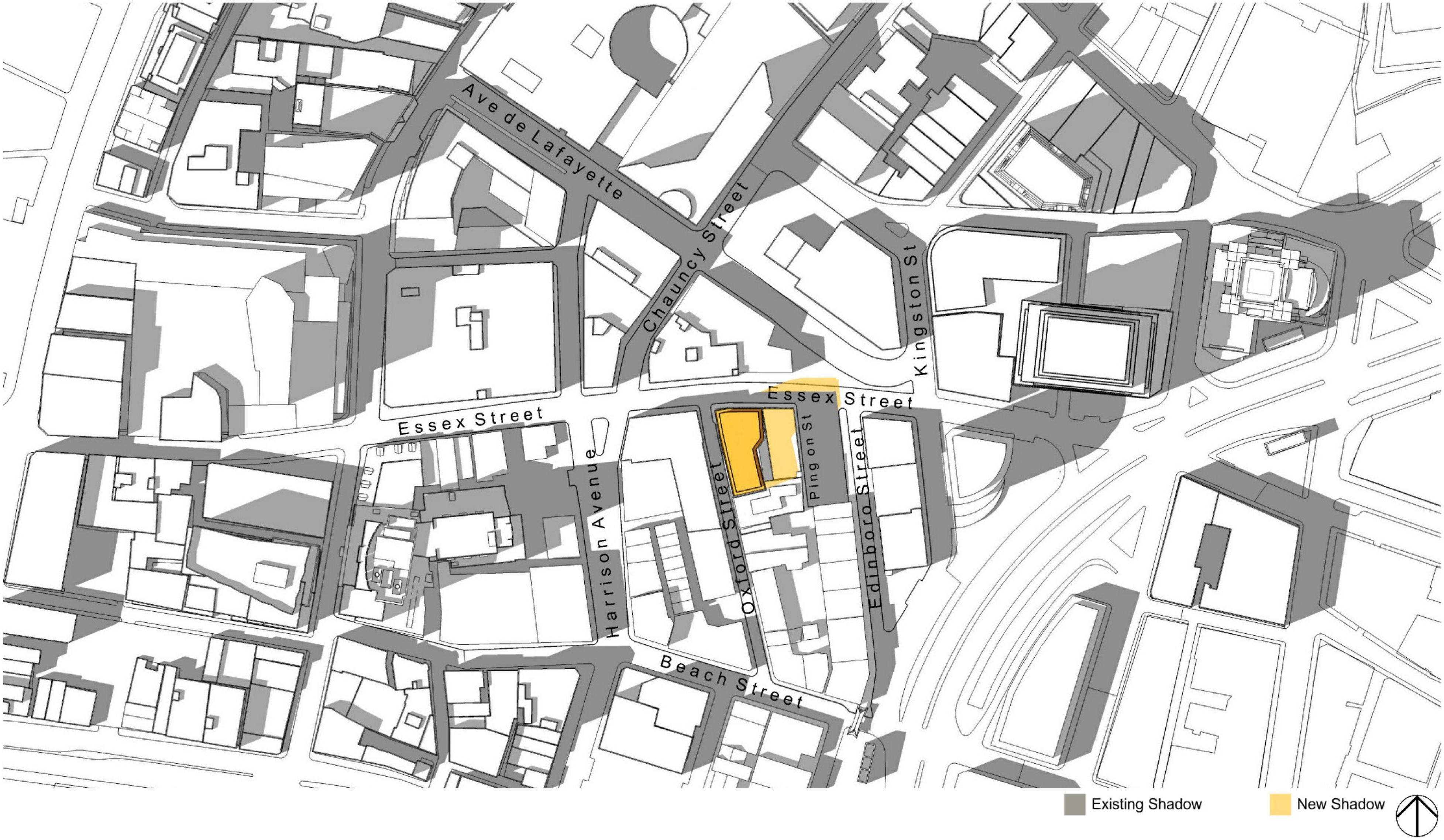


73-79 Essex Street   Boston, Massachusetts

Group One PARTNERS

Figure 3.2-5

Shadow Study: June 21, 12:00pm



73-79 Essex Street Boston, Massachusetts

Figure 3.2-6

Shadow Study: June 21, 3:00pm

73-79 Essex Street Boston, Massachusetts

Figure 3.2-7

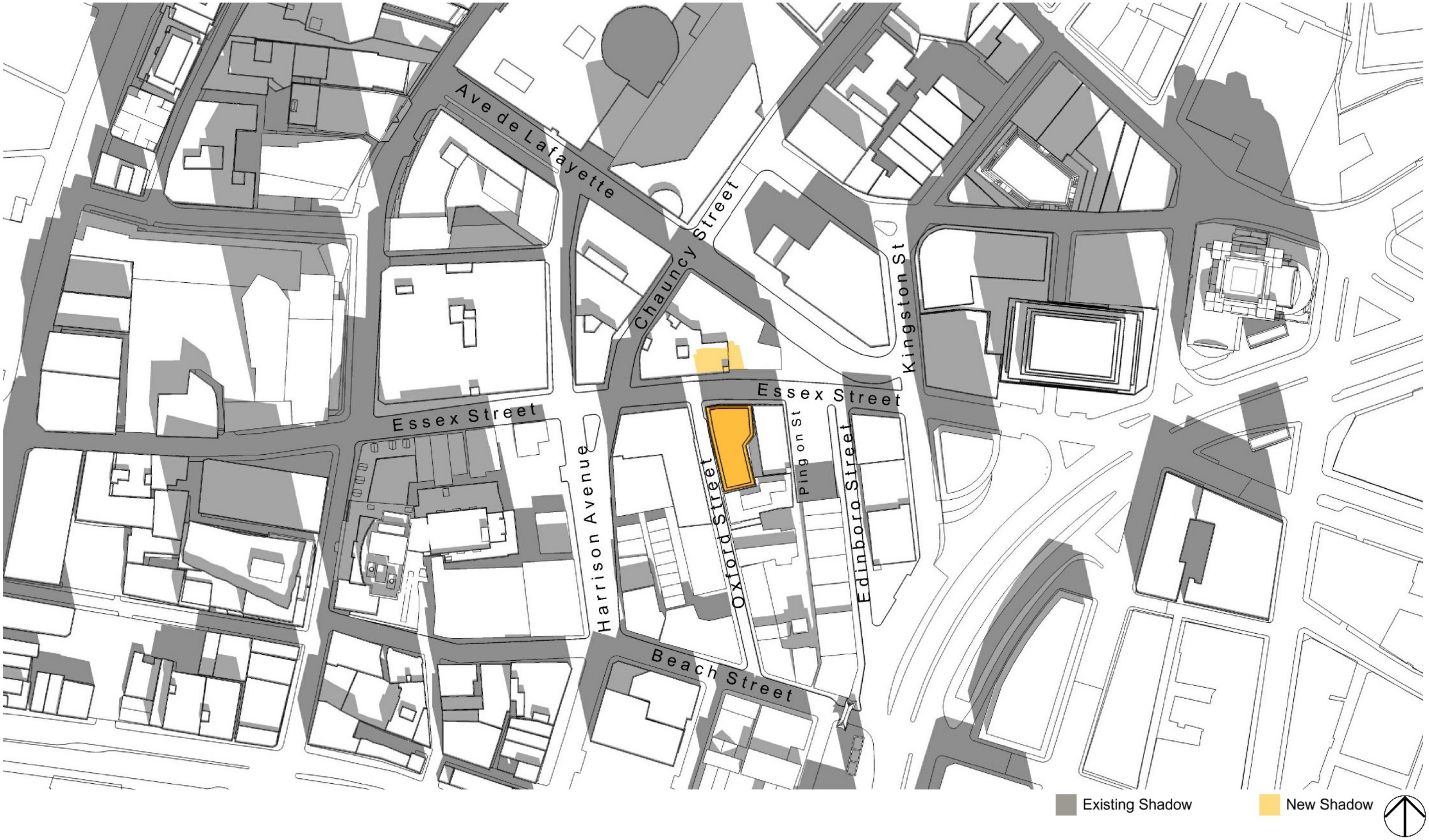
Shadow Study: June 21, 6:00pm

73-79 Essex Street Boston, Massachusetts

Group One PARTNERS

Figure 3.2-8

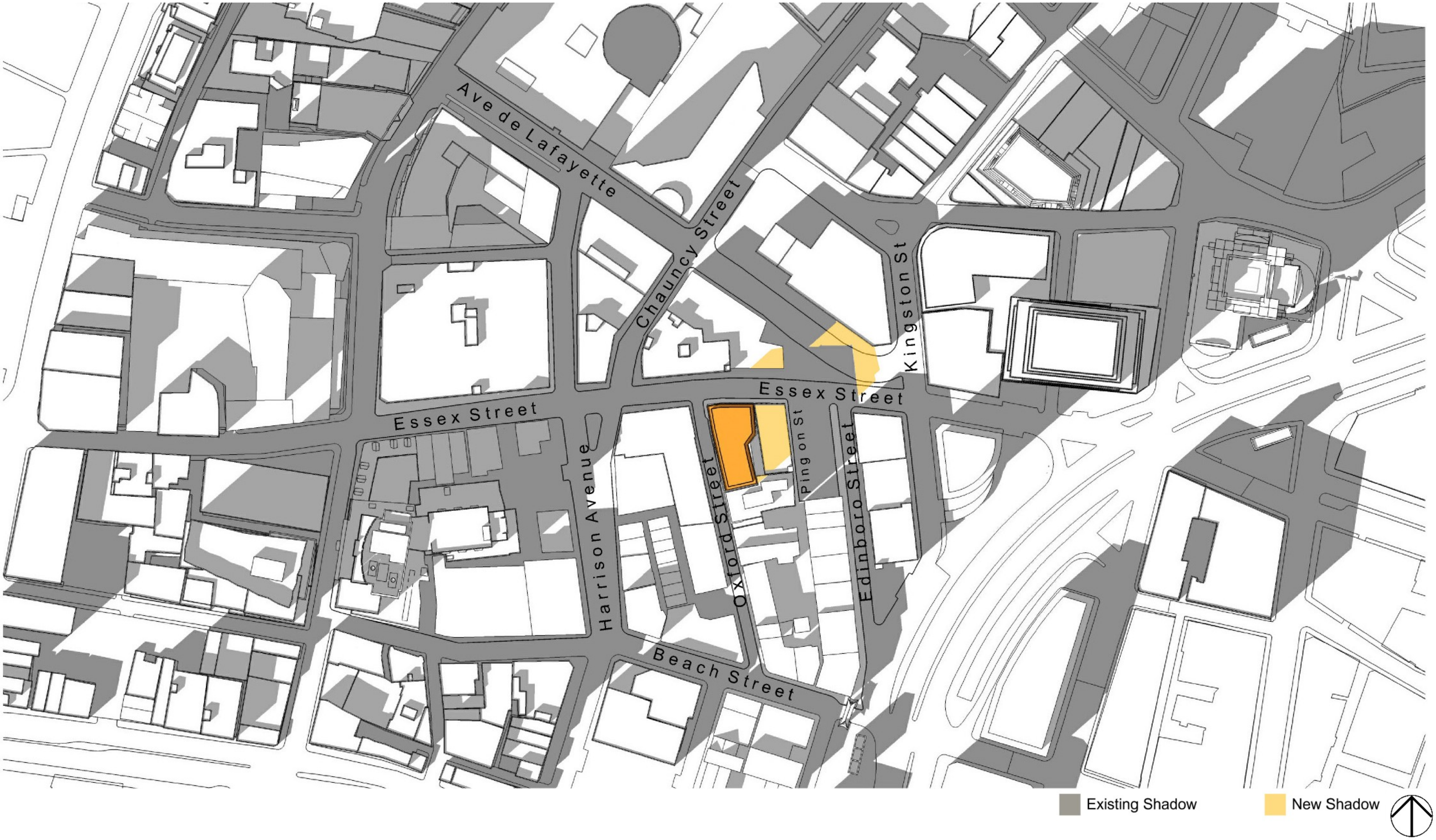
Shadow Study: September 21, 9:00am



73-79 Essex Street Boston, Massachusetts

Figure 3.2-9

Shadow Study: September 21, 12:00pm



73-79 Essex Street **Boston, Massachusetts**

Figure 3.2-10

Shadow Study: September 21, 3:00pm

73-79 Essex Street Boston, Massachusetts

Group One PARTNERS

Figure 3.2-11

Shadow Study: September 21, 6:00pm

73-79 Essex Street   Boston, Massachusetts

Group One PARTNERS

Figure 3.2-12

Shadow Study: December 21, 9:00am

73-79 Essex Street   Boston, Massachusetts

Group One PARTNERS

Figure 3.2-13

Shadow Study: December 21, 12:00pm

73-79 Essex Street Boston, Massachusetts

Group One PARTNERS

Figure 3.2-14

Shadow Study: December 21, 3:00pm

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the Project will be cast to the west. New shadow will be cast upon a small portion of Essex Street. No new shadow will be cast onto nearby bus stops or public open space.

At 12:00 p.m., new shadow will be cast to the north onto a small portion of Essex Street and its northern sidewalk. No new shadow will be cast onto nearby bus stops or public open space.

At 3:00 p.m., new shadow from the Project will be cast to the northeast onto a small portion of Essex Street and its northern sidewalk. No new shadow will be cast onto nearby bus stops or public open space.

At 6:00 p.m., new shadow from the Project will be cast to the east. New shadow will be cast onto John F. Fitzgerald Surface Road and its western sidewalk, as well as a small portion of the open space to the east of 120 Kingston Street. No new shadow will be cast onto nearby bus stops or other public open spaces.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m., during the autumnal equinox, new shadow from the Project will be cast to the northwest. No new shadow will be cast onto nearby streets, sidewalks, bus stops or public open space.

At 12:00 p.m., new shadow from the Project will be cast to the north. No new shadow will be cast onto nearby streets, sidewalks, bus stops or public open space.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow will be cast onto a small portion of Avenue de Lafayette and its northern sidewalk. No new shadow will be cast onto nearby bus stops or public open space.

At 6:00 p.m., most of the area is covered by existing shadow. New shadow will be cast onto a sliver of Summer Street and its southern sidewalk, a sliver of Atlantic Avenue and a sliver of John F. Fitzgerald Surface Road. No new shadow will be cast onto nearby bus stops or public open space.

3.2.5 Winter Solstice (December 21)

The winter solstice creates the least favorable conditions for sunlight in New England. Because the sun angle during the winter is lower than in other seasons, shadows are made longer and reach further into the surrounding area.

At 9:00 a.m., new shadow from the Project will be cast to the northwest. No new shadow will be cast onto nearby streets, sidewalks, bus stops or public open space.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow will be cast onto Chauncy Street and its sidewalks. No new shadow will be cast onto nearby bus stops or public open space.

At 3:00 p.m., most of the area is under existing shadow. New shadow from the Project will be cast to the northeast. No new shadow will be cast onto nearby streets, sidewalks, bus stops or public open space.

3.2.6 Conclusions

The shadow impact analysis considered net new shadow created by the Project during 14 time periods. New shadow will generally be limited to the immediately surrounding area. No new shadow will be cast onto public open spaces during 13 of the 14 time periods studied, or bus stops during any of the 14 time periods studied.

3.3 Daylight Analysis

3.3.1 Introduction

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and sidewalks in the immediate vicinity of a project site. The daylight analysis for the Project considers the existing and proposed conditions, as well as daylight obstruction values of the surrounding area. Daylight obstruction values for the Project are consistent with and less than the Area Context values.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[2]. This program measures the percentage of "sky dome" that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into

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[2] Method developed by Harvey Bryan and Susan Stuebing, computer program developed by Ronald Fergle, Massachusetts Institute of Technology, Cambridge, MA, September 1984.

the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

The analysis compares three conditions: Existing Conditions; Proposed Conditions; and the context of the area.

Two viewpoints were chosen to evaluate the daylight obstruction for the Existing and Proposed Conditions. Four area context points were considered to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context viewpoints were taken in the following locations and are shown on Figure 3.3-1.

- **Viewpoint 1:** View from Essex Street facing south toward the Project site
- **Viewpoint 2:** View from Oxford Street facing east toward the Project site
- **Area Context Viewpoint AC1:** View from Essex Street facing south toward 120 Kingston Street
- **Area Context Viewpoint AC2:** View from Essex Street facing north toward 50 Essex Street
- **Area Context Viewpoint AC3:** View from Harrison Avenue facing west toward 31 Harrison Avenue

3.3.3 Results

The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 through 3.3-4 illustrate the BRADA results for each analysis.

Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		*Existing Conditions*	*Proposed Conditions*
Viewpoint 1	View from Essex Street facing south toward the Project site	85.3%	91.8%
Viewpoint 2	View from Oxford Street facing east toward the Project site	81.6%	94.3%
Area Context Points			
AC1	View from Essex Street facing south toward 120 Kingston Street	94.1%	N/A
AC2	View from Essex Street facing north toward 50 Essex Street	88.8%	N/A
AC3	View from Harrison Avenue facing west toward 31 Harrison Avenue	81.4%	N/A

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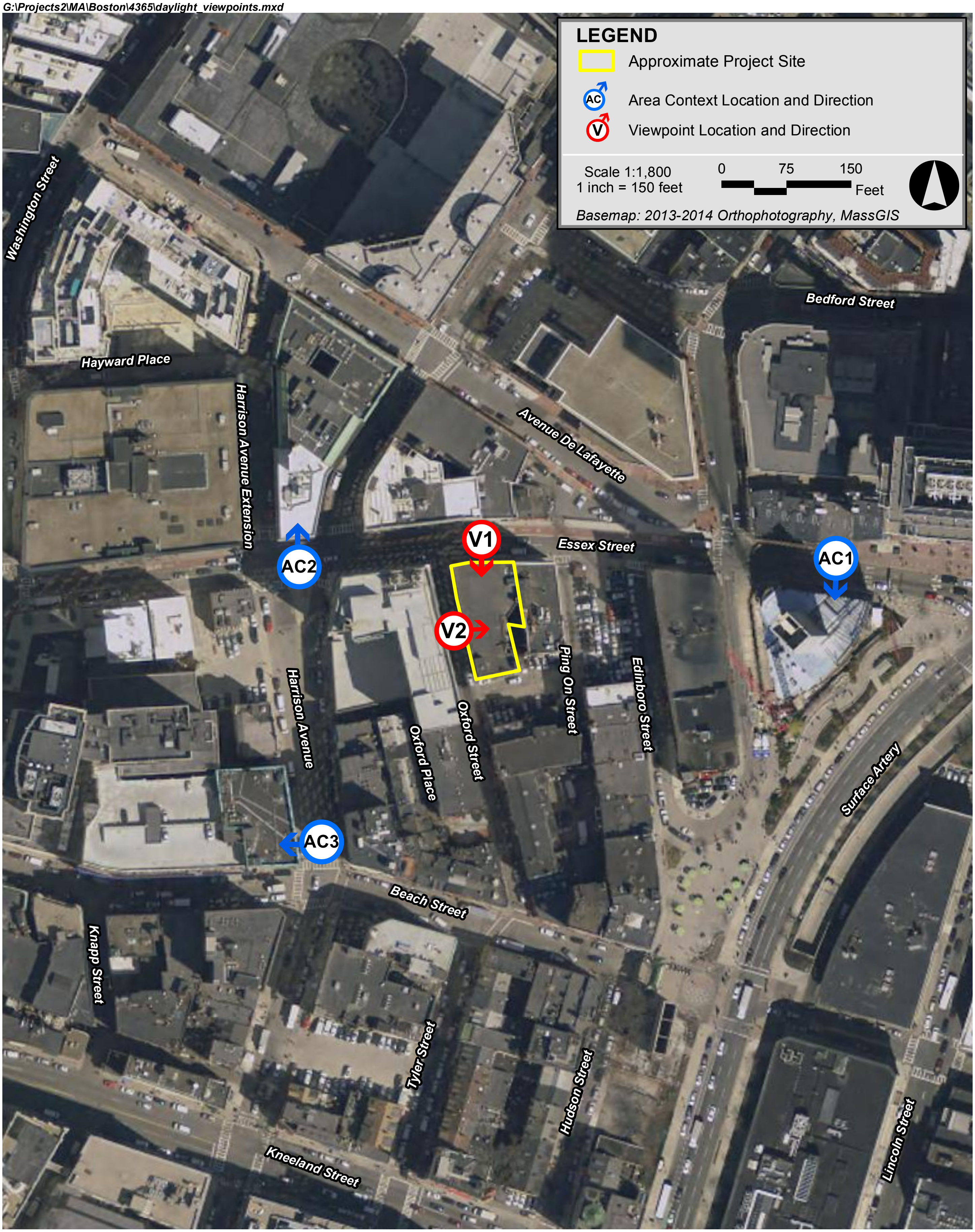
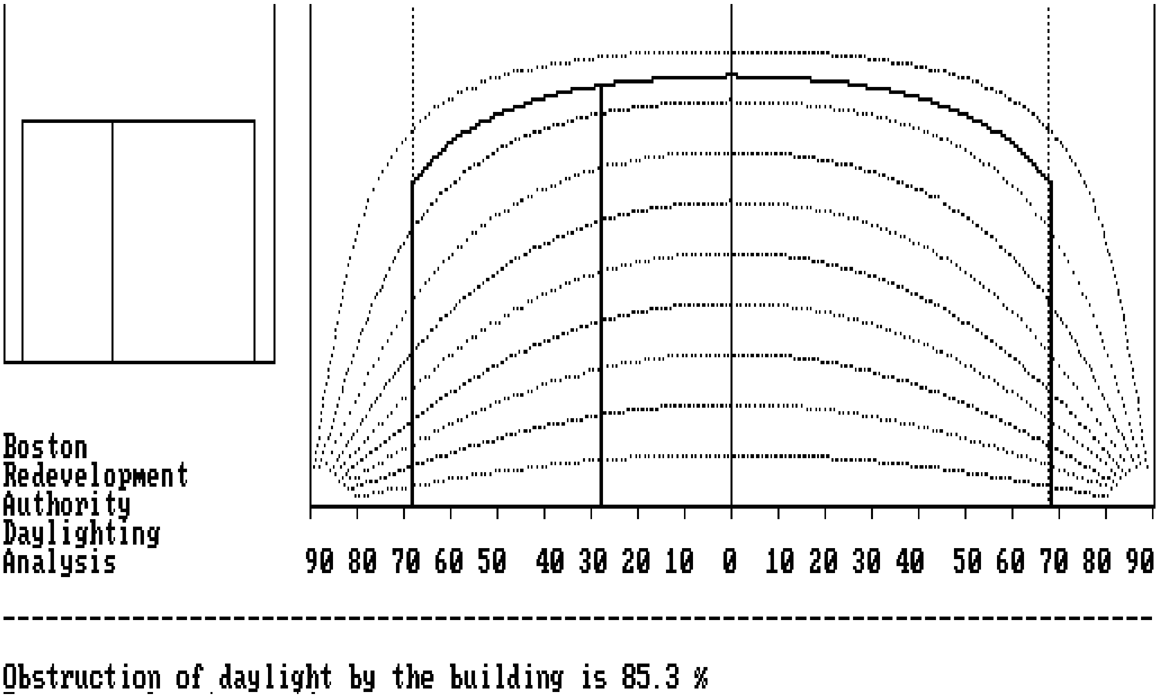


Figure 3.3-1

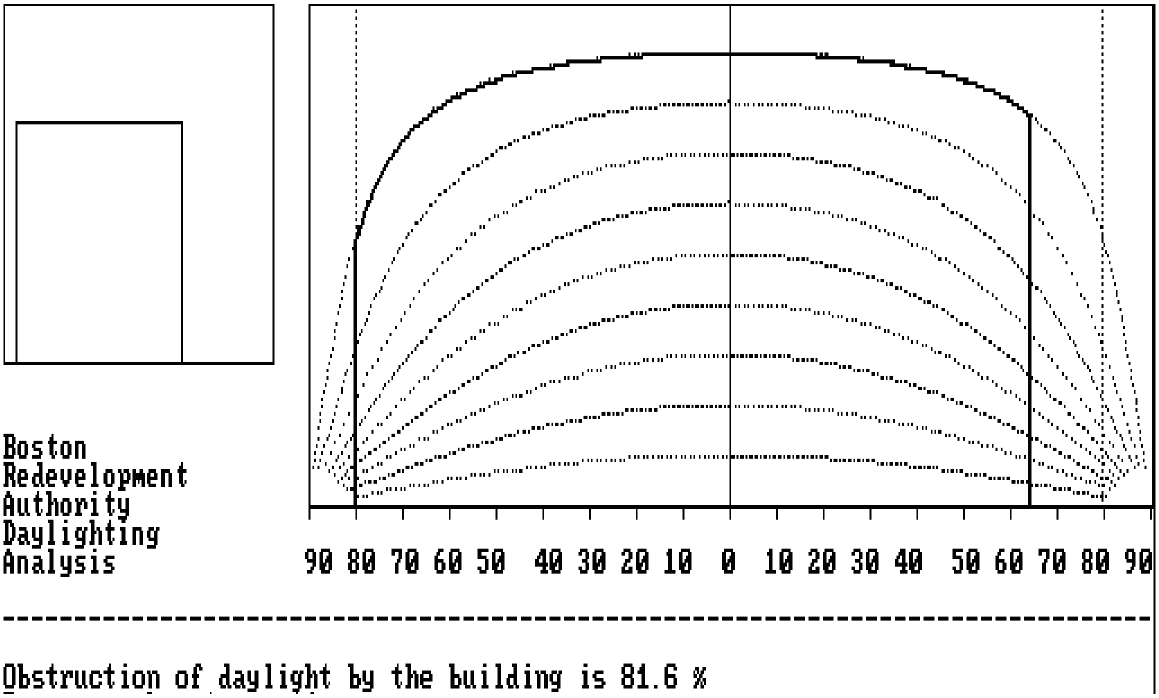
Daylight Analysis Viewpoints

Viewpoint 1: View from Essex Street facing south toward the Project site



Obstruction of daylight by the building is 85.3 %

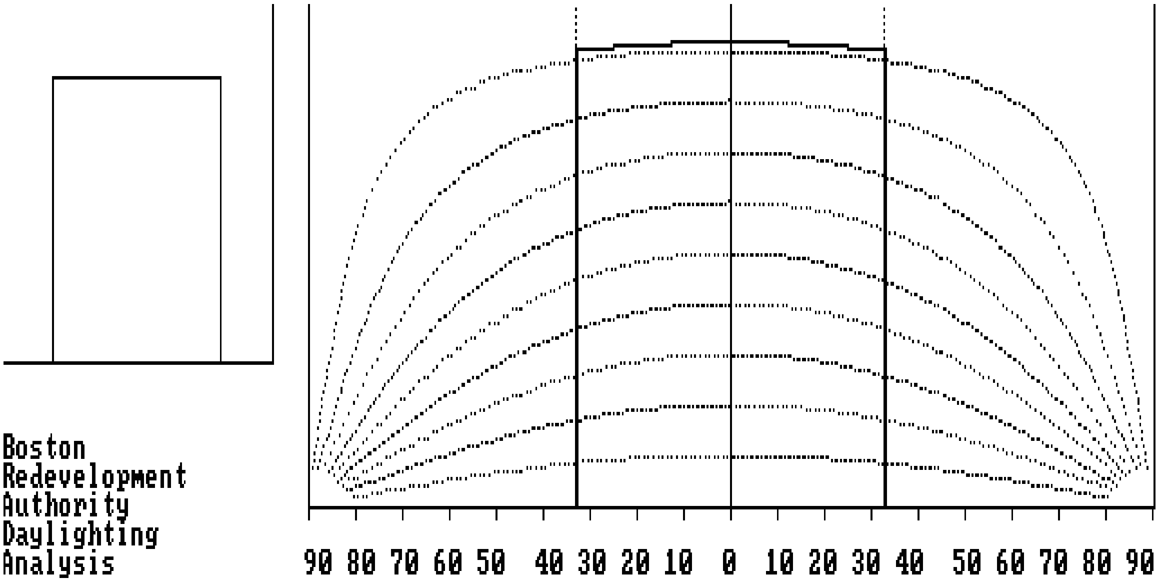
Viewpoint 2: View from Oxford Street facing east toward the Project site



Obstruction of daylight by the building is 81.6 %

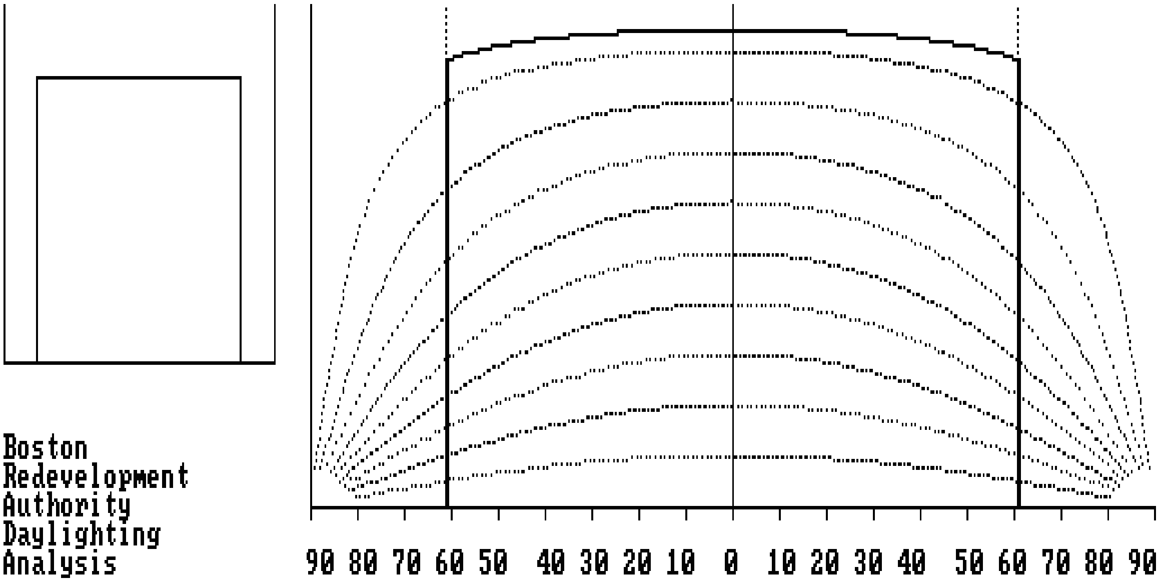
Figure 3.3-2
Existing Conditions

Viewpoint 1: View from Essex Street facing south toward the Project site



Obstruction of daylight by the building is 91.8 %

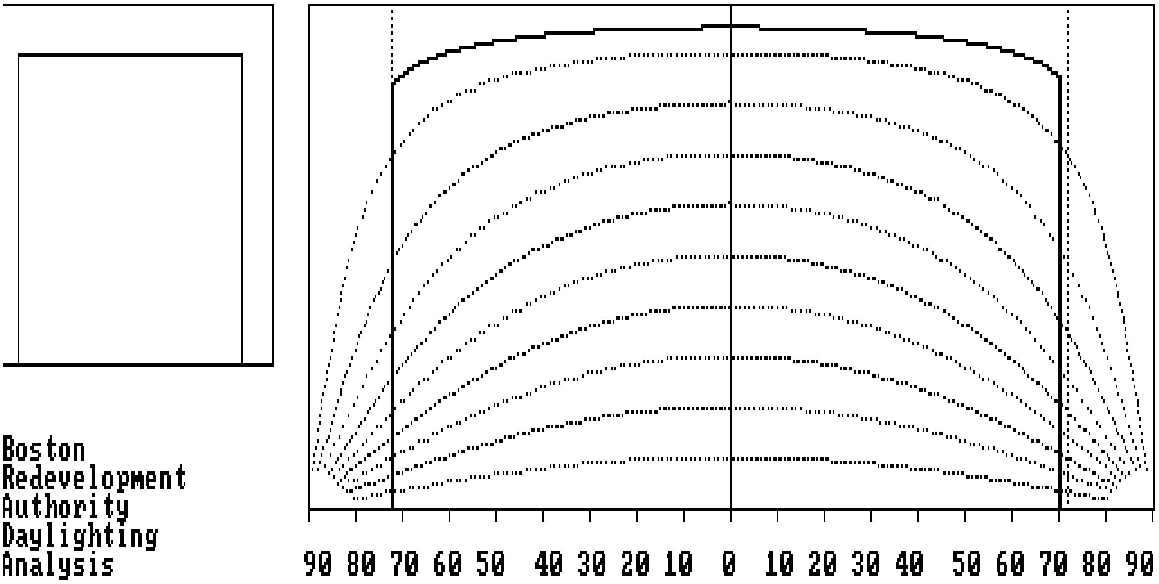
Viewpoint 2: View from Oxford Street facing east toward the Project site



Obstruction of daylight by the building is 94.3 %

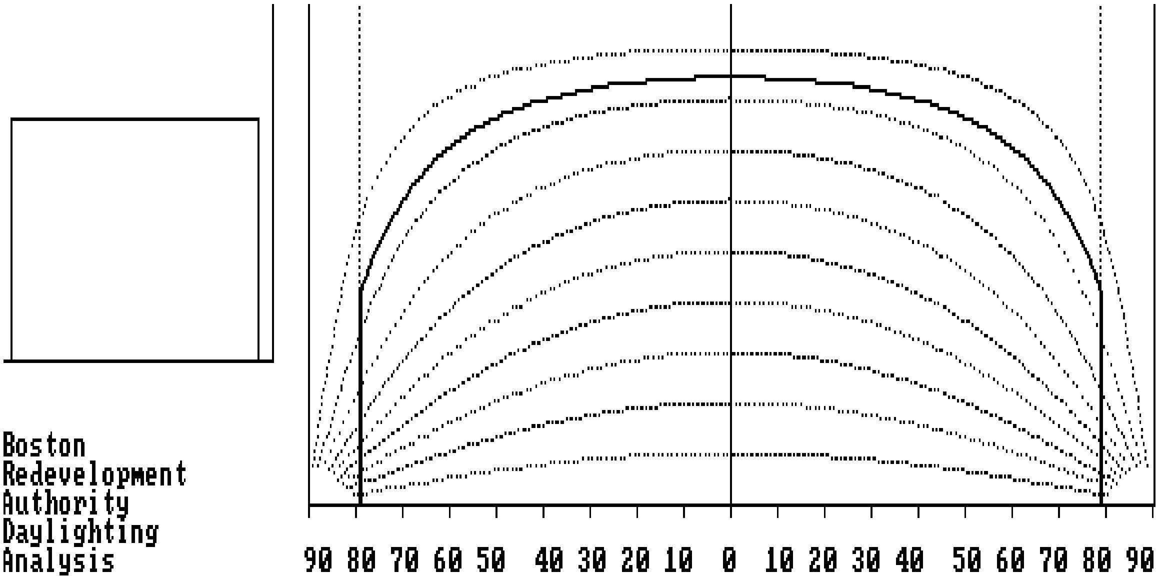
Figure 3.3-3
Proposed Conditions

AC 1: View from Essex Street facing south toward 120 Kingston Street



Obstruction of daylight by the building is 94.1 %

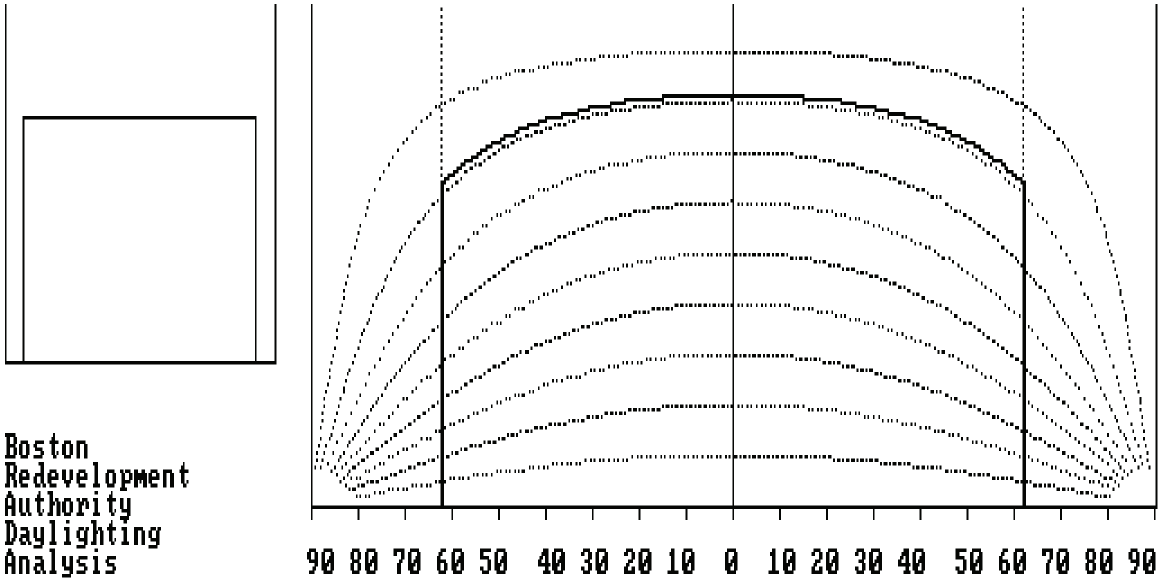
AC 2: View from Essex Street facing north toward 42-44 Essex Street



Obstruction of daylight by the building is 84.3 %

Figure 3.3-4
Area Context Viewpoints

AC 3: View from Harrison Avenue facing west toward 31 Harrison Avenue



Obstruction of daylight by the building is 81.4 %

Essex Street– Viewpoint 1

Essex Street runs along the northern edge of the Project site. Viewpoint 1 was taken from the center of Essex Street facing south toward the Project site. The site has an existing daylight obstruction value of 85.3%. The development of the Project will result in a daylight obstruction value of 91.8%. While this is an increase over existing conditions, the daylight obstruction value is consistent with or less than the daylight obstruction of other buildings in the area, including the Area Context buildings.

Oxford Street – Viewpoint 2

Oxford Street runs along the western edge of the Project site. Viewpoint 2 was taken from the center of Oxford Street, facing east toward the site. The site has an existing daylight obstruction value of 81.6%. The development of the Project will increase the daylight obstruction value to 94.3%. While this is an increase over existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings.

Area Context Viewpoints

The Project site is located in downtown Boston, a dense area with narrow streets and tall buildings. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the four Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 81.4% for AC3 to 94.1% for AC1. Daylight obstruction values for the Project are consistent with and less than the Area Context values.

3.3.4 Conclusion

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site and in the surrounding area. Although the results of the BRADA analysis indicate that the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to the daylight obstruction values within the surrounding area.

3.4 Solar Glare

The Project materials are still being studied and glazing of the windows will be determined as the design progresses. Due to the type of potential glass and glazing proposed, solar glare impacts are not currently anticipated.

3.5 Air Quality

3.5.1 Introduction

The BRA requires that proposed projects evaluate the air quality in the local area, and assess any adverse air quality impacts attributable to the project.

All intersections evaluated in the transportation analysis in Chapter 2 are below the BRA thresholds requiring a microscale analysis of carbon monoxide. Additionally, the Project does not generate enough traffic to require a mesoscale vehicle emissions quantification analysis.

Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection (MassDEP) during permitting under the Environmental Results Program, as required. It is expected that all stationary sources will be small, and any impacts from stationary sources would be insignificant.

3.5.2 National Ambient Air Quality Standards and Background Concentrations

Federal National Ambient Air Quality Standards (NAAQS) were developed by the U.S. Environmental Protection Agency (EPA) to protect the human health against adverse health effects with a margin of safety. The following sections outline the NAAQS standards and detail the sources of background air quality data.

3.5.2.1 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA promulgated NAAQS for the following criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM-10 and PM-2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 3.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS (differences are highlighted in **bold** in Table 3.5-1).

NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation.

The NAAQS also reflect various durations of exposure. The non-probabilistic short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

Table 3.5-1 National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards

Pollutant	*Averaging Period*	*NAAQS ($\mu g/m^3$)*		*MAAQS ($\mu g/m^3$)*	
		Primary	*Secondary*	*Primary*	*Secondary*
NO_2	Annual (1)	100	Same	100	Same
	1-hour (2)	**188**	None	**None**	None
SO_2	Annual (1)(9)	80	None	80	None
	24-hour (3)(9)	365	None	365	None
	3-hour (3)	None	1300	None	1300
	1-hour (4)	**196**	None	**None**	None
PM-2.5	Annual (1)	**12**	**15**	**None**	**None**
	24-hour (5)	**35**	**Same**	**None**	**None**
PM-10	Annual (1)(6)	**None**	None	**50**	Same
	24-hour (3)(7)	150	Same	150	Same
CO	8-hour (3)	10,000	Same	10,000	Same
	1-hour (3)	40,000	Same	40,000	Same
Ozone	8-hour (8)	**147**	Same	**235**	Same
Pb	3-month (1)	1.5	Same	1.5	Same

(1) Not to be exceeded.
(2) 98th percentile of one-hour daily maximum concentrations, averaged over three years.
(3) Not to be exceeded more than once per year.
(4) 99th percentile of one-hour daily maximum concentrations, averaged over three years.
(5) 98th percentile, averaged over three years.
(6) EPA revoked the annual PM-10 NAAQS in 2006.
(7) Not to be exceeded more than once per year on average over three years.
(8) Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.
(9) EPA revoked the annual and 24-hour SO_2 NAAQS in 2010. However, they remain in effect until one year after the area's initial attainment designation, unless designated as "nontattinment".

Source: http://www.epa.gov/ttn/naaqs/criteria.html and 310 CMR 6.04

3.5.2.2 Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP in their Annual Air Quality Reports was obtained for 2012 to 2014. The three-hour and 24-hour SO_2 values are no longer reported in the annual reports. Data for these pollutant and averaging time combinations were obtained from the EPA's AirData website.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. To attain the one-hour NO_2

standard, the three-year average of the 98th percentile of the maximum daily one-hour concentrations must not exceed 188 μg/m^3.

Background concentrations were determined from the closest available monitoring stations to the proposed development. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitor is at 174 North Street (0.8 miles north northeast), but this site only samples PM-2.5. The next closest site is at East First Street in South Boston, roughly 1.4 miles southeast of the Project location. However, this site only samples for SO_2 and NO_2. A site on Harrison Avenue is roughly 1.9 miles southwest of the Project. This site samples for the remaining pollutants. A summary of the background air quality concentrations are presented in Table 3.5-2.

Table 3.5-2 Observed Ambient Air Quality Concentrations and Selected Background Levels

Pollutant	*Averaging Time*	*2012*	*2013*	*2014*	*Background Concentration (μg/m^3)*	*NAAQS*	*Percent of NAAQS*
SO_2 (1)(6)	1-Hour (5)	31.44	36.68	73.36	47.2	196.0	24%
	3-Hour	27.772	42.706	63.666	63.7	1300.0	5%
	24-Hour	11.79	17.03	21.222	21.2	365.0	6%
	Annual	4.323	4.0086	4.5588	4.6	80.0	6%
PM-10	24-Hour	32	34.0	61	61.0	150.0	41%
	Annual	14.2	15.1	13.9	15.1	50.0	30%
PM-2.5	24-Hour (5)	20.9	19.9	14.5	18.4	35.0	53%
	Annual (5)	9.5	8.8	7.1	8.5	12.0	71%
NO_2 (3)	1-Hour (5)	80.84	88	116.56	95.3	188.0	51%
	Annual	18.2924	22.9	26.32	26.3	100.0	26%
CO (2)	1-Hour	2474.2	2145.3	1963.1	2474.2	40000.0	6%
	8-Hour	2177.4	1375.2	1489.8	2177.4	10000.0	22%
Ozone (4)	8-Hour	121.706	115.817	106.002	121.7	147.0	83%
Lead	Rolling 3-Month	0.014	0.006	0.014	0.014	0.15	9%

Notes:

From 2012-2014 EPA's AirData Website

(1) SO_2 reported ppb. Converted to μg/m^3 using factor of 1 ppm = 2.62 μg/m^3.

(2) CO reported in ppm. Converted to μg/m^3 using factor of 1 ppm = 1146 μg/m^3.

(3) NO_2 reported in ppb. Converted to μg/m^3 using factor of 1 ppm = 1.88 μg/m^3.

(4) O_3 reported in ppm. Converted to μg/m^3 using factor of 1 ppm = 1963 μg/m^3.

(5) Background level is the average concentration of the three years.

(6) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

Air quality in the vicinity of the Project site is generally good, with all local background concentrations found to be well below the NAAQS.

3.5.3 Stationary Sources

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources consist of heating and hot water units and emergency electrical generators. Cooling towers, although not a combustion source, are a source of particulate emissions.

It is expected that the majority of stationary sources (boilers, engines, etc) may be subject to the MassDEP's Environmental Results Program (ERP). The Proponent will complete the required applications and submittals for the equipment, as necessary.

3.5.4 Mobile Sources

Mobile sources of air pollution include gasoline, diesel, and natural gas fueled vehicles. Emissions from mobile sources have continually decreased as engine technology and efficiency have been improved.

This "microscale" analysis is typically required for any intersection where 1) 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; 2) project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the project will generate 3,000 or more new average daily trips on roadways providing access to a single location. A microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No-Build cases would then be compared with federal (and state) ambient air quality standards for CO.

The studied intersections do not meet the criteria described above, therefore a microscale analysis has not been completed. Given that this Project does not significantly increase vehicle volumes, and does not affect any already poorly functioning intersections, it can be reasonably assumed that the vehicle trips generated by this Project will not cause adverse air quality impacts in the area.

3.6 Stormwater/Water Quality

Chapter 7 includes a discussion of stormwater and water quality.

3.7 Flood Hazard Zones/ Wetlands

The most current version of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for this area (25025C0081J, March 16, 2016) shows that the Project site is located outside of the 500-year flood zone area.

The Project site does not contain wetlands.

3.8 Geotechnical Impacts

3.8.1 Sub-soil Conditions

Several borings were previously completed in the immediate vicinity of the Project site for nearby developments and for the Central Artery/Tunnel project. These test borings were drilled to varying depths, with several extending to either the glacial till or bedrock.

Table 3.8-1 characterizes the general subsurface profile of sites near the Project site based on review of the readily available subsurface data.

Table 3.8-1 Subsurface Soil Profile

Generalized Description	*Depth to Top of Layer (Feet)*	*Thickness of Layer (feet)*
Fill	-	5 to 20
Marine Sand and Clay	5 to 20	25 to > 40
Glacial Till	40 to > 55	>10
Bedrock	70 to 75 (approximate)	-

Subsurface explorations will be completed following demolition of the existing building, prior to construction.

3.8.2 Groundwater

A groundwater monitoring well exists in front of 15 Edinboro Street, between Essex and Kingston Streets, approximately one block from the Project site. Data reviewed from the Boston Groundwater Trust (BGwT) website indicates the groundwater level measured in August 2007 at the well location was Elevation 9.95 BCB. This is approximately 10 to 12 feet below the existing site grade (ground surface).

Historically, groundwater levels reported by BGwT ranged from approximately Elevation 9.2 to 10.8 BCB. Other wells located north of the Project site indicate measured groundwater levels ranging from about Elevation 6 to Elevation 10 BCB.

3.8.3 Groundwater Conservation Overlay District

The Project site is located within the Groundwater Conservation Overlay District (GCOD) which is governed by Article 32 of the City of Boston Zoning Code. The Proponent is committed to working with the BGwT and neighborhood to ensure that the Project has no adverse impact on nearby groundwater levels.

3.9 Solid and Hazardous Waste

3.9.1 Hazardous Waste

On March 3, 2015, Blackstone Consulting LLC (Blackstone) performed a Phase I Environmental Site Assessment of the Site. The assessment was performed with consideration to standard industry practice and the ASTM E-1527-13 site assessment standard entitled "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process." The assessment did not identify any Recognized Environmental Conditions (RECs) in connection with the property.

Blackstone also conducted a limited survey for the presence of Asbestos-Containing Material (ACM) within the Project site. Samples of suspect ACM in the form of vinyl floor tile and associated mastic, drywall systems, ceiling tiles, and window caulking were submitted for analysis by Polarized Light Microscopy. The ACM will be removed in accordance with all applicable regulations required by the Occupational Safety and Health Administration.

3.9.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of hotel uses. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management. The Project will generate approximately 182.5 tons of solid waste per year.

With the exception of typical housecleaning hazardous wastes typical of hotel developments (e.g. cleaning fluids and paint), the Project will not involve the generation, use, transportations, storage, release or disposal of potentially hazardous materials.

3.9.3 Recycling

A dedicated recyclables storage and collection program will facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

3.10 Noise Impacts

3.10.1 Introduction

A sound level assessment conducted by Epsilon Associates, Inc. included a baseline sound monitoring program to measure existing sound levels in the vicinity of the Project site, computer modeling to predict operational sound levels from mechanical equipment associated with the Project, and a comparison of future Project sound levels to applicable City of Boston Zoning District Noise Standards.

This analysis, which is consistent with BRA requirements for noise studies, indicates that predicted noise levels from the Project, with appropriate noise controls, will comply with applicable regulations.

3.10.2 Noise Terminology

There are several ways in which sound (noise) levels are measured and quantified, all of which use the logarithmic decibel (dB) scale. The following section defines the noise terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities observed in the environment. A property of the decibel scale is that the sound pressure levels of two distinct sounds are not purely additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a three-decibel increase (53 dB), not a doubling (100 dB). Thus, every three-decibel change in sound level represents a doubling or halving of sound energy. Related to this is the fact that a change in sound level of less than three dB is generally imperceptible to the human ear.

Another property of the decibel scale is that if one source of noise is 10 dB (or more) louder than another source, then the total combined sound level is simply that of the louder source (i.e., the quieter source contributes negligibly to the overall sound level). For example, a source of sound at 60 dB plus another source at 47 dB is 60 dB.

The sound level meter used to measure noise is a standardized instrument.[3] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various conditions. One network is the A-weighting network (there are also B- and C-weighting networks), which most closely approximates how the human ear responds to sound as a function of frequency, and is the accepted scale used for community sound level measurements. Sounds are frequently reported as detected with the A-weighting network of the sound level meter in dBA. A-weighted sound levels emphasize the middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequencies.

Because the sounds in our environment vary with time, they cannot simply be represented with a single number. In fact, there are several methods used for quantifying variable sounds which are commonly reported in community noise assessments, as defined below.

- L_{eq}, the equivalent level, in dBA, is the level of a hypothetical steady sound that would have the same energy (i.e., the same time-averaged mean square sound pressure) as the actual fluctuating sound observed.

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[3] *American National Standard Specification for Sound Level Meters*, ANSI S1.4-1983, published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

- L_{90} is the sound level, in dBA, exceeded 90 percent of the time in a given measurement period. The L_{90}, or residual sound level, is close to the lowest sound level observed when there are no obvious nearby intermittent noise sources.

- L_{50} is the median sound level, in dBA, exceeded 50 percent of the time in a given measurement period.

- L_{10} is the sound level, in dBA, exceeded only 10 percent of the time in a given measurement period. The L_{10}, or intrusive sound level, is close to the maximum sound level observed due to occasional louder intermittent noises, like those from passing motor vehicles.

- L_{max} is the maximum instantaneous sound level observed in a given measurement period.

By employing various noise metrics, it is possible to separate prevailing, steady sounds (the L_{90}) from occasional louder sounds (L_{10}) in the noise environment. This analysis treats all noise sources from the Project as though the emissions will be steady and continuous, described most accurately by the L_{90} exceedance level.

In the design of noise controls, which do not function quite like the human ear, it is important to understand the frequency spectrum of the noise source of interest. The spectra of noises are usually stated in terms of octave-band sound pressure levels, in dB, with the octave frequency bands being those established by standard (American National Standards Institute (ANSI) S1.11, 1986). To facilitate the noise-control design process, the estimates of noise levels in this analysis are also presented in terms of octave-band sound pressure levels. Octave-band measurements and modeling are used in assessing compliance with the City of Boston noise regulations.

3.10.3 Noise Regulations and Criteria

The City of Boston has both a noise ordinance and noise regulations. Chapter 16 §26 of the Boston Municipal Code sets the general standard for noise that is unreasonable or excessive: louder than 50 decibels between the hours of 11:00 p.m. and 7:00 a.m., or louder than 70 decibels at all other hours. The Boston Air Pollution Control Commission (APCC) has adopted regulations based on the city's ordinance - "Regulations for the Control of Noise in the City of Boston", which distinguish among residential, business, and industrial districts in the city. In particular, APCC Regulation 2 is applicable to the sounds from the proposed Project and is considered in this noise study.

Table 3.10-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the APCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. These maximum allowable sound pressure levels apply at the property line of the receiving property. The "Residential Zoning District" limits apply to any lot located within a residential zoning district or to any residential use located in another zone except an Industrial Zoning District, according to Regulation 2.2. Similarly, per Regulation 2.3, business limits apply to any lot located within a business zoning district not in residential or institutional use.

Table 3.10-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

Octave-band Center	*Residential Zoning District*		*Residential Industrial Zoning District*		*Business Zoning District*	*Industrial Zoning District*
Frequency (Hz)	*Daytime (dB)*	*All Other Times (dB)*	*Daytime (dB)*	*All Other Times (dB)*	*Anytime (dB)*	*Anytime (dB)*
32	76	68	79	72	79	83
63	75	67	78	71	78	82
125	69	61	73	65	73	77
250	62	52	68	57	68	73
500	56	46	62	51	62	67
1000	50	40	56	45	56	61
2000	45	33	51	39	51	57
4000	40	28	47	34	47	53
8000	38	26	44	32	44	50
A-Weighted (dBA)	**60**	**50**	**65**	**55**	**65**	**70**
Notes:	1. Noise standards from Regulation 2.5 "Zoning District Noise Standards", City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976. 2. All standards apply at the property line of the receiving property. 3. dB and dBA based on a reference pressure of 20 micropascals. 4. Daytime refers to the period between 7:00 a.m. and 6:00 p.m. daily, except Sunday.					

3.10.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project, located within the Chinatown neighborhood of Boston. Existing noise sources in the vicinity of the Project site currently include: vehicle and truck traffic along local roadways; rooftop mechanical equipment; daytime construction activity; aircraft flyovers; pedestrian foot traffic; and the general City soundscape.

3.10.4.1 Noise Monitoring Methodology

Sound level measurements were made on Thursday, January 21, 2016 during the daytime (11:00 a.m. to 12:00 p.m.) and nighttime hours (12:30 a.m. to 2:00 a.m.). Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions. All measurements were 20 minutes in duration.

Sound levels were measured at publicly accessible locations at a height of five feet (1.5 meters) above ground level, under low wind conditions, and with dry roadway surfaces. Wind speed measurements were made with a Davis Instruments TurboMeter electronic wind speed indicator, and temperature and humidity measurements were made using a General Tools digital psychrometer. Unofficial observations about meteorology or land use in the community were made solely to characterize the existing sound levels in the area and to estimate the noise sensitivity at properties near the Project site.

3.10.4.2 Noise Monitoring Locations

Three representative noise monitoring locations were selected based upon a review of zoning and land use in the Project area. These measurement locations are depicted on Figure 3.10-1 and described below.

- **Location ST-1** is located in front of 120 Kingston Street, representative of the closest residential and commercial receptors to the east of the Project along Edinboro Street and Kingston Street.

- **Location ST-2** is located along Oxford Street immediately southwest of the Project, representative of the closest residential and commercial receptors south, southeast, and southwest of the Project along Ping on Street, Oxford Street, and Harrison Avenue.

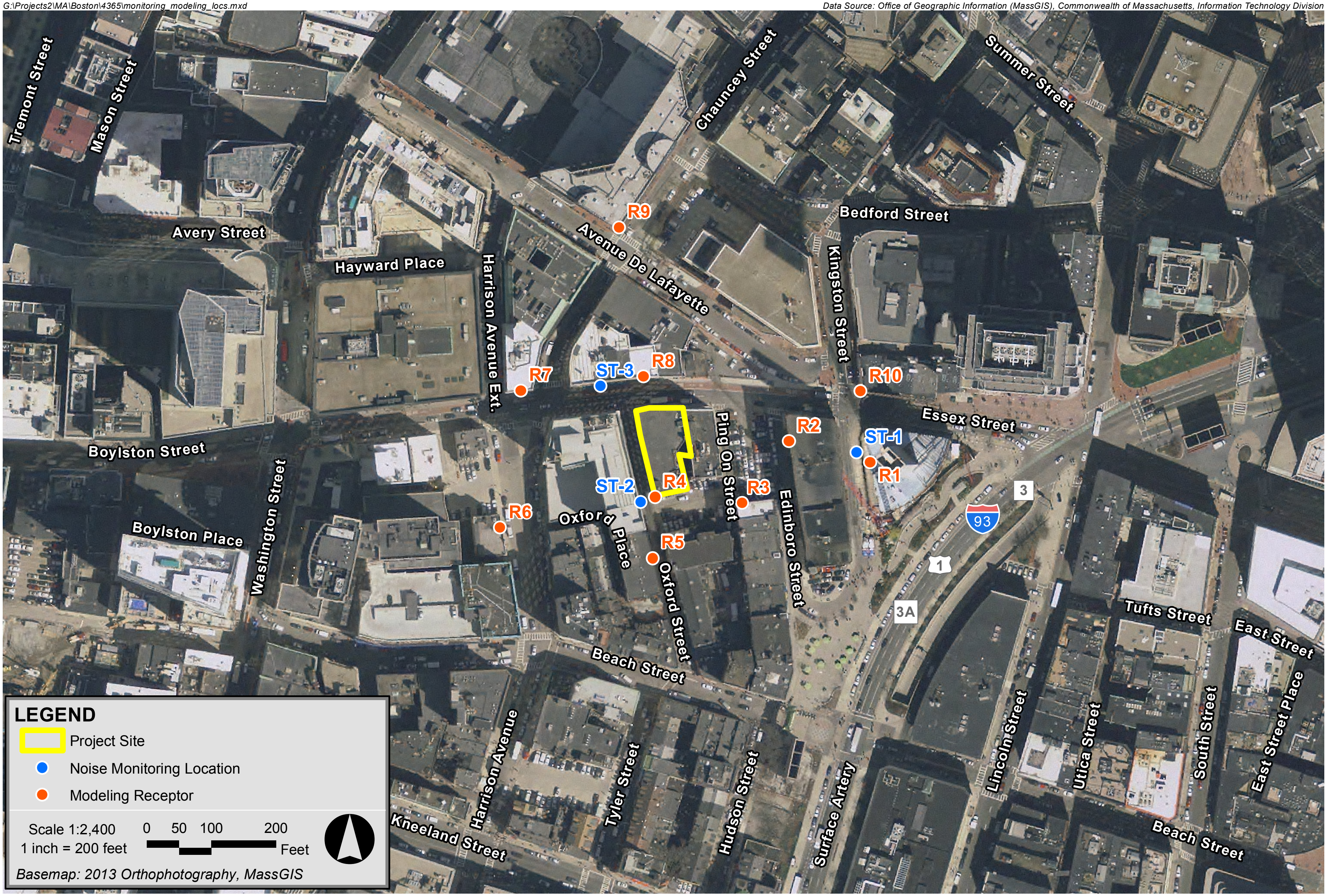
- **Location ST-3** is located in front of 68 Essex Street, representative of the closest residential and commercial receptors north, northeast, and northwest of the Project along Essex Street and Avenue de Lafayette.

3.10.4.3 Noise Monitoring Equipment

A Larson Davis Model 831 sound level meter equipped with a PRM831 Type I Preamplifier, a 377B20 half-inch microphone, and manufacturer-provided windscreen was used to collect background sound pressure level data. This instrumentation meets the "Type 1 - Precision" requirements set forth in ANSI S1.4 for acoustical measuring devices. The measurement equipment was calibrated in the field before and after the surveys with a Larson Davis CAL200 acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984. Statistical descriptors (L_{eq}, L_{90}, etc.) were calculated for each sampling period, with octave-band sound levels corresponding to the same data set processed for the broadband levels.

G:\Projects2\MA\Boston\4365\monitoring_modeling_locs.mxd

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division



73-79 Essex Street Boston, Massachusetts

Epsilon
ASSOCIATES INC.

Figure 3.10-1

Noise Monitoring & Modeling Locations

3.10.4.4 Measured Background Noise Levels

Baseline noise monitoring results are presented in Table 3.10-2, and summarized below:

- The daytime residual background (L_{90} dBA) measurements ranged from 59 to 62 dBA;
- The nighttime residual background (L_{90} dBA) measurements ranged from 51 to 54 dBA;
- The daytime equivalent level (L_{eq} dBA) measurements ranged from 64 to 72 dBA; and
- The nighttime equivalent level (L_{eq} dBA) measurements ranged from 55 to 66 dBA.

3.10.5 Future Conditions

3.10.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project are expected to consist of a rooftop cooling tower, energy recovery units (ERUs), and emergency power equipment.

One 300-ton dual-cell cooling tower and two 9,000 CFM ERUs are anticipated to be located on the roof of the proposed building along with a single 300 kWe emergency generator fitted with a sound attenuating enclosure. Other secondary noise sources including pumps, boilers, and domestic hot water heaters will either be enclosed within the rooftop penthouse, within the building interior, or are assumed to have sound levels 10 dBA lower than the primary sources of noise, and were not considered in this analysis to contribute significantly to the overall sound level. Stair pressurization fans were assumed to be emergency-use only and were not included.

Mitigation will be applied to sources as needed to ensure compliance with the applicable noise regulations. The noise control features assumed in this analysis consist of a sound attenuating canopy for the proposed emergency generator which includes a mechanical enclosure and exhaust muffler. Screening from a proposed parapet wall along the perimeter of the roof approximately five feet high was considered in the model.

Table 3.10-2 Summary of Measures Background Noise Levels – January 21, 2016

Location	*Period*	*Start Time*	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	*L_{90} Sound Pressure Levels by Octave-Band*								
								31.5 Hz	*63 Hz*	*125 Hz*	*250 Hz*	*500 Hz*	*1k Hz*	*2k Hz*	*4k Hz*	*8k Hz*
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
ST-1	Day	11:45 AM	68	90	70	64	61	69	66	62	60	58	56	50	42	34
ST-2	Day	11:21 AM	64	75	67	62	59	67	64	64	61	58	54	47	38	30
ST-3	Day	10:59 AM	72	86	74	67	62	67	66	63	62	59	57	52	44	37
ST-1	Night	12:48 AM	60	76	62	57	54	61	63	59	53	51	50	42	32	23
ST-2	Night	1:17 AM	55	68	58	53	51	62	62	55	53	49	46	39	30	22
ST-3	Night	1:42 AM	66	86	69	57	54	61	57	56	55	52	49	43	33	25

Weather Conditions:

	Date	**Temp**	**RH**	**Sky**	**Wind**
Daytime	Thursday, January 21, 2016	38 °F	21%	Clear	NW @ 1-3 mph
Nighttime	Thursday, January 21, 2016	31°F	30%	Partly Cloudy	Calm

Monitoring Equipment Used:

	Manufacturer	**Model**	**S/N**
Sound Level Meter	Larson Davis	LD831	3044
Microphone	Larson Davis	377B20	LW130593
Preamp	Larson Davis	PRM831	023824
Calibrator	Larson Davis	Cal200	7146

A tabular summary of the modeled mechanical equipment proposed for the Project is presented below in Table 3.10-3. Sound power level data for each unit, as provided by the manufacturer or calculated from provided sound pressure level data, is presented in Table 3.10-4.

Table 3.10-3 Modeled Noise Sources

Noise Source	*Quantity*	*Equipment Location*	*Size/Capacity per Unit*
Energy Recovery Unit	2	Roof	9,000 CFM
Cooling Tower	1	Roof	300 Ton
Emergency Generator	1	Roof	300 kWe

Table 3.10-4 Modeled Sound Power Levels per Unit

Noise Source	*Broad -band*	*32 Hz*	*63 Hz*	*125 Hz*	*250 Hz*	*500 Hz*	*1k Hz*	*2k Hz*	*4k Hz*	*8k Hz*
	dBA	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*
Energy Recovery Unit[1]	88	91[4]	91	87	85	82	80	78	75	86
Cooling Tower[2]	84	74[4]	74	75	81	82	80	75	73	63
Emergency Generator[3]	93	83[4]	83	85	89	91	88	83	80	79

Notes:

1. Venmar CES 9,000 CFM with Coplanar Silencer. Includes Exhaust Fan and Supply Fan Inlets and Outlets.
2. Marley NC8403HLN2 1-Cell Cooling Tower w/ Quiet Fan
3. CAT PGS300 300 ekW Standby Generator w/Sound Attenuating (SA) Canopy
4. No data available in 32 Hz band. Assumed equal to 63 Hz band.

Sound power levels of those units for which data was not provided were assumed based on data for similar or representative equipment. The approximate locations of the mechanical equipment were provided by the Project team through a preliminary roof plan.

3.10.5.2 Noise Modeling Methodology

Noise impacts from mechanical equipment associated with the Project were predicted using Cadna/A noise calculation software (DataKustik Corporation, 2005). This software, which uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation), offers a refined set of computations accounting for local topography, ground attenuation, drop-off with distance, barrier shielding, diffraction around building edges, reflection off building facades, and atmospheric absorption of sound from multiple noise sources.

An initial analysis considered all of the mechanical equipment without the emergency generator running to simulate typical nighttime operating conditions at nearby receptors. A second analysis combined the mechanical equipment and the emergency generator to reflect worst-case daytime conditions during brief, routine, testing of the generator when ambient levels are higher.

3.10.5.3 Noise Modeling Results

Ten modeling locations with a height of 1.5 meters above-grade were included in the analysis representing the nearest noise-sensitive residential and business receptors. Figure 3.10-1 shows the locations of each modeled receptor as well as the monitoring locations selected for background measurements.

The predicted sound levels, presented in Table 3.10-5, from all mechanical equipment operating simultaneously (except the emergency generator) at rated load are expected to range from 29 to 38 dBA at nearby receptors (30 to 38 at the closest residences). Table 3.10-6 presents predicted sound levels from all mechanical equipment including the emergency generator during routine daytime testing periods which are expected to range from 37 to 46 dBA at nearby receptors including the closest residences.

Results of this evaluation demonstrate that sound levels from Project operation are anticipated to fully comply with the most stringent City of Boston nighttime broadband and octave-band noise limits described in Table 3.10-1. Additionally, Project-only sound levels are predicted to remain well below the existing background sound levels in the area shown in Table 3.10-2, which already exceed many of the City of Boston limits without any contribution from the Project. As such, this analysis indicates that the proposed Project can operate without significant impact on the existing acoustical environment.

Table 3.10-5 Modeling Project-Only Sound Levels – Typical Nighttime Operation (No Emergency Generator)

Modeling Location ID	*Zoning / Land Use*	*Evaluation Period*	*Broadband (dBA)*	*Sound Pressure Level (dB) per Octave-band Center Frequency*								
				32 Hz	*63 Hz*	*125 Hz*	*250 Hz*	*500 Hz*	*1k Hz*	*2k Hz*	*4k Hz*	*8k Hz*
R1	Residential	Night	30	41	37	31	29	30	23	19	10	0
R2	Business	Night	31	45	42	36	35	30	22	18	12	0
R3	Business	Night	29	43	40	33	33	28	20	17	13	0
R4	Residential	Night	38	50	48	42	41	36	30	27	24	12
R5	Business	Night	35	48	46	40	39	34	27	24	20	6
R6	Residential	Night	38	47	45	41	40	36	31	29	22	3

Table 3.10-5 Modeling Project-Only Sound Levels – Typical Nighttime Operation (No Emergency Generator) (Continued)

Modeling Location ID	*Zoning / Land Use*	*Evaluation Period*	*Broadband (dBA)*	*Sound Pressure Level (dB) per Octave-band Center Frequency*								
				32 Hz	*63 Hz*	*125 Hz*	*250 Hz*	*500 Hz*	*1k Hz*	*2k Hz*	*4k Hz*	*8k Hz*
R7	Business	Night	34	46	44	39	38	33	24	21	16	0
R8	Business	Night	35	48	45	38	39	34	27	24	21	8
R9	Residential	Night	31	43	41	35	35	30	22	17	10	0
R10	Business	Night	32	43	40	36	36	31	24	19	12	0
City of Boston Limits	**Residential**	**Night**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**
	Business	**Night**	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**
	Industrial	**Night**	**70**	**83**	**82**	**77**	**73**	**67**	**61**	**57**	**53**	**50**

Table 3.10-6 Modeled Project-Only Sound Levels – Typical Daytime Operation + Routine Emergency Generator Testing

Modeling Location ID	*Zoning / Land Use*	*Evaluation Period*	*Broadband (dBA)*	*Sound Pressure Level (dB) per Octave-band Center Frequency*								
				32 Hz	*63 Hz*	*125 Hz*	*250 Hz*	*500 Hz*	*1k Hz*	*2k Hz*	*4k Hz*	*8k Hz*
R1	Residential	Day	37	54	52	46	41	35	26	21	14	0
R2	Business	Day	41	59	57	51	45	37	28	22	17	5
R3	Business	Day	41	57	55	48	46	40	31	25	20	4
R4	Residential	Day	39	56	53	45	42	36	31	27	24	12
R5	Business	Day	37	53	51	44	41	35	28	24	21	7
R6	Residential	Day	39	54	52	46	43	37	32	29	22	4
R7	Business	Day	39	58	55	49	43	36	27	23	18	4
R8	Business	Day	44	60	58	53	48	41	32	28	24	12
R9	Residential	Day	46	58	60	54	50	44	36	31	25	5
R10	Business	Day	46	58	57	54	50	44	35	30	24	3
City of Boston Limits	**Residential**	**Day**	**60**	**76**	**75**	**69**	**62**	**56**	**50**	**45**	**40**	**38**
	Business	**Day**	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**
	Industrial	**Day**	**70**	**83**	**82**	**77**	**73**	**67**	**61**	**57**	**53**	**50**

3.10.6 Conclusions

Baseline noise levels were measured in the vicinity of the Project site and were compared to predicted noise levels based on information provided by the manufacturers of representative mechanical equipment or estimated from the equipment's capacity. With appropriate mitigation (as described in Section 3.10.5.1), the Project is not expected to introduce significant outdoor mechanical equipment noise into the surrounding community.

Results of the analysis indicate that typical nighttime noise levels from the Project, as well as noise levels from routine daytime testing of the emergency generator, are expected to remain well below the City of Boston Noise requirements. It should be noted that the existing background sound levels in the immediate Project area already exceed the City of Boston limits without any contribution from the Project. The results presented in Section 3.10.5.3 indicate that the Project is not anticipated to significantly impact the existing acoustical environment.

At this time, the mechanical equipment and noise controls are conceptual in nature and, during the final design phase of the Project, will be specified to meet the applicable City of Boston noise limits. Additional mitigation may include the selection of quieter units, screening walls, mufflers, or equipment enclosures as needed.

3.11 Construction Impacts

3.11.1 Introduction

A Construction Management Plan (CMP) in compliance with the City's Construction Management Program will be submitted to the Boston Transportation Department (BTD) once final plans are developed and the construction schedule is fixed. The construction contractor will be required to comply with the details and conditions of the approved CMP.

Proper pre-planning with the City and neighborhood will be essential to the successful construction of the Project. Construction methodologies, which ensure public safety and protect nearby residences and businesses, will be employed. Techniques such as barricades, walkways and signage will be used. The CMP will include routing plans for trucking and deliveries, plans for the protection of existing utilities, and control of noise and dust.

During the construction phase of the Project, the Proponent will provide the name, telephone number and address of a contact person to communicate with on issues related to the construction.

The Proponent intends to follow the guidelines of the City of Boston and the MassDEP, which direct the evaluation and mitigation of construction impacts.

3.11.2 Construction Methodology/Public Safety

Construction methodologies that ensure public safety and protect nearby tenants will be employed. Techniques such as barricades and signage will be used. Construction management and scheduling will minimize impacts on the surrounding environment and will include plans for construction worker commuting and parking, routing plans for trucking and deliveries, and the control of noise and dust.

As the design of the Project progresses, the Proponent will meet with BTD to discuss the specific location of barricades, the need for lane closures, pedestrian walkways, and truck queuing areas. Secure fencing, signage, and covered walkways may be employed to ensure the safety and efficiency of all pedestrian and vehicular traffic flows. In addition, sidewalk areas and walkways near construction activities will be well marked and lighted to protect pedestrians and ensure their safety. Public safety for pedestrians on abutting sidewalks will also include covered pedestrian walkways when appropriate. If required by BTD and the Boston Police Department, police details will be provided to facilitate traffic flow. These measures will be incorporated into the CMP which will be submitted to BTD for approval prior to the commencement of construction work.

3.11.3 Construction Schedule

Construction is expected to begin in the third quarter of 2017 and will last approximately 24 months.

Typical construction hours will be from 7:00 a.m. to 6:00 p.m., Monday through Friday, with most shifts ordinarily ending at 3:30 p.m. No substantial sound-generating activity will occur before 7:00 a.m. If longer hours, additional shifts, or Saturday work is required, the construction manager will place a work permit request to the Boston Air Pollution Control Commission and BTD in advance. Notification should occur during normal business hours, Monday through Friday. It is noted that some activities such as finishing activities could run beyond 6:00 p.m. to ensure the structural integrity of the finished product; certain components must be completed in a single pour, and placement of concrete cannot be interrupted.

3.11.4 Construction Staging/Access

Access to the site and construction staging areas will be provided in the CMP.

Although specific construction and staging details have not been finalized, the Proponent and its construction management consultant will work to ensure that staging areas will be located to minimize impacts to pedestrian and vehicular flow. Secure fencing and barricades will be used to isolate construction areas from pedestrian traffic adjacent to the site. Construction procedures will be designed to meet all Occupational Safety and Health Administration (OSHA) safety standards for specific site construction activities.

3.11.5 Construction Mitigation

The Proponent will follow City and MassDEP guidelines which will direct the evaluation and mitigation of construction impacts. As part of this process, the Proponent and construction team will evaluate the Commonwealth's Clean Air Construction Initiative.

A CMP will be submitted to BTD for review and approval prior to issuance of a Building Permit. The CMP will include detailed information on specific construction mitigation measures and construction methodologies to minimize impacts to abutters and the local community. The CMP will also define truck routes which will help in minimizing the impact of trucks on City and neighborhood streets.

"Don't Dump - Drains to Boston Harbor" plaques will be installed at storm drains that are replaced or installed as part of the Project.

3.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that more than 500 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 50% of the total employee work hours be for Boston residents, at least 25% of total employee work hours be for minorities and at least 10% of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston.

To reduce vehicle trips to and from the construction site, minimal construction worker parking will be available at the site and all workers will be strongly encouraged to use public transportation and ridesharing options. The general contractor will work aggressively to ensure that construction workers are well informed of the public transportation options serving the area. Space on-site will be made available for workers' supplies and tools so they do not have to be brought to the site each day.

3.11.7 Construction Truck Routes and Deliveries

Truck traffic will vary throughout the construction period, depending on the activity. The construction team will manage deliveries to the site during morning and afternoon peak hours in a manner that minimizes disruption to traffic flow on adjacent streets. Construction truck routes to and from the site for contractor personnel, supplies, materials, and removal of excavations required for the development will be coordinated with BTD. Traffic logistics and routing will be planned to minimize community impacts. Truck access during construction will be determined by the BTD as part of the CMP. These routes will be mandated as a part of all subcontractors' contracts for the development. The construction team will provide subcontractors and vendors with Construction Vehicle & Delivery Truck Route Brochures in advance of construction activity.

"No Idling" signs will be included at the loading, delivery, pick-up and drop-off areas.

3.11.8 Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during demolition, excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts, pursuant to this Article 80 approval. These measures are expected to include:

- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;
- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

3.11.9 Construction Noise

The Proponent is committed to mitigating noise impacts from the construction of the Project. Increased community sound levels, however, are an inherent consequence of construction activities. Construction work will comply with the requirements of the City of Boston Noise Ordinance. Every reasonable effort will be made to minimize the noise impact of construction activities.

Mitigation measures are expected to include:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;

- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idling equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

3.11.10 Construction Vibration

All means and methods for performing work at the site will be evaluated for potential vibration impacts on adjoining property, utilities, and adjacent existing structures. Acceptable vibration criteria will be established prior to construction, and vibration will be monitored, if required, during construction to ensure compliance with the agreed-upon standard.

3.11.11 Construction Waste

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste. The disposal contract will include specific requirements that will ensure that construction procedures allow for the necessary segregation, reprocessing, reuse and recycling of materials when possible. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per MassDEP Regulations for Solid Waste Facilities, 310 CMR 16.00. This requirement will be specified in the disposal contract. Construction will be conducted so that materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility.

3.11.12 Protection of Utilities

Existing public and private infrastructure located within the public right-of-way will be protected during construction. The installation of proposed utilities within the public way will be in accordance with the MWRA, BWSC, Boston Public Works, Dig Safe, and the governing utility company requirements. All necessary permits will be obtained before the commencement of the specific utility installation. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer and drain facilities will be reviewed by BWSC as part of its site plan review process.

3.11.13 Rodent Control

A rodent extermination certificate will be filed with each building permit application for the Project. Rodent inspection monitoring and treatment will be carried out before, during, and at the completion of all construction work for each phase of the Project, in compliance with the City's requirements.

3.12 Wildlife Habitat

The Project site is in an established urban neighborhood. There are no wildlife habitats in or adjacent to the Project site.

Chapter 4.0

Sustainable Design and Climate Change

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE

4.1 Sustainable Design

4.1.1 Article 37/LEED Compliance

To comply with Article 37 of the Code, the Proponent will measure the results of its sustainability initiatives using the framework of the Leadership in Energy and Environmental Design (LEED) rating system. The Project will meet many of the LEED requirements based on its location in downtown Boston, its proposed design, and the strict requirements of the state building and energy codes. A preliminary LEED-NC Checklist is included at the end of this section and provides a preliminary approach to achieving certifiability under LEED for New Construction v2009. As the design progresses, some identified credits may be added or eliminated from consideration. The Proponent is targeting LEED Silver, and the preliminary LEED checklist shows 53 credits identified as a potential path to meet LEED Silver certifiability.

Sustainable Sites

Prerequisite 1: Construction Activity Pollution Prevention. The construction manager will submit and implement an Erosion and Sedimentation Control (ESC) Plan for construction activities related to the demolition of the existing building and pavement area, and the construction of the new building specific to this Project.

Credit 1: Site Selection. The Project site is currently developed and located in the Chinatown neighborhood of Boston, a dense urban area within one-quarter mile of the Chinatown Station on the MBTA Orange Line, Downtown Crossing Station on the MBTA Orange and Red lines, and South Station which provides MBTA Red Line, Commuter Rail, Amtrak, MBTA bus and Intercity bus services.

Credit 2: Development Density and Community Connectivity. The Project site is located in an urban-core area surrounded by high-rise buildings, and includes many local amenities within walking distance. The Project will also meet the requirements of Exemplary Performance for Community Connectivity given its density.

Credit 4.1: Alternative Transportation, Public Transportation Access. The Project site is less than one-half mile walking distance from South Station, Downtown Crossing Station, State Street Station, Park Street Station, Boylston Station and the Chinatown Station. These seven stations meet the exemplary performance requirements to earn an Innovation Credit.

Credit 4.2: Alternative Transportation, Bicycle Storage & Changing Rooms. The Project is anticipated to include bike racks, and will have a transportation demand management program to help minimize transportation impacts. Exterior bike storage locations for visitors and employees are anticipated to be incorporated into the site design. The Project may also include a shower/changing room for employee occupants.

Credit 4.3: Low-Emitting and Fuel-Efficient Vehicles. The Proponent is exploring the option of having a contract with a car-sharing company in a nearby garage consistent with this credit's requirement.

Credit 4.4: Alternative Transportation Parking Capacity. The Project will not include parking on site.

Credit 6.1: Stormwater Design, Quantity Control. The Project will strive to infiltrate stormwater runoff from impervious areas into the ground to the greatest extent possible. Different approaches to stormwater recharge will be assessed. It is anticipated that the stormwater recharge systems will work to passively infiltrate runoff into the ground with a gravity recharge system or a combination of storage tanks in the building and pumps. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the Project site in the developed condition compared to the existing condition.

Credit 6.2: Stormwater Design, Quality Control. Site stormwater run-off will be captured and treated to the extent possible prior to release.

Credit 7.2: Heat Island Effect, Roof. The roofs will be a high albedo membrane roof product with a minimum SRI value of 78, which will cover a minimum of 75% of the Project's total roof area.

Water Efficiency

Prerequisite 1: Water Use Reduction, 20% Reduction. Through the specification of low-flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that use, at a minimum, 20% less potable water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy Act of 1992 fixture performance requirements. The Project will target an overall potable water use savings of 30% from the calculated baseline use. A higher goal of 35% may be possible depending on the final fixture selection for Water Use Reduction by the Project team.

Credit 3: Water Use Reduction. Through the specification of low-flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that will target an overall potable water use savings of 35% from the calculated baseline use.

Energy and Atmosphere

Prerequisite 1: Fundamental Commissioning of the Building Energy Systems. The Project will engage a commissioning agent for the commissioning process and to verify that the building's related systems are installed and perform as intended.

Prerequisite 2: Minimum Energy Performance. Architectural and engineering systems will be designed to meet the state energy code requirements in effect at the time of the building permit application, which will be more energy efficient than the LEED requirements.

Prerequisite 3: Fundamental Refrigerant Management. The Project will use refrigerants that are chlorofluorocarbon (CFC) free in the HVAC&R system.

Credit 1: Optimize Energy Performance. The Project will demonstrate a minimum of a 20%-22% improvement in energy cost savings when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2007.

Credit 3: Enhanced Commissioning. The Proponent may pursue enhanced commissioning for the Project.

Credit 4: Enhanced Refrigerant Management. Refrigerants will be selected to minimize the combined contributions to ozone depletion and global warming potential. Fire suppression systems will not include CFCs, HCFCs, or Halons.

Credit 5: Measurement and Verification, Base Building. The Project team will meet MPR through compliance Option 1, registering an account in ENERGY STAR's Portfolio Manager tool and sharing the project file.

Materials and Resources

Prerequisite 1: Storage and Collection of Recyclables. The Project will reduce the amount of building waste that is taken to landfills by supporting occupant recycling efforts. A central area for the collection of recyclables will be included in the building.

Credit 2: Construction Waste Management. The construction management team will develop and implement a Construction Waste Management plan for waste generation on site. The construction manager will endeavor to divert as much demolition debris and construction waste from area landfills as possible, with a goal to achieve 75% diversion.

Credits 4: Recycled Content. The Project will specify materials to require a minimum of 10% recycled content materials (combination of pre-consumer and post-consumer recycled content) based on the calculation of cost against total value of materials.

Credit 5: Regional Materials. The Project will specify that 10% of materials be sourced (with respect to extraction, harvesting, recovery and manufacture) within a 500 mile radius of the Project site.

Indoor Environmental Quality

Prerequisite 1: Minimum IAQ Performance. The building mechanical systems will be designed to meet or exceed the requirements of ASHRAE Standard 62.1-2007 sections 4 through 7. Any naturally ventilated spaces will comply with the applicable portions of ASHRAE 62.1 as well.

Prerequisite 2: Environmental Tobacco Smoke (ETS) Control. No smoking will be allowed within the building. Designated smoking areas outside of the building will be located at least 25 feet from doorways, operable windows and outdoor air intakes.

Credit 3.1: Construction IAQ Management Plan, During Construction. The Proponent will follow all of the requirements for implementation and documentation of Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines For Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008, and installation and replacement of filtration media prior to occupancy.

Credit 3.2: Construction IAQ Management Plan, Before Occupancy. A flush-out or air testing may be performed prior to Project occupancy.

Credits 4.1, 4.2 and 4.3, Low Emitting Materials. The Project will specify the use of adhesives and sealants, paints, carpet, and composite woods with low VOC content to reduce the quantity of indoor air contaminants.

Credit 4.4: Low-Emitting Materials, Composite Wood and Agrifiber Products. The Project will prioritize the use of materials with no added urea formaldehyde.

Credit 5: Indoor Chemical and Pollutant Source Control. All chemical storage rooms and housekeeping closets will include full height partitions and 0.5 cfm/sf exhaust with no recirculation. Supply air systems shall include air filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 13 or better.

Credit 6.1: Controllability of Systems, Lighting. The Project will provide access to lighting systems controls for 90% of building occupants. Multi-occupant spaces will include lighting system controls to enable adjustments that meet group needs and preferences.

Credit 6.2: Controllability of Systems, Thermal Comfort. The Project will provide access to thermal systems controls for at least 50% of building occupants in individually occupied spaces. Multi-occupant spaces will include comfort system controls to enable adjustments that meet group needs and preferences.

Credit 7.1: Thermal Comfort, Design. The Project's HVAC design meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.

Innovation and Design Processes

The team has identified several possible ID credits listed below:

Green Housekeeping/Operations. The owner may use green cleaning products and equipment.

Credit 1.2: Exemplary Performance, SSC2. The Project will also meet the requirements of Exemplary Performance for Community Connectivity of the surrounding neighborhood to earn an Innovation Credit. The Project is located on a previously developed site and is within ½ mile of 10 basic services.

Credit 1.4: Exemplary Performance, SSc4.1. The Project site is located within a half mile of the Chinatown Station on the Orange Line, South Station with access to the Red Line, Silver Line, and Commuter Rail, the Downtown Crossing Station with Red and Orange Line service; Park Street Station on the Red and Green Lines; Boylston Station on the Green Line; and State Street Station with access to the Blue and Orange Lines.

Credit 2 LEED Accredited Professional. A LEED AP is part of the Project team.

Regional Priority Credits

Regional Priority Credits, (RPC), are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a Project team achieves one of the designated RPCs, an additional credit is awarded to the Project. RPCs applicable to the site include: SSc6.1, SSc7.2.

4.2 Climate Change Preparedness

4.2.1 Introduction

Projects subject to Large Project Review are required to complete the Climate Change Preparedness Checklist. Climate change conditions considered include sea level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe rainfall events, and increased wind events.

The expected life of the Project is anticipated to be approximately 50 years. Therefore, the Proponent planned for climate change conditions projected to 50 years into the future. A copy of the completed checklist is included in Appendix E. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses.

4.2.2 Extreme Heat Events

The Intergovernmental Panel on Climate Change (IPCC) has predicted that in Massachusetts the number of days with temperatures greater than 90°F will increase from the current five-to-twenty days annually, to thirty-to-sixty days annually[1]. The Project design will incorporate a number of measures to minimize the impact of high temperature events, including:

- Installing operable windows where possible;
- Using sun shading and high performance glazing;
- Using Energy Recovery Ventilation to reduce cooling loads; and
- Specifying high reflective paving materials, high albedo roof tops and green roofs to minimize the heat island effect.

4.2.3 Sea Level Rise

According to the IPCC, if the sea level continues to rise at historic rates, the sea level in Massachusetts as a whole will rise by one foot by the year 2100. However, using a high emissions scenario of climate change, sea level rise (SLR) could reach approximately six feet by 2100. As described in "Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery" recently released by MassDOT (the "MassDOT Report"), "one of the challenges presented by the wide range of SLR projections is the inability to assign likelihood to any particular [SLR] scenario."[2] To be conservative, in the year 2070, SLR could be as high as approximately four feet, resulting in a mean higher high water (MHHW) level of approximately 15.2 feet Boston City Base (BCB). The elevation of the first floor is approximately 20 feet BCB.

Alone, MHHW of approximately 15.2 feet BCB would have no impact on the Project site, however, as shown in the MassDOT Report, combined with storm surge at the right tide, flooding would be anticipated to occur at the Project site.[3] The storms in the Boston area that could create these flood conditions would be Nor'easters and tropical storms. Currently, hurricanes occur less frequently than Nor'easters, however, in the future according to the MassDOT Report, it is anticipated that there will be roughly the same

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[1] IPCC (Intergovernmental Panel on Climate Change), 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Avery, M. Tignor, and H. L. Miller (eds.)]. Cambridge University Press, Cambridge, UK, and New York, 996 pp.

[2] Massachusetts Department of Transportation, et al. "MassDOT-FHWA Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery." November 2015.

[3] The MassDOT Report, funded by the Federal Highway Administration, studied the impact of sea level rise and future storm impacts related to climate change on the Central Artery in Boston. As part of this project, a hydrodynamic model was developed for Boston Harbor, including inland areas that cover portions of Boston, including the Project Site. This model is able to provide site-specific information about the risk of potential future flooding in the years 2030, 2070 and 2100 related to storm events, in particular Nor'easters and tropical cyclones (i.e., hurricanes).

number of tropical storms impacting the Boston area as Nor'easters. In addition, the intensity of storms is anticipated to increase. The risks of each type of storm differ: hurricanes are typically shorter in duration, but are more intense and create a larger storm surge; Nor'easters are longer in duration, but create a smaller storm surge. For this reason, a hurricane would need to impact Boston within a short window to create flooding as shown in the MassDOT Report, while Nor'easters are more likely to create flooding given that they have a higher probability of impacting the area during the rising tide and high tide.

The MassDOT Report shows that by 2070, the Project site is anticipated to have up to a 1% annual chance of flooding by at least 2 inches. By 2070, the 100-year flood is anticipated to have a flood level up to one foot on the southern portion of the site. In response, it is anticipated that measures will be taken, as necessary in the future, to close off the building from potential flood impacts, and increasing the elevation of mechanical equipment will be studied as the design progresses.

4.2.4 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponents will take measures to minimize stormwater runoff and protect the Project's mechanical equipment. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and promote runoff recharge to the greatest extent practicable.

4.2.5 Drought Conditions

Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, water conservation fixtures will be included in the design, including aeration fixtures and appliances that will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed.

4.3 Energy Model

A preliminary energy model has been completed for the Project and is included in Appendix F. The model shows that the Project can achieve an approximately 27% energy savings compared to the ASHRAE 90.1-2013 baseline.

4.4 Renewable Energy

The Project team has evaluated the feasibility of including solar photovoltaic and solar hot water systems with the Project. However, the Project roof area is limited due to the small size and mechanical equipment space needs, making both of these systems infeasible. If building integrated solar photovoltaic becomes more economically feasible prior to construction, the Proponent will study the potential to include such a system.

LEED 2009 for New Construction and Major Renovations

Project Checklist

73 Essex St

Date

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

3	2	5	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
	2	2	Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
3		1	Credit 3	Water Use Reduction	2 to 4

10	11	14	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
5	9	5	Credit 1	Optimize Energy Performance	1 to 19
		7	Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
1	2		Credit 5	Measurement and Verification	3
		2	Credit 6	Green Power	2

3	6	5	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
1	1		Credit 2	Construction Waste Management	1 to 2
	1	1	Credit 3	Materials Reuse	1 to 2

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

10	4	1	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
	1		Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
		1	Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1

4	2		**Innovation and Design Process**	Possible Points:	**6**
1			Credit 1.1	Innovation in Design: Green Housekeeping	1
1			Credit 1.2	Innovation in Design: Exemplary Performance SSc2	1
1			Credit 1.3	Innovation in Design: Exemplary Performance, SSc4.1	1
	1		Credit 1.4	Innovation in Design: Specific Title	1
	1		Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

2	2		**Regional Priority Credits**	Possible Points:	**4**
1			Credit 1.1	Regional Priority: SSc6.1	1
1			Credit 1.2	Regional Priority: SSc7.2	1
	1		Credit 1.3	Regional Priority: Specific Credit	1
	1		Credit 1.4	Regional Priority: Specific Credit	1

53	27	30	**Total**	Possible Points:	**110**

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

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Introduction

The Project has been designed to reflect both its context and its intended use. The building's facades are organized in a pattern derived from the neighboring buildings. Within this rhythm, the design is intended to evoke a contemporary look, one that speaks to the upscale use of the building. By both "fitting in and standing out" at the same time, the Project will be another step in the evolution of the neighborhood.

5.2 Context

The urban context of the Project is a significant factor in determining the overall design approach to the building. The existing street language, as depicted in Figures 5-1 and 5-2, is a mixture of patterns and openings. Throughout the neighborhood, there is a combination of vertical and horizontal textures with windows that can be recessed with large shadow lines next to flat plane window systems. Some of the adjacent buildings are organized with standard base, middle and top treatments while others have a more modern feel with a base and a tall body. The convergence of these various styles and languages is the basis of design for this Project and have been the guiding factor as the design has progressed.

The elevations are organized by a strong base element to ground the building and identify the Project from its pedestrian and vehicular approaches (see Figures 5-3 and 5-4). The strong horizontal edge defines the base from the remainder of the body of the building and is further emphasized by cantilevering over the sidewalk and becoming the main entry feature and weather barrier for the entrance (see Figure 5-5).

The body of the building establishes a rhythm of undulations, both horizontal and vertical, that not only emphasizes the floor lines but will provide unique shadow lines and accents as the sun travels around the building throughout the day. The architecture plays within these parameters and is deliberately contemporary in nature, creating a certain dynamic tension between the traditional and the new by setting the language with its roots in the existing context and translating it into a new modern language for the neighborhood (see Figure 5-6 to 5-8). The combination of glazing, spandrel panels, deep window accents and colors is designed to create distinctive shadow patterns that will help animate the facades (see Figure 5-9). The new Project will send a message that something new and different is happening in this part of town, contributing to the ongoing renaissance of the neighborhood.

The overall Project is planned to be a seventeen-story building. The base floor height is determined by the dimensions necessary for the building functions: 16'-0" at the ground lobby level, 13'-0" at the second floor for the public functions and 10'-0" at all typical hotel floors. Measured from the street elevation, the building height is approximately 181 feet as measured in accordance with the Boston Zoning Code. The mechanical penthouse and screened enclosure above the main roof level will appear as a continuation of the main façade.

5.3 Street Level

A critical component of the design of a building is siting the building in a manner that respects the pedestrian and vehicular environment. This Project reflects this design component by providing greater depth and circulation to the adjacent sidewalk. The ground floor of the building has been set back along Oxford and Essex streets to not only allow for wider sidewalks, but to also provide vehicular access and a drop-off area on Oxford Street (see Figure 5-10). In addition to shifting the building to enhance the pedestrian experience, there is a canopy that denotes the building entrance and overhangs the sidewalk that will introduce light and bring the hotel experience into the public realm.

Figure 5-1

Street Fabric

Figure 5-2

Design Evolution

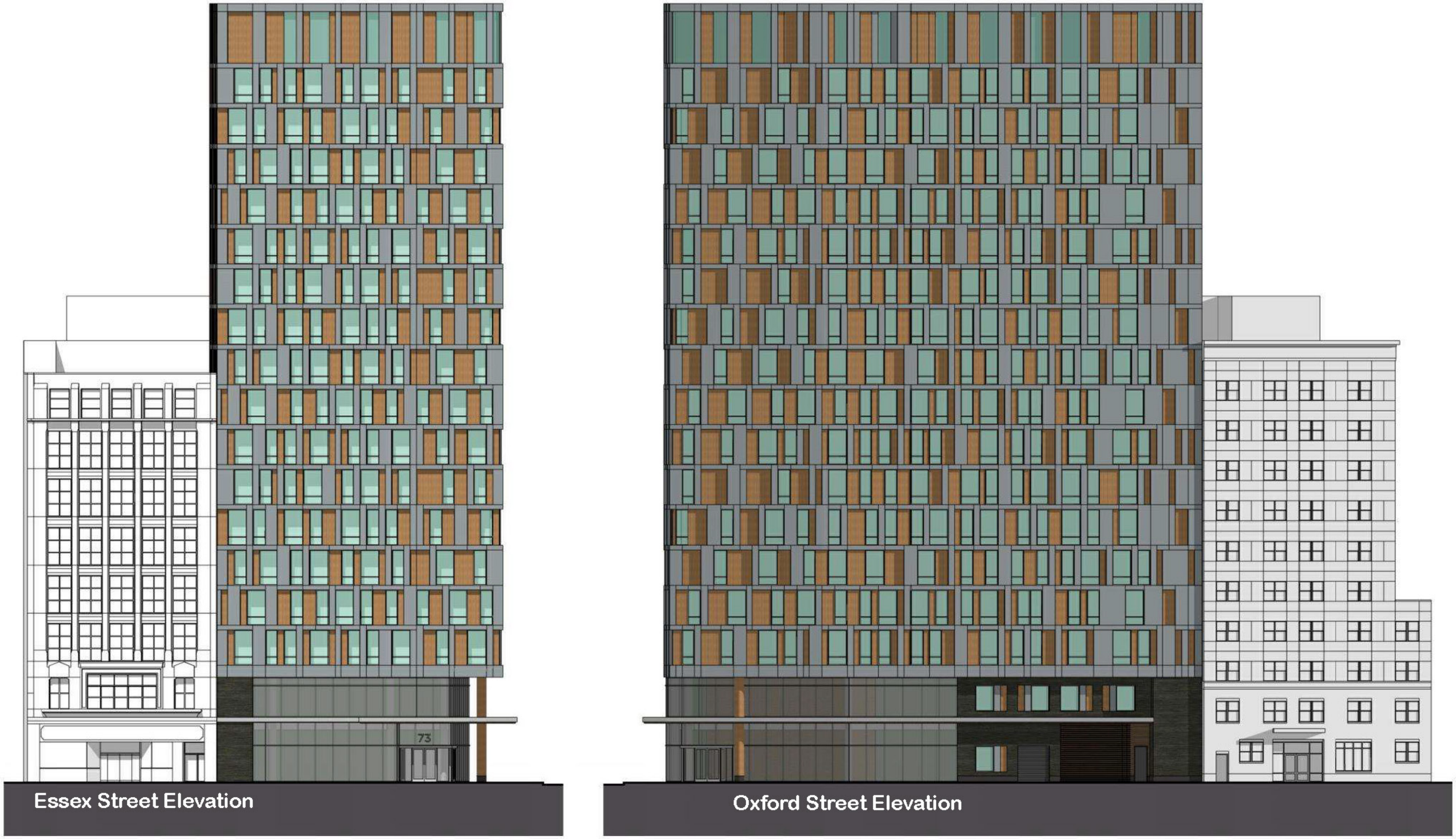


Figure 5-3

Street Elevations - Essex Street and Oxford Street

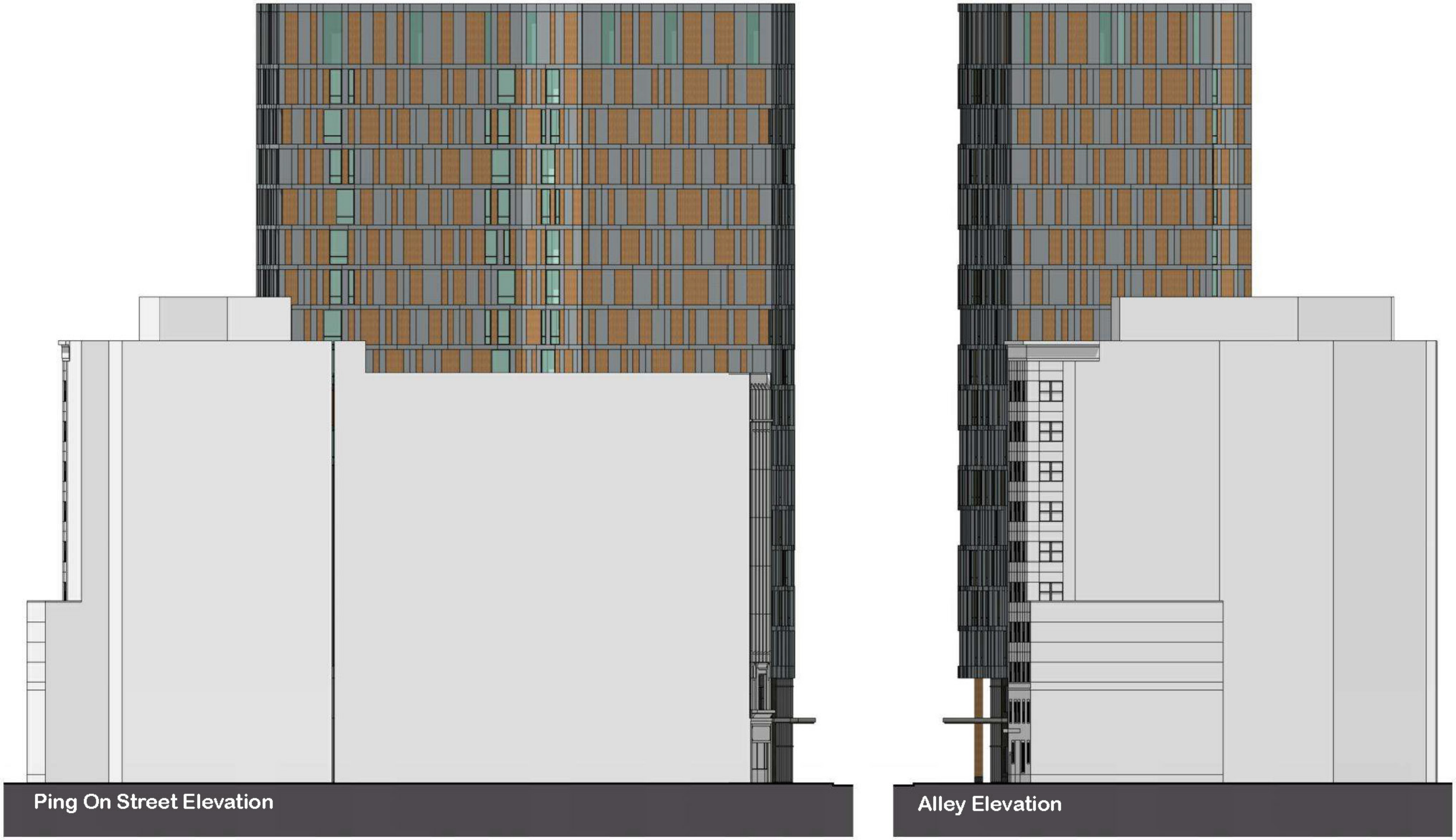


Figure 5-4

Street Elevations - Ping on Street and Alley

Figure 5-5

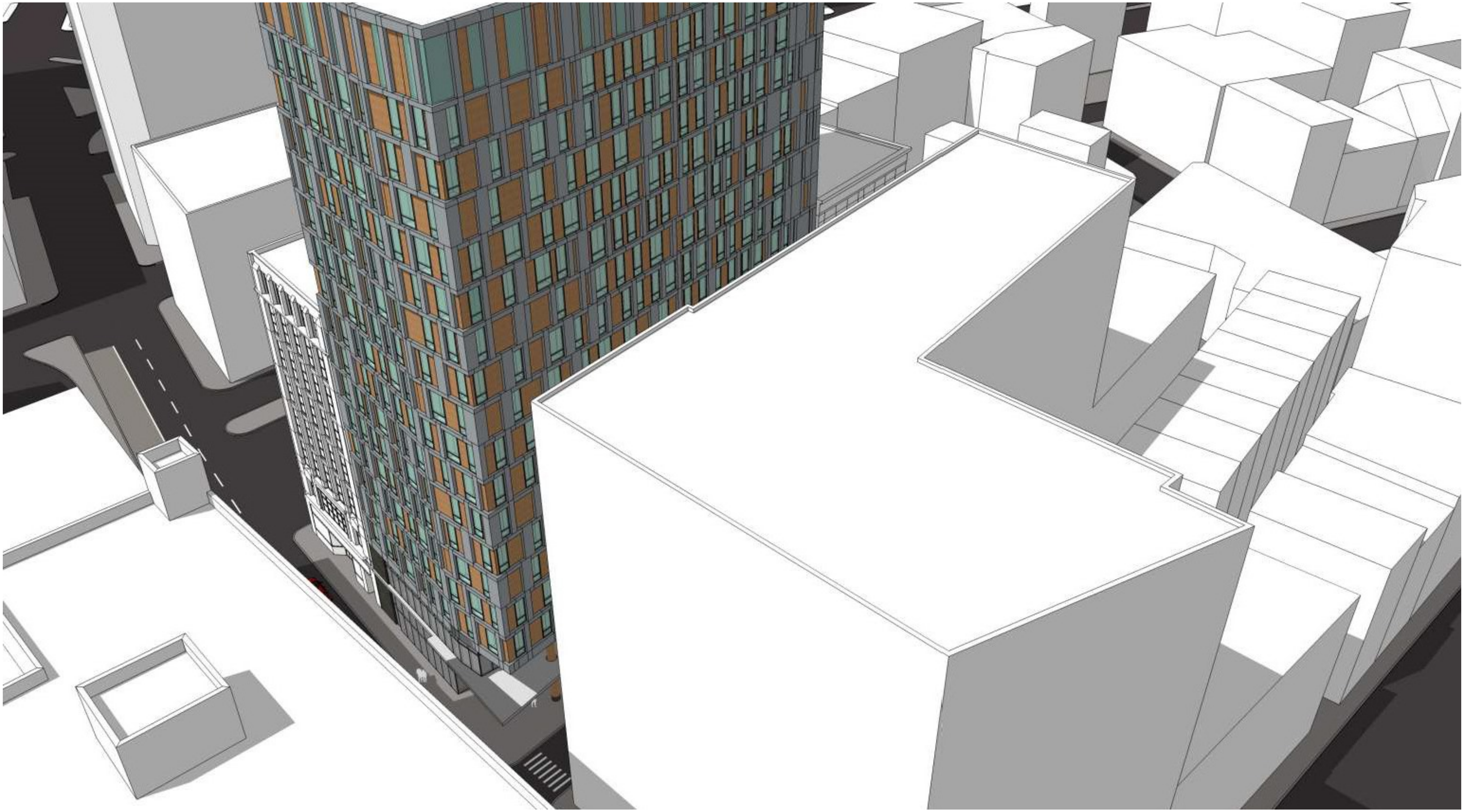
Street View – Corner of Essex Street and Oxford Street

73-79 Essex Street   Boston, Massachusetts

Group One PARTNERS

Figure 5-6

Aerial View Looking West on Essex Street



73-79 Essex Street   Boston, Massachusetts

Figure 5-7

Aerial View Looking East on Essex Street

73-79 Essex Street   Boston, Massachusetts

Group One PARTNERS

Figure 5-8

Aerial View Looking North on Oxford Street

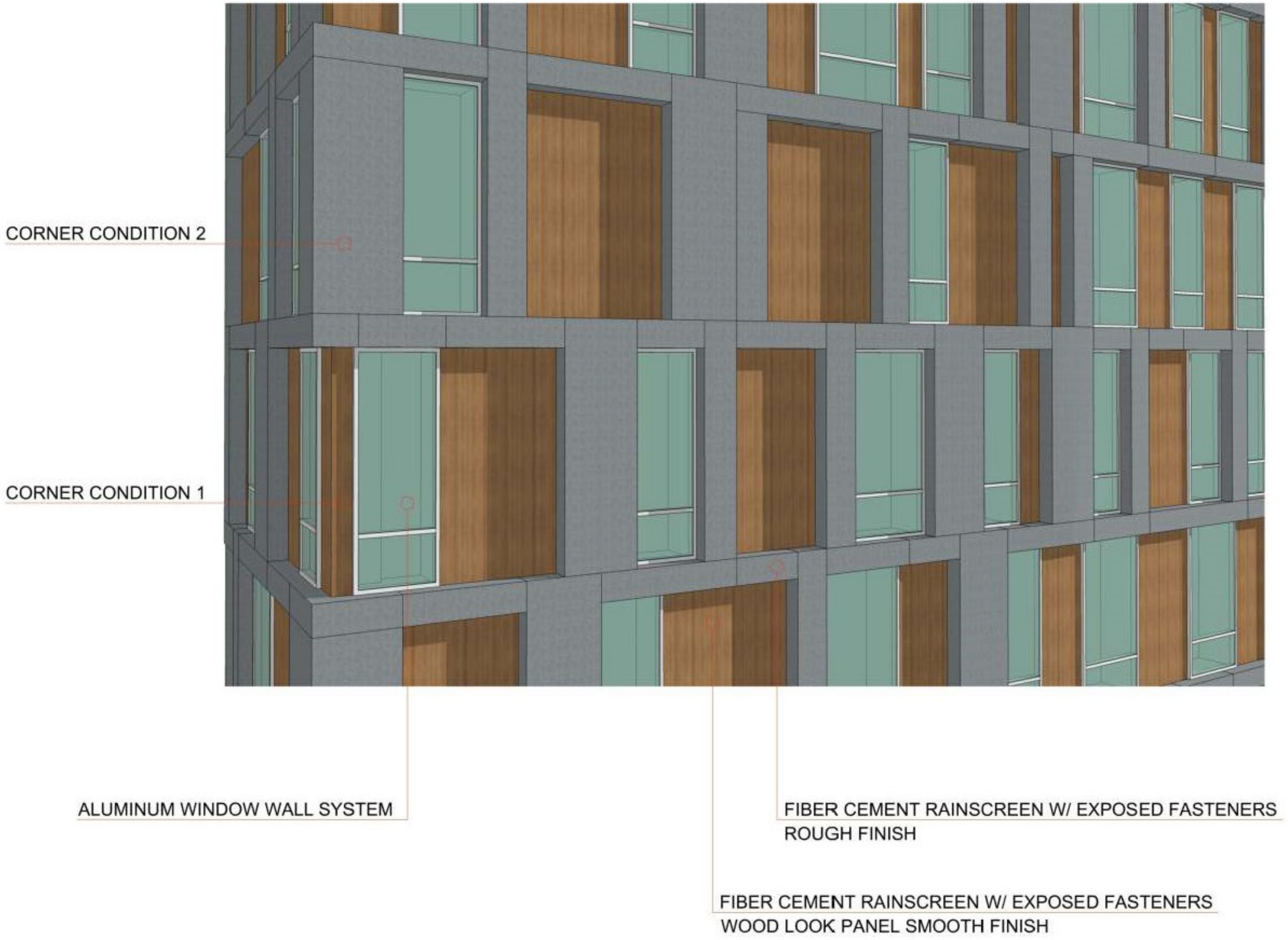


Figure 5-9

Façade Detail

Figure 5-10

Street View – Oxford Street

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

6.1 Introduction

This section identifies historic and archaeological resources located on the Project site and within the Project's vicinity. Reviews of the State and National Registers of Historic Places, as well as the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory), were undertaken to identify historic and archaeological resources.

6.2 Historic Resources

6.2.1 Historic Resources on the Project Site

The approximately 8,095 sf Project site is located in Boston's Chinatown neighborhood. The site is bound by Essex to the north, Oxford Street to the west, the neighboring building at 83 Essex Street to the east and a new residential development to the south. The Project site currently contains an eight-story building addressed at 73-79 Essex Street. Designed by the architectural firm Allen & Collens, the building was constructed in 1907 for the headquarters of Joy, Langdon & Company, agents for the Hamilton Manufacturing Company of Lowell. The building was later occupied by Simons, Hatch & Whitten Company, importers and manufacturers of men's furnishings. The structure rises from a two-story granite and cast iron base containing two recessed entrances located in the end bays. The entrances are capped by eared architraves and classical cornices. The yellow brick upper levels are organized by brick piers into single window bays and triple windows, and separated by cast iron pilasters within bays to and three. The building is capped by a corbelled cornice and a low brick parapet.

The Project site is located within the Textile National Register District. The approximately three acre district is situated on the edge of Boston's Central Business District. Roughly bound by Chauncy, Essex, Edinboro and Kingston Streets the district is dominated by late 19th and early 20th century mercantile buildings. Noteworthy for its consistency of architectural styles including Classical Revival, Renaissance and Romanesque Revival, the district retains a great deal of architectural integrity. The district was listed in the National Register of Historic Places in 1990 and contains approximately 18 resources. The building at 73-79 Essex Street is identified as a contributing resource within the district. The existing underutilized building will be demolished to accommodate the constructed of the Project.

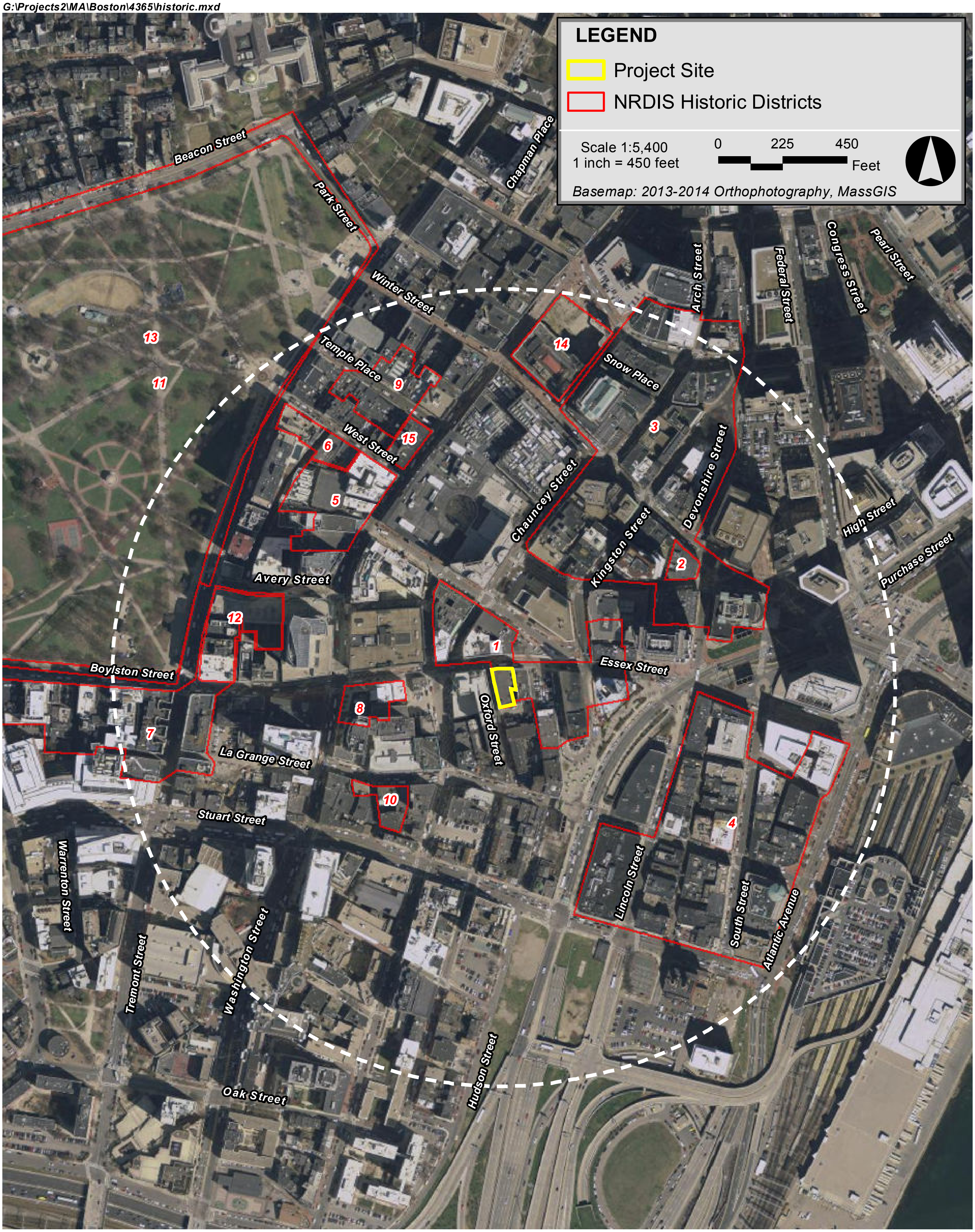
6.2.2 Historic Resources in the Project Vicinity

In addition to the existing building located on the Project site, there are numerous other State and National Register listed historic resources and districts within the Project vicinity. Notable resources include: the Boston Common and Public Garden, the Blake and Armory

Building, and the Leather District. These historic resources, and others within a quarter-mile radius of the Project site, are listed in Table 6-1 and identified in Figure 6-1.

Table 6-1 Historic Resources within the vicinity of the Project

Map No	*Name*	*Address*	*Designation*
1	Textile Historic District	Bound by Chauncy Street, Essex Street, Edinboro Street, and Kingston Street	National Register District
2	Church Green Buildings Historic District	101-113 Summer Street	Local Landmark, National Register District
3	Commercial Palace Historic District	Bound by Hawley Street, Franklin Street, Devenshire Street, Summer Street, Lincoln Street, Bedford Street, and Chauncy Street	State Register, National Register Determination of Eligibility
4	Leather District	Essex Street, Atlantic Street, Kneeland Street, John F. Fitzgerald Surface Road, Lincoln Street	National Register District
5	Washington Street Theatre District	Bound by West Street, Washington Street, Avery Street and Mason Street	National Register District
6	West Street Historic District	Bound by West Street, Tremont Street, and Tremont-on-the-Common	National Register District
7	Piano Row Historic District	Roughly bound by Tremont Street, Avery Street, Boylston Street, Tamworth Street, La Grange Street, Allens Alley, and Carver Street	National Register District
8	Liberty Tree District	Bound by Essex Street, Washington Street, Harrison Street and Beach Street	National Register District
9	Temple Place Historic District	11-55, 26-56 Temple Street	National Register District
10	Beach-Knapp District	7-15, 17-23, and 25-29 Beach Street and 9-23 Knapp Street	National Register District
11	Boston Common and Public Garden	Bound by Beacon Street, Park Street, Tremont Street, Boylston Street and Arlington Street	National Register District
12	Tremont Street block between Avery and Boylston	Bound by Avery Street, Tremont Street, Boylston Street	National Register District
13	Boston Common	Bound by Beacon Street, Park Street, Tremont Street, and Charles Street	Local Landmark, National Historic Landmark, National Register District
14	Filene's Department Store	Bound by Washington Street, Franklin Street, Hawley Street and Summer Street	Local Landmark, National Register Individual Property
15	Blake and Amory Building	59 Temple Place	National Register Individual Property



73-79 Essex Street Boston, Massachusetts

Figure 6-1

Historic Resources

6.3 Archaeological Resources

The Project site consists of a previously developed urban parcel within the Textile National Register District. Essex Street was a waterfront street through the eighteenth century; land south of Essex Street was infilled between 1804 and 1833 for residential development. Based on previous site disturbances, including construction of the existing building, no significant archaeological resources are anticipated to be impacted as a result of the Project.

6.4 Impacts to Historic Resources

6.4.1 Urban Design

The existing underutilized building will be demolished to accommodate the construction of the Project; a 17-story, approximately 137,000 sf hotel. The hotel will contain approximately 250 guest rooms, amenity spaces, fitness room, meeting rooms, and guest-only food service. With a height of 181 feet, the building will be taller in height than the existing building, but will be similar in height or shorter than other buildings within the vicinity, including the buildings located at 120 Kingston Street and 45 Stuart Street. The height of the individual levels will measure 16 feet at the ground level, the second floor for the public functions will measure 13 feet, and all typical hotel floors will measure 10 feet. The roof's mechanical penthouse and screen enclosure will appear as a continuation of the main façade.

The structure is designed to reflect its context and its intended use. The elevations are organized in a pattern derived from the neighboring buildings while intending to evoke a contemporary design. On the ground floor, the building will be set back along Oxford and Essex Streets to allow for wider sidewalks and to provide vehicular access and a drop-off area on Oxford Street. The Project will reengage the streetscape of underutilized buildings and will address the growing hotel need in the City of Boston.

Alternatives for retaining and incorporating the existing building for the intended use or other commercial or residential uses have been considered, but ultimately were determined infeasible. The age and construction type of the building would require significant structural and facade remediation to bring the building up to current code standards. Furthermore, the age, degraded construction, and configuration of the existing structure create further challenges. With respect to the intended hotel use, the configuration of the building and the structural grid do not allow for the building to be repurposed and additions to the existing eight-story building would not be structurally feasible given the reasons mentioned above.

6.4.2 Shadow Impacts

As discussed in greater detail in Section 3.2, the Project will result in the creation of some new shadow. A shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21), as well as 6:00 p.m. during the summer solstice and autumnal equinox.

The area is dense and the surrounding streets and sidewalks are currently in shadow during most times of the year. The shadow analysis shows that new shadow will largely be limited to the immediate surrounding area.

New shadow will be cast onto the Textile National Register District surrounding the Project site, as well as the Commercial Palace Historic District to the northeast. In the Textile District, new shadow impact will be limited to the immediately surrounding areas of the Project site. During some of the time periods studied, there will be additional shadow cast on the buildings on the northern side of Essex Street, across the street from the Project site. The building bound by Essex Street, Chauncy Street, and Avenue de Lafayette are located within the Textile District. During the June 21st at 3:00 p.m. period, new shadow will be cast on the adjacent building to the east at 81-83 Essex Street. Within the Commercial Palace Historic District, new shadow will be cast on the southwest portion of the district surrounding Chauncy Street, Kingston Street and Bedford Street.

While new shadow will be cast on buildings within the Textile and Commercial Palace districts, impacts are not anticipated to adversely impact the character-defining features which qualify the districts for listing in the National Register.

6.5 Status of Project Review with Historical Agencies

6.5.1 Massachusetts Historical Commission

In the event that a state or federal action is identified as required for the Project, a Massachusetts Historical Commission Project Notification Form will be filed for the Project in compliance with State Register Review (950 CMR 71.00) and/or Section 106 of the National Historic Preservation Act (36 CFR 800).

6.5.2 Boston Landmarks Commission

Because the structure on the Project site proposed for demolition is greater than 50 years old, the proposed demolition activities are subject to review by the Boston Landmarks Commission (BLC) in accordance with Article 85 of the Boston Zoning Code (Demolition Delay). As noted above, alternatives for retaining and incorporating the existing building into the Project have been considered, but ultimately were determined infeasible. At the appropriate time, the Proponent will file an Article 85 application as required. Alternatives to the proposed demolition that have been considered will be further addressed as part of the Article 85 process. The Proponent will work with the BLC staff to complete the Article 85 review process.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

7.1 Introduction

The Infrastructure Systems Component outlines the existing utilities surrounding the Project site, the connections required to provide service to the Project, and any impacts on the existing utility systems that may result from the construction of the Project. The following utility systems are discussed herein:

- Sewer
- Domestic water
- Fire protection
- Drainage
- Natural gas
- Electricity
- Telecommunications

The Project includes the demolition of an existing building located at 73-79 Essex Street. The new building will be a hotel with 17 floors with no proposed parking on-site. The Project site is located on Oxford and Essex streets in Boston and is bounded by Essex Street to the north, an existing building addressed 83 Essex Street to the east, a new residential building to the south, and Oxford Street to the west.

7.2 Wastewater

7.2.1 Sewer Infrastructure

Existing Boston Water and Sewer Commission (BWSC) combined sewer mains are located in Essex Street and Oxford Street adjacent to the Project site.

Essex Street

There is a 12-inch BWSC combined sewer which flows in an easterly direction in Essex Street, which then combines with two other BWSC sewer lines into a 36-inch by 54-inch BWSC combined sewer. The 36-inch by 54-inch then flows into a 48-inch BWSC combined sewer, which in turn flows into a 72-inch BWSC combined sewer, which ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal.

Oxford Street

There is an 18-inch BWSC combined sewer in Oxford Street which flows in a southerly direction, joining with another combined sewer line as a 30-inch by 52-inch BWSC combined sewer main that flows into a 36-inch, 46-inch, and 48-inch combined main, respectively, before flowing into a 72-inch combined main which ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal.

The existing sewer system is illustrated in Figure 7-1.

7.2.2 Wastewater Generation

The Project's sewage generation rates were estimated using BWSC water meter billing data for the existing building and 314 CMR 15.00 and the proposed building program. 314 CMR 15.00 lists typical sewage generation values for the proposed building use (in gallons per day [gpd]), as shown in Table 7-1. Typical generation values are conservative values for estimating the sewage flows from new construction. The proposed site is comprised of one new building consisting of a 250-room hotel, with a basement laundry room and second floor restaurant and bar intended to be restricted to use by the hotel guests only. The existing site is comprised of an existing, mostly vacant eight-story building with a first floor restaurant.

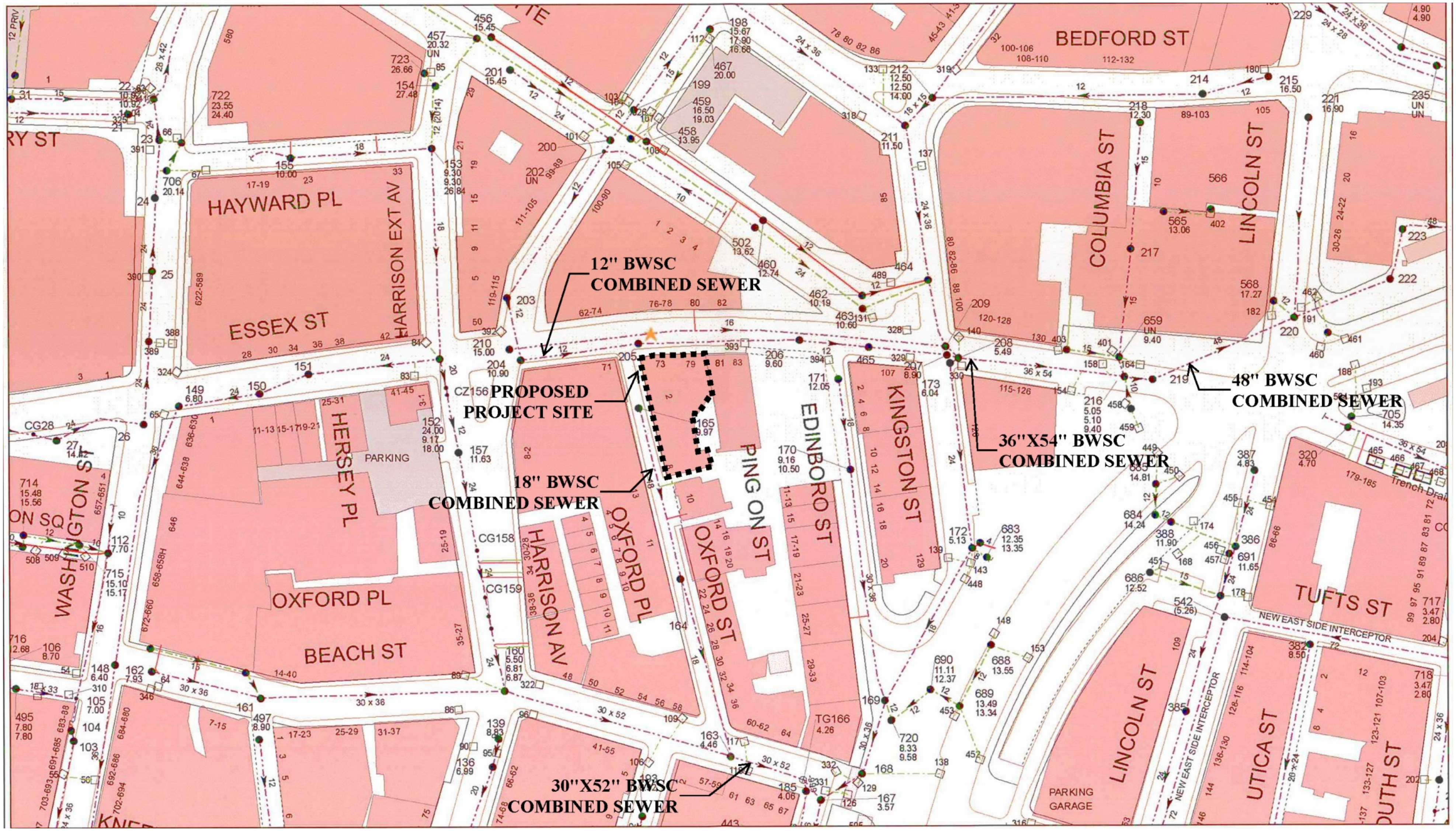
Table 7-1 Proposed Project Wastewater Generation

Use	*Size/Unit*	*314 CMR Value (gpd/unit)*	*Total Flow (gpd)*
Existing Restaurant (from existing water billing data)			
Restaurant	-	-	1,461
Total Existing Sewer Flows			**1,461**
Proposed Hotel Building (using average 314 CMR values)			
Hotel Rooms	250 bedrooms	110/bedroom	27,500
Laundry Room	3 units	400/unit/day	1,200
Restaurant/dining	Min allowable for design	1,000	1,000
Total Proposed Sewer Flows			**29,700**

Increase in Sewer Flows (gpd):	**28,239**

7.2.3 Sewage Capacity & Impacts

The Project's impact on the existing BWSC systems in Essex Street and Oxford Street were analyzed. The existing sewer system capacity calculations are presented in Table 7-2.



73-79 Essex Street **Boston, Massachusetts**

Figure 7-1

Existing Sanitary Sewer and Drainage System

Nitsch Engineering

Table 7-2 Sewer Hydraulic Capacity Analysis

Manhole (BWSC Number)	*Distance (feet)*	*Invert Elevation (up)*	*Invert Elevation (down)*	*Slope (%)*	*Dia. (in)*	*Manning's Number*	*Flow Capacity (cfs)*	*Flow Capacity (MGD)*
Essex Street								
204 to 206	300	10.9	9.6	0.4%	12	0.013	2.35	1.52
206 to 207	160	9.6	8.4	0.8%	12	0.013	3.09	1.99
Minimum Flow Analyzed:							2.35	1.99
Oxford Street								
165 to 163	380	9.97	4.46	1.5%	18	0.013	7.19	4.65
Minimum Flow Analyzed:							7.19	4.65

Note: 1. Manhole numbers taken from BWSC Sewer system GIS Map received on Wednesday, January 6, 2016.
2. Flow Calculations based on Manning Equation

7.2.4 Proposed Conditions

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. The Project is expected to generate an increase in wastewater flows of approximately 28,239 gpd. Approval for the increase in sanitary flow will come from BWSC.

Sewer services for the existing building will be evaluated for capacity and condition and will be replaced as necessary. New sewer services resulting from the Project will connect to the existing sanitary sewer mains in Essex Street and/or Oxford Street.

Improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's Site Plan Review process for the Project. This process will include a comprehensive design review of the existing and proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

7.2.5 Proposed Impacts

The adjacent roadway sewer systems in Essex Street and Oxford Street and potential building service connections to the sewer system were analyzed.

Table 7-2 indicates the hydraulic capacity of the existing 12-inch combined sewer main in Essex Street and the 18-inch combined sewer in Oxford Street. The minimum hydraulic capacity is 1.52 million gallons per day (MGD) or 2.35 cubic feet per second (CFS) for the 12-inch main in Essex Street, and 4.65 MGD or 7.19 CFS for the 18-inch main Oxford Street.

Based on an average daily flow estimate for the Project of 29,700 gpd or .0297 MGD, an increase of 28,239 gpd or .0282 MGD from the existing buildings; and with a factor of safety estimate of 10 (total estimate = 0.0282 MGD x 10 = 0.28 MGD), no capacity problems are expected within the BWSC sewer systems in Essex Street or Oxford Street.

7.3 Water Supply

7.3.1 Water Infrastructure

Water for the Project site will be provided by the BWSC. There are five water systems within the City, and these provide service to portions of the City based on ground surface elevation. The five systems are southern low (commonly known as low service), southern high (commonly known as high service), southern extra high, northern low, and northern high. There are existing BWSC water mains in Essex Street and in Oxford Street.

There is a 10-inch southern high main and 12-inch southern low main in Essex Street, and a 12-inch southern low main in Oxford Street.

The existing water system is illustrated in Figure 7-2.

7.3.2 Water Consumption

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation as described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 314 CMR 15.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project's estimated domestic water demand is 32,670 gpd. The water for the Project will be supplied by the BWSC systems in Essex Street and/or in Oxford Street.

The existing building at 73 Essex Street has one existing BWSC water account. The historical water use for the service to the existing building is estimated to be between 1,182 gpd and 2,186 gpd. This estimate is based on the water meter billing history provided by BWSC for the existing account located at 73 Essex Street from January 2014 to December 2015. The billing history for the existing building water meter account (Account #112895000), is summarized in Table 7-3.

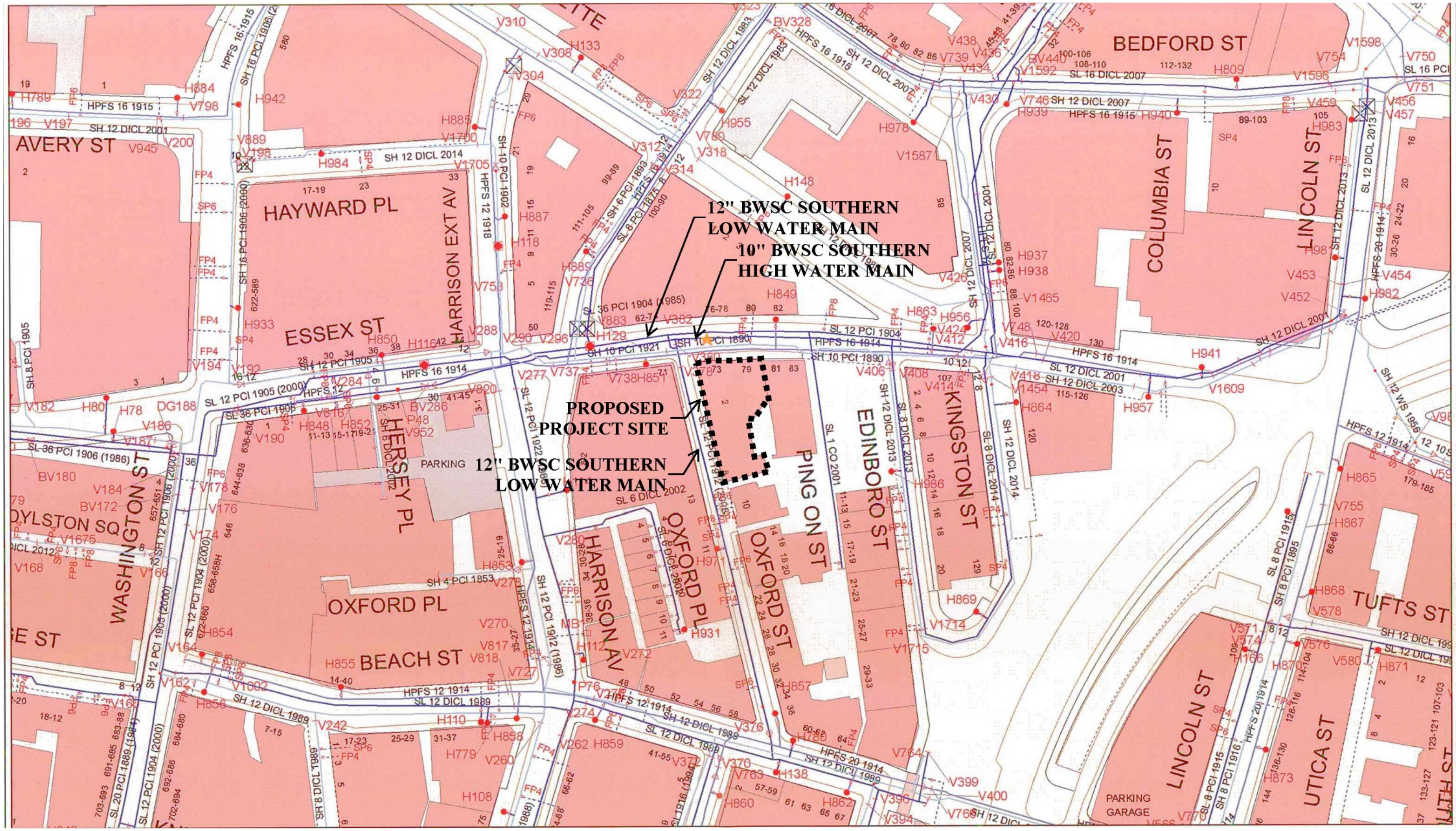


Figure 7-2

Existing Water System

Table 7-3 Existing Building Water Use

	Time Period	*Water Use (cubic feet - cf)*	*Total Days Metered*	*Water Use (cf/day)*	*Water Use (gpd)*
Minimum Water Use Recorded	7/18/15-8/19/15	4,900	31	158.1	1,182
Maximum Water Use Recorded	6/18/15-7/19/15	9,060	31	292.3	2,186
Average Water Use for 2014	1/2/14-1/2/15	81,300	365	222.7	1,666
Average Water Use for 2013	1/2/13-1/2/14	75,540	365	207.0	1,548

Note: Billing History for Account #112895000 provided by BWSC on January 11, 2016

7.3.3 Existing Water Capacity and Impacts

BWSC record flow test data containing actual flow and pressure for hydrants within the vicinity of the Project site was requested by the Proponent. Hydrant flow data was available for one hydrant near the Project site. The existing hydrant flow data is shown in Table 7-4.

Table 7-4 Existing Hydrant Flow Data

Flow Hydrant Number	*Date of Test*	*Static Pressure (psi)*	*Residual Pressure (psi)*	*Total Flow (gpm)*
H138 (Oxford St)	5/9/2014	70	66	2,126

Note: Data provided by BWSC on January 8, 2016.

7.3.4 Proposed Project

The domestic and fire protection water services for the Project will connect to the existing BWSC water mains in Essex Street and/or in Oxford Street.

The Project's impacts to the existing water system will be reviewed as part of the BWSC's Site Plan Review process.

The domestic and fire protection water service connections required for the Project will meet the applicable City and State codes and standards, including cross-connection backflow prevention. Compliance with the standards for the domestic water system service connection will be reviewed as part of BWSC's Site Plan Review process. This review will include sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants and siamese connections that conform to BWSC and Boston Fire Department requirements.

Efforts to reduce water consumption will be made. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed.

New water services will be installed in accordance with the latest local, state, and federal codes and standards. Backflow preventers will be installed at both domestic and fire protection service connections. New meters will be installed with Meter Transmitter Units (MTU's) as part of the BWSC's Automatic Meter Reading (AMR) system.

7.3.5 Proposed Impacts

Water capacity problems are not anticipated within this system as a result of the Project's construction.

7.4 Stormwater

There are existing BWSC combined sewer mains in Essex Street and Oxford Street adjacent to the Project site, as previously described in Section 7.2.1. The existing drainage follows the same path as the sanitary sewer through combined sewer mains in Essex Street and Oxford Street before ultimately flowing to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal.

Essex Street

There is a 12-inch BWSC combined sewer which flows in an easterly direction in Essex Street, which then combines with two other BWSC sewer lines into a 36-inch by 54-inch BWSC combined sewer. The 36-inch by 54-inch combined sewer line then flows into a 48-inch BWSC combined sewer, which in turn flows into a 72-inch BWSC combined sewer which ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal.

Oxford Street

There is an 18-inch BWSC combined sewer in Oxford Street which flows in a southerly direction, joining with another combined sewer line as a 30-inch by 52-inch BWSC combined sewer main that flows into a 36-inch, 46-inch, and 48-inch combined main, respectively, before flowing into a 72-inch combined main which ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal.

The existing BWSC storm drain system is illustrated in Figure 7-1.

Existing stormwater is currently captured by existing closed drainage systems incorporated into the existing building. Stormwater in the roadways is captured by existing catch basins, which flow to the existing BWSC combined sewer mains in Essex Street and Oxford Street.

7.4.1 Proposed Project

The existing site is comprised of one existing building and is nearly an entirely impervious area. The Project will meet or reduce the existing peak rates of stormwater discharge and volumes of stormwater runoff from the site and promote runoff recharge to the greatest extent possible.

The Project will infiltrate one-inch of stormwater runoff from impervious areas into the ground. It is anticipated that the stormwater recharge systems will work to passively infiltrate runoff into the ground with a gravity recharge system or a combination of storage tanks in the building and pumps. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate and volume of stormwater discharge from the Project site in the developed condition compared to the existing condition.

Improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's Site Plan Review process. The process will include a comprehensive design review of the proposed service connections, and assessment of Project demands and system capacity.

7.4.2 Water Quality Impact

The Project will not affect the water quality of nearby water bodies. Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and BWSC storm drain systems. During construction, existing catch basins will be protected with filter fabric, straw bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until the areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

All necessary dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Project will be in compliance with local and state stormwater management policies, as described below.

7.4.3 Water Quality Impact

The BRA oversees proposed projects within the Groundwater Conservation Overlay District under Article 32 of the Boston Zoning Code. The Project parcel is located within the City of Boston's Groundwater Conservation Overlay District (GCOD). The purpose of the article is to prevent deterioration of and, where necessary, promote the restoration of, groundwater levels in the city of Boston, to protect and enhance the city's historic neighborhoods and structures, reduce surface water runoff and water pollution and maintain public safety.

The Project will comply with Article 32. The Project will promote infiltration of stormwater into the ground by capturing within a suitably-designed system the volume of stormwater equivalent to no less than one inch depth of the impervious areas of the site. The Project will result in no negative impact on groundwater levels within the Project site or adjacent lots, subject to the terms of any (i) dewatering permit or (ii) cooperation agreement entered into by the Proponent and the BRA, to the extent that such agreement provides standards for groundwater protection during construction.

7.4.4 MassDEP Stormwater Management Policy Standards

In March 1997, MassDEP adopted a Stormwater Management Policy to address non-point source pollution. In 1997, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy, which was revised in February 2008. The Policy prescribes specific stormwater management standards for development projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance is achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design. The Policy is administered locally pursuant to MGL Ch. 131, s. 40.

A brief explanation of each Policy Standard and the system compliance is provided below:

Standard #1: No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Compliance: The proposed design will comply with this Standard. The design will incorporate the appropriate stormwater treatment and no new untreated stormwater will be directly discharged to, nor will erosion be caused to, wetlands or waters of the Commonwealth as a result of stormwater discharges related to the Project.

Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard *may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR.*

Compliance: The proposed design will comply with this Standard. The existing discharge rate will be met or decreased as a result of the improvements associated with the Project.

Standard #3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmental sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Compliance: The Project will comply with this standard to the maximum extent practicable.

Standard #4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Compliance: The proposed design will comply with this standard. Within the Project's limit of work, there will be mostly building roof, paved sidewalk, and roadway areas. Runoff from paved areas that would contribute unwanted sediments or pollutants to the existing storm drain system will be collected by deep sump, hooded catch basins and conveyed through water quality units before discharging into the BWSC system.

Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent *shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

Compliance: The proposed design will comply with this standard. The Project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-6).

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Compliance: The proposed design will comply with this Standard. The Project will not discharge untreated stormwater to a sensitive area or any other area.

Standard #7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Compliance: The proposed design is a new development and thus this standard is not applicable.

Standard #8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

Compliance: The Project will comply with this standard. Sedimentation and erosion controls will be incorporated as part of the design of the Project and employed during construction.

Standard 9: A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Compliance: The Project will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared for the Proposed Project and will assure proper maintenance and functioning of the stormwater management system.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

Compliance: The Project will comply with this standard. There will be no illicit connections associated with the Project.

7.5 Protection Proposed During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during Project construction. The installation of proposed utility connections within public ways will be undertaken in accordance with BWSC, Boston Public Works Department, the Dig-Safe Program, and applicable utility company requirements. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer, and drain facilities will be reviewed by the BWSC as part of its Site Plan Review process. All necessary permits will be obtained before the commencement of work.

The Proponent will continue to work and coordinate with the BWSC and the utility companies to ensure safe and coordinated utility operations in connection with the Project.

7.6 Conservation of Resources

The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing distribution system. The installation of sensor-operated sinks with water conserving aerators and sensor-operated toilets in all non-residential restrooms will be incorporated into the design plans for the Project.

Chapter 8.0

Coordination with other Governmental Agencies

8.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designed to comply with the standards of the Americans with Disabilities Act. See Appendix G for the Accessibility Checklist.

8.2 Massachusetts Environmental Policy Act

The Proponent does not expect that the Project will require review by the Massachusetts Environmental Policy Act (MEPA) Office of the Massachusetts Executive Office of Energy and Environmental Affairs. Current plans do not call for the Project to receive any state permits or state funding, or involve any state land transfers.

8.3 Massachusetts Historical Commission

The Proponent does not anticipate that the Proposed Project will require any state or federal licenses, permits or approvals, and does not anticipate utilizing any state or federal funds. Therefore, review by the Massachusetts Historical Commission (MHC) is not anticipated at this time. In the event that state or federal licenses, permits, approvals or funding is involved, the Proponent will file an MHC Project Notification Form to initiate review of the Project.

8.4 Boston Landmarks Commission

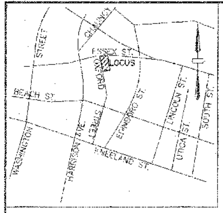
The existing building on the Project Site is over 50 years of age; therefore, the proposed demolition of the building is subject to review by the Boston Landmarks Commission (BLC) under Article 85 of the Boston Zoning Code. At the appropriate time, the Proponent will submit an Article 85 application with the BLC for its review and consideration.

8.5 Boston Civic Design Commission

The Project will comply with the provisions of Article 28 of the Boston Zoning Code. This PNF will be submitted to the Boston Civic Design Commission by the BRA as part of the Article 80 process.

Appendix A

Site Survey



Vicinity Map

Legend

(M)	MEASURED
(D)	DEED
BIT. CONC.	BITUMINOUS CONCRETE
CONC.	CONCRETE
✲	LIGHT POLE
— — —	PROPERTY LINE
⧅⧅⧅	BUILDING WALL

Encroachments

A. THERE IS AN APPARENT ENCROACHMENT OF AIR HANDLING VENTS AT THE EASTERLY PROPERTY LINE.

B. THERE ARE VERY SLIGHT ENCROACHMENTS OF THE BUILDING ON THE LOCUS PROPERTY ONTO THE LAYOUT OF ESSEX STREET AND THE ABUTTING LAND TO THE EAST. THE DISTANCE THAT THE BUILDING ENCROACHES IS SHOWN HEREON FOLLOWING THE WORD "OVER", FOR EXAMPLE "OVER 0.02'".

Items Corresponding to Schedule B

ITEM 7. Common Law Party Wall Rights as suggested by description in Deed from Wong Bros., Inc. to the Trustees of Wong Real Estate Trust recorded in Book 11566, Page 303.
–Party Walls are plotted hereon.

ITEM 8. Easment and Right of Way from Jeffrey Wong to Comcast of Boston dated March 16, 2006 and recorded in Book 39235, Page 122.
–Location of easement coincides with location of the transmission lines. Not plottable.

ITEM 9. Easement Agreement by and between CEDC Oxford Ping On LLC and Jeffrey Wong, Trustee of Wong Real Estate Trust dated October 31, 2014 and recorded in Book 53666, Page 146.
–Easement to maintain the existing encroachment of former party wall over the southern property line. Plotted.

All other Schedule B items are non–survey in nature and are not plottable.

Zoning Information

DISTRICT: CHINATOWN
SUBDISTRICT: COMMERCIAL CHINATOWN

MAXIMUM BUILDING HEIGHT AND FLOOR AREA RATIO: A MAXIMUM BUILDING HEIGHT OF 80 FEET AND A FLOOR AREA RATIO OF 6 ARE ALLOWED; PROVIDED THAT THAT ANY PROPOSED PROJECT SHALL BE ALLOWED A MAXIMUM BUILDING HEIGHT OF 100 FEET AND A MAXIMUM FLOOR AREA RATIO OF 7 IF SUCH PROPOSED PROJECT IS SUBJECT TO LARGE PROJECT REVIEW.

SETBACKS: THE STREET WALL OF ANY PROPOSED PROJECT SHALL BE BUILT TO BE COEXTENSIVE WITH THE BUILDING LINE OF THE BLOCK ON WHICH THE STREET WALL FACES.

Miscellaneous Notes

1. LOCUS PARCEL ASSESSOR'S IDENTIFICATION NUMBER IS 0304449000.
2. THERE WAS NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION/BUILDING ADDITIONS ON THE LOCUS PROPERTY OBSERVED AT THE TIME OF SURVEY. CONSTRUCTION IS IN PROGRESS TO SOUTH OF LOCUS PROPERTY.
3. THE SURVEYOR IS NOT AWARE OF ANY CHANGES (EITHER COMPLETED OR PROPOSED) IN THE RIGHT OF WAY LINES SHOWN HEREON. THERE IS NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
4. THERE WAS NO EVIDENCE THAT THE SITE IS BEING USED AS A SOLID WASTE DUMP, SUMP OR SANITARY LAND FILL, OR CEMETERY.
5. BASEMENT LOCATION WAS DIGITIZED FROM ARCHITECTURAL DRAWINGS.
6-A. THIS SURVEY WAS MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARDS DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS.
6–B. THE PROPERTY DESCRIBED HEREON IS THE SAME AS THE PROPERTY DESCRIBED IN FIRST AMERICAN TITLE INSURANCE COMPANY TITLE COMMITMENT NO. NCS–718901–BOS1 WITH AN EFFECTIVE DATE OF FEBRUARY 24, 2015 (THE "TITLE COMMITMENT") AND THAT ALL EASEMENTS, COVENANTS AND RESTRICTIONS REFERENCED IN THE TITLE COMMITMENT OR APPARENT FROM A PHYSICAL INSPECTION OF THE SITE OR OTHERWISE KNOWN TO ME HAVE BEEN PLOTTED HEREON OR OTHERWISE NOTED AS TO THEIR EFFECT ON THE SUBJECT PROPERTY.
6–C. THE PROPERTY HAS DIRECT ACCESS TO ESSEX STREET AND OXFORD STREET, DEDICATED PUBLIC STREETS.
6–D. THE PROPERTY DOES NOT LIE WITHIN ANY AREA SUBJECT TO REGULATION BY FEDERAL, STATE OR MUNICIPAL AUTHORITY AS INLAND OR COASTAL WETLANDS, BEACH, ESTUARY OR THE LIKE.
6–E. VISIBLE ABOVE GROUND EVIDENCE OF MUNICIPAL WATER, STORM SEWER FACILITIES AND TELEPHONE, GAS AND ELECTRIC SERVICES OF PUBLIC UTILITIES EXISTS IN THE LOCATIONS INDICATED THEREON.
6–F. THE SQUARE FOOTAGE OF EACH PARCEL DELINEATED ON THE SURVEY IS AS SET FORTH THEREON, ALL SUCH PARCELS ARE CONTIGUOUS WITHOUT ANY STRIPS, GAPS AND GORES EXISTING BETWEEN ANY OF SAID PARCELS, AND SAID PARCELS, WHEN COMBINED, FORM AND CREATE ONE COMPLETE AND UNINTERRUPTED PARCEL WITHOUT ANY STRIPS, GAPS OR GORES.

FLOOD NOTE:
By graphic plotting only, this property is in Zone "X" of the Flood Insurance Rate Map No. 25025C0081G, which bears an effective date of September 25, 2009 and is not in a Special Flood Hazard Area.

Parking Notes

PARKING PROVIDED:
THERE ARE NO PARKING SPACES ON THE SUBJECT PROPERTY.

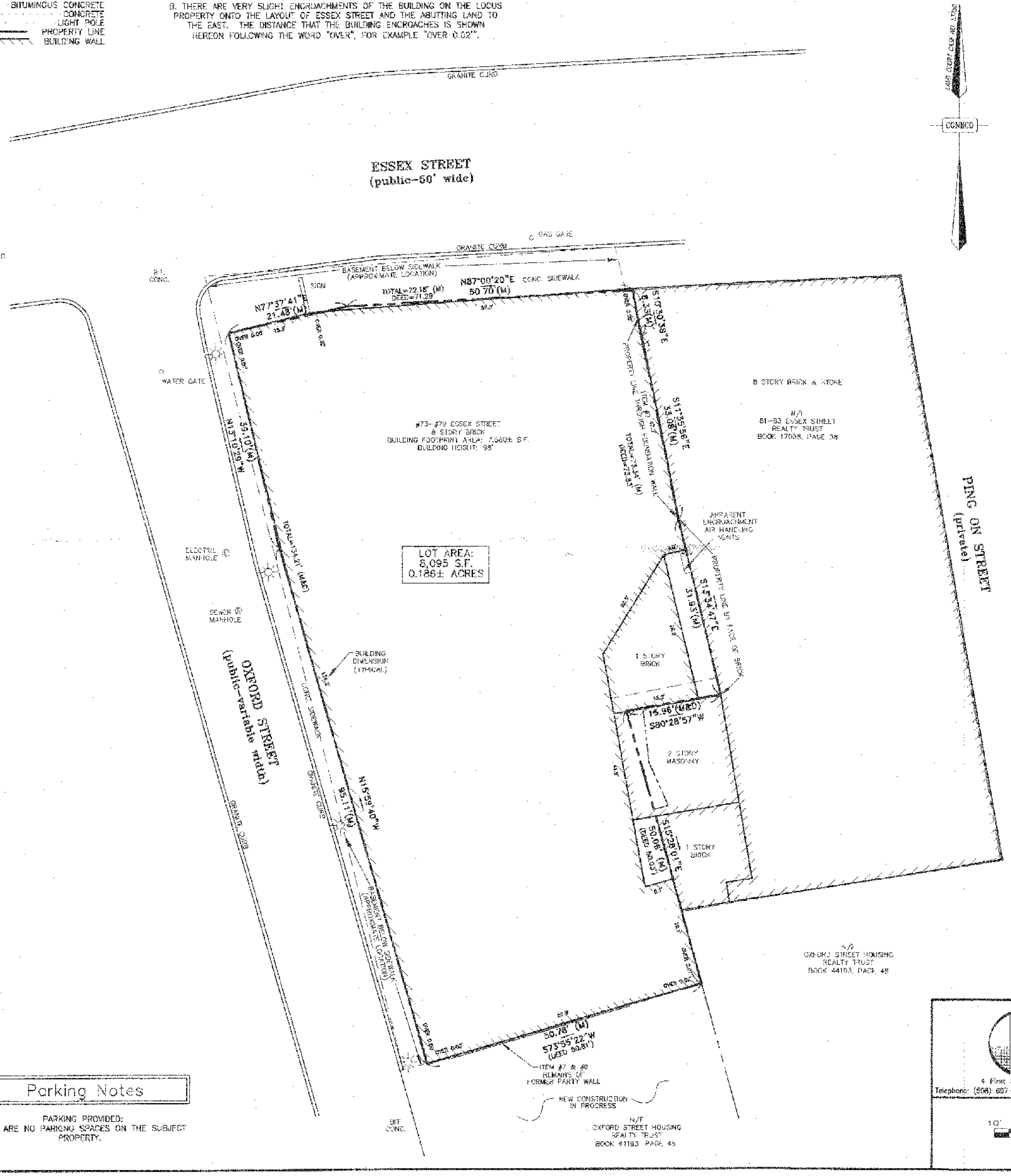


Exhibit "A" Legal Description

Real property in the City of Boston, County of Suffolk, Commonwealth of Massachusetts, described as follows:

A certain parcel of land with the buildings thereon situated on the east corner of Essex and Oxford Streets in Boston, Suffolk County, Massachusetts, being now numbered 73–79 Essex Street and 4–8 Oxford Street, and bounded and described as follows:

NORTHERLY by said Essex Street, seventy–one and 29/100 (71.29) feet;

EASTERLY by land now or formerly of Charles P. Curtis by a line passing in part through the middle of a party foundation wall, and in part by the Westerly face of a brick wall, seventy–three and 83/100 (73.83) feet;

SOUTHERLY by said Curtis land sixteen and 96/100 (16.96) feet;

EASTERLY again in part by said Curtis land and in part on and now or formerly of Louisa Smith fifty and 03/100 (50.03) feet;

SOUTHERLY by land now or formerly of Florence A. M. Thayer by a line passing through the center of an eight (8) inch wall, fifty and 81/100 (50.81) feet and;

WESTERLY by said Oxford Street one hundred thirty–four and 21/100 (134.21) feet.

Containing 8,094 square feet of land, more or less.

ALTA/ACSM LAND TITLE SURVEY

CERTIFICATION

To: Westbrook Acquisitions, L.L.C., its assignees and nominees; ESXMA 72GL Owner, LLC, a Delaware limited liability company, its assignees and nominees; and First American Title Insurance Company, its assignees and nominees.:

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2011 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 1, 2, 3, 4, 6(b), 7(a), 7(b)(1), 7(c), 8, 9, 11(a), 13, 14, 16, 17, 18, 19, 20(a) and 21 of Table A thereof. The field work was completed on March 17, 2015.

Timothy S. Bodan
Timothy S. Bodan
Registration No. 46110
Within the Commonwealth of MA

TIMOTHY S. BODAN NO. 46110

— PREPARED BY —
CONECO
Engineers & Scientists
4 First Street – Bridgewater, Massachusetts 02324
Telephone: (508) 697–3191 Toll free: (800) 548–3355 Facsimile: (508) 697–5996

10' 0 10' 20'
SCALE IN FEET

ALTA/ACSM LAND TITLE SURVEY
73–79 ESSEX STREET
4–8 OXFORD STREET
BOSTON, MA

PREPARED FOR: SULLIVAN & WORCESTER LLP

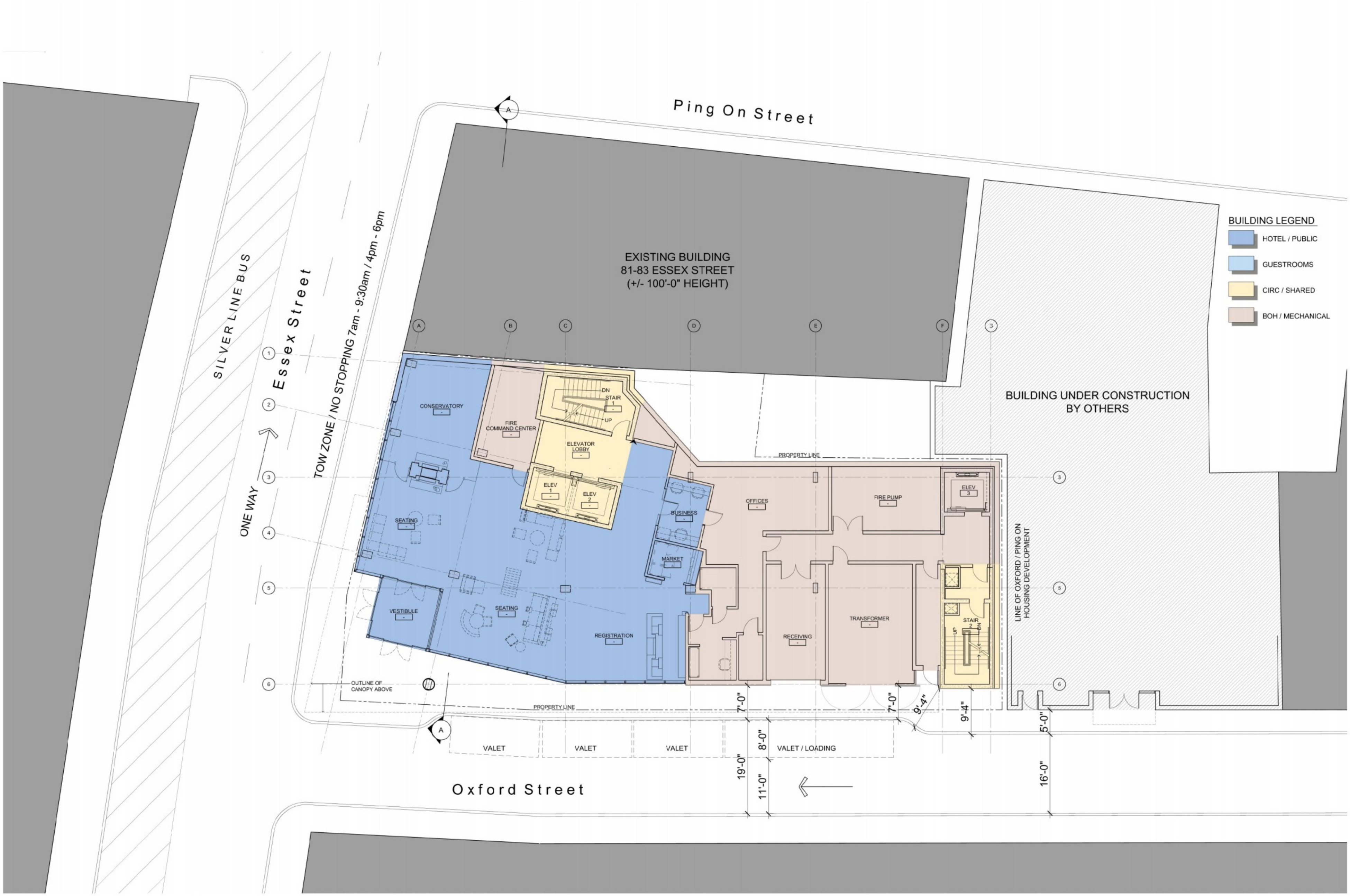
SCALE	DATE	ACAD FILE	JOB NO.
1"=10'	04/30/15	2035.2	2035.2

Appendix B

Floor Plans

73-79 Essex Street   Boston, Massachusetts

Basement Level Plan



73-79 Essex Street   Boston, Massachusetts

Ground Level Plan

Second Level Plan

PROPOSED SECOND FLOOR
SCALE: 1/8" = 1'-0"

Typical Level Floor Plan (Floors 3-17)

Appendix C

Transportation

Available Upon Request

Appendix D

Wind

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
1	A	Spring	7		Sitting	13		Acceptable
		Summer	6		Sitting	11		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	14		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	8	14%	Sitting	14		Acceptable
		Summer	7	17%	Sitting	12		Acceptable
		Fall	8	14%	Sitting	13		Acceptable
		Winter	8		Sitting	14		Acceptable
		Annual	8	14%	Sitting	13		Acceptable
2	A	Spring	7		Sitting	12		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	14	100%	Standing	21	75%	Acceptable
		Summer	11	83%	Sitting	18	80%	Acceptable
		Fall	13	86%	Standing	20	67%	Acceptable
		Winter	14	75%	Standing	23	77%	Acceptable
		Annual	13	86%	Standing	21	75%	Acceptable
3	A	Spring	9		Sitting	14		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	10		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	10	11%	Sitting	14		Acceptable
		Summer	8	14%	Sitting	11		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	10		Sitting	14		Acceptable
		Annual	9		Sitting	14		Acceptable
4	A	Spring	8		Sitting	12		Acceptable
		Summer	7		Sitting	10		Acceptable
		Fall	8		Sitting	11		Acceptable
		Winter	8		Sitting	12		Acceptable
		Annual	8		Sitting	11		Acceptable
	B	Spring	9	12%	Sitting	14	17%	Acceptable
		Summer	8	14%	Sitting	11		Acceptable
		Fall	9	12%	Sitting	14	27%	Acceptable
		Winter	10	25%	Sitting	15	25%	Acceptable
		Annual	9	12%	Sitting	13	18%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Build

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

<u>Effective Gust Criteria</u>

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
5	A	Spring	9		Sitting	13		Acceptable
		Summer	8		Sitting	11		Acceptable
		Fall	9		Sitting	12		Acceptable
		Winter	9		Sitting	13		Acceptable
		Annual	9		Sitting	12		Acceptable
	B	Spring	10	11%	Sitting	14		Acceptable
		Summer	8		Sitting	11		Acceptable
		Fall	10	11%	Sitting	14	17%	Acceptable
		Winter	10	11%	Sitting	15	15%	Acceptable
		Annual	9		Sitting	14	17%	Acceptable
6	A	Spring	8		Sitting	13		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	12		Acceptable
		Winter	8		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	9	12%	Sitting	14		Acceptable
		Summer	8	14%	Sitting	12		Acceptable
		Fall	9	12%	Sitting	13		Acceptable
		Winter	9	12%	Sitting	14		Acceptable
		Annual	9	12%	Sitting	13		Acceptable
7	A	Spring	7		Sitting	12		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	11		Acceptable
		Winter	7		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	7		Sitting	11		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	11		Acceptable
		Winter	7		Sitting	12		Acceptable
		Annual	7		Sitting	11		Acceptable
8	A	Spring	10		Sitting	15		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	10		Sitting	15		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10	11%	Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
9	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
10	A	Spring	13		Standing	17		Acceptable
		Summer	11		Sitting	14		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	13		Standing	18		Acceptable
		Annual	12		Sitting	17		Acceptable
	B	Spring	13		Standing	17		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	13		Standing	18		Acceptable
		Annual	12		Sitting	17		Acceptable
11	A	Spring	14		Standing	19		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	19		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	13		Standing	18		Acceptable
		Winter	14		Standing	19		Acceptable
		Annual	13		Standing	18		Acceptable
12	A	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	22		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
13	A	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable
14	A	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
15	A	Spring	11		Sitting	16		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	10		Sitting	15		Acceptable
		Summer	8	-20%	Sitting	13	-13%	Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
16	A	Spring	9		Sitting	14		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	14		Acceptable
	B	Spring	8	-11%	Sitting	14		Acceptable
		Summer	7	-12%	Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
17	A	Spring	9		Sitting	13		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	7	-22%	Sitting	11	-15%	Acceptable
		Summer	6	-25%	Sitting	9	-25%	Acceptable
		Fall	7	-12%	Sitting	10	-23%	Acceptable
		Winter	7	-22%	Sitting	11	-21%	Acceptable
		Annual	7	-12%	Sitting	10	-23%	Acceptable
18	A	Spring	11		Sitting	16		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8	-11%	Sitting	12		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
19	A	Spring	12		Sitting	17		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	11		Sitting	16		Acceptable
	B	Spring	11		Sitting	16		Acceptable
		Summer	10		Sitting	13	-13%	Acceptable
		Fall	11		Sitting	15		Acceptable
		Winter	11		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable
20	A	Spring	11		Sitting	16		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	11		Sitting	16		Acceptable
	B	Spring	11		Sitting	16		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	11		Sitting	16		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
21	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
22	A	Spring	8		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	8		Sitting	14		Acceptable
		Summer	6	-14%	Sitting	12		Acceptable
		Fall	7	-12%	Sitting	13		Acceptable
		Winter	7	-12%	Sitting	13		Acceptable
		Annual	7	-12%	Sitting	13		Acceptable
23	A	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	14		Acceptable
	B	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	13		Acceptable
		Fall	9	12%	Sitting	15		Acceptable
		Winter	9		Sitting	16		Acceptable
		Annual	9	12%	Sitting	15		Acceptable
24	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Build

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

<u>Effective Gust Criteria</u>

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
25	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
26	A	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
27	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
28	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
29	A	Spring	9		Sitting	16		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	9		Sitting	16		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	9		Sitting	16		Acceptable
	B	Spring	10	11%	Sitting	18	12%	Acceptable
		Summer	9	12%	Sitting	15		Acceptable
		Fall	10	11%	Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10	11%	Sitting	17		Acceptable
30	A	Spring	9		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	16		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	9		Sitting	16		Acceptable
	B	Spring	9		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
31	A	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	11	22%	Sitting	18	20%	Acceptable
		Summer	10	43%	Sitting	16	33%	Acceptable
		Fall	11	22%	Sitting	18	29%	Acceptable
		Winter	12	33%	Sitting	18	20%	Acceptable
		Annual	11	22%	Sitting	18	29%	Acceptable
32	A	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	16		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	8	-11%	Sitting	14		Acceptable
		Summer	6	-14%	Sitting	11		Acceptable
		Fall	8	-11%	Sitting	13		Acceptable
		Winter	8	-11%	Sitting	13	-19%	Acceptable
		Annual	8	-11%	Sitting	13		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
33	A	Spring	9		Sitting	14		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	14		Acceptable
	B	Spring	10	11%	Sitting	16	14%	Acceptable
		Summer	8	14%	Sitting	13		Acceptable
		Fall	9	12%	Sitting	15		Acceptable
		Winter	10	11%	Sitting	16		Acceptable
		Annual	9	12%	Sitting	15		Acceptable
34	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	12	20%	Sitting	19	19%	Acceptable
		Summer	10	25%	Sitting	16	23%	Acceptable
		Fall	12	20%	Sitting	18	12%	Acceptable
		Winter	12		Sitting	20	18%	Acceptable
		Annual	12	20%	Sitting	19	19%	Acceptable
35	A	Spring	9		Sitting	14		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	13	44%	Standing	19	36%	Acceptable
		Summer	11	57%	Sitting	17	42%	Acceptable
		Fall	12	50%	Sitting	19	46%	Acceptable
		Winter	13	44%	Standing	20	43%	Acceptable
		Annual	12	50%	Sitting	19	46%	Acceptable
36	A	Spring	11		Sitting	16		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	12		Sitting	19	19%	Acceptable
		Summer	10	11%	Sitting	17	21%	Acceptable
		Fall	12	20%	Sitting	19	19%	Acceptable
		Winter	13	18%	Standing	20	18%	Acceptable
		Annual	12	20%	Sitting	19	19%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
37	A	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
38	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
39	A	Spring	10		Sitting	15		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
40	A	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	14		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	17		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	14		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	17		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
41	A	Spring	12		Sitting	16		Acceptable
		Summer	11		Sitting	14		Acceptable
		Fall	12		Sitting	15		Acceptable
		Winter	12		Sitting	16		Acceptable
		Annual	12		Sitting	15		Acceptable
	B	Spring	12		Sitting	16		Acceptable
		Summer	10		Sitting	14		Acceptable
		Fall	11		Sitting	15		Acceptable
		Winter	11		Sitting	16		Acceptable
		Annual	11		Sitting	15		Acceptable
42	A	Spring	10		Sitting	15		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	10		Sitting	15		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10	11%	Sitting	15		Acceptable
		Winter	11		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable
43	A	Spring	6		Sitting	11		Acceptable
		Summer	5		Sitting	8		Acceptable
		Fall	6		Sitting	10		Acceptable
		Winter	6		Sitting	11		Acceptable
		Annual	6		Sitting	10		Acceptable
	B	Spring	11	83%	Sitting	17	55%	Acceptable
		Summer	9	80%	Sitting	14	75%	Acceptable
		Fall	11	83%	Sitting	17	70%	Acceptable
		Winter	12	100%	Sitting	19	73%	Acceptable
		Annual	11	83%	Sitting	17	70%	Acceptable
44	A	Spring	7		Sitting	11		Acceptable
		Summer	5		Sitting	8		Acceptable
		Fall	7		Sitting	11		Acceptable
		Winter	7		Sitting	11		Acceptable
		Annual	6		Sitting	11		Acceptable
	B	Spring	14	100%	Standing	20	82%	Acceptable
		Summer	11	120%	Sitting	16	100%	Acceptable
		Fall	13	86%	Standing	19	73%	Acceptable
		Winter	15	114%	Standing	22	100%	Acceptable
		Annual	14	133%	Standing	20	82%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories – Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
45	A	Spring	9		Sitting	13		Acceptable
		Summer	8		Sitting	11		Acceptable
		Fall	8		Sitting	12		Acceptable
		Winter	9		Sitting	13		Acceptable
		Annual	8		Sitting	12		Acceptable
	B	Spring	10	11%	Sitting	16	23%	Acceptable
		Summer	8		Sitting	13	18%	Acceptable
		Fall	10	25%	Sitting	16	33%	Acceptable
		Winter	11	22%	Sitting	18	38%	Acceptable
		Annual	10	25%	Sitting	16	33%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Appendix E

Climate Change Checklist

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at http://www.cityofboston.gov/climate

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/)
3. Army Corps of Engineers guidance on sea level rise (http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf)
4. Proceeding of the National Academy of Science, “Global sea level rise linked to global temperature”, Vermeer and Rahmstorf, 2009 (http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf)
5. “Hotspot of accelerated sea-level rise on the Atlantic coast of North America”, Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 (http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf)
6. “Building Resilience in Boston”: Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond “Yes” to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

A.1 - Project Information

Project Name:	73-79 Essex Street
Project Address Primary:	73-79 Essex Street
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Group One Partners Inc. – Architect 21 West Third Street, Boston, MA 02127 617-268-7000

A.2 - Team Description

Owner / Developer:	ESXMA 72GL Owner, LLC
Architect:	Group One Partners, Inc.
Engineer (building systems):	Vanderweil Engineers, LLP
Sustainability / LEED:	Epsilon Associates, Inc.
Permitting:	Epsilon Associates, Inc
Construction Management:	
Climate Change Expert:	Epsilon Associates, Inc

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

☑ PNF / Expanded PNF Submission	☐ Draft / Final Project Impact Report Submission	☐ BRA Board Approved	☐ Notice of Project Change
☐ Planned Development Area	☐ BRA Final Design Approved	☐ Under Construction	☐ Construction just completed:

A.4 - Building Classification and Description

List the principal Building Uses:	Hotel
List the First Floor Uses:	*Hotel Lobby, mechanical*

What is the principal Construction Type – select most appropriate type?

☐ Wood Frame	☐ Masonry	☐ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*8,095 SF*	Building Area:	*137,000 SF*
Building Height:	*181 Ft.*	Number of Stories:	*17 Flrs.*
First Floor Elevation (reference Boston City Base):	*20 Elev.*	Are there below grade spaces/levels, if yes how many:	*1*

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	☑ New Construction	☐ Core & Shell	☐ Healthcare	☐ Schools
	☐ Retail	☐ Homes Midrise	☐ Homes	☐ Other
Select LEED Outcome:	☐ Certified	☑ Silver	☐ Gold	☐ Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	*Yes /* [✓ *No*]	Certified:	*Yes /* [✓ *No*]

A.6 - Building Energy-

What are the base and peak operating energy loads for the building?

Electric:	*1,000 (kW)*	Heating:	*1,700 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*29 (kWh/SF)*	Cooling:	*110 (Tons/hr)*

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	*300 (kW)*	Heating:	*N/A (MMBtu/hr)*
		Cooling:	*N/A (Tons/hr)*

What is nature and source of your back-up / emergency generators?

Electrical Generation:	*350 (kW)*		Fuel Source:	*Diesel*
System Type and Number of Units:	☑ Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*(Units)*

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 - Analysis

What is the full expected life of the project?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	☐ 10 Years	☑ 25 Years	☐ 50 Years	☐ 75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

8/91 Deg.	Based on ASHRAE Fundamentals 2013 99.6% heating; 0.4% cooling

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

95 Deg.	*5 Days*	*6 Events / yr.*

What Drought characteristics will be used for project planning – Duration and Frequency?

30-90 Days	*0.2 Events / yr.*

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

45 Inches / yr.	*4 Inches*	*0.5 Events / yr.*

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

105 Peak Wind	*10 Hours*	*0.25 Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code: *27%*

How is performance determined: Energy Model

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:

☑ High performance building envelop	☐ High performance lighting & controls	☐ Building day lighting	☑ EnergyStar equip. / appliances
☑ High performance HVAC equipment	☑ Energy recovery ventilation	☐ No active cooling	☐ No active heating

Describe any added measures:

What are the insulation (R) values for building envelop elements?

Roof:	*R = 25*	Walls / Curtain Wall Assembly:	*R = 13.3*
Foundation:	*R = N/A*	Basement / Slab:	*R =4*
Windows:	*R =2.38/ U =0.42*	Doors:	*R =2.7 / U =0.37*

What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure?

☐ On-site clean energy / CHP system(s)	☐ Building-wide power dimming	☐ Thermal energy storage systems	☐ Ground source heat pump
☐ On-site Solar PV	☐ On-site Solar Thermal	☐ Wind power	☐ None

Describe any added measures:

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems?

Select all appropriate:	☐ Connected to local distributed electrical	☐ Building will be Smart Grid ready	☐ Connected to distributed steam, hot, chilled water	☐ Distributed thermal energy ready

Will the building remain operable without utility power for an extended period?

	Yes / [✓ *No*]	If yes, for how long:	*Days*
If Yes, is building “Islandable?			
If Yes, describe strategies:			

Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure:

Select all appropriate:	☐ Solar oriented – longer south walls	☐ Prevailing winds oriented	☐ External shading devices	☐ Tuned glazing,
	☐ Building cool zones	☐ Operable windows	☐ Natural ventilation	☐ Building shading
	☐ Potable water for drinking / food preparation	☐ Potable water for sinks / sanitary systems	☐ Waste water storage capacity	☑ High Performance Building Envelop
Describe any added measures:				

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:	☐ High reflective paving materials	☐ Shade trees & shrubs	☑ High reflective roof materials	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate rain events and more rain fall?

Select all appropriate:	☐ On-site retention systems & ponds	☑ Infiltration galleries & areas	☐ Vegetated water capture systems	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:	☐ Hardened building structure & elements	☑ Buried utilities & hardened infrastructure	☐ Hazard removal & protective landscapes	☐ Soft & permeable surfaces (water infiltration)
Describe other strategies:				

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

[✓ Yes] / No

Describe site conditions?

Site Elevation – Low/High Points: *20 Boston City Base Elev.(Ft.)*

Building Proximity to Water: *520 Ft.*

Is the site or building located in any of the following?

Coastal Zone: *[✓ Yes] / No*

Velocity Zone: *Yes / [✓ No]*

Flood Zone: *Yes / [✓ No]*

Area Prone to Flooding: *Yes / [✓ No]*

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs: *Yes / [✓ No]*

Future floodplain delineation updates: *Yes / [✓ No]*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

0 Ft.

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. ***Otherwise you have completed the questionnaire; thank you!***

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise: *3 Ft.*

Frequency of storms: *0.25 per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation: *20 Boston City Base Elev.(Ft.)*

First Floor Elevation: *20 Boston City Base Elev. (Ft.)*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

TBD

If Yes, to what elevation: *Boston City Base Elev. (Ft.)*

If Yes, describe: Will be determined in the future, if necessary.

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

☐ Systems located above 1st Floor.	☐ Water tight utility conduits	☑ Waste water back flow prevention	☑ Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / [✓ No]

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

[✓ Yes] / No		If yes, to what height above 100 Year Floodplain:	*TBD*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

Yes / [✓ No]

If Yes, describe:

Will the building remain occupiable without utility power during an extended period of inundation:

Yes / [✓ No]		If Yes, for how long:	*days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	*Yes / [✓ No]*	☐ Hardened / Resilient Ground Floor Construction	☐ Temporary shutters and or barricades	☐ Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	*Yes / [✓ No]*	☐ Surrounding site elevation can be raised	☐ Building ground floor can be raised	☐ Construction been engineered
Describe additional strategies:				

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:	*No*	☐ Solar PV	☐ Solar Thermal	☐ Clean Energy / CHP System(s)
		☐ Potable water storage	☐ Wastewater storage	☐ Back up energy systems & fuel
Describe any specific or additional strategies:				

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Appendix F

Preliminary Energy Model

VANDERWEIL

R.G. Vanderweil Engineers, LLP
vanderweil.com

274 Summer Street
Boston, MA 02210

617.423.7423 TEL
617.423.7401 FAX

01/22/2016

Essex St. Hotel

Schematic Design – Energy Model Report

Summary

The following memo includes energy performance results for the Essex St. Hotel, a 133,000 ft^2 hotel building located in Boston MA. The proposed design was compared against an ASHRAE 90.1-2013 baseline. The purpose of the analysis was to assess system design and what potential energy conservation measures and system alterations may be warranted as the design proceeds.

Design Model

The proposed design is served by water-loop heat pump units, with outside air provided by an energy recovery unit. Terminal heat pump units operate with a cooling efficiency of 13 EER, heating efficiency of 4.3 COP. The ERU operates with a cooling efficiency of 11.5 EER. ERU heating is provided by a gas-fired furnace, 80% efficient. The condenser loop is served by a single open-circuit cooling tower and two identically sized hot water boilers operating at 95% efficiency. Domestic hot water is served by a single water heater operating at 95% efficiency.

Additional design assumptions include:

- Increased glazing on the design model (43% window-wall ratio).
- Lighting was held consistent between design and baseline (0.87 W/sf).

Baseline Model

The primary system in the baseline model is modeled as a System 1, Packaged Terminal Air Conditioner. The system utilizes constant volume fans, DX coils and hot water heat. All systems were modeled to comply with ASHRAE 90.1-2013 Appendix G. Cooling efficiencies for PTAC units were set at 9.5 EER. Two hot water boilers provide hot water to the PTAC systems, modeled 80% efficient. All remaining parameters including controls and pumps have been modeled according to ASHRAE 90.1-2013 Appendix G.

Window-wall ratio on the baseline model was modeled at 34% per ASHRAE 90.1-2013.

	Proposed Design WSHPs w/ OA provided by ERUs				**Baseline** PTACs				
End Use	**Electricity**	**NAT GAS**	**Total Energy**	**% of Total**	**Electricity**	**NAT GAS**	**Total Energy**	**% of Total**	**Energy Savings (%)**
	(kWh)	(therms)	(kBTU)		(kWh)	(therms)	(kBTU)		
Lights	290,351		990,678	18%	290,351		990,678	13%	0%
Misc. Equipment	205,719		701,913	13%	205,719		701,913	9%	0%
Space Heating	76,981	8,940	1,156,659	21%		33,336	3,333,625	44%	65%
Space Cooling	158,054		539,280	10%	174,022		593,761	8%	9%
Heat Rejection	547		1,866	0%				0%	
Pumps & Aux	37,249	139	140,994	3%	7,874		26,867	0%	-425%
Ventilation & Fans	266,149		908,100	17%	199,222		679,745	9%	-34%
Domestic Hot Water		10,276	1,027,600	19%		12,234	1,223,400	16%	16%
Total Energy by Type	1,035,050	19,355	5,467,091	100%	877,188	45,570	7,549,989	100%	
Site Energy (kBTU)	3,531,591	1,935,500	5,467,091		2,992,964	4,557,025	7,549,989		**Site Energy Savings**
Site EUI (kBTU/SF)			**41**				**57**		**27.59%**

Building Area	133,000 ft²

Percent Process Energy: **9%**

ENERGY MODEL INPUT TABLES

GENERAL INFORMATION	
Weather Station	Boston, MA
Climate Zone	5A

INPUT PARAMETER	BASELINE	PROPOSED DESIGN	PROPOSED INPUT SOURCE
OCCUPANCY	Hotel guest rooms: 250 sf/pp	Same as Baseline	Design assumption.
EQUIPMENT POWER DENSITY	Hotel: 1.0 W/sf	Same as Baseline	Design assumption.
	Conference/Meeting: 1.5 W.sf		
	MEP: 0.1 W/sf		
LIGHTING POWER DENSITY	Whole Building Method: 0.87 W/sf	Same as Baseline	ASHRAE 90.1-2013 Appendix G

SUMMARY OF AIR-SIDE SYSTEMS

INPUT PARAMETER	BASELINE	PROPOSED DESIGN	PROPOSED INPUT SOURCE
HVAC SYSTEM - PRIMARY	System 1 - PTACs	Water source heat pumps served by DOAS.	ASHRAE 90.1 2013 App G, design assumptions
COOLING EFFICIENCY	EER 9.5	13 EER	ASHRAE 90.1-2013 Appendix G
HEATING EFFICIENCY	NA	4.3 COP	ASHRAE 90.1-2013 Appendix G
FAN CONTROL	Constant speed	Constant speed	ASHRAE 90.1-2013 Appendix G
MINIMUM FLOW	Autosized	Same as Baseline	ASHRAE 90.1-2013 Appendix G
VENTILATION	93,600 cfm	107,000 cfm	Autosized.
AIR-SIDE ECONOMIZER	Not Required	NA	ASHRAE 90.1-2013 Appendix G
ECONOMIZER HIGH-LIMIT SHUTOFF	Not Required	NA	ASHRAE 90.1-2013 Appendix G
OUTDOOR AIR-FLOW RATES	13,500 cfm	Same as Baseline	ASHRAE 90.1-2013 Appendix G

ENERGY RECOVERY (TYPE AND EFFECTIVENESS)	Not required.	Enthalpy wheel contained in dedicated OA unit (74/76 sensible/latent effectiveness)	ASHRAE 90.1-2013 Appendix G, design assumption.

SUMMARY OF WATER-SIDE SYSTEMS

INPUT PARAMETER	BASELINE	PROPOSED DESIGN	PROPOSED INPUT SOURCE
PLANT TYPE	NA	1 open-circuit cooling tower	Design assumption.
WATER LOOP HP CHW TEMP (°F)	NA	85°F	Design assumption.
WLHP HW TEMP (°F)	NA	70°F	Design assumption.
WL LOOP DELTA T	NA	10°F	Design assumption.
WL PUMP SPEED CONTROL	NA	Variable speed	Design assumption.
WL PUMP POWER (W/gpm)	NA	15 W/gpm	Design assumption.
TYPE OF BOILERS	Gas fired HW boilers, 80% efficient	Condensing HW boilers, 95% efficient	ASHRAE 90.1-2013 Appendix G
NUMBER AND CAPACITY OF BOILERS	(2) Equally sized	Same as Baseline	ASHRAE 90.1-2013 Appendix G
HOT WATER OR STEAM (HHW) SUPPLY TEMP (°F)	180 °F	NA	ASHRAE 90.1-2013 Appendix G
HHW OR STEAM LOOP DELTA T	50 °F	NA	ASHRAE 90.1-2013 Appendix G

HHW LOOP TEMP RESET	180°F at 20°F and below, 150°F at 50°F and above, ramped linearly between 180°F and 150°F at temperatures between 20°F and 50°F.	NA	ASHRAE 90.1-2013 Appendix G
PRIMARY HHW PUMP SPEED CONTROL	Single speed	Variable speed	ASHRAE 90.1-2013 Appendix G, design assumption.
PRIMARY HHW PUMP POWER	19 W/gpm	NA	ASHRAE 90.1-2013 Appendix G

SUMMARY OF CONSTRUCTION MATERIALS

INPUT PARAMETER	BASELINE	PROPOSED DESIGN	PROPOSED INPUT SOURCE
ROOF CONSTRUCTION	Insulation entirely above deck	Same as Baseline	ASHRAE 90.1-2013 Appendix G
U-value	U.0.032 / R-30 c.i.	Same as Baseline	ASHRAE 90.1-2013 Appendix G
WALL CONSTRUCTION	Steel-framed	Same as Baseline	ASHRAE 90.1-2013 Appendix G
U-value	U-0.055	Same as Baseline	ASHRAE 90.1-2013 Appendix G
GLAZING DESCRIPTION (ASSEMBLY)	Metal Framing	Same as Baseline	ASHRAE 90.1-2013 Appendix G
U-value	U-0.42	Same as Baseline	ASHRAE 90.1-2013 Appendix G
SHGC	0.4	Same as Baseline	ASHRAE 90.1-2013 Appendix G
VLT	0.4	Same as Baseline	ASHRAE 90.1-2013 Appendix G
WINDOW-TO-WALL RATIO	34%	43%	ASHRAE 90.1-2013 Appendix G

Appendix G

Accessibility Checklist

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

In 2009, a nine-member Advisory Board was appointed to the Commission for Persons with Disabilities in an effort to reduce architectural, procedural, attitudinal, and communication barriers affecting persons with disabilities in the City of Boston. These efforts were instituted to work toward creating universal access in the built environment.

In line with these priorities, the Accessibility Checklist aims to support the inclusion of people with disabilities. In order to complete the Checklist, you must provide specific detail, including descriptions, diagrams and data, of the universal access elements that will ensure all individuals have an equal experience that includes full participation in the built environment throughout the proposed buildings and open space.

In conformance with this directive, all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding the following:

- improvements for pedestrian and vehicular circulation and access;
- encourage new buildings and public spaces to be designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets;
- ensure that persons with disabilities have full access to buildings open to the public;
- afford such persons the educational, employment, and recreational opportunities available to all citizens; and
- preserve and increase the supply of living space accessible to persons with disabilities.

We would like to thank you in advance for your time and effort in advancing best practices and progressive approaches to expand accessibility throughout Boston's built environment.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
    a. http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
    a. http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Boston Complete Street Guidelines
    a. http://bostoncompletestreets.org/
4. City of Boston Mayors Commission for Persons with Disabilities Advisory Board
    a. http://www.cityofboston.gov/Disability
5. City of Boston – Public Works Sidewalk Reconstruction Policy
    a. http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
6. Massachusetts Office On Disability Accessible Parking Requirements
    a. www.mass.gov/anf/docs/mod/hp-parking-regulations-mod.doc
7. MBTA Fixed Route Accessible Transit Stations
    a. http://www.mbta.com/about_the_mbta/accessibility/

Article 80 | ACCESSIBILTY CHECKLIST

Project Information

Project Name:	Proposed Hotel – Essex Street
Project Address Primary:	73-79 Essex Street
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Group One Partners Inc. – Architect 21 West Third Street, Boston, MA 02127 617-268-7000

Team Description

Owner / Developer:	ESXMA 72GL Owner, LLC.
Architect:	Group One Partners Inc.
Engineer (building systems):	Vanderweil Engineers, LLP
Sustainability / LEED:	Epsilon Associates, Inc.
Permitting:	Epsilon Associates, Inc.
Construction Management:	

Project Permitting and Phase

At what phase is the project – at time of this questionnaire?

PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BRA Board Approved
BRA Design Approved	Under Construction	Construction just completed:

Article 80 | ACCESSIBILTY CHECKLIST

Building Classification and Description

What are the principal Building Uses - select all appropriate uses?

Residential – One to Three Unit	Residential - Multi-unit, Four +	Institutional	Education
Commercial	Office	Retail	Assembly
Laboratory / Medical	Manufacturing / Industrial	Mercantile	Storage, Utility and Other

First Floor Uses (List)	**Hotel Lobby and Mechanical**

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	Steel Frame	**Concrete**

Describe the building?

Site Area:	*8,095SF*	Building Area:	*137,000 SF*
Building Height:	*181 Ft.*	Number of Stories:	*17Flrs.*
First Floor Elevation:	*20 Elev.*	Are there below grade spaces:	*Yes*

Assessment of Existing Infrastructure for Accessibility:

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

Provide a description of the development neighborhood and identifying characteristics.	**The proposed Project is located in the Chinatown neighborhood of Downtown Boston. The site is bound by Essex Street to the north, Oxford Street to the west, and Ping on Street to the east. The surrounding area includes high-rise commercial and residential buildings and structured parking garages.**
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	**The bus stop on Essex Street at Kingston Street services the #7 and #11 buses, the bus stop on Washington Street and Essex Street services the #11, #15, SL4 and SL5 buses, and the bus stop on Bedford Street at Chauncy Street services the #7, #11, and #276 buses. The closest accessible T station is Chinatown on the Orange Line. South Station is less than a half mile from the site.**

List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	The SAMFund for Young Adult Survivors of Cancer, Tufts Medical Center, Sackler School of Graduate Biomedical Sciences, Friedman School of Nutrition Science and Policy, ASC English, TALK International, Boston, Center for Collaborative Education, Boston Academy of English, Hickox School, Emerson College, Child Care Choices of Boston, Spruce Street Nursery School, VSA Massachusetts, Language Studies International-LSI Boston
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	Disability Determination Services, Boston Housing Authority, Department of Transitional Assistance, Public Welfare Department Budget Division, Millennium Place, Metropolitan Boston Housing Partnership, Lafayette City Center, Reggie Wong Memorial Park, Leather District Park, Credo Reference Library, Chinatown Park, Mary Soo Hoo Park, Lincoln Street Green, South End Baseball, Oxford Place Playground, Wah-Lum Kung-Fu Athletic Association, Boston Ballet, Community Opportunities Group, Boston ElderINFO

Surrounding Site Conditions – Existing:

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

Are there sidewalks and pedestrian ramps existing at the development site?	Yes.
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	Essex Street – A compliant concrete sidewalk and accessible ramp Oxford Street – a non-compliant bituminous concrete sidewalk.
Are the sidewalks and pedestrian ramps existing-to-remain? If yes, have the sidewalks and pedestrian ramps been verified as compliant? If yes, please provide surveyors report.	The intent is to maintain the compliant sidewalks and ramps. The non-compliant sidewalk will be reconstructed and compliant. Any disturbed sidewalks will be reconstructed/repair in compliance.
Is the development site within a historic district? If yes, please identify.	The Textile National Register District.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of 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. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	Yes, to the fullest extent possible with the consideration of existing right-of-way and infrastructure limitations.
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Industrial: Requirements: Frontage Zone: N/A, Pedestrian Zone: 5'0", Furnishing Zone 5'0"
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	Essex Street: 8.0 feet. Pedestrian Zone: 5.0, Furnishing Zone 3.0' Oxford Street –4.5 feet Pedestrian Zone: 0', Furnishing Zone 0.0'.
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?	Pedestrian Zone: Poured Concrete Furnishing Zone: Poured Concrete or Pervious Paver (TBD)
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	Not anticipated
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	No
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	N/A

Proposed 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 Handicap Parking Regulations.

What is the total number of parking spaces provided at the development site parking lot or garage?	0
What is the total number of accessible spaces provided at the development site?	0
Will any on street accessible parking spaces be required? If yes, has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	No
Where is accessible visitor parking located?	N/A
Has a drop-off area been identified? If yes, will it be accessible?	Yes and it will be accessible
Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.	ATTACHED

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

**Visit-ability – Neighbors ability to access and visit with neighbors without architectural barrier limitations*

Provide a diagram of the accessible route connections through the site.	N/A
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	The entryway will be a flush condition with motion operated slider doors on each side of the vestibule.
Are the accessible entrance and the standard entrance integrated?	Yes
If no above, what is the reason?	N/A
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	No
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	No

Accessible Units: (If applicable)

In order to facilitate access to housing opportunities this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing choice.

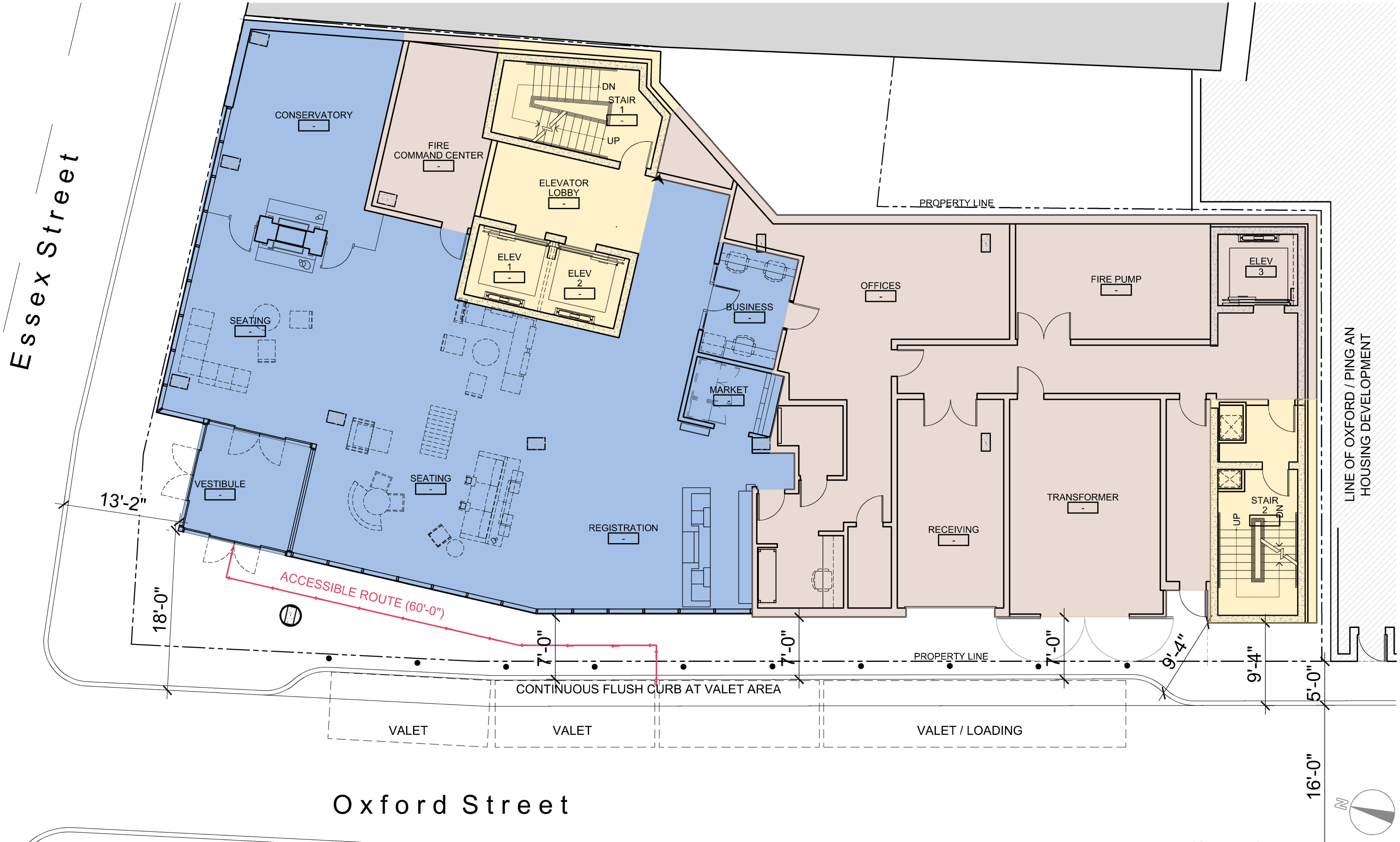
What is the total number of proposed units for the development?	N/A
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	N/A
How many accessible units are being proposed?	N/A

Please provide plan and diagram of the accessible units.	N/A
How many accessible units will also be affordable? If none, please describe reason.	N/A
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. If yes, please provide reason.	N/A
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	N/A
Did the Advisory Board vote to support this project? If no, what recommendations did the Advisory Board give to make this project more accessible?	N/A

Thank you for completing the Accessibility Checklist!

For questions or comments about this checklist or accessibility practices, please contact:

kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities



Date

SCALE: N.T.S.

Proposed Hotel
73 – 79 Essex Street
Boston, MA

ACCESSIBLE ROUTE GRAPHIC

Group One
PARTNERS
21 W 3rd St, Boston, MA 02127